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

# 2021 AGEP Student Success Conference
# Student CrossTalk & Poster Abstracts

Michigan State University

November 6, 2021

CrossTalks: 36 Student Oral Presentations
8:15 AM - 10:30AM
Hopin Platform

Poster Session: 26 Student Poster Presentations
1:20PM - 2:30PM
Hopin Platform

MICHIGAN STATE UNIVERSITY

GRADUATE SCHOOL

# Student Oral Presentation Abstracts
# Zoom Room 1 Facilitator: Dr. Mahlet Garedew

**Zoom Link:** https://bit.ly/3GyPbyz

**Ashley Bolds**
University of Minnesota Medical School

*Role of Chemogenetic Modulation of Nucleus Accumbens Parvalbumin Interneurons on Mouse Opioid Reward Behavior*

Opioid addiction, an extensive public health crisis, is characterized by compulsive drug-seeking behavior and pervasive vulnerability to relapse. Therapeutic options targeting the nucleus accumbens (NAc) circuitry, a central mediator in reward behavior, remain limited. Parvalbumin (PV+) interneurons (PVs) within the NAc have fast-spiking properties and are sparse, yet powerful inhibitors of local projection neurons. Previous studies have identified a role of PVs in motivation and reward in non-opioid drugs of abuse, thus we sought to test whether PVs could modulate opioid reward. We hypothesized that fentanyl reward seeking behavior in mice would be blunted when PV+ interneurons in the NAc were inhibited, as inhibition of PVs have previously been found to induce conditioned place aversion. This study utilized inhibitory DREADDS (hM4Di) as chemogenetic tools to modulate NAc PV+ interneurons during fentanyl conditioned place preference (CPP). Male and female Pvalb-Cre mice were anesthetized and underwent stereotaxic surgery for the Cre-dependent viral DREADD or the control cre-dependent mCherry to be expressed in the NAc shell. To observe opioid reward behavior, Clozapine-N-Oxide (CNO) was administered prior to fentanyl conditioning sessions to activate the DREADDS and inhibit PV+ interneurons. We have collected preliminary data in 4 cohorts of mice (n=19) and failed to reject our null hypothesis, suggesting no statistical significance that chemogenetic inhibition of PV+ interneurons blunts fentanyl CPP. NAc PV+ interneurons may have the potential to be a therapeutic target in the treatment of opioid addiction. Future experimental designs could utilize excitatory, rather than inhibitory DREADDS to observe whether fentanyl reward seeking behavior in mice would be blunted when PV+ interneurons in the NAc are excited.
**Keywords: Neuroscience, Addiction, Opioids, Fentanyl, Mouse, Mice, Nucleus Accumbens, Neuroscience Addiction, DREADDS, Opioid Addiction, Drug Seeking Behavior, Drugs**
**Social Impact: Mental Health**

**Daniela Rodriguez-Chavez**
Cornell University

*Understanding Sea Surface Height Variability at 10km Scales*

In 2022, NASA will launch the Surface Water and Ocean Topography (SWOT) mission, which will send a satellite to collect data on sea surface height and ocean topography. This will advance our understanding of ocean dynamics, illuminating questions in the studies of ocean ecosystems, ocean circulation, and oceanic-atmospheric gas exchange, to name a few. However, even though the data will have a good spatial resolution, it will lack a strong temporal resolution due to the nature of the satellite's orbit; this limits our ability to distinguish between slow geostrophic eddies and fast wave motion. Thus, in 2019 a pre-launch campaign was carried out for 4.6 months to provide a foundation of robust time statistics for the future SWOT mission data. The in-situ campaign included the deployment of two moorings, placed 10 kilometers apart off the coast of California, where sea surface height (SSH) was measured every second. Using these in-situ data, we tested whether previous predictions for 10km SSH signal are consistent with the observations. We calculate a prediction based on a model from recent work for the observable frequency power spectrum of both moorings as well as the difference across the moorings and find that these predictions are generally reflected in the data. Finally, we discuss the implications of these results as they relate to the upcoming SWOT mission.
**Keywords: oceanography; eddies; NASA SWOT Mission**
**Social Impact: Workforce Development**

**Isaiah Hunter**
University of Illinois at Urbana-Champaign

*Creating a Database for Magnetic Point Groups*

A tensor is an algebraic object that maps between two physical quantities by constitutive relation. When tensors are sorted out with symmetry, they serve as a way to simplify calculations that would be more complex without. Magnetic space groups are the symmetry groups that classify the symmetries of a crystal's space and spin properties. Information on these space groups can be found on the Bilbao Crystallographic Server, which is an online database that gives access to information on crystallographic symmetry groups. Along with information on magnetic space groups, the Bilbao Crystallographic Server contains each tensor that is used in mathematical calculations. In this study, a new tool was developed that will display the tables of the Magneto-optical tensor (Faraday's effect) with their associated magnetic space group, which can be used to simplify calculations and analysis of a material. It was developed by parsing the html contents of the Bilbao Crystallographic Server and converting the data tables of Faraday's tensor and its given magnetic space group into a data frame, which was ultimately stored as an array.
**Keywords: Crystal Magnetic Point Groups**
**Social Impact: Workforce Development**

**Lauren McDermott**
Michigan State University

*Multi-wavelength observations of low-mass nuclear black holes*

Significant evidence of two types of black holes exist: stellar-mass black holes which have masses of approximately ten times our suns mass and supermassive black holes, most with masses greater than a million times that of our sun. Bridging the gap between these two types are the elusive intermediate-mass black holes (IMBHs) and mounting evidence suggests they can be found in the center of nearby dwarf galaxies. I'm investigating the X-ray and radio emissions from the nucleus of a nearby low-mass galaxy, NGC 5102, to determine the luminosity of its central IMBH in both X-ray and radio. Findings from analyzing the multi-wavelength observations revealed the central black hole adjacent to another highly luminous source. The X-ray observations revealed two independent sources however, the radio observations detected a single dim extended source positioned across both. Currently, the X-ray luminosity of the central black hole is well-constrained and I'm working to constrain the radio luminosity by analyzing lower resolution observations that are more sensitive to a dim source like mine. By doing so, we'll be able to probe the physical process going on around the black hole and gain insight on the formation and evolution of nuclear black holes.
**Keywords: Nuclear black holes, X-ray, radio, AGN**
**Social Impact: Workforce Development**

**Lillian Walker**
Siena Heights University

*The Female Athlete Triad: A Survey of Menstrual Function in Collegiate Female Athletes*

Under atypical circumstances, physical activity can be a threat to females. In 2007, the American College of Sports Medicine (ACSM) released a Position Stand that presented the Female Athlete Triad as "three interrelated spectrums" composing of energy availability (EA), menstrual function, and bone mineral density (BMD). In addition, research has discovered that the Triad can be more prevalent and more severe in lean sports, like gymnastics, ballet, and cross country, than in non-lean sports. The three components, alone or in combination, are a threat to a female's health and athletic performance. Research has also concluded that the components can lead to a host of further health consequences, such as, more frequent stress fractures, musculoskeletal injuries, and mental health disorders. However, there are large gaps in the research on this topic when it comes to prevalence, awareness, screening, and diagnosis. This research will center its attention around prevalence. The aims of this research will be to explore the menstrual function component of the Triad, with the specific goals of determining the differences with the experience of menstrual dysfunction (MD) in collegiate female athletes versus non-collegiate female athletes, and how lean and non-lean sports compare in the rates of collegiate female athletes who have experienced or are experiencing menstrual dysfunction. An online survey will be administered to participants at two small, southeastern Michigan universities, collecting

quantitative data. Survey questions will mostly focus on the participants menstrual function/dysfunction, with a smaller portion inquiring about height, weight, age, sport type, activity levels, history of fractures (bone health), and eating/diet patterns.
**Keywords: The female athlete triad, exercise science, athletic amenorrhea, menstrual dysfunction**
**Social Impact: Workforce Development**

**Lisadine Cherubin**
University of Rochester

*The Relationship Between Internalized Racism, Coping Mechanisms, and Health-Related Outcomes: A Systematic Review of the Literature*

In this study, I am investigating the connections between internalized racism with physical and mental health in the United States. As a working definition, I am defining internalized racism as the acceptance of negative stereotypes, behaviors, and attitudes of one's specific race to be true. When looking at Monroe County residents in Rochester for example, Common Ground Health found that African American residents were 57% more likely to report having poor or fair mental health in comparison to the white residents in that area. There were greater signs of depression and anxiety from experiencing discrimination and dealing with implicit bias. Seeing that people of color experience internalized racism at a higher rate, my aim was to have a deeper understanding of the impacts this has on health disparities they may face within the health system. The guiding question that paved my research was: How does internalized racism impact health and how do coping mechanisms improve physical and mental health outcomes? Using this question, I was able to explain the significance of the research- which included establishing racism as a Social Determinant of Health, and utilizing this research to understand health disparities first before addressing them. Included in my research are two frameworks: the Gardener's Framework and the Minority Stress Theoretical Framework, each conceptualizing racism and portraying the impacts internalized racism has on the physical and mental health of both children and adults. This research has created a great segue for future research on coping mechanisms and interventions when looking at the overall effect it has on health.
**Keywords: Racism and health, Internalized racism, Coping mechanisms, Coping behaviors**
**Social Impact: Mental Health**

**Megan Brayton**
Virginia State University

*Nuclear Science and Machine Learning: Basic Development and Integrations*

The objective of this project has been to provide an introduction to nuclear science while developing computer programming and machine learning skills. These skills will be utilized to explore methods for reconstructing and classifying neutron trajectories from measurements of their interactions in an array of plastic scintillator bars (Modular Neutron Array [MoNA]/Large multi-Institutional Scintillator Array[LISA]. This is important for analyzing neutron-unbound systems that decay by emitting multiple neutrons, and measuring their properties via invariant mass spectroscopy. These measurements provide crucial benchmarks for the development of theoretical models of fundamental properties of the atomic nucleus and its many applications. Progress towards developing a machine learning algorithm for classifying neutron hit patterns will be presented.
**Keywords: Nuclear science, machine learning, data analysis**
**Social Impact: Workforce Development**

**Morgan Cheatham**
University of Michigan

*How well do climate models simulate ecosystem processes?*

Carbon dioxide ($CO_2$) in the atmosphere is the primary cause of global warming. The amount of $CO_2$ in the atmosphere will depend both on the amount emitted through the combustion of fossil fuels as well as the amount exchanged at Earth's surface due to natural processes such as photosynthesis. Predictions from climate models are used when creating policy to fight climate change; however, models disagree on the amount of carbon exchanged between the land

and atmosphere, casting doubt on their climate predictions Daily and seasonal variations in atmospheric CO2 shed light on land-atmosphere carbon exchange and its sensitivity to environmental variables such as temperature and moisture that will be affected by climate change. In this study, we use measurements of atmospheric CO2 concentrations at 19 locations in the northern hemisphere from the Total Carbon Column Observing Network (TCCON) to estimate daily and seasonal carbon exchange, and use these metrics to evaluate climate models that couple atmospheric processes with land carbon processes. Our results show that the most recent generation of coupled climate models (CMIP6) perform better than the previous generation (CMIP5), but large model-to-model disagreements on land-atmosphere exchange still exist.

**Keywords: climate change, global warming, climate models**
**Social Impact: Environment**

**Rahul Jain**
Michigan State University

*X-rays from the Space*

X-ray bursts are some of the most energetic events in the universe. A single outburst can release such a massive amount of energy in the order of a few seconds which would take our sun one whole year to radiate an equivalent amount of energy. So it is very important to study the sources of these events and understand the processes that cause them. One of the sources of these events is accreting neutron stars. While our sun produces energy through thermonuclear fusion, the neutron stars can produce energy via pycnonuclear fusion, i.e. the density induced nuclear fusion. I will talk about how this process affects our models and their implications on the interpretation of astronomical observations.

**Keywords: Understanding sources of radiation from space**
**Social Impact: Workforce Development**

# Student Oral Presentation Abstracts
# Zoom Room 2 Facilitator: Dr. Julie Plasencia

**Zoom Link:** https://bit.ly/3pMGiLR

**Andrea Campbell**
Rutgers, The State University of New Jersey

*Neuron Survival after Traumatic Brain Injury: The role of Adenosine Kinase*

Traumatic brain injury (TBI) is a significant public health concern that remains a leading cause of death, disability, and socioeconomic burden because there exist little to no therapeutic treatment. After a traumatic brain injury, the brain attempts self-repair through TBI-induced neurogenesis. However, the new neurons' capacity for recovery is restricted by changes in the microenvironment, such as reactive astrogliosis, which affect neuronal survival and axonal regeneration. Adenosine kinase (ADK), the critical adenosine-metabolizing enzyme, has been studied in several brain disorders, including epilepsy, schizophrenia, and stroke. Data from recent lab study reported an association between ADK expression levels and TBI-induced neurogenesis and cell proliferation in adult mice. Due to this data, we hypothesized that ADK inhibition promotes neuronal survival and differentiation after TBI. To address the underlying mechanistic links between ADK and TBI- induced neurogenesis, we used an in vitro model of a scratch-induced injury and immunocytochemistry. Neuronal cells derived from the cortices of wild-type embryos were cultured on coverslips and a scratch injury was induced four days after plating. Subsequent to the injury, each coverslip was treated with either media, the ADK inhibitor ITU, or vehicle (DMSO). Six days after the injury, the cells were stained with various markers to indicate cell death (TUNEL), neuronal growth (BDNF), neuron differentiation (MAP-2) and neuron activation (ERK1/2). Results indicate that ITU promoted cell survival after TBI. In addition, there was an increase in axon growth after the treatment with ITU. However, we observed that ITU-treated cells had fewer dendrites with shorter dendrite lengths, indicating a more immature phenotype as compared to VEH-treated cells. In summary, these data suggest that inhibition of ADK may promote cell survival and growth in an in vitro model of TBI.
**Keywords: Traumatic Brain Injury, Adenosine kinase, Neurogenesis, Astrogliosis**
**Social Impact: Healthcare**

**Anthony Gutierrez**
California State University, Northridge

*A loss of cell curvature resulting from overexpression of a bacterial phospholipid synthase*

Bacterial cell morphology derives from cytoskeletal factors. For example, the intermediate-filament-like protein crescentin, which interacts with cytosine triphosphate synthase (CtpS), is responsible for Caulobacter crescentus' curved morphology. We discovered that overexpression of a phospholipid synthase causes crescentin to partially detach from the membrane, resulting in Caulobacter crescentus cells transitioning from a crescent to a rod shape. To determine if this resulted from having too much of the phospholipid or the enzyme, we overexpressed the wild type phospholipid synthase, or a catalytically inactive mutant, revealing that both mislocalized crescentin and induced a rod-shape morphology. This suggested that the cell shape change resulted from a protein-protein interaction. Miller assays using the Bacterial Adenylate Cyclase Two-Hybrid System were used to probe for protein-protein interactions with known cytoskeletal factors. Our results revealed that the phospholipid synthase interacts with CtpS as well as itself. To test if CtpS localization was perturbed in the rod-shaped cells, we used fluorescence microscopy to view the localization of fluorescently-tagged proteins. In contrast to wild-type cells where the phospholipid synthase uniformly distributes throughout the cell membrane and CtpS localizes mid-cell, these experiments revealed an enrichment of both the phospholipid synthase and CtpS at the cell pole in cells overexpressing the phospholipid synthase. In sum, our data support a model where the overexpression of a phospholipid synthase sequesters CtpS to the cell pole (and away from crescentin at mid-cell) leading to crescentin's partial detachment from the membrane, ultimately resulting in a rod-shaped morphology.
**Keywords: cytoskeleton, protein-protein interactions, Caulobacter**
**Social Impact: Healthcare**

**Brotherly Malique Jones**

Michigan State University, University of Vermont Larner College of Medicine

*Contraction and Desensitization to Histamine Require Cholesterol in Urinary Bladder Smooth Muscle*

**Background:** Histamine is a vasoactive inflammatory signaling molecule that increases hypersensitivity to other inflammatory mediators and causes pleiotropic effects in various organs depending on the receptor subtype activated. Although histamine is implicated in many urinary bladder pathologies, these investigations focus heavily on nerves instead of on urinary bladder smooth muscle (UBSM) contractility. Histamine-induced contractions rapidly desensitize in the trachea, gut, and urinary bladder, but it is unknown if this is due to encocytosis, ß-arrestin mediated receptor inhibition, or histamine metabolism. We hypothesized that histamine induced UBSM contractions rapidly desensitize via caveolae mediated endocytosis.
**Methods:** Isometric contractility with urothelium-intact UBSM strips from male C57BL/6 mice was performed in the presence or absence of the following drugs/chemical agents: the cholesterol depleting agent methyl-ß-cyclodextrin (MßCD; 10 mM), cholesterol (5.1 mM), the dynamin inhibitor dynasore (15 µM - 100 µM), and the ß-arrestin/ß2-adaptin interaction inhibitor barbadin (100 µM). We further determined if the UBSM response to histamine was due to metabolism using the histamine-n-methyltransferase (HNMT) inhibitor SKF-91488, HNMT knockout mice, and a histamine buffer exchange bioassay.
**Results:** MßCD inhibited histamine induced UBSM contractions, which were recovered by reintroducing cholesterol. However, contractions to histamine remained transient. Dynamin inhibition had no effect on histamine-induced contractions, nor did pharmacological inhibition or genetic ablation of HNMT. Also, buffer from strips already contracted and desensitized to histamine still contracted naïve UBSM strips, implying histamine was not metabolized.
Conclusion: These data suggest that histamine-induced contractions in UBSM depend on lipid rafts and/or caveolae to drive both contraction and desensitization. This desensitization is also not due to dynamin-mediated endocytosis or histamine metabolism. The transient UBSM contractile response may indicate that histamine's role pertaining to contractility is insignificant in the absence of a disease state or chronic exposure. However, future studies will examine potential genotypic changes that could occur to UBSM from prolong exposure to histamine. Supported by NIH K01DK103840 (NRT) and R01DK119615 (NRT).
**Keywords: Histamine, Urinary Bladder Dysfunction, Smooth Muscle, Inflammation**
**Social Impact: Healthcare**

**Darrius Sykes**

Virginia State University

*"A data library for multi-neutron events measured with MoNA/LISA In Collaboration with MSU/FRIB's INSIGHT Program, The MoNA Collaboration, and VSU"*

Nuclear science is on the verge of a new era of discovery with the advent of the Facility for Rare Isotope Beams (FRIB). This new accelerator will enable experimentalists to study exotic nuclei that were previously inaccessible. Neutron-unbound systems are a special type of exotic nucleus that immediately decays by emitting one or more neutrons. The MoNA Collaboration studies these systems using the invariant mass spectroscopy technique. Decays involving more than one neutron are challenging to analyze because care must be taken to identify events in which all emitted neutrons are detected. This research project explores new computational tools and techniques to address these challenges. We will present progress towards developing a library of labeled multi-hit events for use in training machine learning algorithms to classify neutron hit patterns measured with an array of plastic scintillators.
**Keywords: Nuclear Science, basic research, radiation detection**
**Social Impact: Workforce Development**

**Desmond Chambers**

The University of Arizona

*Major Depressive Disorder: Modern Antidepressant Alternatives*

Antidepressants are the typical treatment for major depression disorder (MDD) which is linked with decreased ability to control mood. Studies find that antidepressants relieve depression symptoms through pathways within resting-state brain networks. Other reports find that antidepressant pathways include inhibitory circuits within the dysfunctional

resting-state networks. However, pills do not work for patients who are treated for MDD. Antidepressants target underlying psychological processes, except that the clinical drugs unnecessarily affect the wrong bodily systems, causing issues. Pharmacological models of major depression are inconsistent, so treatments need improvements. We explored the resting-state network functional connectivity down to local biochemistry alterations after non-invasive brain stimulation (focused ultrasound) to address this issue. We captured seven volunteers' functional brain network alterations through MRI then contrasted the regulatory biochemistry in local circuits with MR Spectroscopy before and after ultrasound sonication. Functional imaging group analysis reveals decreased activation of the resting-state network, decreased glutamate, and no effective GABA feedback after sonication. We inferred that glutamate reduction corresponds to the decreased activation of the resting-state networks. Then, we reasoned from prior studies that GABA transmission increased after sonication because of a known inverse relationship between GABA and Glutamate. However, the MRS did not effectively measure GABA. We find that ultrasound to the posterior cortex altered the resting-state network functional connectivity and modulated the biochemistry of affected networks.

**Keywords: Focused Ultrasound, Default Mode Network, Major Depression**
**Social Impact: Mental Health**

**Junoria Worthy**
Harris-Stowe State University

*Exploration of the role of the thrifty gene in reproductive fitness and fecundity in African American women and children*

**Background:** The thrifty gene theory presents evidence in support of the hypothesis that a mixture of famines and seasonal food shortages during the time of slavery have exerted natural selection in favor of fat storage. The effects from these famines and food shortages have changed the genetic makeup of those who experienced it. Slaves, mainly African Americans, experienced these famines and food shortages often. In correlation with today you can see that African Americans have a higher rate of diabetes, hypertension, and obesity. These diseases have to do with excess fat and adipose tissue linked to the genetic shifts that the famines caused. The genetic makeup was altered and was passed down through generations causing the influx of African American individuals today who suffer from diabetes, hypertension, obesity, preterm birth or infertility. This research is important because it can lead to new discoveries in the genetic makeup of African American individuals providing new avenues for therapy and treatment of chronic diseases.

**Hypothesis/Objective:** The goal of this research is to quantify the significance of the thrifty gene theory on African American individuals who are descendants of enslaved peoples. My research question aims to focus on the exploration of the role of the thrifty gene in reproductive fitness and fecundity in African American women and children.

Study Design and Research Methods: Meta-analysis will be used in current published and preprints research projects to examine the extent of a relationship between the thrifty gene and African American individuals with low birth weight, preterm birth, diabetes, hypertension, or diseases related to excess adiposity.

**Results:** We predict we will find several genetic mutations common amongst the study population enriched in those individuals that have been diagnosed with diabetes, hypertension, low birth weight, or those who experienced high risk pregnancies, malnutrition, or preterm birth.

**Conclusions:** The findings of our study will contribute to advancements in understanding the role of trauma induced epigenetics in African American women's and pediatric health. The impact on the field of research by allowing us to see the differences in genetics related to race and the traumas that are experienced by individuals. Our studies may lay the groundwork for the use of new technologies and interventions to ameliorate factors contributing to the health disparities experienced by African American women and children. New approaches are needed to reduce, the prevalence of preterm birth, maternal mortality rate, diabetes, hypertension, or metabolic disorders in African Americans.

**Keywords: African American, women, transgenerational**
**Social Impact: Healthcare**

**Kayla Ford**
Michigan State University

*Concussion History and Knee Self-Efficacy in Patients after Anterior Cruciate Ligament Reconstruction*

**Objective:** Previous research has shown that patients with history of anterior cruciate ligament reconstruction (ACLR) demonstrate poor knee self-efficacy. Knee self-efficacy is believing in one's own abilities to complete tasks post-ACLR. Poor knee self-efficacy has been predictive of decreased physical activity (PA) in ACLR populations. The effect of sport-related concussions (SRC) on knee self-efficacy post-ACLR is unknown. SRC may lead to further decreases in knee self-efficacy and in PA.
**Purpose:** This study examined differences in knee self-efficacy between ACLR patients with and without a history of SRC. We hypothesized that the ACLR group with history of SRC would show decreased self-efficacy for PA than the ACLR group without history of SRC.
**Methods:** The analyses included 24 females and 16 males with ACLR (≥1-year postoperative). Participants were put into a no SRC group (n=29) or history of SRC group (n=11). The demographic questionnaire asked about concussion history. The knee self-efficacy scale (K-SES) reported perceived self-efficacy of knee function. We examined group differences with the Mann-Whitney U test.
**Results:** There were significant (p-value=0.03) differences between the two groups in the K-SES Physical Activity sub-scale. Those with a history of ACLR in the SRC group demonstrated worse knee self-efficacy for PA than the ACLR group with no history of SRC.
**Conclusion:** The results suggest that SRC history may negatively impact knee self-efficacy post-ACLR. Early assessment of knee self-efficacy after ACLR should occur in patients with a history of SRC. Implementing psychological interventions, such as mindfulness meditation, may help improve self-efficacy in ACLR patients."
**Keywords: ACLR, Knee Self-efficacy, Sports Related Concussion**
**Social Impact: Mental Health**

**Kevin De La Cruz**
The Ohio State University

*Targeting CD74 in Mantle Cell Lymphoma*

Mantle Cell Lymphoma (MCL) is an aggressive and incurable cancer affecting the lymphatic system. Recently, CD19 Chimeric Antigen Receptor (CAR) T-cell therapy demonstrated significant activity against MCL; however, most MCL patients eventually relapse highlighting the need for novel therapeutic approaches in this disease. CAR-T cells are autologous T cells engineered in the lab and given back to the patient to fight their lymphoma. CD74, a cell surface receptor for the macrophage migration inhibitory factor, is important for regulating B-cell proliferation and survival and a novel therapeutic target in MCL. We hypothesize that blocking CD74 degradation in the autophagosome will lead to enhanced CD74 surface making more antigen available for binding to CD74 CAR-T cells produced in our lab. To address this hypothesis we used 2 compounds: SPL-410, a SPPL2 inhibitor, and OSU-2S. a non-immunosuppressive fingolimod inhibitor with activity in preclinical models of MCL developed at OSU. By cell counting, to check the cell density and viability, and flow cytometry to assess antigen expression, I showed that SPL-410 failed to induce CD74 expression but treatment of MCL cell lines (Jeko and Mino) with OSU-2S resulted in significant enhanced CD74 expression. We plan to test the activity of OSU-2S in combination with CD74 CAR-T cells in normal immune cells as well as MCL cell lines, primary MCL samples, and murine MCL models developed in our lab.
**Keywords: Cancer Research, Safe Cancer Patients, Medical Advances, Medical Research**
**Social Impact: Healthcare**

**Sara Wallace**
Adrian College

*The Role of Anomalous Heat Waves in Northern U.S. Cities*

Increasing atmospheric carbon dioxide concentrations have been leading to substantial changes in the global climate. Much of this has appeared as increased temperatures, particularly in urban heat islands, including extended periods of anomalously high temperatures. While the environmental and natural disaster implications of climate change have been extensively explored, there also may be impacts on human behavior, notably in the form of increased aggression during

extended heat waves. This study explores how heat influences aggressive behavior that may subsequently lead to increased rates of murder and non-negligent manslaughter, violent crime, and aggravated assault. Through analyzing official crime and weather data, dating from 1995 to 2019 for twelve selected cities north of 40° latitude across the United States, with preliminary analyses that suggest a positive correlation between increased periods of high temperature and increased rates of violent crime and aggravated assault. Analyses like these highlight the many critical consequences of climate change and increase the urgency of action.

**Keywords: climate change, urban heat islands, violent crime**

**Social Impact: Environment**

# Student Oral Presentation Abstracts
# Zoom Room 3 Facilitator: Dr. Elizabeth Gil

**Zoom Link:** https://bit.ly/3jOOOG6

**Alexis Ramirez Ruiz**
California State Polytechnic University, Pomona

*The Reformation of Educational Policy in California: An Analysis of Executive Order 1110 and its Effects on Minority Students Inside the California State University System*

As the largest system of public higher education in the country, the California State University (CSU) system has for decades served as a testing ground for some of the most relevant developments in higher educational policy. Recent policy developments within the system however has led to a multitude of speculations surrounding its actual objectives. The purpose of this study is to examine the question of to what extent the implementation of Executive Order 1110 impacted the student success levels of Underrepresented Minorities (URM) within the CSU system. In order to approach this question, the different factors conforming to the concept of student success in higher education are first analyzed and defined. Following the establishment of this central concept, this study gains a more meticulous and precise understanding on the effects of this policy, by conducting a sample survey at one of the largest and most diverse campuses within the CSU system. Prima facie results from this data-based analyses indicate various effects on the levels of college success among URM students. Effects that, according to the same data, can potentially expand as more students from these specified groups continue to experience the effects of this policy.
**Keywords: Underrepresented Minorities, Student success, Executive order 1110**
**Social Impact: K-12 Education**

**Angelina Benli**
John Jay College of Criminal Justice

*Anti-Intellectualism, Educational Attainment, and American Citizens*

Over the last several years, Americans have become increasingly likely to identify with anti-intellectualism (i.e, the generalized mistrust of scientists and other experts). However, Americans are more educated than ever before, spending on average of 13.4 years in school. Utilizing cross-sectional General Social Survey (GSS) data along with public opinion data from the Roper Center for Public Opinion Research, I explore the long term trends of the relationship between educational attainment and anti-intellectual attitudes. Given the established partisan divide in anti-intellectual attitudes in the United States - with most Americans seeing science as relevant to policy, but their willingness to defer to science in policy matters varies considerably across issues - I use political party affiliation to examine the relationship between anti-intellectualism and educational attainment further. Anti-intellectualism stands as a critical challenge in maintaining and increasing public compliance and understanding with expert-guided consensus on a variety of issues. I find that trust in science and scientific agencies has become more polarized, individuals with higher levels of educational attainment are more likely to trust in science, and that Democrats have increased in their trust of science. The greater understanding of the relationship between educational attainment, partisanship, and anti-intellectual attitudes in the United States can help inform science communication with the general population.
**Keywords: anti-intellectualism, public trust, public opinion**
**Social Impact: Healthcare**

**Jada Daniel**
Beloit College

*Media Framing, Sentencing Policies, and Black Criminality*

African Americans and Hispanics constitute 32% of the U.S. population, yet they make up 56% of the nation's incarcerated population. My research seeks to identify and measure factors that contribute to these disparate outcomes in the criminal justice system for people of color. The primary focus of my project is on media framing and its impact on sentencing policies. I also highlight the ways that the print media's depictions of Black criminality shape changes in sentencing policy. Media Framing in the context of criminal justice is the reproduction of narratives and frameworks that

influence culture, indoctrinate the public with distorted configurations of crime and punishment, and alters realities to influence outcomes. To gauge the extent of media framing and how it propagates mass incarceration, sentencing disparities, and more punitive policies, I conducted an ethnographic content analysis of articles from the Chicago Tribune. I measured the degree to which media framing's influence on sentencing and criminal justice policy can be seen through patterns in how information is presented. My results suggest that the articles could be organized into six major frameworks. Each article was analyzed and coded using the following frames: Fear and Public Safety, Deterrence, Just Deserts Punishment (Eye for an Eye), Rehabilitation, Criminalization of the Poor, Black, and Brown, and Pathos Appeals. The findings of my analysis provide evidence that there is media framing of criminal justice policy and that its rhetoric, as well as the violent distortions it produces, lacks a focus on rehabilitation, transformative justice, treatment, and re-entry. I argue that the way criminal justice policy is framed by the media causes sentencing policies and the American carceral state to be more punitive towards marginalized people of color.

**Keywords: media framing, sentencing, criminal justice**
**Social Impact: Criminal Justice Reform**

**Jennifer Mojica Santana**
Michigan State University

*El Dolor de la Madre Patria: Embodying, Individual and Collective, Pain and Resistance in Puerto Rican Visual and Performance Art*

"In her book, Ricanness, Sandra Ruiz theorizes the (Puerto) Rican subject's body as one ""marked by a common ongoing endurance and death that infiltrates the center of the subject's call to life, whether on or off the island"" (2). For Ruiz, our bodies are a site of resistance against the ever-present oppression, and mark of death, imposed on us by colonialism and colonially which, as she contends, is a ""project in temporal looping whereby actions to redress the past lead us into the future and back again to something prior"" (3). Undeniably, our lack of sovereignty, continuously linked to death, comes from both Spanish and American colonialism, yet it also extends to the heteropatriarchal power of Puerto Rican government officials who, like our past and current colonizers, inflict various forms of violence, and trauma, on our bodies and beings. Using Ruiz's theorization as a point of departure, my aim in this paper is to analyze artist Melanie Michelle Rodríguez Rosado's body art and performance piece at La Calle de la Resistencia, during Puerto Rico's Verano del '19 protests. In my analysis of the female Puerto Rican body, painted as our monoestrellada up in flames, as an embodiment of the feminized (also abused and disrespected) Madre Patria, I propose that it is, thus, transformed into a site of endurance and resistance. Although marked, specifically in the context of last year's protests, by silencing, mockery, slut-shaming, and even death, the Puerto Rican female subject and her body still stand strong and determined in an attempt to rupture colonialism's vicious and oppressive cycle."

**Keywords: Performance; Art; Activism; Performance Art; Puerto Rico; Puerto Rican Studies**
**Social Impact: Social Equity**

**Luis Gaytan**
Cal Poly Pomona

*Transcending beyond HIV: From a death sentence to a metaphor of life in Marta Dillon's Vivir con virus (2016)*

"The experiences of women living with HIV (WLHIV) have historically been understudied in medicine and underrepresented in literature due to medical bias and a lack of access to literary resources. Subsequently, during the first decades of the pandemic (1980s-1990s), autobiographies written by WLHIV were scarce and hence the existing literature did not suffice to give a broad overview of what it was like to be a WLHIV. As a result, women did not have the opportunity to read, and learn from, their peers' life stories.

This research focuses on the literary analysis of Marta Dillon's Vivir con virus (2016), which is a collection of newspaper articles published in Argentina between 1995 and 2016. Therefore, it is one of the first autobiographies written in Spanish by an HIV-positive woman. I argue that Dillon is turning around the social perception of HIV, which, as Susan Sontag studied, was commonly used as a metaphor of death. Instead, Dillon captivates her audience by conceiving HIV as a metaphor of life, gratitude, and self-appraisal."

**Keywords: Latin America, HIV, Literature**
**Social Impact: Mental Health**

**Maddison Vansaw**
Siena Heights University

*Athletes Versus Non-Athletes Perceptions of Sexual Violence on College Campus*

Sexual violence is an ongoing issue that often happens on college campuses. It is important for college students, both athletes and non-athletes, to be aware of sexual violence and the perceptions associated with sexual violence to bring awareness to this issue, in order to decrease instances. Sexual violence is any sexual act, unwanted sexual comments against a person regardless of the relationship between the perpetrator and victim. This study evaluated if there are differing perceptions between athletes and non-athletes as it pertains to sexual violence on college campus. Participants received a quantitative survey and responded to questions to determine their perception of sexual violence, university responses to sexual violence, and consideration for drug and alcohol use as it relates to instances of sexual violence. Participants were college age students, both athletes and non-athletes. This study was analyzed both with a two-sample t-test and by individual responses. Results showed that there was statistical significance to some of the questions asked.
**Keywords: Sexual Violence, Athletes, Non-Athletes, Perpetrator, Victim, and Sexual Assault**
**Social Impact: Criminal Justice Reform**

**Mercedes Ross**
University of California, Davis

*The Predictive Validity of GRE Scores for Communication Doctoral Students*

GRE scores are used to predict how well students will do in graduate school. The strongest evidence to support the validity of the GRE as a predictor of graduate success is the students' first year of graduate school and after that the evidence is unclear. Minority applicants tend to score lower on the exam than white and Asian applicants. This disparity in scores means that minority applicants are systematically disadvantaged in graduate school acceptance. A number of factors make it difficult for minorities to take the GRE exam and the current online format is another hurdle. The aim of our study is to determine if the GRE is a useful tool for predicting graduate school success for Communication students. We will be collecting data on undergraduate GPA, GRE scores, graduation rate, race, age and gender from all the programs on the National Communication Association Guide that grant PhDs in Communication within the United States. Once the data are gathered, we will assess, whether or not, the GRE scores really do predict graduate school success in Communication PhD programs. If the GRE scores prove to be valid predictors of success, then graduate schools should continue to use them. If the GRE is not a good predictor then graduate schools may be more supportive of minorities by adopting more holistic forms of application review.
**Keywords: GRE, Graduate Record Exam, Predictive Validity, PhD, Doctoral**
**Social Impact: Higher Education**

**Na'I'Cesses McKether**
Adrian College

*Legal accountability in the Flint Water Crisis*

Environmental rights have been ignored and regarded as a subset of civil rights; infringement on civil rights is easier to prove than environmental rights. Environmental rights include, but not limited to, clean water, fair and equal opportunities for housing, adequate food, and access to these resources. Policies fail to explicitly address environmental protections, allowing government officials and employees to evade enforcing regulatory codes that could prevent environmental injustices. This research will assess legal accountability in the Flint Water Crisis. The case analysis method will be used to assemble quantitative data that will count for: when the case was filed and when the judgement was given, total number of defendants and their charges, whether qualified immunity was sought, and United States laws and policies mentioned. Little research has been done to track legal accountability in environmental justice. Although this topic is relevant, scholars and civilians focus on race and class as the main reason for Flint's water quality. The results will add to the literature of environmental racism and environmental injustices.
**Keywords: environmental justice, environmental racism, Flint Water Crisis**
**Social Impact: Social Equity**

**Oacia Fair**
McGill University

*Assessing Local Produce Produce to Strengthen to Improve School Feeding Value Chains in the Eastern Caribbean*

The rising prevalence of childhood overweight and obesity within the Caribbean is a major public health and policy concern because obese children are at risk of developing non-communicable diseases (NCDs) later in life. Throughout the Caribbean Community (CARICOM), children are consuming unhealthy diets, characterized by energy-dense, processed and ultra-processed foods, sugar sweetened beverages, and limited quantities of fruits and vegetables. Community-based school meal programmes (SMPs) have been identified as useful vehicles to address unhealthy eating among children, and "farm to school" approaches have the potential to increase availability of locally grown nutritious produce, while supporting local agriculture and reducing reliance on food imports. This paper seeks to better understand the barriers to enhancing community-based school feeding value-chains in the CARICOM, by focusing on the Eastern Caribbean Island of Nevis where there is an interest in developing farm-to-school value chains. Results of the study into mechanisms for procuring locally grown produce reveal a systemic lack of reciprocal communication between farmers and SMP administration, as well as an absence of contractual agreement between local farmers and the SMP administration. As a result, SMP administrators resorted to procuring most food items from local supermarkets, and these food items comprised mainly imported foods. Using social network analyses, we found limitations in group organization among farmers, and between SMP administrators and farmers. The results suggest the need for improved SMP governance to support and sustain local food value chains that can deliver nutritious school meals for children.
**Keywords: Child nutrition; Food imports; School meals; Value chains; Local food systems; Produce procurement environmental justice, environmental racism, Flint Water Crisis**
**Social Impact: Healthcare**

# Student Oral Presentation Abstracts
# Zoom Room 4 Facilitator: Dr. Karl Alcover
**Zoom Link: https://bit.ly/3nCBZjw**

**Gloria Ashaolu**
Michigan State University

*"Meaningful Objectives" and "Simple Devices:" The Child's Story of The Negro and Black Educational Heritage*

The educational curricula and well-received textbook of Jane Dabney Shackelford (1895-1979), a Black female teacher from Terre Haute, Indiana, operationalized the educational ideologies and praxis of Carter G. Woodson, "the father of Black History." Shackelford's The Child's Story of the Negro (1938) also offers us a window into the significant ways in which local schoolteachers cultivated intentional educational and intellectual practices that challenged anti-Black systems of knowledge prevalent in the American education system during the Jim Crow era of segregation. Given the prominence of this textbook, it is a useful analytical resource in contextualizing the importance and practical application of the corrective history Shackelford constructed for her readers. The "historical reimagining" that preceded both Shackelford's book and Woodson's Association for the Study of Negro Life and History, places this educational project in a long tradition of ideological and material interventions that challenged the hegemonic epistemology and production of public knowledge surrounding Black history. The publication of The Child's Story of the Negro also coincided with the increased "epistemic" focus on Black youth empowerment in the 1930s and Woodson's educational curriculum. This textbook also allows us to better understand the underlying curricula interventions and narratives employed by teachers and students as they engaged with the "materiality" of the knowledge system in textbooks. It is an insightful purview into the historical context and the environment that informed Shackelford's methods and strategies of organizing within her community and classrooms as she educated and uplifted Black children and families.
**Keywords: Black Women's History; Black Intellectual History; Black Historical Enterprise; History of Black Education**
**Social Impact: Higher Education**

**Hima Rawal**
Michigan State University

*Creating and Cultivating a Culture of Care in Asynchronous Teaching and Learning*

"When the pandemic hit the world in Spring 2020, students, especially undergraduate students, faced substantial stress and challenges when transitioning to remote learning and instruction. As instructors focused on building skills to effectively deliver content virtually, students felt isolated and were deprived of human interactions. The College of Arts and Letters had already recognized the importance of a culture of care by creating a task force in the fall of 2018 and in their report in the spring 2019, culture of care was defined as "active community empathy that leads with intention and kindness". To adopt this culture of care ethics in our teaching and learning was easily followed as a natural consequence. Although pedagogy of care and Nodding's (1984) ideas of receptiveness and responsiveness have been keys to our professional development and teaching, the unexpected situation and challenges caused by the pandemic called for immediate actions with elevated levels of intentionality in teaching with care as a practice (Bubeck, 2002). To respond to this call, we created a nurturing community of graduate teaching assistants to share evidence-based best practices of teaching which, in turn, translated into their undergraduate teaching with care. One way to create and cultivate a culture of care was through Padlet, an online platform. Every week, undergraduate students were prompted to respond to some check in questions on the Padlet. This simple activity quickly turned into something the students not only looked forward to but also viewed as a community building practice in a brave space that allowed for vulnerability, sharing of challenges and emotions. Some student posts made the instructors reach out to them and engage in conversations about mental health resources and services available to all which encouraged them to take advantage of these offerings. Many students commented positively on these culture of care practices in the course evaluations, emails and artifacts. Some recurring themes were as follows: i) Students felt seen, heard, and valued as whole humans in these asynchronous classes, ii) Because these students were prospective teachers, they saw a model of pedagogy of care which they could emulate in their teaching, and iii) These connections built a continued mentoring and support system even after the semesters were over. In this presentation, we will share some narratives and artifacts of embodying the

culture of care and how they benefited students. Furthermore, we will provide suggestions on how this practice can be translated into any educational setting.

**Keywords: culture of care, community building, student success, brave spaces**
**Social Impact: Higher Education**

**Jaleah Rutledge**
Michigan State University

*Facilitators of Empowerment Among Black Women HIV/AIDS Activists*

Black women in the United States continue to be disproportionately affected by the HIV/AIDS epidemic. HIV/AIDS activism among Black women for Black women may be one solution to reduce the disparate rates of HIV/AIDS among Black women. However, little is known about what processes prompt Black women to participate in HIV/AIDS activism. In this paper, I aim to identify what empowers Black women to engage in HIV/AIDS activism. I draw upon empowerment theory as a theoretical framework to guide analysis of the literature and to offer a strengths-based perspective on Black women's efforts to reduce the spread of HIV/AIDS. An extensive literature search was conducted to identify studies of Black women's participation in HIV/AIDS activism. The search yielded 12 studies that were included for review. All studies (n=12) included in the review are qualitative. Synthesis of the literature produced three unique concepts that facilitate Black women's participation in HIV/AIDS activism: living out loud, survival, and community kinship. Further analysis of each concept indicated that Black women's motivation to engage in HIV/AIDS activism reflects the different components of psychological empowerment.

**Keywords: activism, Black women, empowerment, HIV/AIDS**
**Social Impact: Healthcare**

**Jason Baird**
Siena Heights University

*Benefits of Meditation to Full-time College Students*

Full-time college students are most susceptible stress due to the many daily tasks that they must accomplish. College students have to manage schoolwork, athletics, finances, and anything else that life throws at them in between. Meditation has become a more common practice amongst those trying to find methods to help their mental health and aid them in alleviating stress. The most commonly used technique in meditation is the breathing technique. This is where the individual must relax their body and focus on taking deep long breaths while trying to let go of any emotion that may arise during the practice. Researchers believe that physical responses are related to psychological responses. In this method, when the individual slows down their breathing, it should allow the person to get into a mentally relaxed state since their body is going into a relaxed state as well. This should decrease activity in areas of the brain that deals with stress. It is also believed that if an individual practices being in this relaxed state long enough it will bring out positive emotional outcomes, such as a decrease in stress. In this study, I test to see if a simple meditation technique can be successful in decreasing a Full-time college students' overall level of stress.

**Keywords: Meditation, stress, full-time college students**
**Social Impact: Higher Education**

**Lyndsey Pena**
Siena Heights University

*Prison Mental Health Programs and Recidivism*

The growing prison populations and growing number of people in prison who have a mental illness, makes it difficult for prison mental health professionals to provide adequate mental health services to those who need it. The purpose of prison mental health programs is to ensure that people in prison who have mental health issues are able to maintain their best level of functioning and to alleviate symptoms of serious mental disorders and prevent relapse. Without those in prison receiving beneficial mental health treatment, it is possible that most of them will be stuck in an endless cycle of going to prison, getting released, and reoffending ending them back in prison. Qualitative data will be collected through

interviews with different mental health professionals who work or have worked in a prison. The interviews will consist of a set of questions asking their impressions of the services and programs offered, their impressions of how effective these methods are, and whether they think that the programs affect recidivism. This study will provide a first-hand view on the insight mental health professionals who work in the prison have on the programs they provide and their correlation to the recidivism rates of those who have a mental illness. Results may show if there is a correlation between high recidivism rates and number of mental health programs offered. This is valuable information that is useful for people in prison who are dealing with mental health issues because they need to be getting effective treatment that will help them.

**Keywords: Prison, Mental Health, Recidivism**
**Social Impact: Criminal Justice Reform**

**Samantha Scott**
Siena Heights University

*How phase feeding and start to finish feeding affect the weight gain of broilers*

Understanding the diets of broilers is essential to farmers and nutritionists in order to satisfy the needs of consumers. In 2018, 9 million broilers were produced for the consumption of consumers. Protein and amino acides are the two most important components of poultry's diet and are necessary to produce the best carcass quality. Here, we uncover if phase feeding or start-to-finish feeding will produce the highest weight gain in broilers in order to produce them at an efficient pace. We used a control group of 18 Ross 708's to discover the weight gain of a start-to-finish feeding diet, who were given a standard diet of 20% crude protein throughout the span of 6 weeks. Along side of them, we used a test group of 18 Ross 708's to discover the weight gain of a phase feeding diet, who were given feed starting at 18% crude protein, 20% crude protein, and then finally, 22% crude protein; all split up into two-week increments. Six chicks were weighed weekly, per group at random. This data showed the difference of weight gain between the two groups and will result in which group provides the moest efficient diet for producing broiler chickens. We plan to preform a statistical analysis to determine the conclusion.

**Keywords: Broilers, protein, chickens, diet**
**Social Impact: Healthcare**

**Yan Shan Yu**
John Jay College of Criminal Justice

*Sexual Grooming and Its Relation to the Victim's Age*

Sexual grooming is the deceptive process by which an offender selects a vulnerable victim and prepares them for sexual abuse to avoid detection. It is estimated that almost half of all cases of child sexual abuse involve sexual grooming. Recently a content validated model of sexual grooming, the Sexual Grooming Model (SGM), has been developed in which 42 of grooming behaviors have been identified. However, it is believed that these behaviors may differ by the age of the victim. The present study explores the changing behaviors of the offenders depending upon the age of the child victim. CUNY undergraduate students were asked to complete a self-report survey based on the SGM. The grooming behaviors of those who endorse a history of child sexual abuse across three developmental age groups are examined. Findings show that offenders used different techniques and behaviors to groom their chosen victim. Children under the age of 11 were more likely to be engaged in childlike activities and lacked adult supervision. Children ages 11 to 14 were more likely to be given rewards and compliments, and shown pornography photos and videos. Lastly, children ages 15 and older were more likely to be provided drugs and/or alcohol and were made to feel responsible for the abuse.

**Keywords: Sexual Grooming, Sexual Abuse, Deception**
**Social Impact: Criminal Justice Reform**

**Yareli Perez**
John Jay College of Criminal Justice

*Adult Perceptions of Severity in a Sexual Abuse Case: The Impact of Gender of the Perpetrator and Victim*

Sexual assault is a serious problem in the United States and it is estimated that one in four girls and one in thirteen boys will experience abuse by the time they are 18. However, the majority of cases of sexual abuse do not result in conviction. This may be because perceptions of sexual abuse cases vary according to the different characteristics of the perpetrator and victim involved. For this reason, this project will examine whether perceptions of severity of crime differ upon the gender of the victim and perpetrator in sexual abuse cases. A general sample of U.S. adults obtained via mTurk will be randomly assigned to read one of four case vignettes in which the gender of the victim and perpetrator will be varied, and they will be asked to complete a series of questions about the case. They will be asked the degree to which they attribute responsibility/blame to the people involved, if any, and if the case displays a sexual abuse act. It is anticipated that cases in which there is a female perpetrator and male victim, the perpetrator will be seen as less responsible/blameworthy for the situation whereas the male victim will be attributed more responsibility/blame. These findings will be discussed as they pertain to the role of both the gender of the perpetrator and victim and see the impact on how people view the degree of severity of sexual abuse cases.
**Keywords: Advocacy for victims; encouraging treatment**
**Social Impact: Mental Health**

**Yolanda Odufuwa**
Beloit College

*Black Resistance In The Contemporary Era*

In 2013, Black activists Patrice Cullors, Alicia Garza, and Opal Tometi created #BlackLivesMatter to call attention to state-sponsored violence and police brutality. The evolution of Black Lives Matter into a decentralized organization with multiple chapters across the country has advanced efforts in recent years to include state violence into popular political discourse. However, the implementation of demands from grassroots organizations and activists in the larger movement for Black lives remain unaddressed or fundamentally misunderstood. My project entitled Black Resistance in The Contemporary Era aims to add to the current scholarly work that suggests U.S. political institutions continue to fail to reduce police violence. My research question: To what extent has the commodification, exploitation, and misrepresentation of Black resistance in the contemporary era quelled activism and political goals in relation to ending state violence in the United States? Centers Black resistance to state-sanctioned violence and the causes for misrepresentation and co-optation. My methodologies included case analysis and surveying. I surveyed organizers, academics, and social justice-oriented students. Using multiple-choice and open-ended questions, I learned what they believe to be significant political goals of the movement for Black lives, impacts of commodification, and whether current proposed legislation adequately addresses police violence. Early results showed that over 50% of respondents partially or strongly disagreed that the George Floyd Justice in Policing Act of 2021 would adequately address police violence if adopted. Commodification, misrepresentation, and exploitation threaten to undermine activism and political goals like defunding the police needed to reduce and end state violence.
**Keywords: Social justice, police brutality, exploitation, and public policy.**
**Social Impact: Social Equity**

# Student Poster Presentation Abstracts
# Virtual Location: Hopin
## Engineering

**Sofia Martinez-Castillo**
University of Colorado Boulder

*SIR Model for COVID-19: Numerically Solving a System of Ordinary Differential Equations with Python*

The objective of my research is to study the Susceptible, Infected, and Removed (SIR) model for the global pandemic COVID-19 outlined in the 2020 article "A SIR model assumption for the spread of COVID-19 in different communities" by I. Cooper, A. Mondal and C. G. Antonopoulos. The mathematical model is a system of three ordinary differential equations with corresponding initial conditions. In particular, we aimed to recreate the solutions, in the form of graphs, to the system for parameters that are consistent with COVID-19 data of Italy. Python programming was used to numerically solve the SIR model using both Forward-Euler and Runge-Kutta explicit methods. Using the initial parameters given in the article for Italy, our mathematical model, and its numerical solutions closely match the article's results.
**Keywords: Mathematical Modeling, SIR Model, Epidemiology, COVID-19, Applied Math**
**Social Impact: Healthcare**

**JoAnn Ballor**
Michigan State University

*The composition, processing, microstructure, and property relationships of Fe and Al modified Ti-Cr alloys*

Lightweighting, or the replacing of heavier parts with equivalent strength lighter parts, can lead to higher fuel efficiency in the aerospace and automotive industries. Beta-Ti alloys are ideal for lightweighting as their mechanical properties can be tuned to meet needed strength requirements through many processing routes. These processing routes induce the low-stiffness, low-strength beta phase to transform into the higher-stiffness and higher-strength alpha and omega phases. Along with the processing route, alloying elements can significantly influence the transformation order, volume fraction, and morphology of the alpha and omega phases formed. To investigate the influence of Fe and Al on the beta-to-omega and beta-to-alpha phase transformations, beta-titanium alloys Ti-Cr-xFe-xAl(at%), ($0 \leq x \leq 5.3$) were subjected to a 400C aging treatment under vacuum for times between 0.75 and 24 hours to induce the beta-to-omega and beta-to-alpha phase transformations and improve the strengths of the alloys. A multi-modal approach was used to obtain a comprehensive understanding of how the differences in composition affected the phase transformations and the mechanical properties of the alloys. Microstructure changes due to the differing amounts of Fe and Al as well as the different aging times were investigated using high temperature X-ray diffraction and transmission electron microscopy. Atom probe tomography was used to investigate the diffusion of alloying elements during the phase transformations. The mechanical properties of the alloys were investigated using resonance ultrasound spectroscopy and hardness testing. The discoveries made in this work can influence the design of future beta-Ti alloys for lightweighting applications.
**Keywords: Lightweighting, fuel efficiency, new alloy design, environmental impacts**
**Social Impact: Environment**

# Student Poster Presentation Abstracts
# Virtual Location: Hopin
## Life Science

**Austin Katzer**
University of Colorado Boulder

*Understanding the Establishment of TWIST Neural Crest Gene Regulatory systems and Their Evolutionary Significance in Chordates*

The evolution of the vertebrate head in chordate organisms involves genetic mutations that permitted new gene interactions of the existing developmental toolkit. Compared to other phyla the vertebrate head contains complex somatosensory receptors, as well as innovative mechanical and sensory structures. The emergence of these structures resulted from the evolution of the neural crest, a transient cell population exclusive to vertebrates, with qualities such as pluripotency as well as the ability to delaminate and migrate. This ectodermal cell type can give rise to a multitude of adult structures including those that are putative mesoderm derivatives, such as craniofacial bone and cartilage. This project will focus on the evolutionary aspect of the neural crest in chordate organisms and try to help solve the question of how the neural crest emerged. The twist gene is very important in chordate development and encodes a basic transcription factor that plays an important role in the development of embryos. The main focus of the experiment is to determine what kind of mutations integrated twist in the neural crest gene network. This project focuses specifically on mutations within twist cis-regulatory elements (CREs) that gave way to its involvement in neural crest cells. The working hypothesis is that the CREs controlling twist expression in neural crest cells are indeed different than those regulating twist expression in other regions within the developing organism. However, whether they are completely new or emerged from existing enhancer sequences is unknown. A new CRE would consist of a novel sequence that is not present invertebrate chordates and only acts in neural crest cells. Alternatively, an existing CRE could have been modified to permit twist expression in a novel tissue other than the ancestral mesodermal pattern. By identifying putative CREs using conserved teleost sequences outside of the coding region for twist it is possible to functionally test these elements using standard transgenic techniques. These sequences of 1000-1500 base pairs were tested functionally within zebrafish using gateway cloning to introduce the fragments into the reporter construct pGreene, which has a cFos basal promoter and eGFP flanked by Tol2 recombination arms. Injecting these constructs into single-cell embryos highlights twist CRE activity by driving fluorescent signals in a given region of the embryo revealing how the neural crest gene network was co-opted.
**Keywords: Evolution, Development, Genetics, TWIST, Cis-regulatory elements**
**Social Impact: Healthcare**

**Ellaina Wyllis**
University of the Virgin Islands, College of Science and Mathematics and Harvard Medical School, Blavatnik Institute, Department of Systems Biology

*Transcriptional regulation by SP1 and c-myc effector domains*

Transcription factors (TFs) play a fundamental role in regulating gene expression. SP1 and c-myc TFs regulate genes involved in cell growth and have been associated with cancer progression when overexpressed. While the DNA-binding domains of TFs have been well-characterized in past decades, the role of their effector domains (EDs) for modulating target gene expression is less understood. Here we aimed to isolate the regulatory effects of these EDs using an engineered gene regulatory circuit in HEK293T cells. The specific goal of this project was to determine how stochastic transcription of reporter mRNA is altered upon the transfection of SP1 and c-myc effector domains and the impact of zinc-finger binding affinity. We used single-molecule fluorescence in situ hybridization (smFISH) and FISH-quant-based computational image analysis to quantify GFP mRNA in single cells. Overall, our data suggest that both SP1 and c-myc EDs increased transcription levels of the GFP gene, with SP1 having a greater effect. An increase in the fraction of active promoters might explain the rise in transcription levels, suggesting a change in the frequency of stochastic bursting.

Interestingly, reduced affinity did not decrease transcription levels as expected. In future work, we aim to explore this further by correlating the smFISH data with the ED abundance for each condition and investigating other parameters of mRNA regulation.

**Keywords: transcriptional regulation, effector domains, SP1, c-myc, single-molecule FISH, synthetic zinc fingers, fluorescence imaging, FISH_quant, stochastic bursting parameters**
**Social Impact: Healthcare**

**Esonica Charles**
University of the Virgin Islands

*Got Lead? An Assessment of Lead Concentration in Cistern Water on St. Croix, USVI*

Lead (Pb) has been used for centuries in pipes for water systems, color pigments, make-up, and silverware. In 1978, the US Congress banned lead-based paint for home usage. Lead is a very toxic substance that affects both children and adults. Some symptoms of lead poisoning include abdominal pain, difficulties in concentration, and fertility issues. The objective of our study is to collect water from cisterns and determine the lead concentrations. We collected water samples from seven residential locations from May to July 2021 in St. Croix, US Virgin Islands. We hypothesized whether sites east or west of the refinery have differences in lead concentration. The LeadTrak™ Fast Column Extraction Method was used to determine lead levels and the results were reported as parts per billion (ppb) Pb. Our results showed that there was a statistically significant difference between lead concentration in both sites as demonstrated by one-way ANOVA ($p = 0.032$). Sites east of the refinery had lead concentrations from 0 to 3 ppb with an average of 0.73 ppb ± 1.01 from May to July 2021. Whereas, sites west of the refinery had ranges from 0 to 6 ppb with a mean of 2.43 ppb ± 2.07 during our collection dates. In conclusion, our study showed that concentrations of lead in cistern water in the west were higher compared to those of the eastern sites. None of the samples collected has surpassed the action level of 15 ppb as set by the EPA.

**Keywords: Lead, Water, Refinery**
**Social Impact: Environment**

**Etinosa Iyayi**
Tuskegee University

*Development of a Rapid, Inexpensive, Reliable, and Ultra-sensitive COVID-19 Detection Platform*

Ultra-sensitive, rapid, and reliable detection of SARS-CoV-2 is essential to mitigate the spread of COVID-19. To reduce the spread of the virus, the World Health Organization (WHO) demanded an extension of screening and testing which requires people to share limited space in a particular area. Thus, a simple, fast, reliable, diagnostic tool is needed at any point of care to help diagnose COVID-19. Here, we present an approach to overcome these challenges with the utilization of Loop- Mediated Isothermal Amplification (LAMP) to detect SARS-CoV-2 by colorimetric read- out between 25-45 minutes at 65°C. LAMP is a novel nucleic acid amplification method that takes place under an isothermal condition. The colorimetric read-out allows the result to be observed with the naked eye by a distinct color change from pink to yellow in a positive reaction without the need for expensive equipment like the thermocycler. To achieve this goal, we designed four sets of LAMP primers (6 primers in each set) targeting the ORF1a, ORF1b, S, and N regions on the SARS-CoV-2 genome. The technique demonstrated to have a limit of detection of 20 copies per microliter of the SARS-CoV-2 RNA. A cross-reaction test was performed to evaluate the specificity of the primer sets using other respiratory viruses such as Influenza and Epstein-Barr Virus. Our results suggest that the Loop-Mediated Isothermal Amplification technique could pave a way for rapid, ultra-sensitive detection, and diagnosis of COVID-19 especially in areas where access to health care facilities is limited.

**Keywords: SARS-CoV-2, Loop-Mediated Isothermal Amplification, COVID-19, detection platform**
**Social Impact: Healthcare**

**Hailey Van Vorce**
University of Arizona

*Sleep Dependent Memory: Outcomes in Autism Spectrum Disorder and Down Syndrome*

Current research has failed to evaluate gist memory in developmental disabilities, like autism spectrum disorder (ASD) and Down syndrome (DS), groups with specific memory deficits. Memory evaluation within the criminal justice system has increased, focusing on eyewitness testimonies and false memory. False memory stems from the fuzzy trace theory or dual-process theory, where the two types of memory processes, verbatim and gist, utilize different retrieval processes. Gist processes rely on semantic features, while verbatim processes rely on surface details. During sleep, memories are consolidated into long-term storage. People with ASD and DS have specific sleep deficits that have been shown to impact memory. Autistic children have reduced sleep latency, while children with DS spend less time in rapid eye movement (REM) sleep, likely decreasing hippocampal activation, reducing memory consolidation. To investigate the gist memory in neurodevelopmental disorders, specifically ASD and DS, a developmentally appropriate novel picture-based assessment for a gist memory task was used. Questionnaires were completed on an online database, Gorilla, which parents completed before the first testing session. In this computerized task, participants will complete a short and long-term delay task, separated by either a period of sleep or wake. Actigraphy watches assess sleep quality which are compared to the gist memory performance taken at each condition. Eye-tracking is utilized to assess attention to stimuli and encoding processes during the gist memory task. This study will be the first to investigate sleep-dependent gist memory in children with neurodevelopmental disorders. It is hypothesized that children with neuro-developmental disorders will rely more on gist memory than explicit memory, presumably influenced by sleep.
**Keywords: Autism spectrum disorder, Down syndrome, gist memory, memory consolidation, fuzzy trace theory, eye witness testimony**
**Social Impact: Healthcare**

**Inaya Smith**
Harris Stowe State University

*The Dark Side of Light: Intrauterine Epigenetics of Gestational Light Pollution*

Light pollution is the presence of unwanted, inappropriate, or excessive artificial light and is a growing threat to biodiversity. Global light pollution has been increasing exponentially during the past century (Hsu et al.,2021). Along with its growth, it also causes unintended physiological consequences (Chepesiuk et al.,2021). In mammals, light is known to suppress melatonin production (Windsperger et al.,2021). Light also plays a part in the sympathetic nervous system by activating adrenal glands and inducing a surge in glucocorticoid levels via the suprachiasmatic nucleus (Windsperger et al.,2021). Light pollution disrupts circadian rhythms (chronodisruption) by altering downstream signaling pathways and can lead to the development of a variety of chronic disease states such as infertility, diabetes, and metabolic syndrome in mammalian species (Tahkamoa et al.,2021). Melatonin is the hormone released by the pineal gland that is associated with the wake/sleep cycle. Early life is where most chronic diseases originate (Palagini et al.,2021). A developing fetus, if exposed to suboptimal conditions during pregnancy, will experience alterations to normal patterns of growth and development (Hsu et al.,2021)., increasing its vulnerability to a wide range of chronic diseases later in life (Palagini et al.,2021). However, the impact of light-related chronodisruption during pregnancy on offspring health remains poorly understood. Overall, the objective of these studies is to investigate the desynchrony of maternal-fetal signaling during pregnancy caused by light pollution.
**Hypothesis:** Epigenetic modifications associated with deregulation of melatonin rhythms, and fecundity are present in intrauterine tissue of chronodisrupted dams.
**Methods and controls:** We will investigate pregnancy-related changes in intrauterine epigenetic markers of light-polluted and control mice using RT-QPCR.
**Predicted Outcomes:** We predict the dams that experience gestational light pollution will show an upregulated expression of markers involved in inflammatory and stress pathways compared to controls. We predict the melatonin receptors will be downregulated in intrauterine tissue of light-polluted dams compared to control dams.
Conclusions, future research, and key references: Taken together these data will shed light on the impact of light pollution on biodiversity with the female mammalian reproductive system.
**Keywords: light pollution, gestation, melatonin, pineal gland**
**Social Impact: Environment**

**Jordan Carroll**
California State University San Marcos

*The interplay of reward and aversion implicates increased risk for ketamine abuse in adolescent rats when compared to adults rats*

Ketamine was developed as an anesthetic, but now has been shown to be effective in multiple therapeutic contexts including treating pain and major depression. It has also been popularized as a party drug frequently used by adolescents. Adolescence is a developmental stage with distinct behavioral, physiological, and neurobiological changes. Increases in social behavior, risk-taking, and novelty/sensation seeking lead to increased proclivity for drug experimentation. As such, it is important to better understand ketamine use by young people and more specifically, its rewarding and aversive effects since these are factors in problematic drug use. Here, we compared the rewarding and aversive effects of ketamine in adolescent (30 days of age) and adult (60 days of age) rats. We indirectly examined the rewarding effects of ketamine by testing the stimulant response and assessed the aversive effects of ketamine through conditioned taste aversion. We used a low dose of ketamine (10 mg/kg) to model the doses used in party settings by young people. We found that adolescent rats displayed lower conditioned taste aversion, reflecting reduced aversive effects of ketamine, and increased locomotor stimulation, which is indicative of increased reward when compared to adult rats. This points toward an increased risk profile for ketamine abuse in adolescents with reduced negative effects and enhanced pleasurable effects. Future studies will build off these results by using other behavioral paradigms, a broader range of doses, and investigate potential sex differences in response to ketamine.
**Keywords: Drug-abuse, addiction, ketamine, adolescence**
**Social Impact: Healthcare**

**Korey Fennell**
Michigan State University, Virginia Union University

*Consumer behavior towards packaging made of agricultural waste for food*

Agricultural and packaging waste are both environmental concerns worldwide. Agricultural waste can be used to replace plastic during the production of packaging materials, reducing environmental impact and raw material consumption while supporting the circular economy. However, the success of novel food packaging hinges on consumers' acceptance. Consumers can influence the market penetration of food packaging made of agricultural waste by deciding whether to purchase this form of packaging. This study investigated consumers behavior towards environmentally friendly food packaging, specifically packaging made from agricultural waste. A questionnaire was developed and shared with eighty-six participants. The SIMS 2000 Sensory Evaluation Testing Software was used to give participants instructions, questions, and the ability to input responses using different Likert scales and guide-type responses. The responses were analyzed as a whole. Responses were further evaluated by the population segments age, gender, education, ethnicity, and environmental consciousness. The results show that cost and performance were more important than impact of material on the environment. Even though, 70% of the participants rated "greener packaging", "reduction of harmful environmental impacts (water, air, or soil)", and "waste management" as very important or extremely important aspects when buying packaging produced with agricultural waste. However, this importance was different based on age, gender, and/or the environmentally consciousness of the panelist. These differences did not carry over to the non-environmentally-friendly factors "cost", "performance", and "aesthetics". Half of the participant did not know about the effect of packaging produced with agricultural waste on the shelf life and safety of food, however, above 50% of them like the use of agricultural waste combined with plastics for food packaging and their "purchase intent" rated between moderately likely and extremely likely. Overall, this research identifies the consumer sectors most amenable to environmentally friendly food packaging, specifically packaging made from agricultural waste.
**Keywords: Novel food packaging materials, Agricultural by-product, Environmentally friendly packaging, Consumer awareness and interest, Demographic segments**
**Social Impact: Environment**

**Layan Ibrahim**
Vanderbilt University School of Medicine

*A Systematic Review of the Definition and Management of Pediatric Refractory Immune Thrombocytopenia (ITP)*

**Background:**

Immune thrombocytopenia (ITP) is a rare cause of thrombocytopenia in children where the immune system destroys platelets which are essential for normal blood clotting. Treatment of pediatric ITP focuses on the termination and/or prevention of bleeding, irrespective of platelet count. Refractory ITP is diagnosed when there is a lack of response and/or relapse after splenectomy and requires treatment to minimize bleeding. Children rarely meet the formal definition of refractory ITP due to the relative avoidance of splenectomy by pediatric practitioners due to this procedure's potential long-term complications and lifetime risk of bacterial sepsis, while most patients with ITP will have time-limited disease with generally good outcomes. Defining refractory ITP and identifying optimal work up and management of pediatric patients with refractory ITP is important to understand as this subset of patients may be at increased risk for complications, increased bleeding, and requiring additional first and second line therapies. Due to the gap in knowledge of treatment options for pediatric refractory ITP, we aim to conduct a systematic review of refractory pediatric ITP definition, laboratory evaluation, and management.

**Methods:**

The following databases were searched: MEDLINE, Embase, and the CENTRAL Trials Registry of the Cochrane Collaboration using the Ovid interface. Searches were limited to English, French, German, Polish, or Spanish languages and to the publication year 2000 or more recent. Editorials, letters, and review articles (with the exception of meta-analysis and systematic reviews) were excluded. Searches were designed and conducted by a librarian experienced in systematic reviews using a method designed to optimize term selection (MS). After duplicate records were removed online, records retrieved by the electronic search were downloaded and imported into a Reference Manager database and then uploaded to InsightScope (KoH). Records were appraised against the inclusion criteria using a three step method (initial review by MS and KoH for inclusion based on defined criteria, abstract review with arbitration by LI and SD, final inclusion and review by LI, SD, ML, RK, JL).

**Results:**

In total, 2148 records were identified through the initial database search, resulting in 1471 records for screening, yielding 254 records for standardized data abstraction by two reviewers (LI and SD). Disagreements were adjudicated by three additional reviewers (ML, RK, JL). Currently, we are in the process of reviewing and summarizing the definition of refractory pediatric ITP, recommended workup, and treatment for the records relevant to the objective of this study. 205 out of 2148 articles (9.5%) will be reviewed and included in our final analysis and data abstraction. 12 out of the 205 articles (5.9%) discussed the definition of refractory ITP in some capacity.

**Discussion:**

Our systematic review demonstrated that there is a paucity of data to guide treatment in children with refractory ITP, highlighting the need for well-designed studies to answer these important questions for this vulnerable patient population.

**Keywords: Hematology, systematic review, pediatrics, clinical research**
**Social Impact: Healthcare**

**Nkosi Evans**
Northeastern Illinois University

## *CREATING DISTRIBUTION MODELS FOR MIDWEST BRYOPHYTES*

Herbarium specimens collected in the past can play an important role in determining the response species have to environmental changes over time. Previous studies have used herbarium collections to study phenological, genetic, and landscape changes as a response to anthropogenic factors. In this study, we used digitized collections at the Field Museum of Natural History to determine potential changes in distribution patterns over time and to investigate the impacts of anthropogenic factors on species distribution. We also wanted to create a tutorial for how this process can be utilized. The Consortium of North American Bryophyte Herbaria (CNABH) was used to access collection information from common bryophyte species found in Illinois and environmental data was obtained from WorldClim.org. Map shapefiles for the United States were downloaded from GADM.org and opened with QGIS. Predictive maps were created using Maxent and then opened in QGIS for better visualization. This process may be applied for other fields of science such as animal migration patterns or studying how pollution affects certain organisms. The resources used are all open source which allows for others to easily follow this tutorial.

**Keywords: environmental sciences, climate change, mapping, environmental trends**
**Social Impact: Environment**

**Ogechi-Amaka Anene**
Texas Southern University

*Generation of TCR Hybridomas Reactive for Inflammation-Associated Self-Antigens*

Central tolerance removes self-reactive T cells from the body during their development in the thymus. However, it is not understood how T cells reactive for inflammation associated self-antigens (such as those upregulated by interferon signaling) are removed, since there is no inflammation in the thymus. T cell receptor (TCR) sequencing data from our lab has found that the TCR repertoire of mice that lack interferon signaling is distinct from that of normal mice. In order to investigate the reactivity of receptors that are differentially expressed between these two strains, we cloned TCR sequences into the retroviral vector pMIA. pMIA-TCR vectors were used to transduce T cell hybridomas, allowing for expression of TCRs in vitro. Transduced hybridomas will be used for co-culture experiments to determine the reactivity of TCRs. We anticipate that TCRs that were absent in normal mice, but present in mice without interferon signaling, will be reactive for self-antigens upregulated as a result of interferon signaling, and as such may play critical roles in maintaining self-tolerance during inflammation.
**Keywords: T cell, T cell receptor, Central tolerance, Self-tolerance, Self-antigen, Interferon, Retroviral vector, hybridoma, Inflammation, Mice model**
**Social Impact: Healthcare**

**Pragya Saxena**
Michigan State University

*Calculation and Analysis of Bladder Wall Biomechanics During Ex Vivo Filling*

Optimal wall compliance is essential to urinary bladder storage and voiding functions. Changes in compliance occur in many lower urinary tract symptoms (LUTS), however compliance is poorly defined. Clinically, bladder compliance is the change in bladder volume per change in intravesical pressure, but without regard to wall structure or wall volume. Thus, it is unknown if the true mechanical properties of the bladder wall affect bladder function during filling. Thus, we developed a novel method to accurately calculate bladder wall compliance as a measure of the mechanical stress vs stretch instead of pressure vs volume.

Whole mouse bladders were mounted in our novel Pentaplanar Reflected Image Macroscopy (PRIM) System for simultaneous measurement of intravesical pressure (Pves), infused volume and video during ex vivo filling. The PRIM allows simultaneous visualization of the bladder in 5 planes (Fig. 1). Mechanical forces acting on the bladder wall were calculated by assuming the bladder to be an ellipsoid formed with planar areas equal to those measured from the PRIM recordings. Values of wall thickness and wall volume were calculated and used to measure wall stress as [(Pves)(radius)(stretch2)]/Thickness. Stretch was calculated from the infused volume as a function of the relative change in diameter from the start of filling. Volume measurements were validated by comparing the calculated volume in full bladder to the sum of infused and residual volumes.

The calculated volume measurements were comparable to the measured infused volumes. Wall stress only increased rapidly when intravesical pressure exceeded 15 mmHg, implying that wall compliance is maintained until larger infused volumes. At large volumes, bladder wall stress with respect to strain increases rapidly.

Accurate analysis of bladder compliance is an essential step towards understanding the underlying changes in wall tension and geometry during distention. This study demonstrates how wall tension, stress and stretch can be quantified and used to accurately define wall compliance. This method can be used to explore underlying changes in biomechanics of the bladder wall that accompany LUTS. Supported by NIH K01DK103840 (NRT) and R01DK119615 (NRT). (Poster presented at Society for Basic Urologic Research,2021).
**Keywords: Urinary bladder, Extracellular matrix, Compliance**
**Social Impact: Healthcare**

**Rayvin Webber**
Adrian College

*A Comparative Analysis of Organic and Inorganic Fertilizers on Plant Growth and Nitrogen Uptake*

Human beings rely on the nutrients and energy received from the food we consume for our survival. With nutrition being of such importance to the survival of our species, it is important to ensure access to these nutrients, one would assume that healthy options, such as organic foods, would be more accessible to the public. However, what is found more often is a significant difference in price between the cost of organic produce versus inorganic produce. To better understand the rationale behind these price differences, this research tests the effects of organic and inorganic fertilizers on plant growth and nitrogen uptake of Lactuca sativa and Raphanus sativus. Samples of the plant species were provided with organic and inorganic fertilizers to collect and analyze data based on the nitrogen content and growth rate of the plant samples.

**Keywords: Nutritional Disparities, Health Disparities, Nitrogen, Organic and Inorganic Fertilizers**
**Social Impact: Healthcare**

**Viridiana Leon**
Northeastern Illinois University

*Artificial Intelligence Analysis of PET/MRI of cell transplantation in Mice Models*

Type 1 diabetes (T1D) is an autoimmune disease where pancreatic islets halt the production and distribution of insulin. Pancreatic islet transplantation is a clinical approach for T1D where healthy islets are transplanted into the liver and monitored using MRI. Current limitations include low sensitivity of the instruments, as well as possible bias from radiologist. Simultaneous usage of MRI with PET offers higher resolution and sensitivity. However, signal decay over time due to graft loss in addition to time decay of radioactive isotopes makes quantification of transplanted cell number difficult. To solve this issue, we hypothesized that deep learning could predict the number of transplanted islets in a PET/MRI image. This was done through a convolutional neural network (CNN). The goal was to use artificial intelligence (AI) to standardize a method for segmentation and quantification of PET/MRI to further contribute to monitoring cell-based therapies for T1D. In Vitro cell phantoms were used to train CNN to correlate image texture to radioactivity values. The predicted radioactivity value was then classified into a cell number. Phantoms were first injected with MC38/BTC6 cells labeled with 18F-FDG. A dose calibrator was used to measure the radioactivity. The phantoms were imaged using PET/MRI and the CNN was trained on this data. In Vivo testing on transplanted labeled BTC6 cell data of mice demonstrated that deep learning could predict number of transplanted cells solely from an MRI/PET image scan in vivo.

**Keywords: Type 1 Diabetes, AI, CNN, Imaging**
**Social Impact: Healthcare**

# Student Poster Presentation Abstracts
# Virtual Location: Hopin
## Social Science

**Alexia Ferguson**
Siena Heights University

*The Black Lives Matter Movement and Human Rights Efforts*

This research examines the unique aspects of the Blacks Lives Matter Movement to consider if the model, including the structure, goals, and political actions, has the potential to inform other human rights efforts. The Movement is analyzed to identify its structure, goals, and actions. Critical race theory is utilized to understand the significance of the Movement. Secondary data from the Black Lives Matter movement is analyzed to identify connections to prominent human rights theories, such as universalism, cultural relativism, and communitarianism. This project uses archival data, secondary sources, and qualitative interview responses to consider the effectiveness of the Black Lives Matter Movement along with other Human Rights models. This study found that components of the Black Lives Matter movement, including its decentralized structure, goals of equality for people of color, and its ability to work both with individuals and political actors can be replicated in numerous cities and countries across other civil rights movements. This is in part due to the leadership of the Movement being community-based, utilizing modern technology, found globally, and makes use of the political system. Activists and academics can use information from the study to understand the challenges and benefits of using the Black Lives Matter Movement as a model. Addressing human rights issues is complex and daunting. It is essential that activists and academics recognize how communities and political actors can create change to inform human rights campaigns.
**Keywords: The Black Lives Matter Movement, Human Rights, Social Justice**
**Social Impact: Social equity**

**Alyssa Lopez**
Siena Heights University

*The Psychological Effects of Art in College Students*

Many people deal with stress in some way every day, and it is essential to find healthy and productive ways to manage that stress. The arts have been used as a coping mechanism to deal with these daily stressors. This study focuses on college-age individuals and the use of art as a coping mechanism for stress. In this study, undergraduates at a university in Southeastern Michigan were asked to complete the State-Trait Anxiety Inventory (STAI) to assess their initial stress levels. Then students were asked to participate in a thirty-minute free-drawing activity. Afterward, participants repeated the STAI to assess their stress levels after drawing. It is hypothesized that drawing for thirty minutes would reduce stress in undergraduate students, which might then serve as a coping mechanism to deal with the stress they experience in their daily lives. Learning how to manage stress and find ways to remove it from daily life creates a sense of well-being and can help prevent stress-related disorders in the future. This study concluded that while there was no difference at all reported in stress levels, there is a possibility for stress reduction with more research and practice.
**Keywords: Art Therapy, Stress, Free Drawing**
**Social Impact: Mental Health**

**Brionna Colson-Fearon**
Wesleyan University

*Institution-to-Institution Mutual-Exchange Higher Education Model as a Method to Comply with Legal and Social Requirements for the Black Farmer Project: Promotion of Food Access and Healthy Living by Urban Farmers in Baltimore*

Farming is an essential part of a community's ecosystem. Urban and community farmers act as stewards of land, caring for the health of the land and allowing for the production of healthy food. At the beginning of the twentieth century,

there were nearly 1 million Black farmers in the United States, however due to decades of racism and discrimination, fewer than 50,000 remain. The current study focuses on Black-owned urban forms operating in Baltimore, MD. Fifteen urban farmers were interviewed, and interviews were analyzed using a thematic analytic approach. Findings are presented showing the farmers' perceptions of food access in their neighborhoods, as well as ways to improve food availability.

**Keywords: Health, food apartheid, community, urban farm**
**Social Impact: Social Equity**

**Chetna Kumari**
Shaw University

*Health disparities, Social Class, Race and Gender in Cancer research: A Brief Look*

Cancer affects all population groups in the United States. However, there are social and economic disparities within certain groups compared with others. These groups that may experience disparities include: Race/ethnicity, Gender identity, social economic status, and sexual orientation. For example, African American men are twice as likely to have higher rates of cancer, than European-American men. Those with overall less education are more likely to dies prematurely. We will also discuss how groups experience these disparities, and more likely to encounter obstacles in getting health care.

**Keywords: Cancer, Health disparities**
**Social Impact: Healthcare**

**Edward Arnold**
Tennessee State University

*Institution-to-Institution Mutual Exchange Marketing Model for Higher Education*

The Institution-to-Institution Mutual-Exchange marketing model establishes a standardized certificate-based online course in diversity. The standards are based on the concept of Diversity Education Units as a measurable method for higher education institutions to comply with legal requirements for diversity and social obligations for diversity. Diversity Education Units (DEU) standards define 16 categories of diversity: (1) Age; (2) Color; (3) Disability; (4) Environment; (5) Ethnicity; (6) Gender expression; (7) Gender identity: (8) Government; (9) Income inequality; (10) Life course; (11) Nationality; (12) Race; (13) Religion; (14) Sex; (15) Sexual orientation; (16) Social Justice Issues."

**Keywords: HBCU, Diversity, Equity, Inclusion**
**Social Impact: Higher Education**

**Hikmatu Awudu**
Michigan State University

*Excluding Migrant Laborers: Social Identity and Natural Resource Struggles in Agricultural Intensification Programs in Ghana*

How do efforts to improve agricultural productivity transform power relations for farm owners and labor migrants in the Global South? The recent literature on migration recognizes the influence of place on migrants in the Global South compared to those in the Global North. In the Global North, government policies regulate migrant experiences and their access to political rights and community amenities and assistance programs. By contrast, migration in the Global South occurs through relatively porous borders, with low costs, and informal contexts of reception where cultural and linguistic affinities matter more. Additionally, access to land occupies an important place for labor migrants who perform agricultural work in the Global South. Sharecropping and caretaking arrangements, for example, can regulate a migrant's access to land. Despite the differences between the Global South and the North, the scholarship that focuses on migration in the Global South analyzes the economic causes, implications, mechanisms of control, and the construction of care regimes. These approaches miss how efforts to improve agricultural production through techno-scientific means impact labor migrants and farm owners differently. My dissertation research takes a different approach to migration in the Global South by examining the connections between agricultural intensification and the power wielded by farm owners and labor migrants in Ghana. I will draw on feminist standpoint and situated knowledge methodologies, including in-depth interviews, participant observation, and analyzing secondary documents from the Ghana Cocoa

Board. By focusing on migrant labor, the study will theoretically and empirically contribute to understanding the dynamics of migration within the Global South - specifically in the agricultural context; and how interventions to improve productivity deferentially impact social groups.
**Keywords: Migrant laborer, Social identity, agricultural intensification, natural resource struggles**
**Social Impact: Environment**

**Jenika Scott**
Rutgers University

*Teenage Problematic Sexual Behaviors: An Assessment of the Social Factors that impact Teenage Problematic Sexual Behaviors*

Teenage Problematic Sexual Behaviors (PSBs) are developmentally inappropriate or intrusive sexual acts that typically involve coercion or distress among 42-73% of children by 13. This paper will examine how social factors (individual, relationship, community, and society) can positively and negatively affect PSB. The researcher will retrieve data collected from an ongoing Delphi study conducted by Dr. Duron of 30 clinicians to shed light on the social challenges, needs, and protective factors associated with problematic teenage behaviors.
**Keywords: Problematic Sexual Behaviors, Teenaged, Child, Social Factors**
**Social Impact: Mental Health**

**Kamali Clora**
Wayne State University

*Developing a Black Student-Led Support Infrastructure at a PWI*

Since 2016, Wayne State University (WSU) has utilized a tiered, culturally competent approach to support Black male students. WSU is the nation's fastest-improving university for graduation rates from 27% to 47%. This movement sprouted the commencement of programs and organizations focused on narrowing the student population achievement gap including men of color. The approach highlighted here is THE BROTHERHOOD, a student-led organization geared towards undergraduate Black men. This tier of the larger initiative concentrates on social action and student engagement while encompassing facets of academic, social, and emotional wellness. We conducted a study to obtain quantitative and qualitative data about the potential impact this organization had on Black male undergraduate students. Our results suggest that WSU Black males participating in THE BROTHERHOOD have performed better academically than the other Black WSU students in their cohort. Additionally, we found that these members received important transferable skills applicable to their career fields through THE BROTHERHOOD. Here we describe the fundamental components of THE BROTHERHOOD that are attributed to these findings.
**Keywords: education disparities, Black graduation rates**
**Social Impact: Social Equity**

**Markita Jones**
North Carolina Central University

*Understanding the Relationship Between COVID-19 Knowledge, Risk Perception, and Precautionary Health-Related Behaviors Among HBCU College Students*

Currently, the COVID-19 pandemic has adversely impacted. In the US, over 45 million people have been infected by the COVID-19, and over 700,000 have died (CDC, 2021). Globally, over 241 million people have been infected by COVID-19, and over 4 million have died (WHO, 2021). African Americans have a disproportionate number of people affected. Currently, 11.8% of incidences of COVID-19 have been among African Americans, and 13.9% have died (CDC, 2021). African Americans are more likely to catch and die from COVID-19. Recent trends in COVID-19 and the new delta variant have adversely impacted youth and emerging adults. African American youth and young adults with preexisting conditions and not vaccinated are more likely to become infected and die. This has been a key concern for institutions of higher education. Given that most historically black colleges are in low-income communities of color, controlling infection rates on these campuses has become a tenuous process at best. Administrators and health educators at HBCUs have implemented stringent COVID-19 protocols, testing, and distribution of vaccination rates among students and the black community continue to be higher. The present study sought to understand the relationship between knowledge

about COVID-19, students' perceptions of their risk, and precautionary health-related behaviors at HBCUs. Spearman Rho correlation will be used to assess the relationship between knowledge of COVID-19, perceptions of risk, and precautionary health-related behaviors. 128 students from a Historically Black College in the Mid-Atlantic were sampled via Qualtrics. This data is inclusive and ongoing due to new variants (i.e., delta). Students' knowledge and risk perception were associated with precautionary health-related behaviors. Given the disproportionately rates among African American communities and close HBCU proximity, there is a need to understand how COVID-19 and perception of risk are related to protective health-related behaviors. This may aid in reducing incidences of COVID-19 in communities of colors isolated by economics and geography.

**Keywords: COVID-19 knowledge, HBCUs, ethnodrama**
**Social Impact: Healthcare**

**Melissa Ceren**

CUNY John Jay College of Criminal Justice

*Viewing Art Virtually: Benefits of Aesthetic experience on Mood Improvement and Emotion Regulation Strategy*

During the COVID-19 pandemic, individuals were found to use the arts as a form of distraction and escape (Drake et al., in preparation). Research has shown that drawing improves mood in adults when used as a form of distraction rather than expression (Drake & Winner, 2012). Do the benefits of engaging in the arts also extend to viewing art? This study investigated the aesthetic and mood experience of viewing art when participants were asked to focus on the visual properties of works vs. their emotional experience when viewing the works. Participants were 60 mTurk users who were randomly assigned to one of the three conditions: Visual Properties, Introspection, or a Control. Each condition viewed 8 paintings (4 positive and 4 negative). In the Visual Properties condition, participants were asked to identify the elements of each painting—line, shapes, colors, and light. In the Introspection condition, participants were asked to reflect on their own emotions when viewing each painting. In the Control condition, participants passively viewed each painting. All conditions rated how each painting 'moved' them. After viewing the images, all conditions reported their mood improvement and use of emotional regulation strategies. We found that being moved was positively correlated with participants' experience of positive and negative emotions, suggesting that participants experienced mixed emotions while viewing paintings. Across conditions, there were no differences in being moved, positive affect, or negative affect. Additionally, participants were more likely to use the viewing experience as an approach to emotion regulation strategy than a self-development strategy. Findings of this study show that art viewers are: (1) being moved is related to the experience to both positive and negative emotions; (2) being moved by both positive and negative images; (3) participants utilized approach as a form of ERS. However, limitations include whether participants utilized 3 minutes of viewing the artwork without distractions; moreover, the dataset does have a limitation based on participants who had art training or were professional artists due to their experience on viewing and examining the minutiae of paintings. Future studies should explore various art mediums with other kinds of negative and positive emotions in museums or lab settings. Furthermore, future studies should analyze paintings or various mediums of artworks created by BIPOC or LGBTQ+ artists for greater equity, diversity, and inclusion within the arts.

**Keywords: Arts, Emotional Regulation, COVID-19 Pandemic, Museum Studies**
**Social Impact: Healthcare**

**Selma Kaltak**
Wayne State University

*Intergenerational Trauma and Its Impact on the Offspring of Refugees: A review of the literature*

With the rising amount of conflict seen around the world, the number of refugees has reached to unimaginable proportions. Severely traumatic experiences have caused a rise in various mental disorders amongst refugees compared to the general population. Studies have shown that the effects of traumatic experiences can be inherited by future

generations. This is known as the intergenerational transfer of trauma. Research on the offspring of Holocaust survivors have fueled this field. However, refugees, specifically from ethnic minority groups, have been underrepresented in post-traumatic stress disorder research. This literature review will examine the limited data available on intergenerational trauma between refugees or survivors of war and their offspring. The prevalence of intergenerational trauma will be discussed, as well as different factors that can fuel the transmission such as parenting styles and neurobiological changes. The main findings of this review include a higher prevalence of psychopathology in the offspring of trauma survivors. In addition to this, more research needs to be conducted on various parental styles and genetic predispositions to determine a possible correlation.

**Keywords: intergenerational trauma; refugees**
**Social Impact: Family Relations**

**Shanterra Holmes**
Siena Heights University

*The Experiences of Women in the United States Healthcare System*

This study will be examining the experiences of women in the United States healthcare system. In recent years the overall negative health outcomes amongst women in the United States have been rising. Of all ethnicities, African American women have the highest rates of negative medical outcomes and report the highest rate of discrimination in the United States healthcare system and the least overall satisfaction with their quality of healthcare. This qualitative study will be comprised of a virtual survey and interview process where women will be given the opportunity to share the experiences that they have had. It is hypothesized that women who report less satisfaction with their healthcare quality will have more negative healthcare outcomes. The healthcare system was not established with all individuals in mind. It serves a diverse range of patients and therefore needs to be structured to meet their needs. Individuals are treated differently in society based on their identity. This can include identity components such as ethnicity, sexuality, and gender, among others. All individual's experiences are unique in the various environments they are exposed to due to the intersectionality of identity constituents. The CDC has reported African-American women to have higher overall negative health risks than women of other ethnicities. Many factors contribute to this, all connected to the institutional imbalance in access to quality healthcare for all. According to WHO, in 2018, the U.S had the 2nd highest maternal mortality rate, with Mexico having the highest. This issue of the negative medical outcomes of women's rates rising in America affects not only women but also their families. This issue can potentially affect the access to quality healthcare of future generations of women as well.

**Keywords: Healthcare equity, Maternal mortality, social determinants of health**
**Social Impact: Healthcare**

**Victoria Corona**
Texas A&M University-Kingsville

*Composer Diversity in Solo Vocal Repertoire*

Throughout history, female composers have been overlooked in favor of their male counterparts to a great degree. By ignoring female composers' contributions, the male dominance in representation in vocal literature continues without correction. Even with plentiful composed selections by females, educators remain close-minded when choosing vocal solos for their students. This paper aims to state the issue of how limited music educators are in assigning repertoire and offer suggestions that can diversify the repertoire being assigned. This paper will demonstrate the lack of female composers represented in the most common published vocal anthology books and vocal solo competition repertoire lists in Texas. Throughout the paper, I will be including discussions with distinguished voice teachers and significant people at the forefront of vocal diversity research. I will also be recommending art songs composed by women for high school and college singers that can function just as well as the traditional male-dominant selections. Results show that female compositions are woefully discounted in the NATS competition list, 38 published anthology books, and the list of vocal piece selections for all 3 classes on the UIL PML list.

**Keywords: Gender diversity, student teaching, multiculturalism in the arts**
**Social Impact: Social Equity**

**Yasmin Landa**
University of Washington

*The Effects of Inpatient Psychiatric Socio-Physical Experience on Posthospitalization Treatment*

Driven by a desire to provide more humane treatment of psychiatric patients, the deinstitutionalization of massive psychiatric hospitals occurred in the 1970s and 1980s. This movement improved the physical and social environment of psychiatric hospitals, aiding in the transition away from prison-like hospitals. Still, there remains opportunities for growth if the psychiatry field aims to engage and provide patients with a fully therapeutic setting in psychiatric hospitals. This research explores the relationship between a patient's social and physical experience in a psychiatric hospital and their engagement with mental health treatment after discharge. It analyzes the physical environment of a psychiatric unit and explores mental health professionals' views on guidelines for maintaining a therapeutic environment in these spaces. Using qualitative methodology, including ethnographic observations, photographs, and interviews, I provide an analysis discussing the environmental factors of psychiatric rooms through the evaluation of room design and its effectiveness in creating a therapeutic environment. Preliminary results indicate a possible negative relationship between a patient's socio-physical experience in an inpatient psychiatric facility and their engagement in future treatment after discharge.They also point to a possible relationship between consent and a patient's receptivity to post-hospitalization treatment. Patient receptivity may be different between those who voluntarily admitted themselves. In contrast to those who were involuntarily admitted and exposed to the psychiatric hospitalization environment. Study findings will enable mental health providers to better understand the relationship of socio-physical aspects in psychiatric hospitals on the continuation of a patient's treatment after discharge. This information will help providers improve upon these experiences and hence, increase a patient's receptivity to post-hospitalization treatment.

**Keywords: Increased Mental Health Awareness, Decreased Mental Health Stigmatization**
**Social Impact: Mental Health**

# 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@grd.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.