ABSTRACT BOOK

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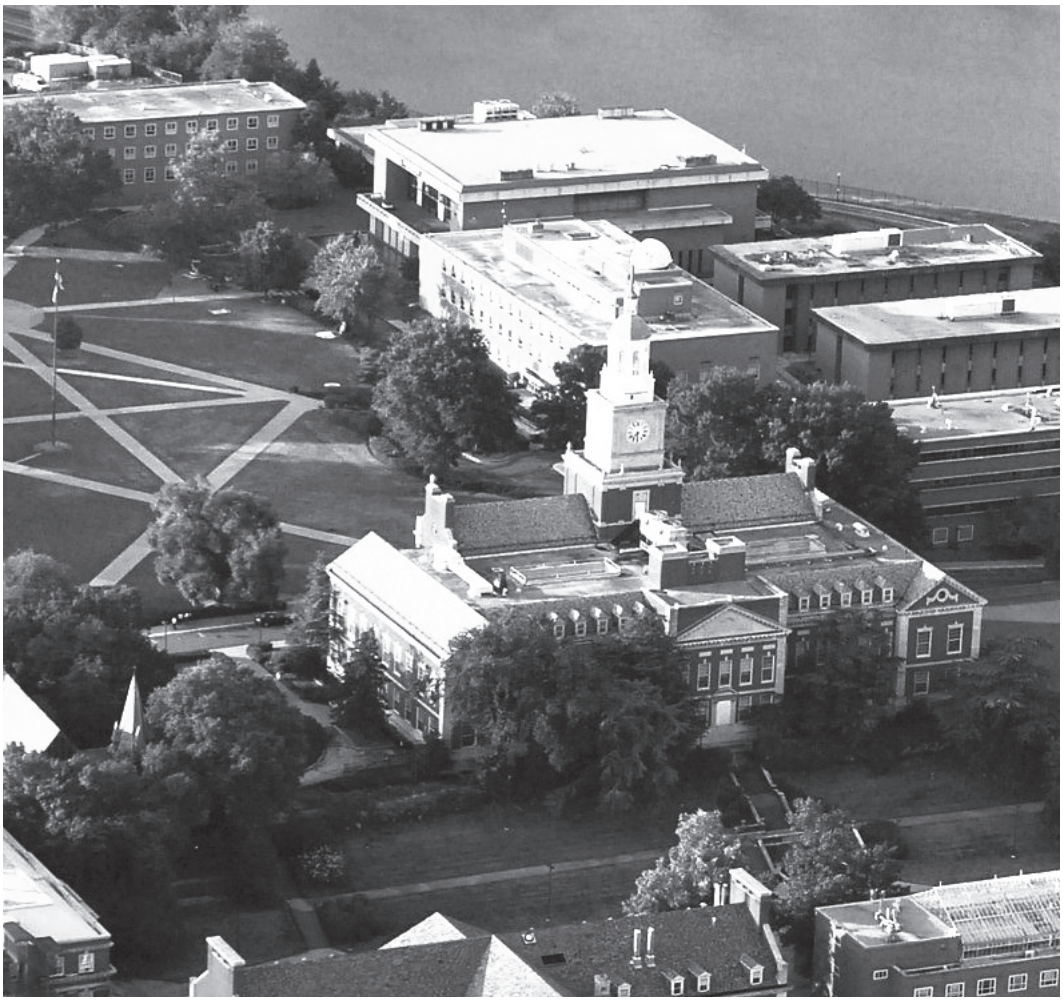
HOWARD UNIVERSITY RESEARCH SYMPOSIUM

APRIL 25-26, 2024

HOWARD UNIVERSITY

RESEARCH SYMPOSIUM



Abstract Book

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BIOLOGICAL & BIOMEDICAL SCIENCES

Bell's Palsy in the 21st Century; An update
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Presentation Type: Poster Presentation
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Background: Bell's Palsy, also known as acute peripheral facial palsy, is a form of facial paralysis that inhibits the body's ability to move one side of the face, causing the affected area to be weak or paralyzed. Dating back to 1774, this disease attracted the scientific community due to it having no proven cause and no cure. Today, it still remains a scientific dogma because of its idiopathy. However, through clinical and scientific research, treatments have been put into place to ease the severity of the paralysis as well as recovering the facial nerve function. Materials & Methods: To unveil the fact, PubMed, Google Scholars, and specially the NIH's NINDS on Bell's palsy was searched thoroughly for the genesis of the disease and the remedies for the cure and being abstracted in this presentation. Results: In recent biomedical practices improvements on surgery (facial reanimation procedure), medications (steroids, analgesics such as acetaminophen, aspirin, ibuprofen), eye protection, physical therapy, and research that mostly aims to realign the face and restore facial movement have been made. Preventative measures such as managing existing conditions (diabetes, obesity, high blood pressure) are encouraged for individuals suffering from this disease to lessen the severity. Discussion & Conclusion: While there is still no cure and an absence of any significant cause to date, an immense amount of clinical research has been conducted and there are a wide range of medical procedures and preventative measures created to ease the severity of the affected individual with Bell's Palsy.

Understanding Organismal Ecology of Identified Ant Species Through DNA Barcoding
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The DNA barcoding project lets individuals identify various species by their genes and see their relations with other organisms. In completing this project more was understood about how DNA barcoding allows the discovery and ability to catalog biodiversity through a database. The information expands human knowledge about biodiversity, conservation biology and human effects on the ecosystem. By comparing the sequences, we can see the relation to multiple species. Ants are not easily distinguished nor placed in the correct taxonomy by their appearance. An ant specimen was collected on Howard University's campus, directly below a tree by the main entrance of Ernest E. Just Hall. To preserve the ants collected, 95% ethanol was used. The specimen's DNA was extracted using Chelex. The sample was then run through Gel electrophoresis for visualization and analysis of the DNA. PCR was used to amplify the COI coding region of DNA, followed by DNA sequencing. Lastly, the website "dnasubway.cyverse" was used to perform a bioinformatic analysis to narrow down the identity of the ant specimen in comparison to other related species. MRK-511 was identified as Tapinoma sessile. The identified species survives in open soil and leaf piles. These ants can be found across the United States, suggesting that they adapt to varied environments.

Understanding Addiction through AI: A predictive analysis powered by machine learning models
Presenter's Name: Dickson Acheampong
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Better predictive models are needed to identify people who are more likely to consume opioids and cocaine because of the drug's prevalence and the socioeconomic and health impact effects that are linked to it. This study investigates how well three machine learning algorithms—Lasso regression, Support Vector Machine (SVM), and Random Forest—predict opioid cocaine usage in people based on a variety of socioeconomic and demographic factors, such as age, sex, income, and education level. We applied these models to a dataset of people classified as opioid cocaine users and non-users in order to identify the most important predictors of opioid use. According to preliminary findings, the models' levels of accuracy vary. By providing insights into the potential of machine learning techniques to identify high-risk individuals and enable more targeted interventions, this study advances the area of substance use prediction. The results highlight how crucial it is to include cutting-edge computational techniques into public health initiatives to address substance use problems. Furthermore, our work creates opportunities for further research to improve predictive models and investigate how well they work for various demographics and drugs.

Evaluation of Antitumor Effects of PSMA-Targeted Drug Loaded Nanoparticles in Cellular and Xenograft Models of Prostate Cancer
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Objective: To evaluate the antitumor effect of prostate specific membrane antigen (PSMA)-targeted, brusatol- and docetaxel-loaded nanoparticles in cellular and xenograft models of prostate cancer. Methods: Urea-based PSMA targeting ligand was synthesized, linked to PLGA-PEG copolymer, and used for the fabrication of nanoparticles. The in vitro cytotoxicity of the PSMA-targeted nanoparticles on LNCaP and PC-3 prostate cancer cells was investigated using the CyQUANT XTT cell viability assay. To determine the impact of reactive oxygen species (ROS) levels, intracellular concentrations of ROS were measured using the 2',7'-dichlorodihydrofluorescein diacetate (H2DCFDA) assay. Additionally, maximum tolerated dose (MTD) studies and determination of antitumor efficacy in male athymic BALB/c nude mice were done. Results: The nanoparticle formulation showed time- and concentration-dependent toxicity against LNCaP and PC-3 cells. Furthermore, greater cell death was observed in PSMA positive LNCaP cells treated with drug-loaded PSMA-targeted nanoparticles compared to PSMA negative PC-3 cells. Additionally, data show a clear increase in ROS levels in LNCaP cells treated with the PSMA targeted nanoparticles when compared with PC-3 cells treated with the same nanoparticle concentrations. MTD studies revealed no mortality, no abnormal clinical observations, and no significant differences in the weights of mice treated for the duration of the experiment. Furthermore, evaluation of the means of the tumor volumes across the different treatment groups show that brusatol-containing nanoparticles contribute to tumor suppressive effect of the nanoparticles. Conclusions: PSMA targeted combination chemotherapy using brusatol and docetaxel in a nanoparticle platform shows synergistic antitumor effects and is suitable for targeting PSMA positive prostate cancer.

How can DNA barcoding contribute to the assessment of ant biodiversity and conservation efforts?

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Ants belong to a widespread and ecologically significant group of insects that are essential to ecosystems all around the world. Maintaining the health and functionality of ecosystems requires evaluating ant biodiversity and putting into practice efficient conservation measures. A valuable technique for researching ant biodiversity and guiding conservation efforts is DNA barcoding. Even when distinguishing between cryptic or physically similar species, DNA barcoding allows for quick and precise species identification through the analysis of standardized DNA sequences, such as the mitochondrial cytochrome c oxidase subunit 1 (COI) gene. Through the use of molecular techniques, previously unknown ant species can be found and information on their distribution, genetic diversity, and evolutionary links can be gathered. Additionally, DNA barcoding helps track ant population fluctuations brought on by habitat loss, climate change, and the introduction of invasive species, which helps guide strategy development and conservation goals. The areas in which we expect to have results are ant species identification and successful ways to preserve ant populations. To improve research capacities and enable global assessments of ant biodiversity, collaborative projects like the Global Soil Biodiversity Initiative seek to create extensive DNA barcode libraries spanning more than 200 years of ant species worldwide (Global Soil Biodiversity Initiative). DNA barcoding has significant promise for improving our understanding of ant biodiversity and helping conservation efforts in a world where ants are becoming more and more vulnerable, despite obstacles relating to taxonomic complexity and database completeness.

Additive Effects of Turmeric Forte Supplement on Type-2 Diabetes Mellitus in Sprague Dawley Rats Fed Nauclea Latifolia Root Extracts

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Background: This study aimed to explore the antidiabetic effects of Nauclea latifolia (N. latifolia) root extracts and the additive effect of turmeric forte supplement in T2DM Sprague Dawley (SD) rats. Methodology: Over fourteen days, sixteen male SD rats were categorized into three groups: normal control, intervention group 1, and intervention group 2. Intervention group 1 received N. Latifolia root extracts at a dose of 240 mg/kg, and intervention group 2 was given a combination of N. Latifolia and turmeric forte supplement, dosed at 240 mg/kg and 20 mg/kg, respectively. The normal control group was given an equivalent amount of distilled water. Results: The intervention group 2 exhibited a significant reduction in fasting blood glucose (FBG) within 2 hours of treatment ($p < 0.05$). The intervention group 1 displayed a steady decline in FBG levels and significant reduction was observed at timepoint 8 and the study's endpoint compared to their initial baseline. Triglyceride (TG) levels in intervention group 1 were significantly higher than those in the control group ($p < 0.05$). Intervention group 2 exhibited reduced total cholesterol (TC) and low-density lipoprotein (LDL) levels compared to the other groups. High-density lipoprotein (HDL) was improved in intervention group 1 and intervention group 2 compared to the normal control group, but the result was not statistically significant. Conclusion: The study highlights the potential benefits of herbal interventions on FBG and lipid profiles. Further research, extending over a longer duration and involving different doses, is recommended to ascertain the full impact of these interventions.

Latent Autoimmune Disease (LADA) in African American Adults: Role of PFKFB3 Gene and Pathways in T2DM African American Patients

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Background: Type 2 diabetes (T2DM) is most prevalent in African Americans (AA) and studies show that 10% of adults are misdiagnosed with T2DM when having Latent Autoimmune Diabetes in Adults

(LADA), an autoimmune that damages the insulin- producing cells in the pancreas. LADA shares features of both type 1 and 2 diabetes and is called type 1.5 diabetes gene PFKFB3 has been identified as a functional candidate gene for glycolysis. The upregulation of PFKFB3 is involved in signaling pathways of AMPK and SIRT1. We further investigated the activation and inhibition of such regulatory genes connected to PFKFB3 regulation in the AA population. Methods: The blood-based whole transcriptome information was further explored from our previously analyzed diabetic patients at Howard University Hospital. Differential gene expression data was analyzed to study the expression status of all the targeted genes. Ingenuity Pathway Analysis was used to study pathway, network, and upstream/downstream regulator genes. The diabetic information was correlated to the blood transcriptome data. Results: Top 15 molecules related to PFKFB3 were BCAR4, CXCL2, EPAS1, FGF2, ICAM, IL15, IL1B, KLF6, mir-34, PALMD, PDGFB, TGFB1, TNF, TP53, and VCAM1. In the network analysis, inhibition of TP53 and the activation of CD24 and TCF7L2 were observed in all participants. The major canonical pathways observed were Sirtuin Signaling pathway, T2DM Signaling, AMPK signaling, and Apoptosis Signaling pathways. Conclusion: The information obtained could contribute to a better understanding of correlation between the gene PFKFB3 and T2DM and better glycemic control for T2DM patients.

"Which ant species are found in certain climates?"

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In Biology 101, students were asked to utilize materials to collect ants to determine the behavior of ants on campus. The materials included: a plastic cup, gloves, a piece of a hot dog, a marker flag, 70% ethanol solution, small test tubes, and a pipette. The methods used: First the ants were collected from different locations around Howard University's campus and were sent to the ant lab. Then Chelex DNA extractions and gel electrophoresis were used to determine the species. Next, PCR analysis was utilized to amplify specific DNA sequences. Bioinformatic tools in the DNA Subway Blue Line were used to edit DNA sequences to create DNA barcodes and phylogenetic trees to determine the taxonomic identity. After analyzing the prominent species in the area, it was found that Liser Niger is the main species of ant found in Washington D.C. or any deciduous forest where there is rarely any litter and the soil is fine organic. During this lab, DNA was extracted from one ant species which was collected before this lab. The DNA was given to the lA and the results were captured. The habitat's characteristics of a temperate climate are indicative of the species present in Washington D.C. and regions with deciduous forests. The experiment found that a specific species of ants live in this climate and could be found around this northern region. This discovery inspired us as researchers to pose the question, "Which ant species are found in certain climates?"

Traumatic Brain Injuries and Alzheimer's Disease in African American Veterans

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Alzheimer's disease (AD) is a disease of the brain that affects memory, thinking, and behavior. African Americans are twice as likely to develop AD than non-Hispanic whites due to their specific genetic makeup and disease pathways involved. Traumatic brain injuries (TBIs) are injuries to the brain that cause severe physiological damages that can happen with or without losing consciousness and are now considered a significant risk factor for developing AD later in life. PubMed, the Alzheimer's Association site, and National Institute on Aging (NIA) at the National Institute of Health (NIH) were consulted to capture the information with the keywords "Traumatic brain injury" + "African American Veterans"+ "Alzheimer's." The top 10 most relevant articles were used for the observational information portrayed herein. The veterans from Iraq and Afghanistan are reporting that between 5% and 35% had sustained a mild traumatic brain injury (mTBI), also known as a concussion. After these wars, TBIs became the "signature injury" because of the new and widely spread use of improvised explosive devices (IEDs). However, with mild TBIs going under-reported, the risk of developing further brain cognition issues is rising. It was reported that even mild TBIs without loss of consciousness show a two-fold increase in the risk of developing Alzheimer's. With a higher enrollment of African Americans into the military and traumatic brain injuries continuing to plague our veterans, it appears that this problem will persist unless a cure for the disease and early detection of TBIs are found with more AA veterans included in the research.

Neural Inhibition of Insulin Resistance Genes and Mitochondrial Strengthening to Combat Early-Onset Dementia

Presenter's Name: Anthony Asante-Danso
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Background: The etiology of early-onset dementia remains multifactorial. Emerging evidence suggests a potential link between insulin resistance and neurodegeneration. This research presentation aims to explore and proposes a novel therapeutic approach to neural inhibiting insulin resistance (IR) genes to mitigate the Alzheimer's Disease (AD) to early-onset dementia progression. Methods: To enquire about such interaction, literature reviews and the abstraction done form the PubMed, Google Scholar and from NCBI, gene databases with special references to frontal cortex human brain samples from research centers focused on AD, Dementia, or Diabetic Research. Results: Abnormality was observed in the AD brain viz., as dysregulation from IRS1, INSR,

and the APOE4 genes Insulin resistance that traditionally associated with metabolic disorders that manifests as altered mitochondrial function and chronic inflammation. It further exacerbates metabolic homeostasis typified by hyperinsulinemia, hyperglycemia, and hyperlipidemia that drives metabolic syndrome and diseases such as type 2 diabetes, obesity, cardiovascular disease, chronic inflammation, and neurodegeneration. Discussion & Conclusion: Neural inhibition of insulin resistance as a therapeutic strategy for early-onset dementia is becoming important these days. By integrating multidisciplinary expertise from neuroscience, pharmacology, and neuroengineering, we aspire to pave the way for innovative treatments that could revolutionize dementia care and improve the quality of life for millions worldwide. Moving forward, the effects of inhibiting genes such as APOE4 can be closely analyzed to mitigate adverse effects. If successful, the next step would be developing a pharmaceutical as well as a holistic form of this drug to administer to communities that are disproportionately affected.

The impact of climate change on the regeneration of Hydra viridissima

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Presentation Type: Poster Presentation
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Hydra viridissima is a freshwater cnidarian commonly found in northern temperate climates. The species is commonly known as green hydra because of their coloration due to symbiotic green algae Chlorella vulgaris in their endodermal epithelial cells. Hydra viridissima is among the few organisms with immense regeneration abilities, including cellular-level regeneration, making it an excellent model organism in regeneration studies. They are capable of whole-body regeneration from longitudinal or transversal amputation and regeneration from amputated tentacles. This ability may be inhibited or encouraged depending on the climate of their habitat. As climate change continues to impact ecosystem s worldwide with fluctuating temperatures, it's crucial to investigate how organisms will respond. This study seeks to explore how the regenerative abilities of green hydra are influenced by varying temperatures. Additionally, this study investigates how the regeneration process influences its speed afterward. We predict that at higher temperatures, the regenerative ability of green hydras will increase, corresponding to an increased rate of movement through the water post-regeneration. We will measure the minimum/maximum lengths of each hydra and the speed at which they can travel in a minute. We will then cut the hydras under a microscope to test their regeneration abilities. We will place the hydras at three different temperature points and measure their minimum/maximum length and speed after regeneration, and how long they can regenerate to see if the temperature change affects any of those aspects.

How efficient is the use of DNA barcoding technology in biodiversity and species identification in relation to the Prionopelta species?

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Presentation Type: Poster Presentation
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An exploratory study of the ant species present on Howard University's campus was performed. Urban areas and especially Howard support a surprising diversity of species. Howard University offers a singular microcosm for investigating ant ecology in an urban environment. A purpose of this study is to look into the diversity of ant species on campus in different settings, as well as finding out how efficient and effective using DNA barcoding can be in locating biodiversity relating to the Prionpelta species. Phylogenetic analysis and species identification are made easier with DNA barcoding, and many biologists and scientists use it to identify particularly new or unknown species. DNA barcoding provides important new information about the evolutionary history and biogeographic distribution of the Prionopelta genus, which includes these little-studied ants. A reliable kit known for its efficiency with ant specimens was used for DNA extraction. The COI gene region, a common mitochondrial DNA marker for animal barcoding, was targeted for PCR amplification using specific primers designed for the cytochrome oxidase of ants. Sequencing was performed using a reliable Sanger sequencing platform, with sequencing parameters specified for high-quality sequences. Bioinformatics tools such as BLAST and BOLD were used for data analysis. By using DNA analysis, scientists can clarify patterns of speciation and dissemination, and uncover hidden species complexes This experiment demonstrates the potential of DNA barcoding as an effective technique for studying biodiversity. The DNA extracted from the ant was loaded into the gel electrophoresis chamber and then the results were shown weeks later.

The Interplay between Alzheimer's Disease and Substance Abuse

Presenter's Name: Kaleb Barnes
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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Alzheimer's disease (AD) and substance abuse are two distinct but interrelated health issues that affect a significant number of individuals. This scientific abstract aims to provide a thorough examination of the current understanding of the relationship between these two conditions. The objective is to outline the shared factors that impact both, including the neurobiological mechanisms and clinical implications of their co-occurrence. Numerous epidemiological research studies have revealed a direct correlation between substance abuse exposure and increased susceptibility to AD. To uncover the intersection between these factors, a thorough comprehension of abnormalities in neurotransmitter systems, genetic predisposition, and environmental factors is crucial. Ongoing research into the effects of substance abuse on cognitive function indicates a direct link, accelerating neurodegeneration and causing heightened impairment. Substance abuse and Alzheimer's disease

share biological pathways involving neurotransmitters like dopamine, glutamate, and GABA. Chronic substance abuse can accelerate AD's neurodegeneration, while AD could increase susceptibility to the neurotoxic effects of substances. Researchers face significant challenges in addressing the intersection between substance abuse and AD, given the complexities of treating both issues and the lack of adequate support networks and treatments. In summary, the study emphasizes the importance of approaching the intersection between AD and substance abuse from a wide lens. This research aims to improve strategies for preventing, diagnosing, and treating individuals with Alzheimer's Disease and substance abuse. Through exploring shared neurobiological mechanisms and potential therapies, we can make significant progress in addressing these challenges.

Bmr and Sugar Traits Improve Feed Value in Sorghum (Sorghum bicolor) Genotypes

Presenter's Name: Ian Barnett
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Presentation Type: Poster Presentation
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Sorghum (Sorghum bicolor) is a drought resilient cereal crop that can be grown sustainably and efficiently in arid and semi-arid lands (ASALs). Fodder genotypes were developed in response to the livestock sector that dominates the expansive ASALs of Kenya. Sweet-stalk and Bmr sorghum were crossed to obtain a more nutritive fodder sorghum. Several lines were obtained and the current study evaluated eleven of the stable lines against two parental and two commercial varieties. The fifteen genotypes were grown in a greenhouse in a RCBD and replicated three times. They were sampled for dry matter and proximate analysis at the booting growth stage. Results show that there are sorghum varieties that have high minerals and protein content when compared to the commercial varieties of E1291 and Sugargraze. Incorporating sugar and BMR traits improve fodder sorghum quality.

Evaluation of the Efficacy of DNA Barcoding

Presenter's Name: Joshua Bartley
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In this comprehensive study, we aimed to explore the diversity of ant species on Howard University's campus by amplifying the COI barcode from their DNA using a mini PCR technique. Utilizing the Polymerase Chain Reaction (PCR) method allowed for the generation of millions of copies of specific DNA sequences, essential for species identification via the cytochrome c oxidase subunit I gene within mitochondrial DNA. Our collection method was designed to attract ants using hot dog sausage pieces attached to marker flags, placed within observed active areas in soil and mulch patches. This approach allowed for the successful collection of several ants, which were then preserved in ethanol for detailed analysis. The habitats from which these specimens were collected were documented as well as the behavioral observations made upon interaction with the bait. The DNA extraction and PCR amplification focused on the COI barcode, employing temperature-controlled denaturation, annealing, and extension phases to ensure precise sequence amplification. The successfully amplified DNA was then shipped off for sequencing. Analysis of the sequenced DNA via the DNA Subway website facilitated species identification. Our research which included BLAST searches, MUSCLE alignments, and phylogenetic trees, revealed a rich diversity of ants, with Nylanderia Sakurae identified as the closest taxonomic match, indicating the method's accuracy. This study highlights the ecological significance of ants in urban settings and the efficacy of DNA barcoding in species identification.

Studying the isoform-specific role of the RNA-binding protein ETR-1 in Caenorhabditis elegans reproduction

Presenter's Name: Sydney Bell
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
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ELAV-Type RNA-binding protein (ETR-1) is an RNA-binding protein (RPB) of the highly conserved CELF/Bruno family. In Caenorhabditis elegans, ETR-1 is needed for full hermaphrodite reproductive capacity. In Caenorhabditis elegans, ETR-1 is essential for full hermaphrodite reproductive capacity, as evidenced by significantly reduced brood size in ETR-1-depleted animals. This study aims to determine the isoform-specific, spatiotemporal role of ETR-1 in C. elegans reproduction. ETR-1 is highly alternatively spliced, but of particular interest are ETR-1 isoforms A and B, which are the only two containing exon 8 and have been implicated in a reproductive capacity. We show that etr-1(lq61) mutants, possessing a premature stop codon in exon 8, exhibit temperature sensitivity, resulting in greater brood reductions at temperatures outside the standard of 20°C. Yet, the consequence of etr-1(lq61) on males remains unexplored. Introduction of the him-5(e1490) mutant allele was used to readily study the effects of ETR-1 on males. Double mutant etr-1(lq61); him-5(e1490) animals exhibit reduced brood sizes compared to wild type animals, similar to etr-1(lq61) animals. Sequencing of exon 8 of etr-1(lq61), reveals the C to T variation is located at a position downstream to the previously published location. In investigating the effects of etr-1(lq61) on male reproductive capacity, etr-1(lq61); him-5(e1490) males were mated to feminized fog-2(q71) hermaphrodites. We show that supplementing sperm from etr-1(lq61); him-5(e1490) males does not rescue fog-2(q71) sterility. Overall, these findings contribute to understanding the function of ETR-1 in C. elegans reproduction.

Studying the isoform-specific role of the RNA-binding protein ETR-1 in Caenorhabditis elegans reproduction

Presenter's Name: Sydney Bell
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
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ELAV-Type RNA-binding protein (ETR-1) is an RNA-binding protein (RPB) of the highly conserved CELF/Bruno family. In Caenorhabditis elegans, ETR-1 is needed for full hermaphrodite reproductive capacity. In Caenorhabditis elegans, ETR-1 is essential for full hermaphrodite reproductive capacity, as evidenced by significantly reduced brood size in ETR-1-depleted animals. This study aims to determine the isoform-specific, spatiotemporal role of ETR-1 in C. elegans reproduction. ETR-1 is highly alternatively spliced, but of particular interest are ETR-1 isoforms A and B, which are the only two containing exon 8 and have been implicated in a reproductive capacity. We show that etr-1(lq61) mutants, possessing a premature stop codon in exon 8, exhibit temperature sensitivity, resulting in greater brood reductions at temperatures outside the standard of 20°C. Yet, the consequence of etr-1(lq61) on males remains unexplored. Introduction of the him-5(e1490) mutant allele was used to readily study the effects of ETR-1 on males. Double mutant etr-1(lq61); him-5(e1490) animals exhibit reduced brood sizes compared to wild type animals, similar to etr-1(lq61) animals. Sequencing of exon 8 of etr-1(lq61), reveals the C to T variation is located at a position downstream to the previously published location. In investigating the effects of etr-1(lq61) on male reproductive capacity, etr-1(lq61); him-5(e1490) males were mated to feminized fog-2(q71) hermaphrodites. We show that supplementing sperm from etr-1(lq61); him-5(e1490) males does not rescue fog-2(q71) sterility. Overall, these findings contribute to understanding the function of ETR-1 in C. elegans reproduction.

Falsies "An Esthetic Compromise to Infection Control"

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Women have longed for and sought out the perfect set of eyelashes that fulfill all beauty and esthetic desires; eyelashes that are long, thick, full, and remarkably enhance their beauty. Iridescent eyes are often seen to be a sign of beauty and are associated with a heightened level of appeal, assurance, and general esthetic welfare. Many options are available to give the look women often desire, including mascara and as of recent popularity "falsies" or artificial eyelashes that can be placed as individual lashes or as a strip adhering to the dermal margin of the eye with lash glue. There is very little evidence-based documentation in the literature on risk of infection from false eyelashes worn in clinical settings. In the typical dental office setting, microbial aerosols are repeatedly suspended in the air as a result of dental treatment utilizing high-speed handpieces and water-air spray syringe systems on a series of patients daily. Aerosol dispersion is relative to many factors including: the composition and ventilation of the area, the length and time at which the particles are projected across the air and remain suspended, and the actual size of the particles. The dispersion of aerosols suspended in the air and direct contact with aerosols as a practitioner can be a conduit for bacterial harvest due to the nature of fake eyelashes.

Culturally Relevant Nutrition Education and Health Outcomes in Elderly Black Americans

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Did you know that most of the Registered Dietitians in the United States are white, which means that federal nutrition guidelines focus on foods that cater to a white population and do not include many cultural foods? This can make it difficult for elderly African Americans to adhere to the dietary guidelines when they are counseled to prioritize foods with which they are not familiar. In fact, African Americans scored 52.7 on the Healthy Eating Index in 2015, which is below the 56.6 average score.We are conducting a study to assess the literature for effective methods of increasing nutrition knowledge among elderly African Americans by using health communication. We believe that it's essential to create nutrition interventions tailored to patients' cultural backgrounds to help improve their nutrition status. To conduct this study, we will use PubMed and Google Scholar to synthesize information for this systematic review. We will also consider other online databases if needed. By including the search terms "nutrition education" and "culturally relevant nutrition" in the search process, we aim to find the best methods for creating nutrition materials tailored to an elderly African American population. We hope our study will help inform policymakers and healthcare professionals on the importance of creating culturally relevant nutrition interventions to improve the nutrition status of elderly African Americans. Keywords: cultural nutrition, senior citizen health, tradition, African American nutrition, nutrition

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Olfaction and aging: at the crossroads of neurodevelopment and neurodegeneration

Presenter's Name: Naina Bhatia-Dey
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Presentation Type: Poster Presentation
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Olfactory dysfunction is a marker of the aging population and neurodegenerative conditions such as Parkinson's and Alzheimer's disease in subsections of the population with higher risk factors. Groups of individuals suffering with other disorders causing degenerative neuropathology, depressive disorders, progressive memory loss, and normal age-based decline in physiological functions as well as communication disorders, also display various olfactory deficits and/or olfactory dysfunction. Thus, olfaction modulates our communication ability early in development and later in life when the olfactory system displays dysfunction as prodromal marker of neurodegeneration. We attempt to understand and analyze the pathways that the olfactory system follows in between early and late time points while it comes under the influence of genetic and epigenetic factors that modulate physiological and behavioral symptoms. As a first step, we have conducted a comprehensive literature review and determined the following: during the COVID-19

pandemic, loss of olfaction and gustation has been widely observed and analyzed in COVID and long-COVID cases. Earlier studies have detected similar effects in other viral conditions. Olfactory bulb neurons play a crucial role in normal physiological function, its deviation, and emergence of pathological conditions as they transmit impulses to higher cortical and limbic structures. However, communication disorders such as autism and other autism spectrum disorders are neurodevelopmental disorders with complex etiology where a polygenic component is a predominant factor. In this group of disorders, symptoms develop early in life and are thought to be the outcome of genetic factors that control neural circuit assembly and synaptic wiring.

DNA Barcoding

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Traditional morphological identification utilizes morphological and phenotypic traits to differentiate between species, while DNA barcoding uses genetic information to identify species. DNA barcoding is a more effective method of specimen identification using short, standardized segments of DNA. Hot dog bait was used to lure ants for collecting. The ants were examined and identified through the Naturalist app and identified as Crematogastrine Ants. The results show that traditional morphological identification by iNaturalist does effectively distinguish between ant species; however, a more detailed conclusion can be made when using DNA barcoding. When using traditional morphological identification, scientists typically use microscopes to differentiate species but it's not as accurate. You can see the phenotypic differences between each specimen but not on a deeper or genetic level. When using BLAST via the DNA Subway, we were able to conclude more about the species of ant that was collected. We discovered that the ants are Tetramorium caespitum based on its top three BLAST hits and the bit score of 1246. We further learned its taxonomic rank, closely related species from an NJ/MJ Tree, muscle alignment, and similarity percentage to other species, and viewed/analyzed its DNA sequence. The ML tree gave a visual explanation of the relation with 10 BLAST hits and the closest one was MK091890.1, which we identified as tetramorium caespitum. Overall, when attempting an in-depth identification of a species, it is best to go with DNA barcoding which is accomplished through DNA subway and BLAST hits rather than traditional morphological identification.

Neurotoxic Effects Associated with Lead Exposure

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Introduction: Lead is a highly poisonous metal affecting almost every organ in the body with its neurotoxic effect on the brain leading to various neurological disorders, including Alzheimer's disease, Parkinson's disease, ADHD in Children, and schizophrenia. This research effort has been made to identify the environmental factors associated with the prevalence of lead and hypothesize what neurological conditions are affected due to lead exposure.

Methodology: Review of the literature and research to identify the environmental factors associated with the increase of lead consumption was carried out, viz., PubMed, Google Scholar, along with the National Toxicological Registry. Results: The study identified key environmental factors contributing to the increased consumption of lead, particularly in industries such as car repair, battery manufacturing and recycling, refining, and smelting. These factors, including the malleability, corrosion resistance, and low melting point of lead, underscore the continued use of this toxic metal in various sectors, thereby presenting a significant public health crisis with damages the prefrontal cerebral cortex, hippocampus, and cerebellum such as brain damage, nerve damage. Discussion: Lead has varying degrees of neurotoxicity. The findings emphasize a need to address lead exposure and the health problems that are tied to lead. This study highlights and pinpoints the environmental factors associated with lead prevalence. The research also makes assumptions about the possible neurological disorders that could be brought on by exposure to lead, which lays the groundwork for future studies and actions targeted at reducing the risks that lead poses to the environment and public health.

Using DNA Barcoding to Identify an Unknown Ant Species Found in Washington, DC

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This study explores the genetic diversity of ants in Washington, DC and its resultant influence from DNA barcoding. DNA barcoding is also used to gain insight into various species and compare them to see how each species is genetically unique. Ant samples were collected using bait, their DNA was extracted using Chelex, and PCR was performed with COI primers. The PCR product was then Sanger sequenced, and BLAST was used for bioinformatic research and to compare DNA sequences. Results demonstrated that the ants found on the Howard University campus belonged to the Tapinoma sessile species, common and native to most of the United States. The species was confirmed with a high degree of certainty based on a close genetic relationship. Results suggest that T. sessile is stable in the local ecosystem, and that this stability gives insight into the evolutionary history of the population. The stability of the species also gives insight into the evolutionary history of this population. Using this information, it is possible to understand the ecological implications and evolutionary trends within species occupying similar environments.

The effects of RNA Polymerase III structures on small non-coding RNAs in a patient derived POLR3B-variant

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A novel POLR3B 1625 A>G mutation was discovered in a patient with severe neurodevelopmental phenotypes. CRISPR-Cas9 was utilized to create two HEK293 cell lines with the POLR3B 1625 A>G mutation (C2 and F4 cells). Parent HEK293 cells served as the wild-type (WT) control. Multiple RNA Polymerase III subunits, transcripts, and non-coding RNAs (ncNAs) were analyzed in this POLR3B variant context, including the human La protein, U6atac, and POLR3G. It is confirmed that U6atac is dependent on La protein expression. siRNA transfection was applied to knock down the La protein. Northern blots were constructed to analyze the impact of La knockdown on minor intron gene expression. Next, experiments aimed at understanding the relationship between the two alternative Pol III subunits, POLR3G and POLR3GL, were conducted. POLR3G is associated with cellular proliferation. By contrast, POLR3GL is associated with cellular differentiation. The mutant strains express specific signatures of Pol III-transcribed ncRNAs. ML-60218 (a Pol III inhibitor) was used to assess the distribution of ncRNAs. Prior research has demonstrated that ML-60218 has selectivity towards POLR3G in THP-1 cells. This inhibitor has never been applied to the HEK-293 mutant cells, however, it was hypothesized that ML-60218 treatment would negatively affect cellular proliferation, reducing POLR3G. Northern blots were performed to analyze the ncRNA levels. The mutant strains expressed higher levels of ncRNAs, Vt 2-1 and snar-A, cancer proliferation biomarkers. This research will obtain a better understanding of the mechanisms of RNA Polymerase III and the effect of various Pol III transcripts on ncRNAs.

Characterization of Capsaicin Implant for Countering Obesity

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Purpose: Obesity occurs when energy intake exceeds energy expenditure leading to cardiovascular complications. African Americans (AA) are affected disproportionately by obesity. 56.6% of AA women are obese compared to 32.8 percent of white women. Currently, therapeutic strategies to mitigate obesity are very limited. Published work from our laboratory and others validates that converting the energy-storing white adipose tissue (WAT) to energy-expending beige adipocytes is an effective strategy to combat obesity. METHODS: Previously, we have demonstrated the oral administration of capsaicin activates transient receptor potential vanilloid subfamily 1 (TRPV1) protein expressed on the adipose tissue membrane to stimulate browning of WAT to counter diet-induced obesity in mice. Considering the pungency of capsaicin and low oral bioavailability, we have developed a polycaprolactone (PCL)-3D printed rod-shaped implants containing capsaicin (CaplantTM) that will be delivered to sWAT or BAT to stimulate thermogenic mechanisms in a mouse model of high-fat diet (HFD)-induced obesity. Results: Capsaicin-loaded injectable implants were successfully prepared by 3D printing technology and validated for stability and release of capsaicin. We are currently evaluating the preclinical safety and efficacy of CaplantTM in a mouse model of diet-induced obesity. We will determine whether 3D implants delivered to WAT/BAT inhibit weight gain and evaluate the safety of these implants in our preclinical mouse model. These evaluations will advance the development of CaplantTM for treating obesity in humans. Conclusion: Validating the safety and efficacy of CaplantTM will advance our goal to develop CaplantTM as a therapeutic target for obesity in the AA population.

Stability Assessment of Unfiltered Solid Lipid Nanoparticles for Long-Term Viability of Optimized Drug Delivery Systems

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Solid lipid nanoparticles (SLNs) represent a class of lipid nanoparticle characterized by a solid lipid core, which is stabilized with emulsifiers. Ranging in size from 40 to 1000 nm in diameters, SLNs hold promise for traversing size-selective barriers within the body, such as the blood-brain (BBB) or blood-testis (BTB) barrier. Many production methods involve filtration, impacting lipid concentration and drug entrapment efficiency. In our study, we adopted a filtration-free method, comparing it with filtration immediately after particle creation. SLNs were created using stearic acid as the fatty acid, sodium taurodeoxycholate and Kolliphor® as the emulsifier/co-emulsifier. Using dynamic light scattering (DLS), we monitored the particle size over 7 days (0, 1, 3, 5, and 7). Unfiltered particles displayed a size reduction of 40-100 nm within the first 24 hours, while filtered particles exhibited an increase in diameter. The data suggests potential reorganization of individual particles for stabilization, influenced by the temperature changes. Our research expands to include diverse lipid formulations, surfactants, and co-surfactants to explore their impact on this phenomenon. These findings aim to contribute to advancing nanoparticle-based drug delivery systems by unraveling fundamental stability dynamics to explore the organization of the nanoparticle during solution equilibrium.

Humans Affect on Ant Populations
Presenter's Name: Alicia Brown
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There are almost 1,000 species of ants in the United States, which have evolved over time and become the most successful colony-based organisms. To identify and map ants globally, the Barcoding US Ants project was launched and has received many contributions from across the country. The ants were collected using bait, their DNA was extracted using the Chelex method, amplified with COI primers during PCR, and sequenced with Sanger sequencing. Finally, bioinformatics, such as their PHYLIP NJ and ML, was performed using the DNA Subway platform to analyze the sequence and highlight the relationships between the different species of ants. A supporting study that reviewed the ant populations found that weather and access to water are the main determinants of population growth. Therefore, the ant population on Howard University's campus is not affected by humans. Knowing that ants flourish independent of human interaction, further research must be conducted to analyze how humans affect biodiversity instead of population size.

Deciphering Species Diversity Through DNA Barcoding
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To what extent can DNA barcoding serve as an effective tool for accurately identifying and characterizing the genetic diversity within ant populations at Howard University, and how can this information contribute to the study of their geographic distribution? The ants were collected, photographed, and preserved in ethanol. Their tissues were collected, and the specimen's DNA was extracted from the tissue sample with Chelex. The DNA was then run through Gel electrophoresis for visual analysis to determine whether or not the PCR reactions were successful. A specific region of that DNA, the COI region, was amplified using specific DNA barcoding primers and the Polymerase Chain Reaction (PCR). The successful amplified DNA samples were then sent to be sequenced. The DNA subway bioinformatic platform was used to retrieve the DNA sequence and examine evolutionary relationships. Comparative analyses were performed to assess evolutionary ties to close and distant related species. DNA barcoding on ants is similar to giving each ant a unique genetic fingerprint. Researchers can use these fingerprints to swiftly identify various ant species without having to carefully inspect each one under a microscope. This makes it much easier to discover new ant species since they can rapidly go through a vast number of samples and identify those that are genetically unique. So, by employing DNA barcoding, researchers can accelerate the discovery of new ant species while also learning more about the diversity of ants in various habitats.

Machine Learning Approaches to Predict Type 2 Diabetes
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Machine learning is a form of artificial intelligence that develops algorithms that learn the patterns of data and can predict outcomes such as mortality or disease state complications and severity. Diabetes affects a significant portion of the population, with profound implications for morbidity and mortality due to associated complications affecting the eyes, kidneys, and cardiovascular system. The MEPS 2021 consolidated data from 2021 was used to develop a model that could be used to predict type 2 diabetes diagnosis and the control of type 2 diabetes based on the comorbidities an individual has or the type of care they are given after diagnosis. The sample included 22,526 individuals. Ordinary least squares regression analysis was done and showed an $R2 = 0.882$ showing that 82% of the variability in diabetes diagnosis can be explained by the features included. The results reveal several statistically significant ($p<0.05$) predictors of diabetes diagnosis, including hypertension diagnosis (HIBPDX), age of hypertension diagnosis (HIBPAGED), coronary heart disease diagnosis (CHDDX), age of coronary heart disease diagnosis (CHDAGED), cholesterol diagnosis (CHOLDX), age of cholesterol diagnosis (CHOLAGED), serious difficulty seeing w glasses (DFSEE42), kidney problems caused by diabetes (DSKIDN53), diabetes causing eye problems (DSEYPR53). Statistically insignificant features included sex, race, and interview language. Future work includes using regularization techniques to prevent overfitting and enhance the model's generalizability. Additional regression analyses will refine the models' accuracy leading to an effective strategy for predicting type 2 diabetes and its management.

Unraveling Genetic Variation Within Tapinoma Sessile Ants
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Introduction: In the US, approximately 900 ant species have been identified, yet much remains to be discovered. By analyzing the DNA of potentially new species, scientists hope to understand how ants respond genetically to climate change and migrate across the country. Our research focuses on uncovering new ant species and tracking their movements in urban areas looking to answer the central question, "How does

genetic variation within Tapinoma Sessile affect their distribution in urban habitats?" Materials and Methods: An ant specimen collected from the front of the Carnegie building at Howard University was preserved in ethanol for storage. Its DNA was extracted using the Chelex method, followed by Gel Electrophoresis to visualize its DNA alongside other specimen. PCR was then employed to amplify the COI target region for sequencing. Utilizing the DNA subway bioinformatic platform, we examined evolutionary relationships between our specimen and others via reference data and a phylogenetic tree. Results: Upon concluding the bioinformatic analysis, the ant specimen was identified as Tapinoma sessile. Further DNA subway analysis indicated its similarity to other specimens in urban habitats, suggesting a correlation between T. Sessile's evolutionary history and urban prevalence. Genetic adaptation to urbanization marks T. Sessile as an invasive species, contributing to genetic diversity loss. Conclusion: Understanding these patterns, help develop efforts for assessing population resilience amid urban biodiversity loss, crucial for addressing the impact of invasive species like T. Sessile. Its genetic adaptability impacts both native and non-native species, clarifying its rapid adaptation and success in urban environments.

Targeting DNA damage response enhances tumor cell Immunogenicity in pediatric Neuroblastoma Cancer.

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Neuroblastoma (NB) is the most common extracranial solid tumor in pediatrics and accounts for about 15% of childhood cancer-related mortality. NB cancer cell harbor MYCN-driven endogenous replication stress, metabolic rewiring, and cell cycle dysregulation contribute to poor treatment response. Furthermore, overexpression of MYCN gene in NB cells leads to suppression of innate immune signaling. To enhance treatment response in MYCN amplified NB cancer, new therapeutic strategies need to be discovered. In this study, we tested the hypothesis that restriction of serine biosynthesis pathways and inhibition of replication stress response in MYCN amplified NB cancer cells engages innate immune signaling. We examined the in vitro model using two NB cell lines: IMR-32 and S-K-N-SH to determine the relationship between replication stress and DNA mediated innate immune responses. We investigated whether targeting of DNA damage response proteins (WEE1) as a single agent or in combination with epigenetic inhibitor synergistically promotes immune signaling. We found that DNA sensor mediated innate immune signaling mediator such as STING, IFNB, IFNG, IL-6, CCL-5, CXCL-10, and PD-L1 significantly expressed in treated cells as compared to untreated cells. These findings open a new horizon for future research to investigate the potential of combinatorial therapeutic drugs based on high-risk neuroblastoma pediatric cancer.

Validation of Genome-wide CRISPR-interference screen in NPC1-/- glutamatergic neurons

Presenter's Name: Christie Cambridge
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Presentation Type: Oral Presentation
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Niemann-Pick disease, type C (NPC) is a rare, neurodegenerative lysosomal storage disorder characterized by the accumulation of unesterified cholesterol in the late endosomal/lysosomal (LE/L) compartments of the cell. NPC is caused by mutations in NPC1 or NPC2, following an autosomal recessive inheritance pattern. A CRISPRi screen previously elucidated genes that, when knocked down in the absence of NPC1, reduced cholesterol accumulation in the LE/L compartments. Several of these genes were associated with mitochondrial complex I. To validate that knockdown of the complex I was involved in cholesterol clearance, one of the subunits of complex I, NDUFB4, was tested. A lentiviral construct encoding sgRNA to NDUFB4 was generated and used to silence NDUFB4 by CRISPRi in NPC1-/- human induced pluripotent stem cells (iPSCs) and their derived glutamatergic i3neurons expressing dead Cas9 (dCas9). Staining with perfringolysin O (PFO) was used to assess cholesterol accumulation in these cells. In addition to this approach, reduced function of mitochondrial complex I by metformin, a commonly used anti-diabetic drug treatment that targets complex I was used. Treatment of NPC1-/- iPSCs with metformin, significantly reduced cholesterol accumulation indicating that perturbation of complex I is a potential avenue for amelioration of NPC1 disease phenotype.

Breathing under pressure: Gill pumping kinematics and temperature in teleost fishes

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Aquatic pump gill ventilation involves pumping water over the gills using cyclical pumping of both the buccal and branchial chambers. While this basic mechanism is present across all teleosts, the kinematics of pumping can vary considerably among and within species. Teleost species with more capability of modulating their ventilation kinematics may be better able to acclimate to changing temperatures as their habitats shift during climate change. We visited the closed-system aquarium habitats at National Aquarium and obtained 90 videos of 44 species using cell phone cameras and collected metadata for each video, including species, behavior, temperature, and estimated fish size. Using DeepLabCut, we tracked the movements of the jaws for individuals of species under different conditions. After training, our DeepLabCut model was able to accurately track jaw movement for most videos, and we developed a custom R script to calculate the duration of inhalation and exhalation. We will correlate kinematic variation with ecological variables such as temperature, geographic range, and habitat.

Metabolic and Hypoxic Consequences of Metformin Intervention in the Tumors of Obese Mice

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Lung cancer is known to be the third most common cancer type in the world (CDC) and is also one of the most dangerous, responsible for the highest number of cancer deaths worldwide. Although the prevalence of lung cancer has decreased in recent years as a result of decreased smoking rates, advanced screening, and new preventative measures (American Cancer Society, 2021), the prevalence of obesity has been doing the exact opposite. With this increase in obesity rates, knowledge of the effect of obesity on lung cancer development and progression is becoming more and more important. What's currently known is that obesity increases the risk of developing lung cancer and can result in a higher risk of death in comparison to leaner patients (Yang et al., 2013). It's also known that Lewis Lung Carcinoma tumors grow faster in obese mice than they do in lean mice and that metformin corrects this but we're currently unaware of the processes involved in this (Ringel et al., 2020). Metformin is also known to increase the efficacy of Immune Checkpoint Blockade therapy (Scharping et al., 2017) but the reason for this is unknown as well. We hypothesize that the obesity specific benefits of metformin are a result of its effects on tumor hypoxia and metabolism.

Enhanced RF Coil and 3D Engineered Animal Imaging Platform for Ocular MRI

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"Enhanced RF Coil and 3D Engineered Animal Imaging Platform for Ocular MRI"

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Vision, a pivotal facet of the intricate sensory system, relies on the eye as the primary sensory organ, contributing significantly to visual processing and encompassing 70% of the body's sensory input. The study introduces a novel mouse ocular imaging system designed for preclinical research on eye diseases, particularly diabetics retinopathy a prevalent complication of diabetes with potenCal vision-threatening consequences. The developed imaging system enhances the visualizaCon of the retina, facilitating early detection and deepening our comprehension of diabetes retinopathy. The imaging system comprises an acCvely decoupled eye surface radiofrequency (RF) coil and a 3D animal holder plaRorm integrated with an isoflurane anesthesia machine. The RF coil, constructed on a Printed Circuit Board (PCB) using KiCad EDA electronics soWware, employs acCvely decoupled circuitry to reduce interference and improve sensiCvity. The 3D animal holder ensures stability during the MagneCc Resonance Imaging (MRI) examinaCon, offering a versaCle space for the mouse. Results from tesCng the coil pair on an eye phantom and in vivo imaging of the mouse eye demonstrate improved image quality, reliability, and noise reducCon. The acCvely- decoupled design enhances Signal-to-Noise RaCo (SNR) twofold, enabling detailed visualizaCon of reCnal layers in mouse models. The integrated system presents a powerful tool for understanding ocular anatomy and potenCal biomarkers of ocular diseases.

Tumor exosome production in cisplatin resistant mouse oral cancer cells following knockdown of Rab27a.

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Rab27a is a critical effector in the exosome production and release. This mediator has been targeted by knockdown and knockout techniques that demonstrated the ability to reduce exosome production. These exosomes also carry ligands that are immunosuppressive in nature, making immunotherapies more difficult to use effectively. Because of previous examples in oncology literature, tumor exosomes (TEX) could potentially have a large role in chemotherapy resistance.

With regard to TEX immunosuppressive properties, tumors can be expected to have a higher level of sensitivity to therapies such as cisplatin or ICI therapies when tumor exosomal production is reduced. Restricting the protein expression of Rab27a has been shown to increase tumor sensitivity in pancreatic cancer. The cell lines that were observed were the mouse oral carcinoma wild type cell (MOC2 WT), mouse oral carcinoma wild type knockdown (MOC2 WT KD), and mouse oral carcinoma cisplatin resistant cells (MOC2 Cis-R). Short hairpin RNA (shRNA) was used to target a protein involved in exosome transport called Rab27a. MTT cytotoxicity assays were used to obtain a lethal dosage of 50% number on mouse oral carcinoma cells. These cells were treated with cisplatin and DMSO in a 96 well plate to check the overall sensitivity to cisplatin. MTT assays measure cell viability in a colorimetric format. Targeting Rab27a resulted in a 90% knockdown of MOC2 exosome Production. The lethal dose 50% (LD 50) of WT MOC2 was 26.1 ug/mL cisplatin. The LD50 of MOC2 Cis-R proved to be 35.2 ug/mL cisplatin.

DNA Barcoding and Local Biodiversity of Ants

Presenter's Name: Ryanne Coleman
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DNA barcoding is a process used to identify the various species around us. The Barcoding U.S. Ants project utilizes DNA barcoding to identify and document ant species, contributing to our understanding of ant biodiversity. Ant collection involved baiting and capturing species of ants around Howard University. DNA was extracted using the Chelex method. The CO1 gene was amplified by PCR and sequenced using the Sanger sequencing. The ant was identified using bioinformatics tools DNA Subway and BLAST. The species of ant that was identified was Formica pallidefulva. These details, uncovered by the DNA barcoding process, provide information of the biodiversity surrounding Howard University's campus. Overall, DNA barcoding enhances our understanding of local ecosystems and helps keep track of all different types of species in an ecosystem, no matter how similar genetically.

An Investigation of White Matter Microstructure Abnormalities Associated with SUD and HIV

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Both human immunodeficiency virus (HIV) and substance use disorder (SUD) have adverse effects on neurological and mental health. The application of statistical analysis to common MRI-based diffusion metrics aids in discerning nuanced white matter differences in clinical populations, including people living with HIV (PLWH) and/or SUD. Indeed, diffusion-weighted imaging studies have consistently revealed widespread white matter abnormalities associated with both HIV and SUD. However, few of those previous studies account for the common co-morbidities between HIV and SUD. Here, we utilized diffusion-weighted MRI to reveal any axonal damage and demyelination patterns in four distinct subgroups: healthy controls, people living with HIV who do not have SUD (PLWH), people with SUD, and people living with both HIV and SUD (PLWH+SUD). We employed tract-based spatial statistics (TBSS) to analyze diffusion metrics, including Fractional Anisotropy (FA), Mean Diffusivity (MD), Radial Diffusivity (RD), and Axial Diffusivity (AD). This approach allows for a more detailed understanding of the underlying neuropathological mechanisms in PLWH, SUD, and PLWH+SUD. Findings from this research may provide valuable insights into the neurobiological underpinnings of HIV and SUD and underscores the importance of considering comorbidities in neuroimaging studies of clinical populations.

Effects of epilepsy on brain development in adolescents

Presenter's Name: Phillip Cook
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Epilepsy is a neurological condition that attacks the nervous system at unpredictable times which haunts me at the late hours of the night due to unusually high levels of electric activity within the brain. It is one of the most common types of neurological disorders affecting close to 50 million people worldwide. The purpose of this study is to summarize research surrounding the effects of epilepsy on the development of the brain in pediatric patients and analyze the potential factors that feed into young children developing this disorder. The brain takes around 20 years to fully develop in the average human. This indicates that the adolescent brain is still developing strong neural connections and expanding generally during this time. Early-life development of this disorder modifies brain chemistry and may even impede development in certain individuals. More than half of children with epilepsy experience some kind of learning disability. Typically, speech and language, attention, memory, and executive functioning are all impacted by epilepsy. The medication used to treat epilepsy is another factor, even though the disorder is having a detrimental effect on the brain. Anticonvulsant drugs are usually well tolerated, though occasionally they can impair cognitive function. I was prescribed medication, and I believe it is the reason for the physical and neurological changes I have noticed in my body. My main goal in doing this research is to learn more about the underlying mechanisms causing these alterations and determine whether the medication or the ailment is to blame.

Ant Diversity Along the Northeast

Presenter's Name: Ciara Cooper
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For this project, ants were researched to discover the diversity and abundance of ant species in the Northeast region of the United States. A comprehensive analysis of the diversity between ants and their ecological characteristics was conducted. The study collected ants from an area known as "The Valley" at Howard University. DNA was extracted using the Chelex method, and it was then amplified using the COI ant primer and sent off for sequencing. The sequences were uploaded to DNA Subway and analyzed using BLAST. Phylogenetic trees were generated and PHYLIP NJ and PHYLIP ML were used to identify the species' closest relatives and common ancestors. The ants were identified as Tetramorium caespitum and Lasius neoniger, two species commonly found in the D.C. area, which represent a portion of the city's ant population. It can be concluded that by studying these ants' DNA, valuable insights into their diverse way of life, habitat, dietary preferences, and behaviors have been gained. Integrating this data with other population studies allows for further hypotheses concerning the abundance and diversity of ants in the Northeast region and the U.S. as a whole.

Intersection of COVID-19 and Alzheimer's Disease: Insights from Cell and Molecular Biology

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The relationship between the SARS-CoV-2 disease (COVID-19) and Alzheimer's disease (AD) pathology has drawn more attention in the field of neurodegenerative diseases, specifically Alzheimer's. The purpose of this study is to highlight our existing knowledge of how COVID-19 affects Alzheimer's disease via cell and molecular biology research. To find out a link between COVID-19 infection and an increase in neuropathological abnormalities associated with Alzheimer's disease, such as tau hyperphosphorylation, amyloid-beta build-up, and neuroinflammation, information was abstracted from literature revises and the scientific materials through PubMed, Google Scholar, and NIA, databases. The association between COVID-19 and Alzheimer's disease is further complicated by common risk factors such as age, vascular comorbidities, and genetic predispositions. It is known that COVID-19 affects the olfactory system, causing anosmia (loss of smell) in infected individuals. The studies found that it caused damage and inflammation in the olfactory bulb and in turn directly connected to areas of the brain like the amygdala and hippocampus regions that are involved in memory development. When COVID-19 or other variables compromise the olfactory input, it impairs the person's capacity to identify familiar scents and related memories. Patients with Alzheimer's disease are more vulnerable to COVID-19 consequences. The state-of-the-art results have indicated common risk factors for both diseases. An understanding of the pathological link between COVID-19 and Alzheimer's disease will help develop strategies to treat both diseases promptly.

A New Approach for Active Coronavirus Infection Identification by Targeting the Negative RNA Strand- A Replacement for the Current Positive RNA-based qPCR Detection Method

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Amid the ongoing global challenge of the COVID-19 pandemic, caused by a virus in the Coronaviridae family, the scientific community is contending with evolving variants that undermine existing pharmaceutical responses by evading immune detection. This situation underscores the urgency for identifying viral components critical for its survival, thereby thwarting the development of new mutation-driven variants. Targeting such components impedes virus proliferation and offers potential therapeutic avenues. One such target is the 5'-PolyU tract of the antigenome, a feature absent in host cell transcripts, making it a unique and virus-specific target. Here, we show that replication of a mouse coronavirus can be inhibited by targeting the 5'-polyU on the negative strand with a simple polyA oligonucleotide. In addition, recent advancements have made significant progress in our detection capabilities. Traditional positive RNA-based detection systems have struggled distinguishing between active and inactive viral particles. This has created a challenge for quarantine measures and therapeutic strategies, particularly for virulent strains. However, new methodologies focusing on the virus's negative strand show promise in providing a more precise assessment of viral spread. This precision is vital in implementing effective public health policies and managing the pandemic more effectively. These breakthroughs represent a critical step forward in our ongoing battle against COVID-19 and similar viral threats.

Mutations in components of the loop-extrusion machinery and their contributions to disease or developmental disorders

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Changes to the epigenome have been proven to cause significant effects within several organisms in terms of protein production. These mutations, which create a different protein than originally intended or decrease/increase the amount of protein made, can cause havoc in the systems in which they are involved. For the epigenetic factors such as WAPL, NIPBL, CTCF, and RAD21, which are involved in the loop extrusion machinery, alteration to either of these can be the catalyst for the rise of developmental disorders and diseases that eventually impair human function. For further study on these factors and the known human mutations, a comprehensive list of variants was created to act as a basis for future experiments. The clinical issues that emerged as a result of select loop extrusion mutations from this list were studied. Additionally, non-naturally occurring mutations in the human epigenome may occur when one is exposed to an unfavorable and isolated environment. Witnessing crimes repeatedly and being isolated from loved ones when sentenced to jail or prison by the legal system have been in review as potential elements. This leads to the potential future directions of this research which discusses how the factors involved in altering epigenetic factors when someone is exposed to a space of incarceration for a lengthy amount of time.

Neuronal Activation of the Lateral Habenula in Rats with Preference for Palatable Food

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Identifying brain regions responsible for inhibiting increased palatable food (PF, high fat and sugar pellets) intake will increase our understanding and efforts to treat binge-eating disorder. Previous studies have postulated several brain regions for controlling feeding behaviors. This study seeks to evaluate the role of the lateral habenula (LHb) as a candidate for the inhibition of PF overconsumption. We utilized female Sprague Dawley rats in our study since there is an increased incidence of binge eating in the female population. Rats (n=7-8/group, 250-300g) underwent nine feeding tests, to characterize feeding phenotypes as BEP or BER based on their consumption of PF. The median 4-hour PF intake was utilized to establish feeding tertiles and rats in this study were characterized as high preferring (HP) or low preferring (LP). Rat brains were processed for c-Fos immunoreactivity (IR) at -3.2mm and -3.6mm from bregma. A control group given only regular chow were included in the study. PF intake was significantly higher in HP versus LP rats ($p<0.05$). A significant increase in c-Fos-IR was observed in HP versus chow only rats ($p<0.05$) at -3.2mm; however, this was not observed in LP versus chow only rats. At -3.6mm, there were no significant differences observed. In conclusion, HP rats have higher expression of c-Fos-IR versus control rats in the rostral LHb. These data will guide future investigations to delineate functional circuit connectivity of the rostral LHb with other regions that regulate binge-eating behavior.

First in-human evaluation of [1-13C]pyruvate in D2O for hyperpolarized MRI

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This study investigated the safety and value of hyperpolarized (HP) MRI of [1-13C]pyruvate in healthy volunteers using deuterium oxide (D2O) as a solvent. Healthy volunteers (n=5), were injected with HP [1-13C]pyruvate dissolved in D2O and imaged with a metabolite-specific 3D dual-echo dynamic EPI sequence at 3T at one site (Site 1). Volunteers were monitored following the procedure to assess safety. Image characteristics, including SNR, were compared to data acquired in a separate cohort using water as a solvent (n=5) at another site (Site 2). The apparent spin–lattice relaxation time (T1) of [1-13C]pyruvate was determined both in vitro and in vivo from a mono-exponential fit to the image intensity at each time point of our dynamic data. All volunteers completed the study safely and reported no adverse effects. The use of D2O increased the T1 of [1-13C]pyruvate from 66.5±1.6 s to 92.1±5.1 s in vitro, which resulted in an increase in signal by a factor of 1.46±0.03 at the time of injection (90 s after dissolution). The use of D2O also increased the apparent relaxation time of [1-13C]pyruvate by a factor of 1.4±0.2 in vivo. After adjusting for inter-site SNR differences, the use of D2O was shown to increase image SNR by a factor of 2.6±0.2 in humans. In conclusion, HP [1-13C]pyruvate in D2O is safe for human imaging and provides an increase in T1 and SNR that may improve image quality.

DNA Barcoding in Relation To Identifying Invasive Species In Washington, D.C.

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Intro: Tetramorium immigrants, also known as the pavement ant, immigrant pavement ant, or sugar ant in parts of North America is an ant native to Europe, which was introduced as a pest in North America. My group found this ant in front of the Andrew Rankin Chapel, in the grass mixed with dirt, soil, and the grass was a little moist. Methods: The method for this lab was for a whole ant to be placed in a tube containing the Chelex solution and the cap of the 1.5-mL Chelex tube was sealed and vortexed for 5 seconds, while the tubes sat in a water bath for 10 minutes trying to break open cells along with extracting DNA to centrifuge for 30 seconds in a balanced configuration which allowed the Chelex to settle on the bottom. The two solutions were gently mixed together by drawing the solutions up into the pipette 2-3 times after the DNA was added to the loading dye. Results: These results show that collecting data and testing ants can detect bacteria and viruses within the ants. DNA barcoding is a dependable technique for rapid accurate ant identification. Discussion: Pavement ants or Tetramorium ants build underground nests found under building foundations, in areas with little vegetation, patios, pavements, and sidewalks. Ants have different classifications with a variation of evidence in their body structure within the same species, this is what makes them more difficult to identify.

Exploring Ant Diversity

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In the field of biodiversity study, DNA barcoding has become an effective tool that provides previously unseen insights into the identification, taxonomy, and evolutionary relationships of various species. In order to better understand ant species' diversity, evolution, and ecological significance in various habitats, this research directly examines the practical significance of DNA barcoding to ant species. Through the review of pertinent literature and use of four detailed case studies, we sought to demonstrate the effectiveness of DNA barcoding in identifying ant species. This study highlights the significant influence of DNA barcoding on the fields of ant taxonomy, evolutionary biology, and ecological research. It also highlights the potential of this technology to fundamentally alter our understanding of ant variety, evolution, and ecological roles in a wide range of global ecosystems. By examining DNA barcodes from ants sampled across different habitats and geographic regions, we were able to infer patterns of species distribution, community structure, and ecosystem interactions. This research also helped to provide valuable insights into ant-mediated ecosystem processes such

as seed dispersal, herbivory, and predation. This study contributes to the efforts which help determine the evolutionary links of ant species as well as the investigation of ant ecological roles in many environments.

Enhancing Microglia Cell Morphology Classification Through Elo-Rating in a Web-Based Application

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Background: The cell morphology of microglia is key to understanding their role in neurodegeneration. Previous studies have suggested classifying cells into discrete categories, such as ramified, hypertrophic, and amoeboid cells, but categorization methods relying on human observation may yield inconsistent results. This study proposes utilizing the Elo-Rating system to classify cell morphology based on instinctive judgement of cell activation levels. Methods: Brain sections from Long Evans rats, 24 hours post-12-minute asphyxia cardiac arrest, were stained with anti-Iba1 and imaged using 20X bright field microscopy. A Python-based web application employs an Elo-Rating system that classifies microglia activation levels by comparing two cell images simultaneously. After the user selects the more inflamed cell image and classifies both cell images, the images are ranked using Elo-Rating. Results: This app aims to generate a unified classifier that efficiently labels microglia, featuring six activation categories, "Clusters" and "Debris" to minimize classification error. A file records image pairings, the selected images, and image classifications. An image's Elo-Rating increases after selection and decreases when unselected. The magnitude of changes depends on individual image rankings within a comparison. After collecting adequate curator data, the program determines the cells more likely to be classified into an activation category based on a higher Elo-Rating. Conclusion: This research presents a novel curation method to enhance cell labeling accuracy and address ambiguity from traditional approaches. Classifying both images reduces bias in correlating inflammation level and classification. This enables precise microglia classification and builds a comprehensive database for deep learning model training.

Comparing Ant DNA Between Urban Metropolises

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In the realms of biodiversity, ants serve as invaluable indicators of a region's ecological health and environmental changes. Understanding the dynamics of ant populations in urban environments is crucial, especially in high traffic regions like Washington, D.C. and New York, because it shows the health of the region. In this study, DNA barcoding was researched to unravel the intricate variations in ant species between these two bustling metropolises. Ants were gathered from both the DC and New York habitats and DNA was extracted. Utilizing PCR, a specific region of the COI gene was amplified. Sequences were identified and underwent phylogenetic analysis using BLAST and sequence alignment tools such as DNA Subway, MUSCLE, and PHYLIP NJ & ML. It was found that the ant species in higher traffic areas lack significant differences. A few species did not appear in both locations, such as the Lasius americanus, which was found in New York City and Aphaenogaster fulva, found in DC. The ants in both areas are still closely related and many share a common ancestor, indicating that the species do not differ greatly between New York City to D.C.

Unraveling the Wings of Mortality: The Essential Role of Curly Suppressor (cysu) in reducing mortality in Drosophila Melanogaster Development

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Curly Suppressor (cysu or dMPO) is the Drosophila ortholog of human myeloperoxidase (hMPO), which is involved in wing development. dMPO plays critical roles in various cellular and physiological processes and is a genetic suppressor in wing development. Flies containing mutations in the dMPO region exhibit abnormal wing phenotypes that curl upwards. This study demonstrated missense point mutation at G378W in the dMPO gene region, mimicking conventional wing phenotypes shared by dMPO mutant alleles. The CRISPR-mediated mutant line (w[*];;cysu G378W CRISPR/TM3, Sb, Ser, GFP) was analyzed to track their developmental patterns with appropriate control. The mutant line consistently lost half of the population in each developmental stage, resulting in a significantly lower number of adults than the control. Together, the study finds that Curly Suppressor is essential in reducing mortality during Drosophila development.

Unveiling the Disparities of Diabetic Insulin Resistance and Risks Among the Black Population

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Type 2 Diabetes Mellitus occurs due to complications in the regulation of glucose in the body. This is due to a reduction of insulin production that aids in the uptake of glucose from the bloodstream. Insulin is known as the anabolic hormone that binds to specific receptors on the cell membranes to stimulate the entry of glucose into the cells. A complication of T2DM is the pancreas not producing enough insulin, therefore resulting in higher blood glucose levels. Along with T2DM being more common among older adults, African-= Americans also have a higher risk of developing T2DM, resulting from genetics, the prevalence of obesity, insulin resistance and its associated factors. In particular, the following factors contribute to insulin resistance: inflammation, glucotoxicity, genetic predispositions, hormone imbalances, oxidative stress, and obesity. This literature review will investigate the factors that contribute to insulin resistance and the increased risk for African Americans to develop T2DM. Initially, we will analyze the underlying causes of obesity, inflammation, oxidative stress, genetics, glucotoxicity, and their involvement in the deregulation of insulin action. The review will discuss how these factors traditionally increase one's likelihood of developing T2DM in comparison to how these factors affect African Americans. Additionally, we will take a holistic approach (educational level, lifestyle, mentality, cultural outlook) and examine the African American experience with the healthcare system leading to their reluctance to seek appropriate medical treatment. Furthermore, modifications to one's lifestyle can further regulate insulin production, thus limiting the disparities within unmoderated T2DM and eventually reducing glucotoxicity.

Tracking the Evolution of Ants through their DNA

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Ants are one of the smallest organisms on Earth, but their total population is said to be 20 quadrillion worldwide. With such a large number, many species have evolved over time. DNA was extracted by gel electrophoresis in order to analyze the evolution of ants. PCR testing was performed to amplify the COI gene from the ant DNA. The genetic information was interpreted through DNA Subway and a phylogenetic tree was created. A complete morphological identification of 37 ant species related to aphids was made; these identifications are found in 19 species across three subfamilies: Dolichoderinae (8), Formicinae (16), and Myrmicinae (13). Overall, the nucleotide identity between the recently obtained sequences and the previously released COI sequences in GenBank was found to be between 84 and 100% using BLAST analysis. Nine species—Aphaenogaster smythiesii, Crematogaster nicobarensis, C. vitiosus, C. egidyi, C. osakensis, Monomorium chinense, Pheidole fervida, P. smythiesii, and Nylanderia flaviabdominis—had their COI sequences newly added to GenBank as a result of this study. Maximum species diversity up to 21 species was demonstrated by the specimens gathered. The discovery of the genetic distance values was determined, and the K2P values were marginally greater than the p-distance. Due to the similarity of the two models' results (p-distance and K2P model). Only the K2P distance was used to find the distance between species of less than 1%, with a maximum internal distance ranging from 1.3%.

A Systematic Review to Assess the Impact of Probiotics on Black Women

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Introduction: Probiotics offer promising benefits for immune, vaginal, maternal, and gastrointestinal wellness. The systematic review focuses on the effects of probiotics on Black women, who have been historically marginalized and are disproportionately affected by systemic health disparities. The review examines the impact of probiotics on disease prevention and health promotion. It aims to discover insights that could support the development of more equitable health outcomes and inform specialized healthcare strategies. Although there is an increasing amount of research on probiotics, there is a significant lack of studies specifically addressing probiotics' efficacy within the context of Black women's health, emphasizing the importance of the study. Methods: Employing a strategic search of studies conducted from 2014 to 2024 in PubMed and Google Scholar, the review examines "probiotics" and "gut microbiota" in relation to health outcomes among Black women aged 18 and over in English-speaking countries. Selection criteria and methods of analysis will be tailored to assess probiotic efficacy within Black women. Expected Outcomes: Current literature indicates that probiotics may significantly benefit vaginal, immune, gastrointestinal, and reproductive health, notably mitigating the risk of gestational diabetes. The study anticipates validating the wide range of probiotic advantages, reinforcing their value as a supplementary therapeutic measure. The findings aim to specifically highlight a consistent, positive impact of probiotic supplementation on the health outcomes of Black women.

DNA Ant Research Project

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The research project involved the DNA exploration of various ant species and the effects on different populations all over the world. Researchers began with the collection of ant samples using the marker and bait method, including materials of hot dog bait, marker, tweezer, collection cup, and a magnifying glass. Researchers stored the ants in microcentrifuge tubes of ethanol and began the Chelex DNA Extraction, where the DNA will separate and purify. The ants were grinded with mortar and pestle, a chelex solution was added to the tubes and

placed into a hot water and ice-cold bath. Next, the PCR method was performed as the COI ant primer was added into a PCR tube, then Taq polymerase, and buffer solution. The ant DNA as well as the other solvents were mixed, stored on ice, and transferred to a thermal cycler. Followed by the PCR method, DNA sequencing was done to purify the PCR results, and submitted into the academic databases for use in the Bioinformatics phase. In this phase, sequences were inserted into a DNA BLAST tool and the results were interpreted to determine the relationship between species. Results from the hits in the database indicate that the collected ants are most closely related to the species of T. caespitum. The species is found native throughout parts of Europe, the Middle East, Asia, and Northern Africa, however they were collected upon the campus of Howard University. This study provided evidence of supporting migration patterns of ant species around the world.

Exploring the Influence of Environmental Conditions on Ant Genetic Diversity

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Ants play a crucial role in ecosystem functionality, yet their genetic diversity is significantly affected by varying environmental conditions. This research examines the effects of environmental factors on the genetic diversity of ants, with a focus on different regions within Washington, D.C. A comprehensive collection effort resulted in 250 ant specimens, gathered through a variety of methods such as manual collection, baiting, and sifting, all of which were subsequently preserved in ethanol. The Chelex method was employed to extract DNA from these specimens, which was then amplified using PCR targeting the COI barcode region for taxonomic identification with the help of the AntWeb database. Initial findings highlight stark differences in ant diversity across urban and natural environments. Urban settings were characterized by reduced ant diversity, showcasing species that have adapted to such environments, in contrast to the richer diversity found in natural habitats. These insights emphasize the significant role that environmental conditions play in shaping the genetic diversity of ant populations. By understanding these relationships, we can better guide conservation initiatives and urban development practices to foster a balanced existence between human and ant communities.

Leveraging Multiple Linear Regression (MLR) and Polynomial Regression to Enhance Predictive Models of Bacterial Adhesion from COMSOL data

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Microbial adhesion to biotic and abiotic surfaces is crucial for biofilm formation, leading to biofouling, biocorrosion, and biodeterioration. This study examines Staphylococcus aureus adhesion under varying hydrodynamic shear stress, integrating BioFlux 200 microfluidic data with COMSOL Multiphysics simulations to analyze shear stress effects on bacterial adhesion and develop a predictive model. Using Multiple Linear Regression (MLR) and Polynomial Regression, we explored the correlation between shear stress and bacterial adhesion, aiming to refine COMSOL's predictive accuracy with BioFlux experimental trends. MLR identified linear relationships among variables affecting bacterial adhesion, while Polynomial Regression captured complex, nonlinear interactions. Our findings showed a significant decrease in bacterial adhesion with increased shear stress, consistent across experimental and simulation data. However, BioFlux and COMSOL discrepancies indicated the need for improved modeling, suggesting machine learning integration to enhance simulations. Thus, the findings of this study may suggest a pathway for developing more effective computational tools in biofilm research, with potential implications for designing new anti-biofilm strategies.

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Posttranscriptional regulation of TBK1 via miR-200c Binding

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Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease characterized by paralysis and motor neuron death. Loss of function mutations in TANK-binding kinase 1 (TBK1) can cause ALS, and rescuing TBK1 levels could treat disease. Protein synthesis is determined by mRNA translation and stability, which rely on interactions with RNA-binding proteins (RBPs) and non-coding RNAs like microRNAs (miRNAs). For example, miRNA-200c reportedly binds and represses the translation of TBK1 through its 3' untranslated region (3' UTR). We predict that miRNA-200c is working to repress TBK1 at the posttranscriptional level. To explore how miR-200c regulates TBK1 mRNA, we prepared a luciferase reporter that contains the TBK1 3'UTR. We used miR-200c inhibitors or expression plasmids to test if miRNA-200c activity influences reporter expression in HEK293 cells. Preliminary data suggested that miRNA-200c might activate, rather than inhibit, TBK1 translation. Finally, we are treating HEK293 with microRNA-200c inhibitors or overexpression plasmids to confirm the effects on endogenous TBK1 levels. We expect these experiments will suggest whether miRNA-200c is repressive versus activating. Understanding how RBPs and microRNAs operate at the post-transcriptional level could inspire novel RNA-targeted therapeutic strategies.

Ant Hunt: Exploring the methods of DNA retrieval and processes with diverse Ant species

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As we know ants are the decomposers of the environment, and understanding the terrains they occupy can be useful in preserving these environments. Aside from experiencing ant collection, we partook in obtaining DNA from these ant samples using extraction methods. In our study, we observed ant specimens, focusing on their environment to understand how genetics plays a role in their jobs as decomposers. We extracted DNA from the ants using the Chelex method, known for its effectiveness with small samples. This method, proven by Gautam's experiment, requires less lab time than organic extraction (2022). Previous studies by Lienhard and Schaffer also showed Chelex's high performance compared to other extraction methods such as NucleoSpin Tissue XS, CTAB, and Wizard DNA kit (2019). To visualize the DNA, agarose gel electrophoresis is recommended, as per Lee their study (2012). We utilized PCR techniques to organize the DNA fragments. With DNA barcoding, you have to rely on species identification and taxonomy so you can compare genetic sequences like mitochondrial COI gene, so you can differentiate ant species. DNA barcoding helps speed up this process. It allows for rapid identification, and this can help you see geographical patterns aiding in identification. DNA barcoding is a great tool that can help approach projects and identification. Based on phenotype, DNA extraction, PCR results, and DNA barcoding we found that the collected ant belonged to the Tainoma Sessile species.

The Role of Interleukin-6 in Regulating Glomerular Filtration Rate, Renal Plasma Flow and Mean Arterial Pressure during Angiotensin II and High-Salt Hypertension

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Previous results demonstrate that interleukin-6 (IL-6) increases mean arterial pressure (MAP) during Angiotensin II (Ang II) + high-salt (HS) hypertension. We measured MAP, glomerular filtration rate (GFR), and renal plasma flow (RPF) in WT (C57BL6) and IL-6 KO mice treated with a Ang II (200 ng/kg/min) +/- 6% HS diet. Control MAP was 130 ± 7 mmHg (WT) and 91 ± 4 mmHg (KO). Ang II increased MAP in WT (153 ± 5 mmHg), no change in KO (83 ± 4 mmHg) mice. Ang II + HS increased MAP to 150 ± 11 mmHg (WT) and 93 ± 4 mmHg (KO). Control RPF was 1822 ± 229 (WT) and 1912 ± 402 µl/min/g (KO). Ang II increased RPF in WT (3156 ± 753 µl/min/g), while lowering in KO (1648 ± 422 µl/min/g) mice. Ang II + HS decreased RPF in WT (1095 ± 305 µl/min/g) and IL-6 KO (1133 ± 248 µl/min/g) mice. Control GFR was 756 ± 86µl/min/g (WT) and 788 ± 95µl/min/g (KO). Ang II increased GFR in WT (1009 ± 63 µl/min/g), no change in KO (756 ± 23 µl/min/g). Ang II + HS increased GFR in WT (1095 ± 146 µl/min/g), no change in KO (540 ± 207 µl/min/g) mice. Our results suggest IL-6 increases MAP during baseline, Ang II, and Ang II + 6% HS; absence of IL-6 prevented increases in MAP, RPF and GFR during Ang II treatment; and that IL-6 contributes to increased MAP and GFR during Ang II + 6% HS hypertension.

Addressing Eating Disorders in Black Women in regard to Social Media exposure

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Research Question: How does social media play a role in impacting the mental and physical health of Black women, such as eating disorders? Abstract: Many scientific research studies have been undertaken on mental disorders in the Black community, emphasizing a variety of mental illnesses that frequently impact the Black population. In addition to this pre-established study, few studies have been conducted on eating disorders in Black women. This study intends to contribute to the existing research on eating disorders among Black women, by conducting a systematic review, and linking the issue to social media and how it might impact the problem. The study also intends to investigate how social media may influence overall mental health in Black women. By observing and reviewing data from 2018 to 2024, the study can acquire context and an improved understanding of the circumstance. Methods: This study is a systematic review to analyze Black women aged 18-25, with eating disorders, in relation to social media usage. Using articles dated between 2018 to 2024, the study carefully examines the trend of eating disorders in Black women, the types of eating disorders that impact the group the most, and how social media plays a role in the phenomenon. Outcome: With presumed exploration, the study is expected to yield contribution to the overall discussion of the prevalence of eating disorders in Black women aged 18-25 and provide a deeper understanding of the correlation between eating disorders and social media pertaining to the respective community.

Associations of Dietary Intake with Biomarkers of Inflammation during Pregnancy

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Excess inflammation during pregnancy increases the risk of adverse maternal and child outcomes such as preterm birth, low-birth weight, and poor infant neurodevelopmental outcomes. Few studies have ex-

amined the linkages between maternal diet during pregnancy and inflammatory biomarker levels. The purpose of this study was to examine the association of dietary intake with biomarkers of inflammation during pregnancy. Data are from the Pregnancy Eating Attributes Study (PEAS) study, a longitudinal cohort followed from early pregnancy through one-year postpartum. Participants completed multiple 24-hour dietary recalls during study visits and C-reactive protein (CRP), interleukin-six (IL-6), tumor necrosis factor alpha (TNF-α) levels were measured from blood serum collected at visits during the third trimester. Linear regression models were used to examine associations of HEI total and component scores with inflammatory biomarkers controlling for age, education, and income-to-poverty ratio. CRP was significantly associated with refined grain consumption (β=-0.24 ± 0.08; p=0.004); associations with the total HEI (β=-0.04 ± 0.02; p=0.05) and seafood and plant scores (β=-0.28 ± 0.14; p=0.05) were on the threshold for statistical significance. The association of IL-6 with added sugar was on the threshold of statistical significance (β=-0.06 ± 0.03; p=0.06). TNF-α was not associated with any HEI score. Future research studies should further outline the biological mechanisms of diet and its influence on CRP in inflammation pathways.

Activity Patterns and Plastic Behavior of Principal Neurons and Interneurons in Nuclei of the Amygdala

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The amygdala consists of several related nuclei and is involved in different functional contexts such as memory, learning, emotion, fear, and motivation. Neurons in the amygdala contribute to symptoms of temporal lobe epilepsy, spread of seizure discharges in models of epilepsy, post-traumatic stress syndrome, and depression. This study aims to characterize different amygdala cell types and determine their role for signaling and information processing in relation to learning and memory processes in the amygdala. In rodent brain slices, electrophysiological recordings were used to determine physiological and synaptic parameters of amygdala neurons. Neurons were labeled intracellularly and digitally reconstructed to correlate structure and function. The lateral amygdaloid nucleus (lateral amygdala) is the initial site of synaptic integration for cortical and thalamic afferent input to the amygdala. Signal flow of lateral amygdala excitatory principal neurons to downstream basolateral and central amygdaloid nuclei is influenced by two populations of GABAergic interneurons, classic local interneurons scattered throughout the amygdala and clusters of paracapsular intercalated (ITC) cells. These interneurons control impulse traffic through the amygdala and are sites of synaptic plasticity. Using genetically engineered mice in which specific neuronal populations are labeled with fluorescence markers, interneurons were classified by describing their molecular and cellular properties. Patch-clamp electrophysiology was used to determine activity patterns and plastic behavior of principal neurons and interneurons. Results obtained in these studies aid in better understanding the mechanisms of fear and anxiety, and consequently anxiety disorders, and might yield a new approach in fighting anxiety and stress disorders.

Nutritional Prevention of Cognitive Decline and Dementia in African American and Asian American Populations

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Introduction: Research has shown that nutrition positively impacts cognition and brain health. Evidence strongly supports the preventive effects of consuming B vitamins, vitamin E, and n-3 fatty acids on dementia symptoms. Foods classified as neuroprotective contain these nutrients, such as green leafy vegetables, berries, and seafood. Evidence shows that African Americans have the highest prevalence of dementia and Alzheimer's disease, and are consistently documented with the lowest diet quality, especially concerning fruit and vegetable consumption. In relation, Asian Americans are the fastest-growing population in the U.S. and are identified as one of the least-reported groups in dementia risk and nutritional intervention research. The primary objective of this research is to determine whether nutritional intervention can inhibit cognitive decline in African American and Asian American populations, subsequently reducing dementia risk. Methods: This research will involve systematically reviewing population-based studies that compare the impact of nutrition intervention on cognitive decline in the specified populations. The search will involve keywords such as neuroprotective foods, cognitive decline, minority populations, and nutritional intervention. Exclusion criteria for the review will exclude studies involving participants under the age of thirty-five, those diagnosed with nutritional deficiencies and cognitive impairment at the beginning of the study, and individuals residing in the U.S. for less than five years. Expected Outcomes: The outcomes derived from concluding this systematic review are expected to provide supportive evidence regarding the cognitive effects of nutritional intervention in African and Asian American populations.

The Impact of Socioeconomic Status on Pregnant Black Women's Management of Obesity & Overweightness

Presenter's Name: Eugene Holsey
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Introduction: Black women have the highest prevalence of obesity in America, accounting for 24% of those of low socioeconomic status. In addition, it is reported that Black women have higher incidences of being overweight/obesity while pregnant, subjecting them to possible complications, and preventable deaths. The purpose of the study will be to evaluate how Black women's low socioeconomic status affects their ability to combat excessive weight gain during pregnancy. Method: The study will conduct a systematic review of recent studies to assess Black women's access to means that contribute to a healthy lifestyle, motivations to alter current lifestyle, and knowledge of appropriate reinforcements of health. The study will review articles from 2015-2024

using search engine scholar, Google, and PubMed with keywords such as pregnancy, black women, excessive weight gain. Expected Outcome: It is expected that barriers to healthcare and education will be categorized, challenging Black women's access to means of a healthy pregnancy. Also, the underlying motivations of combating excessive prenatal weight gain will be identified.

Enhancing Household Food Security: A Systematic Study on the Impact of Agroecological Training for Farmers

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Background: The goal of this review is to explore the correlation between crop diversity and household food security among farmers. The primary goal of the project was to educate farmers on agroecological practices, with a focus on promoting nutrition awareness and gender equity. Through a cross-sectional approach, this study examined the relationship between crop diversity, household-level food security, and the individual diversity of women within the context of an agroecological framework, nutrition education, and farmer mentoring program. Methods: The initial step involves creating clear research questions and objectives to find the influence of training farmers in agroecological practices on household food security and nutrition. A data analysis, examining different research on the topic, entails a thorough examination of outcomes, facilitated by statistical methods to discern significant correlations and changes. Ultimately, the findings are interpreted, highlighting their ramifications for agricultural practices, food security, and nutrition. A conclusive report and presentation are prepared, including the study's methodology, results, and conclusions. Results: Something that may be found based on research may be that households with reduced crop diversity showed a significantly decreased likelihood of achieving food security. These results imply that in the context of participatory agroecological training coupled with community-based nutrition education emphasizing social equity, greater crop diversity correlates with reduced household food insecurity and enhanced diet quality among rural farming households. The presence of diverse crops may contribute to improved dietary diversity by increasing the availability of nutritious foods.

The Efficiency of DNA Barcoding

Presenter's Name: Shelby Hopson
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Barcoding has helped with species identification, taxonomic research, biodiversity assessment, and medical research. Despite this, there is still room to assess the accuracy and efficiency of this process against other types of species identification. This study compares DNA barcoding to iNaturalist, a citizen science identification method. For this experiment, samples of ants were collected, their DNA was extracted using the chelex method, PCR was performed, and the DNA was sequenced using Sanger sequencing. Comparatively, data regarding collection location, nest type, and ant behavior were uploaded to iNaturalist. Following the experiment, it was found that DNA barcoding is a more accurate way of determining ant species. Due to its reliance on technology, DNA barcoding minimizes mistakes, as scientists previously had to rely on visual and environmental cues to determine a species. Although iNaturalist can be an accurate form of identification, it is possible that different species of ants were not considered due to human error.

SroA regulates Staphyloxanthin Pigment Synthesis in Staphylococcus aureus

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Staphylococcus aureus is a pathogen notorious for causing serious infections worldwide. Its ability to evade host immune defenses and develop antibiotic resistance allows it to persist and spread in hospitals and communities. Without new treatment strategies, antibiotic-resistant S. aureus infections are projected to become a leading cause of death worldwide. Characterizing novel virulence factors or regulators of virulence factors will assist us in developing new treatments. A critical virulence factor for S. aureus immune evasion is the carotenoid pigment Staphyloxanthin (STX). STX enhances the ability of S. aureus to cause invasive infections with high mortality, including sepsis and bacteremia. STX protects S. aureus from reactive oxygen species released by phagocytic immune cells and is essential for pathogenesis. The multistep biosynthesis of STX is encoded by the crtMNOPQ operon, which is primarily regulated by the alternative sigma factor SigB. However, additional regulatory factors likely exist but remain undiscovered. We recently discovered a novel S. aureus protein, SroA, that may act as a major effector of virulence. We created a mutation in sroA and noticed that the cells exhibited increased pigment. This led us to hypothesize that SroA may act to modulate STX synthesis in S. aureus. To confirm the SroA effect on STX synthesis, we methanol extracted STX from wild type and sroA mutants and quantitatively measured them. Our results demonstrate a statistically significant (P-value < 0.001) increase in STX amounts in sroA mutants, suggesting that SroA regulates STX synthesis in S. aureus.

Advancing Microglia Morphology Analysis with YOLOv8
Presenter's Name: Chao-hsiung Hsu
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Microglia, which are central nervous system immune cells, morphologically transform in response to neuroinflammation, shifting from ramified to amoeboid shapes. This study employs the YoloV8 deep learning model to analyze these changes by detecting and classifying microglia in immunohistochemistry images captured using bright field microscopy from both healthy and cardiac arrest-induced Long Evans rat brains. The YoloV8 model classified microglia into six types: ramified, hypertrophic, bushy, amoeboid, rod, and hyper-rod. It quantified over 40,000 cells, achieving a mean Average Precision of over 0.8 across these classes for the entire brain slice section, all within 20 minutes. This classification facilitated the creation of detailed morphological maps for clear visualization. Notably, affected brain tissues showed an increased presence of bushy and amoeboid microglia in the cortex and hyper-rod cells in the corpus callosum, indicating severe neuroinflammation. This research underscores the YoloV8 model's significant improvements in the speed and accuracy of analyzing microglia morphology, offering valuable insights for neuroscience. It lays the groundwork for further refining deep learning applications in neurobiology and understanding microglia's role in brain immunity and neurological diseases.

Impact of Invasive Species on the Genetic Diversity of Tapinoma sessile: Insights from Field Studies
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In this research, the focus was on exploring the genetic variability of Tapinoma sessile, an indigenous ant species, and its potential interactions with an invasive counterpart. Field-collected Tapinoma sessile specimens underwent DNA extraction via the Chelex method, followed by Electrophoresis separation and PCR amplification of DNA fragments. Through bioinformatics analysis, the study uncovered the distinct genetic profile of Tapinoma sessile, emphasizing its unique genetic makeup within the ant species. When sequencing was complete, similarities to Amblyoponinae Prionopelta amabilis were revealed, hinting at a potential genetic association between the two species. These findings raise interesting questions about the influence of invasive species on the genetic diversity of native species. They suggest that invasive species might impact the genetic makeup of indigenous counterparts, highlighting the need for further exploration into the ramifications of invasive species on native ecosystems. This study highlights the pressing need to understand the dynamics of invasive species and their effects on native genetic diversity. It emphasizes the critical role of conservation efforts in reducing these effects and preserving the genetic integrity of indigenous species. By diving into these interactions, we can better understand and address the complex ecological challenges posed by invasive species, ultimately fostering more effective conservation strategies.

What is the effectiveness of DNA Barcoding in distinguishing closely related species within a specific ecosystem?
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Over the last decade, climate change, a long-term change in the average weather patterns that have come to define Earth's local, regional, and global climate, has affected countless species from agriculture to domestic animals suspected patterns. Among the species affected by this issue are ants, a species that dictates its lifestyle around external temperatures. Ant populations can be found in almost any climate zone and terrestrial habitat throughout the world. Studying these insects allows scientists to further understand the effects of climate on the environment as well as biodiversity. The Ant DNA Barcoding project is a study that allows any person, no matter the lack of scientific knowledge, to track ant species throughout the United States and study similarities between ant species and the ants' normal lifestyle patterns. This research was conducted on the Howard University campus, where ants were tracked and collected. DNA was then extracted from the ants using the Chelex method and PCR was used to intensify the COI barcode region. From this process DNA was then used to determine the taxonomy of various ant specimens. Phylogenetic analyses based on the CO1 gene region determined that one of the predominant species collected was Nylanderia Vividula.

Nonalcoholic Fatty Liver Disease and Hispanic Population in United State
Presenter's Name: Jaysha Jackson
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Presentation Type: Poster Presentation
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INTRODUCTION: Nonalcoholic fatty liver disease (NAFLD (now designated as metabolic dysfunction-associated steatotic liver disease (MASLD), is a MASLD that includes superficial fatty infiltration (a benign condition called steatotic liver disease) and metabolic dysfunction–associated steatohepatitis (MASH), a less common but more important variant. MASH (sometimes called steatonecrosis) is diagnosed

most often in patients between 40 and 60 years of age but can occur in all age groups. METHODOLOGY: To understand the pathobiology of the linked diseases and see what groups are most affected, PubMed, Google Scholar, and AASLD websites were consulted to get the most updated information and findings, along with our own published articles. Non-Hispanic Latino information was prioritized due to their prevalence. RESULTS: It should be stated that the significant factors of NAFLD are poor diet, obesity, and diabetes, which are common in the Latino population. Many affected patients have obesity, type 2 diabetes mellitus (or glucose intolerance), dyslipidemia, and/or metabolic syndrome. One of the larger groups impacted by this is the Hispanic population. It has been reported that 48% of US Hispanics have the disease accompanied by some metabolic syndrome. DISCUSSION: It does not explain why their risks are so high. With the use of genetic analysis to explore gene patterns in Hispanics with MAFLD, it should hopefully become clear which disease markers are found in the Latino population from the rest of the population.

Understanding the Genetic Cause behind Ant Genus Solenopsis affinity for Sugar

Presenter's Name: Sasha Jemison
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Ants are present in numerous areas around the world. Common locations of ants may be found near sugary foods, picnics, and fields. Even so, many humans are unaware of the variations of ant species and behaviors. In the process of DNA barcoding, particular specimens are identified using short, standardized segments of DNA. By DNA barcoding, researchers can verify species in order to determine relationships and behaviors between species or patterns that are evident in species. A hot dog was used as bait to attract ants in front of the Ernest Everett Just Hall on the Howard University campus. The ants were to be used to extract DNA using the Chelex method. Short, standardized segments of DNA were used for PCR, which were later analyzed by gel electrophoresis. The amplicons were then mailed to Cold Spring Harbor Laboratory for taxonomic identification. The data was published on an online database, GenBank, which we then used to identify the ant species. After analyzing the results identified, students can note that there is not a lot of previous or current research regarding ant colonies, their gustatory systems (perception of taste), and their foraging activities in relation to their genetic processes. Hence, this research is based on a genus and not a specific species. Therefore, although it is difficult, it is imperative for researchers to conduct future experiments to give a genetic rationale for an ant's attraction to certain foods, sugars, and nutrients to expand the breadth of knowledge on specific ant species.

PEI-Mannose Interaction for Targeted Nano Delivery

Presenter's Name: Janet Johnson
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Polyethylenimine, also known as PEI, is a linear polyamine polymer is often used for transfection and other types of gene therapy, such as nano delivery. Nano delivery is a technique that uses nanoparticles as carriers for gene therapy. Nanoparticles are known for their targeting ability, variety of functionalization, and low immunogenicity. However, it is important to note that when designing the nano delivery carrier system, polymeric nanocarriers such as PEI should be used, as they often contain ionizable amine groups that interact with negatively charged nucleic acids. This interaction leads to self-assembly within the positively charged PEI. In this research project, we will discuss PEI and mannose. Mannose is a sugar monomer that contains a series of carbohydrates and plays a vital role in the human metabolic system. The reaction of mannose and PEI is extremely important as it creates a target for delivering DNA into mannose receptor-expressing cells. This refers to the earlier discussion of PEI's role in the nano-delivery carrier system. The overall goal of nano delivery is to deliver drugs or other therapeutic agents to specific areas in the body, which is why the PEI and mannose combination is an effective target.

Unveiling Tetramorium caespitum Dynamics Through DNA Barcoding

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This study delves into the intricate dynamics of ant communities, emphasizing the significance of DNA barcoding in understanding biodiversity, hybridization, and mating systems. Utilizing advanced genomic sequencing techniques, the research validates the identification and monitoring of Tetramorium caespitum. This experiment involves collecting ant samples near Ernest Just Hall in the Howard University campus area and extracting the ant's DNA. Through a multidimensional approach integrating BLAST analysis, phylogenetic trees, and morphological matching, the research unveils genetic diversity within Tetramorium caespitum populations across diverse regions and ecosystems. The results from this study demonstrate the reliability and substantial similarity between unknown sequences and taxonomically distinct BLAST hits, supporting the classification of Tetramorium caespitum. There are further suggestions that the unknown sequences likely belong to the same species as the BLAST hits across North America. The Neighbor-Joining (NJ) tree and MUSCLE alignment provide visual representations of the taxonomic relationships among T. caespitum samples and taxonomically distinct BLAST hits. These analyses reveal a convergence of multiple techniques, reinforcing the taxonomic identification of T. caespitum and shedding light on its population structure and distribution patterns. Overall, this research underscores the effectiveness

of DNA barcoding in clarifying taxonomic relationships and population dynamics within ant communities. The findings contribute significantly to our understanding of biodiversity conservation and evolutionary mechanisms driving hybridization and polyandry in ant populations, offering valuable insights for ecosystem management and conservation strategies.

Advancing Ant Identification: DNA Barcoding at Howard University
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Over the years, ant species were identified using morphological features, i.e., the shape of their bodies, color, etc. Later on, as technology advanced, methods like genetic analysis came into play. This includes DNA barcoding, which compares specific genetic markers to distinguish between species. In this study, we investigate the use of DNA barcoding in ants using polymerase chain reaction (PCR) amplification of the mitochondrial cytochrome c oxidase I (COI) gene using ant samples obtained from Howard University's yard located in Washington DC. DNA extraction was performed using the Chelex method, sequencing, and analysis. The chelex extraction method, introduced in the 1990s, is recognized for its rapid and cost-effective nature and is widely adopted in biology laboratories globally. Additionally, we used the bioinformatics software DNA Subway and BLAST to match our sequences to their corresponding species. The results demonstrate the effectiveness of DNA barcoding as a rapid and accurate method for ant species identification. This method proves beneficial when a swift and uncomplicated extraction is required, and high-purity DNA is not essential.

Advancing Ant Identification: Integrating DNA Barcoding and PCR Techniques in Washington, D.C. Ecosystems
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This study dives into the application of DNA barcoding alongside polymerase chain reaction (PCR) techniques to refine the identification process of ant species, particularly within the Washington, D.C. region. We aim to investigate the comparative effectiveness of molecular methodologies against conventional approaches. This study explores how combining DNA barcoding with PCR methods enhances the precision of identifying ant species, in contrast to the usual approaches. By examining the effectiveness of these molecular techniques alongside traditional methods, we will determine their use in characterizing ant biodiversity. Through a meticulous examination of DNA sequences amplified using PCR, specific genetic markers unique to each ant species are identified, allowing for a more precise taxonomic classification. This molecular approach enables the detection of cryptic species that often evade detection through traditional observations alone. In addition, commonly encountered species such as the Argentine ant (Linepithema humile), Pavement ant (Tetramorium caespitum), and Odorous house ant (Tapinoma sessile), our research endeavors to identify less well-known species that inhabit the D.C. area, including Carpenter ants (Camponotus spp.), Acrobat ants (Crematogaster spp.), Field ants (Formica spp.), and others. Through analyzing genetic markers related to each species, this approach offers a more precise means of cryptic species often missed by visual inspection. The findings of this research have the potential to deepen our comprehension of ant diversity in natural settings, with potential implications for conservation efforts. Through this exploration, we aim to inspire future generations of biologists and conservationists to engage in the study and preservation of urban ecosystems.

Ant DNA Extraction and Taxonomy
Presenter's Name: Charmeon Jones
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Over the years, ant species were identified using morphological features, i.e., the shape of their bodies, color, etc. With technology advancement, DNA barcoding became an effective way for identifying species. In this study, we investigate the use of DNA barcoding in ants using polymerase chain reaction (PCR) amplification of the mitochondrial cytochrome c oxidase I (COI) gene using ant samples here at Howard University. In our research we went to different areas of the University and collected ants to determine the numerous species and taxonomic differences of the ants. Our materials consisted of small pieces of hot dogs for bait, a cup of ethanol to place the ants in, A flag marker to hold the hot dog in place, and a timer to keep track of how long it took for the ants to attract to the bait. For our method the group members went to different regions of the campus, but followed the same protocols: placing the marker with the hot dog in the ground and then recording the environment that they were in. After collection DNA extraction was performed using the Chelex method. Then using DNA subway and BLAST we were able to match our sequences to their corresponding species. Our procedure resulted in the discovery that the majority of the ants we collected were Native to the area (Tetramorium caespitum). This research also demonstrated the effectiveness of DNA barcoding as a rapid and accurate method for species identification.

A mathematical model-derived parameter during continuous glucose monitoring

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Recent advancements in Continuous Glucose Monitoring (CGM) technology have revolutionized the field of diabetes research by precise and continuous tracking of blood glucose levels, which is crucial for managing glycemic variability and preventing related complications. Despite these advancements, there remains a significant gap in leveraging CGM data for extracting critical metabolic parameters that could further enhance diabetes management. Our study aims to bridge this gap by introducing an approach to estimate a metabolic parameter that captures glucose excursions and mean glucose levels, thus offering a deeper understanding of the metabolic dynamics underlying glycemic variability. Utilizing a mathematical model applied to the CGM data, we estimated relative beta-cell function and validated this against conventional markers of glucose excursions and average glucose levels to ascertain its accuracy in reflecting the dynamics of glucose metabolism and beta-cell activity. Our findings reveal that the model-derived estimate of relative beta-cell function (mDI_CGM) not only shows a strong correlation with direct measurements of glucose excursions ($R=0.6$, $P<0.001$ vs. Mean Amplitude of Glycemic Excursions) but also aligns well with mean glucose levels during CGM monitoring, indicating its effectiveness in predicting glycemic variability. The introduction of mDI_CGM as a metabolic parameter for assessing glucose excursions and mean glucose levels holds promise for enhancing diabetes management and prevention strategies, ultimately leading to improved patient care and treatment outcomes.

Ant Identification Made Easy: DNA Barcoding at Howard University

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Ants play an essential role in ecological processes, along with exhibiting remarkable biodiversity within ecosystems. Meanwhile, DNA barcoding facilitates rapid and high-throughput species identification, enabling comprehensive surveys of ant communities across diverse habitats and geographical regions. For this study, ants were collected with bait around Howard University's campus. DNA was extracted via the Chelex method, followed by PCR amplification using COI primers and then Sanger sequencing. Bioinformatics analysis conducted on the DNA Subway platform determined the species as Tetramorium immigrants, commonly known as pavement ants. Pavement ants are an invasive species native to Europe, and such species can negatively impact local organisms. These results demonstrate the effectiveness of DNA barcoding in species identification and contributing to the understanding of ecosystem dynamics, particularly in areas such as bioconservation.

DNA Barcoding for Exploration of Taxonomic Diversity and Ecological Management of Ant Species in Washington, D.C.

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Ant populations serve a vital role in our local ecosystems by recycling dead matter, enriching the soil with nutrients, and contributing to the flow of the food pyramid—maintaining a stable ecological balance. Taxonomic diversity is the measure of the number of species per genus and family within a community and can provide valuable insight into necessary conservation efforts to be taken for these creatures. Ant samples were collected on Howard University's campus, extracted for their DNA, sequenced, and finally analyzed through DNA Subway. Online ant databases, such as AntWeb and AntMaps, were then used to assess the populations of similar subfamilies, genera, and species within the D.C. region in which our samples were collected. Results demonstrated that the two predominant subfamilies in Washington, D.C. are Formicidae and Myrmicinae. The Strumigenys and Temnothorax genera of the Myrmicinae subfamily have the greatest number of native species present (9 and 7 respectively). Similarly, the Lasius and Formica genera of the Formicidae subfamily are the most abundant, both with 8 native species. The study of these predominant subfamilies, genera, and species can help us to further understand environmental dynamics such as nutrient cycling, the presence of invasive species, habitat requirements, etc. Surveillance will aid in conserving these species that may not be as abundant non-locally and conserving at-risk species that may share the same habitat.

The Characterization of Small Proteins YhgO and YhgP

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Proteins of less than 50 amino acids in bacteria are designated small proteins. Recent studies have revealed that small proteins can play extensive regulatory roles. YhgO (13 aa) and YhgP (9 aa) were detected on the reverse strand of the genome by ribosome profiling for Escherichia coli. The genes for the two proteins overlap, and are upstream of the glgBp promoter, involved in glycogen biosynthesis, and downstream of the aspartate-semialdehyde dehydrogenase gene (asd). The glgB promoter is activated by the phosphorylated transcription factor PhoP, whose DNA binding site overlaps the yhgO and yhgP sequenc-

es. YhgO and YhgP are conserved across several bacterial species. I hypothesized that YhgO and YhgP interact with transcription regulators based on the observation that this is the function of the smallest proteins characterized thus far. To elucidate potential functions, I used recombineering to knockout yhgOP, and the two genes were cloned into overexpression plasmids. The growth of the ΔyhgOP and overexpression strains was evaluated in response to different carbon sources, but neither deletion nor overexpression resulted in an apparent phenotype. YhgO and YhgP also were tagged on the C- and N-termini. Expression of SPA-tagged YhgO and YhgP varied slightly when cells were grown in minimal media with the different carbon sources. I also tried co-purification experiments, but no binding partners were identified. This research is significant to expanding small protein knowledge as this investigation may give insights to gene regulation in E. coli and lead to the discovery of novel roles for small proteins.

DNA Barcoding

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Although Washington D.C is 177 km sq, it serves as home to over 100 different and distinct species of ants. Naturally, these closely related and geographically located species of ants shared many morphological traits. These distinctions between species, however, can be seen through DNA barcoding. The process of DNA barcoding will help us further our knowledge and reveal to us the genetic differences of ant populations found in D.C. Ant subjects are collected in DC (Howard University Campus) using baits to later be used for DNA extraction and gel electrophoresis. The DNA extracted from the subjects, using the Chelex method, was stored in PCR tubes on September 12, 2023. The refrigeration of these samples used to further separate samples was done for approximately 8 weeks. Once separated and examined along with a phylogenetic tree reveals the fact that some of the samples extracted from the ant subjects in close proximity to each other had differences in their DNA. This suggested that a number of different species can be close to each other, despite being morphologically very similar. This also helps affirm that although Washington D.C is relatively small for an ecosystem, it can support a wide variety of ant species and subspecies, showing their coexistence. Further research through DNA sample collection should be done in the D.C area to verify the findings of this study. In conclusion our study expanded our understanding and provided insights into the biodiversity of Washington D.C.

The Effects of Mibefradil in African American Triple Negative Breast Cancer Cells

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More than one in ten women are affected globally by breast cancer (BC). Occurrence of BC differs among women of all ethnic groups and ages. The morbidity rate is the same in European American (EA) and African American (AA) women however, the BC mortality rate is higher in AA women by 42%. Triple negative breast cancer (TNBC) is the most aggressive BC subtype. TNBC is characterized by the absence of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Treatment options for this disease are limited and the five-year survival rate of TNBC is 6% lower in AA woman than other ethnicities. The store operated calcium entry (SOCE) mechanism has been implicated for TNBC progression, thus providing an innovative drug target for this disease. Gamma-butyrobetaine hydroxylase 1 (BBOX1) has been identified as an inositol 1, 4, 5-trisphosphate receptor type 3 (IP3R3) stabilizer in SOCE. We hypothesize that Mibefradil, a T- and L-type calcium channel blocker (CCB), causes apoptosis in the AA TNBC cell line HCC1806 via SOCE dysregulation. To determine this, cell proliferation assays, RT-PCR, and immunofluorescence were performed. Our results show a decrease in cell proliferation in HCC1806 cells with Mibefradil in a concentration- and time-dependent manner. RT-PCR findings of gene expressions involved in calcium regulation suggest apoptosis in HCC1806 cells treated with Mibefradil. Results from immunofluorescence also depicted signs of apoptosis in HCC1806 cells treated with Mibefradil using the BBOX1 antibody. Taken together, these results suggest Mibefradil as a treatment option for TNBC.

Investigating the bioremediation kinetics of microbial reduction

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Nuclear waste management is a crucial national and global concern. The most common and widely accepted method of nuclear waste disposal is to bury the contained waste deep underground in uninhabited areas to isolate the waste from the surface environment. Radioiodine-129 is one of the major contaminants that leak out from aging nuclear waste storage tanks, contaminating groundwater. Prior research has shown that a strain of bacteria, Shewanella oneidensis MR-1, may reduce iodate content from culture media while growing as a biofilm or as planktonic cells. This was proven through a series of experiments in which MR-1 was grown in the presence of iodate under both aerobic and anaero-

bic conditions. The iodate concentration was monitored by absorbance with UV spectrophotometry to confirm conversion. This data suggests a potential for MR-1 bacteria to serve as microbial reduction agents within a bioreactor for the remediation of radio-iodate contamination. This project aims to investigate the potential reduction properties of MR-1 cells in relevant reactor systems by doing a comparative analysis of plug flow reactor (PFR) and continuous stirred-tank reactor (CSTR) models. To achieve a desirable level of conversion, the relevant kinetic parameters from the analysis of the MR1 cells growth kinetics as well as the kinetic variables of the reactor models are examined. Using these kinetic parameters, both PFR and CSTR reactor simulations will be analyzed to develop applicable bioreactor models that may be used to address environmental radioiodine contamination.

Analyzing COVID-19 Positivity Data Using Machine Learning

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In this study, the application of machine learning techniques to analyze COVID-19 positivity rates is examined, with a focus on logistic regression models for predicting changes in positivity percentages based on historical data. This research highlights the significance of machine learning in processing complex health data sets, specifically utilizing logistic regression to forecast trends in COVID-19 positivity rates. The methodology involves data preparation, model development, and evaluation, demonstrating the model's capacity to predict with an accuracy of approximately 83.5% and an Area Under the Curve (AUC) score of 0.888, indicating effective predictive performance and generalization capability. The results underscore a modest correlation between current trends and past positivity rates, suggesting the influence of intricate patterns on pandemic dynamics. The study concludes with the logistic regression model's utility in enhancing public health response strategies and recommends further investigation into more advanced models and incorporating external variables for improved predictive accuracy. This research contributes to the evolving field of epidemiological modeling, offering insights into the application of machine learning to manage and predict public health crises. In essence, this investigation showcases the potential of machine learning in public health analytics, specifically for predicting COVID-19 trends, and sets a foundation for future research to refine and expand predictive capabilities in epidemiology.

The Molecular Imaging Laboratory:
A Howard University Imaging Core Facility

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Purpose: The Howard University Molecular Imaging Laboratory (MIL) is a university core facility that promotes and supports research using imaging technology to study the disease processes and response to therapy at the molecular to whole animal level. The objectives of the MIL are to provide state-of-the-art instrumentation, technical expertise and essential services for in vivo imaging, to provide training in biomedical imaging, and to foster multidisciplinary research collaborations using imaging. Methods: The MIL has Bruker 7T and 9.4T MRIs, a PerkinElmer IVIS Spectrum optical imaging machine, and a Bruker Albira PET/SPECT/CT for small animal studies. The MIL assists users by providing expertise in designing imaging studies. Results: The MIL supported 21 research projects proposed by 16 Howard faculty members from the Colleges of Arts & Sciences, Engineering, Pharmacy, Dentistry and Medicine, and 11 external researchers from neighboring institutions. 7 postdocs, 6 graduate, 2 undergraduate, and 5 high school students received training performing research in the MIL with their mentors. MIL users generated 6 publications and two patent applications. MIL staff submitted 10 grant applications, 3 of which were funded. Discussion: The MIL has been a synergetic center, fostering multidisciplinary research collaborations among researchers from Howard and neighboring institutions, allowing faculty and students to be involved in cutting edge biomedical research. The MIL provided training in imaging science through seminars, hands-on workshops, and internships. The MIL will continue to provide scientific expertise and imaging equipment in support of its mission to support and expand biomedical research and training at Howard.

The chemical compositional analysis of diapausing Culex pipiens by FTIR

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Background: Female Culex pipiens, take various sources of carbohydrates during diapause in preparation for winter. We investigate the effects of different carbohydrate uptake on the biosynthesis and accumulation of glycogen and lipids which are essential for overwintering using Fourier Transform Infrared Spectroscopy (FTIR). Although there are various biochemical methods available for quantifying lipid and glycogen accumulations, FTIR represents a highly sensitive method that can enable direct quantification for each organism. Our goal is to measure and quantify the effects of carbohydrate composition on the glycogen and lipid accumulations in individual mosquitoes. Methods: Diapause female Culex pipiens after adult eclosion were fed for 7 days on sponges soaked with 10% glucose, fructose, or sucrose. After the 7-day feeding, the mosquitoes were frozen at −80 °C then lyophilized for 3 days. FTIR spectra were collected from lyophilized individual intact mosquitoes as well as pulverized multiple individuals. The spectra were normalized to the amide I and II intensities. Results: FTIR spectra of diapause females fed with different carbohydrates are shown in figures. The narrow absorption bands that are hidden by the broad component are analyzed by taking the first and second-order derivatives of the spectra. Conclusions: The second-order derivative spectra provided resolution of the lipid absorption bands at 2920 and 2850 cm-1

that corresponded to the CH2 antisymmetric and symmetric vibrational modes, and 1078 cm-1 for COH in-plane bending for glycogen. The second-order derivative spectra analysis revealed that different carbohydrate uptake resulted in the changed glycogen and lipid accumulations in diapausing mosquitoes.

The Impact of Black Seed Oil on Salivary Proteins: Mucin 2, Mucin 7, and TNF-Alpha

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Nigella sativa, commonly known as black seed oil, is well-known for its powerful medicinal properties that greatly reduce infections and inflammation within the body. These beneficial characteristics can play a significant role in the prevention and treatment of periodontal disease. Its major structure thymoquinone (TQ) provides the anti-bacterial and anti-inflammatory effects in black seed oil. Periodontal disease is a result of infections and inflammation of the gums and bone that surround the teeth caused by excessive plaque and tartar buildup. Mucin 2, TNF-Alpha, and Mucin 7 are the most abundant biomarkers present within the oral cavity that are used to evaluate oral health. 10 participants provided saliva samples after rinsing at different intervals with either saline solution or black seed oil. Each saliva sample was tested with the BioSource ELISA Test kit to detect antigens and analyzed with the Thermo Scientific NanoDrop 2000/2000c to determine the overall protein concentration at A280 wavelength. The concentrations of each biomarker increased with extended rinse time with the highest concentrations being present after 5 minutes of rinsing with black seed oil. Although the results showed a positive correlation between black seed oil use and biomarker concentration in the oral cavity, we would like to evaluate other inflammatory associated salivary proteins that might also be altered with black seed oil.

Environmental Conditions and Their Influence on Ant Taxonomy

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Understanding the complexities of genetic analysis in ant taxonomy necessitates careful consideration of environmental factors that can influence research outcomes. Despite DNA barcoding's efficacy in species identification, its accuracy can be influenced by variables outside the laboratory, such as dynamic weather patterns. This study seeks to reveal the potential impact of short-term weather fluctuations on DNA barcoding accuracy, thus illuminating the intricacies of genetic analysis amid environmental variability. Ant specimens were collected at Howard University's campus using marker flags and hotdog bait. Employing the Chelex method for DNA extraction and PCR amplification, specific DNA regions, or DNA barcodes, were targeted. Gel electrophoresis validated successful amplification, followed by sequencing for taxonomic identification. Analysis indicated the potential effects of short-term weather fluctuations on DNA barcoding accuracy. Variations in temperature and precipitation likely affected ant behavior and distribution on campus. Consequently, diminished species availability may have yielded a less accurate representation, skewing data and reducing species variability. This study highlights the importance of environmental factors in genetic analyses. Short-term weather may have limited available ant species on campus, leading to a less accurate profile. Further research is needed to quantify these influences on DNA barcoding accuracy in ant taxonomy. In summary, this study underscores the importance of environmental considerations in genetic analysis and highlights the need for continued research to elucidate the extent of weather-related impacts on DNA barcoding accuracy in ant taxonomy.

How can DNA barcoding contribute to the assessment of ant biodiversity and conservation efforts?

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Ants belong to a widespread and ecologically significant group of insects that are essential to ecosystems all around the world. Maintaining the health and functionality of ecosystems requires evaluating ant biodiversity and putting into practice efficient conservation measures. A valuable technique for researching ant biodiversity and guiding conservation efforts is DNA barcoding. Even when distinguishing between cryptic or physically similar species, DNA barcoding allows for quick and precise species identification through the analysis of standardized DNA sequences, such as the mitochondrial cytochrome c oxidase subunit 1 (COI) gene. Through the use of molecular techniques, previously unknown ant species can be found and information on their distribution, genetic diversity, and evolutionary links can be gathered. Additionally, DNA barcoding helps track ant population fluctuations brought on by habitat loss, climate change, and the introduction of invasive species, which helps guide strategy development and conservation goals. The areas we expect to have results in are ant species identification and successful ways to preserve ant populations. To improve research capacities and enable global assessments of ant biodiversity, collaborative projects like the Global Soil Biodiversity Initiative seek to create extensive DNA barcode libraries spanning more than 200 years of ant species worldwide (Global Soil Biodiversity Initiative). DNA barcoding has significant promise for improving our understanding of ant biodiversity and helping conservation efforts in a world where ants are becoming more and more vulnerable, despite obstacles relating to taxonomic complexity and database completeness.

Isolation and Characterization of B1 Bacteriophages: Dice, Olak, Orefu, Pacifista, Ricotta, and Selr12

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Bacteriophages, also called phages, are viruses studied for their ecology and epidemiology. The characterization of novel *Mycobacterium* bacteriophages may advance the development of therapeutics for *Mycobacterium leprae* and *Mycobacterium tuberculosis* infections. Students at Howard University from the SEA-Phages 2023-2024 class isolated the bacteriophages Dice, Olak, Orfeu, Pacifista, Ricotta, and Selr12. These bacteriophages were purified using standard procedures from enriched soil samples collected from the Howard University environment. *Mycobacterium smegmatis* mc2 155 served as host. All six phages are of the Siphoviridae morphotype. Illumina sequencing revealed that the sample phages belonged to cluster B and subcluster B1. The genome lengths for all the phages are between 68337bp and 69100 bp, with GC content ranging from 66.4% to 66.5%. Annotation was carried out using PECAAN, HHpred, and BLASTp analyses with a cutoff E-value of 10−4. All six phages had unique tail lengths: Dice 294.375 nm, Olak 309.375 nm, Orfeu 313.125 nm, Pacifista 315.8 nm. Ricotta 302.5 nm and Selr12 312.5 nm with an average capsid diameter ranging from 69-73.8 nm. The genome organization across all 6 phages were consistent with other members of the sub cluster. Key words: Mycobacteriophages, Soil, *Mycobacterium smegmatis* and Siphoviridae

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Mitochondria, Mood Lability, And Bone: MtSNPs' Surprising Relationship to Mental Homeostasis

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Mitochondrial DNA profiles comprise some of the most inclusive and broadly representative genomic databases publicly available, containing diverse haplogroups from all over the world; however, there is less emphasis on mutations' biochemical and neurological impact. Mitochondria's function in calcium regulation is often cited, but few weave in its roles in immunity, bone homeostasis, cytokinesis, and apoptosis. While this approach is apt for increasing statistical significance, it can miss the bigger picture. Currently, there are enough associations—such as the effects of calcium dysregulation, the role of ROS in circadian rhythm determination, and cytokines' interaction with mitochondria—to speculate on causality. This systematic review re-contextualizes previously reported haplotypes and single nucleotide polymorphisms (SNPs) in their biochemical environment, reports on potential systemic effects of altered mitochondria, explores common setbacks for studying bipolar disorders, and suggests new technologies that could ameliorate some of them using a novel graphic representation of each study's findings—a "findings map." This represents reported study results as a heat map, allowing to compare similarities between dysregulation of proteins, comorbidities, and psychiatric disorders at a glance. Our study highlighted TNF-α., IL-6, IL-1β, ROS, CACNA1C (CamKIIα), TFAM, Disc1-Q31L, diabetes, and insomnia as potential etiological agents due to their similar physiological effects.

Investigating the impact of Conjugated Folic acid-dipeptide Frameworks on Mesenchymal Stem Cells

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The ability to reliably induce transdifferentiation or direct reprogramming of MSCs holds significant promise for regenerative medicine. A wider range of diseases and injuries could be treated effectively and efficiently by precisely guiding MSCs to become specific cell types. However, the exact mechanisms and factors influencing transdifferentiation and reprogramming in MSCs are not well-defined. The manipulation of cell fate for cell trans-differentiation and reprogramming can be achieved by external or artificial controls in the case of MSCs. The small chemical molecules or biomolecules can serve as prospective tools to accomplish cell trans-differentiation and reprograming. In this project, we utilized a novel conjugated folic acid-dipeptide framework as small biomolecules to investigate the impact on the MSCs. We designed, synthesized, and characterized the folic acid conjugated L-Tyr-L-Phe-based frameworks capable of self-assembling into sheet-like scaffolds to study the molecular mechanisms of transdifferentiation and reprogramming in MSCs. This study has the potential to unlock an exciting avenue for regenerative medicine.

Quantifying Influence: The Orthopaedic PAC's Impact Explored through Analysis of FEC Data

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In American politics, Political Action Committees (PACs) play a crucial role as a route for various sector's common interest to be written into legislation. Among these, the Orthopedic PAC, affiliated with the American Association of Orthopedic Surgery (AAOS), is notable for their strategic contributions and advocacy aimed at shaping health policies. This study quantifies the Orthopedic PACs influence by analyzing financial contributions, campaign support, and policy advocacy efforts through Federal Election Commission (FEC) data to offer empirical

insights into its role in the political and healthcare landscape. Using a retrospective observational design, FEC data from 2000 to 2024 was aggregated to reveal a significant increase in political contributions over time, with notable peaks in 2010 and 2012. Contributions were strategically allocated, predominantly favoring Republican candidates and targeted deliberate states. The Orthopaedic PAC's evolving financial engagement highlights its efficient resource utilization in shaping healthcare policy, demonstrating its active presence in politics. The study underscores the relationship between financial support and legislative outcomes, emphasizing the PAC's role in steering priorities within the healthcare landscape. By mapping contributions, a direct correlation between financial support and legislative outcomes is evident, emphasizing the influence of targeted political contributions on policy and legislation.

To evaluate the efficacy of combination therapy (empagliflozin and Hydralazine/ISDN) Vs monotherapy of Empagliflozin or Hydralazine/ISDN in HFrEF in African American Population

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Heart failure (HF) is a global pandemic with higher prevalence in African American (AA). The notable reason for the increased occurrence of HF in AA is attributed to hypertension, impaired endothelial function, and reduced nitric oxide production and bioavailability. This research proposal is developed to analyze the synergistic effect of Empa + H-ISDN in decreasing the rate of HF-related hospitalization, and mortality and improving the quality of life in AA with HFrEF and establishing the proof of concept of increased vasodilation as the mechanism of combination therapy Vs monotherapy. Methods: A retrospective study using Soarian Cerner on HFrEF patients admitted to the coronary intensive care unit in Howard University Hospital from May 2022 till Jan 2024 who were prescribed Empa or H-ISDN alone or Empa + H-ISDN. Measurement of the cGMP level (vasodilator and end product of the enzyme sGC activation) in the aorta isolated from C57Bl6 mice at 6 weeks and 32 weeks of age after treating the tissues with Empa or H-ISDN or Empa + H-ISDN. Electronic health records are used to identify all adult patients who were ordered and received empagliflozin plus nitrate combination therapy and nitrate monotherapy. We stimulated the thoracic aorta from C57Bl6 mice 6 weeks and 22 weeks of age and stimulated with Empa (500 nM) or H-ISDN (100 μM) or Empa + H-ISDN and measured the cGMP. This project will generate preliminary data on the synergistic effect of the new emerging drug Empa along with NO in treating HFrEF in AA.

DNA Ant Research Project

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The research project involved the DNA exploration of various ant species and the effects on different populations all over the world. Researchers began with the collection of ant samples using the marker and bait method, including materials of hot dog bait, marker, tweezer, collection cup, and a magnifying glass. Researchers stored the ants in microcentrifuge tubes of ethanol and began the Chelex DNA Extraction, where the DNA will separate and purify. The ants were grinded with mortar and pestle, a chelex solution was added to the tubes and placed into a hot water and ice-cold bath. Next, the PCR method was performed as the COI ant primer was added into a PCR tube, then Taq polymerase, and buffer solution. The ant DNA as well as the other solvents were mixed, stored on ice, and transferred to a thermal cycler. Followed by the PCR method, DNA sequencing was done to purify the PCR results, and submitted into the academic databases for use in the Bioinformatics phase. In this phase, sequences were inserted into a DNA BLAST tool and the results were interpreted to determine the relationship between species. Results from the hits in the database indicate that the collected ants are most closely related to the species of T. caespitum. The species is found native throughout parts of Europe, the Middle East, Asia, and Northern Africa, however they were collected upon the campus of Howard University. This study provided evidence of supporting migration patterns of ant species around the world.

Genetic Diversity Between Ant Species

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An effective technique for precisely identifying and categorizing ant species is ant DNA barcoding, which has wide-ranging biological applications. In this work, we used DNA barcoding methods to examine the taxonomic connections and genetic diversity between different species of ants within a particular habitat. The key genetic marker for species identification that we employed was the mitochondrial cytochrome c oxidase subunit 1 (COI) gene. To fully represent the range of ant variety, sampling was done in several habitats and geographical locations. Our results show that the ant community has a high degree of genetic variety, with discrete genetic clusters that align with recognized species boundaries. It's interesting to note that we also found evidence of cryptic species inside several taxonomic categories, demonstrating the value of molecular methods in clearing up taxonomic ambiguities. Our phylogenetic analyses also clarified the evolutionary links between different ant species, providing insight into their biogeographic patterns

and evolutionary history. Studies on the biodiversity of ants using DNA barcoding have great potential for managing ecosystems, preventing pests, and promoting conservation. To comprehend ecosystem dynamics, evaluate the effects of environmental changes, and put focused conservation actions into action, accurate species identification is essential. Furthermore, DNA barcoding can help identify and track invasive ant species early on, allowing for prompt mitigation measures to stop their spread. Our research shows that DNA barcoding can be used to examine biodiversity and ant taxonomy, revealing ant species' complex connections and ecological responsibilities.

Characterizing the number, distribution, and response properties of basiconic sensilla on Schistocerca americana

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Sensory processing is important for all animals to understand and carefully respond to stimuli in our environment. This processing begins with specialized structures such as the nose and ears in mammals and antennas or palps in insects. Sensory information arrives at these structures and gets transformed into signals that are passed on to processing centers in the brain. The purpose of this project is to study these specialized sensory structures and their anatomical organization in a simple insect system to provide insight into the complex coding processes involved in olfactory information processing. The overall goal of this project is to characterize the number, distribution, and response properties of olfactory sensilla on the palps of Schistocerca americana. I looked at the number, location and distribution of sensilla on the palps using scanning electron microscopic images of female and male maxillary and labial palps. I found that there are 10.5 ± 1.4 (mean±SD) basiconic sensilla on each palp (N=17 samples). The distribution of sensilla was determined within a common polar coordinate system (angle and radius). I found that the sensilla were uniformly distributed along the angle dimension, and non-uniformly distributed along the radial dimension. Electrophysiology recordings generated a general trend of increased responses to grass odors compared to other odorants. It further elucidated the palps function in olfaction. This work will help to establish the locust palp system as a simple model for studying olfactory neural coding.

DNA Barcoding Abstract

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Introduction: This research investigates the evolutionary relationships and taxonomic placement of Tetramorium caespitum within the Formicidae family using DNA barcoding techniques. The study aims to enhance accuracy and efficiency in ant species identification compared to traditional morphological methods. Materials & Methods: Ant specimens were collected from Howard University's campus using bait traps, and DNA was extracted through Chelex DNA extraction. PCR amplification targeted specific COI gene regions, followed by gel electrophoresis for visual confirmation. DNA sequencing and bioinformatics analysis were employed to elucidate genetic markers and conduct phylogenetic studies.

Results: The study successfully obtained DNA barcodes for Tetramorium caespitum, revealing high specificity and accuracy in species identification. Phylogenetic analysis demonstrated the evolutionary relationships of T. caespitum within the Formicidae family. The comparison of global populations highlighted genetic diversity and potential sub-speciation.

Discussion: DNA barcoding proved instrumental in differentiating cryptic species, overcoming morphological challenges. The refined taxonomic placement of T. caespitum contributes to a comprehensive understanding of ant biodiversity. This study's findings have implications for conservation efforts and provide a standardized molecular approach for future ant species identification. In conclusion, the integration of DNA barcoding techniques in ant research offers a powerful tool for unraveling evolutionary relationships and refining taxonomic classifications, fostering advancements in both molecular biology and biodiversity studies.

Adaptive Ants: Unveiling Genetic Variations in Urban Tapinoma sessile

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Understanding the correlation between genetic variation in Tapinoma sessile populations and environmental factors such as habitat type and urbanization is crucial for explaining their adaptive mechanisms. Ant samples were collected from outside the Ernest Just Hall Auditorium Entrance on the ground floor directly on the left of the North steps, and were subsequently preserved in ethanol and processed for DNA extraction. DNA extraction was performed using Chelex, followed by PCR amplification, gel electrophoresis for DNA visualization, DNA sequencing, and bioinformatic analysis. The most closely related sequences were compared, and the taxonomic identity of the specimens was determined. The results provided the taxonomic identity of our ant: Tapinoma sessile, and allowed for the evaluation of the relationship between genetic variations and habitat characteristics. Our investigation allowed us to deduce that genetic variations including resistance to environmental stressors, enhanced detoxification mechanisms, altered foraging behavior, and changes in social structure are more advantageous in urban habitats compared to natural or rural environments for the Tapinoma sessile. Overall, this study shows the importance of understanding how ants adapt to urban environments in order to inform conservation efforts and urban management strategies, further allowing

policymakers and urban planners to develop strategies that minimize negative impacts on native ant populations while promoting biodiversity and ecosystem resilience in urban areas.

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mtDNA & Cancer: Exploring the Role of Mitochondrial DNA Alterations in Cancer Proliferation

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Cancer has increasingly become a health concern which affects many. This research aims to explore the interplay that exists between mitochondrial DNA and cancer, focusing on mitochondrial DNA alterations and cancer proliferation, progression and metastasis. Mitochondria is pivotal in cellular energy production. Overtime, studies have implied that mtDNA alterations have a role to play in genetic disorders as well as cancer. This research aims to delve into the intricacies that exist between the two. This research being conducted through the QuadGrid Laboratory, aims to address some of the complexities that exist between mtDNA and cancer. By examining completed research and ongoing laboratory work, I seek to elucidate how changes in mitochondrial DNA propel carcinogenesis. Additionally, I hope to uncover how these changes affect the progression, which may potentially serve as a start to treatment strategies. This research stands to help society towards understanding better detection and treatment strategies. Cancer as a research topic is often overlooked so this research will also serve as a continuation of the commendable work started in this field.

Upregulation of Death associated-protein kinase 1 during the Development and Progression of Diabetic Kidney Disease in BTBR ob/ob Mice

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Background and Significance: Diabetic kidney disease (DKD) is the leading cause of end stage renal disease (ESRD). Autophagy, an essential process to cell survival and homeostasis, involves the breakdown and recycling of cell organelles and use of the resulting products in cell maintenance. Dysregulation of autophagy response is reportedly involved in the development and progression of diabetic kidney disease. This study aimed to identify genes involved in autophagic signaling during the development and progression of DKD in an accelerated animal model of disease. METHODS: Blood, spot urine, and kidneys were harvested from male BTBR ob/ob (n=4) and BTBR wild type mice (n=4) at 8-weeks to analyze glucose, albumin:creatinine ratio, gene expression, and protein analysis via western blot. A pathway focused analysis was performed to identify differentially expressed genes associated with autophagic response in BTBR ob/ob and BTBR wild type mice. RESULTS: Blood glucose and albumin:creatinine ratios were significantly higher, 2-fold (p=0.001) and 4-fold (p=0.01) higher, respectively, in BTBR ob/ob mice. An autophagy pathway focused analysis revealed ten upregulated genes in the kidneys of BTBR ob/ob mice. Dapk1 (215-fold; p=0.01) and Bcl2l1(192-fold; p=0.0009) were the most significantly upregulated genes. qRT-PCR analysis further confirmed significant upregulation of DAPK1, revealing a 5-fold higher expression of (p=0.04) in the kidneys of BTBR ob/ob mice, in comparison to BTBR wild type mice. CONCLUSION: DAPK1 is upregulated in the kidneys of 8-week-old male BTBR ob/ob mice. Additional studies will investigate the role of DAPK1 in autophagy response in DKD.

Academic Electronic Health Records: SimChart Students' Perspective

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Background: The introduction of electronic health records (EHRs) with the increasing uptake in its implementation is a manifestation of the positive impact of EHRs in the healthcare delivery system. However, studies have shown that academic EHR technologies have not been adequately incorporated into the educational curricula of nurses to prepare them for transition to real- world practice experience on graduation. This study investigated the undergraduate students' usability and perspective regarding the academic EHR (SimChart) in nursing education. Method: Approximately, a hundred SimChart codes were purchased through the Evolve® Elsevier Inc., and University IRB (#IRB-2022-0467) obtained with a consent for ethical consideration. Both faculty and students were trained on the usage of SimChart post codes installation. A survey was created with a secured Survey Monkey tool for data collection and analysis on the SimChart perspective and usability. Results: 59 (81.94%) out of 72 students who responded to the survey answered favorably to perceived importance of SimChart usage in case study, simulation, or clinical arena. 37 (56.39%) of students responded that SimChart as extremely important and very important. The remarkably high percentage of students who acknowledge usefulness of SimChart is proof of the significance importance of SimChart in developing relevant competencies as well as building skills that students need to be successful in current healthcare settings. Implications: There is need for more studies to identify impediments to students' adoption of SimChart learning strategies to meet current health technology and informatics workplace requirements and equip nurses with essential knowledge and skills to perform nursing roles

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Improving the stability of Solid Lipid Nanoparticles by exploring the tunable properties and different combinations of Ionic liquids

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Background: Solid Lipid Nanoparticles (SLNs) are a category of nano-sized drug delivery systems characterized by particles ranging from 10 to 1000 nm in diameter. These nanoparticles exhibit a spherical structure, featuring a solid lipid core stabilized by an outer layer lined with amphiphilic surfactants. Comprising lipids solid at room temperature, SLNs present a stable and biocompatible platform for drug delivery. The drug loading capacity of SLNs is contingent upon factors such as drug solubility in the lipid, the lipid matrix's structure, and its polymeric state. The crystalline orderliness of SLNs influences drug loading capacity, with more intricate molecules demonstrating higher capacity due to their incorporation between fatty acid chains, lipid layers, and crystal imperfections. Physicochemical properties like particle size and surface charge are influenced by variations in SLN formulations, including the type and concentrations of surfactants/emulsifiers, lipid nature, and mechanical parameters like sonication time and amplitude. Without appropriate stabilization by surfactants, thermodynamically unstable phase separation occurs. Hence Surfactants help to inhibit phase separation by reducing interfacial tension and increasing the stability of SLNs. Methods: The impact of ionic liquid-based surfactants, specifically 1-hexadecyl-3-methylimidazolium chloride monohydrate 98% and 1-n-butyl-3-methylimidazolium chloride 96%, on the physicochemical properties of SLNs was investigated using dynamic light scattering. Results: Ionic liquids are incorporated into SLN formulation and their effect on the nanoparticle size and stabilization were measured over seven days. Conclusion: The study concludes by suggesting further research avenues, including exploring variations in surfactant concentrations and combining ionic and non-ionic emulsifiers to optimize SLN formulation.

Comparative Morphological Analysis of Facial Arteries, Nerves, and External Carotid Artery Branches in Chimpanzees, Orangutans, and Humans

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Introduction: This study compares the morphological characteristics of facial arteries, nerves, and external carotid artery branches in chimpanzees, orangutans, and humans. These structures are vital for providing blood supply and innervation to facial tissues, offering insights into evolutionary adaptations within primate head and neck regions.

Methods: Meticulous dissections on chimpanzee specimens examined the anatomical features of facial arteries, nerves, and external carotid artery branches. Synthesizing our findings with existing literature enabled comparative analyses among the three primate species. Results: Confirming previous research, all three species share common branches from the external carotid artery, including the facial artery, superior thyroid artery, and lingual artery. Distinctive differences were observed in branching patterns, especially with chimpanzees and orangutans exhibiting more complex facial artery configurations than humans. Variations were also noted in temporalis and masseter muscle attachment, infraorbital artery characteristics, and facial muscle innervation.

Discussion: Our study supports prior observations on temporalis and masseter muscles, infraorbital artery distribution, lingual nerve characteristics, and occipital artery branching. Species-specific anatomical variations emphasize the significance of evolutionary adaptations in primate anatomy. Conclusion: Comparative analysis of facial arteries, nerves, and external carotid artery branches in chimpanzees, orangutans, and humans enhances understanding of primate evolution. These findings deepen knowledge of primate anatomy and advocate for further research.

DNA Barcoding's Role in Identifying Genetic Diversity in Ant Populations within the District of Columbia

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Barcoding US Ants is a program made to improve range maps for the ants of the US. By collecting different ants and identifying them at various locations, their data can be used to observe species' responses to climate change. There are nearly 15,700 ant species worldwide and around 34 in Washington DC. Some of the most common species include Argentine ants and Carpenter ants. Before the DNA barcoding of the ant, preparation was required to obtain an ant sample. Hotdog slices lured the ants out before they were collected. The app iNaturalist was used to predict what species the ants were. The DNA extraction took place around two months after obtaining the ant samples. After drying, the ants were removed from the ethanol-filled microtubes and placed into another tube that contained a Chelex solution. The "gel electrophoresis" method was used to help the DNA within the ant solution migrate through the mixtures and completely separate. The DNA barcoding allowed the proper ant species to be identified based on other DNA strands that resemble the sample the most. When viewing the sequence similarity between the DNA from the ant sample and the top 10 hits that matched it, the species Formica rufa had the highest sequence similarity with 99.85%. This concludes that the most accurate taxonomic identity for the organism of the ant sample is Formica rufa.

Effects of Baphia nitida Lodd Plant Extracts on Selected Biomarkers of Type-2 Diabetes in Sprague Dawley Rats

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Background: Baphia nitida Lodd leaves have been utilized as a traditional remedy for diabetes. This study aimed to explore the antidiabetic effects of Baphia nitida Lodd whole root plant extracts on type 2 diabetes mellitus (T2DM) in Sprague Dawley (SD) rats.

Methodology: Over twenty-two days, fifteen male SD rats were categorized into three groups: normal control, positive (diabetic) control, and intervention. The intervention group received a daily oral dose of Baphia Nitida Lodd whole root extracts (225 mg/kg body weight), while the diabetic and normal control groups were given an equivalent amount of distilled water. Fasting blood glucose (FBG) levels were recorded initially and biweekly until study completion. At the study's endpoint, lipid profiles, ABCC8 gene expression, and Tumor necrosis factor-α (TNFα) levels were evaluated. Results: The intervention group exhibited a significant rise in FBG at all recorded times compared to the other groups ($p < 0.05$). The intervention group displayed a significantly reduced total cholesterol (TC) value compared to other groups ($p < 0.05$), and low-density lipoprotein (LDL) compared to the negative control ($p < 0.05$). Their triglyceride (TG) level was significantly elevated compared to the negative control ($p < 0.05$), though the increase relative to the positive control group was not statistically significant. The intervention group also showed decreases in high-density lipoprotein (HDL) values and were not statistically significant.

Conclusion: Our study suggests that Baphia nitida Lodd root extract may exacerbate T2DM in rats by increasing FBG, TG levels and decreasing HDL in the intervention group.

DNA Barcoding on Ant and its Uses

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DNA barcoding has revolutionized taxonomic identification by providing a rapid, accurate, and standardized method for species identification based on short DNA sequences. With DNA barcoding, researchers can generate DNA barcodes that serve as unique genetic signatures for species. This DNA Subway project aimed to analyze DNA barcode sequences to determine sequence relationships. The sequence of events included finding organisms, photographing them, and collecting their tissue for DNA extraction. Using gel electrophoresis to confirm that DNA was successfully extracted, specific regions of the DNA were amplified using specific DNA barcoding primers and the Polymerase Chain Reaction (PCR). Lastly, the DNA samples were sequenced with a forward and reverse read for each sample. After generating a consensus sequence of 721 base pairs (bp) and conducting a BLAST search to identify the closest matches, the top hit, Tapinoma sessile, showed a remarkable similarity of 99.85% with the sample. A MUSCLE alignment was performed to assess sequence similarity, confirming Tapinoma sessile as the closest match. The NJ phylogenetic tree revealed Tapinoma sessile as the most closely related taxon to our sample. Furthermore, the ML phylogenetic tree was utilized to explore evolutionary relationships, highlighting the sample's position within the tree and its closest clade. The results suggest that DNA barcoding is important in enhancing the accuracy and speed of ant species identification. While DNA sequencing has aided in the rapid identification of different species, this knowledge can be applied to forensic applications, biodiversity research of other species, and other fields.

Advancements in Sickle Cell Disease Management: Review of Treatments and Addressing Health Disparities in Black Communities

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Background: Sickle cell disease is a genetic blood disorder characterized by abnormal hemoglobin, resulting in distorted red blood cells causing deleterious effects, including organ damage, severe pain, and decreased life expectancy. Approximately 90% of those affected worldwide have African ancestry. Despite treatment advancements, healthcare access disparities persist, particularly affecting African American (AA) populations. This investigation explores current SCD management, emphasizing treatments and health disparities in AA. Methods: A search was conducted using databases such as PubMed, MEDLINE, and relevant journals. Keywords including "sickle cell disease," "treatment," "health disparities," and "Black populations" published from 2010 to 2023 yielded 523 relevant articles. Focus was on sources addressing healthcare access, treatment effectiveness, and outcomes among AAs. Results: The findings highlight treatment options, including hydroxyurea, hematopoietic stem cell transplantation (HSCT), and emerging therapies such as gene therapy and editing (CRISPR-Cas9, Lentiviral vectors, Ex vivo gene editing). According to the U.S. Census, approximately 18.9% of AAs in the United States live below the poverty line, significantly impacting healthcare access, including specialized care for chronic conditions. Discussion: Addressing health disparities in sickle cell management among Black communities requires a variety of approaches. In conclusion, healthcare access and outcomes disparities persist among the African American population despite advancements.

Genetic and Epigenetic Factors in Post Traumatic Stress Disorder (PTSD)
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BACKGROUND: Post Traumatic Stress Disorder (PTSD) is a psychological disorder that manifests after a traumatic experience. Symptoms include unwanted upsetting memories, nightmares, flashbacks, emotional distress and physical reactions to reminders of a traumatic event, debilitating one's ability to function on a daily basis, increasing thoughts of loneliness, depression, difficulty sleeping, hypervigilance, difficulty concentrating and more aggressive behavior. Not everyone who experiences a traumatic event ends up with long term PTSD. Genetics account for at least 30% of the cause of PTSD including in African Americans (AA). METHODS: Research into PTSD was conducted through scientific publications, and NCBI was used to identify specific genes associated with PTSD. RESULTS: Mutations in key genes found in different populations are linked to the prevalence of PTSD in those who are exposed to trauma. The gene SLC64A, a gene that regulates serotonin levels, has an insertion/deletion mutation in the locus 5-HTTLPR which increases the risk of PTSD in high-stress situations. In European populations, there are a number of genes that have been found to contribute to the risk of PTSD including ZDHHC14, PARK2, KAZN, TMEM51-AS1 and ZNF813. In African populations, another five genes LINC02335, MIR5007, TUC338, LINC02571 and HLA-B are cited as increasing risk of PTSD. DISCUSSION: As more African Americans join US military services, research on African Americans with PTSD is required to understand how ethnicity matters, so that early prevention can be made. Genetic mutations found in African populations likely occur in African American populations, giving researchers a starting point towards addressing PTSD in African Americans.

Study on the Biodiversity of Ants in Residential and Urban Areas
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Urban and residential areas have variations in soil composition due to their distinct settings, which underscores that there should be a diversity of ants in these areas. This study examines the disparity in biodiversity between residential and urban areas, focusing specifically on 134 Michigan Ave. NE (residential) and Howard University (urban) in Washington, D.C. Ants were collected using bait traps, preserved in ethanol, and subjected to DNA extraction, PCR amplification, and sequencing for species identification. Utilizing DNA barcoding techniques and understanding habitat profiles, the aim was to discern whether there is a notable distinction in ant species richness and diversity between these two environments. For ants collected at Howard University grounds in front of Ernest Just Hall, all the above techniques were utilized, and the ant was identified as Leptogenys kitteli. For those collected from the residential area, a comprehensive analysis of its morphology and habitat profile, which included studies of the type and coverage of litter, type of soil, etc., was conducted. The results obtained closely resembled the same set of data collected at Howard University. Thus, contrary to the initial hypothesis, the results revealed minimal variation in ant diversity between the residential and urban areas. These findings suggest that urbanization may not significantly impact ant biodiversity in these specific locations, highlighting the resilience of ant populations in urban environments. However, further research is needed to fully understand the genetic variations among the ants in the residential area, which will be achieved by performing DNA barcoding on those specimens.

Understanding the Genetic Cause of Sugar Affinity in Fire Ants
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Ants are present in numerous areas around the world. These insects vary in indoor and outdoor locations. Even so, many humans are unaware of the variations of ant species and behaviors. In the process of DNA barcoding, particular specimens are identified using short, standardized segments of DNA. By DNA barcoding, researchers can verify species of plants, fungi, and animals to determine relationships and behaviors between species or patterns that are evident in species. A hot dog was used as bait to attract ants in front of the Ernest Everett Just Hall on the Howard University campus. The ants were to be used to extract DNA using the Chelex method. Short, standardized segments of DNA were used for PCR, which were later analyzed by gel electrophoresis. The amplicons were then mailed to Cold Spring Harbor Laboratory for taxonomic identification. The data was published on an online database, GenBank, which we then used to identify the ant species. After analyzing the results identified, students can note that there is not a lot of previous or current research regarding ant colonies, their gustatory systems (perception of taste), and their foraging activities in relation to their genetic processes. Hence why this research is based on a genus and not a specific species. Therefore, although it is difficult researchers must conduct future experiments to give a genetic rationale for an ant's attraction to certain foods, sugars, and nutrients to expand the breadth of knowledge on specific ant species.

Heat Stroke in Patients with ADHD Medication
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Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental condition characterized by persistent patterns of impulsivity, hyperactivity, and inattention, significantly impacting daily functioning and quality of life (Matuszak, 2020). While typically diagnosed in childhood, its symptoms endure into adolescence and adulthood. Heat stroke is a serious illness characterized by central nervous system dysfunction, seizures, and severe hyperthermia, and can lead to death, even despite clinical treatments (Leon & Helwig, 2010). Exertional heat stroke persists as a primary factor in unexpected fatalities among young athletes and those engaged in physical exertion (Miller et al., 2021).

Liver PKCε Heterozygous (LivPKCε fl/Δ) Female Mice Showed Better Glucose Tolerance than LivPKCε fl/Δ Male Mice When Fed on High Fat or High Fructose Diet for One Month

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Excess high fat and high fructose diet intake leads to liver fat accumulation contributing to insulin resistance, glucose intolerance, and obesity. Liver protein kinase C epsilon (PKCε) activation has been implicated as a key mediator of diet-induced hepatic insulin resistance, yet the mechanisms remain unclear. Using hepatic PKCε knockout mice, we aim to investigate how PKCε interacts with insulin signaling cascades in diet-induced metabolic disorders. In this study, Male and Female heterozygous (LivPKCε fl/Δ) mice were placed on three diets for one month: Control (Protein 20%, Carbs 70%, corn-starch 50%, sucrose-maldextrin 20%, fructose 0%, Fat 10%), High Fructose (HFrD) (Protein 20%, Carbs 70%, corn-starch 50%, sucrose-maldextrin 20%, fructose 60%, Fat 10%), and High Fat (HFD)(Protein 20%, Carbs 20%, corn-starch 0%, sucrose-maldextrin 20%, fructose 0%, Fat 60%). We found that within one month, LivPKCε fl/Δ-HFD and LivPKCε fl/Δ-HFrD female mice displayed better glucose tolerance than males as seen by their lower glucose level during Glucose Tolerance Test (GTT). However, both male and female LivPKCε fl/Δ mice did not differ in glucose tolerance on control diet within the same duration. Conflicting evidence exists whether liver or adipose tissue-specific PKCε deletion protects mice from diet-induced glucose intolerance. Both human and rodent studies suggest that females experience less endogenous glucose production and less hepatic insulin resistance than males after high fat or high fructose challenge and our findings are consistent with these studies. Subsequent research will use homozygous LivPKCε Δ/Δ mice and their littermate controls for detailed metabolic and molecular analysis.

Impact of Fatty Acyl Chain Length on Physicochemical Properties of Solid Lipid Nanoparticles

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Solid lipid nanoparticles (SLNs) are versatile carriers for therapeutic molecules ranging from lipophilic small molecules to mRNA vaccines, which tend to be prone to degradation. The biodegradable nature, stability, reduced toxicity, and solvent-free preparation of SLNs make them advantageous over previous lipid-based carriers. Because of their lipophilicity, SLNs can bypass conventional barriers, such as the blood-brain barrier, hepatic first-pass metabolism, and others, and enhance the bioavailability of therapeutic molecules. In their simplest form, SLNs are composed of a core of fatty acid that is solid at room temperature, and surfactants and other molecules can be added for further stability. The small size of an SLN improves bioavailability, while the surface charge prevents individual particles from aggregating and improves stability. In this project, SLNs have been synthesized using saturated fatty acids of differing acyl chain lengths (myristic (14:0), palmitic (16:0), and stearic (18:0)), with sodium taurodeoxycholate as the surfactant. The effects of the fatty acyl chain length on the size and surface charge, or zeta potential, of the SLNs were investigated. The stability of the SLNs was studied by measuring the size and zeta potential on the day of formulation and 1, 2, 3, 5, 7, 14, 21, and 28 days after formulation. Since SLNs can be stable without refrigeration, they can be administered to individuals in Global South communities without access to refrigeration. These studies will be beneficial for optimizing SLNs for this application, which will contribute to better health outcomes globally.

Burden of Trachoma: India, China, and Sub-Saharan Africa

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Background: Trachoma is a neglected tropical disease (NTD) caused by Chlamydia trachomatis. The infection causes lesions of the conjunctiva of the eyelids to erode the surface of the cornea, causing opacity and eventual blindness when left untreated. This study examined the burden of trachoma in 2019, focusing on India, China, and Sub-Saharan Africa. Methods: The Global Burden of Disease (GBD) produced estimates years of life lived disabled (YLD) due to trachoma. YLD were obtained for 1990-2019 for India, China, and Sub-Saharan Africa. Sub-national estimates were available for India and Ethiopia. Results: In 2019, the global number of YLDs was 0.181 million, rate 2.2 per 100,000. YLD declined from 2010 to 2019. In 2019, the number of YLD was 50,409

in India, the highest for a single country, compared to 126,746 in 1990. Age-adjusted rates were highest in Madhya Pradesh and Punjab. In China in 2019, the number of YLD was 11,716. The age adjusted rate in 2019 was 0.57 per 100,000. In 2019, there were 75,484 YLD estimated for Sub-Saharan Africa. The highest rate was in Ethiopia, 37.56 per 100,000. Within Ethiopia, rates in 2019 were highest in Amhara and Southern nations, nationalities and peoples, (51.62, UI 34.43 - 75.1). Rates were lowest in Addis Ababa from 1990 to 2019 (5.99, UI 3.25 - 10.06). Conclusions: Data from GBD may be helpful in targeting trachoma interventions to areas with the greatest burden such as Ethiopia.

Advancing DNA Barcoding: Enhancing Efficiency and Accuracy in Ant Species Identification

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Ants are ecologically important insects exhibiting high species diversity, yet their accurate identification remains challenging due to morphological similarities. DNA barcoding offers a powerful tool for precise species identification and phylogenetic analysis. Ants were collected from multiple different areas of Howard University. DNA was extracted with Chelex, and the COI gene was amplified using PCR. Sanger sequencing was performed. DNA subway was used with BLASTN, MUSCLE, and PHYLIP to identify the species and create phylogenic trees. The ant was found to be Tetramorium immigrants or commonly called immigrant pavement ant. This species of ants can sometimes be mistaken with other ants that inhabit pavements like the majority of the Lasius species. DNA barcoding emerges as an invaluable tool for ant taxonomy, allowing for rapid and accurate species identification. The discovery of cryptic species underscores the importance of molecular techniques in uncovering hidden biodiversity. Our findings contribute to the understanding of ant evolution and highlight the need for further exploration of ant diversity using DNA barcoding methods.

The distribution patterns of the yellow footed ant compared to other closely related species

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This study explores how the yellow-footed ant's global distribution compares to other closely related ants. This ant, though initially native to East Asia, had its first North America sighting in the East Coast, and has remained in this region since. The migration of this ant species from East Asia to America has prompted us to examine its distribution patterns and compare them to those of related species. Our research aims to determine whether this migration is an isolated incident or if it reflects a common trait shared amongst closely related species. Through various methods, including direct ant harvesting, gel electrophoresis, and DNA amplification, and were able to gather relevant genetic information. The DNA results were then placed into BLAST software and compared across different databases. Our findings show the yellow-footed ant has a distribution across 27 geographic areas including Maryland and Virginia. These results confirm the wide distribution and adaptability of the yellow-foot ant, as well as hints at genetic connections with other species. Further research needs to be conducted to compare the different regions' climate, foliage and overall environmental conditions. It is possible that over time, the ant migrated due to changing temperatures, limited resources, or shifting food sources.

Analysis of Seedling Sex Ratios of Sorrel (Rumex acetosa)

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Rumex acetosa, commonly known as garden sorrel, is a dioecious weed of the Polygonaceae family. Sorrels have long been a source of scientific inquiry due to their heteromorphic chromosomes, a rare phenomenon in plants. The karyotype for Rumex acetosa females is XX, and for males is XY1Y2. Dioecy in plants is also uncommon and has raised many novel ecological questions—especially regarding the mechanisms that influence female bias in Rumex acetosa. Determining whether there is a female bias in diecious plants is important for future research regarding stress tolerance and vegetative growth. I investigated the composition of Rumex acetosa populations by using molecular methods to screen for plant sex. Primary sex ratios were evaluated using a PCR method to amplify a genetic marker only found on a Y chromosome. As expected, I found primary sex ratios were not 1:1 but 16:4 with the number of female seedlings being higher than the males. These results are on par with previous research done in the Burke Lab during different stages of R. Acetosa's plant growth cycle. Moseley-McCloud (2023) analyzed the sex ratios in R.acetosa seeds with the three different populations, having results showing female bias with the percentage of all three populations being 66%. Both studies, with varying proportions, display that Rumex acetosa has a female bias operational sex ratio. Further investigations using larger sample sizes are needed to verify this finding.

Everyone's a Traditionalist at Night: Integrating Traditional 'Religio-Cultural' Beliefs and Practices with Biomedical Care to Improve Maternal Health Outcomes in Ghana

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Over the past two decades, efforts to decrease maternal mortality on the continent of Africa have achieved moderate success, however, 70% of all global maternal deaths continue to occur in sub-Saharan Africa. In a 2023 executive summary examining trends in maternal mortality, the World Health Organization et al. stated that, in addition to direct biological causes, harmful gender norms, biases, and inequalities that deprioritize women and girls; political instability; weak healthcare infrastructures; and lack of quality healthcare are major indirect causes of maternal death. Ghana's healthcare infrastructure reflects these challenges and is further complicated by operating a dual system of care. This bifurcated system developed as a direct result of colonization, and as such, Ghana operates a "formal" biomedical system and an "informal" traditional system. The informal system is favored by the community because of its affordability, accessibility, and respect for religio-cultural traditions, especially those surrounding pregnancy. The result is antenatal care (ANC) that is intermittent and uncoordinated, with pregnant women utilizing the formal system for some ANC, while the informal system is utilized for religio-cultural care and delivery. With 63% of births occurring in skilled birthing centers, yet 90% of maternal deaths occurring in the community, prior research suggests that integration is likely the nexus to improving maternal health outcomes. A literature review of past efforts to integrate healthcare systems in Ghana, and in other low-and-middle-income countries, was performed with the goal of developing a culturally-affirming and evidenced-based integration framework to reduce maternal mortality in Ghana.

Exploring Ant Biodiversity Through DNA Barcoding
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For this examination, experimenters collected ant specimens of an unknown species around the Howard University campus. DNA was extracted from the specimens using the Chelex method. Lastly, taxonomic identification was used with the implementation of the AntWeb website, allowing for the accurate and precise identification of the ant species. The materials for the conduction of the Ant DNA Barcoding experiment were, as follows: To amplify ant DNA by PCR, experimenters thawed the DNA, primer, and Taq polymerase; allowing them to sit for 10 minutes until any remaining Chelex settled at the bottom of the tube. Next 18 microliters of the Taq polymerase, 5 microliters of the primer, and 2 microliters of the ant DNA were added to an empty PCR tube. Finally, the mixture was put on ice until it was ready for thermal cycling. The results concluded that the experimental group collected from the Howard University campus contained the same taxonomic information, all belonging to the subfamily, Formicidae. At the beginning of the experimental procedure, it was hypothesized that if DNA barcoding techniques are applied for the identification of ant species in which morphological characteristics are inaccurate for accurate identification, then the utilization of this technique should improve taxonomic challenges, consistency, and identification of unknown species. The results support this hypothesis, given that the MRK species through the application of similar taxonomic information and the accuracy of species identification in which morphological characteristics were proven to be insufficient.

Isoform-Specific Function of C. elegans Tau, PTL-1
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As life expectancy increases with technological advancements, age-related dementia disorders, such as tauopathies, have become more rampant, impacting over 50 million people worldwide. Tauopathies are neurodegenerative diseases catalyzed by the dysregulation of tau protein in the brain. Alzheimer's disease, the most common tauopathy, has impacted more than 6 million Americans in 2023. It has been speculated that within tauopathies, dysregulation only occurs in specific tau isoforms. After alternative splicing, two types of tau isoforms (one with three microtubule-binding repeats and one with four microtubule-binding repeats) may cause functional differences within the brain. A protein in C. elegans called PTL-1 was discovered to have similar microtubule-binding repeats in its isoforms. In this project, worms with two types of PTL-1 isoforms (PTL-1A and PTL-1B) and wild type worms were aged and consistently tested for their touch sensitivity and speed to document whether certain microtubule-binding repeats negatively impact function. It was found that PTL-1A worms lost speed and touch sensitivity at an expedited rate compared to the other two samples of worms. It was also found that some PTL-1A worms developed abnormal branches throughout their exons. These findings suggest that PTL-1A overexpression may cause morphological defects. These study results will assist in the development of tauopathy research and can be applied in evaluating how isoforms impact the genetic spread of neurodegenerative diseases.

Isoform-Specific Function of C. elegans Tau, PTL-1
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As life expectancy increases with technological advancements, age-related dementia disorders, such as tauopathies, have become more rampant, impacting over 50 million people worldwide. Tauopathies are neurodegenerative diseases catalyzed by the dysregulation of tau protein in the brain. Alzheimer's disease, the most common tauopathy, has impacted more than 6 million Americans in 2023. It has been speculated that within tauopathies, dysregulation only occurs in specific tau isoforms. After alternative splicing, two types of tau isoforms (one with three microtubule-binding repeats and one with four microtubule-bind-

ing repeats) may cause functional differences within the brain. A protein in C. elegans called PTL-1 was discovered to have similar microtubule-binding repeats in its isoforms. In this project, worms with two types of PTL-1 isoforms (PTL-1A and PTL-1B) and wild type worms were aged and consistently tested for their touch sensitivity and speed to document whether certain microtubule-binding repeats negatively impact function. It was found that PTL-1A worms lost speed and touch sensitivity at an expedited rate compared to the other two worm samples. It was also found that some PTL-1A worms developed abnormal branches throughout their exons. These findings suggest that PTL-1A overexpression may cause morphological defects. These study results will assist in the development of tauopathy research and can be applied in evaluating how isoforms impact the genetic spread of neurodegenerative diseases.

Geographic variation in racial disparities in age-adjusted mortality rates in Mississippi

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Background: Racial disparities in mortality rates have been well-documented in the last century. No studies have examined disparities using the latest data for the state of Mississippi. Methods: Mortality data for the state of Mississippi were obtained from the vital statistics program of the Centers for Disease Control & Prevention for years 1999-2020. The age-adjusted mortality rate (AAMR) for ages 35-84 years was calculated by county, gender–male (M) vs female (F)--and race–black (B) vs white (W)--among non-Hispanics (NH) for all causes of death. Results: In 2020, MS had the highest AAMR per 100,000 among states in the US: 1,624.76 (1,605.61 - 1,643.91) at age 35-84. In 1999-2020 combined, AAMR varied among counties for each gender-race group. High AAMR was concentrated in the delta region for NHBM and NHBF. This was less so for NHWM and not so for NHWF. The Black/White AAMR ratio among males and females was highest (1.42, 1.36) in the small metropolitan areas and lowest (1.18, 1.05) in the large fringe metropolitan areas. In 1999-2020 for NH males, the ratio of AAMR in blacks to whites varied from 0.9 to 1.8. In NH females, the ratio varied from 0.9 to 2.2. In both genders, the ratio was significantly correlated with the percent of the population that was NH Black. Conclusions: The AAMR in MS varied greatly among counties as did the Black/white ratio of AAMR. Further research is needed to explain this geographic variation in racial disparity.

Exploiting aberrant oxidative DNA damage repair and epigenetic landscape promotes tumor immunogenicity in gastric cancer

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Oxidative DNA damage plays a pivotal role in the emergence of human diseases, notably gastric cancer. The principal mechanism for repairing oxidative DNA damage is the base excision repair (BER) pathway. Impaired DNA damage repair (DDR) result in an accumulation of DNA in the cytoplasm, which triggers the innate immune response via STING pathway. We have previously published that impaired oxidative DNA damage repair results in cytosolic DNA mediated inflammatory response. In this work, we examined the role of BER factors, a scaffold protein XRCC1 (X-ray1 cross complementing 1) in innate immune signaling and tumor immunogenicity. XRCC1 facilitates the coordination of single-strand break repair. In addition, in silico data shows that XRCC1 expression decreased in various cancers including gastric cancer. However, it is unknown whether aberrant XRCC1 can impact the tumor immunogenicity in gastric cancer. To address how XRCC1 deficiency and impaired DDR may increase the immunogenicity in gastric cancer, we applied invitro and in vivo studies. Our data shows that DNA damage response inhibitor that target ATM (Ataxia Telangiectasia Mutant) significantly increased the micronuclei in XRCC1-/- cells compared to XRCC1+/+ gastric cells indicating increase in cytosolic DNA. Subsequently, qPCR and western blot results showed increment of innate signaling genes (IFNB, CCL5, CXCL10) in XRCC1-/- cells. Our initial report also showed ATM inhibition increased immune checkpoint PD-L1 in XRCC1-/- cells. Overall, our preclinical data indicates that using a combination of ATM/ EZH2 inhibitors likely provides a potential immunogenic landscape for gastric cancer for future Immune based therapeutic strategy.

Dynamic Patterns of Staphylococcus aureus Adhesion under Fluid Flow: Bridging Microfluidic Experiments with Computational Insights

Presenter's Name: Sarees Shaikh
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The adhesion and spatial organization of Staphylococcus aureus on biotic and abiotic surfaces are critical factors in the pathogenesis of its infections. Bacterial adhesion particularly plays a major role in the subsequent formation of biofilms on medical implants and host tissues. This study investigates the dynamics of S. aureus adhesion under varying levels of hydrodynamic shear stress. Experimental assays employed a Bioflux 200 microfluidic system to mimic physiological fluid flow conditions and COMSOL Multiphysics software for computational simulation. Our research employed OpenCFU for automated count-

ing and MATLAB for data analysis. Experimental findings revealed a significant reduction in bacterial surface concentration with increasing shear stress, highlighting a 64% decrease at 5 dyn/cm² compared to a 1 dyn/cm² scenario. This trend was paralleled by a 49% decrease in the maximum rate of adhesion, emphasizing the shear stress's detrimental effect on bacterial adhesion capabilities. Moreover, while the overall spatial distribution of cells remained consistent across varying shear stresses, maintaining an average distance of approximately 25 μm, the proximity between adjacent cells decreased over time under higher shear conditions. Contrasting experimental observations with COMSOL simulations highlighted the limitations of current models in accurately replicating these biological interactions, advocating for the integration of AI to enhance predictive accuracy. This study not only advances our understanding of the early stages of S. aureus biofilm formation but also underscores the necessity for more sophisticated simulation tools, potentially informing novel therapeutic strategies against biofilm-associated infections. This study was supported by an NSF-CMMI-Award#2000330 to Dr. Patrick Ymele-Leki

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Effects of Exposure to Violence on Telomere Length in Young African American Adult Men

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OBJECTIVE: Exposure to violence (ETV), an environmental stressor, impacts human health and can have long-term biological effects, including shorter telomere length (TL). The relationship between TL, environmental stressors (ETV and policing), and depression have been studied, but not yet extensively in Young African American Adult Men (YAAAM). This study examines relationships between environmental stressors and depression on TL, measured by a quantitative PCR assay, in YAAAM in Washington DC. METHOD: We analyzed 48 saliva samples of 18 to 25-year-old AA men. Participants who reported either ETV or no ETV on several measures of ETV (exposure to physical violence, threat of violence, witnessing violence, and community violence) were selected. Correlations were calculated between TL, depression, and ETV measures. Stepwise regressions were conducted to examine the relationships of ETV variables and depression to TL, controlling for age, receiving welfare or public assistance, age at first substance use, and BMI. RESULTS: In stepwise regressions for males, police interaction ($\beta = .657$, $p<.001$) and the threat of violence ($\beta = .260$, $p<.01$) had substantial effects on depression, which has a negative effect ($\beta = -.464$, $p<.01$) on TL. CONCLUSION: The results indicate that for African American men in our sample, depression had a significant negative association with TL, aligning with past research that links psychological stress and TL. The findings highlight the importance of psychosocial internalization of environmental stressors among YAAAM.

Racial Differences in Postpartum Blood Pressure Trajectories Among Women After Hypertensive Disorder of Pregnancy

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The hypertensive disorder is a prevalent issue pregnant women face due to it putting them at risk of maternal mortality. The objective of this study was to investigate the blood pressure trajectory in women of different races who have given birth for the first six weeks following a hypertensive disorder pregnancy. The study focused on women who were in the University of Pittsburgh Medical Center Magee-Women's Hospital between January 1, 2018, and December 31, 2019, within the postpartum unit. These women self-reported their race while enrolling in the use of blood pressure monitors immediately following the delivery of their child that would be used for six weeks. The study showed that more black women met the criteria for stage 1 or 2 hypertension in comparison to white women. The overall study found that the blood pressure in pregnant women significantly reduced following their deliveries for the first three weeks. It showed that compared to white women, black women had a slower decrease in their blood pressure.

Leveraging Saturated Computational Mutagenesis to Study Gene Expression in Transgenic Fruit Flies

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The Curly Su protein (dMPO), an analog of human myeloperoxidase (hMPO), governs wing morphogenesis in Drosophila melanogaster. The dMPO orchestrates a surge of reactive oxygen species (ROS), pivotal for developmental and immune processes in the fruit fly. The purpose of this research is to elucidate the functional impact of missense mutations in Myeloperoxidase.

First, we performed computational mutagenesis to analyze the effect of potential missense mutations on the stability of dMPO and hMPO. Second, we performed the bioinformatic analysis of the RNA sequences of transgenic fruit flies. Third, we utilized experimental procedures to validate the computational results. A comparative analysis disclosed high sequence similarity between dMPO and hMPO. Employing saturated computational mutagenesis, we identified G378W and W621R predicated on positive changes in folding energies ($\Delta\Delta G$) of dMPO. The G378W is the most destabilizing mutation in dMPO, and W621R is homologous to W643R, which causes myeloperoxidase deficiency (MPOD) in humans. By leveraging genome editing techniques, we generated transgenic Drosophila harboring G378W, Del 305-687, and W621R variants, resulting in a distinctive 'curly' wing phenotype across all mutants, accompanied by a notable lifespan reduction during

maintenance. Transcriptomic profiling via RNA-Seq elucidated differentially expressed genes (DEGs) among the transgenic lines, corroborated by qPCR validation exhibiting similar expression patterns for the DEGs. Gene ontology (GO) analysis of DEGs unveiled functional annotations delineating the roles of both up-and down-regulated genes. Our results showed that G378W portends the worst prognosis. The integrative approach of combining computational predictions with empirical experimentation facilitates rapid elucidation of 'pathogenic' phenotypes from novel missense mutations.

Neonatal Meningitis: A Chronological Analysis of Past and Present Research

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Background: Neonatal meningitis is the inflammation of the meninges within the first 28 days of life. This condition can occur as a result of maternal or newborn infection with viruses or bacteria, prematurity, placental or amniotic infection, or an inhabitance in geographic regions without access to adequate health care. Many complications result from neonatal meningitis.; Short term issues include a lack of interest in feeding and breathing difficulties, long term issues include epilepsy, cerebral palsy, and speech or hearing troubles. Materials and Methods: Google Scholar and PubMed were consulted to acquire data within the range of 2014-2024. Key words "Neonatal meningitis," yielded 275 and 26,200 research articles on PubMed and Google Scholar respectively, with a total of 26,475 search results. We emphasized articles that serve as an indication that neonatal research has advanced and reforms have been made to care approaches. Methods of early detection such as cranial ultrasounds have been utilized and found successful, yielding information about neurological sequences leading to the disease. Results: Within the past decade, observational research has revealed that different types of neonatal meningitis yield different neurological outcomes later in life for the child. Discussion & Conclusion: As time progresses, more information about the disease is revealed. The complexity of the etiology has been dissected, enabling the curation of effective treatment and diagnostic approaches. As with any infection, prevention has proven to be easier than curing the disease completely.

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mtDNA and Oral Health

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Much research suggests that oral health is impacted and connected to other biological factors in the body, but mtDNA's role in oral health has been understudied. Modern insights into the mechanics of mtDNA's role in oral health, however, have fueled recent research. Poor dental hygiene often results in the buildup of bacteria-containing plaque on teeth that causes the release of reactive oxygen species, or ROS. In the oral cavity, it is suspected that excessive production of ROS has the capacity to damage mtDNA and trigger various oral diseases. While mitochondria naturally produce ROS by way of respiration, mutated mtDNA often results in excessive production of ROS, causing a destructive cycle of unnatural ROS production and mtDNA damage. This makes dysfunctional mtDNA the culprit to many diseases. Knowledge about mtDNA, its various components, and associated factors aids in the development of precision medicine that targets the specific mtDNA-oral health interactions of individuals instead of focusing on universal or generalized medical aids and/or cures. In this review we produce a comprehensive overview about the various oral conditions that have a significant relationship to mtDNA. A better understanding of this connection allows for more efficient innovations to be made in gene targeted oral disease therapies. Such conditions as diabetes influence oral health and its linkages with mtDNA have been reported. We also investigate the role of advanced genetic tools such as CRISPR/Cas9 to address the problematic interactions of mtDNA and oral health.

Establishing the Impact of a High-Fat/High-Sugar Diet on Preference for Drug Reward

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There is incongruency in the literature concerning which drugs of abuse may be preferentially consumed by individuals with eating disorders. By gaining a better understanding for how increased consumption of high-fat, high-sugar diets may affect the reward pathway and influence the vulnerability to the use of drugs of abuse, we seek to investigate how a chronic high-fat, high-sugar diet impacts drug reward. The goal of this study is to determine the impact of high-fat, high-sugar pellets (PF) consumption on morphine preference. Since the overconsumption of this diet leads to binge eating and that disorder is more commonly observed in females, we conducted nine intermittent feeding tests in female, Sprague Dawley rats (n= 20). The rats that were given chronic exposure to 30g of PF were considered PF rats and control rats were only given standard chow. All rats underwent morphine conditioned place preference (CPP) training for three days and were assessed for morphine reward. The data shows that control rats had a significantly greater preference for morphine versus PF rats ($p=0.0389$). This finding is contrary to preliminary data for stimulant preference. It is possible that prior exposure to PF altered the brain's reward pathway, making morphine less desirable. Future investigations will determine if this is applicable to other opiates and characterize how a PF diet causes plasticity in the reward pathway.

Mitochondrial defects in mutants of the GATOR1 and GATOR2 Complex
Presenter's Name: Deja Straughter
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Mitochondria structure and function are often impacted greatly during development, here we will focus on the resulting impacts from the metabolic regulator, TORC1. The GTPase-activating protein toward Rags (GATOR) complex contains two smaller multi-protein complexes, GATOR1 and GATOR2. These complexes work upstream of the target of rapamycin complex 1 (TORC1), a metabolic regulator, and are responsible for its activation. GATOR1 inhibits TORC1 activation, while GATOR2 promotes its activity. GATOR1 consists of the proteins Iml1, Nprl2, and Nprl3, and GATOR2 consists of Wdr24, Wdr59, Mio, Seh1, and Sec13. Mutations in components of GATOR1 and GATOR2 increase and decrease TORC1 activity respectively. We wanted to explore if the mitochondrial structure and distribution are changed during oogenesis in GATOR2 mutants. To address this question Drosophila was used as our model organism, and oogenesis was utilized as the model system. Fluorescent Co-Staining with the dyes, 4',6-diamidino-2-phenylindole (DAPI), (antibodies against the proteins) ATP5A, RabC, and Orb was used to visualize the presence of the mitochondria, lysosomes, and oocytes within the early-stage egg chambers using a confocal microscope. We observed a similar mitochondria structure and distribution in Wdr24 and mitfKO47. However, in mioKO2 there was an obvious decrease in mitochondrial distribution. These data indicate that at least some components of the GATOR2 complexes are required to maintain mitochondrial structure and distribution during oogenesis.

Computation Analysis of VHL Protein Mutations with Pancreatic Cancer
Presenter's Name: Crystal Teng
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School/College: Arts & Sciences
Presentation Type: Poster Presentation
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Pancreatic cancer is known as one of the deadliest cancers out there, with a small 5 year survival rate of 20-30%. The deadliness of it is largely due to the fact that symptoms of pancreatic cancer are often late, leading to poor early diagnosis and a higher mortality rate. Factors that increase the risk of pancreatic cancer include diabetes, tobacco usage, obesity and genetics, with regards to the fact that certain genes like the von Hippel-Lindau tumor suppressor (VHL) gene are especially prone to mutating and causing pancreatic cancer. The missense mutations in the VHL gene could change its protein sequence and alter the post translation modifications, resulting in abnormal protein functions, which can lead to higher risk of diseases, especially pancreatic cancer. In this study, we used a bioinformatics approach to analyze missense mutations associated with pancreatic cancer. We found that specific mutations destabilize the VHL protein stability. We also identified the mutation involved in the post translation modification. This study will be able to help biomedical scientists to identify specific target sites for drug development on pancreatic cancer.

Analyzing Systemic Effects of Disease-Causing Mutations on Protein Function through Computational Platform
Presenter's Name: Shaolei Teng
Classification: Senior Faculty
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Presentation Type: Oral Presentation
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Advanced machine learning techniques such as AlphaFold enable the generation of accurate protein structure models. This study leverages these techniques to explore how protein mutations impact systemic functions by mapping them onto computational structure models. Our aim is to investigate the effects of disease-causing mutations on protein stability and protein-protein interactions using a computational approach. We developed computational saturation mutagenesis platform that combines structure-based energy calculations with sequence-based machine learning predictions to analyze the effects of missense mutations on protein structure and function. Experimental validation of mutation effects associated with human diseases was conducted using genome editing and RNA-seq. We evaluated the systemic consequences of viral mutations on the functional attributes of the coronavirus spike protein and probed the effects of genetic variants associated with mental disorders on computational structural models. Additionally, our computational platform was used to identify potentially pathogenic missense mutations in peroxidases, elucidating their influence on wing phenotypes and gene expression in transgenic fruit flies. This platform offers a rapid and effective method for studying the functional impacts of mutations in specific proteins, aiding biomedical researchers in understanding how missense mutations contribute to disease development. These findings could lead to the identification of potential target sites for drug and vaccine development against various human diseases.

Nutritional Literacy Among Black Athletes and Risks associated with Sodium Intake
Presenter's Name: Luke-Kennedy Thompson
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Presentation Type: Poster Presentation
Faculty Advisor: Chimene Castor
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Nutritional awareness is essential for athletes to maximize performance, improve recovery, and preserve general health. Thus, there are differences in Black athletes' access to nutrition resources and information, which can affect their well-being and performance. This systematic review will compile the body of research on Black athletes' nutritional literacy to understand the risks of sodium intake in a black athletes diet. The keywords used to compile research are "nutritional literacy", "black athletes", and "hypertension". Our sources of data collection will include searches on PubMed and Google Scholar. This review will specifically focus on studies published in the last ten years. The research will include studies that have mixed methods, food logs, and quantitative study design. The nutritional knowledge of black athletes will be evaluated in this review. There are differences in nutrition resources and education available, with many black athletes possessing

limited knowledge or access to good dietary practices. Food insecurity, restricted access to fresh produce, and cultural and socioeconomic factors significantly impact good dietary practices. More specifically, minority individuals are at a higher risk for hypertension and health risk associated with high intake of sodium and electrolytes, that are included in sports drinks and an athletic diet. This study will explore the literature using our keywords to examine the risk associated with black athletes, their athletic diet and how it affects their athletic performance.

A Meal Prep A Day keeps the "Freshman 15" Away

Presenter's Name: Jordan Tucker
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Over 84.4 percent of university students are reported to experience stress. The World Health Organization defines stress as a "state of worry or mental tension caused by a difficult situation." In pursuing academic success, research shows that the early mornings to late nights, last-minute assignments to laborious tests, and the workload of college-aged students increase their stress levels, resulting in poor mental, cognitive, and physical health. Stress worsens when students lack cooking skills, money for quality foods, time constraints, perceived barriers, and irregular dietary patterns. As a result, research has reported that 44 percent of college students are overweight or obese, which may be related to increased consumption of high-caloric food, leading to significant weight gain such as the "freshman 15". Hence, this assessment aims to provide tools such as meal prep and time management to minimize stress and improve poor dietary behaviors among college students. This information will provide the necessary tools to develop an intervention to educate students on healthy nutritional information and improve nutritional literacy for behavioral change and good dietary practices. This paper conducts a systematic literature review within the PubMed search engine to identify the role of stress on nutritional health. It will use the Health Behavior Model and Transtheoretical Model to develop an intervention. This study expects to determine the perceived barriers students face impacting their diet, develop self-efficacy amongst students and their dietary decisions, and propose coping mechanisms to reduce lapses and relapses of undesired dietary behaviors.

Genetic Landscape of Alzheimer's Disease: Does ethnicity Matter?

Presenter's Name: Brooke Turner
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Introduction: Alzheimer's disease is a neurodegenerative disorder characterized by progressive cognitive decline and memory impairment. It manifests in two main forms: late-onset Alzheimer's and early-onset Alzheimer's. Genetic factors, particularly variations in the Apolipoprotein e2 (APOE e2),3, and 4 gene, play a significant role in the risk of developing AD.

Methods: A systematic search was conducted using the National Center for Biotechnology Information to identify primary articles relating to Alzheimer's disease, ethnicity, and Apolipoprotein E (APOE). Relevant studies were reviewed to investigate the association between APOE gene variants and AD risk across different ethnic groups. Results: APOE genotype e2 has been linked to a reduced amyloid beta (Aβ) thereby reduce risk of AD, with odds ratios of 0.90 for Hispanics, 0.72 for African Americans (AA), and 0.55 for Caucasians. Conversely, APOE e4 is associated with an increased risk of AD, with odds ratios of 1.90 for Hispanics, 2.39 for AA, and 3.48 for Caucasians. Those with APOE e2/e4 and APOE e3/e4 combinations exhibit higher AD risk, while individuals with APOE e4/e4 have the greatest risk.

Discussion: While research suggests a higher prevalence of APOE e4 in Caucasians, its crucial to acknowledge the potential bias stemming from the disproportionate focus on white populations in studies. Therefore, conducting further research that includes diverse ethnic groups is imperative to obtain more accurate and representative results. While APOE e4 is associated with an increased risk of developing Alzheimer's disease, environmental factors, lifestyle choices, and other health conditions also play significant roles in AD.

Unlocking Howard University's Ant Biodiversity Through Environmental DNA

Presenter's Name: Darius Valere
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Generalist predators, such as ants, play a pivotal role in terrestrial ecosystems, particularly in agricultural landscapes where they form essential links within food webs due to their abundance and influential presence. The use of DNA amplification techniques, including PCR, has become fundamental in molecular genetics for the identification and detection of organisms and diseases. This study draws on the methodology of Tetsu Yoshimoto et al. (2021) to explore the applicability of environmental DNA analysis for monitoring alien ant species, specifically Linepithema humile, through soil sample analysis. Ant specimens were collected from Howard University's campus using a baiting technique and preserved for DNA extraction using the Chelex method. The extracted DNA underwent PCR amplification with a COI ant primer cocktail and Taq polymerase/buffer mixture, following protocol to ensure the integrity of the samples. Thermal cycling was controlled to prevent premature replication. The amplified DNA was then sequenced, and bioinformatics tools such as BLAST and DNA subway were employed for species identification. Our investigation successfully identified the presence of Tapinoma sessile subfamilies within the sampled area. This highlights the efficacy of PCR amplification and eDNA analysis in detecting specific ant species in environmental samples, potentially offering a valuable tool for monitoring biodiversity and invasive species in agricultural settings. The finding underscores the significance of advanced molecular techniques in ecological studies and pest man-

agement strategies. By confirming the presence of Tapinoma sessile, this research contributes to a better understanding of ant diversity and distribution, emphasizing the potential of eDNA analysis in environmental monitoring.

Unlocking Howard University's Ant Biodiversity Through Environmental DNA

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Generalist predators, such as ants, play a pivotal role in terrestrial ecosystems, particularly in agricultural landscapes where they form essential links within food webs due to their abundance and influential presence. The use of DNA amplification techniques, including Polymerase Chain Reaction, has become fundamental in molecular genetics for the identification and detection of organisms and diseases. This study draws on the methodology of Tetsu Yasashimoto et al. (2021) to explore the applicability of environmental DNA analysis for monitoring alien ant species, specifically Linepithema humile, through soil sample analysis. Ant specimens were collected from Howard University's campus using a baiting technique and preserved for DNA extraction using the Chelex method. The extracted DNA underwent PCR amplification with a COI ant primer cocktail and Taq polymerase/buffer mixture, following protocol to ensure the integrity of the samples. Thermal cycling was controlled to prevent premature replication. The amplified DNA was then sequenced, and bioinformatics tools such as BLAST and DNA subway were employed for species identification. Our investigation successfully identified the presence of Tapinoma sessile subfamilies within the sampled area. This highlights the efficacy of PCR amplification and eDNA analysis in detecting specific ant species in environmental samples, potentially offering a valuable tool for monitoring biodiversity and invasive species in agricultural settings. The finding underscores the significance of advanced molecular techniques in ecological studies and pest management strategies. By confirming the presence of Tapinoma sessile, this research contributes to a better understanding of ant diversity and distribution, emphasizing the potential of eDNA analysis in environmental monitoring. Future studies could expand on these methods to explore broader applications in conservation biology and ecosystem management.

Critical Complications: Cardiac Arrest Following Neuraxial Anesthesia in a 22-Year-Old Female During Labor - A Case Study

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This case study explores the critical complications experienced by a 22-year-old female during labor, specifically focusing on the development of high spinal anesthesia leading to cardiac arrest following neuraxial anesthesia administration. Neuraxial anesthesia is a common technique used during childbirth to provide pain relief, yet it carries potential risks, including neurological and cardiovascular complications. Shortly after the administration of neuraxial anesthesia, the patient exhibited signs of respiratory distress and eventually suffered cardiac arrest. Prompt recognition and intervention, including CPR, were initiated to stabilize the patient. Following resuscitation efforts, an emergency cesarean section was performed to ensure the safety of both mother and baby. This case underscores the importance of vigilant monitoring and early recognition of potential complications associated with neuraxial anesthesia during labor. Furthermore, the case emphasizes the necessity of informed consent and thorough risk assessment discussions with patients undergoing neuraxial anesthesia, particularly in young, obstetric populations. Additionally, the study highlights the significance of having the antidote, IV lipid emulsion, readily available in the crash cart to prevent treatment delays. Ensuring accessibility to this can expedite therapy initiation, potentially enhancing patient outcomes in cases of this and other known complications of neuraxial anesthesia, like local anesthetic systemic toxicity. Understanding the factors contributing to this rare yet serious complication can aid healthcare professionals in improving patient safety protocols and enhancing perioperative management strategies for neuraxial anesthesia in obstetric settings. By sharing this case, valuable insights can be gained to prevent similar incidents and optimize outcomes for patients undergoing labor anesthesia.

Using DNA Barcoding to Monitor Invasive Ant Species

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DNA barcoding allows researchers to identify species by comparing specimen DNA samples to known gene sequences. In the US, databases of ant DNA sequences helps researchers keep track of common species. This process requires the use of gel electrophoresis to separate DNA fragments by size and a Polymerase Chain Reaction (PCR) to amplify the DNA fragments. The goal of this research is to discover how ant DNA barcoding aids in monitoring invasive ant species. Chelex was used to extract DNA from ants collected from Howard University's campus and then the COI region of the DNA was amplified using PCR. The specimen DNA samples were trimmed and put through a BLAST hit search. They were then compared to known COI gene segments and BLAST hits using the DNA subway website to make a phylogenetic tree. The BLAST hits and phylogenetic tree formed using the DNA subway showed the specimen was most closely related to L. Niger, a species native to northeastern United States. This indicates that the specimen is likely not invasive or experiencing major genetic drift. Using bioinformatics and DNA barcoding allows researchers to recognize invasive ant species, especially when invasive species are morphologically similar to native species.

ADRB-2 Signaling Regulates IL-33 Expression in Pancreatic Ductal Adenocarcinoma (PDAC)

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Pancreatic ductal adenocarcinoma (PDAC) is an aggressive malignancy of the pancreas and accounts for the vast majority of pancreatic cancer cases worldwide. Because of its aggressive nature, it is often diagnosed late and fatal. The anticipated 5-year survival rate for those diagnosed with PDAC is about 12% (SEER, 2023). Though the risk factors of pancreatic cancer, specifically PDAC, are still being studied, researchers have identified stress as a hallmark of cancer that can increase cancer metastasis, worsening patient outcomes. Beta-2 Adrenergic receptor (ADRB-2) is known to play a large role in the hormonal stress response as it is activated in the presence of stress hormones. A specific pathway has been identified in which ADRB-2 is the target receptor for stress hormones, which leads to the upregulation of various proteins, like PKA, CREB, and BAD. Separate studies have explored the role of IL33, which is a gene regulated by Kras that is very abundant in pancreatic ductal adenocarcinoma (PDAC). Once released from cells, it will be tumorigenic in nature. With this information, this project sought to determine if ADRB-2 also regulates IL-33 as a part of the stress response in pancreatic cancer. We found that the production of IL-33 is upregulated through the ADRB-2 stress pathway. Additionally, we found that beta blockers can potentially be used to inhibit this pathway.

Limbic and Whole-Brain Functional Connectivity in Non-Substance Abusers with HIV: A Machine-Learning Enhanced Analysis of Neuroimaging Data

Presenter's Name: Stuart Washington
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School/College: Medicine
Presentation Type: Oral Presentation
Faculty Advisor: Marjorie Gondre-Lewis
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Human immunodeficiency virus (HIV) negatively impacts behavioral health and is co-morbid with neurocognitive and psychiatric disorders, including substance use disorder (SUD). Neuroimaging studies repeatedly show diminished functional connectivity in people infected with HIV. However, previous studies appear to disregard any potential for HIV/SUD co-morbidities, an oversight that represents a potential confound in HIV-related neuroimaging literature. Further, the functional connectivity of limbic neural substrates underlying reward and SUD (e.g., nucleus accumbens, amygdala, and hippocampus) remain unexplored in people living with HIV (PLWH). Here, we obtained resting-state functional magnetic resonance imaging (rsfMRI) data from a small population (N=7) of PLWH who have no history of SUD. Functional connectivity in PLWH had generally reduced functional connectivity relative to healthy controls (N=14), with the greatest differences occurring between visual cortex and cerebellum. Seed-based analyses of left and right nucleus accumbens and hippocampus yielded robust connections with the default mode network in controls. Similar seed-based analyses of the amygdala in controls yielded robust connections with inferior temporal lobe regions rather than the default mode network. Connectivity between corresponding regions in PLWH was reduced but recruited the default mode and inferior temporal networks. Machine learning algorithms further refined the neuroanatomical features of functional connectivity that distinguish controls from PLWH. Our results suggest that (1) PLWH who do not have SUD show reduced overall functional connectivity relative to controls, consistent with previous rsfMRI studies of PLWH, and (2) this reduced connectivity in PLWH extends to limbic structures underlying reward, even in the absence of SUD.

MYC & OmoMYC: Role of MYC in Head and Neck Squamous Cell Carcinoma

Presenter's Name: Shamel Wilson
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The MYC gene is a proto-oncogene that drives numerous normal cellular processes, including the cell cycle. MYC overexpression is frequently implicated in various human cancers such as head and neck squamous cell carcinoma (HNSCC), thus regulating its expression is crucial for maintaining cell and tissue health. Inhibiting MYC oncogenic functions has emerged as a promising strategy for cancer treatment. In recent years research has revealed several molecules that inhibit the oncogenic activity of MYC, with the most notable being the dominant negative OmoMYC protein, a mini protein that binds to the promoter region of MYC and demonstrates efficacy in tumor regression in preclinical mouse models. Furthermore, OmoMYC exhibits the capability to discriminate between Oncogenic and physiological MYC expression. By targeting the promoter regions on genes with oncogenic MYC levels, OmoMYC suppresses excessive cell proliferation, while allowing those with normal MYC levels to maintain cellular functions. For this research we conducted experimentation on how MYC overexpression and OmoMYC protein affect cell growth patterns, colony formation and apoptosis rates in HNSCC cells. Our results support the hypothesis that deregulated and overexpressed MYC amplifies cellular pathways promoting excessive cell proliferation, as evidenced by the growth curve in HNSCC cells, compared to conditions where OmoMYC is present. Additionally, the presence of OmoMYC decreases colony formation capabilities and increases apoptosis rates. These findings underscore the potential of omoMYC as a therapeutic agent for HNSCC driven by MYC overexpression, however, further research could expand its application beyond HNSCC.

Exploring Solid Lipid Nanoparticles for Targeted Skin Therapy
Presenter's Name: Jesenia Wofford
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Solid lipid nanoparticles (SLNs) have emerged as promising drug delivery systems due to their biocompatibility, controlled release properties, and potential for targeted therapy. Solid lipid nanoparticles (SLNs) represent an innovative approach for drug delivery in combating many skin issues such as aging, cancer and skin allergies, addressing many challenges in the cosmetic field. In this study, we synthesized SLNs composed of different lipids such as stearic, mystic and palmitic acid and the use of TDC as an emulsifier, utilizing the cold quenching method, yielding particles with both a negative charge and average size of under 200 nm utilizing the DLS apparatus. Additionally, we assessed the efficacy of drug loading using Nile Red as a surrogate for dermatological therapeutics, providing insights into the potential of SLNs for effective cosmetic interventions. These findings contribute to the growing body of evidence supporting SLNs as promising vehicles for targeted drug delivery and underscore their significance in cosmetic interventions aimed at addressing many skin concerns.

Is Convergent Evolution the Reason for Shared Colors in Ants?
Presenter's Name: Jewel Wood
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
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The Ant DNA barcoding project allows us to examine ants at a closer level by exploring physical and genetic traits. Through that, we are able to determine the level of genetic similarities and differences across ant species for identification purposes. The primary goal of this study was to determine if ant color, such as dark brown and black, were a result of convergent evolution or common ancestry through DNA barcoding analysis. Convergent evolution is when different species evolve similarly over time as they adapt to their environment. We compared various different species in North America to the one we collected, Lasius neoniger. We extracted the DNA from the sample collected, performed polymerase chain reaction (PCR) and gel electrophoresis, and then sent the DNA to be sequenced. Upon receiving the sequenced DNA, we used bioinformatics analysis and DNA Subway in order to compare Lasius neoniger to 9 different brown and black ant species. In bioinformatics, we used various tools including BLAST and GenBank for comparative genomics. Each of these ants came from the Formicidae family, yet different genuses. In comparing each of these species, we created phylogenetic trees that depict evolutionary descent of different species. From these comparative results, we can deduce the likelihood of ants' color being heritable.

The efficacy of DNA barcoding in uncovering genetic similarities and differences among closely related ant species
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Presentation Type: Oral Presentation
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Ants are a vital insect group that exhibit intricate relationships and subtle genetic differentiations that are challenging to discern through traditional morphological analyses. This study investigates the efficacy of DNA barcoding in uncovering genetic similarities and differences among closely related ant species. The research focuses on the cytochrome c oxidase subunit I (COI) gene as a molecular marker for species identification and phylogenetic analysis.

Ant specimens representing closely related species were collected from various habitats, and DNA was extracted for PCR amplification and sequencing of the COI gene. The species Hymenoptera Camponotus pennsylvanicus, is often referred to as MSK-511. Utilizing the muscle alignment viewer, it uncovered that the Tapinoma Sessile ant species was most similar to the MRK-511 with a 99.85% similarity. Being extremely similar, the BLAST hit meticulously revealed the alignment length mismatched by one on the trim line. Our results demonstrate the utility of DNA barcoding in providing a nuanced understanding of genetic relationships within related ant taxa. The approach allows for the identification of subtle genetic variations that may not be apparent through morphological examination alone. The phylogenetic analyses based on DNA elucidate the evolutionary connections among closely related ant species, contributing valuable insights into their genetic diversity and evolutionary history. This research underscores the potential of DNA barcoding as a powerful tool for exploring genetic relationships within taxonomically challenging groups, such as closely related ant species. The findings have implications for refining ant taxonomy, enhancing biodiversity assessments, and advancing our understanding of the evolutionary processes shaping ant communities.

High-MYC renders sensitivity of HNSCC cells to MAPK pathway inhibition
Presenter's Name: Cuicui Yang
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Background: Head and neck squamous cell carcinoma (HNSCC) is the most common type of head and neck cancer, with upregulated MAPK signaling driving its progression. Trametinib, a MEK inhibitor, has shown effectiveness in HNSCC cell inhibition. MYC, a known promoter of cell proliferation, is highly expressed in HNSCC but its influence on trametinib response is not well understood. This study aimed to investigate the impact of MYC on trametinib's inhibition of HNSCC cells. Results: Trametinib effectively suppressed MEK signaling

and reduced cell proliferation with an IC50 of 45 nM for JHU-022-LV and 28 nM for JHU-022-MYC cells, respectively, indicating that MYC overexpression rendered JHU-022 more sensitive to MEK inhibition. Cell cycle analysis showed that while MYC overexpression promoted JHU-022 cell cycle progression, trametinib resulted in a marked G1 phase arrest and diminished G2/S phases in both cell lines. Importantly, flow cytometry analysis revealed that trametinib treatment induced significantly increased apoptosis in JHU-022-MYC compared to JHU-022-LV, supported by the increased ratio of cleaved PARP/PARP and BIM levels in immunoblotting analysis. MYC further enhanced the increase in trametinib-induced γ-H2A level, a DNA damage marker. Functionally, MYC overexpression significantly delayed the wound healing response of JHU-022 to trametinib. Although MYC overexpression promoted colony formation, trametinib resulted in a greater inhibition of colony formation ability in JHU-022. Conclusions: In conclusion, our data demonstrate a combined effect of MYC-promoted cell cycle progression and trametinib-induced MEK inhibition, which may confer hypersensitivity of HNSCC to DNA damage-induced cell death.

Ecological factors influencing the population dynamics and distribution of Tetramorium caespitum ants in Washington, DC

Presenter's Name: Madisen York
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The population dynamics and distribution of Tetramorium caespitum ants in urban environments, specifically in Washington DC, are influenced by a combination of ecological factors, including the region's climate and environment. Our research question delves into the intricate relationship between ecological factors and the distribution of Tetramorium caespitum ants. Our study employed a multi-faceted approach, combining fieldwork and genetic analysis techniques. In the field, we attached a hot dog piece to a marker and placed it in a soil bed on Howard University's campus, chosen for its low litter levels and low canopy coverage, which we determined to be more beneficial for collecting ants. After observing 15-20 ants on the hot dog, we collected them in 70% ethanol for further analysis. In the laboratory, we extracted DNA from the ants using the Chelex method, followed by gel electrophoresis to analyze the DNA samples. We then used PCR to amplify the COI gene of the ant DNA and analyzed the sequences using BLAST to identify similarities with other ant species. Our results revealed a close genetic match with Tetramorium caespitum ants, indicating their presence in the DC area. Our findings contribute to the understanding of the ecological factors influencing the population dynamics and distribution of Tetramorium caespitum ants in urban environments. Further research incorporating additional genetic, environmental, and geographical data is warranted to enhance our understanding of this complex relationship and aid in the effective management and conservation of Tetramorium caespitum ant populations in urban environments.

Spontaneous Keloid Formation in Dialysis Patient

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This is a case report of a 74 -year-old African American female with a history of rheumatoid arthritis on dialysis who developed eruptive keloids, many of which developed with no history of previous trauma. Spontaneous keloids are rare in the literature, and given her history of renal failure, we have considered a connection with nephrogenic systemic fibrosis (NSF). The patient had no history of prior keloid formation and had recently been exposed to gadolinium 3 months earlier.

Effects of a Vegan Plant-Based Diet on the Metabolic Syndrome Biomarkers in Eritrean American Adults

Presenter's Name: Sesen Zerhamenet
Classification: Graduate Student
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Presentation Type: Poster Presentation
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A vegan plant-based diet (VPBD) is a diet that includes foods solely from plants, excluding all animal products. Studies have shown that a VPBD can positively affect overall health if done correctly. However, the limitation of the research is the lack of studies being done among African American (AA) adults with cardiovascular disease (CVD) on a VPBD. While there is limited data on the East African community, the research has shown that in the AA community. The proposed study aims to determine the effects of a VPBD on the lipid biomarkers, Blood pressure, and BMI of Eritrean American adults. The objective is to measure changes in metabolic syndrome symptoms like LDL and HDL pre-and post-intervention. The hypothesis being tested is that if the subjects are on a VPBD for the allotted amount of time, their metabolic syndrome biomarkers will get closer to optimal levels by 3 points for lipid biomarkers and by one BMI score closer to normal weight. With CVD being the leading cause of death in the USA and globally, much government funding and insurance aid are used for CVD alone. The methods will use an experimental design, including about 25 DMV local non-vegan adult Eritrean/Ethiopian Americans whose biomarkers are either normal or abnormal. Using SPSS, data will be received from bloodwork, blood pressure, and BMI calculations pre- and post-intervention, with bi-weekly dietary assessment check-ins on subjects undergoing a VPBD for 55 days. This study can improve our nation's overall health statistics, allowing the USA to thrive.

ABSTRACTS

BUSINESS

Throwing a Lifeline Behind Closed Doors: Addressing Informational Asymmetry Through a Signaling Theory Typology

Presenter's Name: Alieu Kamara
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Presentation Type: Oral Presentation
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Background: On January 27, 2017, Executive Order 13769, a presidential decree signed by former United States President Donald J. Trump; went into effect, the decree threatened to rescind existing visa considerations for working-age expatriates from the following countries: Iran, Iraq, Syria, Sudan, Yemen, Libya, and Somalia. Following this decision, institutions of higher education, whose student bodies contain sizeable proportions of international students, engaged in a series of crisis management-related actions. A dimension of these crisis management actions, the issuance of executive statements, and what these statements signal, is the focus of the below study. The authors will construct a typology that will have potential applications in reducing informational asymmetry. Informational Asymmetry, as defined by Nobel laureate, Joseph Stiglitz, is a mechanism that exists within economic interactions. Economic actors, when engaging in activities of exchange, have access to different levels of information. This uneven exchange can lead to differing outcomes for all parties. Firms, Institutions of Higher Education, run the risk of driving students away if there exist persistent forms of informational asymmetry. Methods: The authors have utilized Computer Aided Textual Analysis (CATA). Specifically, the CAT-Scanner tool, developed by the University of North Texas, Professor of Strategic Management, Dr. Jeremy C. Short. Additionally, the authors have utilized Microsoft's Visual Studio code to create two executable programs that have aided in the synthesizing of over 15 University statements. Conclusion: The authors are conducting ongoing research and will be continuing the study. So far, the authors have synthesized 19 executive statements and look to develop their work.

Evolving Patterns of Networks of the Major Global Retailers: A Longitudinal Analysis

Presenter's Name: Abhijit Roy
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Global retailing continues to evolve in a myriad of ways in various parts of the world. This presentation seeks to explore the patterns based on data from Deloitte Global Powers of Retailing (2023) and similar data from two decades ago. Some major findings include retailing is not as globalized as other similar industries. Most major retailers have expanded their sales over the two-decade period even though they may not have expanded in serving more territories. Even as the sales revenues of most global retailers have grown dramatically, the number of countries that they operate in have shrunk in most cases, mirroring the overall pattern of globalization in the recent past. Other interesting findings include comparing the degree centralities of the retailers after a twenty-year span and their implications. and how the power law also applies to the field of global marketing in terms of the total retail sales revenues figures being dominated by just a handful of companies. The Pareto Principle also applies to the field of global marketing- amongst the top 200 retailers only a few continue to operate in more than 10 countries, while most of them operate in fewer than 10 countries. I finally look at the continuance of the patterns of international retail divestment activities and how the COVID-19 pandemic has impacted the patterns of global retailing investments, the internationalizations of specific types of retailers (e.g., fashion vs. grocery), as well as global sourcing patterns in various parts of the world, and across various retailing industries.

CREATIVE ARTS & DESIGN

Artist Exploitation as a Result of Contemporary Label-Dominant Models in the American Music Industry

Presenter's Name: Jordan Joe
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Since the turn of the century the monopoly within the American music industry has been consolidated to four major conglomerates: Sony Music Entertainment, EMI Group, Warner Music Group and Universal Music Group. The power of these four labels extend to all aspects of the music industry such as distribution, marketing, and artist development but perhaps the most important facet within their control is the economic model of artist compensation. The yearly revenue reports from the Recording Industry Association of America consistently boast increases in total revenue as music streaming increases. However, this financial success of conglomerates like UMG and Warner Music Group are neither enjoyed nor championed by the artists that actually make the product responsible for the positive earnings calls. The currently existing model of record label contracts consists of a complex network of profit sharing, advances, recoupment, profit sharing and copyright transfers. This model historically has been exploitative in modest terms, and has been especially damaging to black artists and other artists of color. The research conducted in this paper examines this exploitative dynamic of record label contracts through the specific anecdote of Prince and his relationship with Warner Music Group. This example provides historical context for both the conventions of the modern music industry and the possibilities for innovative alternatives centered around artist self-determination. A brief analysis of the structure of a record label contract is given, and a broader analysis of the current label-dominant model in the American music industry follows.

Dance and its Relationship to Mental Health and Well-being

Presenter's Name: Simonne Legette
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Involvement in the arts and the resulting impacts on mental health is an emerging topic of research (see Stukey & Nobel, 2010). While multiple artistic modalities have been explored, the health and well-being benefits of music have been explored the most. In his 2010 review, MacDonald (2013) gathered some of this research and formed a conceptual model about the benefits of different music disciplines (e.g., music education and music medicine) and their relationship to health and well-being. We aimed to create a similar model that visualizes the way some disciplines of dance and movement overlaps with one another and relates to well-being and mental health. Our work started by identifying and defining different forms of dance and movement disciplines. We conceptualized the dance disciplines as follows: dance education, community dance, dance/movement therapy, dance as therapy, professional dance, recreational/everyday uses of dance, and dance medicine. We also gathered research about the benefits of these disciplines on mental health and well-being. In this presentation, we will present the current version of our conceptual model. After explaining our definitions for each dance and movement discipline, we will highlight commonalities and how they overlap. Lastly, we will review the research literature on dance and well-being.

Space for Soul: Finding Well-Being Through The Union of Holistic Interior Design and The Black Aesthetic

Presenter's Name: Ryane Smith
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Space for Soul: Finding Well-Being Through The Union of Holistic Interior Design and The Black Aesthetic" explores the transformative power of combining holistic interior design principles with the rich cultural expressions of the Black aesthetic to create spaces. Holistic interior design prioritizes the well-being of mind, body, and soul through the strategic use of space, color, natural elements, light, and materials. The Black aesthetic refers to the creative and cultural expression that arises from the experiences and perspectives of Black people, culture and life. In the context of the African American community, the concept of 'soul' extends beyond its spiritual connotation to embody the essence of Black culture, excellence, and creativity. It represents a deep-rooted connection to heritage, pride, and expression. Integrating the Black aesthetic into holistic design practices offers a unique opportunity to create spaces that reflect this cultural richness to promote healing, cultural affirmation, belonging, and well-being. Thereby crafting interior spaces that are not merely functional or aesthetically pleasing but deeply meaningful and restorative. "Space for Soul" encapsulates the dual aim of honoring cultural identity and fostering an atmosphere of healing and well-being, making it a powerful expression of the intertwined goals of holistic design and the celebration of the Black aesthetic.

EDUCATION & OUTREACH

Inequality of Higher Educational Opportunity – The Role of Circumstances among the Jordanian people

Presenter's Name: Yusra Alkasasbeh
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This paper investigates the role of background circumstances in shaping individual opportunities in higher education in Jordan, for the whole population as well as for key subpopulations using both of the publicly available waves of the Jordan Labor Market Panel Survey (2010 and 2016). Our findings suggest that higher education attainment and the mean years of completed education have expanded for the whole population, as well as for all subgroups, despite the low coverage rate in both survey waves. Unequal opportunities in higher education are relatively moderate in Jordan and are mainly explained by parental education, father's occupation, and sector of work, with much less impact from gender, number of siblings, and the region of birth.

Partnering for Success: A Scaffolded Approach to Inclusive Experiences in Clinical Education

Presenter's Name: Sabrina Altema
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There is a strong need for skilled mentors in the clinical setting, especially for underrepresented minority students pursuing physical therapy and physical therapy assistant degrees. To address this need and the persistent disparities in healthcare, attention to the experience of minority students within physical therapy education is necessary.1 Therefore, building a community of practice that provides safe educational experiences that promote academic success is imperative.
One of the ways we can accomplish this is by reframing our clinical experiences as mentorship opportunities. Mentorship in clinical education can offer structure, inclusive learning spaces, and culturally responsive teaching.2 Using instructional scaffolding supports, an individualized plan can be crafted and used as a roadmap toward successful learning experiences. This special interest poster presentation aims to provide the outcomes of a support model used to establish a strong mentor-mentee relationship in clinical education.

1. Naidoo K, Yuhaniak H, and Abel Y. An ecological systems approach to exploring facilitators and barriers to success for minority students enrolled in a doctor of physical therapy program. Health Professions Education. 2020;6(3):394-405.
2. Pfund, C, Sanchezneto, F, Byars-Winston, A, Zarate, S, Black, S, Birren, B, et al. Evaluation of a culturally responsive mentorship education program for the advisers of Howard Hughes Medical Institute Gilliam Program Graduate students. Life Science Education. 2022;21(50):1-12. https://doi.org/10.1187/cbe.21-11-0321

Affirming Black Joy in Academia

Presenter's Name: Tatiana Anthony
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Cumulative experiences of racism and inequity have negatively impacted the psychological wellbeing of Black individuals and the act of joy, specifically, Black joy, has been a source of healing for Black people across the diaspora (Johnson, 2015). For context, Black joy has been defined as ". . . a state of psychic contentment, an enduring feeling of "enoughness," and an experience of racial pride despite deficit narratives about Black identities" (Williams, 2022, p. 370). Black joy explicitly combats the notion that Blackness is solely defined by historical trauma and oppression (Lewis-Giggetts, 2022). Black students are a subgroup of the larger Black community that has been found to experience systemic racism and academic trauma in higher education (Williams, Walker, & Wyatt, 2022). Despite the burden of systemic oppression in academia, Black students cultivate Black joy as an act of resistance (Tichavakunda, 2021). Limited studies in higher education research examine positive experiences of Black students in college. This poster presentation will provide a comprehensive review of current literature that examines Black joy as a cultural tool used by Black collegiates to enhance their college experience. Current research that explores Black joy among Black individuals has either focused on intrapersonal or interpersonal factors, but very few have combined these two dimensions into a shared model. A model will be proposed on how Black students can cultivate Black joy in academic spaces for themselves.

Effects of Racial Representation on Self-Efficacy in School Children of Color

Presenter's Name: Jazmin Arnold
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This proposed study is to understand if representation influences self-efficacy in Black children in school settings. The aim is to understand if children of color are affected by the lack of racial representation

of authority figures in school settings. Current literature regarding this topic is mostly inconclusive. There is however evidence that suggests that strong racial centrality is correlated with high academic achievement in Black children (Zirkel & Johnson 2016). Zirkel and Johnsons' work highlights that the more a child associates with being a member of their racial group, the better the child performs academically. Other research concludes that course type influences a child's racial centrality therefore influencing their academic success (Legette 2018). A possible reason for this may be the certain racial stereotypes children accept as the truth (Cokley et al. 2011). Gaps in the literature exist when discussing the perspective of children. Rather than understanding directly from the children, the subjects of this research, the literature discusses interpretations and researchers' understandings of findings. This proposed study is to fill this gap by asking "Does representation contribute to a strong, positive black identity" and "In turn, how does representation or the lack thereof in schools' impact Black youth's self-efficacy in regard to educational outcomes?" I plan to utilize the Children's Perceived Self-Efficacy Scale (CPSE), school data, and the Multidimensional Inventory of Black Identity (MIBI) to answer the research questions.

A qualitative study on the disparities in seborrheic dermatitis clinic trials in the United States

Presenter's Name: Madeline Brown
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Background: The incidence of seborrheic dermatitis is higher in African Americans (6.5%) than the general population. Unfortunately, people of color are more likely to be ineffectively managed due to over generalizability of treatment methods along with the disregard of ethnic and cultural practices. Therefore, there is an increased need for diversity amongst research participants in seborrheic dermatitis clinical trials.

Methods: Trial diversity was evaluated by searching the ClinicalTrials.gov website using the key word "eczema, seborrheic dermatitis". Interventional and observational studies that documented racial demographics and were conducted nationally between January 2000 and August 2023 were included. All other studies were excluded. Results: There are currently 18 seborrheic dermatitis clinical studies either in the recruitment, unknown, or completed phase. Of these studies, there were 4 trials that reported racial or ethnic demographics. There were 736 participants total, 75.4% were Caucasian, 15.4 % were African-American or Black, 3.5 % were documented as "other", 4.9% were Asian, 0.1 % as Native Hawaiian or Pacific Islander, and 0.7% were Native American. Interestingly, there was only one study that intentionally recruited African American females ages 18 to 89 who were diagnosed with seborrheic dermatitis of the scalp. Discussion: There is a dire need for increased representation of minorities enrolled in seborrheic dermatitis clinical trials. Limitation: There was a lack of clinical trials that publicly documented race or ethnic demographics of participants. Conclusions: By highlighting inadequate clinical trial diversity and the need to report ethnic/racial demographics, cohort recruitment can be improved rendering better health outcomes in underrepresented populations.

Characteristics of "Men Take Ten" program participants from 2009-2018: Implications for future prostate cancer screening guidelines and recommendations

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Prostate cancer is the most diagnosed cancer in men. American men show the greatest incidence of prostate cancer. Black men in Washington, DC are twice as likely to develop and die from prostate cancer than White men. Not all men will experience symptoms related to prostate cancer, but some men will and may not be aware of the symptoms. As there is limited data regarding public awareness of lower urinary tract symptoms, particularly for Black men, contributing to the limited ability of patients and some primary health care professionals not recognizing lower urinary tract symptoms in the early stages. In a cohort of predominately Black men being screened for prostate cancer, this study will examine risk factors for prostate cancer and determine the impact risk factors might have on lower urinary tract symptoms. Results suggest that some established risk factors (age and prostate size) have a significant interaction with lower urinary tract symptoms, however, not all risk factors (family history of prostate cancer and prostate specific antigen level) were significant in our cohort of Black men. Additional analyses are required to better understand the impact of established and clinical prostate cancer risk factors and lower urinary tract symptoms in Black men.

Identity and Improving Racial Consciousness in the Classroom

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If you glanced at a cafeteria in any American school, what would be one noticeable constant? It would be naive to think everyone sat arbitrarily, with race, socioeconomic status, media, and family background not playing a factor. The truth is that most American lunchrooms reflect years of systemic oppression and adolescents must adjust to this identity realization. National diversity is the highest it's ever been, but it is not reflected in marginalized groups' educational outcomes. The statistics show that American schools are more segregated now than

they were in the 1980s, illustrating a failure to diversify the classroom dynamic properly. Black adolescents are either in all-Black learning environments or forced to navigate a predominately white space. Previous scientific research has supported the benefit of Black students having a sense of group solidarity for higher academic success. The following literature goes further to explain why predominantly White learning environments are detrimental to the development of Black students' racial identity and class engagement. The question of why Black students choose to group will be answered and why intergroup dialogue is essential for an inclusive future. Another central focus is uncovering why race feels so taboo to speak about in the classroom.

The Health Cost of Ultra-Processed Foods: A Systematic Review on the Impact of Corporate Determinants of Health in Sub-Saharan Africa Countries

Presenter's Name: Jacob Duncan
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Presentation Type: Poster Presentation
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Introduction: The rise in non-communicable diseases in Sub-Saharan Africa countries is alarming and largely attributed to the consumption of processed and ultra-processed foods (UPFs). These foods, laden with sugar, salt, and artificial preservatives, cause poor diet quality and an increased risk of chronic diseases such as obesity, diabetes, and cancer. This study aims to uncover the impact of UPFs on the region's health and how local stakeholders perceive and interact with the changing food environment. Methods: Our systematic review dives into the entry of transnational food corporations in the Sub-Saharan African food market. The primary scientific databases used are PubMed and Google Scholar. Our search consisted of studies published from 2017 to 2024. The keywords used were "ultra-processed foods", "sub-Saharan Africa", "nutrition transition", "corporations", "food environment", "non-communicable diseases", and "stakeholders". Results/ Conclusion: Our findings reveal the insidious nature of transnational food corporations that enter the markets of low and middle-income countries, including Sub-Saharan Africa. By establishing global production networks, corporations reduce production costs and make their UPFs more affordable to consumers, leading to an increase in BMI and non-communicable diseases. Their large-scale and hyper-local distribution networks make their products accessible in local retailers, leading to the deterioration of public health and political power that favors these corporations. However, the presence of supermarkets and these corporations has led to a reduction in stunting in children due to the increase in calories consumed. The cost of UPFs is high, and it is up to us, as consumers, to demand healthier, more affordable food options.

Social Workers as School Administrative Faculty

Presenter's Name: Courvaun Hill
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Presentation Type: Oral Presentation
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Schools are an integral part of youth development and a key institution in our society, it is only right that social workers have a place in them. School Social Workers (SSW) serve in a capacity specialized by their wealth of knowledge that serves such a complex system such as schools. The image many institutions have of SSW is that they are caseworkers of the school, only responsible for providing mental health services and coordinating services, a feat that the field prioritizes and appreciates. However, with the ongoing widening of the educational achievement gap and the persistence of the school-to-prison social workers can play a unique role in shifting the school system, starting at the mezzo level within the school. Social workers have proven to be effective at the macro and direct practice level of working with clients in the school system. This research is directed at finding empirical data and solutions for SSW using macro and mezzo system practices in schools to improve the outcome of students and positively shift school culture. The goal of this is to begin to shift the mindset of school social work to view school social workers as capable of taking on administrative roles in schools, as to curate positive school climates.

"The Impact of Intersectionality: Black Students and Learning Disabilities"

Presenter's Name: Marlon John
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Presentation Type: Poster Presentation
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The number of US students receiving special education services between the ages of 3-21 has significantly increased from 6.4 million to 7.3 million over the last 10 years (National Center for Education Statistics, 2023). There is a continued discussion on the intersectionality of learning disabilities & Black students. It has been noted that there is a disproportionality in which Black students have been diagnosed with learning disabilities whereas they are more prone to be placed in the categories of intellectual disability, emotional disturbance, and specific learning disability (Robinson and Norton, 2016). The mislabeling of Black students impacts their academic growth, the rate at which they are disciplined, and literacy development. In addition, 13.8% of children between the ages of 3-17 years old were diagnosed with a learning disability (CDC, 2020). According to the CDC, Black children were more likely to be diagnosed with ADHD or a learning disability more often than their White and Hispanic peers (2020). Although there is no disproportionality in the diagnosis of autism, Black children are typically diagnosed later in comparison to their White peers. Another major aspect of learning disabilities includes literacy deficits. Consequently, individuals who have literacy deficits are more likely to be a part of the school-to-prison pipeline. The phenomenon of the school-to-prison

pipeline leads to more students being introduced to the criminal justice system (Heitzeg, 2009). This study is an exploration of the literature involving the intersectionality of race and learning disabilities as it relates to ADHD, Autism, and Literacy.

Socioeconomic Status and its Implications on Education

Presenter's Name: Rhylee Jones
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
Faculty Advisor: Keesha Middlemass
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This essay and its research investigate the relationship between socioeconomic status (SES) and the educational outcomes of K-12 students. By assessing the impact SES has on educational experiences, this study aims to explore the extent to which SES influences educational outcomes, providing context to educational inequities and its impact on social mobility. The findings of this study illuminate the result of certain educational practices and policies, illustrating the imperativeness of targeted interventions to mitigate and help alleviate the negative consequences of socioeconomic inequality on educational equity. By revealing the intricate relationship between SES and educational outcomes, this thesis seeks to provide strategies that encourage inclusive and equitable access to education for all K-12 students, regardless of socioeconomic background.

Publication outcomes of abstracts presented at Skin of Color Update Annual Meeting from 2018 to 2020

Presenter's Name: Kaitlin Keaton
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Background: The Skin of Color Update (SOCU) is an annual dermatology conference focused on educating clinicians and trainees on the best practices to treat dermatologic conditions in patients with skin of color. The objective of this study was to analyze the publication rates post-presentation and determine the variables that may influence publication outcomes.

Methods: A literature search was conducted for each abstract presented from 2018 to 2020 to determine publication outcome. An abstract was considered unpublished if there was no relevant search result found. Information such as study design, and latency to publication were extracted and analyzed. Results: Results showed that of the SOCU abstracts presented in 2018, 2019, and 2020, 53%, 50%, and 62% were published, respectively. For all three years, most abstracts were published in the Journal of Drugs in Dermatology and the Journal of the American Academy of Dermatology. For abstracts published after the conference date, the average latency to publication in 2018, 2019, and 2020 meetings were 11 months, 9.1 months, and 8.6 months, respectively.

Conclusion: There are a variety of factors that can influence abstract publication rates, including the type of study design, publication bias, or low statistical power of a study. Abstracts presented are typically published within 1 year of presentation and are more likely to be published in the Journal of Drugs in Dermatology or the Journal of the American Academy of Dermatology. These insights provide aspects to consider when designing projects, drafting abstracts, and selecting which conferences to attend to present findings.

Building and cities decarbonization

Presenter's Name: Nea Maloo
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Presentation Type: Oral Presentation
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At this critical inflection point in our country's history, challenges of diversity, equity, environmental sustainability, and social justice abound. Additionally, we are facing unprecedented demands concerning sustainability and the need for education and research to design solutions that address environmental conservation. Learning about carbon-free design is essential for every student's success in addressing the challenges of the built environment.

Carbon neutrality in built environment is essential for the climate crisis. The presentation will look at the global precedents of carbon neutrality, honing in on the ways to achieve decarbonization. The presentation will focus on global scale to micro scale, giving strategies on everyone ways to achieve carbon neutrality. The presentation will also give various courses which are good methods to incorporate in the curriculum.

The Sports Institute at Howard University

Presenter's Name: Kalema Meggs
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School/College: Communications
Presentation Type: Poster Presentation
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Two third-year PhD students at HU's Department of Communication, Culture, and Media Studies (CCMS) in the Cathy Hughes School of Communication, wrote and developed a research proposal to create a Sports Institute at Howard University, focusing on the intersections of academic disciplines, sports culture, communication, international and domestic sport in addition to sport industry as a central element to HBCU students and HBCU's institutional culture. Culture and communication are constitutive (duGay et al., 1997), just as communication, sport culture, and social justice are constitutive. The ritual view of communication functions at the highest level to produce meaning

defining the cultural world (Carey, 1989). The Sports Institute at Howard University will encompass (i) academic knowledge expansion from students and faculty, (ii) a mission, vision, and goals, (iii) a theoretical framework, (iv) sports institute academic and industry components including women and sport, (v) international sports, (vi) a think tank for scholars with both student and faculty contributions centered on sport research and an academic journal titled, Howard University Sport Journal, and (vii) potential partnerships with corporations, non-profits, foundations, and universities. Culture exists with shared meaning, and its production and exchange of meaning occurring in interactions amongst members of a group or society (Hall, 1997). The Sports Institute will create a partnership with HU's Center for Women, Gender, and Global Leadership. Sports culture connects to HU's CCMS Department, and Departments of African Studies, Political Science, Business, African American Studies, Psychology, Economics, and Medicine.

Validation of a New Academic Acculturation Scale for College Students: Next Steps

Presenter's Name: Kyndra Middleton
Classification: Senior Faculty
School/College: Education
Presentation Type: Oral Presentation
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Grounded in Berry's (1997 acculturation framework and neo-Vygotskian theory of cognitive development (Trueba, 1988), academic acculturation, a term coined by the author, is a broad concept that describes the processes of acquiring the values, norms, and practices of the academic community. A successful acculturation to the academic environment can enhance students' well-being and prepare them for academic success. While acculturation may be an easy task for students from the predominant culture, it can be a daunting task for minority students, especially those from lower socioeconomic status, rural locales, or who are immigrants or first-generation college students suddenly exposed to college life. The current study validates a new academic acculturation scale (AAS) designed as a diagnostic tool to assess college students' ability to adjust to their academic environment and be academically successful. The scale was divided into five subscales. Rasch analyses of this second version of the instrument consisting of 39 items revealed high item reliability of .98 with a separation index of 7.34. Concurrent validation with other constructs including students' GPA, ethnic identity, college self-efficacy, and self-esteem were also conducted, and results showed the scale was reliable (Cronbach's alpha = .90) and valid with solid discriminant validity with ethnic identity, solid convergent validity with college self-efficacy, and solid concurrent validity with GPA. The current study will also discuss next steps for the scale which includes an adaption for younger students.

Reducing Pathways to the School to Prison Pipeline through Incentivized Attendance-Based Programming

Presenter's Name: Jasmin Miller
Classification: Graduate Student
School/College: Social Work
Presentation Type: Oral Presentation
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School attendance policies in the United States use punitive measures that adversely affect at-risk students and their families. These policies disproportionately impact minority students and involve family services agencies and legal court systems. Across the country, school districts punish parents and children for non-attendance by imposing criminal procedures, misdemeanor charges, and arrest warrants. Previous data shows that Texas has the highest rate of chronic absenteeism among Hispanic and Black students, who also receive the majority of citations and tickets compared to their white peers. Moreover, Black students are twice as likely to be petitioned for absenteeism than white students. These policies, although they may serve as a starting point, can create a pathway to continuous involvement in the criminal justice system. This can have a negative impact on a student's ability to continue their education, leading to dropping out and further involvement in the criminal justice system. In order to address absenteeism, this study proposes an alternative method by implementing incentivized attendance-based programming for chronically absent students. By providing incentives, students will have increased attendance rates, thus reducing the need for punitive disciplinary measures that can have long-lasting effects. Furthermore, with an increase in attendance and engagement in other school services, students and parents will develop positive attitudes and behaviors towards school and build a positive relationship with the school community and staff. This study employs qualitative data to evaluate the effectiveness of this alternative method.

How Occupational Therapy Can assist in treatment of Gender Dysphoria

Presenter's Name: Madison Oberg
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Presentation Type: Poster Presentation
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Approximately 13.9 million people in the United States Identify as LGBTQ, with approximately 1.6 million people aged 13+ identify as transgender. WHile there has been much debate over the previous years over medical transition of patients, there is a social and identity transformation that takes place and is considered the only appropriate treatment for persons who are experiencing gender dysphoria. Occupational therapy can be used to help lessen the symptoms of gender dysphoria by assisting with gendered occupational roles and social roles to minimize patients experience of gender dysphoria, which can have devastating effects on mental health.

Evaluating the Impact of Nutrition Education for Seniors
Presenter's Name: Fathia Oladipupo
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
Faculty Advisor: Chimene Castor
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Introduction: Nutrition plays a crucial role in sustaining a healthy lifestyle at every stage of life. As individuals age, significant changes in body composition occur, often accompanied by a reduction in basal metabolic rate and an increased risk of various age-related diseases. As such, educating older adults about the importance of maintaining a nutritious diet becomes crucial. Purpose: The purpose of this study is to evaluate the effectiveness of the nutrition education program implemented at a senior wellness center in Washington D.C., with a focus on its impact on participants' dietary knowledge, behaviors, and overall well-being. Methods: A mixed-methods approach would be employed to evaluate the effectiveness of the nutrition education program at the center. Surveys will be administered after each session to assess participants' perceptions, knowledge changes, and intentions to implement recommendations. Semi-structured interviews will be conducted with select participants to gain deeper insights. Discussion/Conclusion: While this study has not yet been conducted, it holds significant potential benefits for promoting the health and well-being of older adults. We anticipate that by evaluating the impact of such programs on participants' dietary knowledge, behaviors, and overall well-being, we can gain valuable insights on how best to support healthy aging in this population. Additionally, identifying any barriers or challenges encountered in implementing these programs can inform future interventions and improve their effectiveness. Ultimately, this research has the potential to contribute to the development of evidence-based strategies for enhancing the quality of life for seniors in Washington D.C. and beyond.

HOME: A Case Study of American Public School Stakeholders' Identification and Responses to Student Homelessness
Presenter's Name: Shaina Thomas
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Presentation Type: Oral Presentation
Faculty Advisor: Kathryn Wiley
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The rate of student homelessness has increased nationwide, particularly among K-12 Black/African American students, who often encounter unique challenges accessing resources under the McKinney-Vento Homeless Assistance Act. To better support Black/African American students experiencing homelessness, it is necessary to know how school stakeholders identify and support Black/African American students experiencing different forms of homelessness. Further, to improve support for Black/African American students experiencing homelessness, it is essential to learn what enables and constrains stakeholders' proper identification and support strategies for Black/African American students, including beliefs, values, and knowledge gaps that may hinder stakeholders' responses. Few studies are available, however, to help us understand how school staff and other stakeholders identify and respond to student homelessness, and specifically for Black/African American students. To fill this gap, this case study explored ways in which diverse stakeholders contribute to systems of support for K-12 Black/African American students experiencing homelessness. This case study focuses on Tulsa, Oklahoma's Tulsa Public Schools district in the Midwest region of America, a district where conservative estimates indicate that nearly 1,000 students are believed to be experiencing homelessness. This case study is informed by critical race and ecological systems theory and draws multiple data sources including semi-structured interviews, written district policies and other related materials. Findings indicate identification and response barriers on district, schools and community partner levels. Recommendations for wrap-around identification strategies and response measures are made through a systems-model approach, offering existing and desired organizational structures between various stakeholders.

Fostering Inclusion in Wind Energy Industries through Grassroots Educational Programs
Presenter's Name: Quaran Ahmad
Classification: Undergraduate Student
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The Wind Energy Workforce division of NREL was tasked with developing a project aimed at advancing diversity, equity, and inclusion within the wind energy industry. Such a program would provide both educational and professional opportunities for marginalized communities, fostering awareness and education surrounding the job opportunities in the field of wind energy. Throughout the summer, researchers engaged in meaningful conversations with representatives from twelve different organizations and companies, such as National Urban League, Girls Incorporated, and Vineyard Wind. These interactions brought about clarifying information and provided valuable insights, which will later assist the Wind Energy Workforce in the implementation of a thorough wind energy education program. Through community organization and ongoing collaboration with these partners, NREL can potentially create opportunities that will directly impact the youth, and thus potentially inspire the future generations of wind energy researchers and scientists.

Effects of Duration on Burial Coverage of the Symphurus Plagiusa (Cynoglossidae)
Presenter's Name: Tobechi Ajah
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Stacy Farina
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When a fish buries itself, the fish lays flat in the sand and undulates to fluidize the substrate from underneath it and around it. It lifts its head up and then down to start the undulation, kicking up the sand

above them in the water column in a process called particle fluidization. Body kinematics and body shape play a significant role in the frequency of undulation (McKee et al., 2016). Symphurus plagiusa, blackcheek tonguefish, is a fish that has its body very compressed and elongated. It belongs to the family of Cynoglossidae. In this study, we printed out a silicone model with a 3D printer. The robot allows us to test the undulation frequency and locomotion of Symphurus plagiusa. In order to bury themselves, they undulate, or wiggle, at various frequencies that are contingent on their size, shape, length, sediment size, location, etc. (Corn et al., 2018). A common trend is that the higher the undulation frequency is, the higher the burial coverage of the flatfish will be (McKee et al., 2016). Since Symphurus plagiusa is an unique fish shape compared to other common types of flatfish, we tested for shape variation as well. The duration varied for each set of trials that we did. The flatter shape of the tonguefish in width is compared to other flatfishes like L.bilineata could also contribute to the burial performance. Past studies have led to the hypothesis that the Symphurus plagiusa will have a better burial performance as the duration time increases.

ENVIRONMENTAL SCIENCES & STUDIES

Evolutionary Influence on Heart Chamber Biomechanics and Morphology: Marine Actinopterygian Fishes
Presenter's Name: Kyra Amacker
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Presentation Type: Poster Presentation
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Fish heart anatomy differs considerably from other vertebrate hearts, due to their more simplistic, single- circuit circulatory system with a single atrium and ventricle. Despite this simplicity, the teleost cardiovascular system addresses the specific demands of the varying conditions of oceanic environments for 34,000+ species. Our study seeks to establish the ecological influence on heart form and function via morphological analysis and phylogenetic comparisons. We studied ecologically distinct species from across the Actinopterygii clade (pelagic, benthic and intermediate) via size and volume landmarking analysis. We used 3D Slicer to landmark the chambers of iodine-stained CT scanned hearts. We converted these chamber landmarks to meshes using a custom R script. We visualized and analyzed the meshes in MeshLab for size, shape, and volume measurements for interspecies comparison. We will use phylogenetic ANOVA analysis to investigate interspecies variations and confirm heart function specificity in similar zone species, for preliminary results indicate that ecological factors influence the anatomical and physiological function of these fishes. The benthic species' heart exhibited more rounded and thin-walled ventricles and large atria, while the pelagic species' heart has a more triangular shape to the ventricles with comparably smaller atria.

Size Matters: Investigating the Influence of Fish Size and Undulation Duration on Flatfish Burial Behavior in Coarse Sediments
Presenter's Name: Mikhyah Austin
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Our study explores the burial behavior of flatfish, specifically examining the influence of fish size and undulation duration on their capability to cover themselves in coarse sediments. Flatfish are uniquely adapted fish that lie flat on the seafloor. They practice a common behavior among various species known as burial. It involves the organism burying itself under a substrate for camouflage or ambush purposes. Flatfish specifically undulate their bodies to fluidize the sediment allowing it to then settle on top of the flatfishes body. Our experiment employed silicone model fish and a robotic system to simulate undulation behavior during burial. Results revealed that smaller flatfish exhibited higher percent coverage post-burial compared to larger counterparts, with undulation duration positively impacting coverage. Larger fish faced challenges in fluidizing coarse sediment, resulting in lower frequency movements and reduced coverage. This study provides insights into habitat preferences and burial mechanics of flatfish, reinforcing previous observations and offering valuable implications for understanding the ecological dynamics of marine environments.

DNA Barcoding: Monitoring Ecological Responses to Environmental Changes
Presenter's Name: Ariel Beneyam
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To understand an ecosystem and biodiversity conservation, it's important to monitor changes in their community over time due to environmental factors or any disturbances. DNA barcoding is the perfect method for this since it provides efficient species identification and tracking. The aim of this study is to explore the use of DNA barcoding in monitoring the changes in ant communities over a period of time. We can assess the impact that environmental factors and disturbances have on ants by collecting ants from different locations and measuring factors like temperature, habitat, location, and more. DNA barcoding analysis also allows us to detect the change in ant communities over time. This research contributes to our understanding and learning of ecological responses to environmental changes in ant communities. This allows for effective conservation strategies and ideas.

The Life Cycle Assessment (LCA) of Fungi-Based Building Insulation
Presenter's Name: Kai Dixon
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Every product has a life cycle impact from raw material gathering to its eventual end use, where it is recycled or discarded. A life cycle assessment (LCA) is the process of looking at every stage of a product's lifespan and seeing the environmental impact in several categories. In the built environment, building materials have high embodied and operational CO2 values and low recyclability. The embodied carbon values are particularly high for states like Alaska, as building materials are imported by sea from the lower 48 states. Insulation for building materials is a high carbon emitter in this regard. A team at the Cold Climate Housing Research Center has identified a promising alternative to the

existing insulation currently used in Alaska. While the exact details of the project aren't public, the implementation of this project is projected to yield substantial embodied carbon, operational energy, and cost savings, primarily due to the elimination of the need to transport insulation materials. We worked with an open-source LCA program (OpenLCA) to create a model of the product. This model encompasses the entire lifespan of the product, from its initial stages to eventual recycling. The model was created process by process, including material collection, transportation, manufacturing, distribution, recycling, and, reuse. By examining all the relevant factors involved in these processes and assessing their environmental impacts, this LCA model aims to provide a comprehensive understanding of the product's life cycle and the effects it will have on global warming and other environmental measures.

Prediction of membrane fouling using artificial neural network and genetic programming techniques

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Pressure-driven membrane filtration methods are widely used to remove suspended solids from liquid, particularly in environmental applications such as dewatering sludge. In these processes, a significant issue that decreases process efficiency is membrane fouling. Engineers need to predict membrane fouling based on system and feed characteristics. Typical fouling or process models depend heavily on bench-scale experiments using a simulated feed, after which additional modifications must occur during scale-up. It would be desirable to develop a model using artificial intelligence methods to develop a model to predict membrane fouling and assist in overall system design. Such a model could be adopted to a wide range of membrane configurations, operating conditions, and feed characteristics.

Among the major artificial intelligence methods, artificial neural network and genetic programming methods have been selected as modeling techniques to predict microfiltration membrane fouling, due to their autonomous learning and self-diagnosis capabilities. This study compares the incorporation of Artificial Neural Networks (ANNs) and Genetic Programming (GP) strategies in a process model to predict microfiltration membrane fouling and solids concentration in a dewatering application. The results reveal that artificial intelligence methods such as ANN, and GP provide a deeper understanding of the complexity of membrane filtration processes and can reduce the number of experiments. In addition, the main advantage of the GP model over the AI models is the capability of GP in giving mathematical expressions for the studied phenomenon.

Histological Analysis of the Ovary in Viviparous Shiner Perch Cymatogaster Aggregata

Presenter's Name: Jordan Graves
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Coauthors: Janine Ziermann, Paola Correa-Alfonzo, Jaquan Horton, Stacy Farina

In general, the vertebrate reproductive tract consists of gonads and their associated ducts and glands. It has three to four layers that surround it termed the mucosa, submucosa, muscular, and serosa. This is a common surfpech found in lagoons, estuaries, and coastal streams along the Pacific coast from Baja California to Alaska. Surfperches (Embiotocidae) are a live-bearing family that also exhibits superfetation, which is the presence of multiple stages of developing offspring at once due to multiple paternity. Here we aim to determine which biological materials can be found within the uterus of the shiner perch (Cymatogaster aggregata). We analyze the organization of the uterine layers in this fish. Uteri were isolated from pregnant perch, embedded in paraffin, and serial sectioned. Sections were stained using the Abcam Elastic Stain Kit and analyzed under a light microscope with a camera. The uterus of the shiner perch has an outer membrane made of collagen, smooth muscle, and other materials including elastin fibers. The uterus contains numerous inner folds that consist of epithelial tissue anchored to a collagen base surrounding the developing offspring. This work will serve to learn the structural relationships of live-bearing teleost uteri. A detailed understanding of its histology will be used to comprehend how the tissue properties of the uterus allow it to expand and accommodate developing

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Glucose amine Schiff Bases as Fluorescent Sensors for Recognition of Al 3+ and Zn2+ Ions

Presenter's Name: Yousef Hijji
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Abstract: Glucose amine Schiff bases are useful building blocks in organic synthesis. They have many medicinal pharmaceutical applications. It is of paramount importance to develop efficient
methods for their synthesis and find more applications in chemical sensing. Glucose amine salicylidene (GAS) and Glucose amine 4-nitrosalicylidene (GANS) were synthesized using microwaves and their structures were confirmed using X-ray and NMR and other spectroscopic data. Metal ions play a valuable role in many processes of life as well as applications in important industries and household applications. Exposure to these metals is not avoidable. Most of the metals are toxic at higher levels. Therefore, there is a need to develop efficient and easy methods of their detection and determination at low concentrations. The Glucose amine Schiff bases synthesized were investigated as a water-soluble chemo sensor for detection of aluminum and zinc ions

in aqueous system. UV-vis and fluorescence titration and NMR studies showed that the Schiff bases used have high selectivity and sensitivity towards aluminum and zinc ions detection in aqueous solutions and living cells. The detection limits were lower that the WHO allowed levels. The synthesis and analysis methods and applications in detection of aluminum and zinc ions real life applications will be presents.

Endophyte Diversity in Chia in Kenya

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Chia Salvia hispanica L. is a nutrient-dense crop that has the ability to become a staple crop in Kenya due to its high protein content. It is grown in many parts of Kenya and utilized worldwide. This study aimed at increasing chia production plants by identifying diversity of endophytes within the dense rich plant. The experiments were pe formed at Biotechnology laparotomy, Egerton University, Kenya. Healthy flowering Chia plants were uprooted and taken to the laboratory. The plants were washed in tap water for 10-15 minutes, blot dried then sterilized and separated into leaves, stems, and roots. The parts were macerated, and plated in serial dilutions from 10 -1 to 10 -5 for both fungal and bacterial endophytes. The plates were incubated at 28°C for 2 weeks and 37°C for 48-72 hours respectively. Then the bacterial and fungal endophytes grown were identified by morphological and biochemical characterization and tested for the ability to fix nitrogen and solubilize phosphate. A total of 9347 fungal and bacterial endophytes were isolated from the plant. Out of the 6 endophytes, one fungal endophyte was found to solubilize phosphorus. 22 bacterial endophytes were isolated, and we found that the bacterial endophytes grow best at the 10-5 Concentration.

The Fire Next Time: Investigating Wildfire Vulnerability in Communities of Color

Presenter's Name: Lauren Taylor
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The increase in wildfires across the U.S. is a growing concern, particularly due to anthropogenic climate change. These fires present not only immediate ecological risks but also have profound social repercussions. Certain groups, especially indigenous and communities of color, often bear a disproportionate burden due to longstanding socioeconomic challenges. This warrants focused research on how social identities intersect to impact community response and ability to recover during and following wildfire disasters. To examine this issue, the study will look through the lens of Black feminist theory and employ an intersectional framework that resonates with these groups' systemic obstacles. A mixed-methods approach will be utilized to understand the population better. Through in-depth semi-structured interviews, the experiences and stories of those affected will be collected, providing rich context. At the same time, data analyses on demographics, property damage, healthcare data, and recovery periods will be used to draw a connection between racial and economic profiles and susceptibility to wildfire damage. Early stages of this research point to likely disparities in how prepared different communities are and how well they recover, with communities of color faring worse than wealthier, predominantly white neighborhoods. This suggests that current methods for managing wildfires do not fully consider the specific needs of communities of color. This work aims to reach comprehensive conclusions that can guide equitable policy changes for wildfire management and community preparedness, emphasizing strategies that acknowledge cultural differences and are designed to fortify the most vulnerable populations against wildfires. By understanding the role of complex and intersecting identities in disaster response, this study paves the way for policies that serve all communities equitably in the face of environmental disasters.

Diversifying Ethics Across the Curriculum to Challenge Global Existential Threats

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Presentation Type: Oral Presentation
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Given the possibilities of synthetic biology, weapons of mass destruction and global climate change, humans have achieved the capacity to globally alter life. This crisis calls for diversifying ethics to furnish effective motives to take global action necessary for survival. We propose a research program for understanding why ethical principles change across time and culture. We also propose provisional motives and methods for reaching global consensus on diversified ethics. Current interdisciplinary research in ethics, psychology, neuroscience and evolutionary theory grounds these proposals. Experimental ethics, the application of scientific principles to ethical studies, provides a model for developing policies to advance solutions. A growing literature proposes evolutionary explanations for moral development. Connecting these approaches necessitates an experimental or scientific ethics that deliberately examines theories of morality for reliability. To illustrate how such an approach works, we cover three areas. The first section analyzes cross-cultural ethical systems in light of evolutionary theory. The second examines African, African American and Indian models of diversified ethics. The third features African and Indian examples of ethical, sustainable rural ecovillages incorporating ethical principles of autochthony, autonomy and authenticity. The conclusion argues that clusters of comparable ecovillages have the potential to dramatically reduce global rural poverty while addressing catastrophic climate change.

ETHICS, LAW & RELIGION

Exploring How Black People Are Excluded During Research Trials
Presenter's Name: Carrington Boyer
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School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Assya Pascalev
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Clinical research trials are meant to test the effectiveness and safety of treatments within people. I will assess the part that machine learning (ML) algorithms have in creating bias in such trials. I will look through study reports via ClinicalTrials.gov to gather this information. Historically, discrimination and bias amplify the health disparities of the Black community. Being able to assess how machine learning algorithms are used could inform outside resources about where to focus their efforts when trying to bridge the gap between the exclusion of the Black community. The bias created in research trials impacts the level of care that Black people will experience in clinical settings. Including Black people in the training cohorts of ML algorithms accounts for the medical conditions and environment that will impact the results of the study. I will gather information about steps taken toward creating inclusive spaces for Black participants in poverty using resources such as the Georgetown-Howard University Center for Clinic and Transitional Science and PCORI (Patient-Centered Research Institute). I will also look at literature that has officially been published to gain a better understanding of how ML algorithms impact studies that involve Black people or minorities in general. I hope to gain an understanding of how different resources attempt to facilitate the participation of certain demographics in clinical research trials.

From Plantations to Prisons: The War on Drugs and Enduring Legacies of State Violence in the Americas
Presenter's Name: Maya Hadley
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
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On July 17, 1971, former President Richard Nixon declared a "War on Drugs," stating drug abuse as "public enemy number one." While this war is often seen as a U.S.-centric initiative targeting drug use, the war extended beyond the domestic border and inflicted irreversible consequences for African descendants across the Americas. In the U.S., the crack cocaine epidemic led to the disproportionate mass incarceration of African Americans. In Colombia, aerial eradication and state violence disproportionately displaced and impoverished Afro-Colombians for coca cultivation. This paper deconstructs the international drug trade, identifying cultivation, distribution, commercialization, and consumption as the four major components. Notably, the United States and Colombian governments have primarily focused efforts on the first (cultivation) and last (consumption) steps, neglecting the two sectors that predominately control trafficking and profit in the market. This paper utilizes a combination of qualitative methods, including informal interviews, case studies, historical documents, governmental policies, and firsthand accounts to help trace both the government's strategies for the War on Drugs in the Americas and its devastating impacts on African descendants. This research unveils a stark parallel: The coca that Afro-Colombians are being slaughtered and displaced for growing in the Pacific region is the same crack cocaine that is fueling the mass incarceration of African Americans. By illuminating these connections across continents, this research aims to spark a dialogue about dismantling a system that perpetuates racial injustice, state abandonment, displacement, poverty, and violence across the Americas.

The Criminalization of Drugs in the lives of Black Men
Presenter's Name: Thamarre Laroche
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Presentation Type: Poster Presentation
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The overall purpose of my Honor's dissertation thesis paper is to examine the various ways in which the prohibition of the drug "Marijuanna" has affected distinct demographic and racial groups over time. The initial research will also compare and contrast how males of color have received substantially greater prison terms for the same drug-related offenses that their white counterparts commit. I will begin by analyzing a variety of government instituted laws that have resulted in the criminalization of cannabis, and then provide readers with a more in-depth look at the racially based policies regarding the sales, manufacturing and consumption of drugs within low-income communities. Other subparts of my research will focus on regulated policing by law enforcement within marginalized, disenfranchised and even economically disadvantaged communities as a result of an increase within drug-related crime. Furthermore, the foundation of my research will provide readers with a profound understanding of why a disproportionate number of colored men are incarcerated for cannabis offenses, despite the fact that cannabis is now not only legalized in more than half of our states, but being utilized by big pharmaceutical companies as a way of generating public profit, and momentary income. Overall I hope to raise awareness upon the importance of decriminalizing marijuana through not only establishing reformative laws, but also by finding constructive ways to help the reintegration of former offenders as they re-acclimate to life outside of prison.

The Ethical Implications of Artificially Raised Food Prices: A Critical Examination of Food Deserts and its regards to stunted Child Growth

Presenter's Name: Michaela-Joyce Moshe
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It is morally wrong to purposefully inflate food prices since it directly violates children's fundamental rights to a healthy diet and development, stunts their growth, and upholds social injustices. The deliberate manipulation of food prices is revealed as a bioethical dilemma that entangles moral precepts with the complex dynamics of justice and societal health. Economically motivated artificially inflated food prices have a significant negative impact on vulnerable populations, especially children. A critical reevaluation of the moral landscape surrounding food price manipulation by examining the intricate interactions between societal obligations, nutritional

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Reparations for Indigenous Peoples: A Century of Addressing Historical Dispossession and Cultural Genocide

Presenter's Name: Allyssa Williams
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Ana Araujo
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The following forms of reparation exist: restitution, compensation, rehabilitation, satisfaction, and guarantees of non-repetition. The history of indigenous peoples in the United States is fraught with colonization, dispossession of land, and cultural genocide. These historical injustices have had lasting and profound impacts on indigenous communities, including loss of land, language, culture, and identity. Despite acknowledgment of these wrongs, the issue of reparations for indigenous peoples remains largely unresolved in the United States. This research paper aims to explore the concept of reparations for indigenous peoples, focusing specifically on addressing historical dispossession and cultural genocide during the span of a century, beginning in 1871. Keywords: Cultural genocide, dispossession, reparations, Indigenous reparations

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Selective acknowledgement: America's selective financial compensation history

Presenter's Name: Siobhan Wofford
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For the victims of the holocaust, the period following their terrorization would be designated by pauperization, seemingly irreversible damage to both material and familial entities as well as lasting discrimination from a violently racist regime. This partnered with the immense death toll which impacted demographics across the world, would push external powers to pressure Germany into compensating its victims, who had already admonished its former leaders and apologized for the damage done. Despite this, for people to receive compensation it was imperative that Germany was held to the expectation that this would not be the only form of acknowledgement for its atrocities. The United States government would play a key role in this, aiding in securing reparations for victims of German persecution after the atrocities of the Holocaust, both for Jewish victims of American nationality and those who were native to Germany and other European countries. At the same time, African Americans would be pushing for compensation for the regime of terror which forced them into captivity as well as against the Jim Crow system which developed in place of shackles and whips . The period which followed emancipation, similarly to that of the second world war for Jewish people was awash with destitute conditions but where it differs is in that the powers at hand were working to preserve the legacy of that former institution that barred African American's from not only compensation but also civil rights which many were under the impression were promised with their citizenship.

HUMANITIES

The Permanence of Death: The Materiality of Grave Markers and its Impact on the Burials of Black Soldiers and Civilians in Civil War Era Northern Virginia
Presenter's Name: Sydney Coleman
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Sickness and injury led to the deaths of many Black soldiers and civilians living in contraband camps during the Civil War. Due to racism and wartime chaos, these individuals were faced with unequal burial practices and death records. This is evident through the grave markers present at the Alexandria National Cemetery, the Contraband and Freedmen's Cemetery, and Arlington National Cemetery. This study argues that the present-day existence of grave markers, or lack thereof, of Black soldiers and civilians at these three cemeteries in Northern VA can provide insight into the experience of death and burial for Black soldiers and civilians during the Civil War.

The Mental Health of Black Women College Athletes
Presenter's Name: Brittany Copeland
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School/College: Graduate School
Presentation Type: Poster Presentation
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Black female athletes have always stood at the intersection of gendered and racialized discrimination, striving to exist and excel in spaces where they are not always respected or protected. Collegiate athletes like Angel Reece, a basketball player for Louisiana State University, sounded the alarm on the double standard Black women athletes face in comparison to their white counterparts. She was called "classless" for her competitive edge, whereas White competitors who engaged in the same behavior were not (AlBaroudi, 2023). Behavioral health research on African Americans paints disparities between the prevalence of mental illness and the receipt of mental health support services. According to the Substance Abuse and Mental Health Service Administration (SAMHSA, 2023), 23% of Black and African Americans report having a mental illness, yet 39% report receiving services. Adults aged 18-25 reported the highest rates of any mental illness among adults (SAMHSA, 2021), while research from the Centers of Disease Control named suicide the third leading cause of death for Black Americans between the ages of 15-24 (2020). Given extant research on mental health for minoritized populations, research specific to the mental health of Black women collegiate athletes (BWCA) is a rare find. There is research that speaks to the female athlete experience, the Black male athlete experience, and the general student-athlete experience, yet the mental health of Black women collegiate athletes is hidden due to coupling with whiteness and maleness. This poster explores current published research that centers the mental health of BWCA.

Hospitals are Killing Us: A Legal Response to the Ongoing Genocide of Black Mothers and Their Babies
Presenter's Name: Lerato Cummings
Classification: Professional Student
School/College: Law
Presentation Type: Oral Presentation
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In the United States, Black women and their babies are dying at an alarming rate during childbirth. This crisis necessitates a multifaceted legal, social, and political response that addresses the ongoing health disparities, confronts the root causes of racial inequalities in maternal healthcare, and provides the victims of this ongoing genocide with an immediate legal remedy and compensation for their loss. This law review note will delve into the historical roots of medical racism that permeate our modern healthcare system and contribute to the alarming disparities in maternal health outcomes. To address these pressing issues, this note proposes the integration of a victim compensation fund within the Momnibus Act, a comprehensive legislative package aimed at improving maternal health outcomes. The inclusion of a victim compensation fund would provide immediate relief and support to the victims of medical racism, acknowledging the harm caused and offering financial assistance for medical expenses, emotional trauma, and other related costs. By establishing a victim compensation fund, victims who received negligent healthcare would no longer need to go through the arduous process of bringing a medical malpractice lawsuit, facilitating timely compensation and redress for harmed patients. This note examines successful victim compensation funds within the United States and abroad, illustrating the feasibility and effectiveness of such initiatives in addressing medical injustices and providing restitution to affected individuals. By integrating a victim compensation fund into the Momnibus Act, policymakers have the opportunity to address the legacy of medical racism and advance equitable maternal healthcare for all women.

"Let Her Tell It": A Creative Eradication of Black Women Stereotypes
Presenter's Name: Takier George
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School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Tony Medina
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Black women representation in literature and film is susceptible to grotesque stereotypes and tropes when written by non-Black women. Popular fiction writers, such as Toni Morrison, Alice Walker, and Octavia Butler, who are Black women themselves cater to a Black women audience. Therefore, the characterization of their Black women characters do not perpetuate racist stereotypes but rather expose who they

are to their core. Gone with The Wind, which is most popularly known for its film-form was adapted from a book version written by Maragret Mitchell. While Harriet Beecher Stowe is credited for creating the first Mammy caricature in Uncle Tom's Cabin, writer's like Mitchell carried on the legacy, as seen in her character "Mammy" character. Non-Black women writers in both television and literature are often reckless with the depictions of Black women. In this oral presentation, I will read excerpts from an original creative writing story, "Let Her Tell It," which features two Black, estranged sisters finding their way back to each other. The story explores the themes of betrayal, familial love, and guilt. As a Black woman writer, I strived to create a story where the characters had depth. I did so by centering the Black women in the story and confronting their feelings rather than condemning them to racist clichés.

Diet-Mental Health Correlations in Underrepresented College Students
Presenter's Name: Dasia Hodge
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Presentation Type: Poster Presentation
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Background: Prior research extensively delves into the intricate connection between diet and mental health outcomes across various demographics. Studies suggest that diets abundant in fruits, vegetables, whole grains, and lean proteins are linked to reduced risks of depression and anxiety, whereas diets high in processed foods, sugars, and saturated fats may elevate susceptibility to mental health disorders. However, a noticeable gap exists in literature specifically targeting underrepresented college students. These students, encompassing individuals from racial and ethnic minority backgrounds, low-income households, and first-generation college attendees, encounter distinct challenges that may impact their mental well-being. National data indicate elevated levels of stress and mental health issues among this demographic compared to their counterparts. Purpose: This study seeks to clarify the impact of diet on the mental health outcomes of underrepresented college students. By gaining insights into this relationship, the study aims to inform the development of targeted interventions and support mechanisms to enhance mental well-being in this population. Objective: The objective of this study is to thoroughly examine the dietary behaviors, mental well-being, and the associations between dietary patterns and mental health outcomes among underrepresented college students.
Methods: To accomplish this study, a mixed-methods approach will be employed, utilizing surveys and interviews to collect data on the dietary patterns, mental health status, and perceived stress levels of underrepresented college students. Expected Outcome: Through identifying key correlations and risk factors, this study intends to guide the creation of culturally sensitive interventions and support services tailored to the specific needs of underrepresented college students.

Voice of the People: Barbados and Black Internationalism in the Black Power Era (1920-1970)
Presenter's Name: Melanie Holmes
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
Presentation Type: Oral Presentation
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The tradition of resistance in Barbados from slavery to independence has been inadequately examined by historians, and its post-independence struggles are largely ignored. Many studies have captured the vast spatial dimensions of the Black Power Movement, but narrow definitions of Black Power have caused Barbados to be excluded from this scholarship. Through original archival research and legislative analysis, this dissertation uniquely demonstrates Barbados as an instrumental contributor to Black Power politics through its domestic activism and Black international solidarity. Barbadian Black Power individuals and organizations formed direct connections between the source of their own Marxist, anti-capitalist struggles to those of the United States. They also denounced impositions of U.S. and European neo-colonialism on Caribbean and African nations. By viewing Black Power through the framework of Black internationalism, this research provides a rare perspective on Barbados as an integral and underrated participant in the 1960s Black freedom struggle.

In Due Time
Presenter's Name: Khari eyen zamé Johnson
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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This paper will examine the concept of reparations through descendants of African American communities impacted by American Slavery. How communities of descendants inherit the will and the struggles of their ancestors and actively are continuing the fight for reparative justice in the present. Reparations in the context of monetary compensations, in the context of access to resources, in the context of education, and in the context of memory-through attempts to uncover, preserve, and amplify the historical legacies of the enslaved ancestors. Ensuring the truth of the past is acknowledged and exist unshrouded by the past, allowing it to be accessible for current/future generations. The first group of descendants are the GU272, whose ancestors were sold by the Jesuits who were in Georgetown University, to offset debts. The second group of descendants are members of the Gibson Grove community in Montgomery County Maryland. The third group consists of members of communities in Florida, who operate cultural institutions for the purposes of historical education and preservation. The first portion of the paper will evaluate the historical backgrounds of each community of descendants. Through archival retrieval of information their pasts will be examined in juxtaposition with each other. The second portion of the paper will address present efforts of living descendants of the communities to obtain a form of reparations and rectify the centuries of wrongs. The third portion of this paper would examine the efforts of

descendant communities to create museums and monuments to honor the suffering of their ancestors.

Rhythms of the Soul: The Influence of West African Drums in the Americas

Presenter's Name: Tamia Mcdonald
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Presentation Type: Oral Presentation
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In this object study, I analyze the transnational influence of West African drums in the Americas, specifically as a product of slave communities – or factors that have become ingrained within the culture of these once slave-holding countries. My study will focus on three drums: one from West Africa as a point of reference, one from Northern America, and one from the Afro-Caribbean. I evaluate the build, design, use, and cultural value these three objects hold in their respective locations. From this appraisal, I determine the cultural connections and practices that persisted in the New World, despite the atrocities that came with enslavement and oppression.

The Miracles of Mary Texts, and Civilizational Discourses Across Nations and Regions

Presenter's Name: Dawit Muluneh
Classification: Graduate Student
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Presentation Type: Oral Presentation
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Historically, Africa has been subjected to a Euro-centric narrative that diminishes its contributions and portrays the continent as devoid of any substantial history. Contrastingly, Europe is often positioned as the epicenter of knowledge production, shaping Africa's way of life. This ahistorical revision not only jeopardizes the validity of scholarly pursuits but also influences the formulation of policies. To address this historical misrepresentation, it is imperative to acknowledge Africa's rich history and its valuable contributions to global development. This shift in perspective will lay the foundation for more informed and equitable policies that respect Africa's agency and diversity. Ethiopia stands as a counter-narrative to the prevailing Western perspective on Africans and their role in embracing Christianity. Contrary to the Western account that often associates the introduction of Christianity in Africa with European colonizers, Ethiopia's historical trajectory challenges this narrative. Among Ethiopia's intellectual treasures, the genre of Ethiopic texts known as the Miracles of Mary (TM) has captured the fascination of scholars. These TM manuscripts, constituting a collection of miraculous stories about the Virgin Mary, have been written over a millennium across the globe.

The Moral Responsibility of Harm by Physicians Due to Implicit Bias in Healthcare

Presenter's Name: Victoria Poythress
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
Faculty Advisor: Assya Pascalev
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The United States has a history deeply rooted in racism, evident across social and economic frameworks. While racism in areas such as policing and the criminal-justice system is often highlighted, racism in healthcare is often overlooked. A 2016 NIH study revealed many white medical students believed there were significant biological differences between Black and white individuals, such as Black people not feeling pain as strongly or possessing thicker skin. These misconceptions stem from historical stereotypes dating back to slavery. To determine moral responsibility for these implicit biases, one must consider the immediate action following the thought, the harm caused to the patient, and whether the thought can be acknowledged. Harm refers to direct actions by physicians that compromise patient safety, such as errors in diagnosis, treatment, medication administration, or surgical procedures. Addressing these biases in healthcare is crucial for equitable patient treatment. Mindfulness, exposure to multiple perspectives, empathy, and immersive experiences can train the brain to think more empathetic towards affected groups. Understanding the role of the amygdala in implicit bias guides efforts to counteract biases. Experiences that invoke fear about the harmful results of implicit bias can help recognize and break down automatic attitudes.

PHYSICAL SCIENCES & ENGINEERING

Tuning the Electronic Properties of EuA2X2 (A = Cd, Zn, Mg, Sb; X = As, P) by using Chemical substitution

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Intrinsic magnetic topological materials (IMTMs) are promising for next-generation spintronics applications. These materials exhibit topologically protected exotic states relevant to their functionality, which can be further enhanced by tuning their topology and magnetism. Among the different classes of IMTMs, EuCd2P2 family has been observed to present unique responses in its electrical resistivity. Here, using first-principles, density-functional theory-based modeling, we explore the electronic structures of EuA2X2 (A = Cd, Zn, Mg, Sb; X = As, P). Our calculations reveal that 3d and 4f orbital localization plays a key role in controlling the bandgap and the electronic states near the Fermi level in this materials family. We show that topological properties can be tuned via chemical substitutions and are not sensitive to spin-orbit coupling effects. Our study highlights the complex relationship between the topology and chemistry of this materials family.

Characterization of Thermal Conductivity for Niobium at Cryogenic Temperatures Using the Cut Bar Method

Presenter's Name: Sadiyah Anderson
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The study investigates the impact of cryogenic temperatures on the thermal conductivity of niobium (Nb). Precise thermal property data in the specified cryogenic temperature range is scarce, making it crucial for material selection and thermal design in the microelectronics sector. Temperature cycling in microchip circuits can lead to fatigue and premature failure.ergoes temperature cycling that can lead to fatigue and premature failure. This study was conducted to validate the effects of cryogenic thermal cycling on electronic packaging materials, specifically niobium and copper. Niobium, with its high superconducting transition temperature of 9.32 K, was found to be thermally stable and capable of withstanding consistent temperature changes. The experiment used the cut bar method, with niobium sandwiched between copper and aluminum, and liquid nitrogen as the cryogen. The digital to analog converter (DAC) was used to monitor the system's temperature, which could be imported into MATLAB. Three temperatures were measured in the cut bar system: T1 near the heater surface, T2 near the cold mount (copper), and T3 between the known and unknown materials. By using temperature data, Fourier's Law, and parameters such as power, material length, and area, we can determine the thermal conductivity. Three temperature sensors and a DAC collect relevant data. Testing showed that a decrease of 1.5°C resulted in a thermal conductivity of 393.7007874 W/m·K for niobium, while a decrease of 2.8°C resulted in 175.7592801 W/m·K. Our findings indicate that thermal conductivity increases with temperature change. Our cryostat system and measurement methods accurately monitor thermal characteristics of substrates and samples.

Extended Reality for Assisting with Tactical Decision Making

Presenter's Name: Nia Anderson
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Extended reality (XR) extends an individual's perception of reality using varying degrees of immersion. The least immersive type of XR is augmented reality (AR), when an image (static or animated) is superimposed upon the individual's immediate environment via an AR-enabled smartphone or AR headset, but there is no interaction between the environment and the image. Mixed reality (MR) is similar to AR, but the digital image can interact with the physical environment. Finally, the most immersive type of XR is virtual reality (VR), where the individual wears a VR headset to be completely immersed in a digital environment. In recent years, XR has been used extensively by the Department of Defense (DoD) for mission readiness, tactical superiority, enhanced situational awareness, operational security, and other purposes. In 2021, Microsoft signed a nearly $22 billion contract with the Army to supply them with Integrated Visual Augmentation System (IVAS) MR devices designed to provide tactical superiority. XR has a broad range of applications within the military domain, and the DoD is expected to invest more resources into this technology to better equip the members of the Armed Services, as they protect our nation's land, sea, air, and cyberspace. The project team has developed a MR prototype based on the Meta Quest 3, where the user is immersed in a realistic scenario in the Combat Information Center (CIC) of the U.S.S. Mason that requires them to make a high-stakes tactical decision about whether to engage an approaching unknown vessel.

Characteristics of Clinical Radiation Dose Measurement with Radiochromic Films

Presenter's Name: Lordina Asibey
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Radiochromic films, which result in color changes upon exposure to ionizing radiation, can provide radiation dose information for cancer patients undergoing radiotherapy. In this study, we investigated commercially available films EBT3 and EBT4 models, for accurate measurement of radiation doses in a clinical radiotherapy linear accelerator. The film pieces from EBT3 and EBT4 were scanned with a flatbed photographic scanner. To investigate the efficacy of these films, we irradiated film samples from two different batches of EBT4 film and one batch of EBT3 film at three dose levels using a clinical 6 MV linac accelerator. Subsequently, the samples were scanned at various points in time. For each sample, the variation of red-green-blue (RGB) color signals in a region of interest (ROIs) were analyzed using ImageJ. JS v0.5.7 software and optical density was computed. Similarly, the films were irradiated to various doses from 0.19 Gy to 15 Gy in a solid-water phantom at 10 cm depth. The optical density at 48 hours after irradiation was calculated to determine the dose response. Both EBT3 and EBT4 films exhibited an increase in optical density with radiation dose. Regarding the choice of an ROI, EBT4 films demonstrated lower noise levels with a decrease in ROI from 100x100 pixels to 20x20 pixels compared to EBT3 films. The optical density continued to increase up to 48 hours post irradiation. Overall, our study suggests that EBT4 films may offer a more reliable option for radiation dosimetry in cancer treatment.

Spectroscopic Characterization of Molybdenum Disulfide Using Raman and UV-VIS Spectroscopy for Optoelectronic Applications.

Presenter's Name: Saumika Bandopadhyay
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Molybdenum disulfide, MoS2, is a transition metal dichalcogenide. In bulk form it is an indirect semiconductor with an energy bandgap of about 1.2 eV, whereas in the form of monolayers the electronic bandgap increases to 1.8 eV. As a result, the layered structure of MoS2 facilitates its use in switchable transistors and photodetectors. We are investigating the layered band structure of MoS2 in the laboratory using both UV-VIS and Raman spectroscopy. Absorption spectra of the sample in the UV-VIS range (300-800 nm) is being explored to determine accurately the energy bandgap, while at the same time Raman shift (in the range 0-1600 cm-1) is enabling the determination of the number of layers present in the sample based on the ratios of the intensities of the vibrational features in the Raman spectra. MoS2 exhibits distinct Raman scattering signatures that reflect its layer thickness, structure, and defects. We are also exploring quantum computing aspects of MoS2 using modelling and simulation techniques.

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High-pressure Synthesis of Cobalt Polynitrides: Unveiling Intriguing Crystal Structures and Nitridation Behavior

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We conduct extensive high-pressure experiments to investigate phase stability in the cobalt-nitrogen system. Through a combination of synthesis in a laser-heated diamond anvil cell, first-principles calculations, Raman spectroscopy, and single-crystal X-ray diffraction, we establish the stability fields of known high-pressure phases, hexagonal NiAs-type CoN, and marcasite-type CoN2 within the pressure range of 50-90 GPa. We synthesize and characterize previously unknown nitrides, Co3N2, Pnma-CoN and two polynitrides, CoN3 and CoN5, within the pressure range of 90-120 GPa. Both polynitrides exhibit novel types of polymeric nitrogen chains and networks. CoN3 feature branched-type nitrogen trimers (N3) and CoN5 show π-bonded nitrogen chain. As the nitrogen content in the cobalt nitride increases, the CoN6 polyhedral frameworks transit from face-sharing (in CoN) to edge-sharing (in CoN2 and CoN3), and finally to isolated (in CoN5). Our study provides insights into the intricate interplay between structure evolution, bonding arrangements, and high-pressure synthesis in polynitrides, expanding the knowledge for the development of advanced energy materials

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Deep Learning Approach for Lunar Analog Mineral Identification Using Raman Spectroscopy

Presenter's Name: Jordan Clemetson
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Prabhakar Misra
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Accurate identification of lunar analog minerals is critical for understanding lunar geology and potential resource utilization. Raman spectroscopy provides a powerful tool for mineral identification, capturing molecular vibrational signatures. In this study, we introduce a novel deep learning approach employing convolutional neural networks (CNNs) for classifying lunar analog minerals based on Raman spectral data. Our dataset combines Raman spectra obtained from laboratory experiments simulating lunar conditions with entries from the RRUFF Project Raman database, encompassing a diverse range of lunar analog minerals, including pyroxene, olivine, almandine, and ilmenite. We train a CNN model to automatically learn discriminative features from the Raman spectra, facilitating accurate mineral classification. Through

iterative training and validation processes, the CNN effectively distinguishes spectral patterns associated with different mineral compositions, enhancing classification accuracy. Preliminary results demonstrate the efficacy of our deep learning-based approach in accurately identifying lunar analog minerals from Raman spectra. The CNN model exhibits robust performance, even in the presence of noise and variability inherent in real-world spectral data. Furthermore, the automated classification process accelerates mineral identification compared to traditional manual methods.

This research contributes to advancing mineralogical studies in planetary science by providing a novel methodology for lunar mineral identification. By leveraging deep learning techniques and Raman spectroscopy, our approach offers a powerful tool for characterizing lunar surface materials, thus informing future exploration missions and potential resource utilization endeavors.

Financial support from NASA LEADER award # 80NSSC20M0019 is gratefully acknowledged.

Numerical simulation of skin friction and heat transfer measurements for a sharp cone in hypersonic flow

Presenter's Name: Lucas Davis
Classification: Undergraduate Student
School/College: Engineering & Architecture
Presentation Type: Oral Presentation
Faculty Advisor: Sonya Smith
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Turbulence in high-speed flow boundary layers is important in predicting and controlling regions of high surface heat loads for high-speed flight vehicles. However, the nature of the turbulent eddy-mixing processes involved in interactions is still uncertain in research studies. As turbulent eddy mixing causes high-momentum fluid to pass closer to wall surfaces, cooler air is circulated further away from the flight vehicle wall surface. As a result, high surface friction and heating spots occur leading to increased mechanical stresses and instability in the aerodynamic performance of high-speed flight vehicles. The flow over a sharp cone being investigated is hypersonic and compressible. Such axisymmetric flows experience shockwaves, elevated temperatures, and intense shearing forces in the turbulent boundary layer. Our numerical simulation investigates the high surface loads by analyzing the heat transfer and skin friction surface measurements for a Mach 7.0 hypersonic flow over a sharp cone geometry at a zero-degree angle of attack. The computational fluid dynamic (CFD) model results will be verified and validated with experimental data collected at the UTSA Ludwieg tube facility. Preliminary data from numerical simulations performed using the Reynolds-Averaged Navier-Stokes (RANS) simulations with the Generalized k- (GEKO) two-equation turbulence model formulation are presented.

Talent Development at The Dow Chemical Company through Inclusion and Diversity Programs

Presenter's Name: Dow chemical company Dow chemical company
Classification: Staff
School/College: Other
Presentation Type: Poster Presentation
Faculty Advisor: Dow Chemical Company Dow Chemical Company
Faculty Advisor's email: shanna2@dow.com

The Dow Chemical Company, a global materials science company, is deeply committed to fostering inclusion and diversity. Our strategic initiatives span advocacy, community engagement, and talent development. Notable programs include the Diamond Symposium, the BEST (Building Engineering and Science Talent) Symposium, which nurture diverse talent, and the Dow SURE (Scholars Undergraduate Research Experience) program, empowering students of color through mentorship and academic research opportunities. Through these efforts, we continue to create an equitable and inclusive workplace for the future.

Functional Polymers Product R&D – Packaging & Specialty Plastics and Hydrocarbons

Presenter's Name: Dow chemical company Dow chemical company
Classification: Staff
School/College: Other
Presentation Type: Poster Presentation
Faculty Advisor: Dow Chemical Company Dow Chemical Company
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The Functional Polymers Product (FPP) R&D organization within Dow Packaging & Specialty Plastics and Hydrocarbons (PSP&H) leads global industrial R&D in Specialty Plastics Materials and Technology. Our products serve a wide range of markets and applications, including infrastructure, consumer, transportation, food & specialty packaging, power transmission, telecommunication, low voltage/halogen free fire-retardant materials, and adhesives. In recent years our organization has achieved remarkable accomplishments in enablement of plastics circularity and low carbon infrastructure. Through our people and technology, Functional Polymer Product R&D is the powerhouse of disruptive innovation and value creation for Dow's Specialty Plastics businesses. Seamless collaboration across divisions and geographic locations enables us to deliver innovative solutions to meet today's most pressing sustainability challenges, market opportunities, and societal needs. FPP R&D is organized into 5 divisions encompassing all segments of Functional Polymers business portfolio: Adhesives, Elastomers, High Pressure Copolymers, Wire & Cable, and Post-Reactor Extrusion & Processing, and there are many opportunities for career growth and development across our broad range of technology areas. In Functional Polymer Product R&D, we have a strong commitment to today's environment and humanity. Sustainability and humanity with plastics is a key focus and driver for our research and innovation, and we're committed to driving progress for people, the environment, and technology.

General Overview of the R&D/TS&D Capabilities within Coatings and Performance Monomers

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Presentation Type: Poster Presentation
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Dow Coating Materials focuses on delivering innovative solutions that enhance performance, durability, aesthetics and sustainability of paints and inks. The coatings business relies on deep synthesis, polymer/materials science, scale-up/commercialization, and formulation expertise to deliver a broad portfolio of materials for the coatings industry, including architectural and industrial coatings. Upstream of coatings, Dow Performance Monomers provides a safe, reliable, cost-advantaged, and global supply of acrylate, methacrylate, vinyl acetate, and specialty monomers driven by world-scale assets and vertical integration into key feedstocks. This poster will highlight the variety of scientist and engineering roles available in the acrylics envelope, with positions aligned to new process technology development, process optimization & reliability, product development, product commercialization (scale-up), and technical services and development (TS&D) – with strong collaboration across roles to enable innovative solutions and a positive customer experience. This poster will also highlight two key areas of innovation focus within industrial coatings: paper coatings for recyclable food packaging and road markings for improved durability and safety. The acrylics envelop has a variety of exciting career opportunities including a unique rotational assignment.

Accelerating Innovation through World-Class Capabilities & Expertise

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Innovation on some of the world's most complex industrial problems requires world-class capabilities and collaboration across all of Dow. Efforts on the discovery of new polyolefin catalyst architectures highlight the multidisciplinary toolbox required to accelerate from the lab scale to the commercial scale. Through a combination of computational modeling, high throughput synthesis, high throughput performance testing, and analytical workflows, new catalysts can be developed and scaled-up faster than ever before. This work will highlight the journey in innovation and the tools that make it happen.

Influence of Reaction Parameters on the Architecture of Grafted Nanoparticles Synthesized Using ATRP

Presenter's Name: Alexis Duncan
Classification: Undergraduate Student
School/College: Arts & Sciences
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There is a strong demand for portable and efficient energy storage devices with optimum charging and discharging characteristics for a variety of applications. In this regard, polymer grafted nanoparticles is noted for integrating the positive attributes of polymer and inorganic nanomaterials to improve the overall dielectric properties of material. Polymer-grafted nanoparticles were synthesized using atom transfer radical polymerization (ATRP) by performing hydroxylation followed by silanization, initiator anchoring, and ATRP of the initiator functionalized nanoparticles with styrene monomer. The role of hydroxylation time used to prepare the precursor and the mole % of monomer to initiator functionalized nanoparticles in influencing the architecture of grafted nanoparticles was investigated. The successful grafting of polystyrene (PS) on the BaTiO3 nanoparticles was confirmed by thermogravimetric analysis, fourier-transform infrared, dynamic light scattering and gel permeation chromatography. The MW of grafted polymer increased from 23.8 kDa to 53.3 kDa as the hydroxylation time went from 3hr to 5hr. 1H NMR analysis was used to track the grafting kinetics by monitoring the monomer conversion of styrene in solution. Preliminary results, as expected indicate that 1H NMR integration signal of styrene follows a progressive decrease with reaction time. Currently studies are underway to obtain correlation between reaction time, monomer conversion, and molecular weight of grafted polymer as a function of mole % of monomer to initiator functionalized nanoparticles. The findings of this research can have a strong bearing on the design of next generation dielectrics.

Carbon capture from wet vapors

Presenter's Name: Silvina Gatica
Classification: Senior Faculty
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Presentation Type: Oral Presentation
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We study numerically the adsorption of a mixture of CH4, CO2, and N2 at room temperature on a substrate composed of graphene flakes. Our study is based on Molecular Dynamics and Monte Carlo simulations. Methane is considered a spherical molecule, carbon dioxide and nitrogen are represented as linear rigid bodies, and the substrate is rigid and fixed. Our simulations of N2 at 77K and CO2 at 273 K on the substrate are compatible with the experimental isotherms in activated carbons. We consider different concentrations for the mixtures and show that the substrate is adequate for the separation and adsorption of CO2. On average, CO2 is adsorbed 6.5 more than the other components in a ternary mixture CO2/CH4/N2. The rate of adsorption of CO2 is higher than CH4 and N2 in all the mixtures studied. We also explore the effects of humidity and interlayer separation.

Rheological behavior of protein-enriched 3D-printed snacks from yellow pea

Presenter's Name: Sama Ghadiri Gargari
Classification: Graduate Student
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Presentation Type: Poster Presentation
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3D food printing is a potential emerging technique for creating customized nutritional foods. Understanding the impact of individual components on the nutritional and structure of 3D-printed foods is crucial for their strategic development and applications. This study evaluated the viability of using yellow pea protein-rich and starch-rich pastes in extrusion-based 3D food printing. Yellow pea protein and starch mixtures with different compositions were prepared and blended with water without additional additives to assess their ease of extrusion and shape stability after printing and heating. The 3D printing results were then correlated with their rheological behaviors. All pastes exhibited shear-thinning characteristics, including the most efficient and unsuitable pastes for printing. The efficient pastes had an intermediate level of storage and loss modulus compared to the pastes incapable of being extruded uniformly or preserving their shape. However, there was no specific threshold to classify them as suitable 3D printing materials. At the equivalent amounts of solid mixture and water, increasing the protein content of the mixture enhanced the complex viscosity of pastes, necessitating more water in protein-rich mixtures to improve their printability. The best-performing starch-rich pastes experienced a notable rise in their storage modulus at temperatures above 70°C, suggesting using an additive to enhance their stability during cooking post-processing. The provided data may help fortify the nutritional qualities of 3D food printing materials and offer valuable insights into the critical rheological parameters contributing to effective extrusion-based 3D printing.

Acknowledgment: The project was funded through USDA-NIFA-AFRI Grant #2020-67021-31141.

PHYSICAL SCIENCES & ENGINEERING

Anisotropic magnetocaloric effect in single crystal Cr2Te3
Presenter's Name: Anirban Goswami
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Presentation Type: Oral Presentation
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We report a systematic investigation of anisotropic magnetocaloric effects in single crystal Cr2Te3. Single crystal samples are synthesized by chemical vapor transport and characterized by X-ray and Laue diffraction methods. The maximum magnetic entropy change −ΔSMmax is 4.50 J kg−1 K−1 for the easy c-axis (3.36 J kg−1 K−1 for the hard axis along ab-plane) and the relative cooling power RCP is 296.7 J kg−1 for the easy c-axis (183.84 J kg−1 for the hard axis along ab-plane) near the Curie temperature for a magnetic field change of 9 T. The magneto-crystalline anisotropy constant Ku is estimated to be 580.12 kJ m−3 at 140 K, decreasing to 148.60 kJ m−3 at 168 K. Meanwhile, the maximum of the rotational magnetic entropy change ΔSMR(T, H) between the c-axis and the ab-plane is about 1.14 J kg−1 K−1 for magnetic-field change of 9 T. The critical exponents are estimated by analyzing magnetocaloric effects, which indicate 2D-Ising type magnetic system. The accuracy of estimated critical exponents is verified by scaling analysis. The maximum magnetic entropy change −ΔSMmax ~5.25 J kg−1 K−1 (along the c-axis) and the corresponding adiabatic temperature change ΔTad ~3.31 K (along the c-axis) are estimated by analyzing heat capacity measurements with a magnetic field up to 9 T.

Influence of Reaction Parameters on the Architecture of Grafted Nanoparticles Synthesized Using ATRP
Presenter's Name: Jordan Gray
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
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There is a strong demand for portable and efficient energy storage devices with optimum charging and discharging characteristics for a variety of applications. In this study, polymer-grafted nanoparticles were synthesized using atom transfer radical polymerization (ATRP) by varying the reaction times used to synthesize precursors. Hydroxylation followed by silanization, initiator anchoring, and ATRP of the initiator functionalized nanoparticles was performed with styrene as the monomer. Additionally, the concentration of monomer was varied as part of a second study. The successful grafting of polystyrene (PS) was confirmed by thermogravimetric analysis and Fourier-transform infrared spectroscopy measurements. Proton nuclear magnetic resonance analysis of the cleaved polymer showed characteristic signals for PS. The hydrodynamic radius of the polymer-grafted nanoparticle increased upon the grafting of polymer, as observed using dynamic light scattering. GPC measurements of the cleaved polymer and TEM characterization of the polymer-grafted nanoparticles will be performed to evaluate the role of reaction times and concentration of monomer on the structure of polymer-grafted nanoparticles. The findings of the research can have a strong bearing on the design of next generation dielectrics.

"Exploring Piezoelectric Properties of ZnO Quantum Dots for Sensor Applications"
Presenter's Name: Bipul Gyawali
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School/College: Engineering & Architecture
Presentation Type: Oral Presentation
Faculty Advisor: Prabhakar Misra
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Coauthors: Allison Powell, Nikhil Vohra,Prabhakar Misra

Laser Spectroscopy Laboratory, Department of Physics & Astronomy, Howard University

This research explores the piezoelectric properties of metal oxide quantum dots, specifically focusing on zinc oxide (ZnO), using the Spanish Initiative for Electronic Simulations with Thousands of Atoms (SIESTA) modeling and simulation software. Density functional theory (DFT) simulations have been employed to analyze the electronic structure of these quantum dots. The Kohn-Sham Equation and pseudopotentials are utilized to approximate non-valence contributions in the simulations. Preliminary results match the ZnO properties, including a direct band gap of 3.37 eV and an exciton binding energy of 60 meV. Through the simulation, the effect of increasing stress and presence of magnetic field is under study. The project explores the high sensitivity of ZnO quantum dots to nitrogen dioxide (NO2), indicating potential applications in quantum dot sensors. Furthermore, the research investigates optimization strategies such as temperature control and doping to enhance the sensitivity and selectivity of the sensors, employing COMSOL Multiphysics Simulation Software for this purpose. Challenges such as high energy costs and measurement instability are acknowledged, and the approach involves optimizing sensor morphology and component variation to address these challenges. Overall, the study underscores the promise of ZnO quantum dots for developing sensitive and selective quantum dot sensors. Further experimentation and validation are needed to confirm these theoretical findings and advance the field of quantum dot sensor technology.

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Enhancing Infrastructure Integrity Assessment through Interdisciplinary Research in Structural Health Monitoring

Presenter's Name: William Hawkins
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Presentation Type: Poster Presentation
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Ensuring the integrity of transportation infrastructure represents a critical challenge in the context of urban development and public safety. The vast array of assets comprising this infrastructure, ranging from emblematic bridges to simple road signs and light poles, necessitates a robust and accessible approach towards Structural Health Monitoring (SHM) – a goal that is both ambitious and indispensable. This presentation is about the interdisciplinary research undertaken at Howard University by computer scientists and civil engineers, focusing on the application of advanced computer vision techniques to assess the health of simple structures and pedestrian bridges. By leveraging computer vision, vital vibration data can be extracted from these structures, thus identifying potential vulnerabilities. The presentation will cover advancements in computer vision and its practical applications in SHM with emphasis on the use of these techniques to obtain displacement responses from full-scale structures. The efficacy of video displacement tracking algorithms in revealing fundamental dynamic properties and providing an understanding of structural behavior will be demonstrated. Moreover, the presentation will demonstrate the application of these methods on a small pedestrian bridge in Northern Virginia, showcasing the potential of these techniques to revolutionize SHM and contribute significantly to the enhancement of infrastructure integrity assessment.

Impact of Mathematical REUs on Matriculation into Professional Degree Programs

Presenter's Name: Aaron Johnson
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Presentation Type: Poster Presentation
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In the late 1950s, the National Science Foundation (NSF) piloted the first of many programs that were designed to give undergraduate students the ability to participate in application-based or basic science research in their intended field of interest. First labeled as Undergraduate Research Participation Programs and then evolving to Research Experiences for Undergraduates (REUs). During this time Research & Development (R&D) in the areas of science and technology, in both the public and private sectors, produced great incentives for colleges and universities to consistently generate innovative ideas that would boost social and private returns. After the year 2000, academia polished its pipeline for undergraduates to earn professional degrees to not only be more competitive in the workforce but also continue to produce more research. For students to be attractive to garner admittance into highly selective graduate programs, REUs played a pivotal role in how universities viewed students and how students saw themselves in that specific career field. From the years 1999 to 2006, the number of REUs that the NSF funded nearly doubled, and chief among them were mathematics-based. This study aims to explore, via survey collection, how mathematical REUs impacted matriculation into professional degree programs. Mathematicians across the globe were sought after for their lived experience from garnering their bachelor's to their doctorate.

Preliminary Results - The survey collection is still ongoing and promising

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Wind Turbine Modeling from Wind Wakes Predicted Based on Climate Change Patterns

Presenter's Name: Morgan Jones
Classification: Undergraduate Student
School/College: Engineering & Architecture
Presentation Type: Poster Presentation
Faculty Advisor: Sonya Smith
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Coauthors: Sonya Smith

Modeling the complex nature of the offshore floating wind environment is essential for future energy production. Offshore wind turbines are large rotating machines that are 260m in height with 220m diameter rotors which at such vast scales are well located in the atmospheric boundary layer (i.e. ~1km from the Earth's surface). Due to the nature of the offshore environment, full-scale predictive modeling and simulations which include validation and data assimilation are essential tools for simulating floating offshore wind. Wind turbines are significantly affected by climate change through changing atmospheric conditions, like wind patterns, temperature, and humidity. All of these conditions have impacted wind turbine wakes, which occur due to the extraction of energy from the wind by the leading turbines. As a result, there is decreased power and increased load on the wind turbines, which lowers energy output and profitability. To determine the effects of climate change on the wakes, the Weather Research & Forecasting Model (WRF), is used to model the effects of climate change on atmospheric conditions that create wind wakes, including the wind patterns, temperature, and humidity. The effectiveness of offshore wind turbines is essential to meeting the nation's energy needs and supporting the national energy transition.

Exploring New Crystalline Sponges for Challenging Molecules

Presenter's Name: Amber Jones
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Presentation Type: Poster Presentation
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Background: Crystalline sponges, like (ZnX2)3(tpt)2[2,4,6-tris(4-pyridyl)-1,3,5-triazine], have transformed structural determination for organic molecules. The crystalline sponge method involves the incorporation of target molecules into the pores of a crystalline sponge, forming stable inclusion complexes. The targets are immobilized with-

in the sponge lattice, allowing for their characterization through single-crystal X-ray diffraction. However, analysis of molecules featuring basic functional groups, exhibiting significant water solubility, or with molecular weights exceeding 500 g/mol are difficult to analyze through the technique due to incompatibility with the current sponges. This project aims to identify new crystalline sponges to overcome these limitations. Methods: Drawing inspiration from recent advancements (ACS Cent. Sci. 2020, 6, 9, 1626–1634; Nature 2013, 495, 461–466), a combination of synthetic strategies and characterization techniques were applied to design and evaluate a series of new crystalline sponges. Various metal salts were combined with aromatic organic ligands under different synthetic conditions (solvent, temperature, reagent concentration) to generate metal-organic frameworks (MOFs). Results: This approach has yielded several novel and promising crystalline sponges. These sponges contain Zn, Ho, Dy, Ni, Sr, Ba, Ca, Mg, Pr, Gd and Y metals non-covalently complexed with aromatic organic ligands. Conclusions: Next steps include testing these novel sponges against a variety of target molecules that contain very basic functional groups, those with significant water solubility, and those that have large molecular masses to determine whether they can be included in these MOFs. Inclusion of these types of compounds would significantly expand the chemical scope of the technique.

Proof-of-Concept Demonstration of Standoff Raman Spectroscopy for Lunar Science and Exploration

Presenter's Name: Anverly Jones
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Presentation Type: Oral Presentation
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Coauthors: David Mugisha, Chase Adams, Shahid Aslam, Dina Bower, Qian Gong, Len Seals, Blanche Meeson, Mike Provenzano, Tom Oberst, Prabhakar Misra

For this project, we have developed a novel method for standoff Raman spectroscopy for studying and characterizing lunar minerals. Current state-of-the-art Raman systems are limited in range (~ 7 m) due to restricted telescope aperture signal collection area. Our approach optimizes back scattered spectral radiance from the analog lunar mineral samples by maximizing the so-called etendue, which is the product of the area of cross-section of the sample interacting with the excitation laser and the solid angle of collection of the Rayleigh and Raman signals. We have successfully demonstrated the proof-of-concept in the laboratory for an array of minerals (e.g., limonite, calcite, apatite, etc.) using 1-m and 10-m length optical fibers on a breadboard and are in the process of enhancing the signal-to-noise ratio of the back scattered Raman signal using a Questar QM1 long-range microscope system in conjunction with a 30-m length optical fiber. The proposed experiment is being designed as a proof-of-concept for a future lunar lander mission to be implemented on an Astrobotic Raman Cube Rover and is being done in collaboration with NASA Goddard Space Flight Center and industry partner, Astrobotic Technology, Inc.

Financial support from NASA M-STAR (Award # 80NSSC21M0301) and LEADER (Award #80NSSC20M0019) are gratefully acknowledged.

Development of radioactive decay chain calculator for actinium based targeted alpha therapy

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Background: There is a growing interest in alpha particle emitting radionuclides for cancer therapy. Targeted alpha therapy involves administering radiolabeled pharmaceuticals emitting short-range alpha particles, aiming to treat cancer cells effectively while sparing healthy tissue. However, decay chains in many radionuclides present measurement challenges due to the complex ingrowth and decay behavior of progeny, along with the potential for breakthrough in medically-important nuclides. This complexity arises in radionuclides like Th-227 and Ra-224, where drug delivery may precede radioactive equilibrium among present radionuclides. Additionally, uncertainties in nuclear decay data, especially in newer systems like Ac-225, complicate activity predictions during delivery. Methods: As an initial step, the activities of all the nuclides in Ac-225 chain of interest were computed by, solving the recursive representation of Bateman equations for a decay chain of arbitrary length while allowing for multiple branches. In the next step, we will propagate uncertainties from input nuclear decay data, separation time, and potential breakthrough, including correlations to predict uncertainty on all radionuclide activities at future times. The study's findings are integrated with experimental detector efficiencies to predict detector responses for radionuclide calibrators and liquid scintillation counters. Results: We applied this methodology to Ac-225 to predict ingrowth and equilibrium activity ratios within the chain and used the results to derive detector efficiencies for this radionuclide. Conclusion: This study initiates the development of a user-friendly tool for alpha therapy researchers, addressing Bateman equations and associated uncertainties. This fundamental step lays the groundwork for improved accessibility and dependability in alpha therapy procedures.

Quantum Corners: Improving Emergency Response with Smart Traffic Management and Quantum Sensors

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In the Washington, DC, emergency vehicles are subject to traffic as it is very common to see emergency vehicles halted behind various cars on highways or even side streets due to congestion issues. Smart traffic management works well to solve this issue as it implements Internet of Things (IOT) sensors to provide information for traffic analysis. While IOT sensors provide a great foundation for smart traffic management,

system designers can migrate to quantum sensing technology to enhance precision in data collection. To address the problem of delayed emergency response, the goal is to design a sensing system that sends information to a smart traffic management system. This information will be relayed to a smart traffic management system to plan the best route for an emergency vehicle to travel. Once the ideal path is planned for the emergency vehicle, the system will then send notifications to surrounding vehicles to update their current GPS routes to redirect them away from the emergency vehicles path. To accomplish the original goal, this work uses an autonomous car as a testbed using a mixture of cutting-edge and state of the art technologies. In this testbed, the objective is to perform a hardware acceleration of ORB-SLAM2 with a Graph Neural Network designed in Vivado HLS and implemented on an Intel Cyclone 10 at the edge. After completion, the final goal is to report how the previous mentioned cutting-edge technologies can be used to design the quantum sensing system for improved emergency response.

The effect of different tribo-charger materials in the dry separation of soybean meal proteins through triboelectrification approach

Presenter's Name: Hadeia Liburd
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The increasing demand for plant-based proteins necessitates the development of efficient and sustainable separation technologies. Tribo-electrostatic separation (TES), a promising dry fractionation technique, offers a sustainable method for protein enrichment from plant resources. This study investigates the impact of tribo-charger materials on the separation and charging behaviors of soybean meal components, focusing on soybean protein and fiber isolates as model systems. The TES approach utilizes pressurized air to transfer the milled soybean meal particles within a fluidized bed through tribo-chargers into the vertical separation chamber with positive and negative electrode plates. The use of PVC and PTFE tribo-charger tubes was evaluated on the efficiency of protein separation from soybean meals at the laminar airflow rate and plate voltage of ±4.5 kV. The PVC tribo-charger facilitated a more significant positive charge in protein than PTFE, indicating a material-dependent variance in charging efficiency at laminar airflow. Using a PTFE tribo-charger resulted in all protein and dietary fiber components gaining a positive charge. Upon contact with PVC, the opposing charge acquisition of protein and fiber particles demonstrates its efficacy in protein fractionation via TES. The TES of soybean meal demonstrated that PVC offers enhanced protein separation performance compared to PTFE. This study provides valuable insights for developing more efficient and targeted separation strategies in oilseed meal protein production, contributing to the sustainability and efficacy of food processing techniques.

Acknowledgments: This project was funded through NSF-HBCU-UP-RIA (#1900894) and the DOW SURE program.

Understanding the Role of Hydrochloric Acid Modulator towards Modification of Metal Organic Frameworks and Post Modification with Gold Nanoparticle for Photocatalytic Applications

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Metal organic frameworks (MOFs) are an important class of reticular materials offering a wide array of applications owning to its excellent stability, highly ordered porous structure, and high tunability. Specifically, zirconium-based MOFs (Zr-MOFs) such as UiO-66 display catalytic activity in organic synthesis and recently displayed exceptional photocatalytic behavior for carbon dioxide (CO2) capture, hydrogen evolution reaction (HER), and overall water splitting (OWS). MOF behavior and performance is determined by its synthesis and is influenced by modulators within the MOFs matrix. Therefore, understanding how modulators effect the crystallinity of Zr-MOFs is of great interest. Modulators can include acetic acid (CH3COOH), formic acid (HCOOH), hydrochloric acid (HCl), amino acids, as well as aromatic systems bearing -COOH, -SH, -NH2 functional groups. Herein, we describe how employing HCl during the synthesis of Zr-MOFs (UiO-66-HCl) improves crystallinity without altering the chemical integrity during the synthesis of UiO-66-HCl. The concentration of HCl was systematically evaluated from 0.00 to 0.1 mM with the crystallinity determined by powder X-ray diffraction. Key peaks at 2–7°, 7.3°, 8.3° and 25.8° showed significant decrease in their full-width-half-height which correlate with increased UiO-66-HCl crystallinity. The characteristic peak at 7.3° and 8.3° are attributed to the planes (111) and (200) and 25.8° of UiO-66 crystal. These peaks are not well defined with diffraction peak of UiO-66 without modulator. UiO-66-HCl was subsequently impregnated with gold nanoparticles (AuNPs) through post-synthetic modification and analyzed by PXRD, FT-IR, and Raman analyses.

Keywords: UiO-66-HCl, AuNPs@UiO-66-HCl, Modulators, Photocatalyst

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Pseudo Jahn-Teller effect at the intrinsic defects in hexagonal boron nitride

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Presentation Type: Oral Presentation
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Since the 2016 discovery of defect-based quantum emitters in hexagonal boron nitride (hBN), significant theoretical and experimental efforts have been directed towards identifying their chemical nature(s). Most of the theoretical works themselves focus on the high-symmetry reference structures for these defects and have not considered the possibility of the pseudo Jahn-Teller effect (PJTE), which arises from the vibronic coupling between the ground state and excited states. Using density

functional theory-based calculations, we explore the effects of pseudo Jahn-Teller distortion on the structural, electronic and optical properties of intrinsic defects in hBN. Using intrinsic defects as prototype defects, we demonstrate the consequences of PJTE on the observable properties of the defects and show that one cannot rule out PJTE at the defects a priori.

Developing a Real-Time Monitoring and Machine Learning model for Automating and Optimizing the Anaerobic Digestion process

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Introduction: Anaerobic digestion, similar to human digestion, processes organic waste into biogas and nutrient-rich fertilizer. However, it neglects the potential for volatile fatty acid (VFA) production, which is crucial for bioplastics and other industrial applications. Purpose: This research aims to automate the anaerobic digestion process, optimize VFA production through precise condition monitoring, and develop a machine-learning model to address the inefficiencies of traditional manual methods. Methods: Utilizing Raspberry Pi and Python, we established an automated system connecting sensors to digesters for real-time condition monitoring. We are exploring and utilizing machine-learning models like Multivariate Linear regression, random forest, gradient boosting, and deep learning to maximize VFA productions, foster tailored microorganisms, inform the quantity of feedstock composition for desired output, and maintain pH. Results: Employing Gradient-Boosting Machine (GBM) models in our anaerobic digestion research, we achieved a refined Root Mean Square Error (RMSE) of 2.36 and an R-squared error of 0.77, indicating a substantial improvement in predicting VFA production. Similarly, using the Random Forest model, critical factors such as 'Feedstock,' 'NH4(mM)amount,' and 'pH' were identified as key to optimizing yields, offering a targeted pathway for enhancing bioenergy production efficiency. Now, we are exploring deep learning to inform the optimum quantity of feedstock composition for the desired VFA production. Conclusion: We've laid the groundwork for advancing anaerobic digestion processes by integrating real-time monitoring with machine learning. This innovation maximizes VFA production, contributes to waste reduction, and explores VFAs' industrial applications, marking a significant leap toward optimizing anaerobic digestion technology.

Modelling Nanosensor Devices with piezoelectric materials using COMSOL Multiphysics

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Piezoelectric materials exhibit a unique property where mechanical strain applied induces an electric field, offering a promising avenue for different sensing applications, (e.g., gas sensing).These piezoelectric materials have very fast response time, broad frequency response(making them applicable in diverse sensing applications), very high sensitivity, as well as direct and indirect piezoelectric effects. This research study focuses on using COMSOL Multiphysics, a powerful tool for simulating multiphysical phenomena, to design, build and model nanosensor devices, with piezoelectric quantum dots (such as ZnO). By designing the sensor device on COMSOL Multi-physics, using ZnO as the base material, we can model response of this nanosensor device to the external NO gas. The adsorption of the NO gas on the sensor will induce mechanical strain in the piezoelectric QD and ultimately, alter their piezoelectric response. By analyzing and simulating these responses, we can optimize the nanosensor's sensitivity and selectivity. This research holds promise for the design and optimization of piezoelectric based nanosensor devices that would be used for various applications and different sensing modes such as pressure sensing, accelerometry and strain sensing.

First Principles Investigation of Thickness Dependent Magnetic Phase Transitions and Transport Properties in Heterostructures (MnBi2Te4)/(Bi2Te3)n

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The interplay between magnetism and topology led to the realization of quantum anomalous Hall effect in heterostructures, exhibiting the axion insulator MnBi2Te4 and well-known topological insulators like the Bi2Te3 family. The current study aims to explore the magneto-transport properties like anomalous Hall conductivity of heterostructures such as Bi2Te3/MnBi2Te4, which is an extension of previous study on Bi2Se3/Bi2MnSe4 reporting non-trivial topological surface states. MnBi2Te4 is found to exhibit antiferromagnetic ordering, substantiated by ground state energy eigenvalues analysis. The Hubbard U value of 1.1 eV is included to commensurate the electron correlation effect for Mn - 'd' orbitals. The amount of non-magnetic Bi2Te3 layers sandwiched between two antiferromagnetic MnBi2Te4 layers suppresses the interlayer exchange coupling between the two antiferromagnetic layers. Such is beneficial for quantized anomalous Hall conductivity at low intrinsic/extrinsic magnetic fields. This inspires the examination of magnetic properties of the heterostructure forms, MnBi2Te4/(Bi2Te3)n/MnBi2Te4 ,with n = 2 to n = 6 to minimize the interlayer exchange coupling between two MnBi2Te4 layers, leading to exotic magneto-transport properties like anomalous Hall conductivity.

Field dependence of spin glass transition temperature in Cu: Mn single crystals

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The understanding of the spin glass transition under the influence of a magnetic field has been a topic of considerable debate. Previous research (Phys. Rev. Lett. 66, 2923 (1991)) examined the magnetic field's impact on the spin glass transition temperature using polycrystalline Cu:Mn samples. They observed a single transition temperature in low magnetic fields and two in high magnetic fields, which were interpreted as the d'Almeida-Thouless (AT) and Gabay-Toulouse (GT) transitions. However, recent studies (Phys. Rev. B 91, 014434 (2015)) highlighted the complexities introduced by a distribution of crystal sizes, leading to multiple coherence length scales and a range of glass transition temperatures. This challenges the straightforward interpretation of transitions as AT and GT. In our current work, we present preliminary findings on the magnetic field dependence of the spin glass transition temperature using large single crystal Cu:Mn samples with varying Mn concentrations. Our preliminary results show that in low fields, the temperature of the onset of irreversibility (MFC - MZFC) decreases with increasing magnetic field strength, but the cusp of the temperature-dependent MZFC curve does not.

Acknowledgement: This work is supported by the NSF Award No. DMR-2018579 and DOE Award No. DE-SC0013599.

Fatigue failure of metallic glasses under cyclic shear deformation

Presenter's Name: Nikolai Priezjev
Classification: Junior Faculty/ Lecturer/ Instructor
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The effect of oscillatory shear deformation on the fatigue life, yielding transition, and flow localization in metallic glasses is investigated using molecular dynamics simulations. We find that upon approaching a critical strain amplitude from above, the number of shear cycles until the yielding transition is well described by a power-law function. Remarkably, the potential energy at the end of each cycle as a function of the normalized number of cycles is nearly independent of the strain amplitude, which allows for estimation of the fatigue lifetime at a given strain amplitude. The analysis of nonaffine displacements of atoms elucidates the process of strain localization, including irreversible rearrangements of small clusters until the formation of a system-spanning shear band. Website: https://sites.google.com/view/nikolai-priezjev

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Systematical Acceleration of Material Discovery

Presenter's Name: Sinan Sevim
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Presentation Type: Oral Presentation
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Material discovery research can be accelerated by workflow automation. A tailored workflow can repeat the same calculations for a set of materials while removing the downtime between the calculations. Before constructing a workflow lattice symmetries, number of atoms and number of sites should be decided as constraint. Materials Projects database can be screened for the constraints and the structures can be collected. After setting computational parameters, calculations can be put into a pipeline specific for the material type. The pipeline includes optimization of structure, determining magnetic ground state and calculation of magnetic exchange parameters. Since the materials are similar to each other, we can operate the same method on each of them. Besides applying the same procedure to different structures, it is also possible to discover more about the same material. The work flow can be improved in a way to apply strain, pressure and layer effects. Which expands the phase space even further and generates more data.

Synthesis of Carboranylamidindates and Amidinates for a systematic evaluation

Presenter's Name: Nistha Shrestha
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Amidinates have received significant attention due to their structural and electronic properties, especially for chelating metal ions. Recently, this ligand class has been extended with the inclusion of carborane bound to the amidinate backbone via a carbon vertex to give a carboranylamidinate subclass of ligands. Carboranes are often used as a 3-dimensional benzene analog, though they are σ-aromatic and contain an internal dipole. As a result, this can open up new functions for established chemistry. Specifically, traditional amidinates bind Lewis acids through a κ2N, N of the amidinate ligand. Unusually, the carboranylamidinates were found to bond Lewis acids via one nitrogen of the amidinate and the unsubstituted carbon vertex of the carboranylamindinate in a κ2C, N fashion. To date, all carboranylamidinates studied have been bound to the amidinate via the C1-vertex, despite the electron donating capacity of the boron vertexes, and there hasn't been a significant comparative study of the carboranylamidinates with their organic analogs. Described herein is the synthesis and characterization of a series of amidinates and carboranylamidinate analogs purposed for coordination studies to dinuclear metal centers to expand this classic area of research.

Spectroscopy and Simulation of Quantum Dots for Sensing and Computing applications

Presenter's Name: Yaman Siwakoti
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Quantum dots (QDs) possess unique optical and electronic properties, making them promising candidates for applications in optoelectronics, photonics, and sensing. Our research focuses on quantum dot molecules for developing sensors and qubits, employing Raman and UV-VIS spectroscopy to study a variety of QDs (e.g., ZnO, ZnS, Al 2 O 3 , CdSe/CdS, CdTe, Perovskites) in solvents (e.g., hexane, toluene, oleic acid, etc.). We investigate the QDs using Raman spectroscopy to characterize the vibrational frequencies for designing sensors for detecting toxic gases (e.g., NO x , CO, etc.). Siesta software has been used in conjunction with the supercomputing ACCESS platform to computationally model the density of states and band structure of these QDs. Our preliminary results and findings are promising. For example, using the UV-VIS spectra of CdSe/CdS (with hexane solvent), the band gap energy was obtained to be 3.030 eV. In addition, the Raman spectra analysis of ZnO provided valuable insight into the vibrational modes with eigenmode features E 2 (low), E 2 (high) and A 1 (LO) located at 101 cm -1 , 437 cm -1 and 576 cm -1, respectively, while the 2E 2 (low) and E 2 (high)-E 2 (low) modes emerged at 202 cm -1 and 333 cm -1, respectively. Our goal is to enhance the sensitivity and selectivity in QD spectroscopic characterization and explore QD-based Raman and UV-VIS spectroscopy for quantum sensing and computing applications.

Financial support from the National Science Foundation (NSF) award numbers DMR-2101121 and PHY-1950379 are gratefully acknowledged, along with ACCESS support (PHY210066 and DMR190126).

The Impact of Nutritional Health on Young Black Female Athletes

Presenter's Name: Rushie Solomon
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Presentation Type: Poster Presentation
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Nutrition is a crucial factor that affects the health and performance of female athletes. Research indicates that female athletes often lack sufficient nutritional and energy intake, which can lead to poor health, inadequate performance, and malnutrition. Additionally, female athletes may intentionally restrict their calorie intake for performance or aesthetic reasons, which can lead to the development of body image disorders and chronic health conditions such as hypertension and cardiovascular diseases conditions. Therefore, this study aims to investigate the nutritional health of black female athletes and develop culturally appropriate interventions to improve their nutritional health. The research methodology involves a systematic review of existing literature on the subject. This also aims to assess the nutritional health and risk of young black female athletes by using the search engines PubMed and scholar.google.com with key variables such as: "hypertension", "Athletes", "women", "Nutrition", "Chronic diseases", "Cardiovascular disease." \This study hopes to generate knowledge that can assist in developing dietary plans and interventions that improve cardiovascular health and prevent the development of chronic health conditions in black female athletes. Furthermore, the results of this study will help to improve the overall physical health of black female athletes. The findings also emphasize the importance of a comprehensive approach that considers social and individual factors to address gaps in health and promote fair practices in sports and physical activity.

Residual Resistivity Measurements of Superconductive Materials

Presenter's Name: Quentin Taylor
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Presentation Type: Oral Presentation
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Superconductive materials have many applications relating to sustaining connections and protecting electronic equipment under extreme conditions. Part of a substance's conductive properties can be obtained by finding its residual resistivity ratio(RRR). It is possible to quickly test RRR and superconducting transition temperature (STT) for copper and niobium. Knowing the conductive properties of a material at critical temperature(Tc) can prove helpful when looking at a sample. By taking the ratio of the electrical resistivity of the material at room temperature(300K) over the electrical resistivity of a material at Tc (normally 0K) RRR can be determined. This experiment outlines a method for testing the RRR of materials; namely copper and niobium using a four-point probe method to measure the voltage of a current in a material compared to the source's original charge and find the resistance of said material. Theory results show that the resistivity of copper will gradually diminish to 0.020 ohms before leveling off at that resistance, no matter how close the temperature of the copper sample approaches 0K. Meanwhile, niobium's resistance will decrease with temperature until it reaches below 9K. At this point, niobium should read a resistance of 0.000 ohms or a value very close to it, because of niobium's well-documented superconductivity. The RRR of niobium should be an order of magnitude smaller than the RRR of copper as the RRR of niobium will essentially be 0.

A simple benzothiazole-based sensor for cyanide detection and its applications in environmental and bioimaging

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The toxicity of cyanide ions to living organisms and the environment has led to numerous research efforts focused on developing methods for its detection and quantification. In this study, a simple, sensitive, selective, and cost-effective CN− sensor based on naphthol-benzothiazole (SU-1) conjugate has been designed and synthesized. The structure of SU-1 was confirmed by 1H-NMR, 13C-NMR, High-Resolution Mass Spectrometry (HRMS), and single crystal X-ray diffraction studies. Its optical properties were studied, revealing that SU-1 showed a colorimetric and fluorometric response. The change in color from deep red to colorless has been seen by naked eye with a ~99 nm red shift in absorption spectra upon CN− addition, due to the nucleophilic attack of the CN− on the double bond in the benzothiazolium ring. The LOD was calculated to be 0.23 μM in aqueous solution, significantly lower than the permissible concertation of CN− in drinking water determined by the WHO. SU-1's practical applications were demonstrated on environmental water samples and fluorescence imaging of the CN− in Hella cell lines.

Bioremediation of radioiodine contamination via Shewanella Oneidensis MR-1 – a kinetic and design study.

Presenter's Name: Tochukwu Uyanne
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Radioiodine-129 contamination of the Columbia River has had serious effects on the ecological health of the area and the quality of life of thousands of people who depend on the Columbia River system. Radioactive waste leaking from the Hanford site, a decommissioned nuclear weapons plant, has contaminated the area with over a million gallons of radioactive waste. Research has shown that Shewanella Oneidensis MR-1, a gram-negative bacterium, can reduce heavy metals like silver, lead, and uranium via microbial dissimilatory reduction. In this study, we hypothesize that S. oneidensis can be used as a microbial reduction agent within a bioreactor to reduce radioiodine content in wastewater. Early results suggest that S. oneidensis can reduce radioiodine by up to 27% over 24 hours. Our present study investigates the associated kinetics parameters that govern the rate of reduction of this process in the presence of planktonic S. oneidensis cells. In addition, our study also investigates extended reduction to assess the reduction potential of planktonic S. oneidensis cells past the 24-hour mark. Finally, using the generated data, our study considers the design and evaluation of batch and continuous reactor systems for the removal of radioiodine from wastewater with planktonic Soneidensis cells as the microbial reduction agent. The results of this work can lead to the commercial scaling and deployment of bioremediation reactors to address radioiodine contamination at the Columbia River and other places experiencing heavy metal pollution.

Modeling Aerosol Microphysics in Ice Giant Atmospheres

Presenter's Name: Ashley Walker
Classification: Graduate Student
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The atmospheric composition of the ice giants, Uranus and Neptune, encodes key details of their formation and evolution, and also informs our understanding of exoplanetary systems. An important component of ice giant atmospheres are the clouds and hazes that impact atmospheric radiative transfer, dynamics, and chemistry, and are often used to track wind speeds and direction. Condensation of methane and hydrogen sulfide are thought to form the observed cloud layers in the troposphere, while hazes likely composed of higher order hydrocarbons are seen in the stratosphere. In this work, we use the 1D Community Aerosol and Radiation Model for Atmospheres (CARMA) to simulate the aerosol distributions, processes, and interactions in the atmospheres of Uranus and Neptune. CARMA computes the size and vertical distribution of aerosol particles given material properties such as saturation vapor pressure and surface energy, and allows for the nucleation of one material on another. Here we will present our initial results showing how CARMA treats different ice giant condensates after we input them into the base model. For our future work we plan to simulate the stratospheric hazes and tropospheric clouds separately, then assess how they interact with each other, such as whether the former can provide nucleation sites for the latter. We will also evaluate the role of meteoritic material in nucleating aerosol layers.

Tactical Decision Making, A Large Language Model

Presenter's Name: Christopher Watson
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At the Howard University Institute for Human Centered Artificial Intelligence (HCAI), we are concerned with creating innovative technical solutions that are informed, inspired by, or directly involve humans surrounding AI. Tools that will inform and improve effective decision making and training experiences, such as the Tactical Decision Making Under Stress (TADMUS) large language model. TADMUS refers to the process of making important decisions in high-stress situations, particularly in a military context. Tactical decision making involves the assessment of an environment and its actors to effectively control a given situation. Due to the profound impact stress can have on the body & mind during emergency situations, it is critical for military personnel to remain focused and competent. This presents a challenge for military branches in how to properly equip their units with tangible, utilitarian information in the field. The TADMUS research team under HCAI@Howard will explore how a large language model addresses this problem.

Variation of the Moon's Solar-Induced Hydrogen Cycle during Solar Storms

Presenter's Name: Kennedi White
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School/College: Arts & Sciences
Presentation Type: Oral Presentation
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Observations of surficial OH/H2O in regolith grains on the Moon's surface indicate variability on diurnal timescales consistent with the variability of the solar wind proton flux and local surface temperature. Recent Monte Carlo models accounting for hydrogen diffusion and the degassed H2 exosphere support the theory of solar wind implantation being the primary driver of the lunar hydrogen cycle. In this presentation, we will report modeling results of the dynamical response of surficial OH content and the H2 exosphere during three unique Coronal Mass Ejection (CME) events, for which the proton flux can be a factor of 20 larger than nominal solar wind conditions. Observations of the response of hydrogen in the lunar environment during the solar storm events would provide strong support for solar wind implantation being the principal mechanism producing surface OH content and H2 exosphere.

SOCIAL SCIENCES

¿Quiénes somos? The Representation of the Latino Identity in the "¡Presente! A Latino History of the United States" Exhibit
Presenter's Name: Lillian Agosto Maldonado
Classification: Graduate Student
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Presentation Type: Poster Presentation
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Museums are defined as "powerful identity-defining machines" (Duncan, 1995). Through art and cultural artifacts, they tell the story of communities and represent their identity and history. Applying Stuart Hall's definition of representation as the study of language and meaning-making (1997) and Peter Burke's identity concept as a set of meanings that let people know who they are, as established in identity theory (2009), this article describes the representations of Latino identity at "¡Presente! A Latino History of the United States," the first exhibition of the Smithsonian's National Museum of the American Latino. Results based on this qualitative research positioned the representation of Latino identity in the United States as diverse, complex, and dynamic. This article demonstrates how relevant museums are as cultural institutions to telling the story of communities contextualized in social, political, and historical backgrounds. By examining the exhibit cases and interactive displays, there is an opportunity to learn more about Latino history as a heterogeneous social group in the United States.

The United States Supreme Court and Public Opinion
Presenter's Name: Carlos Aguilera
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Presentation Type: Oral Presentation
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The Supreme Court holds a unique position within the American political system, wielding immense influence over the nation's legal landscape. Equally significant is its interaction with public opinion, which shapes and is shaped by the Court's decisions. This research investigates the relationship between the Supreme Court and public opinion, examining how the Court's rulings, institutional factors, and socio-political contexts impact public attitudes and perceptions. Additionally, this research employs quantitative analysis of data, examination of public discourse and opinion, and analysis of public opinion polls, examining trends in attitudes towards the Supreme Court and its rulings over time. By explaining the mechanisms through which the Court influences and is influenced by public sentiment, this research will enhance our understanding of the role of the judiciary in American democracy and the broader dynamics of legal and political legitimacy. This is an exploration of the historical evolution of the Supreme Court's role in American society and its influence on public opinion. This study identifies factors that contribute to fluctuations in public approval and disapproval of the Supreme Court over time. It also examines the role of media, interest groups, and political actors in framing public perceptions of the Supreme Court. The research dives into the impact of landmark Supreme Court cases on public attitudes towards key social, political, and legal issues. Lastly, this study investigates the role of public opinion in shaping the legitimacy and authority of the Supreme Court as an institution.

Does the trauma stop if the oppression never does? A phenomenological review
Presenter's Name: Mariem Ahmed
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This paper examines the non-Western, specifically Arab Middle Eastern and North African, understanding of trauma. With continued marginalization and oppression, Arab people do not fit the criteria for Post-Traumatic Stress Disorder (PTSD) as defined in the DSM-V. Does the trauma stop if the oppression never does? To gain an understanding of how Arab people process trauma, this study analyzes the lived experiences of Arab writers who survived war and political turmoil. Current research on the topic mainly places the traumatic event(s) as an individualized experience of the past, without consideration of the collective and continued trauma. As war and political unrest continue to displace and traumatize people in the Middle Eastern and North African (MENA) region, this question becomes more relevant than ever before. This study aims to form a preliminary understanding of the topic and create a foundation to inform further studies in the future on how to accurately and effectively treat people from a non-Western background who have experienced traumatic events.

Fintech and Women Empowerment, the Role of Digital Finance on Labor Market
Presenter's Name: Hanadi Alabaad
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Presentation Type: Oral Presentation
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This research aims to empirically investigate the impact of financing through digital platforms on the female labor force participation rate (FLFPR) and female-to-male labor participation rate for 110 countries. The study covers a period from 2013 to 2019 and utilizes a dataset compiled from the Cambridge Center for Alternative Finance, the World Bank, and the United Nations Development Programme. The empirical approach in this study employed a Fixed Effects estimation method to explore the nexus between the variables at a macro-level analysis. The results indicate robust evidence that digital finance promotes female labor entry, particularly regarding the effect of digital lending. A one

percentage point increase in digital lending implies a 0.0795 and 0.102 increase in FLFPR and female-to-male participation, respectively. Moreover, female labor in the service sector shall positively and significantly augmented on average by 1.368 as a result of the increase in digital lending. Thus, policymakers should consider implementing and regulating such policies that facilitate women's accessibility and usage of digital finance to mitigate labor market entry barriers for women seeking work.

The Implementation of the United Nation's Right to Food: A U.S. Food Bill of Rights

Presenter's Name: Jordan Alexander
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Presentation Type: Poster Presentation
Faculty Advisor: Chimene Castor
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The UN's Right to Food Initiative asserts that every individual is entitled to safe, nutritious, and culturally appropriate food, positioning food as a fundamental human right. This global effort aims to enhance food security, eradicate hunger, and improve nutrition worldwide. By recognizing food as a basic human need rather than a mere commodity, the initiative addresses food insecurity as a matter of social justice, emphasizing the importance of equitable access to food for all. This study evaluates the impact of the United Nations Right to Food Initiative on food access and the global economy by comparing conditions before and after its implementation. It seeks to assess the initiative's effectiveness in enhancing food security, reducing hunger and malnutrition, and promoting economic development. The study will conduct a systematic literature review, examining academic articles, reports, and policy documents related to the initiative. Utilizing resources such as WorldOrganization.org, PAHO.org, Scholar.google.com, and PubMed, the review will focus on keywords like "food sovereignty," "right to food," and "food security." The findings of this study will underscore the importance of the United Nations' recognition of the right to food and its implications for global food security. Additionally, the study will draw parallels between the success of the Right to Food Initiative and the potential benefits of implementing a United States Food Bill of Rights.

Vicarious racial discrimination and alcohol use behaviors among Black college students: A mixed methods approach

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In the United States, people are expected to fall into a racial social hierarchy with Whites at the top as the dominant group, and people of color at the bottom, including Black individuals. Among marginalized racial groups, Black individuals experience significant racial discrimination. Evidence demonstrates that racial discrimination contributes to a myriad of dire physical and mental health outcomes among Black individuals including alcohol use behaviors. A striking pattern of alcohol use and related consequences exist within the Black community; despite equivalent or lower levels of alcohol use, the rate of drinking consequences for Black individuals exceeds that of their other racial counterparts. It is noteworthy that racism exerts its influence not only through direct personal experience but also via the secondhand exposure to the racial discrimination directed at another same-race individual, that is, vicarious racial discrimination. Black college students may be a population at risk to the exposure, and subsequent damaging effects, of vicarious discrimination given the wide usage of the internet and social media. The proposed study seeks to enhance our understanding of the paradoxical alcohol patterns among Black persons by examining the role of vicarious racial discrimination. Specifically, using a measurement-burst design (that is, daily-assessments alongside prospective assessment), the study aims to examine the exposure to vicarious racial discrimination, as well as the relationship between alcohol use behaviors and negative drinking consequences in response to vicarious racial discrimination. This is the first study to prospectively examine the relationship between vicarious racism and alcohol outcomes among Black individuals.

Disciplinary Rebels: A Reckoning with Black Knowledges

Presenter's Name: Samuel Anthony
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Presentation Type: Oral Presentation
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Interdisciplinarity is the contemporary ceiling limiting our ability to conceptualize epistemological liberation; what it might look like existing beyond the chaos for what we assume has always existed as a necessary way of intellectual governance. It is the veil, mask, and cloak that precepts the colonial canons of "knowledge in its totality." It may have been comfort, "privileged elite status," or the mere fact that we have won the battle to render African Deep Thought from non-existence, but today many of us have shown an unwillingness to interrogate the master narratives, the total beings, and their foundations of knowledge. Interdisciplinarity, and the foundations of the structures of academic knowledge, in regards to Africana studies, "was not, however, a definitive or ultimately satisfactory solution." Though we have won these spaces within the withering academy, the aim of Africana studies is still not fulfilled. Thus, in what ways does Africana studies today seek to "break the bounds" of this "misdirection?" How have we allowed the "preservation of ontological totality" to show up in the productions of offerings that "move its boundaries beyond the borders of academia?" What tools are we committed to generating for the purposes of establishing an intellectual grounding in what lies beyond the intellectual wasteland that underpins the western world today? Disciplinarity, in its totality, and very nomenclature, absorbed itself into the Africana studies space and remains unchallenged at large.

The Howard Movement: Collective Action Framing Amongst Howard University Student Protestors

Presenter's Name: Shane Appiah
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Presentation Type: Oral Presentation
Faculty Advisor: Michael Ralph
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Using the sociological comparative historical approach and primary source analysis of The Hilltop Student Newspaper, I argue that through the process of collective action framing, student protestors draw on collective memory and collective identity to link past and present protests. Through informing The Hilltop Student Newspaper staff writers and public media, Howard University's 2021 #BlackburnTakeover Protest and September 4, 2009, protestors claimed the administration was responsible, held rallies, and drew on past protests. Furthermore, they create slogans, unify with the faculty and staff as well and encounter internal and external disputes to frame the events in a manner that benefits their campus protests' objectives. This research expands the literature on social movement theory, collective memory, collective identity, and framing by exploring collective memory and identity on a singular college campus across time as well as providing insight into how student protestors construct campus movements.

Bridging The Great Divide: Rectifying Political Polarization

Presenter's Name: Jaedon Arnasalam
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Presentation Type: Poster Presentation
Faculty Advisor: Robinson Woodward-Burns
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This thesis seeks to examine the contributing factors to the political division and tension between political parties in the United States. The research attributes the tension and division to the existence of the two-party system. A literature review was conducted that focused on works that sought to understand and analyze political polarization. In their analyses, the authors presented their findings and contended that there are a variety of ways that polarization could be fixed. However, this thesis seeks to not only cross-examine those findings but also simultaneously propose a new solution. The elimination of gerrymandering and the implementation of proportional representation are the ways in which this thesis contends that polarization can be fixed.

Family-Based Multiple Minority Stress Model: Queer Young Adults of Color Coping with Stigma

Presenter's Name: Oluwatimilein Bamgbola
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Stigma has been noted to have negative effects on Queer Young Adults of Color (QYAoC). As Meyer (2003) stated, QYAoC frequently experiences stress from social structures - racism, heterosexism, and cissexism - put in place by the dominant structures, could lead to detrimental effects on mental health. (Bowleg, 2008; Meyer, 2010) found that people who have a visible minority status - such as race and gender - tend to have increased resilience regarding oppression for their sexual/gender identity in comparison to their counterparts. QYAoC resilience is also strengthened by familial support concerning their sexual/gender identity. The Family-Based Multiple Minority Stress Model intersects three frameworks: family-systems approach, minority stress model, and intersectionality framework. Based on the prior approaches, the family system positively impacts the resilience of QYAoC when encountering distal and proximal minority stressors. This model states that family support can increase the self esteem of the racial and sexual minority individual and assist in developing healthy coping mechanisms such as befriending other QYAoC, aiding them in being resilient to the distal minority stress, (e.g. peer victimization). This reduces the likelihood of the individual developing proximal minority stress, as there is an increase in self-acceptance of their sexual identity and being open with their identity. This model also addresses that family rejection is a form of distal minority stress. This rejection of the individual has a higher chance of the QYAoC developing lower self-esteem, increasing the likelihood of psychological distress. Psychological distress could lead the adult to develop proximal minority distress.

The Oppressive Violence that Begets Resistance: Uncontentious Politics and the Democracy Dilemma

Presenter's Name: Marcus Board Jr.
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Any approach to addressing democracy must omit select institutional, interpersonal, and ideological points of view. Oppressions, however, persist in democracies when these omitted points of view are consistently neglecting the same people (Board 2022; Lukes 2004; Gaventa 1982). Therefore, we have a compelling reason to be very specific when both defining and problem-solving democracies: so that we do not reproduce the same failures. In this paper, I address rising concerns around fascism in the U.S. and particularly the efforts to reify democracy through what I call uncontentious politics or the uncontentious counternarrative. I ask who is being neglected when a democracy is rejecting contentious politics and what do uncontentious politics mean for oppressions? Using my 2022 Black Pluralism Survey (n= 1526), I hypothesize that respondents rejecting both contentious politics and #BlackLivesMatter will reject democratic commitments to political accountability, inclusion, pluralism, and combatting misinformation. Regression analyses support my hypotheses. Compared to those supporting the M4BL, the uncontentious respondents are significantly likely to embrace Black capitalism (e.g., Black business as a means of overcoming), reject descriptive representation (e.g., Black elected officials and judges as a means of overcoming), deny the political advocacy of Black feminists and Black transgender communities, refuse COVID-19

vaccinations, and reject police abolition or reform. In this sense, the uncontentious counternarrative look less like thriving democracy and more like nihilism and disillusioned liberalism (see DuBois, Nietzsche, Dawson). These findings suggest that uncontentious counternarratives are furthering democratic dilemmas and neglecting historically oppressed communities.

Influences Beyond the Intersection of Race and Socioeconomic Status on School Performance

Presenter's Name: Mharisi Bonner
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This research study delves into the complex factors influencing the underperformance of Black children in the American education system, expanding beyond the conventional examination of race and socioeconomic status. It explores the complex interplay between race and income through extensive literature reviews, revealing persistent achievement gaps even within comparable economic contexts. Compelling findings indicate that Black children from affluent backgrounds can outperform their White counterparts, emphasizing the significance of familial wealth. However, the importance and influence of parental education over household income, advocating for a broader consideration of parents' educational backgrounds and resources, must also be highlighted. In addition to economic factors, the research explores the crucial role of teacher-student relationships, illustrating how these interactions can impact academic achievement. The study also examines the resilient mindset of Black and African American students, who maintain high expectations for success despite internalized negative messages. In conclusion, this study calls for a paradigm shift from a narrow focus on race and socioeconomic status to a comprehensive examination of systemic issues within the education system. Insights into teacher beliefs, societal perspectives, and broader contextual factors provide a foundation for designing more effective interventions to address the persistent educational disparities faced by Black children in the United States.

Examining Healthcare Disparities And The Psychosocial Factors That Contribute To Concussion Underreporting For Black Athletes

Presenter's Name: Autumn Boone
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Presentation Type: Poster Presentation
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Concussion underreporting contributes to challenges in care for student-athletes. Clark & Stanfill (2019) identified common barriers that athletes used to explain the underreporting of concussions. Barriers included the fear of losing playing time, not taking the injury seriously, a fear of letting one's team down, and a lack of knowledge of concussion signs and symptoms. Concussion reporting is an issue among athletes of all racial/ethnic backgrounds; however, current findings indicate that Black athletes present with lower instances of concussion reporting as well as less awareness and knowledge of concussion symptoms as compared to their White counterparts. In addition, Black athletes reportedly are more likely to lack health insurance and less likely to receive a concussion diagnosis if they go to the hospital (Wagner et al., 2020; Wallace, Biedler, Kerr, et al., 2021; Wallace & Mannix, 2021; Wallace et al., 2020;). Overall, Black athletes experience greater levels of disparity in healthcare access and overall care. Unfortunately, Black athletes are also reported to have poorer post-concussion outcomes following brain injury (Arango-Lasprilla et al., 2007). Therefore, an in-depth analysis of concussion reporting must be conducted to gain a better understanding of Black athletes' and athletic stakeholders' knowledge and perceptions. The aims of this study are to 1) analyze concussion reporting practices among Black athletes and athletic stakeholders including speech-language pathologists, athletic trainers, and coaches; 2) examine the psychosocial factors associated with healthcare disparities and identify relationships to attitudes surrounding concussion reporting; and 3) identify strategies to increase concussion reporting among Black athlete.

Reparations in the United States & Why These Words Sound So Foreign in the Same Sentence

Presenter's Name: Ishinae Briggs
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Ana Lucia Araujo
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This paper seeks to reveal any, if there are, connections between various failed attempts in the US for both direct survivors and descendants of the enslaved African people. Throughout the paper, I will explore a few example cases, and the specific details of why they ended up not working; from the agendas of the individuals in power at these times, to the nuances that can only be unpacked through extensive research.

Advocacy among Black mothers whose children and immediate family members were murdered by gun violence

Presenter's Name: Denzell Brown
Classification: Graduate Student
School/College: Other
Presentation Type: Oral Presentation
Faculty Advisor: Shareefah al uqdah
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Black parents are disproportionally affected by gun violence (Huggins et al 2021; Sharpe & Boyas, 2011). Moreover, Black parents and families' psychological experiences with post-traumatic stress and grief are often different from those of Caucasian parents (Laurie & Neimeyer, 2008). Five years post-loss, Black parents who lose children to homicides experience higher rates of post-traumatic stress, and complicated grief, and often struggle with multiple co-morbidities such as gastro-

intestinal problems, insomnia, and cardiovascular complications (McDevitt-Murphy et al, 2012). Race-based stigma and other systematic disparities such as wealth inequality, discrimination in the criminal justice, and racial profiling are all key factors that impact Black parents' access to legal and social support networks after losing a child to gun violence (Lawson, 2013). Despite these systematic challenges, Black parents who have lost their children to gun violence often find alternative ways to manage the intrusive and destabilizing impact of post-traumatic stress and chronic prolonged grief without sufficient access to culturally responsive and comprehensive psychological services using social justice activism and homicide-specific-coping strategies (Sharpe & Iwamoto, 2022). This study will use a qualitative narrative inquiry analysis to examine themes that emerge among Black women who lost children and immediate family members to firearm injuries and their lived experiences with advocacy. The findings of this study reveal that community organizing, familial support, fundraising, and unity are all important themes and factors that contribute to Black women and families' healing process after experiencing the death of grandchildren, spouses, and siblings due to gun violence.

Examining Cultural Responsiveness in Concussion Management and The Roles of Interdisciplinary Team

Presenter's Name: Cassandra Brown
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Athletes who are racially/ethnically diverse may experience more significant challenges after sustaining a concussion due to disparities in access to care and levels of care. Consequently, healthcare disparities are most evident for those who identify as Black, particularly for emergency room visits in which the concussion diagnosis, if given, may not be appropriate (Wallace & Mannix, 2021). There is a significant lack of research centered on racially/ethnically diverse populations with concussion in the field of speech-language pathology which has contributed to a lack of culturally responsive assessment materials and methods. Much of the literature related to racial disparities in concussion management is found in sports medicine and neuropsychology and primarily addresses Black and White differences for awareness and knowledge of concussion symptoms and the consequences, injury reporting, and emergency department visits. (Wallace et al., 2021). The field of neuropsychology has some concussion research focused on race/ethnicity; however, one must be aware of racial bias in the methods and findings of the studies. There are no studies that address cultural responsiveness in concussion management. Therefore, this presentation aims to analyze 1) the benefit of the interdisciplinary team for concussion including the speech-language pathologist, the neuropsychologist, and professionals in sports medicine; 2) current concussion management practices for persons who are racially/ethnically diverse; and 3) provide culturally sensitive and responsive considerations for the interdisciplinary concussion team.

Honors Program Faculty Fellow Course Innovations- Shaping Future Leaders through Academic Innovation

Presenter's Name: Latanya Brown-Robertson
Classification: Senior Faculty
School/College: Arts & Sciences
Presentation Type: Oral Presentation
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The panel discussion and breakout session features the College of Arts and Sciences Honors Program's Inaugural Honors Faculty Fellow Cohort's innovative pedagogies being tested through Honors courses in COAS. This event highlights the diverse range of classroom innovations across various disciplines, including data science, AI reparations, digital humanities, medical pathways, Colombian communities, and crime and (in)justice in Paris. Topics will not only reflect the cutting-edge research and teaching methods being employed but also the interdisciplinary approach taken by the Honors Program to enrich students' academic experiences. This discussion aims to explore how these innovative course ideas can enhancing the larger educational landscape.

Subcontinental Identity: A Comparative Qualitative Analysis of the Effects of Tribal and Caste Identity on Marriage Attitudes in Northeast India and North India

Presenter's Name: Angel Bryant
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: LaTanya Brown-Robertson
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Marriage attitudes in India are deeply tied to tribal and caste identity. Due to historical and cultural influence, differing marriage practices in India are manifested through its geographic regions. This research will undergo a comparative analysis of previous research to answer the question of how tribal and caste identity impact the distinct marriage attitudes in the regions of Northeast and North India from a historical and cultural perspective. When compared to North India, the findings reveal that the Northeast region, which is dominated by tribal and indigenous systems, is often an outlier among its mainland counterparts, especially when it comes to the traditional hallmarks of an Indian marriage. As India continues to amass influence and population in the world, future research should undergo a more disaggregated approach towards examining Indian culture by region.

Comforting the Comfort Women: An Analysis of the Japanese Response to Redress

Presenter's Name: Kelaiah Carey
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
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During World War II, the Japanese Imperial Army organized the ianfu, or "comfort women", system which forced approximately 200,000 Asian women into sexual slavery in military brothels. These women were abducted and or coerced from their homes and taken to Japanese occupied territories throughout East and Southeast Asia. Many women suffered beatings, venereal disease, forced sterilization, and other medical and psychological issues due to their treatment, with the majority dying in captivity. In 1991, a group of former Korean comfort women filed a lawsuit against the Japanese government demanding an official apology, monetary compensation, and greater awareness and education on the issue. While other lawsuits followed, the redress movement was generally met with a lack of accountability and atonement from the Japanese government. To this day, an official apology has not been issued leaving comfort women without adequate indemnification. This paper will analyze the inadequacy and implications of Japan's response to the legal redress movement. Moreover, this paper will question the role of gender and class in shaping the comfort women issue as well as how sufficient redress can be achieved.

Evaluation and Analysis of Physical Touch Deprivation on Quality of Life
Presenter's Name: Zoë Coffman
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Davis Dixon
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Healthy and affectionate physical touch has long been understood to have a positive impact on child development. It is known that physical touch, through physical contact or closeness, can create feelings of affection, comfort, and psychological well-being. Further, research suggests that physical touch increases one's sense of well being and decreases stress reactivity (Jakubiak et al., 2016). However, there is limited knowledge about the impact of physical touch in adulthood, despite its natural prevalence in human and animal development. While research has explored the long-term effects of physical touch deprivation during early development, there are still gaps in the data with regard to the effects of physical touch on quality of life. (Hasenack et al., 2023). In addition, despite significant research on the social and psychological response to physical touch, little correlation has been made to Quality of Life (Hasenack et al., 2023). The aim of this study is to investigate the broader relationship between physical touch and quality of life through a survey that employs a descriptive research design. By providing more data on the possible relationship between physical touch and quality of life, this study will contribute to the existing research in this field. The relevance of this research has grown significantly following the Covid-19 Pandemic, drawing further attention to the impact of physical touch (Von Mohr et al.,2021). Additionally, this study will contribute to future research on the effects of physical touch on development and contribute towards finding solutions to improve the overall quality of life.

Black Immigrants as the New Model Minority
Presenter's Name: Inga-Marie Cohen
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: James Barden
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By exploring the model minority stereotype attributable to Black immigrants in the United States, the paper seeks to understand Black immigrant identity and sense of community with African Americans. Through an outline of model minority stereotypes attributable to Asian Americans, it will be asserted that Black immigrants can be considered a model minority. Whether a Black immigrant holds to the model minority stereotype will influence their perceptions of African Americans and vice versa. Also, a Black immigrant's kinship with their racial identity will indicate the sense of community one feels with African Americans. Such research is fundamental to understanding the insidious nature of the model minority stereotype on dividing the Black diaspora and African Americans in the United States; through research across multiple fields and interviews, the findings indicate that Black immigrants can be attributed to the model minority stereotype. The stereotype has more drawbacks for Black immigrants, including isolation from African Americans. The paper will find that building community and breaking down barriers is the best defense against the model minority stereotype.

Digital Drag: Impression Management and the Intersection of Identity and Performance on Social Media
Presenter's Name: Jabari Courtney
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
Faculty Advisor: Kehbuma Langmia
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The advent of social media has now given humans more control than ever over how they express their identity. This research will observe the evolution of human socialization and how our access to knowledge and human connection via modern media affects how we develop. The study will analyze young people's opinions on social media concerning how it is a tool for individual expression and identity development. The research will reflect the current state of society and how to help sociologists and communication specialists as they study modern human interaction and its evolution due to the development of modern media. It can also contribute to the concentrations of advertisement and academia as these shows showcase current social dynamics. Researchers can use this information to draw conclusions about ever-evolving socialization. As young people serve as the frontline of the digital frontier, there will be a significant focus on how their social media presence impacts their developing identities. The methodology for the present study will entail a quantitative analysis of young people ages 17-22. This research will utilize the social identity theory as a framework to examine social media's role in understanding and expressing modern identity. The study

will include questions related to identity, media consumption, and ideas on societal structures. The researcher will compare the results to the highlighted concepts of media that will be the focus of the study.

Unraveling the College Wage Premium: Sectoral Disparities and Temporal Dynamics

Presenter's Name: Chad-Alex Dennis
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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The rising costs of tuition and increasing student debt has sparked debates about whether college education is a worthwhile investment. To better understand the college wage premium and the varying returns across different educational institutions, this study analyzes data from the College Scorecard and incorporates insights from Webber (2022) and Itzkowitz (2021). It focuses on comparing the earnings outcomes of students from non-profit and for-profit colleges. Through rigorous analysis, this paper uncovers patterns in the returns on investment across different sectors of higher education. The research uses decomposition techniques to examine changes in the college wage premium over time and identify evolving trends and disparities. The study also considers graduation rates and other outcomes to provide a comprehensive understanding of the impact of educational choices on economic outcomes. The findings offer valuable insights for policymakers, students, and families who are making decisions about higher education. By examining the complex relationship between institutional sector, temporal dynamics, and economic returns, this research contributes to the ongoing discourse surrounding the efficacy of educational investments. It underscores the importance of informed decision-making in navigating the contemporary educational landscape.

Masc Scripts, Masked Men?: A Review of Early Findings on a Study Examining Self-Gender Policing in Gay African American Men

Presenter's Name: Courtland Douglas
Classification: Graduate Student
School/College: Education
Presentation Type: Oral Presentation
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In the United States, men are expected to adhere to masculinity norms. Gay African American men are socialized according to masculinity standards in the U.S., are measured against them, and may internalize associated ideology. In an effort to meet these standards, gay African American men may engage in self-gender policing (SGP): changing or avoiding behavior and expression that could be perceived as feminine or making attempts to present oneself as masculine. The present study explores the lived experiences of gay African American men who self-gender police. The study uses Interpretative Phenomenological Analysis (IPA) as the qualitative research method of choice. The researcher conducted semi-structured interviews with six gay African American men to learn about their experiences of SGP. Preliminary data analysis reveals themes related to reasons for SGP, the experience of SGP, perception of success versus failure in meeting masculinity standards, and the influence of cultural identity on SGP. Avoidance of harassment, concealment of sexuality, change in dress and mannerisms feelings of inauthenticity, anger, sadness, desire for inclusion, esteem concerns, and the influence of ethnic identity are some of the themes which appear to be consistent across narratives. Findings from the completed study will be valuable in advancing masculinity discourse, informing psychological practice with gay African American men, and raising awareness of self-gender policing and its unique meaning for the population of study.

Childcare Voucher: A Qualitative/Pilot Study, Exploring the Experiences of Expectant and Parenting Teenage Mothers in Washington, District of Columbia (DC)

Presenter's Name: Nkechi Enwerem
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Coauthors: Nkechi Enwerem,Zillah Wesley, Davene White

Objective: The aim of this study is to use human-centered design and journey mapping to explore the experience of Expectant and Parenting Teens in the District of Columbia (DC) in accessing childcare while attending school and/or seeking employment. Methods: In-depth interviews were conducted with 20 young mothers who had experienced teenage pregnancy and 10 providers assisting young parents in accessing support services, including childcare. Journey map interview guide (Table 1) was used for this interview. Interviews were audio recorded and transcribed verbatim to ensure that the participants' statements were maintained in the transcripts. A thematic analysis was used to examine data and themes arising from the interviews. Open and axial coding was used to code the interview transcripts and organize them into categories and themes following an inductive and deductive approach. Results: The design team conducted 30 deep-dive interviews with 20 young parents (ages 18 - 25) and 10 providers assisting young parents in accessing support services, including childcare. The young parents interviewed were majority Black (66%) and Hispanic (19%), and largely live in wards 7 (33%) and 8 (28%). Their children's average age was 4 years (range 2 months -8 years). Discussion and Conclusion: Three main themes and categories were identified as (1) Motivation to finish high school and find employment, (2) Challenges of accessing childcare voucher and quality childcare (3) Support staff (school councilors) experience.

How natural resources affect GDP growth in Nigeria
Presenter's Name: Chisom Eze
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This paper aims to explore how natural resources affect Nigeria's economic growth. Since the GDP growth rate is a significant economic growth indicator, it is used in this paper as the main dependent variable. In exploring this question, Nigeria is compared to two other countries, Ghana and Saudi Arabia. One might think the abundant natural resources should have a positive correlation with GDP growth. But, this study shows that natural resources rent has a negative relationship with GDP growth rate when inflation, gross capital formation, population growth, and trade openness are accounted for.

Personality Factors as a Preliminary Indicator of Wellbeing
Presenter's Name: Iman Ferguson
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Mindfulness tendencies have a large impact on wellbeing, physically and psychologically. However, there is a gap in literature on how personality factors can influence one's well being. In this study, the goal was to see if the two Big Five personality factors that correlated most heavily with mindfulness, Neuroticism and Openness to Experience, had any impact on the general health perception and physical and mental health subsets of wellbeing. Pro-inflammatory biomarkers Interleukin 6 (IL-6), Interleukin-1 alpha (IL1A), and C-Reactive protein were used as mediating factors. The data analyzed comes from the Gholson 2015 Stress and Psychoneuroimmunology Factors in Renal Health and Disease study sample of 129 African American participants, with a mean age of 44.4 years. Participants completed the Neo-Personality Inventory, SF-36 (Short Form Health Survey for Quality of life), and underwent tests for immune markers. It was found that both Openness and Neuroticism have significant direct and total effects on mental health; neuroticism had an inverse relationship. Additionally, numerous significant A-path relationships were found between predictor variables and some of the mediators, most notable being C-Reactive and IL-6. These findings help to highlight the implications of how predisposed personality factors can influence one's physiological state and health. There is potential to see which people might be more susceptible to health issues due to their personality and their perception of wellbeing. Further research needs to be done to account for other variables, possible moderators, and if there can be a predictive nature of the effect.

Black Migration and Political Influence in Hawaiian History
Presenter's Name: Jenesis Finks
Classification: Undergraduate Student
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This research project looks into Black People's history in Hawaii. What factors have historically led to Black migration to Hawaii and how have those factors changed. How has the black population in Hawaii influenced policy and political outcomes? I seek the answer to this question through research based on census data, book information, and academic sources like articles and dissertations. The literature tells the long history between black Americans and the Kingdom of Hawaii and how many presents day black residents mainly reach the island through military connections. Though Black people are only about 2% of the population, they still impact the political sphere. Not many researchers seek to learn about black history in Hawaii, so as a black woman and Hawaii resident this research will bring a new perspective to the field.

Cultivating Critical Consciousness in Youth: A Rapid Review
Presenter's Name: Yajaira Fleming
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Presentation Type: Oral Presentation
Faculty Advisor: Ezer Kang
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Background. In an era marked by rapid societal changes and growing awareness of social injustices, the role of education extends beyond traditional academic instruction. Educators may be tasked with fostering critical consciousness (CC) in young people that leads to their sociopolitical engagement. CC refers to the ability to recognize and act against oppressive structures. Objective. We provide a review of the pedagogical approaches used to enhance CC and promote sociopolitical action. While there is a wealth of scholarship investigating CC, promotion of engagement is lacking. We hypothesized that psychosocial support and experiential learning will be common themes among effective pedagogy. Methods. This review synthesizes research on pedagogical approaches for enhancing CC and promoting sociopolitical engagement among youth. Using a rapid review methodology, a single-reviewer strategy was employed to streamline analysis. Searches focused on English-language articles published between 2010 and 2023 in HU's databases. Inclusion criteria emphasized studies within educational and youth development settings, examining specific pedagogy impact on CC and engagement. Preliminary Results. Pedagogical models by which experiential and inquiry based learning promote reflection and understanding of systemic oppression are effective in fostering CC and sociopolitical engagement. Academic achievement, career enhancement, and positive mental health outcomes were explored in some studies, suggesting that these approaches do not exclusively support CC. Conclusions. Experiential inquiry and group reflection/dialogue are key to fostering CC and sociopolitical engagement. The lack of longitudinal studies examining the efficacy of CC pedagogy underscores the

importance of further research to explore promotion of sociopolitical engagement among youth.

A Study of the Militant Radical Black Womanist of the 1960s and 1970s
Presenter's Name: Logan Ford
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From the 1960s to the 1980s there were several large social movements in the United States- the Black Power Movement, and the Feminist Movement. The Black Power Movement had a goal of Black liberation, and the Feminist Movement had a goal of women's liberation, but there was not a set place for those who had a stake in both movements- militant radical Black women. Using a historical comparative case study, this research will examine why and how the MRBW came to be and their impact and importance today. I found that the MRBW became prevalent due to not finding a set space for women such as themselves. As such, they carved out their own space and became pioneers for other women like them through their leadership, examples, and writings. This study will help us better understand the integral aspect of intersectionality in revolutionary movements and figures.

Examining The Post-Concussion and Academic Learning Skills of B lack Student-Athletes: An Exploratory Study
Presenter's Name: Medora Frazier
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School/College: Arts & Sciences
Presentation Type: Oral Presentation
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Black, collegiate-level athletes in contact sports tend to make up high percentages of the teams and they are at higher risk for sustaining concussions as well as not being identified with post-concussive cognitive-communicative deficits. Often, Black athletes may not be assessed by a speech-language pathologist or may not receive culturally sensitive or responsive cognitive testing (Davis, 2023). Following a concussion, there is a significant concern for the physical, behavioral/emotional, and cognitive-communication symptoms that affect an athlete's ability to successfully return-to-activity. For Black athletes, cognitive-communication disorders can lead to greater challenges in academic, vocational, and social settings than for athletes from other racial/ethnic backgrounds. In addition, symptom overlap may lead to misdiagnosis if the process of differential diagnosis does not include interdisciplinary collaboration. Speech-language pathologists and neuropsychologists provide valuable insights into brain injury. Working together for concussion assessment will allow for a deeper analysis of skills and increase the accuracy of diagnosis. This is an exploratory design in which collegiate-level athletes who identify as Black were administered measures of cognitive processing and self-report measures for cognitive learning styles and academic learning strategies. The aims of this study were: 1) To assess the post-concussive cognitive performance of Black student-athletes. 2) To examine the overlap between cognitive-communicative symptoms and psychosocial symptoms. 3) To identify the influence of cognitive learning styles and academic performance among Black student-athletes. Preliminary data identifies post-concussion cognitive challenges and trends in self-reported learning strategies, as well as cognitive learning styles among Black athletes.

The Journey of the American Black Revolution and the Interlude of White Backlash
Presenter's Name: Shayla George
Classification: Graduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Keesha Middlemass
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While revolutions are romanticized through the American education system, a true revolution has not touched the nation's shores since its inception. Those who rule have secured their status–making revolutions obsolete–through the exploitation of the oppressed people who inhabit this land. Over the centuries, there have been attempts made to pillage all hope and possibility for revolution from Black people particularly; it is the adaptive nature of white supremacy that permits and encourages this. It is this system that allows white people to remain innocent within a government and society that are inherently guilty. Literature that connects this tradition to the failure and stagnancy of the Black revolution in America is rare. This thesis consists of a multitude of publications that research and analyze the history and timeline of Black oppression in the United States of America. It is through the linkage and cross-analysis of these writings that this thesis was completed. The included research found that white supremacy allows white people to leave loopholes in the policies and traditions that rule this land. This cruel malfeasance is orchestrated through ambiguity and the given perception of a law at any point in time; making policies and constitutional rights subjective and retractable instead of objective and inalienable. By realizing this a better path can be paved toward a realized revolution for Black people in America creating a foundation to further build upon.

Keywords: Black people, oppression, revolution, chattel-slavery, white supremacy, liberation, race relations, racism, commodification, abolition

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The Power of Clothes; How Black Activists Today Use Fashion as Rebellion
Presenter's Name: Nirvana Gomez
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Presentation Type: Poster Presentation
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The clothing we choose to wear has the power to make a significant political and cultural statement. It can be used, for instance, as a form of rebellion, particularly in the Black community. Throughout histo-

ry Black people have utilized fashion to further demonstrate their beliefs and send a message. In the 1960s, Black organizations such as the Black Panther Party and the Student Non-Violent Coordinating Committee (SNCC) purposefully used their clothing to uphold the values of their organizations and demonstrate how they wanted to be perceived. The Black Panther Party used leather jackets, pants, turtle necks, Afros, and guns to broadcast their militant look, while members of SNCC always dressed in their "Sunday best," to uphold their image of being approachable and non-violent. Today, fashion continues to be used to convey values by organizations such as Black Lives Matter (BLM). BLM activists make strategic choices in what they wear, depending on the occasion–video interview, protest march, etc. This study analyzed still pictures, interviews, and news clips depicting BLM activists and leaders to see how they present themselves in different contexts. Preliminary results suggest that there are clear differences in what they choose to wear that reflect the different values they want to project. This research sheds light on the effort these organizations put into showcasing their message beyond the words they use and demonstrates the importance of considering both verbal and non-verbal messaging components in assessing a group's impact.

"Rebuilding Together and Occupational Therapy: Lived experiences of OT students during a pilot fellowship program"

Presenter's Name: Selina Graham
Classification: Post Doc/Resident/Fellow/Research Associate
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Presentation Type: Oral Presentation
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Occupational therapy (OT) programs provide mandatory fieldwork learning placements to facilitate the enhancement of clinical decision making, professional development and growth, and hands-on application of OT intervention approaches for students aspiring to become OT practitioners. Fieldwork placements are typically offered in hospitals, outpatient clinics, schools, and skilled nursing facilities. However, non-traditional settings, such as community-based programs have the potential to offer lucrative and challenging experiences for OT students who seek to further enhance their leadership skills and promote OT-based concepts in places that lack the perspectives of OT practitioners. In a unique opportunity, four second year (level II) Master of Science in Occupational Therapy (MSOT) students at Howard University, a historically black college/university (HBCU), were selected to participate in the pilot launch of Howard University-Rebuilding Together Fellowship Program as their final level I fieldwork experience.

This study aims to examine a five-month long experience of four level II MSOT students who were selected to participate in the Howard University-Rebuilding Together Fellowship program. In this mixed-methods retrospective study, qualitative and quantitative data collected from student surveys and personal reflections will be analyzed to determine outcomes and impact of fellowship responsibilities (e.g., meetings, reports, workshops, site visits). Furthermore, it is anticipated that findings will also inform whether or not this pilot fellowship experience helped enhance their professional and educational development as future OT practitioners. The findings of this research study can help improve fellowship program design and promote development of similar nontraditional fieldwork experiences to better prepare future OT practitioners.

Trends in Firearm Related Deaths

Presenter's Name: Yasmine Griffiths
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Background: Firearm-related deaths constitute a substantial public health crisis in the United States, with studies reporting a rising rate in the past decade. Aim: To provide a comprehensive examination of trends in firearm-related deaths over a 55-year period and identify key risk and protective factors associated with firearm-related deaths in the United States. Methods: Cross-sectional study utilizing data from the Centers for Disease Control and Prevention's Web-based Injury Statistics Query and Reporting System (WISQARS) between 1968 and 2022 with a multivariate logistic regression model to identify trends, independent predictors of firearm-related suicides, homicides, and unintentional deaths, and intersectional factors of race and level of education. Results: Firearm-related death showed a fluctuating upward trend from 23,875 in 1968 to 48,205 in 2022, with firearm-related suicides accounting for a significant proportion of firearm deaths (45.7% in 1968 to 56.1% in 2022, peak of 63% in 2013). Individuals aged 10–19 years had the highest risk of firearm-related suicide (OR=3.04, 95% CI=2.92 - 3.16) and homicide (OR=2.87, 95% CI=2.77- 2.97). Whites with higher education had highest risk of firearm-related suicide (OR=1.42, 95% CI=1.40 - 1.45), while Blacks with lower educational attainment had the highest risk of firearm-related homicide (OR=6.68, 95% CI=6.50 - 6.87). Conclusion: Our findings underscore the urgent need for evidence-driven public health interventions and policies including suicide prevention strategies, focusing on means restriction and reshaping perceptions around firearm ownership. Comprehensive approaches which engage communities and address structural factors are imperative to curbing the challenges associated with firearm-related injuries and deaths.

Young Business Owners

Presenter's Name: Amajah Hall
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Presentation Type: Poster Presentation
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This study describes the ways in which social capital is associated with the growth rate of young entrepreneurs' business ventures in the city of Pittsburgh, Pennsylvania. It was designed as a pilot study after a review of the literature on young entrepreneurship. It was determined that this study would help bridge the gap in our understanding of the

relationship between entrepreneurship and social capital among young adults. Data on social capital and entrepreneurial success will be collected using a case study design that employs interviews with five young Black entrepreneurs between the ages of 18 and 24. An analysis of the differences between young entrepreneurs' foundational knowledge in business, understanding of the value of social interactions, as well as how they leverage their personal networks, utilize the resources available through social networks, and approach business opportunities within their respective fields and communities, will be conducted. It is expected that the economic success of any of the businesses owned and managed by the participants will depend on their social capital. It is hypothesized that young entrepreneurs who have been taught foundational business skills and have a network of mentors, peers, and other community members are more likely to receive support in business dealings and thus experience positive economic growth. In contrast, those who do not experience an increase in business engagement are likely to have poorer social networks and lack skills that would make them better able to identify and pursue business opportunities.

Language Justice for Who? Considering and Elevating Black Language Identity During the Evaluation Process

Presenter's Name: Jerriel Hall
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Presentation Type: Oral Presentation
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Language justice is a relatively new focus for the field of evaluation. As an essential component in ensuring that the evaluation process honors diverse backgrounds and promotes equitable participation, mindful consideration of language is necessary for equity-centered and responsive evaluations. When language justice is referenced, non-English languages are often considered and elevated. Black language is excluded from the conversations on language justice. Linguistic diversity and cultural heritage within the African American community intersect with systemic inequities that can unintentionally produce deleterious outcomes and reinforce sociohistorical power dynamics in evaluation and research. This presentation addresses the challenges and opportunities for advancing language justice within the African American community. Drawing on Critical Race Theory (CRT), Culturally Responsive Evaluation (CRE), and linguistic anthropology, this presentation will articulate the unique variables in how the lack of consideration of Black language as a credible linguistic identity has been used as a tool of oppression and resistance, continuously shaping biased narratives of identity, power, and acceptance. Building upon that foundation, I outline specific challenges to language justice during the evaluation process for Black language users, which include linguistic discrimination, limited access to culturally relevant resources, and linguistic assimilation pressures. In response to those challenges, I propose strategies for promoting language justice that center and honor Black language traditions during the evaluation process, allowing Black language speakers to reclaim and celebrate their linguistic heritage, helping evaluators mitigate the power dynamics of language discrimination, and discuss how evaluators can prioritize awareness, practice, and advocacy for language justice.

The Intersection of Gender and Cultural Identity as They Relate to Emotional Control

Presenter's Name: Katlyn Havlin
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The purpose of this project was to explore the extent to which Black college students' cultural identity influenced endorsement of emotional control ideals–a masculine gender norm–as a function of gender. Masculine norm conformity is characterized as an individual's conformity to feelings and actions which reflect masculine norms of the dominant culture in the United States, and "Emotional Control" refers to one's suppression and restriction of emotions. Cultural identity is understood as a commitment to fundamental afrocultural beliefs including communalism, affective salience, movement expression and expressive individualism. Researchers collected survey responses from 156 students across a PWI and an HBCU. Surveys included Conformity to Masculine Norms, Cultural Identity, and Demographic variables. Results indicated that there 1) was no effect of gender on endorsement of emotional control beliefs; 2) was a negative effect of afrocultural beliefs on endorsement of emotional control beliefs; and 3) there was an interaction between gender and afrocultural beliefs such that Black women became less committed to emotional control as they endorsement afrocultural beliefs. However, this pattern of findings did not exist for Black men. Results imply a need to further understand how traditional cultural norms may interact with, support, and/or oppose dominant culture gender norms and how these juxtaposing norms may force Black individuals to either align with their cultural norms or to align with the norms of the dominant, eurocentric culture. Moreover, there is a need to continue the exploration of how individual conformity to gender norms may be influenced by factors including race.

Black Women's Participation in Fiber Arts: Past, Present, and Future

Presenter's Name: Katlyn Havlin
Classification: Undergraduate Student
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The COVID-19 pandemic and consequent quarantine greatly impacted American daily life. Symptoms of both anxiety and depression increased during the pandemic and are more pronounced in women and young adult populations (Panchal et al., 2023). The lockdown also had great impacts on engagement with the arts. While public and social arts saw significant decreases in participation, art that could be done from the comfort of one's home increased in popularity. The purpose of this research is to examine specifically black women's participation in arts before and during the pandemic, with a focus on fiber arts. Black women's history is interwoven within the history of fiber arts specifically regarding quilting, knitting, and crocheting. Factors like education level and income influence the likelihood of participating in fiber arts. Further research is needed to understand why some factors are influential

and what drives black women to engage in fiber arts. According to the 2022 National Endowment for the Arts' Survey of Public Participation in the Arts (SPPA), fiber arts saw a 2.4% overall increase in participation from their 2020 Arts Basic Survey. The theoretical basis for why this shift occurred can potentially be explained using a humanistic psychology lens. Kaimal, Gonzaga, and Schwachter (2016) reviewed existing literature on crafting and its health implications and performed a secondary data analysis on the 2012 SPPA. This study is a comparative secondary analysis of demographic and arts participation data between 2020 and 2022.

Hooks for Healing: A Multivariable Examination of Crocheting's Anxiety Reduction Potential for Black Women

Presenter's Name: Katlyn Havlin
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Presentation Type: Poster Presentation
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Individuals who crochet self-report that the activity improves their mood and increases their wellbeing (Burns & Van Der Meer, 2021), but there is little empirical evidence to support these findings (Kaimal, Gonzaga, & Schwachter, 2016; Collier, 2011). The purpose of this study is to apply existing theoretical frameworks to evaluate crocheting as a method of anxiety reduction. In their 2005 study, Curry and Kasser examined different types of art activities' effectiveness in reducing anxiety. Participants were assigned to mandala coloring, plaid form coloring, or freeform coloring. Their anxiety was measured at three intervals: at the beginning, after anxiety induction, and following completion of their coloring activity. In this research we will replicate their work, replacing coloring with crocheting and using coloring mandalas as a control. To account for previous art experience, the participants will be separated into two groups: novice and expert. Novice participants will be taught how to crochet a basic granny square, whereas experts have learned to crochet on their own but will be taught how to crochet a willow granny square. Phase 1 involves a demographics survey, an art experience questionnaire, and the teaching component of the study. Phase 2 involves repeated state anxiety assessments between an anxiety induction exercise, a crocheting task, and a coloring task. The anxiety scores will be compared from the repeated measures between the novices and experts. The implications of this study may conclude that crochet is effective at reducing anxiety in collegiate and clinical settings.

Exploring Narrative Identity, Eating Behavior, and Food Choice in the African American Community: Implications for Preventing Chronic Diseases

Presenter's Name: Robert Head
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This dissertation proposal aims to explore the intricate connection between narrative identity and the dietary habits and eating behaviors of African American emerging adults. There is considerable evidence from research that social and ecological factors perpetuate the problem with unhealthy eating behaviors and food choices. However, the research is sparse that examines how specific foods are connected to the narrative identity, culture, and behavioral health change of African Americans. Narrative identity is a person's inner narrative of self that is curated through making sense of lived experiences. By examining the impact of personal stories and meaning making on the multidimensional experience of eating, this study aims to uncover how narrative identity shapes health behaviors in this demographic. Through qualitative analysis and narrative inquiry, the research explores the potential for leveraging narrative interventions to promote healthier eating habits.

Unraveling the Impact of Digitalization on Labor Markets

Presenter's Name: Morola Ige
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Global labor markets have seen profound changes as a result of the advent of digitization, which has reshaped traditional employment structures and given rise to new types of work arrangements, particularly within the gig economy. My study explores the complex dynamics of this changing environment, concentrating on the effects of digital platforms on the distribution of income, the labor market, and governmental responses. My study investigates the complex effects of the gig economy on several aspects of employment through a thorough empirical investigation using both qualitative and quantitative approaches. I will look at how digital platforms have changed traditional employer-employee interactions, made flexible work arrangements easier, and affected labor market participation across various demographic groups.

Exploring Help-Seeking and Coping Mechanism among American Muslims: A health belief model perspective

Presenter's Name: Zainab Jackson
Classification: Graduate Student
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Presentation Type: Poster Presentation
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Despite the increasing prevalence of mental health issues among American Muslims, there is still a significant gap in understanding their help-seeking behaviors and coping experiences with health issues. This study aims to address this gap by examining how Muslim Americans define and respond to different stressors, and how they seek help and cope with these issues. The Health Belief Model will serve as the framework for this research, which will investigate factors influencing help-seeking behaviors, including perceived susceptibility, severity, benefits, barriers, and cues to action. Quantitative surveys will be used to provide a deeper context in exploring an individual's specific help-seeking pref-

erences. The findings will provide insight into the diverse coping mechanisms and support systems utilized by Muslim Americans, including reliance on clinical interventions, religious practices, social networks, and community resources. These results will contribute to the development of culturally sensitive mental health interventions tailored to the needs and strengths of the American Muslim community.

Exploring Digital Sexual Exploitation and AI Generated Deepfake Pornography

Presenter's Name: Kennedy James
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Presentation Type: Poster Presentation
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Deepfakes are "videos and images that have been digitally created or altered with artificial intelligence or machine learning" (Hadero, 2023). As of recently, deepfakes have become increasingly popular with scammers now using artificial intelligence to create deepfakes of people's voices and extort money from their loved ones. Moreover, as technology continues to develop and generative AI improves, non-consensual deepfake pornography is expected to grow more and more common and more and more realistic (Hadero, 2023). And while the main victims of the non-consensual pornography continue to be young girls and women, young boys and men are the continued targets of the marketing and advertising of these websites. To look at this dual victimization of both the young boys who are the target of predatory marketing and young girls who are the common victims of the generative AI pornography itself, this paper explores 5-10 websites that offer AI generated pornography content. Information was compiled about each websites' instructions, pricing model, example images, reverse image search results, and quality of the AI. Overall, the websites used a combination of different predatory marketing and advertising tactics to target young boys and perpetuate the creation of non-consensual pornography. These tactics include: using pictures of young, attractive influencers as examples for the AI generator, promoting unrealistic body images according to European standards as example images, adopting usage-based subscription pricing models that encourage continual use of AI, and employing friendly/alienating language that isolate users or makes the target audience feel more comfortable using the product.

Challenges of Opening a CSD program in the Dominican Republic

Presenter's Name: Brianna James
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The SLP student abroad experience is essential to the development of clinicians that are culturally and linguistically sensitive to their clients. As a result, CSD programs in other countries are being developed and are in collaboration with graduate training programs here in the in the United States to accentuate the development of culturally appropriate clinical services. Howard University is working to develop programs in the Dominican Republic while training students here to be culturally and linguistically sensitive. Many challenges considered must be noted when developing and working with an international program. This poster presentation aims to review challenges that other countries have faced in the past opening a CSD program. A feasibility study will be completed, and results will be provided during this poster presentation to detail the need of speech language pathologists and audiologists in the Dominican Republic. Additionally, it will detail specific challenges that the Dominican Republic faces.

Reckoning with Inequality: Reparation Parameters for Slave Owners vs. Enslaved Individuals in 1860s Washington, D.C.

Presenter's Name: Bria James
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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This paper aims to examine the parameters that allowed for slave owners in Washington D.C. to receive reparations as stated in the District of Columbia Compensated Emancipation Act. Then, this paper will compare and describe the stark differences of this legal basis to different cases of formerly enslaved persons in Washington D.C. seeking reparations that ultimately were not successful. This research will shed light on the complications of justice and equality in post-slavery America through historical analysis, evaluation of legislative records, and also proof of societal attitudes during the 1860s. By deeply analyzing the system that enabled slave owners to receive compensation while neglecting the needs of those they enslaved, this paper intends to bring focus on the enduring inequalities in restitution and the challenges that Black Americans have long faced in the battle for reparations. Through conducting research from these different lenses, this paper will find that the parameters of reparations for the enslaved in comparison to slave owners were not treated nor measured equally, as determined by racist rhetoric in the 1860s Washington D.C.

The Efficacy of the Truth and Reconciliation Commission

Presenter's Name: Jurnee Jessie
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This research paper seeks to examine the efficacy of the Truth and Reconciliation Commission (TRC) in South Africa in implementing a system for reparations following the era of Apartheid. The TRC, established in 1995, was created in congruence with the countries transition to democracy. The Commission's purpose was to address past human rights violations and foster national reconciliation efforts after decades of segregation and oppression under apartheid-era legislation. This paper will assess extent to which the TRC succeeded in designing and executing a framework for reparations adequately addressed the needs

of victims and contributed to overall restorative justice. Through a comprehensive study of TRC reports, scholarly literature, and interviews with stakeholders, this research will analyze the strengths, weaknesses, challenges, and overall impact of the TRC's reparations program. From this research, it will become clear that though the TRC made strides in acknowledging past injustices and promoting reconciliation, the significant obstacles encountered in the implementation phase were detrimental to the programs efficacy Despite its intentions, this research will show that the TRC's reparations program ultimately fell short of achieving its objective due to inherent complexities and limitations.

Pathways to Success: Cultivating Skills, Confidence, and Connections Among HBCU Black Doctoral Students

Presenter's Name: Briayanna Johnson
Classification: Graduate Student
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Coauthors: Elizabeth Ricks, Veronica Thomas

Background: Against the backdrop of longstanding racial disparities in the STEM (science, technology, engineering, mathematics) field, there has been a recognized historical underrepresentation of minorities. However, little attention has been directed towards the experiences of STEM doctoral students at Historically Black Colleges and Universities (HBCUs). This population is crucial to study as these students have valuable insights into the intersection of race and STEM education, providing a unique perspective on strategies for promoting equity and excellence in higher education. This presentation will examine the experiences of doctoral students at HBCUs, focusing on translational skill development, self-efficacy, and faculty-student relationships. Furthermore, our presentation will explore gender differences in self-efficacy and faculty relationships. Methods: This study utilized the Doctoral Student Survey (DSS), an online instrument designed to capture the perspectives and experiences of HBCU doctoral students. This survey was administered to 160 participants from the three participating institutions of the HHMS-AGEP Alliance. Results: Demographic analysis revealed a diverse representation, with 48.1% identifying as African American, 40.9% as African, and 10.0% as Caribbean. The survey outcomes unveiled significant associations between faculty-student relationships and STEM self-efficacy, with students reporting stronger relationships displaying heightened self-efficacy in STEM disciplines. Additionally, programs that emphasized translational skill development, such as promoting teamwork and interdisciplinary approaches, had higher STEM self-efficacy among participants. Conclusions: These findings contribute to a deeper understanding of the factors influencing doctoral students' experiences at HBCUs and offer insights into fostering supportive academic environments.

Exploring the Relationship Between Self-Concept and Relationship Satisfaction

Presenter's Name: Sundara Jones-quartey
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Erik Erickson's Stages of Psychosocial Development (1958) states that without proper identity formation in adolescence, one will struggle with maintaining successful, satisfying intimate relationships in adulthood. Recent research has focused on self-concept in young adults, and researchers continue to identify a significant positive relationship between perceived self-concept and relationship success and satisfaction (Arikewuyo et al., 2022). By specifically focusing on young adults, research on this subject will strengthen and refine Erickson's theory by giving insight into the sensitive period of transitioning from adolescence to adulthood. This study examines the relationship between self-concept and relationship satisfaction in university students. The transitional period of young adulthood provides a unique insight into the strength of the relationship between the variables. The research question asks, "How does one's perceived self-concept clarity affect their satisfaction in intimate relationships?" Findings are hypothesized to reveal a positive relationship between self-concept and relationship satisfaction. The lower one's self-concept is, the less satisfied they are with their intimate relationships. Holding negative and critical beliefs about oneself can lead to feelings of anxiety, depression, resentment, and shame; all of which can be detrimental to the progress of familial, platonic, and romantic relationships.

African perception of China's mega projects

Presenter's Name: Eric amugo Kadenge
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This study sought to explore the perceptions of Africans towards Chinese Mega projects as presented through the media. Few studies have paid attention to the actual recipients of Chinese media hence the need for a localized study. Previous studies have been accused of making sweeping proclamations and equating reach with impact. While anchored on the public diplomacy theoretical framework, this qualitative study used textual analysis to assess viewer's perceptions on the launching of Kenya's largest infrastructural project since its independence. The launch of the $4b railway and train was posted on China Global Television Network 's (CGTN) Facebook page that attracted 859 comments. Preliminary findings suggested though a majority of the audience praised the project while a minority was critical about it. The findings also suggested that many comments were influenced by the prevailing political environment at the time of the launch. The project was launched four months to a presidential election. These findings are consistent with some existing literature that found mixed perceptions of CGTN content. They however also suggest a limited under-

standing of China's influence in Africa as seen in some of the sweeping positive comments made by the audience.

Keywords: China-Africa relations; infrastructure development; African perceptions of China's mega projects

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A Meta-Science Investigation of Stereotype Overlap Across Gender, Race, and Sexual Orientation

Presenter's Name: Troy Kearse
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Presentation Type: Oral Presentation
Faculty Advisor: Jamie Barden
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Coauthors: Jamie Barden

Cultural stereotypes convey nuanced information within gendered contexts, shaping perceptions of masculinity and femininity across various social groups. Previous research indicates the feminization of Asian men and the masculinization of Black men, as well as the association of femininity with gay men and masculinity with straight men (Carnaghi et. al, 2020; Merritt et. al, 2013). While traditional studies employ scale measures to gauge these perceptions, recent approaches utilize non-parametric methods to explore trait overlaps across stereotypes and other factors (Bergstrom, 2022). This study investigates how trait lists from stereotypes towards Black, Asian, and Gay social groups intersect with lists of masculine and feminine traits. Stereotype trait lists were pulled across 24 published studies to create lists of 100 traits included in each group stereotype. The overlap between these stereotype trait lists, and masculine or feminine traits was examined (N = 783). As hypothesized, Black stereotypes overlapped more with masculine traits than feminine ones, while Asian and Gay stereotypes overlapped more with feminine traits. Furthermore, Black traits overlapped more with Gay than Asian traits despite associations of Black and masculinity and Asian and femininity. These findings underscore the nuanced interplay between race, gender and sexual identities in shaping stereotypical perceptions. We replicate gendered stereotypes of race, but the gay stereotype overlap with Black more than Asian runs counter to what you would expect from the gender findings. This study contributes to our understanding of stereotype trait overlap across social categories with implications for person perception and bias.

Exploring Relationships between School Belonging, Worry and Stress at School, Coping Ability, and Peer Competence in Children

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It is important to examine prosocial behaviors when examining stress because research reveals that more efficient prosocial behaviors allow the youth to experience less stress Griese & Buhs (2013). The less stress that the youth experience, the more they can engage in and benefit from education. Additionally, coping strategies, stressors, and individual differences interact to promote children's resilience and well-being in a school environment. The extent to which children feel like they belong in a school environment play a critical role in the development of prosocial behaviors and resilience. The goal of this study is to examine the extent to which school belonging is related to worry and stress at school, coping ability and peer competence among 5th grade children. The study used data from the Early Childhood Longitudinal Kindergarten class 2010-2011 (NCES,2001) to investigate relationships between school belonging, worry and stress at school, coping ability and peer competence among 5th grade children. Preliminary results revealed positive relationships between school belonging, worry and stress at school, coping ability, and peer competence. Gender and racial differences will be discussed. We will also discuss implications for policy and practice in education.

The Impact Of Parental Incarceration In The Lives Of Black Children

Presenter's Name: Angela Laroche
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School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Dr. Bahiyyah Muhammad
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Parental Incarceration within the United States is a severe issue that has been growing within the African American community. Children are left to fend for themselves in their most vulnerable moments as their parents are ripped away from their lives. They are left with no choice but to deal with the stipulations that follow along with the punitive & corporal punishment of their parents. As incarceration rates within Black communities continue to rise, we see that African Americans are arrested at greater rates in comparison to their other racial counterparts. The people who are the most affected when African American men and women are arrested, unfairly prosecuted, and sent away to prison are their children. The following dissertation thesis will take the time to thoroughly analyze the disparities within the criminal justice system & how they result in real-life disadvantages for children of incarcerated parents. It will also see what factors of parental incarceration cause the likelihood of children becoming incarcerated themselves. From this, we will be able to take a closer look at the recidivism rates of parental incarceration and the different rehabilitation programs set in place to help tackle negative jail programs. Through the use of studies, research, anecdotes, reflections, and exemplars we will be able to conclude how parental incarceration affects the adverse childhood experiences of children.

Social Media Engagement and Biased Algorithms: An Analysis of the Social Media Performance of Black and White Influencers

Presenter's Name: Janeen Louis
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Amy Yeboah
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Algorithm bias in social media platforms has emerged as a critical issue affecting content creators, particularly influencers, who navigate these spaces. This research investigates the impact of algorithm bias on the engagement metrics of Black and white influencers, focusing on culturally relevant dances within rap and hip-hop on the social platforms TikTok and Instagram. It looks at likes, views, comments, follower counts, and search results from three case studies. Drawing on Danks and London's (2017) definition of algorithm bias as a deviation from fairness standards, this study reveals a concerning pattern of racial bias in algorithmic treatment. Despite the deep-rooted connection of these dance forms to Black culture, search results predominantly feature white creators, who consistently garner more likes, comments, views, and followers for participating in identical dances as Black creators. These findings underscore the need for a more inclusive and unbiased algorithmic framework that accurately reflects the diversity and contributions of creators in the digital space.

Examining Media Consumption and Perspectives on Romantic Relationship Behaviors: A focus on Supernatural Romance Media
Presenter's Name: Danielle Middleton
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Hope Hill
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Movies and television shows can influence viewers' perceptions of romantic relationships. Romantic media contains themes that promote the concept of soulmates and love at first sight, while also romanticizing unhealthy relationship behaviors. Various sub-genres of romantic media influence viewers in different ways. The influence of viewing supernatural romance, which features non-human romantic partners, remains understudied. This study analyzed the responses of those who watch supernatural romance, general romance, and non-romance towards fictional scenarios depicting relationship behaviors. In this study, participants of each category evaluate scenario-based romantic relationship behaviors, identify the behaviors as healthy or unhealthy, and report their tolerance levels towards the behavior. The relationship between participants' media consumption patterns and ability to identify and tolerate unhealthy behavior will be examined through correlation analysis. Additional participant data such as demographic information, romantic media portrayal beliefs, and media enjoyment will provide further insight into participants' responses. Hypotheses suggest that compared to other participants, those who view supernatural romance will perform differently in identifying unhealthy behaviors, and will be more accepting of these behaviors. It is hoped that this research will aid in understanding the relationship between media consumption and viewers' perceptions and acceptance of behaviors in romantic relationships.

An Analysis of Romantic Messaging Within Supernatural Romance Films
Presenter's Name: Danielle Middleton
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Debra Roberts
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The movie genre of romance contains themes which promote concepts such as soulmates and love at first sight, while also romanticizing unhealthy relationship behaviors. Sub-genres of romantic media contain varying messages on love and romantic relationships. The messaging within the genre of supernatural romance, which features non-human romantic partners, remains understudied, despite being a growing subgenre of romance. Through a systematic content analysis of movies within this sub-genre, this study seeks to analyze the messaging regarding love and relationships, as well as the role and actions of the non-human romantic partners within their different species romantic relationships.

"The Soul Food Cookbook: A Resource Guide for Accessing Feeding and Swallowing Services in Rural Communities"
Presenter's Name: Morgan Moore
Classification: Graduate Student
School/College: Graduate School
Presentation Type: Poster Presentation
Faculty Advisor: Valencia Perry
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Coauthors: Valencia Perry

The Soul Food Cookbook is a program designed to increase and enhance service delivery to families of infants and toddlers with feeding and swallowing difficulties. The program aims to 1. Increase awareness of speech-language pathology feeding and swallowing services, 2. Increase the value of these services by supporting speech-language pathologists with advocacy, education, and training, 3. Connect families with providers and resources. The project will facilitate a meaningful discussion among attendees aimed to identify relevant issues and potential solutions while creating more sustainable approaches that increase access to care and the quality of services provided to families of children with feeding/swallowing issues in rural communities. The following are a list of questions/topics that may be discussed during the information sharing session: (1) How can clinicians advocate for speech and language services to address issues with service delivery to patients who experience feeding and swallowing challenges in rural communities?; (2) What questions do participants have about pediatric dysphagia and health disparities?; (3) How can we empower participants to share their knowledge and create an open dialogue about pediatric feeding and swallowing difficulties in the pediatric population and in rural communities?; (4) How can SLPs practice at the top of the license in the area of feeding/swallowing with diverse families in rural communities?

The Politics of Resource Extraction in DR Congo and Fostering a Sustainable Solution to Mining in DR Congo
Presenter's Name: Louis-leopold Muderhwa
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
Faculty Advisor: Cyril Hunte
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This Honors thesis aims to analyze the policies of mining extraction in the Democratic Republic of Congo and measures to create durable solutions to the extraction of minerals within the country. To that end, this paper will analyze the current situation of resources within the DR Congo, their geographical location, their economic impact, and their economic potential. By understanding the vast richness that currently goes unexploited (or rather misappropriated) by Congolese officials, this paper will serve to draw a clear and concise picture of the dichotomy that currently affects the welfare of Congolese citizens. The first aim of the Congolese government to fix the current situation would be an extensive pacification operation of DR Congo and a strong mobilization of the army to quell armed militias within Eastern Congo. Despite several operations aimed at dismantling terrorist militias in the East, they are still vastly present and continue to foster insecurity within the region. After establishing legal mining practices and establishing corporations under the control of the government, the country can then progress into developing self-sufficiency, which will help an industry of non-renewable resources finance other renewable resources across the country. With the profits that legal mining practices can generate across the nation, the Congolese government can then focus on financing and improving other high-potential areas namely forestry, agriculture, and hydropower.

Impact of Black Maternal Incarceration on the Black Family Unit.
Presenter's Name: Tadiwa Mujokoto
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Keesha Middlemass
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Black maternal incarceration poses a threat to the stability of the Black family unit. In the Black community, mothers play an essential role in the family unit, serving as caregivers, breadwinners, and sometimes both parents. This thesis aims to analyze the dynamics of the Black family by focusing on how incarceration can have a detrimental impact on it. It takes a deep dive into how Black maternal incarceration can break down the structure of Black families.
Examining the pre-incarceration period provides an understanding of how lack of resources and systemic inequalities contribute to Black mothers entering the revolving door of the criminal justice system. This thesis also explores the mental, physical, and financial strains on children and mothers endured during the period when a mother is incarcerated. Finally, using existing research about crime and punishment as it relates to race, it gives a thorough critique of the post-reunification process after incarceration and how it can be made more efficient through policy solutions and community resources. Ultimately, this thesis seeks to spread awareness about Black maternal incarceration and offer comprehensive policy solutions that rely heavily on alternative punishments to reduce the number of Black mothers who are incarcerated.

Implications of AI systems and software in the criminal justice system
Presenter's Name: Lauren North
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
Faculty Advisor: Amy Yeboah
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Artificial Intelligence has been growing and expanding over the past few years. While there have been many advances and benefits for many of the core sectors, there also have been many disadvantages such as algorithmic discrimination, data privacy issues, etc. For my research, I will be specifically focusing on the implications of AI in the criminal justice system. COMPAS was created in the 1990s and was implemented into the court system in 2000. COMPAS is an algorithm that estimates the recidivism rate for a defendant. Judges give defendants a score using this system to estimate the likelihood a defendant has for recidivism. The numbers given range from 1-10, 10 being the highest likelihood. This information is then used by the sentencing judge who decides what the defendant's sentence will be. Over the years, courts all over the United States have been known for their bias in criminal sentencing for African Americans in comparison to Caucasians. African Americans are often given a higher score despite having similar offenses to Caucasians. Based on my conclusion, AI systems such as COMPAS are dangerous and unethical, The COMPAS algorithm has been shown to go against two of the key principles listed in the Blueprint for an AI Bill of Rights: Safe and Effective Systems and Algorithmic Discrimination Practices.

Meeting the Sensory Needs of Children: Sensory Processing Disorder & Its Physical, Social, and Academic Effects
Presenter's Name: Lauren Otis
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
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Sensory processing disorder (SPD) is a condition that affects how the brain processes stimuli. It makes it difficult for someone to accurately interpret and manage their senses. This paper examines the effects of the condition, specifically on young children, in different physical, social, and academic settings, and discusses the eight sensory systems within the body. To examine these effects this paper reviews the role of Dr. Jean Ayres' research on the topic and examines the experience of a four year old with the condition. The review indicates that there is a negative effect on children with SPD when navigating the world. It revealed that the lack of involvement of children in different physical, social, and academic settings can be accredited to the presence of the condition. Findings also indicated that sensory integration is a helpful implementation that aids children in understanding and responding to

stimuli. These results will be influential in developing new methods of teaching and interacting with children with SPD. They will also be useful in helping children understand their condition and how they can learn to live comfortably with it.

Voices from the Ranks: Understanding Perceptions of Extremism Among US Army Service Members

Presenter's Name: Sydney Poe
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Presentation Type: Poster Presentation
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On January 6, 2021, more than 2,000 rioters invaded the United States Capitol in an effort to overturn the election. 12% of those charged federally were military veterans or active servicemembers (Dreisbach, 2021). Most individuals who were arrested and associated with the military had served in either the Marine Corps (47.8%) or the US Army (41.3%). Since January 6, there has been an increase in debate surrounding the question of whether or not the United States military has an extremist problem. There is a lack of research on the opinions of service members and their thoughts on extremism. This study aims to answer what is considered extremism by US Army servicemembers and how it is investigated after being reported. In a series of interviews, I spoke with twelve members of the US Army to answer seven to eight questions relating to their experience with extremism during their time in the service. There were many trends between enlisted personnel and officers in their answers. The servicemember's military occupation specialty (MOS) and rank also determined the individual's experience and perspective on extremism. The results of this study indicate that service members who are not Judge Advocate Generals (JAGs) or field grade officers may need more education on extremism and how each case of extremism is managed.

Changing Lives in Educational Spaces: Teachers Trauma Competency Skills' Influence on Childhood Trauma and Academic Engagement

Presenter's Name: Kennedi Roberts
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Presentation Type: Oral Presentation
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Research around childhood trauma and its effects is increasing. Childhood trauma can have many detrimental effects from the moment it is experienced well into their adult life. Effects of childhood trauma include PTSD, engaging in risk behaviors, substance abuse, mental health issues, academic disinterest, and more. Alongside the research around childhood trauma comes an increase in research around the need for trauma informed teachers. Studies have found that when teachers are more informed about what childhood trauma is and how they can support those students who experience trauma students begin to do better in school across the board. What still needs to be studied is the effects of trauma on Black children's academic engagement and the positive or detrimental effects of the level of trauma informed training their teachers have received. This thesis hypothesizes that Black students who have experienced childhood trauma and have become academically disengaged are negatively impacted by teachers who lack trauma competency. This thesis will also connect the school-to-prison pipeline to the lack of trauma competency and trauma informed care by teachers.

Unveiling Disparities: Exploring Overmedication of Black Foster Care Youth and How Implicit Bias Contributes

Presenter's Name: Adachi Selas
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The overmedication of foster care youth has raised nationwide alarm in recent years for the potential harm it could cause this already vulnerable population (ACLU Maryland, 2023; Palmer et. al., 2023; Leslie et al., 2010; U.S. House, 2014). Yet not much is known about how this issue impacts Black youth in the child welfare system. Black children and adolescents are overrepresented in the child welfare system due to racial bias in reporting, investigations, and out-of-home care placement (Cénat et. al., 2021; Godoy, 2022; Lee et. al., 2015; Montgomery, 2022;). This reality indicates a probable risk to the young, Black foster care population that begs further investigation (Barth, 2020; Lee et. al., 2021; Scott, 2011). This article examines the issue of Black foster care youth who are falling victim to the overprescribing of psychotropic medication, as well as other concerns such as misdiagnoses and lack of access to therapeutic interventions (Cullins & Moore, 2020). Discussion of the role of implicit bias in the overmedication and inappropriate medication of these youth examines ways to employ equitable solutions. This article further shares our findings from a review of the literature that confirms that Black foster care youth are medicated at disproportionately high rates. However, implicit bias at every stage of the child welfare process is apparent, and more culturally intelligent interventions are needed to ensure that Black children and adolescents receive adequate treatment.

Dismantling Injustice: A Critical Examination Exposing How the U.S. Criminal Justice System Perpetuates the Oppression of Black Youth

Presenter's Name: Savannah Sharpe
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Presentation Type: Oral Presentation
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This thesis embarks on an in-depth exploration of the significant factors contributing to the unfathomable injustices faced by Black youth within the U.S. Criminal Justice System. The intricacies of this long-standing epidemic extend beyond isolated incidents, including systemic biases, racially biased legalities, unlawful interrogation tactics, and socio-eco-

nomic disparities working to fuel an unfair and unjust system. This study will examine how these discriminatory components operate within the system, impeding the growth, development, and well-being of black youth on a national scale. Upon investigation, literature reviews affirmed the widespread prevalence of unlawful interrogation methods directed at black juveniles. This study explores the several ways in which these practices disproportionately impact this demographic. This research follows a critical investigative approach to navigate legal protections afforded to minors, biological and psychological differences between youth and adults, the impact of disciplinary actions enforced by the school-to-prison pipeline, and the challenges juveniles encounter in exercising their legal rights. Preliminary findings suggest persuasive interrogation tactics employed on adults mirror those applied to minors, revealing routinely manipulative strategies designed to extract admissions of guilt from vulnerable and compliant youth. This study is intended to provide a comprehensive understanding of the identified complex issues harming black juveniles, offer critical awareness, and contribute to the promotion of a fair and just system. The mission is to advocate for systemic changes, concluding with proposals of potential reforms and policies addressing and rectifying the disproportionate rate of black youth entering the U.S. Criminal Justice System.

Coasts Unchained: A Comparative Analysis of Recidivism in California and Virginia

Presenter's Name: Jada Sherald
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Recidivism rates in the United States vary greatly depending on location as well as sociopolitical, economic, and legal factors. Through a comprehensive comparative analysis, this research aims to examine the impact of poverty, sentencing practices, and reentry policies, such as disenfranchisement, on recidivism rates in California and Virginia, two states on opposite sides of the country characterized by distinct socioeconomic profiles, legal frameworks, and correctional practices. California, a historically blue state on the West Coast with a 3-year recidivism rate of 50%, represents the higher end of the scale. In contrast, Virginia, a historically red (but recently blue) state on the East Coast with a 3-year recidivism rate of 23%, represents the lower end. The analysis employs a mixed-methods approach, synthesizing existing literature and extrapolating from studies and policy reviews. The conclusions drawn from this work seek to provide policymakers and criminal justice workers with practical insights to aid in reducing recidivism across the country.

North America's Perfect Victim and it's Affect on Black Women

Presenter's Name: Anguelyca Sherrell
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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African American victims of violent crimes are inequitably considered by the United States justice system due to the societal concept of a 'perfect victim'. This paper addresses this mindset of the perfect victim, how it affects procedural justice, and its negative effect on African American women using qualitative methods.

Maternal Mental Health of Black Refugee Women: Conceptualizing Gaps and Advocating for Change

Presenter's Name: Whitney Skippings
Classification: Graduate Student
School/College: Education
Presentation Type: Oral Presentation
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Maternal mental health has historically been neglected in both policy and academic circles, and that of black refugees even more so. This literature review examines publications concerning postpartum mental health of African diasporic refugees and distills findings about root causes and culturally integrative treatment. Findings illuminate the interplay of race, culture, daily stressors, and pre-migration trauma, revealing their impact on refugee mothers' mental health. The review identifies key knowledge gaps, presents a framework for understanding refugee maternal mental health challenges, and advocates for culturally informed interventions.

Safety of Unconditional Positive Regard: Identification, Validation, and Rectification (SUPR IVR)

Presenter's Name: Tiara liqardonay Smith
Classification: Graduate Student
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Presentation Type: Poster Presentation
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This original theoretical framework is a proposed solution to the unproductive mental health treatment of Black college students seeking and receiving care and reporting little to no improvement in psychological health. Themes in the current literature suggest that counseling centers' focus on increasing the number of Black students seeking mental health treatment is premature (Jones et al., 2020). Research indicates that progressing toward more individualized treatment modalities focusing on sociocultural and environmental stressors would prove more effective and productive in addressing the growing mental health needs of the Black college student population. (Leath & Jones, 2022). Considering sociocultural experiences and an enhanced need for rapport, trust, and connection, this theory works to tailor treatment to the specialized population. The current proposal is the result of a comprehensive literature review examining themes surrounding the challenge at hand, reviewing current procedures implemented, and tying in principles from various distinguished theories, such as psychoanalytic, behaviorism, and person-centered, to propose a new framework that addresses the existing gaps. This research aims to highlight the prominent barriers to effective treatment and ultimately provide adequate strategies to enhance the effectiveness of treatment.

"Decolonizing Economies: Breaking the Monopoly Grip on Post-Colonial Nations and Crafting a Path to Equitable Development"

Presenter's Name: Karson Smith
Classification: Undergraduate Student
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This abstract delves into the intricate dynamics surrounding the economies of colonialist countries and the pervasive trend of monopolization that has emerged as a consequence of historical colonization. Despite achieving political independence, numerous nations continue to grapple with the enduring legacies of colonialism, particularly in the economic realm. This study investigates the multifaceted mechanisms through which colonialist countries find themselves ensnared in economic monopolies, perpetuating a cycle of unequal power distribution and hindering sustainable development. By employing a multidisciplinary approach, combining historical analysis, economic theory, and case studies of specific countries such as Columbia and Mexico. It scrutinizes the role of transnational corporations, international financial institutions, and global economic policies in exacerbating the economic imbalances inherited from the colonial era. Furthermore, the study explores the impact of monopolization on local industries, small businesses, and the overall socio-economic fabric, shedding light on the widening wealth gaps and persistent poverty in these nations. By offering a comprehensive understanding of the issue and proposing actionable solutions, this research contributes to the ongoing discourse on post-colonial economic development, providing a roadmap for policymakers, stakeholders, and global entities to collaborate in fostering economic environments that prioritize inclusivity, sustainability, and shared prosperity. Furthermore, the abstract explores the importance of empowering local communities through education, skill development, and access to resources, aiming to create a foundation for sustainable economic growth that is resilient to monopolistic pressures. International cooperation is highlighted as a crucial component, urging developed nations and international organizations in fostering inclusive economic partnerships.

Deciphering Cannabis: The Results Are In

Presenter's Name: Nailah Smith
Classification: Graduate Student
School/College: Graduate School
Presentation Type: Poster Presentation
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This study aimed to gather insight into patient perspectives about remediating symptoms associated with neurological conditions that affect communication and related functions using medicinal cannabis and how speech-language pathologists (SLPs) can support their patients while remaining in the scope of practice. The investigation involved a mixed methods design that drew upon data collected from ethnographic interviews and a single case intervention involving a pretest-posttest design. The interviews aimed to gain insight into the perspectives, feelings, and attitudes of adult patients and/or caregivers of people with neurological conditions who are taking or recommended to take some form of medication to address symptoms associated with focus, communication, and/or learning. The intervention portion of the study used a single-case research design that involved the presentation of an educational video lecture to subjects to inform them about medicinal cannabis and how it might be used to address symptoms of neurological conditions that are often treated with pharmaceuticals.

The presenter will review issues in access to care regarding medicinal cannabis from various standpoints such as health equity, stigmatism, and legislation. Resources for supporting patients will be provided to SLPs.Additional resources will be provided to promote patient safety and support in overcoming barriers that might prevent them from exploring alternative medicine.

Data Diplomacy: A Study of Chinese-US Telecom Competition in South Africa

Presenter's Name: Tyler Smith
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School/College: Arts & Sciences
Presentation Type: Poster Presentation
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In an era where technology is increasingly central to diplomatic discourse, South Africa has emerged as a center for information and communication technology (ICT) trade competition. As the second-largest nation on the African continent, South Africa has often been touted as a benchmark for its African counterparts. Its telecommunications sector has experienced rapid growth, catering to approximately ninety-nine million South Africans as of 2021. This expansion has ignited economic competition among domestic and international entities, particularly between China and the U.S., seeking to extend their economic and diplomatic influence across the region. This thesis will analyze South Africa's ICT industry while examining the diplomatic implications it carries within the broader economic competition between China and the U.S. Adopting a multifaceted approach, this study dissects data, diplomatic rhetoric, and government legislation to present the geopolitical context of South Africa's foreign investment landscape. The paper seeks to unveil the economic and diplomatic underpinnings of South Africa's foreign investment strategies, shedding light on their implications for the wider African continent. Using qualitative and quantitative analyses, this thesis aims to portray the ICT development landscape in South Africa while examining the sector's crucial role in global geopolitical and economic tensions. Thus, it offers valuable insights into the broader dynamics shaping African diplomacy and global power struggles.

"Sugar, the State, and A Commercial Empire: The Bass Family and the Exploitation of the Dominican Cane Sugar Industry, 1887-1912."
Presenter's Name: Joseph Sturgeon
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Oral Presentation
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This paper, entitled "Sugar, the State, and A Commercial Empire: The Bass Family and the Exploitation of the Dominican Cane Sugar Industry, 1887-1912," examines two American-born sugar industrialists, Alexander & William Bass, and their involvement in the Dominican Republic's sugar industry from 1887 to about 1912. The most lucrative of the Bass family's sugar mills was the Ingenio Consuelo in San Pedro de Macorís, which was the largest sugar plantation in the nation from 1883 until about 1920. In this particular period, foreign industrialists were overwhelmingly participating in the Spanish Caribbean's sugar cane industry, considerably in the aftermath of the Spanish-American War of 1898. This paper centers around the Bass family and the idea of power—the power that their political relationships, their wealth, and their status as large American commercialists afforded them in the Dominican Republic. Also examined is how the Bass family encouraged U.S. interference in the country, which later came to manifest with the U.S. occupation that began in 1916.

Termination of Parental Rights: A Comprehensive Examination of an Under-studied Collateral Consequence of Mass Incarceration
Presenter's Name: Cecelia Tate
Classification: Undergraduate Student
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Presentation Type: Poster Presentation
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Loss of voting rights and reduced employability are two well established collateral consequences of being sentenced to confinement in the United States. Far less is known about when, how, and how often being incarcerated leads to termination of parental rights (TOPR). The current study examines this issue in depth because the Adoption and Safe Families Act (ASFA), a federal law enacted in 1997, requires states to begin TOPR proceedings for children who have been in foster care for 15 of the previous 22 months. Parental incarceration is a substantial contributor to children being placed in foster care, with low-income children of color being at a disproportionate risk of such placement. Based on the principle that every child deserves to be in a safe and permanent family, ASFA hastens the path to adoption with the collateral consequence of disrupting the relationship between children and their biological parents. Legal advocates have resisted the use of TOPR against incarcerated parents because the separation from their children is involuntary and the risk of TOPR may vary by state. The current study examines the TOPR statutes from each of the 50 states and statistical reports of how often and under what circumstances the statutes are invoked. The findings will address the formal legal considerations in the process of TOPR for incarcerated parents, how often the process is used, and commonalities among incarcerated parents and their children who experience this outcome.

Examining the Semantic Language Patterns of African American Adolescents Who Have Experienced Grief and P.T.S.D Symptoms.
Presenter's Name: Cynthia Taylor-cutler
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Presentation Type: Oral Presentation
Faculty Advisor: Ovetta Harris
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Coauthors: Ovetta Harris

Traumatic experiences can have profound implications for individuals, often resulting in deep grief. Grief is an intense response after a significant loss that has emotional and psychological effects (Cowles & Rodgers, 1993). Grief involves both mourning the attachment of the victim in addition to realization of the loss of innocence within self. (Freud, 1916). This level of dissociation is equally as traumatic for the adolescent brain as the initial trauma from the grief itself. The heart of this research aims to examine the meaning and expressions used by African American adolescents to convey their traumatic experiences related to grief. Culture plays a significant role in how individuals view grief and there is a collective understanding that grief is a universal experience, that is expressed differently among cultural groups. In the black community, kinship is not seen as direct lineage but instead bonding and attachment. Within African American culture, grief is viewed as a communal loss (Nobles, 2004). Grief creates neurological changes in cognition that shift language. It's the change in how the mind processes trauma that alters their lexical concept of emotional language. Decoding the adolescent's semantic content will help create a safe space for educators and linguists to understand the youth's concept of social emotional language.

Black Youth's Self Concept in the Wake of Social Media
Presenter's Name: Bryce Trible
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Presentation Type: Poster Presentation
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Social media exacerbates our need for evaluation and comparison, with this comparative mentality leaking over into our day-to-day interactions. The nature of this social media-induced comparative framework has been studied; however, the demographic of black male youth has not been focused on specifically. I posit that the nature of the issues created for youth in the landscape of social media may be different for this demographic, and seek to understand the relationship between black youth's self-concept and their use of social media through the lens of social comparison theory. Using a questionnaire created from a combination of the Harill Self-Esteem Inventory, the INCOM assessment, and the Tuck-Thompson Social Media Usage Inventory, the study recorded the answers of around 50 participants, all of whom fit the 18-24 year old black male demographic. The questionnaire was distributed through media platforms that see frequent use by the target demographic. Participant responses were recorded and scored according to their respective sections. Using multivariable regression analysis, we were able to conclude that there is some correlation between fluctuations in

social media usage and self-concept that may be mediated by social comparison theory. This is possibly explained by social media creating a more heightened sense of social comparison that in turn affects the participants' self-concept negatively. While social media may influence social comparison, further studies would need to elucidate the link between race-specific social media usage differences.

From Specious Statistics to Dependable Data: Constructing Retail Spending Estimates with Nigerian Transactions Data

Presenter's Name: Aisha Udochi
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The accessibility and reliability of data on development is poor. This is particularly true for less developed countries. While retail transactions remain part of a small but increasing literature, as an alternative data source, transactions emerge as a potent remedy to data deficient environments. Firm-sourced "big data" requires scientific methodologies to be transformed into reliable and timely economic statistics; this quantification process strengthens the legitimacy of statistical formation currently lacking in economic development. In this study I collected 538,999,091 observations (1TB) from a Nigerian payment processor containing details on the nature of the transaction and firm identifiers, in combination with industry and geographical information. Applying the Aladangady et al. (2022) technique of filtering raw data into daily spending indexes, I developed a new comprehensive research dataset on consumer spending. Through event study analysis, relationships between specific events and the retail industry are explored to provide statistical insights on aggregate retail sales and by extension middle-income consumers in Nigeria. This study breaks new ground by extending transactions data literature to a developing country context; more critically, this study offers a treatment for the endemic of poor numbers within economic development.

From Specious Statistics to Dependable Data: Constructing Retail Spending Estimates with Nigerian Transactions Data
Presenter's Name: Aisha Udochi
Classification: Graduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
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The accessibility and reliability of data on development is poor. This is particularly true for less developed countries. While retail transactions remain part of a small but increasing literature, as an alternative data source, transactions emerge as a potent remedy to data deficient environments. Firm-sourced "big data" requires scientific methodologies to be transformed into reliable and timely economic statistics; this quantification process strengthens the legitimacy of statistical formation currently lacking in economic development. In this study I collected 538,999,091 observations (1TB) from a Nigerian payment processor containing details on the nature of the transaction and firm identifiers, in combination with industry and geographical information. Applying the Aladangady et al. (2022) technique of filtering raw data into daily spending indexes, I developed a new comprehensive research dataset on consumer spending. Through event study analysis, relationships between specific events and the retail industry are explored to provide statistical insights on aggregate retail sales and by extension middle-income consumers in Nigeria. This study breaks new ground by extending transactions data literature to a developing country context; more critically, this study offers a treatment for the endemic of poor numbers within economic development.

Calls for Education as Reparations During the Reconstruction Era

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Contemporary conversations around redress for slavery in the United States commonly focus on monetary reparations. However, reparations can come in a multitude of forms, which are worth considering when approaching modern calls for reparations. After Emancipation, literacy rates in the Black community were extremely low due to laws that prohibited slaves from learning how to read and write during slavery. When ex-slaves were expected to enter society after Emancipation, this set them at a disadvantage. Proponents of educational reparations believed that education was a fundamental right. Because they were deprived of this during slavery, they believed it was the responsibility of the American government to make sure they received the education they were owed. While some reformers from the Reconstruction Era advocated for monetary reparations, advocates for educational reparations knew that monetary reparations could only go so far. They believed that any money granted would likely return to the hands of white Americans instead of truly uplifting the Black community. Advocates for educational reparations saw education as a vital way to advance the Black community and bring about equality. Some of the most influential proponents of educational reparations included Black churches, Black politicians, and the Freedmen's Bureau. Most calls for educational reparations during the Reconstruction Era were unsuccessful, with the exception of a few cases. I aim to take a look at calls for education as reparations for slavery in the United States during the Reconstruction Era to see how they can inform discussions about reparations today.

Relationship Between Urban Life Stress (ULS), Social-Familial Wellbeing (SWB) and Depressive Symptoms (DS) Among Breast Cancer Survivors (BCS)

Presenter's Name: Naomi Vinod
Classification: Graduate Student
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Presentation Type: Poster Presentation
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Coauthors: Jenna Warren

Background: Data show general perceived stress (GPS) is positively associated with DS. What is less known is how ULS (stress associated with mid-large cities) is associated with DS and factors mediating the relationship. SWB (meaningful social/family relationships) may be a potential mediator given its inverse relationship with GPS and DS. The purpose of this study is to test the mediating effect of SWB on the relationship between ULS and DS among BCS. Methods: ULS, SWB and DS were measured using the Urban Life Stress Scale, Social-Family Wellbeing Subscale of FACT-B and Center for Epidemiologic Studies Depression Scale, respectively. Hayes' Process Macro mediation regression analysis was performed to examine the mediating effect of SWB. Results: Participants included 72 breast cancer survivors (African American/Black (n=35), Caucasian (n=37)) (Mean age=55.2 (10)). Self-report scores were ULS: (M=15.3(12.0), possible range=0-84), SWB: (M=21.5 (5.3), possible range=0-28), and DS: (M=7.4 (5.3), possible range=0-30). The mediation analysis revealed a significant effect of ULS on DS through SWB (b=0.1, t=2.3), supporting our hypothesis. Furthermore, the direct effect of ULS on DS was significant (b=0.2, $p<0.001$). Thus, SWB partially accounted for the relationship between ULS and DS in a protective manner. Conclusion: Further investigation of SWB as a protective factor is necessary to advance more specific interventions for depression in metropolitan areas.

The Effect of Physical Activity (PA) on Fears of Recurrence (FOR) and Personal Strength (PS) in Breast Cancer Survivors (BCS)

Presenter's Name: Jenna Warren
Classification: Graduate Student
School/College: Graduate School
Presentation Type: Poster Presentation
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Coauthors: Chiranjeev Dash,Jennifer Sween, Naomi Vinod, Teletia Taylor

Purpose: Data are mixed regarding the relationship between FOR and post-traumatic growth (PTG), positive life changes, among BCS. To elucidate this relationship, data is needed examining potential moderators. PA may serve as a moderator given the inverse relationship between PA and FOR and the positive relationship between PA and PTG. Therefore, this analysis aimed to assess whether PA moderates the relationship between FOR and PS (a factor of PTG). Methods: PA was measured in minutes per week then transformed to reflect CDC PA guidelines. FOR was measured by Concerns about Recurrence Scale, and PS was measured by Post Traumatic Growth Inventory. Data was analyzed using Hayes PROCESS Macro. Results: Participants included 72 BCS, African American (n = 35), Caucasian (n = 37) (Mean Age = 55.19, SD = 10.19). Less than half of the respondents maintained recommended PA levels (n = 30). FOR results were (M = 3.25 (1.19), possible range = 1-6) and PS results were (M = 11.65 (5.84), possible range = 0-20). Moderation analysis revealed PA did not significantly moderate the relationship between FOR and PS (b = 0.82, SE = 1.38, p = 0.55). Conclusion: Findings revealed that PA did not demonstrate a significant effect on the relationship between FOR and PS. Future studies may explore other potential moderators in order to understand the mechanisms underlying this outcome.

Three Eras of Black Commodification: Slavery, Convict Leasing, & Mass Incarceration

Presenter's Name: Darline Washington
Classification: Undergraduate Student
School/College: Arts & Sciences
Presentation Type: Poster Presentation
Faculty Advisor: Keesha Middlemass
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Throughout the history of the United States, white supremacy has been integral to the devastating effects of mass incarceration on the African American community. So much so that white supremacy has committed to confining, defining, and regulating African Americans. From 1619, when the very first slaves were transported to America, to the 2022 midterm elections and beyond, there has been a direct line of impact on how African Americans have been disproportionately affected by white supremacy. Today, although antebellum slavery may be abolished, the impact is still great for Black men in today's society. The Thirteenth Amendment has kept slavery alive by preserving slavery through its transformation of mass incarceration. My research and presentation will focus on how incarceration systems in the south, particularly the Louisiana State Penitentiary and the Mississippi State Penitentiary, are part of the connection of punitive institutions used to enforce the racial hierarchy in the United States.

Women in the World: Their Political Past, Present, and Future

Presenter's Name: Peyton West
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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This research on the impact of women in electoral politics examines the relationship women have with different political ideologies and how they have been influenced by their country of origin. From the first country to legally enfranchise women and give them the right to vote in national elections to modern day female politicians who have been elected, this paper contextualizes historical women and how they have assisted in furthering female suffrage. With the rise of facism in the 21st century, this is an examination of the historical context of how women have been involved in facism, but also their leftist counterparts. This research divides women into three distinct categories that reflect their political ideologies, leftism, centrism, and facism.

The Founding of the All-African People's Revolutionary Party (A-APRP) 1968-1972: A Pivotal Moment in the History of Black Internationalism and Black Radicalism

Presenter's Name: Tiffany Wheatland-Disu
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Faculty Advisor: Jean-Michel Mabeko-Tali
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The convening of the historic 1958 All-African People's Conference in Accra and the subsequent founding of the All-African People's Revolutionary Party (A-APRP) a decade later, constitute pivotal moments in the history of pan-Africanism, black radicalism and black internationalism. Yet, insufficient attention has been paid to the linkages between these events or to the revolutionary ferment to which they gave rise. This analysis of the collaboration between President Kwame Nkrumah of Ghana, President Sekou Touré of Guinea, and pan-Africanist Kwame Ture as founders of the party, examines the evolution of their political project in 1968 until the death of President Nkrumah, assessing the impetus for the collaboration and the role of the A-APRP as a physical and intellectual site of pan-African, black internationalist ferment.Among the most significant yet understudied transnational political formations of the 20th century, the broader study situates the emergence of the A-APRP along a continuum of black radical politics and praxis traversing national and political boundaries activated towards the liberation and self-determination of Africa and African people. The study engages a multi-archival review of documents and primary source materials collected from archives in Guinea, Ghana and the U.S. and oral interviews conducted with party militants and affiliates of the A-APRP and Parti démocratique de Guinée (PDG), which incorporates the A-APRP into the historiography of Black radicalism and radical thought as perhaps one of the most significant revolutionary, transnational, political formations of 20th century.

The Effect of Exposure to Parental Mental Illness on Anxiety and Self-esteem in Adolescents Who Live in Urban and Suburban Community Types

Presenter's Name: Erin Whitt
Classification: Graduate Student
School/College: Graduate School
Presentation Type: Poster Presentation
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Children with parents who suffer from mental illness are at increased risk of developing psychological disorders and behavioral problems that interfere with their performance in school and their interaction with peers, ultimately impacting their educational, social, and psychological development. The literature finds that urban community types give children a stronger sense of community togetherness and social support that may alleviate anxiety symptoms and promote a sense of self-esteem through belongingness. In contrast, suburban communities are more disconnected, leaving children feeling isolated from peers, which leads to higher levels of anxiety and lower self-esteem. The study proposes to examine how exposure to parental mental illness may affect the development of anxiety and self-esteem in adolescents and whether community type, i.e., urban or suburban, moderates this relationship between parental mental illness and the psychological distress experienced by adolescents. It is hypothesized that adolescent exposure to parental mental illness is associated with higher levels of anxiety and lower self-esteem due to possible caregiving roles, perceived stigma, and daily life stressors; and that community type will moderate the relationship between parental mental illness and psychosocial outcomes. A cross-sectional correlational research design will be employed, where approximately 120 adolescents (ages 13-18) will complete a survey consisting of measures used to operationalize the respective variables. Results are expected to advance our understanding of factors that promote resilience to the psychological distress caused by parental mental illness and aid in the development of an intervention that incorporates cultural coping mechanisms targeting early adolescents.

Black Student Athlete Mental Health: Healing Past "Fake It Until You Make It"

Presenter's Name: Dara Williams
Classification: Graduate Student
School/College: Graduate School
Presentation Type: Oral Presentation
Faculty Advisor: Ivory Toldson
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This presentation explores how Black student-athletes can proactively support their mental health. Student-athlete-specific demands contribute to the vulnerability and increased susceptibility for mental health challenges (Hagiwara et al., 2017), including clinical depression, anxiety, eating disorders, overtraining, substance use, and suicidality (Armstrong et al., 2015; Ryan et al., 2018; Schlimmer & Chin, 2018). The assumption that exercise is a protective factor for student-athletes has gained much scrutiny as mental health and wellness in competitive sport has magnified (Wolanin et al., 2016) because student-athletes mirror similar rates of depression as the college-aged population (Rao & Hong, 2015; Sullivan et al., 2020). The conflicting evidence between mental wellness, clinical presentation, and the stressors of the student-athlete experience has demonstrated mental health concerns to be contextual, under-investigated, and scarcely treated for the student-athlete population – particularly Black student-athletes. The aim of this presentation is to demonstrate that mental health is not simply the absence of illness, but the influence of wellness strategies, a claim substantiated by Dr. Nancy McWilliams, a pioneer of contemporary psychoanalysis. A unique perspective offered is that wellness is rooted in reality and cultivating authenticity while performing the role of a student-athlete - not pretending or "faking it until you make it". This talk will engage the audience with an integration of psychoanalytic/psychodynamic psychology and strengths-based thinking to support athletes' unique identities and mental wellness.

The Impact of COVID-19 on Gentrification in Atlanta's Periphery

Presenter's Name: Natalia Wilson
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Presentation Type: Poster Presentation
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Amidst the global health crisis caused by the ongoing COVID-19 pandemic, its widespread effects have extended beyond physical well-being. Socio-economic and political processes have been significantly disrupted, with gentrification experiencing a notable transformation across large U.S. cities. Due to Atlanta's distinct socioeconomic structure and racial composition, the researcher sought to investigate this particular instance of the phenomenon. Though many scholars have ex-

amined gentrification in Atlanta, illuminating the city's political power structure and its implications on communities, research has yet to analyze gentrification within the context of COVID-19. Recent scholarly literature has begun to examine the effects of COVID-19 on gentrification and urban development across large U.S. cities, revealing a pattern where city centers hollowed out and surrounding suburban rings became denser. As remote work became the standard, city dwellers saw an opportunity to relocate to the suburbs when the need to commute to work became obsolete. To better understand how the pandemic impacted gentrification in peripheral cities, the researcher conducted semi-structured interviews with long-term residents of Atlanta neighborhoods. The researcher then analyzed interview transcriptions, performing line-by-line coding to identify common thematic patterns and draw conclusions from resident perspectives. Future research should utilize longitudinal data to determine changes in intercity residential migration patterns after COVID-19 compared to previous years.

Lost Narratives, Broken Spirits: The Menticide of Erasing Black History
Presenter's Name: Brianca Wright
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This presentation advocates for the integration of CRT principles in education to expand, explore, and examine Black History. This approach aims to counteract menticide and foster constructive identity development for Black school-age students. This phenomenon is characterized by the imposition of restrictions on Afro-centered education, particularly targeting critical race theory (CRT). Embracing an unabridged approach to Black History through leveraging Phenomenological Variant of Ecological Systems Theory (PVEST) supports the development of ethnic-racial identities, educators can create an environment that nurtures inclusive identities, academic success, and cross-cultural relationships (Del Toro & Wang, 2021). Recommendations are provided for educators, policy, and research. Through integrating CRT into curriculum, educators can provide students with a critical lens through which to examine the systemic perpetuation of oppression.

The Paid Reparations of America
Presenter's Name: Hanif Wright
Classification: Undergraduate Student
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Presentation Type: Oral Presentation
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In 1988, the then President Ronald Reagan passed the Civil Liberties Act of 1988. This bill officially apologized for the wrongful, forced incarceration of thousands of Japanese Americans and other peoples of Asian descent during World War II. This act authorized payments of up to $20,000 (which was around $49,000 in 2022) to be paid to each wrongfully detained American who was still alive when the act was passed. In this paper, we will be exploring the arguments made by those who were detained as well as arguments made by their descendants as to why reparations were so important and ultimately what it was that allowed those who were detained to be compensated for it. We will also be reviewing the different types of reparations asked by those detained and why a monetary reparation was settled upon. And finally, I'd like to touch on the African American at the time of reparations. I want to not only compare and contrast the current battle for a form of reparations for centuries of enslavement to the reparations given to Japanese Americans but also what makes their situations so unique but at the same time very similar. I'd also review the general climate of the African American community of the time towards the rewarded reparations given to Japanese Americans.

Desiring More Than Cotton: What Material Culture Tells Us About Commodified Sexual Exploitation
Presenter's Name: Fahtim'a Yaro
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This study highlights the significance of incorporating material culture in the examination of the commodification and sexual exploitation enslaved women in the Fancy Trade endured. Material culture serves as evidence of the ways in which enslaved women's bodies were objectified, commodified, and subjected to violence within the institution of slavery. As a result, we are able to reconstruct the lived experiences of these women and gain a deeper understanding of the systemic oppression they endured. We can also deduce more about society and the social norms at the time. The objects I will primarily explore to do so are: documents, architectural structures and monuments. Ultimately, I argue that material culture is essential to understanding the complexities of the Fancy Trade.

TRANSLATIONAL & CLINICAL SCIENCES

Pediatric Oral Health Service Access in Racial/Ethnic Minority Neighborhoods: A Geospatial Analysis in Washington, D.C., USA

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Oral health plays a crucial role in overall well-being. The US Department of Health and Human Service aims to reducing dental caries in children and adolescents. The study aims to investigate the accessibility of pediatric dental care in neighborhoods with mixed-race and predominantly African American populations in the Washington District of Columbia (DC) area. Our objective is to uncover and highlight the disparities that exist in pediatric dental care within these communities. We have specifically examined the geographic and socio-demographic aspects of pediatric dental care facilities, utilizing geospatial tools such as modeling and mapping, as well as data from the clinical database at Howard University College of Dentistry. The detailed analysis of dental care access revealed significant disparities among various Wards in the region. Specifically, Wards 5, 7, and 8 stood out as having both the highest concentrations of African American residents and the lowest availability of pediatric dentistry providers when compared to the more affluent Wards 1, 2, and 3. Howard University College of Dentistry's pediatric dentistry department played a crucial role in providing dental care services to the community. Over the course of the year 2022, they recorded a total of 3,855 visits from residents of the DC area. Notably, a substantial portion of these visits, specifically 1,566 visits, were from individuals residing in Wards 5, 7 and 8. This data underscores the significant demand for pediatric dental services in these underserved communities and highlights the importance of addressing the disparities in access to care.

Unveiling the Nutritional Nexus: Mindful Eating's Impact on Depression in Adult Black Men

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This study delves into the intricate relationship between mindful eating practices and depression among adult black men, within the framework of their nutritional landscape. Through advanced methodologies rooted in nutritional science, it aims to analyze how mindful eating influences mental health outcomes. The research involves a deliberately diverse cohort of adult black men, encompassing varying degrees of depression severity, ensuring broad applicability of findings. To garner comprehensive insights, the methodology integrates cutting-edge techniques like comprehensive dietary analysis, micronutrient profiling, and a thorough examination of gut microbiota composition. These methods are tailored to provide a nuanced understanding of the intersection between mindful eating and mental health outcomes. At the heart of the study lies a meticulously designed mindfulness-based dietary intervention. Customized to accommodate individual dietary preferences within the cohort, it emphasizes heightened awareness during meals by incorporating key principles of mindful eating. The objective extends beyond immediate effects to investigate sustained impacts over the study's longitudinal timeline, spanning from 2017 to 2024. This prolonged duration facilitates the exploration of sustained benefits and potential changes over time. Through the integration of diverse components, including advanced methodologies, a diverse participant cohort, a carefully crafted intervention, and a longitudinal perspective, this research aims to offer nuanced insights into the relationship between mindful eating practices, the nutritional landscape, and depression among adult black men. The anticipated outcomes could inform future interventions, ultimately contributing to improved mental health outcomes within this specific demographic.

Neural Network Insights into Operative Efficiency in Shoulder Arthroplasty

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Background: Shoulder arthroplasty is a common orthopedic procedure, the efficiency of which is influenced by various patient and procedural factors. This study leverages a neural network to analyze these factors, aiming to optimize operative efficiency. Methods: We categorized arthroplasties into Total Shoulder Arthroplasty (TSA), Reverse, and Hemi, examining demographics, diagnosis patterns, operative details, and postoperative outcomes. A neural network model was then utilized to predict surgery durations, evaluating its performance through R^2, Root Average Squared Error (RASE), Mean Absolute Deviation (MAD), and additional metrics. Results: The analysis identified TSA as primarily used for degenerative conditions, with a relatively balanced gender distribution across all procedures. Operative times were consistent, yet Hemi arthroplasty demonstrated longer pre- and post-operative durations. Financial analyses revealed Reverse arthroplasty as having the highest mean supply charge, and Hemi the highest cost, with variable readmission rates across procedures. The neural network's predictive capacity was limited ($R^2 = 0.0114516$), indicating a marginal explanation of the variance in surgery durations and suggesting significant potential for model enhancement. Conclusion: This study

offers novel insights into the demographic, diagnostic, and procedural nuances affecting shoulder arthroplasty efficiency. Despite the neural network's initial limitations, the findings underscore the complexity of predicting operative times and emphasize the importance of continuous model refinement. Enhancing predictive accuracy could significantly aid in preoperative planning, resource allocation, and overall patient care optimization. Keywords: Shoulder arthroplasty, Neural network, Operative efficiency, Predictive modeling, Healthcare optimization.

Tenecteplase Versus Alteplase in Acute Ischemic Stroke

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The purpose of this retrospective medication use evaluation is to compare alteplase versus tenecteplase for the treatment of acute ischemic stroke. This is a retrospective chart review of patients who received alteplase six months prior to the formulary thrombolytic conversion between December 2022 and June 2023, and tenecteplase six months post-transition between June 2023 and December 2023 for the treatment of acute ischemic stroke. The primary objectives were to determine the rate of fibrinolytic-associated intracranial hemorrhage 24 hours
after fibrinolysis and the door-to-needle time of fibrinolytic administration. The secondary objectives were to identify changes in NIHSS at 24 hours after fibrinolysis, the incidence of dosing errors, and cost savings associated with tenecteplase versus alteplase after formulary transition. Thirty patients were included in this study. Baseline characteristics were comparable between the two groups. The percentage of patients with intracranial hemorrhage did not differ between alteplase and tenecteplase (13% vs 7%, p=0.54). The median door to needle time was 42 minutes in the tenecteplase group and 30 minutes in the alteplase group (p=0.52). There was no statistically significant improvement in NIHSS at 24 hours after fibrinolysis between alteplase and tenecteplase (2.2 vs 2.6, respectively, p= 0.76). The incidence of dosing error was comparable between the two groups. There was a significant reduction in medication cost with tenecteplase. The similar efficacy and safety outcomes of tenecteplase compared with alteplase,
along with the significant cost reduction with tenecteplase, support the preferential use of tenecteplase in patients with ischemic stroke.

Gender Disparities in Dietary Habits and Food Insecurity among African American Young Adults in Washington, D.C.

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Background: The USDA's 2022 report highlighted a rise in food insecurity, affecting 12.8% of households compared to previous years. In 2021, nearly one-third of Washington, D.C.'s population struggled to access food, including vulnerable young adults aged 18-25. This developmental stage influences education, workforce engagement, and long-term health, highlighting its significance for the nation's future. Methods: Participants, aged 18-25, African American/Black, HIV negative, and residing in disadvantaged wards in Washington, DC, completed a survey covering various domains, including dietary habits. Analysis employed frequency and t-tests. Dietary habits were assessed using fifteen questions on weekly or monthly eating habits. Results: The study examined gender differences in young adults' dietary habits. While both genders rated their diet health as "Very Good," females reported higher consumption of soda/pop, but also vegetables, excluding carrot, potato and green salad. Breakfast intake was similar. Significant differences were found between genders in various dietary aspects. However, no significant disparities were observed in potato, carrot, milk, fruit, or fruit juice consumption. Males had lower green salad intake. Food insecurity experiences were comparable, with around 51.4% of males and 49.4% of females reporting skipping meals due to insufficient funds. Conclusions: This study explored gender disparities in dietary habits among young adults. While both genders rated their overall diet health similarly, significant differences emerged in specific practices. These findings emphasize the importance of understanding gender-specific dietary behaviors for health promotion. Further research and interventions are needed to address disparities and promote healthier eating habits among young adults.

The Murder of Tyre Nichols: The power of video counter-storytelling, policing culture, and police brutality

Presenter's Name: Raul Candelaria
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Policing Culture and police brutality function as a destructive force of violence towards African Americans. Police brutality is a central element in policing culture. Police officers from the Memphis Police Department pulled over Tyre Nichols and beat him unconscious on January 7, 2023, resulting in his death on January 10, 2023 (New York, 11/2/23). Edited clips from the officers' lapel videos show the pulling of Nichols out of his car, the initial altercation at his car, his escape, and his recapture. Nichols an African American, experienced police brutality and death at the hands of five African American police officers; this relates to white supremacy and policing power. The study examines the Nichols videos as counter-storytelling on YouTube and social justice messages. Critical race theory is used to examine the videos depictions of policing culture, police brutality, and African American's reactions through social justice messages embedded in counter-storytelling. The study centers on counter-storytelling and social justice messages in reaction to the Nichols on YouTube pertaining to the pervasive nature of police brutality entrenched in policing culture. The purpose centers on counter-storytelling offering a lens to how communication is used through narrative and messages to express the lived experiences of

African Americans and police brutality. Thematic analysis is used to conduct in-depth analysis of the written words in YouTube reactions of social justice messages and counter-storytelling to the Nichols videos.

A Comprehensive Comparative Analysis of Early Onset and Late Onset Colorectal Cancer Among African Americans: A 60-Year Study in an Underserved Population-Serving Hospital

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Aim: To investigate differences between early-onset colorectal Cancer (EOCRC) compared to late-onset colorectal cancer (LOCRC) in African Americans (AA). Methods: Retrospectively reviewed demographic, clinical presentation, colonoscopy, and pathology reports of patients at HUH from 1959-2023. We identified 176 EOCRC (<45 years) and 2025 LOCRC cases (>45 years). Results: Overall, AA's were predominant (>80%) and slightly more females (53%). The mean age was 38 years for EOCRC and 66 years for LOCRC. Family history of CRC in first-degree relatives was higher in EOCRC (15.5%) compared to LOCRC (3.2%, p<0.01). Initial symptoms at presentation were prevalent in both groups(93.8% & 92.6%). EOCRC exhibited a higher incidence of abdominal pain (23.3% vs. 17.2%, p=0.05) and changes in bowel habits (24.4% vs. 14%, p=0.05) compared to LOCRC. Initial encounter with a GI physician differed, with EOCRC patients primarily presenting in outpatient, while LOCRC patients in inpatient setting (p=0.059). There was higher occurrence of neuroendocrine tumors and squamous cell carcinoma in EOCRC (2.8% & 2.3%) than in LOCRC (1.4% & 0.9%). EOCRC was primarily observed in the left side of colon (p=0.01) with high metastasis rate in EOCRC compared to LOCRC (p=0.02), presenting in stage 3 (p=0.05). EOCRC patients took longer duration to undergo surgery compared to LOCRC patients (p=0.03). Interestingly, the incidence of CRC showed fluctuations over the years, peaking between 1980 and 1989 before declining in recent years. Conclusion: EOCRC incidence is increasing among AA displaying highly advanced and more metastatic tumors. Special attention and further research are warranted to identify EOCRC in high risk AA's.

Temporal Trends of Blood Glucose in Children with Cerebral Malaria

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Hypoglycemia, defined as a blood glucose <2.2 mmol/L, is associated with death in pediatric cerebral malaria (CM). The optimal duration of glucose monitoring in CM is unknown. We collected data from 1674 hospitalized Malawian children with CM to evaluate the association between hypoglycemia and death or neurologic disability in survivors. We assessed the optimal duration of routine periodic measurements of blood glucose. Children with hypoglycemia at admission had a 2.87-fold higher odds (95% CI: 1.35-6.09) of death and, if they survived, a 3.21-fold greater odds (95% CI: 1.51-6.86) of sequelae at hospital discharge. If hypoglycemia was detected at 6 hours but not at admission, there was a 7.27-fold higher odds of death (95% CI: 1.85-8.56). The presence of newly-developed hypoglycemia after admission was not independently associated with neurological sequelae in CM survivors. 94.7% of all new episodes of blood sugar below a treatment threshold of 3.0 mmol/L occurred within 24 hours of admission. In those with blood sugar below 3.0 mmol/L in the first 24 hours, low blood sugar persisted or recurred for up to 42 hours. Hypoglycemia at admission or 6 hours afterwards is strongly associated with mortality in CM. Children with CM should have 24 hours of post-admission blood glucose measurements. If a blood glucose less than the treatment threshold of 3.0 mmol/L is not detected, routine assessments may cease. Children who have blood sugar values below the treatment threshold detected within the first 24 hours should continue to have periodic glucose measurements for 48 hours post-admission.

Interventional dietary saffron drives antitumor immunity in high risk colorectal cancer IBD Patients: A Multisite Clinical Trial Study

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Background: Inflammatory polyps in patients with Inflammatory Bowel Disease (IBD) pose a risk for colorectal cancer (CRC). Dietary interventions targeting anti-tumor immunity lower this risk. Aim: We investigated saffron's anti-inflammatory effects in IBD patients due to the high prevalence of polyps, aiming to prevent CRC. Methods: The study retrospectively evaluated 485 colitis patients (70 IBD, 415 NIC) from Howard University Hospital, through colonoscopy, pathology and clinical reports evaluations. At Howard University, three UC patients received 50mg of saffron twice daily for 8 weeks, with two cycles. Inflammatory markers, stool calprotectin, and cytokines were assessed. Similar saffron trials performed at Yazd University (30 UC patients) and Egypt University (11 UC patients). Results: Patients with inflammatory bowel disease (IBD) had a 15.7% prevalence of polyps compared to 8.2% in non-inflammatory colitis patients. IBD patients with ulcerative colitis had more polyps (27%) than Crohn's disease (5%) patients. In a multisite clinical trial, Saffron treatment improved partial Mayo Score and quality of life. Treatment with saffron (HU site) led

to pro-inflammatory cytokines decreasing, anti-inflammatory markers increasing, and reduction of fecal calprotectin levels. No adverse events were reported. In one group of patients (Yazd study), saffron improved depression scores, disease severity, and inflammation markers. In another site (Egypt study), 50% of saffron-treated patients improved in severity, inflammation, and quality of life. Conclusion: Saffron, alongside standard treatments, shows promise in reducing inflammation in UC patients and may reduce the development of inflammatory polyps. This safe and feasible intervention warrants exploration as an inflammation-driven colorectal preventive strategy.

Emerging Trends in Colorectal Cancer: A Comprehensive Analysis of Early and Late-Onset Cases among African Americans, with a Focus on the Pre- and During COVID-19 Era

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Aim: To investigate differences between EOCRC and late-onset colorectal cancer (LOCRC, >45 years) in AA patients and understand the trend patterns in the last decade, particularly during the COVID era. Results: The majority (80%) of our cohort consisted of AA. A high proportion of males were diagnosed with colorectal cancer (CRC) during the COVID-19 period (2020-2022), with rates of 87.5% in EOCRC versus 75% in LOCRC, in contrast to a nearly equal gender distribution in preceding years. The incidence of CRC fluctuated over the study period, with a higher observed incidence between 2011-2013 that gradually declined until 2019, followed by a notable spike during the COVID era (2020-2022), particularly in EOCRC patients (Fig 1) probably due to an increase in smoking, alcohol consumption, and obesity in both LOCRC and EOCRC groups. Our temporal analysis uncovered a noteworthy rise in the incidence of altered bowel habits (75% vs. 50%) and hematochezia (75% vs. 52%), especially in the recent COVID era in EOCRC patients compared to LOCRC patients. Importantly, these shifts were noted to be the primary indications for colonoscopy among EOCRC patients (p=0.044). In the COVID era, EOCRC patients exhibited a predominant left side occurrence (p=0.040), unlike the balanced distribution in 2017-2019. Overall, LOCRC patients mostly had cancers on their right side. Analysis of cancer stage revealed a significant shift in EOCRC patients presenting in stage 4 during 2011-2016 to stage 2 in the COVID era (p=0.042), suggesting increased awareness or a more symptomatic presentation that led to early diagnostic evaluation.

Identifying Relevant Allergens and Anti-Inflammatory Therapy in Hair Loss Patients

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Background: FFA, LPP, and CCCA are inflammatory alopecias that can be challenging to treat. Studies demonstrate LPP and FFA patients are significantly more likely to have positive patch tests and evidence of allergic contact dermatitis. Allergen avoidance improved scalp inflammation. Those studies didn't include patients with CCCA common in people of African descent. The purpose of this study was to determine if our data was similar to previous studies, including CCCA patients. Methods: A retrospective chart review was conducted on all hair loss patients who received patch testing from January 2021 to June 2023 at KMC Dermatology in Mission, Kansas. Patients were stratified based on diagnosis of FFA, LPP, or CCCA, patch testing, allergens, and anti-inflammatory therapy. All data was collected, and the percentages were calculated and analyzed. Results: 57.55% of 80 patients had a positive patch test. 62.5% of 48 LPP patients reacted positively. 30 of 46 positive test patients had LPP. 70% of 10 FFA patients reacted positively. 55.56% of 9 CCCA patients had reacted positively. 78.75% of 80 patients received anti-inflammatory therapy. Of 48 LPP patients, 81.25% received anti-inflammatory therapy. Of 10 FFA patients, 70% received anti-inflammatory therapy. Of 9 CCCA, 88.89% received anti-inflammatory therapy. Discussion: Avoiding relevant allergens is helpful in reducing active inflammation in scarring alopecia. Similar to previously mentioned studies, a significant number of patients had a positive patch test. The most common allergens were toluenediamine sulfate, benzoyl peroxide, and propylene glycol. Less impressive patch test can result if the patient is on anti-inflammatory medication.

Preventing Youth Incarceration: A translational approach

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Youth crime and incarceration in DC is perceived by many as a problem. While many people search for answers, this project aims to ask students and community members what they believe the causes and solutions are for juvenile incarceration. Conventional surveys sometimes do not produce complete data because 1) response-rates are low or 2) survey instruments ask respondents to rank statements that may not reflect respondents' views or needs. By offering cash prizes to high school students to make short videos or offer statements about the causes and solutions to youth incarceration and then using AI technology to analyze the natural language responses and comments to the videos of students and community members, this project aims to offer community driven policy suggestions. The research involves the translational

work of law and psychology, advancing and approach to youth incarceration that has rarely been seen. The research method advances in fives phases, including planning, data collection, policy development, and systems engagement. Collaborators include the School of Law, Psychology Department, the ILEAD Program, and a DC high school student.

Income-Based Poverty Predicts Reduced Cognitive Performance in American Older Adults: The Health and Retirement Study

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Background: Socioeconomic status (SES) has implications for the development of dementia. SES has various indicators such as education, income, and wealth. Poverty has been linked to mortality, especially in marginalized communities of color. Lower incomes, education, occupational status, and social class have a higher risk of dementia. The study aimed to examine the impact of SES on cognitive functioning in a large sample of American older adults and determine the moderating effects of race, ethnicity, and sex. Methods: Participants (n=8,659) in the Health and Retirement Study (HRS) completed background, neuropsycho, and social assessments. Analyses determined demographic and health differences by poverty-based income status. Linear regressions determined if SES measures predict cognitive functioning, controlling for demographic and clinical covariates. Subgroup analyses investigated effect modification by race, ethnicity, or sex. Results: Our sample is on average 74 years old, 15% Black, 10% Hispanic, and 59% female. Those below the income-based poverty threshold (n=748) were younger, disproportionately Black, less wealthy and educated, and more unhealthy. All measures indicating low income and wealth predicted poorer performance in global cognition, with the strongest predictor being income-based poverty status ($B = -1.65$, $p < 0.001$). This relationship is stronger in African Americans, Hispanics, and men. Discussion: Income-based poverty predicted poorer cognitive functioning, particularly in African Americans, Hispanics, and men. Early interventions in marginalized communities through systemic policy change may lower dementia risk later in life. Future studies should focus on multidimensional poverty and its implications on long-term cognitive impairment and dementia in older adults.

The potential for data science analytics to remediate existing health disparities through improved clinical and medical research insights.

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Data science analytics can respond definitively to health disparities through an investment in the creation of databases that emphasize the unstructured, qualitative nature of the most relevant information needed to alleviate health disparities. This paper discusses the potentials for unstructured machine learning to harness qualitative, ethnographic information of relevance in reconstructing the origins and maintenance of current inequities in diverse populations, medical settings, and health conditions. We also identify the current databases that attempt to address health disparities, and we suggest explicit strategies that must be put in place to use data science analytics to identify the nuanced details of health inequities. The application of ethnographic-rich databases to clinical and medical research can increase their power and better identify the proximate and ultimate causes in understudied health disparities.

Elevated maternal mental distress in low resourced Black and African American pregnant women in DC

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Introduction: Low-income Black pregnant people are disproportionately affected by maternal mortality and poor mental health outcomes and represent an understudied perinatal population in clinical trials. The Mommy&Me study is a novel RCT using patient navigation/mental health/peer support interventions compared to usual care in a population of low resourced Black and African American (AA) pregnant women. Objective: To describe baseline prenatal maternal mental health characteristics of the Mommy & Me cohort. Methods: Eligible participants were consecutively recruited from three DC urban sites, including birthing hospitals (GWUH, HUH) and federally qualified health centers (Unity). Structured mental health assessments of stress (perceived stress scale, PSS), depression (Edinburgh postpartum depression scale, EPDS) and anxiety (generalized anxiety disorder-7 item scale, GAD7) were assessed at study enrollment. Results: To date, 381 participants of the 700 targeted sample size have been enrolled since September of 2022. Mean maternal age 28.3±5.82 years. 57% of respondents report elevated stress at enrollment, while 34% report elevated depression, and 22% report elevated anxiety. Mean scores of PSS=15±8, GAD7=5.5±5, EPDS=8±6. Seven percent (7%) of participants reported thoughts of self-harm and 5% of participants were withdrawn due to concern for psychosis or self-harm. Conclusions: We report high engagement, recruitment and retention using flexible and adaptable approaches in a cohort of low-income black and AA pregnant women. Maternal psychological distress among enrolled participants is very high including stress, depression and anxiety, as well as elevated reports of psychosis and self-harm, necessitating additional clinical referrals.

Cardiovascular Disease Risk in Diabetic African Americans: An Assessment Through Transcriptomic Approach

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Purpose: Type 2 Diabetes (T2DM) is a leading risk factor for the development of cardiovascular disease (CVD) in African Americans (AAs), who are at higher risk compared to other racial groups. Reports indicate that AAs are 30% more likely to die from heart disease than non-Hispanic whites. We aimed to identify the key intervening networks with their shared genes for both CVD and T2DM through a comprehensive transcriptomic analysis. Methods: Blood transcriptomic information was collected from our previously established cohort (n=36; T2DM=18, Control=18, ages 45 - 65 years). Sociodemographic, lifestyle exposures and medical background information were retrieved. Ingenuity Pathway Analysis (IPA) was performed to determine the gene networks and pathways. Comparison analysis was conducted using datasets curated from GEO. Results: Our transcriptomic data revealed a total of 64 genes were significantly differentially expressed (-1.5 to + 3.5-fold change, p-value < 0.05) that directly related to the CVD pathway in T2DM condition. DNAAF11, ADAMTS3, FLT3, MYH9, and SMIM19 were the top genes that were either up or down-regulated. Network analysis revealed familial cardiovascular disease, nonischemic cardiomyopathy, and microangiopathy were top networks. Ethnicity-wise comparison analysis revealed HIF1A, BAG3, DES, PCSK9, and ICAM2 were common genes among the Caucasian and Hispanic populations. Conclusion: This pilot study provides an understanding of the molecular mechanisms of underlying disease in AAs. We identified some of the common genes and networks which are significantly associated with the CVD pathway in the context of T2DM, pinpointing potential molecular targets for further research and therapeutic intervention.

Factors Associated with Increased Outpatient Follow-Up Referrals for High-Risk Infants and Subsequent Clinic Attendance in Various States

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High-risk infants are those typically born at very low birth weights and lower ages. These factors put them at risk of developing congenital abnormalities which would necessitate their stay in the NICU for proper monitoring over some time. Congenital abnormalities may lead to complications in development such as behavior or impaired motor skills. However, there are unforeseen circumstances and or components that can facilitate or prevent attendance at the High-Risk Infant Follow-up. These follow-up visits are intended to monitor the advancement and development of the infant. To have these visits, the patient must be referred at their initial release from the hospital. To further understand, referral rates as well as attendance are focused on in the various articles. The main components that follow-ups and attendance are contingent on are Maternal age, family income, mother's educational background, distance, maternal race, and distance.

A Review of Sublingual Buprenorphine and Naloxone Access in Community Pharmacies in an Urban Community

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Purpose: Opioid-related deaths in the District of Columbia (DC) have increased by 38% since 2019 with approximately 84% among blacks. However, studies indicate that community pharmacies do not maintain adequate stock medications to treat opioid use disorder (MOUD). This study assesses the availability of these medications in community pharmacies in DC. Methods: Student pharmacists were trained in the study procedures. Phone calls were made to actively registered community pharmacies in DC. Those that were no longer in business were excluded from this study. The students posed as individuals with prescriptions for sublingual buprenorphine/naloxone and naloxone. They asked the pharmacist if they had them available to be dispensed. Pharmacies with low or no quantities of the medications in stock were asked if they were willing to order the medications and when it would be available. Results: Out of 147 community pharmacies, 118 pharmacies were included in the study. Fourteen percent (14%) had sublingual buprenorphine/naloxone in stock. Approximately 13.5 % had sublingual buprenorphine/naloxone and naloxone in stock. Forty-two percent (42%) had naloxone only in stock. Fifty-nine percent (59%) had no sublingual buprenorphine/naloxone in stock. Additionally, 21% of them had no naloxone in stock. Among the community pharmacies that had neither of the medications in stock, two pharmacies were willing to order. Conclusion: Significant gaps to access of sublingual buprenorphine/naloxone and naloxone exist among community pharmacies in DC. Further studies are needed to understand why most community pharmacies in DC do not stock these life-saving medications.

Synthesis and characterization of polymer-drug conjugates prepared by strain-promoted azide-alkyne cycloaddition-mediated step-growth polymerization

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Background: Polymer-drug conjugates (PDCs) are drug delivery systems where active pharmaceutical agents are covalently attached to polymeric chains through stimuli-sensitive linkers. They offer opportunities such as high drug loading and modification of the pharmacokinetics of small-molecule anticancer agents to prevent undesired off-target adverse effects. The common techniques employed for the synthesis of PDCs often require rigorously controlled reaction conditions, high temperatures, and an initiator or catalyst. Strain-promoted [3+2] azide-alkyne cycloaddition (SPAAC)-mediated step-growth polymerization enables an easy and rapid synthesis of polymers with more precise control over the architecture and functional groups under mild conditions and without a catalyst or initiator. Method: α-ω-bis-azide-terminated bifunctional gemcitabine-coupled and doxorubicin-coupled monomers, with drug linkage via Gly-Phe-Leu-Gly (GFLG), a cathepsin B-sensitive peptide linker, were separately synthesized. The two azide-terminated bifunctional drug-coupled monomers were individually copolymerized with a dibenzoazacyclooctyne bifunctional polyethylene glycol monomer via SPAAC to prepare gemcitabine and doxorubicin PDCs. Results: The method produced PDCs with high molecular weight (Mw ~ 40.18 kDa for gemcitabine; Mw ~ 1800 kDa for doxorubicin), narrow polydispersity (Mw/Mn < 1.4), and high drug loading (29.2 %wt. gemcitabine and 10.3 %wt. doxorubicin). The PDCs showed cathepsin B-catalyzed cleavage and drug release at pH 5.0, and no drug release in the absence of cathepsin B within the period evaluated. Conclusion: The novel method for the syntheses of the PDCs enables the selective delivery of potent anticancer agents to tumors. In our opinion, this work is the first report of SPAAC-mediated step-growth polymerization for the synthesis of PDCs.

How Biologicals such as Zilucoplan, a complement 5 inhibitor, working wonders to prevent exacerbations in Mayasthenia Gravis but at a cost

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Advancement in technology and increasing knowledge in the use of Biologics or specifically immunomodulators have modernized medicine in many specialized fields to now give effective treatment in pathological disease where no treatment, if any, was available. Immunomodulators have made great strides, especially in treating autoimmune pathology. In this case report, a 47-year-old African American female patient with medical history of Myasthenia Gravis was transferred to Howard University Hospital for impending respiratory failure requiring intensive care unit admission. Per history, the patient follows up at nearby tertiary hospital for Myasthenia Gravis and has been part of a drug trial since 2019, taking a complement 5 inhibitor called Zilucoplan. She was found to have large pleural effusion on CAT scan. She underwent urgent bedside thoracentesis with output of 2.1 L. Her symptoms significantly improved along with broad spectrum antibiotics. This case report aims to bring awareness to the advanced use of immunomodulators such as Zilucoplan which shows to improve disease control a number of years but at a cost. Although this patient was previously vaccinated against Neisseria meningitis, she became at risk for infection with use of immunomodulators in the long term resulting in parapneumonic effusion.

Neighborhood Socioeconomic Deprivation and Likelihood of Revascularization in Maryland

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Background: Race/ethnicity, socioeconomic status and insurance status have all been reported to have an effect not only on outcomes, but also on the likelihood of Chronic Limb Threatening Ischemia (CLTI) patients undergoing revascularization versus amputation. The effect of neighborhood socioeconomic deprivation is increasingly being acknowledged as having a role in these sociodemographic disparities. This study aimed to determine if neighborhood socioeconomic deprivation, as measured by the Distressed Communities Index (DCI), influences treatment selection for revascularization versus amputation for patients presenting with CLTI in the state of Maryland. Methods: We conducted a retrospective analysis of the Maryland State Inpatient Database between January 2018 and December 2020 to assess the association between DCI and the likelihood of revascularization versus amputation for patients presenting with CLTI. Multivariate logistic regression analyses were also used to determine the odds for revascularization versus amputation. Results: There were 3520 hospitalizations for CLTI. Of these, 2,504 (71.1%) underwent revascularization, while 1016 (28.9%) underwent major amputation The median age was 69 years (Interquartile range 61-78), 40.3% of the patients were females, 54.6% identified as Whites, 40.9% identified as Black, 2.2% were Hispanic, and 2.3% were Other race/ethnicity. There was no association between the DCI and the treatment received, i.e. revascularization versus amputation. Conclusion: The DCI was not associated with a likelihood of revascularization versus amputation for patients presenting with CLTI in this Maryland statewide database.

Relationships between sleep health and geospatial indicators of neighborhood distress among African American participants in Washington DC

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Introduction: Environmental factors disproportionately increase the risk for negative health outcomes in African Americans. Poor sleep duration and sleep efficiency–both of which are subject to influence by poverty

and crime rates in the environment–have been linked to metabolic and cardiovascular disease. Threats of violence and insecurity from poverty may negatively impact feelings of vulnerability when sleeping–potentially decreasing sleep quality. The aim of this study is to explore relationships between sleep health measures and geospatial indicators of neighborhood distress. Methods: African- American men and women between the ages of 18-36 completed the Insomnia severity index (ISI) and city stress index (CSI). The expanded sample includes 2 cohorts who were recruited between 2010-2015 and (2017-2024). Sleep indicators (sleep duration and sleep efficiency) were measured using home based actigraphy. Higher scores of sleep indicators correlate to poor sleep quality. The addresses of the participants were linked to a census tract defined by the Census Bureau using the MAR geocoder and QGIS mapping software. Violent crime rates and other social determinants of health were obtained from the DC Census Bureau. Results: CSI was found to be positively correlated with ISI ($p< 0.001$) and negatively correlated with sleep efficiency ($p<0.000$). Sleep efficiency was also found to be positively correlated with property crime ($p<0.029$). Conclusion: Self-reported measures corresponding to the subject's perception of threat and crime in the environment had a stronger correlation to sleep health than objective indicators in the environment.

Exploring the Impact of Family History and Lifestyle Factors on Colorectal Cancer Risk

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Abstract: Colorectal cancer (CRC) ranks as the third most prevalent cancer and the second most common cause of cancer deaths in the United States. Given its significant impact, effective screening methods are vital for its prevention. Screening can detect CRC early, and regular screening can even prevent CRC. However, current screening recommendations primarily rely on a history of colorectal cancer and age. To facilitate a more effective screening of colorectal cancer, this study investigates the potential of machine learning algorithms for predicting colorectal cancer risk. A comprehensive analysis was conducted on a diverse cohort to explore the interplay between family history and lifestyle habits. Leveraging the longitudinal Pancreatic, Lung, Colorectal, and Ovarian Cancer datasets from the National Cancer Institute, machine learning algorithms were trained and tested. The dataset comprised individuals with varying degrees of familial predisposition to CRC and detailed information on lifestyle factors such as smoking, physical activity, and dietary habits. The models were used to assess the importance of top risk factors, aiding in formulating more effective screening recommendations. The experiment results show that the logistic regression model has an AUC of 0.66 under the Receiver Operating Characteristics curve. This appears consistent with the accuracy score and the precision value from the classification report. Overall, integrating familial history and lifestyle assessment holds promise for enhancing CRC prevention and early detection efforts, ultimately improving public health outcomes and reducing the disease burden.

Acute Hypoxic Respiratory Failure and Acute Renal Failure due to Phenazopyridine Overdose: A case report and literature review

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Phenazopyridine, an Over-The-Counter urinary tract analgesic, can cause methemoglobinemia which can lead to respiratory failure; hemoglobin is oxidized to form methemoglobin which results in a ferric state with increased oxygen affinity that impairs oxygen release. A 27-year-old woman with a history of recurrent urinary tract infections presented to the emergency department with complaints of 2-week history of difficulty voiding, abdominal pain, back pain, jaundice, and shortness of breath. She was found to have hypoxia, leukocytosis, anemia, hyponatremia, bacteriuria, and acute kidney injury. Renal ultrasonography was unremarkable. She saturated 95% after treatment with 4 liters of oxygen. She was admitted for management of acute renal failure, acute pyelonephritis, and acute hypoxic respiratory failure. Computed Tomography of the chest, abdomen, and pelvis was negative for acute pathology. A lung ventilation/perfusion scan found a low probability for pulmonary embolism. With no clear etiology of her respiratory failure, there was concern for methemoglobinemia which prompted a comprehensive medication use history. During the four days prior to admission, she ingested 34 tablets of Phenazopyridine 100mg including 10 tablets on the day of admission. The poison control center, pulmonology, and nephrology services were consulted. Co-oximetry noted methemoglobin level of 2.8%. Glucose-6-phosphate dehydrogenase level was normal. Her treatment involved supplemental oxygen, oral Vitamin C 1000mg three times daily, intravenous Ceftriaxone 1g daily, and intravenous fluids. She was discharged following improved renal function and resolution of her methemoglobinemia and respiratory failure. This case highlights the need for a high index of suspicion for methemoglobinemia with Phenazopyridine use.

Comparison of renal function estimators and their impact on HIV pharmacotherapy eligibility: A Monte Carlo approach

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The inclusion of race in the MDRD, and CKD-EPI equations has been a concern, because it results in a lower prevalence of CKD diagnosis in Black patients compared to White patients, despite Black patients being four times as likely to experience end-stage renal disease. Previous studies have shown use of the MDRD equation and 2009 CKD-EPI equation in Black male veterans with HIV can overestimate GFR, thus causing kidney damage and failure to be overlooked. In 2021, the

National Kidney Foundation recommended the implementation of the 2021 CKD-EPI creatinine equation that estimates kidney function without a race variable. Studies have shown this results in reclassification of the stage of kidney disease in some cases, allowing for more Black patients to be eligible for kidney disease prevention as well as kidney transplants. Conversely, some have also stated the removal of the race variable can exclude some Black patients from life-saving cancer treatment. The purpose of our study is to explore if the 2021 CKD-EPI equation without race impacts eligibility and dosing for certain HIV medications in black patients, in comparison to older eGFR methods. A Monte Carlo simulation generated eGFR values of 10,000 virtual patients based on essential parameters derived from a retrospective chart review conducted on patients from Howard University Hospital Infectious Disease Clinic from January 2019 to August 2022, on antiretroviral therapy. Results showed there was a higher percentage of patients ineligible for HIV therapy when using the 2021 CKD-EPI compared to the other renal estimators.

"Let's Grab A Bite" A Systematic Review to Assess the Impact of Nutritional Health on Cognitive and Academic Performance in Black Children

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Introduction: According to Feeding America, 29% of Black children are more likely to live in food insecure households. Researchers found that many of the children living in these households are often from single-parenting families with low socioeconomic status resulting in higher poverty rates, unemployment, and low wages with limited access to quality food. Because of these factors, children who are a part of underrepresented communities are also lacking access to quality resources that can in turn lead to deficiencies in nutritional and educational opportunities, increasing behavioral challenges and poor school performance. Hence, this assessment aims to examine the relationship between socioeconomic status, nutrition, and its connection to cognitive and academic performance in preschool aged Black children which will provide critical information for the development of an intervention within the school system. Methods: This proposed study will utilize a systematic approach that will review the existing literature over a period of 7 years to identify the impact of undernutrition on cognitive and academic performance in preschool aged Black children. The systematic review will include a search of databases that include the National Institutes of Health (NIH) Library, Google Scholar, PubMed, and EBSCO. Expected Outcome: The outcome of this study will summarize the impact of low socioeconomic status and its association with reduced nutrient intake in Black children, understand the influential factors related to undernutrition and poor cognitive development in Black children, and provide recommendations on the best practice for optimal cognitive functioning and academic performance in Black preschool-aged children.

HIV TAT Protein Effects on Neurotransmission and CB1 Receptor-Mediated Signaling in a Model of Endogenously Expressed Cannabinoid Signaling

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In HIV-infected individuals, brain microglia release neurotoxic agents which evoke excitotoxic synaptic injury. The HIV trans-activator-of-transcription (TAT) is one of the neurotoxins and a key player in HIV-associated neurocognitive disorders (HAND). Exogenous cannabinoids attenuate neurotoxicity in animal models of HAND. Targeting the cannabinoid system in HAND has therapeutic potential. However, it has not been determined if cannabinoid signaling in the brain is affected by HIV. The hypothesis is that TAT protein will inhibit endocannabinoid mediated synaptic plasticity. We tested this with patch-clamp recordings in autaptic hippocampal neurons, a model that expresses an intact endogenous retrograde circuit with presynaptic cannabinoid (CB1) receptors that, when activated, inhibit neurotransmitter (glutamate) release, known as Depolarization-induced Suppression of Excitation (DSE). When neurons are stimulated with a series of successively longer depolarizations (50 ms to 10 sec) this results in progressively greater inhibition of neurotransmission and yields a "depolarization-response curve" which permits the calculation of an effective-dose (ED50), i.e., the duration of depolarization that results in 50% of the maximal inhibition. We tested the effect of 5-min treatment with TAT protein at 100 ng/mL. At this concentration, TAT protein did not alter baseline excitatory postsynaptic currents, indicating that TAT was not altering pre- or postsynaptic components of neurotransmission. The DSE responses were not significantly different in terms of ED50. Other studies have reported robust effects of TAT in a cell line at 1ug/mL. Therefore, it will be important to test the effect of TAT at higher concentrations to determine its role at the cellular level.

Exploring the Efficacy of Traditional Medicinal Foods in Chronic Disease Management: A Systematic Review

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Introduction: The prevalence of chronic diseases continues to rise globally, instilling a curiosity for methods of prevention and management. Traditional medicinal foods have shown their potential for alleviating and treating such conditions, yet they are not widely researched. Scientific investigation is essential to evaluate their validity as an applicable approach to disease management. The purpose of this study is to provide a comprehensive overview of the current evidence regarding the use of traditional medicinal foods in chronic disease management.

Methodology: This study involves a systematic review of more than 15 peer-reviewed articles focusing on the efficacy of traditional medicinal foods in chronic disease management. The literature search spans electronic databases such as PubMed using keywords like "traditional medicine" "medicinal foods" "food as medicine" and "chronic disease". Results: Preliminary findings suggest that traditional medicinal foods exhibit promising effects in mitigating various chronic diseases. Mechanistic studies have highlighted their antioxidant, anti-inflammatory, and immunomodulatory properties, contributing to their potential therapeutic effects.

Conclusion: The review of multiple peer-reviewed articles reveals traditional medicinal foods to show promise in management and prevention of chronic disease. These natural remedies demonstrate potential benefits across various aspects of health, including glucose regulation, pancreatic function, lipid levels, inflammation, and oxidative stress. Further rigorous research is necessary to strengthen the existing evidence and clarify the role of traditional medicinal foods in the holistic management of chronic diseases.

Impact of the Affordable Care Act on Revascularization versus Amputation in Patients Presenting with Chronic Limb-Threatening Ischemia in Maryland

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Introduction: The Affordable Care Act (ACA) aimed to expand Medicaid, enhance healthcare quality and efficiency, and address health disparities. These goals have potentially influenced medical care, notably revascularization rates in patients presenting with chronic limb- threatening ischemia (CLTI). This study examines the effect of the ACA on revascularization versus amputation rates in patients presenting with CTLI in Maryland. Methods: This was a retrospective analysis of the Maryland State Inpatient Database comparing rate of revascularization to rate of major amputation in patients presenting with CLTI over two periods: pre-ACA (2007-2009) and post-ACA (2018-2020). In this study, we included patients presenting with CLTI and underwent a major amputation or revascularization during that same admission. Using regression analysis, we estimated the odds of revascularization vs. amputation pre- and post-ACA implementation, adjusting for pertinent variables. Result: During the study period, 12,131 CLTI patients were treated. Post ACA, revascularization rate increased from 43.9% to 77.4% among patients presenting with CLTI. This was associated with a concomitant decrease in the proportion of CLTI patients undergoing major amputation from 56.1% to 22.6%. In the multivariate analysis, there was a 4-fold odds of revascularization among patients with CLTI compared to amputation, (OR=4.73, 95% CI 4.34-5.16) post-ACA. This pattern was seen across all insurance groups. Conclusion: The post-ACA period in Maryland was associated with an increase in revascularization rate for patients presenting with CLTI with overall benefits across all insurance types.

The Impact of Prior Authorizations on Treatment Outcomes for African American OUD Patients in Washington D.C.

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BACKGROUND: Opioid use disorder (OUD) is characterized by significant impairment due to the chronic use of opioids. Buprenorphine/naloxone (BUP) is indicated for OUD management and has a maximum dose of 24 mg per day. Patients requiring higher doses above 24 mg daily often require a prior authorization (PA), leading to delays in access to treatment and increased withdrawal symptomatology. The purpose of this research is to compare treatment outcomes for African American OUD patients by insurer. METHODS: We will employ a retrospective cohort study design utilizing patients from an OUD practice in Washington D.C. from January 1, 2017 to the present. Inclusion criteria are age over 18 years and OUD diagnosis. Our independent variable will be insurer (AmeriHealth, AmeriGroup, Medstar, or other) and our dependent variable will be withdrawal symptomatology. Study variables include patient demographic information, insurer, BUP dose, and PA information. Data will be gathered from the electronic health record. Statistical analyses will include univariate analyses and regression analyses.

EXPECTED RESULTS: We anticipate that patients enrolled with Medstar insurance will have a significant lower instance of withdrawal symptoms than with AmeriHealth, AmeriGroup, or other insurances.

CONCLUSION: PAs can create barriers to access to care and predispose patients to increased risk of opioid overdose. This is especially a challenge for African American patients, who are more likely to need doses above 24 mg per day of BUP in order to achieve treatment stability. Removing treatment barriers can help to reduce health disparities for African American OUD patients.

Utilizing Machine Learning to Evaluate the Impact of Different Treatment Approaches on Cancer Progression and Metastasis and Predict Outcomes in African American Women with ER+ Breast Cancer

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Background: Metastatic Breast Cancer (MBC) remains a leading cause of oncologic mortality among women globally, with a notable prevalence in African American women diagnosed with ER+ breast cancer. This study utilizes machine learning to assess the impact of various treatment modalities on cancer progression and predict metastasis,

providing insights into the effectiveness of immunotherapy, chemotherapy, and hormone therapy in altering disease outcomes. Objectives: The study sought to identify predictive factors for treatment efficacy in ER+ breast cancer among African American women and evaluate the influence of different treatment approaches on the progression and occurrence of metastasis. This effort facilitated the development of a model capable of predicting metastasis occurrence, thus informing personalized treatment plans. Methods: Utilizing data from the PLCO Cancer Screening Trial, we employed supervised machine learning techniques to assess the impact of various treatments on cancer progression and metastasis. The study specifically evaluated the ability of clinical features to predict metastasis, adapting multiple strategies to mitigate overfitting. Results: A comprehensive performance evaluation of all the models was conducted, identifying an optimal model with excellent predictive performance. This model indicated its efficacy in distinguishing between the presence and absence of metastasis. Significant predictors were highlighted, underlining their critical roles in influencing cancer progression and metastasis risk. Conclusion: The study established that specific treatment approaches significantly impact the progression of ER+ breast cancer and the likelihood of metastasis. The model developed offers a robust tool for predicting metastasis, contributing to improved clinical decision-making, early detection, and personalized treatment planning.

Examining the Influence of Social Determinants on Mental Health: A Study of Housing Instability and Income Levels.

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This research project investigates the influence of social determinants on mental health, focused on housing instability and income levels. The study aims to discover the correlation between mental illnesses and homelessness in the Black community and suggest possible policy implications as solutions. Through the analysis of the All of Us Database, which comprises patient health records and survey data, the study investigates the correlation between mental health issues and homelessness within the Black community, offering insights into potential policy interventions. The motivation for this research is drawn from the observable conditions of the Black homeless population in neighborhoods adjacent to Howard University in Washington, D.C. The exploration of the database reveals a gap in the analysis of respondents who omitted specific survey questions or did not specify their racial identity. This study aims to enrich the discourse on healthcare policy and the nexus between housing instability and mental health in urban Black communities in the United States. Findings from this research underscore a significant correlation between mental health disorders and housing instability, suggesting a bidirectional relationship that warrants attention for policy and healthcare improvements. These insights are pivotal for informing new healthcare policies, municipal regulations, and academic research. In conclusion, the study enhances the comprehension of mental health issues within the homeless Black population, emphasizing the critical role of research in the social determinants of health. The outcomes provide valuable perspectives for the Black community, healthcare practitioners, and future inquiries into the social determinants of health.

MSH3: An underestimated DNA MMR gene in Colorectal Carcinogenesis and its potential role in disparity

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Maintaining DNA sequence integrity is crucial to prevent cancer-causing mutations. In cancers like colorectal cancer (CRC), inactivation of DNA Mismatch Repair (MMR) genes, such as MSH3, leads to classic microsatellite instability (MSI) known as elevated microsatellite alterations at selected tetranucleotide repeats (EMAST), particularly affecting prognosis in African American (AA) CRC patients. However, the genetic variants and their pathogenicity of MSH3 differ across populations like AA, which are underrepresented in public databases.
Targeted exome sequencing of MSH3 in AA CRC samples (n=54), followed by computational bioinformatics and molecular dynamic simulation (MDS), confirmed six novel pathogenic MSH3 variants (p.E413K, p.S466N, p.S920F, p.E976K, p.H1010Y, p.E1081K). These variants exhibited alterations in hydrogen, ionic, hydrophobic, and disulfide bonding, affecting ATP hydrolysis and the MSH3-MSH2 interacting domain. This suggests a detrimental impact on structure and stability, particularly in the ATPase and MSH3-MSH2 interacting domain, compared to wild type MSH3 structure. Furthermore, in vivo CRISPR-Cas9 introduced MSH3 variants into SW620 CRC cells, showing reduced transcripts, protein levels, and increased 5-fluorouracil resistance compared to wild-type cells. These findings suggest a role in CRC resistance in AA patients. These findings highlight the deleterious nature of the six identified MSH3 mutations affecting crucial sites within the MSH3-MSH2 interactive and ATPase domains. Assessing mutation frequency in larger cohorts may clarify its high prevalence, EMAST phenotype and poor prognosis in AAs. Currently, in vitro functional assays are underway to replicate the observed phenotype caused by these mutations.

The Perceptions of Black Women Focusing on the Theme "From Waste to Worth" in The Context of Food Based Messaging and Food Waste

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Introduction: Every year, about one-third of the food produced for human consumption, amounting to approximately 1.3 billion tons, and valued at USD 1 trillion, is either lost or wasted. In the year 2022, almost 9 million black people in the United States were unable to access

sufficient food to lead a healthy, active life. Innovative strategies are needed to tackle this dual problem, including using food-based communication to reshape consumer attitudes towards food waste. However, there is a significant gap in targeting Black women, a crucial demographic that is often overlooked in food waste reduction efforts. The main objective of this study is to gather the stories and viewpoints of black women in the United States on food waste and food-based messaging within the framework of the theme "from waste to worth." Methods: This qualitative study will collect narratives and perceptions regarding food waste and food messaging from Black women in the United States under the theme "from waste to worth." It will involve in-depth interviews with ten to twenty participants, including consumers and professionals in nutrition and agriculture. The expected outcome: The expected outcome provides deeper understanding of the effectiveness of food-focused messaging in reducing food waste, particularly within the Black women demographic. These results will guide future interventions targeting food waste reduction and insecurity within this group. Ultimately, this research aims to advance a more comprehensive and impactful strategy for curbing food waste and fostering food security among Black women in the United States.

Ethnicity Based Similarities and Differences in Global Transcriptomic Profiles among MASLD Patients using Ingenuity Pathway Analysis (IPA)

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Purpose: Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD), formerly termed Non-alcoholic Fatty Liver Disease (NAFLD), is becoming the predominant chronic liver disease globally. MASLD prevalence has increased from 20% in 2009 to 25-30% in 2023 in the US population. Reporting the MASLD's incidence among African Americans (AA) is lower than of the other groups due to the underrepresentation of AA in studies. This study aims to perform a comparative analysis by using published meta-data of different ethnicities with our previously examined AA population transcriptomic data. Methods: A total of 47 AA individuals (MASLD=23, healthy control =24) were recruited from the Georgetown University Liver Transplantation Unit, Washington DC. Their global gene expression data and medical background information were recorded. Comparison analysis was performed using GEO data sets curated from different ethnic groups (Caucasians, Hispanic, and Chinese). Ingenuity Pathway Analysis (IPA) was employed to evaluate similarities and differences in major pathways and gene functions across the datasets. Results: In our transcriptomic analysis, we noted a significant upregulation ($p<0.05$) of TGFB1 with Hepatic fibrosis signaling as the top canonical pathway. Ethnicity-based comparison analysis yielded many pathways i.e., molecular mechanisms of cancer, NAFLD signaling pathway, IL-6 signaling, and estrogen receptor signaling, and following our global expression results observed in the AA MASLD population. Conclusion: This pilot study presents an opportunity to understand the molecular correlation of MASLD in an AA population. In doing so, it unravels the commonalities and variances within the gene networks or pathways associated with MASLD disease conditions.

Understanding and Addressing Pre- and Post-COVID-19 Disparities in Colorectal Cancer Screening and Outcomes among African Americans

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Background: The onset of the COVID-19 pandemic led to a decrease in colorectal cancer (CRC) screening, particularly affecting African Americans (AA). Preceding the pandemic, CRC screening rates had shown an increase across all racial groups. However, post-pandemic, there has been a decline in screening rates among AA, exacerbating existing disparities. Objective: This study aims to analyze data collected before, during, and after the COVID-19 pandemic to identify direct and indirect factors contributing to the exacerbation of CRC disparities in the AA population. Methods: A systematic literature search through PubMed and Embase was done using keywords "Colorectal cancer screening", "Covid 19", "Colorectal Cancer", "African Americans". We reviewed patient records to assess the influence of factors such as reallocation of health resources, financial burdens, decreased advocacy, and psychosocial factors. Results: In our analysis, we reviewed n=4351 AA patients in 2019 that had colonoscopy screening in the USA (Missouri, NYC, Ohio) with n=4351 reduced to n=2568 in 2020 and further reduced to n=1958 in 2021. There was a (n=1783 41%) reduction in screening rates in 2020 and a (n=2393 55%) reduction in CRC screening rates among AA in 2021 compared to 2019. This decline in screening is correlated with an increase in adenomas from n=1697 in 2019 to n=2059 in 2021. Conclusion: To mitigate effects of COVID-19 on AA-CRC outcomes, efforts should focus on reducing socioeconomic barriers, increasing advocacy, and promoting minimally invasive screening options. Additionally, future research should investigate the severity of CRC cases in AA with delayed screening.

Understanding and Addressing Pre- and Post-COVID-19 Disparities in Colorectal Cancer Screening and Outcomes among African Americans

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Background: The onset of the COVID-19 pandemic led to a decrease in colorectal cancer (CRC) screening, particularly affecting African Americans (AA). Preceding the pandemic, CRC screening rates had shown an increase across all racial groups. However, post-pandemic,

there has been a decline in screening rates among AA, exacerbating existing disparities. Objective: This study aims to analyze data collected before, during, and after the COVID-19 pandemic to identify direct and indirect factors contributing to the exacerbation of CRC disparities in the AA population. Methods: A systematic literature search through PubMed and Embase was done using keywords "Colorectal cancer screening", "Covid 19", "Colorectal Cancer", "Colonoscopy", and "African Americans". We reviewed patient records to assess the influence of factors such as reallocation of health resources, financial burdens, decreased advocacy, and psychosocial factors. Results: In our analysis, we reviewed (n=66623) AA patients in 2019 that had colonoscopy screening in the USA (Missouri, NYC, Ohio) reduced by 66% (n=22818) in 2020 and further reduced by 78% (n=14508) in 2021. This decline in screening showed an increase in adenomas (Cleveland Clinic Ohio) from n=1697 in 2019 to n=2059 in 2021. Conclusion: The pandemic led to a reduction in colonoscopies among AA, heightening CRC risk. To counteract this, we must tackle socioeconomic barriers, advocate for accessible screening options, and prioritize research on CRC severity in AA with delayed screening.

Understanding and Addressing Pre- and Post-COVID-19 Disparities in Colorectal Cancer Screening and Outcomes among African Americans

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Enhancing Health Equity: The Vital Role of Cultural Competence in Healthcare Provider-Patient Interactions Regarding Nutrition

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Introduction: Effective healthcare provider-patient interactions are essential for addressing health disparities, particularly in the context of nutrition. Cultural factors significantly influence dietary behaviors and health beliefs among diverse patient populations, highlighting the importance of cultural competence in healthcare settings. Purpose: This abstract aims to examine the significance of cultural competence in healthcare provider-patient interactions regarding nutrition, emphasizing its role in promoting health equity and reducing disparities in nutrition-related health outcomes. Methodology: Drawing on existing literature and empirical evidence, this abstract synthesizes insights into the complexities of cultural factors shaping dietary behaviors and health beliefs. Additionally, it explores challenges faced by healthcare providers in delivering culturally responsive nutrition care and investigates strategies to enhance cultural competence. The literature search used keywords such as "cultural competency training", "linguistic proficiency", "nutrition", and "cultural humility". Major Findings: Research articles and resources reviewed in this abstract reveal that culturally competent care leads to improved patient satisfaction, treatment adherence, and health outcomes. The systematic review highlighted that educational interventions enhancing cultural competence among healthcare providers led to improved patient-provider communication and trust, potentially reducing healthcare disparities for minority populations. Conclusion: Cultural competence plays a vital role in healthcare provider-patient interactions regarding nutrition, contributing to improved health equity and reduced disparities in nutrition-related health outcomes. By prioritizing cultural competence in clinical practice and adopting evidence-based strategies, healthcare providers can better address the diverse needs of patients and promote positive health outcomes across diverse populations.

Hidradenitis Suppurativa Gene Expression in Skin of Color Patients from Howard University Dept. of Dermatology

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Background: Hidradenitis suppurativa (HS) is a chronic, debilitating inflammatory skin condition most prevalent in the US in Black/African American (AA) patients, with worse severity and clinical outcomes. Previous transcriptomic studies have investigated the genetic etiology

hypothesized in HS pathophysiology; however, demographic data is unreported, or skin of color (SOC) patients are underrepresented. The analysis of SOC biospecimens is crucial for improved diagnosis, prognosis, and treatment optimization. Methods: Lesional HS and healthy tissue were obtained from 8 Black/AA HS patients and 4 Black/AA healthy control subjects, respectively. mRNA was isolated and assayed in a custom Nanostring cartridge containing myeloid V2 panel with probe spike in codes set to human targets. This data was analyzed using nSolver version 4.0 Advanced Analysis. Results: There was a significant upregulation of multiple genes (CXCL1, CXCL13, S100A8/9) while others were significantly downregulated (FABP4, LPL, FGF10) in HS lesional tissue compared to healthy controls. Advanced cell analysis identified a significant abundance of cytotoxic cells and B cells. Dendritic cells, macrophages, mast cells, neutrophils, T cells, NK cells, and exhausted CD8 cells were also detected. Discussion: Comparable to previous studies, several genes involved in immunomodulatory responses, including Th17 and neutrophil chemotaxis (CXCL1) as well as those that mediate B cell recruitment (CXCL13) were significantly upregulated in HS SOC patients. Similar to other skin diseases, the upregulation of S100A8/9 is likely due to their roles in immune modulation. Downregulated genes, such as FABP4 and LPL, may contribute to hyperlipidemia and obesity reported in this ethnic group.

The Value of Race and Ethnicity in Gene Expression Studies in Hidradenitis Suppurativa

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Background: Hidradenitis suppurativa (HS) is a chronic skin condition characterized by painful nodules and abscesses. Gene expression profiles can vary in HS patients across ethnic groups, leading to differences in disease susceptibility, progression, and treatment response. By analyzing gene expression patterns in diverse racial/ethnic backgrounds, the molecular mechanisms underlying HS can be more precisely understood. Methods: A literature review was conducted using the PubMed database. The search was performed for HS studies focused on gene expression published from 2000-2023 using the following parameters: "hidradenitis suppurativa" OR "acne inversa" AND "gene expression." The demographic data was recorded. Review studies were excluded. Results: The search criteria resulted in 46 publications, 19 were excluded. Of the included 27 studies, 20 contained demographic data while 7 did not. Of the 20 studies that contained demographic data, only 6 noted race or ethnicity of the patient. Of these 6 studies, 2 studies solely included White patients. Discussion: Our findings highlight that there is a great need for consistent publishing of race and ethnicity in HS studies focused on gene expression. Currently, only 6 of the included 27 studies accounted for race/ethnicity. Additionally, though HS disproportionately affects Black/African American patients, we found only 4 studies included this population. Gene expression of immune biomarkers in HS lesions varies widely and is a potential target of therapy for HS. By discovering both the differences and similarities in gene expression profiles between HS patients of different race and ethnicities, new therapeutics can be better targeted for individualized therapy.

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