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ABSTRACT BOOK



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ABSTRACTS

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BIOLOGICAL & BIOMEDICAL SCIENCES

Tissues differential sparing of FLASH ultra-high dose rate Radiotherapy: an in-silico radiotherapy study

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The study aims to understand the role of cellular microstructures and vasculature in human normal and malignant tissues and their correlations to the biological responses at FLASH ultra-high dose rate (UHDR) radiotherapy. The latter plays the role of oxygen effect in normoxic and hypoxic tissue environment and oxygen depletion effect at UHDR. We fit the current experimental and clinical data available in the literature to propose a theory based on the topology and geometry of diffusion channels in tissue to contribute to the mechanistic understanding of normal tissue sparing at UHDRs and explore an interplay between intra- and inter-track radical recombination through a reaction-diffusion mechanism. We aim to push further the current understanding of the role of cellular microstructure and vasculature in radiotherapy from a physico-chemical standpoint. We present a more precise model that enables clinicians' better control of the treatment endpoints, relying on the radiobiological responses of human tissues based on the nano-scale molecular makeup of cells in normal and malignant stages under normoxic and hypoxic conditions. We explore the underlying mechanism responsible for the differential tissue responses observed experimentally and clinically at FLASH ultra-high dose rate (UHDR) and incorporate that knowledge as a guideline for the validation of our predictions in future in-vivo and in-vitro experiments with the potential of incorporating that knowledge in the patient treatment planning systems and the prescription dose.

From Gains To Guilt: Body Dysmorphia & Disordered Eating In Young Males

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Introduction: Body dysmorphia and disordered eating behaviors are growing concerns among young males engaged in exercise culture. This study investigates how social media, gym environments, and societal masculinity ideals contribute to these issues. Research suggests that social media promotes unrealistic body standards, while gym culture often encourages excessive muscle-building goals. Societal pressures to conform to masculine ideals can lead to harmful behaviors like extreme dieting, compulsive exercise, fostering anxiety around food choices, and shifting eating habits from pleasure to perceived health benefits. Purpose: The purpose is to explore the role of social media, gym culture, and societal masculinity in the prevalence of body dysmorphia and disordered eating behaviors in young males. The study aims to focus on the growing concern of orthorexia and its psychological impacts. Methods: This systematic review will analyze existing research through a comprehensive literature search. Articles will be examined using search engines like Google Scholar and PubMed, using keywords -"body dysmorphia," "disordered eating," "orthorexia," and "social media". The study will evaluate the psychological implications of these factors on young males. Expected Outcome: It is anticipated that the findings will highlight the need for targeted interventions aimed at promoting healthier relationships with fitness, nutrition, and body image. The goal is to highlight the psychological impacts of these issues and provide evidence that may guide future research and health initiatives focused on reducing disordered eating and body image distress in this demographic.

PDX1 Knockdown Modulates Breast Cancer Proliferation and Drug Sensitivity: Insights into Paclitaxel and Doxorubicin Response Mechanisms

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Background: PDX1, a homeobox transcription factor, is implicated in cellular proliferation and therapeutic resistance across various cancers, including breast cancer. However, its precise role in drug response mechanisms remains underexplored. This study investigates the impact of PDX1 knockdown on breast cancer cell proliferation and its modulation of drug response pathways following paclitaxel and doxorubicin treatment. Methods: Breast cancer cell lines were transfected with shRNA targeting PDX1, and successful knockdown was confirmed via gRT-PCR and Western blot analysis. Cellular proliferation was assessed using viability assays. The impact of PDX1 knockdown on drug response genes was evaluated following treatment with paclitaxel and doxorubicin using qRT-PCR and Western blot. Results: PDX1 knockdown significantly reduced cell proliferation, suggesting a potential oncogenic role in breast cancer. Furthermore, drug sensitivity assays revealed that cells with reduced PDX1 expression exhibited altered responses to paclitaxel and doxorubicin, with notable changes in key drug resistance genes involved in apoptosis, DNA damage repair, and drug efflux pathways. Western blot analysis confirmed differential expression of these proteins, further supporting a PDX1-mediated mechanism of drug resistance. Conclusion: These findings suggest that PDX1 plays a critical role in breast cancer progression and chemotherapy response. Its knockdown sensitizes cells to paclitaxel and doxorubicin, highlighting PDX1 as a potential

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therapeutic target for overcoming drug resistance in breast cancer. Future studies will focus on elucidating the molecular mechanisms underlying PDX1-mediated chemoresistance and its translational relevance in clinical settings. Keywords: PDX1, Breast Cancer, Chemoresistance, Paclitaxel, Doxorubicin, Drug Response, Gene Knockdown

Impact of Polymer Molecular Weight on Nanoparticle Size and Size Distribution

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The size of nanoparticles plays an important role in their accumulation, retention and penetration at tumor sites. Nanoparticles below 10nm in size are susceptible to glomerular filtration while nanoparticles above 200nm in size are susceptible clearance from the body by the mononuclear phagocyte system. Thus, nanoparticle sizes of between 10 and 200nm are considered optimal for cancer nanotherapeutics. We here present empirical data of the impact of different PEG-PLGA copolymer molecular weights on particle size of docetaxel-loaded nanoparticles fabricated by the emulsification solvent evaporation method. All formulation and process variables were kept constant, such that the only variable is PLGA molecular weight (20kDa - 75kDa). Our data show that particle size increases linearly from 109.18 ± 3.44 nm to 225.25 ± 5.48 nm as the PLGA molecular weight increased from 20kDa to 75kDa (R2 = 0.92). Analysis of Variance (ANOVA) followed by Tukey post hoc tests showed significant increase in the size of nanoparticles (p≤0.001) with increasing polymer molecular weight. The polydispersity index (PDI) is a measure of particle size distribution. Nanoparticles fabricated using the 20kDa and 30kDa PLGA polymer have lower PDI (<0.1) while nanoparticles prepared using the 45kDa and 75kDa polymer have higher PDI (>0.1). Thus, nanoparticles fabricated with the 20kDa and 30kDa PLGA polymers had mean particle sizes below 150nm and may be more suitable for fabrication of monodisperse nanoparticles for efficient tumor penetration and accumulation. We postulate that nanoparticles of suitable size may be prepared by selecting PEG-PLGA polymers of appropriate molecular weight.

Formulation of a Niosomal Drug Delivery System for the Treatment of Colorectal Cancer

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Colorectal cancer (CRC) remains a leading cause of cancer-related deaths in the United States, with an estimated 153,020 new cases and 52,550 deaths in 2024. Effective treatment is often hindered by poor drug delivery to tumor sites, resistance to existing therapies, and toxicity associated with conventional chemotherapeutic agents. This study aims to develop targeted pegylated niosomes encapsulating drugs attacking cells via two different, potentially synergistic mechanisms. Using Design of Experiment (DOE) software, optimal niosome formulations were identified and prepared using the thin-film hydration method. Niosomes were characterized for size, polydispersity index (PDI), morphology and intra-structure, and drug loading. Size of blank niosomes ranged from 215 nm to 257 nm, while that of drug-loaded niosomes averaged 251 ± 2.20 nm. The mean polydispersity index (PDI) of drug-loaded niosomes was 0.293 ±0.01. The formulation's composition, particularly the surfactant-to-cholesterol ratio, significantly influenced niosomes size and PDI. Hydrophilicity and lipophilicity of loaded drugs impacted encapsulation and drug release, with hydrophilic drugs showing 50% higher loading efficiency and a faster release rate than the lipophilic drug. Cholesterol and Span60 concentrations significantly impacted niosome characteristics. The hydrophilic BCS Class III compound exhibited superior loading capacity to the lipophilic BCS Class I compound. It appears that lipophilic drugs competed with other lipophilic niosome components that limit its residence in the palisade layer of niosomes. Promising formulation for cellular testing have been obtained for the next phase of the study.

The Q248H mutation in Ferroportin leads to a moderate iron overload in SLC40A1Q248H/Q248H Mice

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Background: Iron is vital for life by facilitating hemoglobin. Iron homeostasis depends on the regulatory axis between the hepcidin and ferroportin (SLC40A1). We previously showed that FPN Q248H mutation resists degradation by physiologic hepcidin concentrations and thus may facilitate higher iron uptake. Objectives: In this study, we showed that Q248H mutation upregulated iron regulatory protein expression and it was responsible for iron overload. METHODS: A knock-in Slc40A1 Q248H mouse model was generated, and the levels of iron regulatory proteins were analyzed by qPCR and Western Blot. Hematological parameters were analyzed using plasma samples. Iron deposition was determined by Perl's iron staining and ELISA. RESULTS: Both male and female SLC40Aa1Q248H/Q248H mice grew normally but male mice exhibited considerably reduced body weight when getting older. Thus, we confined our analysis to male mice. Serum iron was slightly increased in SLC40A1Q248H/Q248H mice fed with SID. SLC40A1Q248H/ Q248H mice showed a slight increase in Serum Ferritin (SF). HID significantly increased SF levels in all groups of mice. We found HID diet significantly increased FPN levels in all groups. We noticed high iron levels in the spleen of SLC40A1Q248H/Q248H mice. Non-heme iron

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showed a gradual increased in the spleen of SLC40A1Q248H/Q248H mice. Conclusion: FPN Q248H mutation in male mice increases SF and spleen iron accumulation without significant changes in the iron metabolism proteins, reflecting increased iron recycling in the spleen macrophages. Taking together, our findings from the first in vivo model of FPN Q248H mutation suggest that it may changes iron metabolism and leads to iron load.

Dithiocarbamate Derivatives Of 6,7-Dimethoxy-1,2,3,4-Tetrahydroisoquinoline: Synthesis And Cancer Therapeutic Potential

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Traditional medicine has utilized plants rich in tetrahydroisoquinoline alkaloids for their anti-inflammatory, antimicrobial, and analgesic properties. These compounds can affect cell cycles, induce apoptosis, and eliminate damaged cells. They also have antioxidant properties that protect the body from oxidative stress. Both preclinical and clinical studies have shown promising results for their medicinal use, supporting their extensive use in traditional medicine due to their diverse pharmacological effects and therapeutic potential. Multiple studies have suggested that the therapeutic effects of tetrahydroisoquinoline alkaloids may be mediate through various pathways, including binding to nucleic acids or protins, inhibiting important enzymes, and influencing epigenetic processes. Recent research has also demonstrated the significant anti-cancer properties of tetrahydroisoquinoline alkaloids by inducing cell cycle arrest, apoptosis, and autophagy. These findings clearly indicate the substantial potential of tetrahydroisoquinoline alkaloids as a viable cancer treatment. It is evident that isoquinoline alkaloids possess a complex mechanism that triggers cell death in cancer cells. We here present the synthesis and characterization of some dithiocarbamate analogs of 6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline. The dithiocarbarmate ester analogs were synthesized in 53-80% yield in a two-step reaction via the dithiocarbamate salt (80% yield). All the analogs of tetrahydroisoquinoline synthesized were characterized by 1H-NMR, 13C-NMR, Triple Quad LC/MS, and FT-IR.

Structure Characterization of a Cadmium Dimer Complex with a Thiosemicarbazone-Based Chelator

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Disrupted iron balance causes anemia and iron overload leading to hypoxia and systemic oxidative stress. Iron overload may arise from red blood cell disorders such as sickle cell disease, thalassemia major and primary hemochromatosis, or from treatment with multiple transfusions. These hematological disorders are characterized by constant red blood cell hemolysis and the release of iron. Hemolysis is a continuous source of reactive oxygen species whose accumulation changes the redox potential in the erythrocyte, the endothelium and other tissue causing damage to organ systems. Iron overload and its consequences can be treated with iron chelating therapy. We have carried out structural studies of small molecule ligands that were previously reported for their iron chelating ability. The chelators were analyzed using mass spectrometry, proton nuclear magnetic resonance and infrared spectroscopy. The iron chelators, 2-benzoylpyridine-4,4-dimethyl-3-thiosemicarbazone, 3-ethyl-1-{[2-phenyl-1-(pyridin-2-yl)ethylidene]amino} thiourea and 1-{[2-phenyl-1-(pyridin-2-yl)ethylidene]amino}-3-(prop-2-en-1-yl)thiourea in their unbound conformation were crystallized and their structures were determined. This work addresses the evolution of a thiosemicarbazone class of iron chelators by analyzing and comparing the structure and properties of a series of closely related molecules, relating these to their in vitro activity thus providing valuable update to the search for newer, better and more effective iron chelators and metal-based therapeutics.

Structure determination and metal coordination chemistry of a set of closely related small organic molecule iron chelating agents

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Excess metal levels in the body have been linked to various serious illnesses from hereditary iron overload, secondary iron overload, usually from multiple blood transfusions, neurodegenerative disease and even mental illness. Nevertheless, metals are required for several physiological processes essential for life. Small molecules can be used to query cellular function. Their metal complexes may have additional properties that are not seen naturally. Metal complexes of small organic ligands can be used for visualization and imaging, for diagnostics, as sensors, and for their pharmaceutical properties. We made a series of organic compounds based on a heterocyclic thiosemicarbazone scaffold with incremental changes in the substituent groups. This approach was to discern characteristics important in the design or discovery of small molecule therapeutics for use as novel iron chelators. We characterized these ligands in X-ray crystallographic diffraction studies to get the atomic structure of the novel chelators. We also formed complexes with common metal ions including Fe3+, Zn2+, Co2+, Mg2+, Cd2+ and Ca2+. Alongside, we obtained powder diffraction, mass spectrometry data and direct binding measurements using UV-Vis spectroscopy. We have refined the structures to a nominal resolution of 0.80Å and R1= 0.04. The novel chelators bind metals in a different modes and ratio depending on the ligand as well as the metal.

"Designing of Focused Libraries for Glucagon-like peptide-1 with Generative AI Models: Fine-Tuning a GPT-3.5 Turbo for Rule of Five Compliant SMILES Notations". Haifa Alzahri and Xiang Simon Wang* Artificial Intelligence and Drug Discovery Core Laborator

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Focused libraries are collections of small molecules designed or selected to target specific biological pathways, protein families, or disease-related mechanisms. Glucagon-like peptide-1 (GLP-1) agonists are a class of medications used to treat type 2 diabetes mellitus. These drugs mimic the action of the GLP-1 hormone. In this study we aimed to employ deep learning techniques to generate novel focused libraries for potential GLP-1 agonists. A powerful large language model (LLMs), i.e. pre-trained GPT-3.5 Turbo model, was fine-tuned using specific prompts, enabling it to generate SMILES strings by translating the textual representation of molecular properties into new SMILES strings based on the Rule of Five criteria, a key principle in drug discovery. We utilized a dataset of 105,983 GLP-1 agonist SMILES strings sourced from the ChEMBL database, which was pre-processed for training. The model was optimized using the OpenAI API to ensure its ability to generate valid SMILES strings. Subsequently, the model was deployed to generate new SMILES strings as potential candidates for validation as orally active drugs. Furthermore, RDKit was used to confirm the chemical validity of the generated SMILES, while the ADMET-AI tool was applied to prioritize ADMET (absorption, distribution, metabolism, excretion, and toxicity) properties for the generated SMILES. Additionally, molecular docking was performed using AutoDock Vina to evaluate their potential interactions and binding affinities with the GLP-1 receptor. The results demonstrated the model's capability to generate novel focused libraries with desirable druglikeness features. These findings suggest that fine-tuned LLMs can serve as powerful tools in modern drug discovery.

Exploring Large Language Models for Text-Based Molecular Design Using In-Context Learning

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Text-based molecular design has emerged recently as a new task in medicinal chemistry and drug discovery, where AI models translate descriptive textual information into molecular structures. Large language models (LLMs) such as the GPT models excel in natural language processing (NLP) and translation but their ability to design compounds from a given textual description remains underexplored. GPT3.5 and GPT4 were previously reported to show strong performance in generating novel molecules using Simplified Molecular Input Line Entry System (SMILES) string, a format that the model can read which encodes the chemical structure in a linear string of letters. However, there are many other new LLMs that have not been benchmarked yet. To address this gap, we are exploring the ability of popular LLMs such as DeepSeek, Open AI, Google, Anthropic, and others. Our method utilizes in-context learning, where the LLMs learn from ideal molecules and their textual descriptions. Accordingly, the model generates molecules as an output in a SMILES format, which will be eventually visualized as molecular structures via the chemical tool RDKIT. Our preliminary results show that the models we have tested so far can generate valid molecular structures. Herein, we aimed to evaluate their performance using evaluation metrics. Our findings gave insight for the future advancements in expanding the scope of utilizing LLMs for drug discovery applications.

Stigma as Barrier to Care for Invividuals with HIV

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Stigmatization remains a significant barrier to healthcare access and adherence for individuals living with HIV in Ghana. Despite advances in HIV treatment and care, societal stigma continues to negatively impact the mental and physical well-being of affected individuals, limiting their willingness to seek medical help. This paper explores the multifaceted nature of HIV-related stigma in Ghana, examining how cultural beliefs, misinformation, and discrimination contribute to the marginalization of individuals with HIV. It highlights the consequences of stigmatization, including delayed diagnosis, non-adherence to treatment, and increased psychological distress. Additionally, the study investigates the efficacy of healthcare providers in mitigating stigma and the importance of community-based interventions and policy reforms to foster a more inclusive healthcare environment. By understanding the barriers posed by stigmatization, this paper emphasizes the need for comprehensive strategies to promote stigma reduction and improve access to care for individuals living with HIV in Ghana.

HIV-1 Nef protein activates Src kinase and alters pulmonary macrophages distribution in HIV Tg mice

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Antiretroviral therapy has improved the longevity of individuals with HIV-1; however, chronic infection increases the risk of age-associated diseases, including non-infectious respiratory disease. The mechanisms underlying HIV-related lung disease remain unclear, necessitating further investigation into how HIV-1 affects immune function in the lungs. Using an HIV-transgenic (HIV-Tg) mouse model, we identified an abnormal spatial-temporal distribution of peritoneal macrophages following bacterial LPS administration, suggesting HIV-1 disrupts macrophage migration. This disruption may be mediated by the HIV-1 regulatory protein Nef, which activates cellular Src kinase, a modulator of macrophage motility and immune responses. We hypothesized that Nef is expressed in pulmonary macrophages and alters their distribution following LPS administration by inducing Src kinase phosphorylation, impairing immune cell trafficking in the lung. To investigate this, HIV-Tg and WT mice (3 per group) received LPS injections (3 µg/g body weight), followed by the Src inhibitor PPi (1 µg/g body weight) 15 minutes later. Lungs were harvested 24 hours post-injection, and immunohistochemistry and Western blot analyses measured Nef expression and Src phosphorylation. Immunostaining confirmed Nef expression in pulmonary macrophages of HIV-Tg mice and increased Src phosphorylation compared to WT controls. LPS administration induced macrophage infiltration in WT lungs but was significantly reduced in HIV-Tg lungs. Src inhibition decreased Src phosphorylation and restored macrophage infiltration in HIV-Tg mice, supporting the role of Src activation in macrophage dysfunction. These findings suggest Nef-mediated Src activation disrupts pulmonary macrophage migration, while Src inhibition improves macrophage recruitment and reduces LPS-induced lung injury.

Development of Multifunctional Targeted Dual-Loaded Polymeric Nanoparticles for Triple Negative Breast Cancer Treatment

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Triple-negative breast cancer (TNBC) is a subtype of breast cancer that accounts for 15-20% of all breast cancer cases. TNBC is extremely challenging to treat using conventional treatment modalities like chemotherapy, radiotherapy, and surgery. Our study aimed to solve the problems of TNBC treatment, such as low efficacy, toxicity, and poor site-specific drug delivery, by developing a dual-loaded antibody-targeted nanotherapeutic. We synthesized the HEMA-PLA macromonomer by ring-opening polymerization of lactide and HEMA-PLA-cisplatin by EDC/DMAP coupling. PEGylated methacrylate-polylactide copolymer containing cisplatin was synthesized by RAFT polymerization. Characterization of conjugates was done using proton NMR, GPC, and FTIR. The copolymer was used to fabricate nanoparticles (NPs) in the presence of paclitaxel, which is a widely used anticancer agent. The nanoparticles had an average diameter of 162 nm and a negative zeta potential (-12.4 mV). Cetuximab (CTX), a monoclonal antibody that binds to the epidermal growth factor receptor (EGFR), was attached to the surface of the NPs to enhance its targetability to TNBC. An in vitro drug release study showed that both drugs were completely released by 10 days at pH 5. Based on the drug release profile, the drug contents were obtained to be 1.46% PTX and 0.63% cPt in plain NPs, and 1.33% PTX and 0.48% cPt in CTX-NPs. Cytotoxicity, cellular uptake, and binding studies in MDA-MB-231 cells confirmed that CTX-targeted NPs have higher potential than plain NPs. The study indicates that CTX-targeted polymeric NPs that contain cisplatin and paclitaxel are effective in treating TNBC.

Effect of High Fructose Diet (HFrD) on Insulin Signaling in Ovarian Tissues of Hepatic PKCε Heterozygous Female Mice

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High-fat diets are known contributors to metabolic complications and obesity, but growing evidence implicates high fructose consumption as a significant factor, particularly in the development of insulin resistance and metabolic syndrome. Protein kinase C epsilon (PKCE) has been identified as a negative regulator of insulin signaling through phosphorylation and inhibition of the insulin receptor. We hypothesize that liver-specific deletion of PKCE in female mice on a high fructose diet (HFrD) enhances insulin signaling in peripheral tissues, including the ovaries.To test this, heterozygous LivPKCɛ (PKCɛ^fl/Δ) female mice were fed either a control diet (Cntrl) or HFrD for one month. A subset received insulin (0.5 U/kg) prior to sacrifice, and ovarian tissues were collected. Protein expression was analyzed via western blot, with concentrations normalized using BCA assays. Insulin action was assessed by measuring phosphorylation of AKT at Serine 473 (p-AKT^S473), a key marker of insulin signaling.Results showed a ~2-fold increase in p-AKT expression in insulin-stimulated, HFrD-fed LivPKC ε (fl/ Δ) mice compared to insulin-stimulated controls. Basal p-AKT levels were lower in non-insulin-treated groups, indicating diet-induced modulation of insulin signaling (p<0.05; n=2-4). These findings suggest that hepatic PKCE deletion may enhance insulin sensitivity in ovarian tissues, potentially offering systemic protection against fructose-induced insulin resistance. This improved signaling could result from changes in circulating metabolites influenced by liver-specific PKCe deletion. Further investigation using homozygous LivPKC ε (Δ/Δ) female mice is underway to clarify PKCe's role in ovarian insulin response.

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Objective: To compare levels of TNF-a between Hidradenitis Suppurativa (HS) patients of different races and Hurley Stages pending Insulin, Leptin, and IL-6 analysis.Background: HS is an inflammatory disorder that disproportionately affects Black patients in the U.S. Its severity is measured by three Hurley Stages based on the extent of lesions, sinus tracts, and scarring. This study analyses TNF- α and IL-6 due to their inflammatory roles. Metabolic disorders and obesity are risk factors for HS,1 with hyperinsulinemia and hyperleptinemia linked to increased adipose tissue and hormonal resistance. Methods: Serum samples were collected from 54 HS patients at Howard University Department of Dermatology. Of 40 analyzable ELISA samples, 6 patients were in Hurley Stage 1, 12 in Stage 2, 17 in Stage 3, and 5 lacked Hurley Stage data. One patient was Asian, 31 were Black, 3 were Hispanic, and 5 were White. Results: Patients in Hurley Stage 2 had significantly lower TNF-α levels than those in Hurley Stage 1. TNF- α levels were similar within Black and White patients across all stages. However, White patients in Hurley Stage 3 had significantly higher TNF- α levels than Black patients across all stages. Results for other markers are pending. Conclusion: This data suggests that White individuals in Hurley Stage 3 may experience more severe inflammation than Black individuals regardless of disease severity. These findings underscore the importance of studying HS across diverse demographics to understand its pathophysiology and guide targeted therapies. Future studies should include a racially diverse sample to enhance precision healthcare.

The Impact of Childhood Trauma on Depressive Symptoms Among African American Young Adults

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Background: Childhood trauma, including exposure to violence, is a significant predictor of adverse mental health outcomes, particularly depression. African American young adults disproportionately experience various forms of childhood victimization, increasing their risk for long-term psychological distress. Understanding the association between different types of childhood trauma and depressive symptoms is critical for developing effective, trauma-informed interventions. Methods: This study analyzed data from 638 African American young adults (ages 18-25) in Washington, D.C., who retrospectively reported childhood exposure to conventional crime, child maltreatment, peer/sibling victimization, sexual victimization, and witnessing crime. Depressive symptoms were assessed using validated measures, including mood disturbances, cognitive difficulties, and emotional dysregulation. Correlation analyses were conducted to examine associations between childhood trauma and depressive symptoms. Results: Depressive symptoms were significantly correlated with all five categories of childhood victimization (p < 0.001). Strong correlations were found between depressive symptoms and childhood maltreatment (r = .304), peer/sibling victimization (r = .291), witnessing crime (r = .308), sexual victimization (r = .266), and conventional crime (r = .286). Notably, witnessing violence and experiencing direct maltreatment were among the strongest predictors of depressive outcomes. Additionally, over 77.9% of the sample reported experiencing some form of childhood trauma, highlighting the widespread prevalence of early-life adversity in this population. Conclusion: Childhood trauma is a strong predictor of depression among African American young adults, underscoring the need for trauma-informed mental health interventions. Addressing the long-term psychological effects of early victimization through targeted prevention and support programs is essential for reducing mental health disparities in this vulnerable population.

Treatment with RON Kinase Inhibitor Ameliorates Podocytes Injury in Sickle Cell Disease Mouse Model

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Introduction: Endothelial dysfunction is a major pathophysiological feature of sickle cell disease (SCD). We demonstrated that RON kinase signaling contributes to renal endothelial injury in SCD mice. Treatment with RON inhibitor BMS777607 (RONi) reduced renal endothelial injury, glomeruli permeability, and ameliorated glomerular disease. Podocytes play a key role in maintaining the glomerular filtration barrier. Hypothesis: We hypothesize that RONi reduces podocytes injury in SCD mice. Methods: Five-month-old mice were injected daily with 10 mg/ kg of body weight of RONi or vehicle (2% DMSO) for 10 consecutive days. Four SCD and control (ctrl) mice per treatment were used per treatment. Kidney sections were labeled with anti-WT-1, anti-nephrin, and anti-podocin antibodies. Images were generated on Olympus Ix51 microscope and analyzed using ImageJ. Transmission electron microscopy (TEM) was performed for structural analysis. Statistical analysis was performed using GraphPad Prism 7.05 with p<0.05 considered statistically significant. Results: In SCD mice treated with RONi, glomerular, capillary size, and capillary congestion were significantly reduced compared to vehicle, but RONi treatment did not alter podocyte number. Nephrin and podocin expression was lower in SCD mice injected with vehicle but increased in both SCD and ctrl mice after RONi treatment. TEM showed restored foot processes and reduced glomerular basement membrane thickness after RONi treatment. Conclusion:RONi treatment improved podocytes morphology and reduced ultrastructural changes in SCD mice without altering podocyte numbers. These results suggest that RONi reduces glomerular injury.

Severe Amlodipine Toxicity treated with Veno-Arterial Extracorporeal Membrane Oxygenation

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Amlodipine is a dihydropyridine calcium-channel blocker most often used in the treatment of essential hypertension. Amlodipine toxicity primarily causes cardiovascular effects through L-type calcium channel blockade both in the vasculature and myocardium. A 22-year-old male presented with severe amlodipine toxicity after ingesting 119 5-mg amlodipine tablets. This case was refractory to standard first-line medical therapies including crystalloid resuscitation, intravenous calcium, multiple vasopressors, endotracheal intubation, high-dose insulin therapy with glucose, intravenous glucagon, and lipid emulsion therapy, as well as further intervention with methylene blue, hydroxocobalamin, and bicarbonate infusion. Venoarterial extracorporeal membrane oxygenation (VA-ECMO) and continuous renal replacement therapy (CRRT) were initiated as salvage therapy, followed by gradual improvement of hemodynamics. Therapy was complicated by right lower extremity ischemia with compartment syndrome and rhabdomyolysis despite distal perfusion catheter placement, requiring four-compartment fasciotomy and ultimately an above-the-knee amputation. He was decannulated from VA-ECMO on hospital day 4, extubated on hospital day 6, transitioned from CRRT to hemodialysis on hospital day 7, and discharged home with excellent neurological recovery on hospital day 22. VA-ECMO use in severe amlodipine toxicity has been described in several case reports, however the quality of evidence is generally low. It was successfully used in this patient to restore oxygen perfusion and allow intrinsic drug metabolism and elimination. VA-ECMO should be strongly considered for refractory vasodilatory shock secondary to calcium-channel blocker toxicity.

Serum miRNA Profiling in Obese, Diabetic African American Colon Adenoma Patients

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Co-authors: Adeyinka O Laiyemo, Mudasir Rashid, Ashktorab Hassan

Background: Metabolic syndrome increases colon cancer risk. Biomarkers are needed for early detection and prevention. Serum miRNAs are potential biomarkers. Aim: The purpose was to elucidate the role of miR-NAs in the pathophysiology of colon adenomas in the context of obesity and diabetes. Methods: We analyzed serum miRNA expression in age- and gender-matched African Americans (n=18/group) across three groups: Normal, adenomas with obesity, and adenomas with diabetes.

Using miRNeasy and Lexogen kits, RNA extraction and sequencing (IIlumina NextSeq 500) achieved high coverage. Differential expression analysis (DESeq2, UCSC hg38) identified miRNAs with significant fold changes (log2 FC \ge 2 or \le -2, p < 0.05). Results: In the Adenoma-Obese group, miR-455, miR-219b, miR-34a, miR-378a, miR-485, and miR-133b showed significant associations with obesity-related metabolic dysregulation. Notably, miR-34a, involved in cell cycle and apoptosis regulation, was upregulated, highlighting its role in obesity-related cancer pathogenesis. In the Adenoma-Diabetic group, miR-455 was upregulated, suggesting its involvement in insulin resistance and adenoma progression, while miR-219b was downregulated, potentially reflecting a compensatory response to hyperglycemia. Ingenuity Pathway Analysis revealed that these miRNAs are linked to pathways involved in cancer, diabetes, and lipid metabolism. Key pathways, including insulin signaling, Wnt/β-catenin, and mTOR, underscore the interplay between metabolic disorders and colorectal adenoma progression. Conclusion: This study identified miR-34a, miR-378a, and miR-455 as potential biomarkers and therapeutic targets for adenoma in obesity and diabetes, warranting further validation in larger cohorts.

Characterizing Sodium Taurodeoxycholate as a Cholesterol Alternative in Lipid Nanoparticles Formulations

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Co-authors:

Lipid nanoparticles (LNPs) are self-assembling lipid-based carriers with a structured lipid matrix. They have become notable drug delivery carriers, since they can encapsulate and protect loaded therapeutics. LNPs are created using PEGvlated lipids, phospholipids, and cholesterol; the particles' ingredients significantly impact their size, stability, and efficiency as carriers. Traditionally, cholesterol is used as a stabilizer to enhance the membrane's durability and reduce the chance of drug leakage. This study investigates the potential of sodium taurodeoxycholate (TDC) as a suitable substitute for cholesterol; TDC is a bile salt surfactant with well-known emulsification and stabilizing properties. LNPs were created using a microfluidic device that maintains a precise ratio of phospholipid and PEGylated lipid, while incorporating TDC as a surfactant. To analyze the stability of the particles over time, the size distribution and polydispersity index were obtained using Dynamic Light Scattering (DLS). The formulations were created with 5% DMG-PEG (PEGylated lipid), 57% DSPC (phospholipid), and 38% stabilizer; the first formulation used cholesterol, while the second formulation used TDC. It is hypothesized that TDC will create smaller particles than cholesterol, due to its smaller molecular size. By comparing LNPs formulated with cholesterol and TDC, this study aims to determine if TDC can act as an alternative, potentially improving stability and biocompatibility in drug delivery.

The Evolution of GLP-1: A Journey from Basic Science to Clinical Impact

Presenter's Name: Brown Rebecca Classification: Professional Student School/College: Pharmacy Presentation Type: Poster Presentation *Faculty Advisor: Baskaran Padmamalini* Faculty Advisor's email: padmamalini.baskaran@howard.edu

Co-authors: Tin Cheung, Sara Tellawi

The Evolution of GLP-1: A Journey from Basic Science to Clinical Impact Tin Cheung¹, Sara Telawi², Rebecca Brown³, Padmamalini Baskaran⁴ ¹, ², ³ – Equal contributors ⁴ – Corresponding author

Glucagon-like peptide-1 (GLP-1), an incretin hormone discovered in the early 1980s, has become a cornerstone of glucose homeostasis and metabolic regulation. This study traces its evolution from basic science to its transformative clinical applications. Secreted by intestinal L-cells in response to nutrient intake, GLP-1 exerts multifaceted effects across organ systems, including the pancreas, gastrointestinal tract, and central nervous system. Its primary actions-stimulating glucose-dependent insulin secretion, suppressing glucagon release, delaying gastric emptying, and promoting satiety-have established GLP-1 as a critical target for diabetes and obesity management. The rapid degradation of GLP-1 by dipeptidvl peptidase-4 (DPP-4) led to the development of DPP-4 inhibitors and GLP-1 receptor agonists (GLP-1RAs) resistant to enzymatic breakdown, revolutionizing the treatment landscape for type 2 diabetes and obesity. GLP-1RAs have demonstrated significant efficacy in lowering blood glucose, inducing weight loss, and reducing cardiovascular risk. Ongoing research continues to expand GLP-1's clinical potential, exploring its roles in inflammation, cardiovascular health, and neurodegenerative diseases. The development of novel GLP-1-based therapies, including orally bioavailable agonists and unimolecular multi-agonists, aims to optimize their therapeutic profile. This systematic analysis underscores the profound impact of GLP-1 research on metabolic regulation and its pivotal role in reshaping the management of metabolic diseases.

Suppression of the H3K27me3 demethylase disrupts diapause formation in mosquito Culex pipiens

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Co-authors: Xueyan Wei, Prabin Dhungana, Berhanu Zewde, Fu Chen, Cheolho Sim, Sung Joon Kim

Culex pipiens mosquitoes enter diapause to survive harsh winters, exhibiting increased lipid storage, enhanced cold endurance and extended lifespan. The H3K27me3 repressive histone modification has been suggested to influence diapause-associated traits, but its exact role remains unclear. In this study, the histone demethylase inhibitor GSK-J4 was used to investigate the effects of H3K27me3 levels on Cx. pipiens diapause

characteristics. Solid-state NMR, FTIR, and biochemical assays showed that elevated H3K27me3 levels disrupted lipid and glycogen accumulation and reduced survival rates, highlighting its role in diapause regulation and suggesting potential targets for mosquito population control.

Investigating the Mechanism of Coronavirus-Induced Cell Cycle Disruption Through 5'-PolyU Targeting

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Co-authors: Hemayet Ullah

The emergence of SARS-CoV-2 variants necessitates therapeutic strategies targeting conserved viral elements. The 5'-polyU tract of the coronavirus antigenome, uniquely absent in host cell transcripts, represents such a target. Our previous research demonstrated that DNA oligonucleotides containing polyA sequences effectively inhibit viral replication and syncytium formation in the mouse coronavirus (MHV-A59) model. Specifically, oligonucleotide treatment disrupted key viral processes including double-stranded RNA (dsRNA) synthesis and virion infectivity, while leaving host cells unaffected. This establishes a novel antiviral mechanism potentially applicable across RNA viruses, including coronaviruses. Coronavirus infection typically results in multinucleated syncytia formation, suggesting significant perturbation of host cell cycle regulation. However, the molecular mechanisms linking 5'-polyU targeting to the prevention of syncytium formation and potential cell cycle effects remain unclear. We hypothesize that our oligonucleotide approach may restore normal host cell cycle progression while preventing syncytium formation. To test this hypothesis, we propose to: (1) characterize cell cycle checkpoint modifications during infection with and without polyA treatment; (2) map the molecular pathways connecting 5'-polyU targeting to syncytium formation inhibition; and (3) analyze the relationship between cell cycle restoration and reduced viral spread. This research will advance our understanding of viral pathogenesis and validate the therapeutic potential of targeting the 5'-polyU tract across coronavirus variants. The strategy's specificity for viral sequences ensures minimal impact on host cells while effectively limiting viral spread and tissue damage.

Association between stress markers and collective hypertensive disorders among birthing persons in DC - 2018 to 2022 PRAMS

Presenter's Name: Campbell Melissa Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Hugh Mighty Faculty Advisor's email: hugh.mighty@howard.edu

Co-authors: Hugh Mighty, Rui Zhang, Richard Schottenfeld, Betelihem Tobo

ABSTRACTS

Background: Hypertensive disorders of pregnancy (HDP) are a leading cause of maternal morbidity, affecting 20.1% of birthing persons in Washington, D.C., in 2021. While physiological mechanisms of HDP are well-documented, psychosocial stressors such as depression and substance use remain understudied in D.C.'s maternal population. This study analyzed D.C. Pregnancy Risk Assessment Monitoring System (PRAMS) data to evaluate the relationship between stress markers and HDP. Methods: A retrospective, cross-sectional analysis was conducted using IRB-approved, de-identified, self-reported PRAMS data (2018-2022). The study population included postpartum individuals aged 18-44 years residing in D.C. (N=2,554). The primary outcome was HDP (yes/no). Dichotomized independent variables including depression before and during pregnancy and drug use during pregnancy. Logistic regression models tested associations between stress markers and HDP, adjusting for various covariates. Results: In our sample, 77.9% experienced HDP. After adjusting for covariates, depression during pregnancy significantly increased the likelihood of HDP (AOR: 2.16, 95% CI: 1.31-3.54). High blood pressure before pregnancy, being overweight, and obesity were also significantly associated with higher odds of HDP after controlling for covariates (AOR: 9.47, 95% CI: 5.92-15.14; AOR: 2.27, 95% CI: 1.55-3.32; AOR: 2.89, 95% CI: 1.92-4.35). Conclusions: Our findings showed that depression during pregnancy, pre-pregnancy HBP, and BMI significantly increased the odds of HDP, underscoring the need for targeted interventions. Strengthening perinatal mental health support, improving access to preventive care for chronic disease management, and addressing structural determinants of health promoting behaviors may help reduce HDP prevalence and improve maternal outcomes in D.C.

Kojic Acid Dipalmitate-Loaded Nanoparticles: Development and Characterization

Presenter's Name: Capp zilles Julia Classification: Graduate Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Emmanuel Akala Faculty Advisor's email: eakala@howard.edu

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Kojic acid dipalmitate (KDP) is the esterified form of kojic acid (KA). It is mainly used for skin depigmentation. KDP has advantages over KA due to higher stability. However, due to its high lipophilicity, it is hard to incorporate it into formulations. Hence, nanotechnology was considered appropriate to help solve this issue. Besides the skin depigmenting properties, kojic acid derivatives also show promising antitumor potential, but it is still unexplored for KDP. The aim of this study was to develop and characterize KDP-loaded nanoparticles fabricated by in situ dispersion polymerization, and further test the nanoparticles against breast cancer cell lines. The first step in the nanoparticles development was the synthesis of the polylactide macromonomer and the crosslinker, and their characterization by 1H NMR and FT-IR. Afterwards, the nanoparticles were fabricated by in situ dispersion polymerization: the drug was mixed with the polylactide macromonomer, the crosslinker, PEG-MMA, and reaction initiators in a one-pot synthesis reaction. The KDP-loaded nanoparticles were then characterized for particle size, zeta potential, drug loading, and encapsulation efficiency. The nanoparticles were synthesized in triplicate (three batches). The average particle size was 241.07 ± 36.65 nm, with a polydispersity index of 0.164 ± 0.011 . The zeta potential was -46.92 ± 5.67 mV. The drug loading was $0.61\% \pm 0.06$ (w/w), which is in agreement with the theoretical value of KDP in the formulation. The nanoparticles will be further characterized for cellular uptake and cytotoxicity in breast cancer cell lines.

Calcium-activated chloride channels: A potential new molecular target for reducing alcohol consumption

Presenter's Name: Cardoso Gleice Kelli Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Prosper N'Gouemo Faculty Advisor's email: prosper.ngouemo@howard.edu

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Excessive and uncontrolled alcohol consumption can lead to the development of an alcohol use disorder. Ca2+ influx plays a significant role in regulating neuronal excitability and behavioral responses to alcohol. However, the specific role of Ca2+ signaling in the pathophysiology of alcohol consumption is not yet fully understood. Our previous data indicated that activating Ca2+-activated chloride channels (CaCCs), specifically transmembrane protein 16A (TMEM16A) channels, suppressed alcohol withdrawal seizures and alleviated anxiety-like behaviors in rats. In this study, we investigated the potential role of TMEM16A channels in voluntary alcohol consumption in adult male and female Sprague-Dawley rats. We used EACT or T16Ainh-A01 to activate or inhibit TMEM16A channels, respectively. Over four weeks, rats were trained to drink ethanol (7.5% vol/vol in water) using a two-bottle choice paradigm, with one bottle containing ethanol and the other filled with water. Rats were then randomly divided into eight groups, each consisting of male or female rats treated with either EACT (2.5, 5, or 10 mg/kg, p.o.) or T16Ainh-A01 (5 or 10 mg/kg, p.o.). We measured ethanol intake, ethanol preference, water intake, and total fluid intake per kilogram of body weight after 2 or 24 hours of access. The results demonstrated that activating TMEM16A channels reduced alcohol consumption and preference while increasing water intake in both males and females. Conversely, blocking TMEME16A channels did not alter alcohol intake and preference or water intake. These findings suggest that TMEM16A channels may represent a potential molecular target for controlling alcohol symptoms of alcohol use disorder.

Optimizing Lipid Nanoparticles: Effects of Lipid Composition on Particle Size

Presenter's Name: Carey Kelaiah Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Sung Joon Kim Faculty Advisor's email: sung.kim@howard.edu

Co-authors: Kaylah Callender

Lipid nanoparticles (LNPs) are self-assembling nanostructures designed to protect and deliver nucleic acids intracellularly. They have gained prominence as therapeutic agents in applications such as COVID-19 mRNA vaccines, cancer treatment, and gene therapy. LNPs typically consist of ionizable lipids, "helper" lipids, cholesterol, and polyethylene glycol (PEG)-lipid conjugates, with each distinctly influencing its physicochemical properties. Namely, DSPC and POPC, both commonly used phospholipids in the phosphatidylcholine class, differ primarily in their degree of unsaturation; while, PEGylated lipids, DMG-PEG and DSPEmPEG, differ in tail length and surface charge. This study investigates how these structural variations, along with various formulation ratios, affect the characteristics of LNPs, particularly size, dispersity, and overall stability. The LNPs, composed of cholesterol, phospholipid, and PE-Gylated lipid, were synthesized using a microfluidic device. Dynamic light scattering was used to analyze the resulting particle sizes, providing insight into the influence of lipid composition on the particle size and guiding the optimization of particle design.

Optimizing Lipid Nanoparticles: Effects of Lipid Composition on Particle Size

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Chronic kidney disease in adults with sickle cell trait: A systematic review and meta-analysis

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Sickle cell trait (SCT) may increase the risk of chronic kidney disease (CKD). We aim to determine the pooled statistics of the association between SCT and CKD. Studies published up to May 2024 on PubMed, Embase, Global Health Library, and Web of Science were screened. We included studies reporting odds ratios (OR) or hazard ratio (HR) of CKD and/or end-stage renal disease (ESRD) comparing adults with and without SCT. Risk of bias was evaluated using the ROBINS-E tool. The pooled SCT prevalence was calculated among patients with CKD/ ESRD. Random-effects analysis was performed. Only studies with a low or some concerns of bias were included corresponding to 18,847 SCT participants and 1,060,818 without SCT. SCT participants had significantly higher odds of having an eGFR ≤ 60 ml/min per 1.73 m² (OR: 1.62, 95% CI: 1.39-1.89), proteinuria (OR: 2.02, 95% CI: 1.61-2.54), and eGFR \leq 60 ml/min per 1.73 m² and/or proteinuria (OR: 1.79, 95%) CI: 1.44–2.22). The pooled prevalence of SCT among African Americans with ESRD was 10% (95% CI: 8-12%); however, heterogeneity was very high (I²: 85.6%). There was a significant difference (p = 0.04) in the HR for ESRD between studies that included both males and females (HR: 1.72, 95% CI: 1.13-2.61) and the study that included only females (HR: 0.75, 95% CI: 0.39-1.44), suggesting that males have a higher risk of ESRD. Controversial results were observed for the association with hypertension and diabetes. SCT increases the risk of developing CKD and ESRD. PROSPERO registration: CRD42021275274.

Machine learning algorithms predicting cancer associated with diabetes and hypertension: NHANES 2021 to 2023

Presenter's Name: Chang Chiehhsiung Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Edmund Essah Ameyaw Faculty Advisor's email: edmundessah.ameyaw@howard.edu

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Cancer, diabetes, and hypertension are significant global health concerns with high prevalence and mortality rates in the U.S. Epidemiological research indicates a link between type 2 diabetes, hypertension, and an increased risk of cancer, which may interact synergistically. Early prediction of cancer in these populations is crucial. Machine learning (ML) is effective at predicting complex diseases; however, current ML-based cancer risk assessments for individuals with both diabetes and hypertension, utilizing existing national data, are insufficient. This study aims to overcome this limitation by utilizing the NHANES dataset from 2021-2023, a comprehensive U.S. health resource, along with ML algorithms to evaluate cancer risk in this high-risk group. The study seeks to explore associations and develop robust ML prediction models, potentially enhancing early detection, personalized care, and public health initiatives.

Rhabdomyolysis associated by Salmonella Infection: A Case Report

Presenter's Name: Charleus Cameau Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@howard.edu

Co-authors: Armando Ugarte

Introduction: Rhabdomyolysis is a clinical syndrome characterized by elevated serum creatine kinase and myoglobin levels due to the breakdown of muscle fibers and is associated with symptoms such as myalgia and hematuria. Rhabdomyolysis has an array of potential causes, including Salmonella infection. Salmonella can cause two types of disease, enteric fever and gastroenteritis. We report one case in which nontyphoidal Salmonella caused rhabdomyolysis that later progressed to compartment syndrome, a rare outcome. Case Description: A 21-year-old male was admitted to the ED with severe hyperthermia (temp. 106°F) following exercise. Laboratory testing demonstrated evidence of rhabdomyolysis with CPK levels of 257,000 with a creatinine of 2.4. He was treated with intravenous hydration, however, his creatinine level increased. His stool PCR also came back positive for Salmonella. The following day, his clinical condition worsened with new-onset edema and pain. Due to concern for bilateral compartment syndrome, he underwent bilateral gluteal fasciotomy. His renal function eventually improved with a CPK of 3,300 and myoglobin level of 5,600. Discussion: With causes ranging from trauma to systemic infections, rhabdomyolysis is a rare but serious condition. The pathogenesis of rhabdomyolysis has been well studied. The final common pathway is believed to be an excessive accumulation of intracytoplasmatic calcium with consequent damage to the cell membrane. This case is unique because an infectious origin in rhabdomyolysis is diagnosed in only 5% of cases. Even more rare is the percentage of rhabdomyolysis cases that result in compartment syndrome, which is only 4%.

Developing Safer Chelators for Iron and Other Metal Overload Disorders

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Co-authors:

Excess metal levels in the body have been linked to serious illnesses, from Alzheimer's disease, Parkinson's, other neurodegenerative diseases, and mental illness, and hematological disorders. The metals axis is also crucial in infectious diseases and immunity. Iron overload is a common side effect in chronic, often genetic, disorders such as hemochromatosis, b-thalassemia, and sickle cell disease or may arise from multiple blood transfusions. To date, only three chelators have been approved for clinical use in treating iron overload; however, these have undesirable properties and toxicity. There is a need for newer chelating agents with less toxicity. To this end, we have synthesized a series of compounds based on a benzoylpyridine thiosemicarbazone scaffold with incremental variation in the backbone and R substituent groups. We are conducting biophysical studies to discern characteristics important in designing or discovering small molecule therapeutics as iron chelators. We have obtained the structure of these small molecules and their bound complexes with common metal ions including Fe3+, Co2+, Ni2+, Zn2+, Mn2+, Mg2+, Cd2+, Ca2+ and Al3+ using X-ray diffraction studies. These novel chelators bind metals in different metal: chelator ratios, 1:1, 2:1 and 2:2; some metal-bound complexes formed dimers that may be important in stabilizing the complex. These systematic structure-activity studies are useful for discovering newer and better chelators with less toxicity. The synthesized compounds formed stable complexes with various metal ions, primarily in a 1:1 ratio. Crystallization and X-ray diffraction revealed some dimers, potentially enhancing stability. These insights aid in developing safer, more effective metal chelators.

Uncovering the mechanisms of potato leaf roll virus' effect on Myzus persicae's antiviral immunity

Presenter's Name: Coleman Aminah Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Michelle Heck Faculty Advisor's email: mlc68@cornell.edu

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Flaviviruses are single-stranded positive-sense RNA viruses primarily transmitted by arthropods from host to host. Many have caused major global public health crises, including Dengue virus, West Nile virus, and Zika virus. The Myzus persicae Flavivirus is a recently discovered longform aphid flavivirus. Aphids are important virus vectors in plant pathology, and often plant viruses associated with aphid vectors coinfect aphids along with aphid pathogenic viruses. Potato Virus Y (PVY) and potato leaf roll virus (PLRV), both vectored by the green peach aphid (Myzus persicae), are the most widespread and detrimental viruses infecting potatoes. Small interfering RNAs (siRNAs) are short, noncoding RNA molecules involved in RNA interference pathways that can be analyzed using short RNAseq data from an infected host. In this project we analyzed short RNAseq data from healthy aphids and aphids infected with PLRV and PVY, to quantify siRNAs against Flavivirus and Myzus persicae Densovirus. Quality control was performed on sequencing data for the removal of adapter sequences and filtering out rRNA reads. The remaining reads were mapped to reference genomes of known aphid viruses and quantified. This analysis confirmed the effects of viral coinfection, between the circulative plant virus PLRV and aphid pathogenic viruses Densovirus and Flavivirus, on aphid antiviral immunity. These findings may be applied to modulate coinfection of Flaviviruses infecting humans through mosquito vectors. Studying how coinfection alters the RNAi pathway in aphids can lead to therapies which reduce the spread of flavivirus-borne illnesses through RNAi.

Interrogating the Influence of Grooming on Hippocampal Place Cell Activity

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Hippocampal place cells, known for their increased activity in the exploration of new spatial environments, sequentially fire under various conditions beyond position and movement, suggesting that their activity may also be rooted in behavior or meaningful aspects of experience. Grooming, an innate, self-induced behavior seen in mice, is thought to maintain physiological stasis, provide comfort, and obtain information regarding food sources and social circumstances. However, the impact of grooming behaviors on higher order brain regions such as the hippocampus has not been explored. Here, we sought to understand whether grooming modulated hippocampal place cell activity through analyzing mouse behavior during a locomotion-dependent virtual reality spatial learning task. We found that during groom bouts, there are 2 potentially distinct subsets of place cells that either increase or decrease in activity, as seen by calcium levels measured via 2-photon imaging. These "grooming cells" do not respond during stopped or running bouts, suggesting that movement alone does not affect their activity. These results suggest that grooming could be a meaningful behavior that modulates hippocampal place cell activity in distinguishable circuits from locomotor activity. A direct link from grooming to hippocampal place cell activity could suggest that innate behaviors play a role in hippocampal functions such as learning.

Laponite Nanocarrier for Sustained Release of Chloroquine

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Chloroquine is an antiparasitic drug that effectively treats malaria and extraintestinal amebiasis. However, maintaining sustained amount of chloroquine in body for treating malaria is difficult because of rapid absorption and fast clearance of drug, leading to fluctuating plasma levels. Consequently, higher chloroquine is administered leading to high risk of side effects such as gastrointestinal discomfort, retinal toxicity, and cardiotoxicity. Laponite nanocarriers offer a promising solution to the challenges of antimalarial therapy by providing pH-responsive and sustained release of chloroquine. This study aims to investigate the drug encapsulation efficiency, release profile, and pH-responsive behavior of chloroquine loaded Laponite RD, RDS, and XLG variants. The encapsulation efficiency and intercalation was followed using UV-VIS and XRD respectively, with Laponite RDS achieving 99% encapsulation efficiency.

cy and maximal basal peak shift compared to RD and XLG, which is consistent with cation exchange capacities of various clays. The intercalation of chloroquine in Laponite was confirmed by the broadening of Si-O bonds as it relates to Laponite structure. Electrostatic interactions between Laponite and chloroquine were confirmed using zeta potential and DLS measurements. Laponite exhibited pH-responsive chloroquine release, with significant release at pH 5 and sustained release at physiological pH over 5 days. Understanding the chloroquine loading of Laponite grades (RD, XLG, RDS) and release profile helps select the best variant for optimal chloroquine delivery and desired clinical outcome.

Rapid Detection of Active Coronavirus Infection by Lateral Flow Test Strips: A New Approach to Distinguish Replicating Viruses from Non-Replicating Viruses

Presenter's Name: Davis Darnell Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Hemayet Ullah Faculty Advisor's email: hullah@howard.edu

Co-authors:

As the Coronavirus Disease 2019 (COVID-19) pandemic continues to challenge global health systems, the emergence of immune-evasive variants has led to complicated pharmaceutical and diagnostic interventions. This underscores the urgent need for innovative diagnostic tools to distinguish between active and dormant viral particles. Our research focuses on developing a Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-Cas13a-based Lateral Flow Assay (LFA) targeting the antigenome of mouse hepatitis virus A59 (MHV-A59), a surrogate model for coronaviruses, such as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). By detecting active viral replication through CRISPR-LFA, this method offers significantly improved accuracy in infection detection compared with traditional positive RNAbased systems. Furthermore, this research addresses critical biological questions, including the processing of viral RNA segments, such as the nucleocapsid and spike protein genes, during replication and the influence of host immune responses on these processes. This tool will enable the real-time monitoring of viral dynamics and provide valuable insights into viral life cycles. From an epidemiological perspective, developing this diagnostic tool could significantly enhance public health by enabling earlier and more accurate detection of infections, facilitating timely intervention strategies, and improving outbreak management. These advancements are essential for a better understanding of viral behavior and for controlling future pandemics.

ABSTRACTS

Evaluation of Long-Term Neuronal Activation in the Lateral Habenula of Rats with Varied Preferences for Highly Palatable Foods

Presenter's Name: Davis Leikwaivion Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Kimberlei Richardson Faculty Advisor's email: Kimberlei.richardson@howard.edu

Co-authors:

This study investigates the long-term neuronal activation patterns in the lateral habenula (LHb) of rats with varied preferences for highly palatable foods. Building upon previous research that used c-Fos as a marker for neuronal activation, this study employs Δ FosB, a marker with a longer half-life, to provide a more comprehensive map of neuronal activation in the LHb. Rats were categorized as high preference (HP), low preference (LP), or neutral based on their consumption of palatable food during an intermittent feeding paradigm. Behavioral results confirmed significant differences between HP and LP groups, with HP rats consuming significantly more palatable food and less standard chow compared to LP rats. Immunohistochemical analysis using a full-length FosB antibody demonstrated positive staining in the LHb, though technical challenges with reagent availability and tissue processing affected the quality of results. Preliminary findings suggest improved staining at higher antibody concentrations (1:1000 dilution). While the study faced limitations in fully isolating Δ FosB expression due to time constraints, it represents an important step toward understanding the relationship between LHb activity and food preferences. Future directions include double-labeling with a C-terminus specific antibody to isolate neurons expressing Δ FosB and using retrograde tracers to identify inputs to the rostral LHb region. This research has implications for understanding the neural mechanisms underlying feeding behavior and potential therapeutic targets for eating disorders and obesity.

Functional Characterization of a small RNA in Staphylococcus Aureus that may Regulate Drug Resistance

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Co-authors: Alana Johnson, Kai Avilez, Jaja Baldeh, Kaie Hall

Staphylococcus aureus is a gram-positive bacteria and human pathogen. In 2019, S. aureus infections were responsible for 1.1 million fatalities, which far surpassed global deaths from HIV/AIDS that same year (at ~850,000). One of the deadliest S. aureus infections is bacteremia (bacteria in the blood), which can result in sepsis (excess activation of the molecular immune system in the blood) and multiple organ failure. In 2018, there were approximately 120,000 S. aureus related sepsis infections, resulting in 20,000 mortalities. S. aureus rapidly develops antibiotic resistance, complicating public health efforts, with Methicillin Resistant S. aureus (MRSA) being a common example. Increasing our understanding

the mechanisms controlling S. aureus drug resistance will help us control the spread of multi-drug resistant S. aureus infection. A small RNA identified in specific S. aureus strains is rsai. While its precise function remains undetermined, it is hypothesized that rsai may play a role in inhibiting the norB pathway, which encodes an antibiotic efflux pump associated with drug resistance in S. aureus strains. We are now executing genetic studies to determine if this sRNA regulates S. aureus drug resistance genes. If our hypothesis is true, we will have identified a novel regulatory mechanism influencing multi-drug resistance in S. aureus. We are further characterizing this small RNA along with others to further understand the mechanisms of drug resistance in S. aureus.

Demand Dynamics for Female, Black, Brown, and Spanish-Speaking Urologists: A Google Trends Analysis

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Co-authors: Marek Harris, Nader Shayegh, Shay Taylor, Danae Byer Jeremy Tonkin, Leslie Deane, Pamela Coleman

Introduction and Objectives: Patient-centered care in urology requires addressing demographic-specific needs, yet disparities in access and provider diversity persist. The objective of this study is to assess demand for female, Black, Brown, and Spanish-speaking urologists across the U.S. using Google Trends as a proxy for patient interest, and to highlight regions where demand for diverse providers outpaces supply, underscoring healthcare disparities. Methods: Google Trends data (2004-2023) was analyzed to calculate the Search Volume Index (SVI, 0-100 scale) for "female urologist," "black urologist," "brown urologist," and "Spanish urologist" across states. Demographic data was obtained from the 2023 AUA Census, and the Patient Demand Index (PDI) was computed by dividing SVI by the urologist-to-population ratio. Results: Searches for female urologists were highest in New Jersey (6.3), Texas (4.9), and New York (4.1), with increasing national interest underscoring demand gaps. Analysis of female-patient-to-female-urologist ratios highlighted significant regional shortages. Searches for Black and Spanish-speaking urologists showed consistent trends nationwide, though state-level data was sparse. Demand for Brown urologists fluctuated by region, possibly reflecting demographic shifts. These results suggest disparities in access to female and minority urologists, stressing the need for diverse representation in urology. Figure 1: Trends for search terms over time. Figure 2: State analysis of female urologist demand. Conclusion: State-level findings for female urologists and national data for minority urologists reveal varying patient demands. These disparities indicate a need for healthcare systems to address regional demands for diverse providers.

ABSTRACTS

The impact of RACK1 playing a role in nitrogen deficiency reponse

Presenter's Name: Dewar Destiny Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Hemayet Ullah Faculty Advisor's email: hullah@howard.edu

Co-authors:

Food Insecurity affects millions globally. Nitrogen, as an essential macronutrient, plays a fundamental role in photosynthetic efficiency and overall plant development. Through photosynthesis, plants rely on nitrogen, associated with being a key component.Nitrogen deficiency has been associated with stunted growth, early senescence of the mature leaves along with chlorosis. Traditional methods, such as chemical fertilizer have many drawbacks, that includes the health concerns that having the ability too devastate the environment. I reviewed the published work of Dr. Ullah and found that these implications in relation to productivity making combating nitrogen deficiency in plant systems is a major issue that presents itself within modern day agriculture. We aim to address the role of Scaffold protein RACK1 on the plant nitrogen utilization pathway as previously RACK1 is found to regulate stress responses. (Dakshanamurthy, Ullah, 2018) RACK1 presents itself to be a part of every aspect of the plant life cycle which includes growth and the plant stress level responses. RACK1 is used to help with the signaling of multiple proteins for the organization of signaling cascades. Translation and protein synthesis has a direct relationship to protein communicating with the ribosomes which control the mRNA translation. The purpose of this research is to determine RACK1 plays a key role in nitrogen deficiency stress response. Understanding the molecular basis of the stress response presents a route to develop a new approach to help boost productivity to contribute to a safe environment.

Assessing Visual Representation in Medical Media: Examining Diversity in Health-Related Imagery and Its Implications for Healthcare

Presenter's Name: Dorman Jaylah Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Valora Bishop Faculty Advisor's email: valora.bishop@howard.edu

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This research examines the representation of darker skin tones in medical media, including physical and digital health-related resources such as brochures, textbooks, social media posts, websites, and search engine results. Studies, such as Bell (2021), have highlighted an imbalance in visual representation, raising concerns about its potential impact on medical diagnosis, healthcare experiences, and educational resources. Drawing on the work of Alvarado (2020), this study explores the significance of diverse medical imagery in educational settings and healthcare communications. It also examines the availability of diverse stock images in search engine results and their role in medical representation. The study aims to provide statistical evidence regarding visual representation in medical media and offer practical approaches to addressing any identified gaps. Additionally, the work of individuals such as Chidiebere Ibe, a medical illustrator, is discussed as an example of efforts to enhance diversity in medical imagery. The research questions investigate the extent of diversity in medical media and its potential influence on healthcare outcomes, with the goal of informing future discussions on inclusive medical representation.

Urinary Activin A in Sickle Cell Disease: Correlation with Urinary Biomarkers of Inflammation and Risk of Progression of Chronic Kidney Disease.

Presenter's Name: Egharevba Faithful Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Marina Jerebtsova Faculty Advisor's email: marina.jerebtsova@Howard.edu

Co-authors:

Renal disease is a major complication of sickle cell disease (SCD), often associated with renal inflammation and immune cell infiltration. Activin A, a key factor in the inflammatory response, is expressed by renal tubular cells and macrophages. Our recent research identified urinary orosomucoid (ORM)-a glycoprotein elevated during inflammationas a biomarker for early-stage chronic kidney disease (CKD) in SCD patients. We hypothesize that Activin A may also serve as a urinary biomarker for the early stage of CKD associated with inflammation. To test this hypothesis, we measured urinary Activin A levels using ELISA in 46 urine samples from the Registry Study at the Howard University Center for SCD. Receiver operating characteristic (ROC) and Pearson correlation analysis were performed using GraphPad Prizm 6. Low levels of Activin A were detected in 10% of SCD patients without renal disease. In contrast, 69.9% of patients with early-stage CKD demonstrated elevated Activin A levels. Urinary Activin A levels showed significant correlation with urinary but not plasma ORM levels. Furthermore, Activin A levels were significantly higher in patients at high or very high risk of CKD progression compared to those at low or moderate risk. In addition, activated human SCD peripheral blood mononuclear cells (PBMCs) exhibited a threefold increase in Activin A expression compared to control PBMCs. These findings suggest that urinary Activin A may be a useful biomarker for monitoring renal inflammation in SCD patients. Elevated urinary Activin A levels may also help predict a higher risk of CKD progression.

ABSTRACTS

Urinary Activin A in Sickle Cell Disease: Correlation with Urinary Biomarkers of Inflammation and Risk of Progression of Chronic Kidney Disease

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Renal disease is a major complication of sickle cell disease (SCD), often associated with renal inflammation and immune cell infiltration. Activin A, a key factor in the inflammatory response, is expressed by renal tubular cells and macrophages. Our recent research identified urinary orosomucoid (ORM)-a glycoprotein elevated during inflammationas a biomarker for early-stage chronic kidney disease (CKD) in SCD patients. We hypothesize that Activin A may also serve as a urinary biomarker for the early stage of CKD associated with inflammation. To test this hypothesis, we measured urinary Activin A levels using ELISA in 46 urine samples from the Registry Study at the Howard University Center for SCD. Receiver operating characteristic (ROC) and Pearson correlation analysis were performed using GraphPad Prizm 6. Low levels of Activin A were detected in 10% of SCD patients without renal disease. In contrast, 69.9% of patients with early-stage CKD demonstrated elevated Activin A levels. Urinary Activin A levels showed significant correlation with urinary but not plasma ORM levels. Furthermore, Activin A levels were significantly higher in patients at high or very high risk of CKD progression compared to those at low or moderate risk. In addition, activated human SCD peripheral blood mononuclear cells (PBMCs) exhibited a threefold increase in Activin A expression compared to control PBMCs. These findings suggest that urinary Activin A may be a useful biomarker for monitoring renal inflammation in SCD patients. Elevated urinary Activin A levels may also help predict a higher risk of CKD progression.

The Impact of Telehealth Intervention On Therapy Adherence In Oncology Patients: A Systematic Review of Randomized Clinical Trials

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Background: Medication non-adherence is a global public health issue that must be addressed to achieve optimal patient care. Telehealth intervention promises to improve this challenge. Objectives: This study seeks to systematically review various clinical trials on the impact of telehealth intervention on therapy adherence in patients diagnosed with cancer. Methods: Studies were search on 4 databases (PubMed, Science direct, Google scholar and Wiley online library), 96 studies were identified after duplicates were removed. 12 studies were included following the inclusion criteria. The included studies were written in English language and compared the use of telehealth intervention to the usual care. Results: The result shows that 91.7% of the included studies showed significant improvement on adherence with the use of telehealth intervention compared to the usual care while 8.3% indicated that the usual care had a significant effect on adherence than telehealth intervention. Conclusion: Telehealth interventions are effective in improving therapy adherence in patients diagnosed with cancer. Mobile health via mobile applications should be further explored and researched. Keywords: Telehealth, Telemedicine, Oncology, Adherence, RCT

Enhancng Ground Truth Accuracy in Deep Learning-Based Microglia Classification through Elo-Rating

Presenter's Name: Ette Essiet-adidiong Classification: Post Doc/Resident/Fellow/Research Associate School/College: Other *Presentation Type: Oral Presentation* Faculty Advisor: Tsang-Wei Tu Faculty Advisor's email: tsangwei.tu@howard.edu

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Microglia express diverse phenotypes, and their morphology is key to understanding their role in neurodegneration. Traditional methods of categorizing cells into discrete categories like ramified, hypertrophic, and amoeboid, for deep learning models often yields inconsistent results due to subjective judgements. This study utilizes the Elo-Rating system to classify microglial morphology based on the intuitive assessment of cell activation levels, aiming to reduce the ambiguity associated with human judgement during classification. Bright-field microscopy images (20X) of anti-Iba1-stained brain sections were collected from Long Evans rats 24 hours post-asphyxia cardiac arrest. Approximately 2,000 pairs of 72 images were reviewed using a Python-based web application that presented two images simultaneously. Curators selected the more inflamed cell in each pair, increasing its Elo-rating. Each image was also assigned into one of eight categories: six activation states, "Clusters" or "Debris." Final Elo-rating scores were computed and validated against outcomes from the categorical system. The Elo-Rating system achieved 91% classification accuracy, with ratings ranging from the Debris (558.26) and Ramified (569.21) to Cluster (1417.42) and Amoeboid (1413.97), showing significant differences (p<0.0001) across classifications. Pairwise comparisons revealed significant differences between Rod and Hyper-Rod cells (p<0.05), Cluster and Hypertrophic cells (p<0.05), and Bushy cells versus Hyper-Rod (p<0.05) and Amoeboid (p<0.05). Cluster and Amoeboid distributions showed the highest variability, reflecting morphological diversity, while Debris and Hypertrophic had minimal variability, indicating consistent curator agreement. These results confirm that the Elo-Rating system effectively differentiated microglia activation states, addressed ambiguity, and mitigated bias to produce a comprehensive database for deep-learning.

PDX1 as a Tumor Promoter in Prostate Cancer: Metabolic Regulation, EMT, and Implications for Aggressive Disease in African American Men

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Co-authors: Tayo Alex Adekiya

Aberrant methylation of the homeodomain of Pancreatic and Duodenal Homeobox 1 gene (PDX1), and concomitant decreased levels of mRNA expression were noted in cases of aggressive prostate cancer (PCa), compared to benign prostate tissue, in African American men. Here, we carried out gain-and-loss of function of PDX1 gene in in-vitro studies using the PCa cell lines- PC-3 and LNCaP. We observed an increase in cell proliferation, migration and invasion in the PCa cell lines over-expressing PDX1, whereas the knockdown of PDX1 expression inhibited cell proliferation, migration and invasion. The expression of metabolic regulatory factors INS, IGF1R, CXCR4, CRP, CDH2, TWIST1, SNAIL1, and c-Myc positively corelated with an increase in PDX1 expression, as quantified by RT-PCR and Western blot, whereas a negative correlation was noted for regulators ESR2, PTEN, p53, NF-κB, and TNFα. PDX1 downregulation, conversely, resulted in the opposite expression profile. To investigate the role of PDX1 in glucose homeostasis, PC-3 cells were treated with a glucose titration to mimic blood-glucose levels noted in cases of PCa with diabetes and obesity as comorbidities. The expression of these metabolic regulatory factors was pronounced in the presence of glucose. We propose that PDX1 plays a tumor-promoting role in human PCa cells, influencing the expression of insulin-related metabolites, inflammatory cytokines, oncogenic drivers, and epithelial-mesenchymal transition genes. We postulate that an understanding of the role PDX1 in PCa morphogenesis will provide a basis for development of more representative strategies, for treatment and prevention of aggressive PCa in African American men with obesity and diabetes.

The American Journal of Surgery Medicaid Expansion and Thyroid Cancer Stage at Presentation: A Comparative Study of Two US States

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Introduction: The Patient Protection and Affordable Care Act (ACA) expanded Medicaid eligibility to individuals earning up to 138% of the Federal Poverty Level, providing coverage to over 7 million Californians and reducing the uninsured rate to 7.1%. While Medicaid expansion has improved outcomes in cancers such as prostate, lung, and breast, its impact on thyroid cancer, which lacks formal screening guidelines but

generally has a favorable prognosis, remains unclear. Objective: This study evaluates the effect of Medicaid expansion on thyroid cancer stage at presentation, comparing outcomes in California (expansion state) and Texas (non-expansion state). Methods: A retrospective cohort analysis using SEER data (2009-2020) examined thyroid cancer diagnoses in patients aged 18-64. Pre- (2009-2013) and post-expansion (2016-2020) periods were compared using a Difference-in-Differences approach to assess changes in stage at diagnosis. Results: Among 63,073 patients, 30,768 were diagnosed pre-ACA (Texas: 39.4%, California: 60.6%) and 32,305 post-ACA (Texas: 38.9%, California: 61.1%). Patients were predominantly female and White, with a decline in White patients from 56.4% to 48.6% (Texas) and 50.0% to 40.9% (California). No significant change in stage at presentation was observed in California compared to Texas: localized disease (1.1%, 95% CI: -1.2% to 3.3%), regional metastasis (-1.3%, 95% CI: -3.5% to 0.9%), and distant metastasis (0.3%, 95% CI: -0.5% to 1.1%). Conclusion: Medicaid expansion did not significantly impact thyroid cancer stage at presentation, highlighting potential differences in healthcare access effects across cancer types.

Mechanistic Insights into Inflammation-Mediated Neuroprotection Following Ischemic Stroke: A Role for Microglia

Presenter's Name: Faborode Oluwaseun Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Sayan Nandi Faculty Advisor's email: sayan.nandi@howard.edu

Co-authors: Alani Miller, Sayan Nandi

Every year, nearly 800,000 people in the U.S. suffer a stroke, a major cause of mortality and disability. African American population is twice more susceptible than White Americans to stroke-related mortality or disability. Ninety percent of all strokes can be classified as ischemic in nature when a block in an artery supplying part of the brain occurs, leading to permanent neuronal injury. Ensuring neuronal survival during the acute or neuroprotective phase of stroke has been particularly challenging; pharmacological targeting of neuronal cells did not yield any significant beneficial effect. On the other hand, microglial cells, the principal immune cell type of the brain, are the first responders following a neuronal injury. We combine mouse genetic mutants and rodent stroke models, to study the contribution of microglial-mediated inflammation in acute stroke outcome. Our results suggest that blocking a specific proinflammatory signaling pathway, namely Allograft Inflammatory Factor-1 (AIF1 a.k.a. Iba1)-signaling in microglia, produced a larger infarct following ischemic stroke. AIF1/Iba1 is an intracellular, actin cytoskeleton-binding protein in microglia and macrophages. It facilitates the release of cytokines with neuroprotective action and promotes microglial interactions with neurons. Ongoing work focuses on understanding of molecular and cellular mechanisms underlying AIF1/Iba1-mediated neuroprotection. Our result reinforces the emerging idea that proinflammatory signaling can be neuroprotective. Thus, our study may potentially establish a strong rationale for the targeting of microglia or specific inflammatory mediators for the treatment of acute stroke. Our work aims at improving a brain health issue that disproportionately affects the African American population.

Time to Clozapine: Analysis of treatment initiation for patients with Treatment-Resistant Schizophrenia [TRS] (vs Schizophrenia Spectrum Disorder [SSD])

Presenter's Name: Falegan Toyosi Classification: Graduate Student School/College: Medicine Presentation Type: Poster Presentation Faculty Advisor: Miriam Michael Faculty Advisor's email: miriambmichael@gmail.com

Co-authors:

Background: Treatment-resistant schizophrenia (TRS) affects approximately 34% of individuals diagnosed with schizophrenia and remains a significant challenge in psychiatric care¹. Clozapine is the only medication with proven efficacy for TRS after the failure of at least two other antipsychotics². However, disparities in timely initiation, particularly among minority populations, contribute to inadequate treatment and worse outcomes3. In our 20-year study, only 0.766% of patients exhibited neutropenia-related diagnoses, suggesting concerns over agranulocytosis may be overstated. Objective: This study examines delays in Clozapine initiation among TRS patients compared to those with schizophrenia spectrum disorders (SSD) and evaluates demographic and clinical factors contributing to treatment disparities. Given the minimal occurrence of agranulocytosis (0.766%), we aim to support earlier Clozapine access by challenging perceived risks that hinder treatment initiation. Methods: A retrospective cohort study utilized TriNetX electronic health record data from 2004–2024, analyzing time from schizophrenia diagnosis to Clozapine initiation. Secondary outcomes included demographic characteristics, prior antipsychotic treatments, and predictors of delays using multivariate regression models. Results: African American patients experienced longer delays in Clozapine initiation⁴. The most commonly prescribed antipsychotics before Clozapine included haloperidol, olanzapine, and risperidone. Contributing factors to delays included physician hesitancy, benign ethnic neutropenia concerns, and lack of patient awareness⁵. Only 0.766% of patients exhibited neutropenia-related diagnoses, reinforcing the need to reconsider restrictions based on agranulocytosis fears. Conclusion: Addressing misconceptions about neutropenia and reducing physician hesitancy may improve Clozapine access. Future research should explore systemic barriers to equitable treatment.

Bridging the Gap: Collaboration Between Black Farmers and Dietitian Nutritionists to Improve Health Outcomes in Marginalized Communities

Presenter's Name: Ferguson monk Jaena Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Chimene Castor Faculty Advisor's email: chimene.castor@howard.edu

Co-authors: Carie Bradshaw

Background: Chronic diseases, including diabetes, heart failure, and obesity, are disproportionately prevalent in Black and marginalized communities, intensifying existing health inequities rooted in systemic disparities. These conditions are often exacerbated by inadequate access to nutritious foods and culturally relevant health education, underscoring broader issues of food apartheid and socio-economic marginalization. A collaborative, community-centered approach involving Black farmers and Black Registered Dietitian Nutritionists (RDNs) holds significant potential for addressing these disparities. Black farmers are pivotal in enhancing food access, providing culturally relevant, fresh produce to underserved communities. Simultaneously, RDNs deliver tailored nutrition education, empowering individuals to adopt preventive strategies against chronic diseases. This partnership is essential for dismantling systemic barriers to health equity and fostering community well-being. Methods: Systematic searches were conducted in scientific databases, including PubMed, MEDLINE, and Google Scholar for peer-reviewed articles published between 2010-2023. Keywords included "Black farmers," 'dietitian nutritionists," "food apartheid," "chronic disease prevention," and "health equity." Gray literature, such as policy briefs and community reports, was also included to capture real-world interventions. Results: Access to culturally relevant food provided by Black farmers, along with tailored nutrition education from RDNs, contributes to a decrease in chronic disease prevalence within Black and marginalized communities. Together, these interventions address both individual behaviors and the systemic determinants of health. Conclusion: Partnerships between Black farmers and RDNs offer a promising strategy to advance health equity. Providing access to culturally relevant food and evidence-based nutrition education equips marginalized communities to combat chronic diseases, bridging gaps in the healthcare system and reducing disparities.

Segmenting brain regions in whole-brain zebra fish light sheet images

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Co-authors:

Whole-brain light sheet imaging enables high-resolution visualization of neural activity across the zebrafish brain, providing a powerful tool for studying functional brain organization. This project focuses on segmenting brain regions by registering light sheet images to a standardized zebrafish brain atlas, allowing for precise localization of neuronal activity. By applying this approach, we investigate whole-brain responses to visual and pain-related stimuli under both awake and anesthetized conditions using ketamine and propofol. Through systematic mapping of neural activity, this research aims to identify how sensory processing and neural dynamics vary across distinct brain regions under different states of consciousness. By comparing awake and anesthetized conditions, we assess the differential effects of these anesthetics on sensory pathways and global brain function. This study contributes to a broader understanding of how ketamine and propofol influence neuronal responses, shedding light on their mechanisms of action in modulating perception and brain-wide connectivity. Additionally, the integration of whole-brain imaging with standardized brain atlases enhances the accuracy of neural activity quantification, facilitating cross-experimental comparisons. The findings from this research provide valuable insights into the effects of anesthesia on neural circuitry, with implications for both basic neuro-

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science and clinical applications. Understanding how anesthetics alter sensory processing and brain-wide functional organization may inform future strategies for anesthetic use in both medical and research settings.

Analysis of Ebola Virus NP Protein Interaction with Protein Phosphatase-1 and Transcription Complex Assembly using AlphaFold 3

Presenter's Name: Forney Kobii Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Sergei Nekhaii Faculty Advisor's email: snekhai@howard.edu

Co-authors:

Background: Ebola virus (EBOV) is a deadly pathogen causing severe hemorrhagic fever in humans. The nucleoprotein (NP) forms the helical viral capsid and is part of the transcription-replication complex with polymerase L, VP30, and VP35. Our lab previously showed that host phosphatase PP1 dephosphorylates VP30, shifting activity toward replication. We also identified an NP E619K mutation in EBOV resistant to the PP1 inhibitor 1E7-03. This study aimed to visualize NP-PP1 interactions and assess the effects of NP E619K and VP30 phosphorylation on the polymerase complex bound to EBOV RNA. Methods: Using AlphaFold 3 and ChimeraX 1.3, we modeled EBOV molecular complexes. Sequences from the Yambuku-Mayinga strain (NC 002549.1) were used for L, NP, VP30, VP35, and the first 110 nt of EBOV RNA. PP1 residues Cys-291 and Arg-261, forming its RVxF-binding cavity, were labeled. NP was segmented (~50 aa) and assembled with PP1 for structure prediction, including the NP E619K mutation. VP30 phosphorylation (Ser-28, -29, -30, -41, -43, -45) was introduced. Results: NP E619K enhanced PP1 binding (Cys-291, Arg-261) and likely affected NP polymerization. Non-phosphorylated VP30 clustered near EBOV RNA, while phosphorvlation displaced VP30. NP E619K also repositioned VP30 toward NPbound PP1, suggesting functional interplay. Conclusion: NP interacts with PP1, and NP E619K enhances this binding, shifting polymerase activity toward replication. VP30 phosphorylation disrupts its RNA interaction, explaining its role in transcription. Targeting PP1's RVxF pocket may improve antiviral strategies. Further structural studies are needed for PP1-based EBOV therapeutics.

Development and Optimization of an HPLC Method for Analyzing N2'-Dithiocarbamate Derivatives of Emetine Alkaloid in Anticancer Research.

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Co-authors: Mehmet Gumustas, Emmanuel Akinboye

The identification of novel therapeutic agents for the treatment of diverse pathologies remains a significant focus in pharmaceutical research. Cancer, as one of the most prevalent and life-threatening diseases globally, is influenced by a complex interplay of environmental, lifestyle, and genetic factors. Emetine, an alkaloid isolated from Psychotria ipecacuanha, has demonstrated a wide array of pharmacological effects, including promising anticancer potential. However, to elucidate its full therapeutic potential and understand its mechanism of action, the exploration of its derivatives is essential. This study outlines the development and optimization of a reverse-phase high-performance liquid chromatography (RP-HPLC) method designed for the separation and characterization of N2- dithiocarbamate derivatives of emetine. The RP-HPLC system employed an XBridge-C18 column (250 × 4.60 mm, 5 µm particle size) and was fine-tuned for the qualitative analysis of these derivatives. The mobile phase comprised a 70:30 (v/v) mixture of acetonitrile and a 20 mM phosphate buffer (pH 8), operated at a column temperature of 35°C and a flow rate of 1 mL/min. Liquid chromatography-mass spectrometry (LC-MS) was subsequently utilized for the quantification and structural elucidation of the synthesized derivatives. The optimized chromatographic parameters enabled precise separation, identification, and quantification, providing a robust analytical framework for the study of emetine derivatives in anticancer research.

Kidney MiRNA Expression in BTBR ob/ob Mice at a Critical Time Point in Disease Development and Progression

Presenter's Name: Ghaderzadeh Sadaf Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Maurice Fluitt Faculty Advisor's email: maurice.fluitt@howard.edu

Co-authors: Maurice Fluitt, Baiyee-Ndang Agbor-Baiyee, Chidera Obiwuma, somtochi edeh, Kanwal Gambhir

Objective: Diabetic Kidney Disease (DKD) affects 40% of diabetic patients, leading to renal failure, yet the molecular drivers remain elusive. MicroRNAs, non-coding regulators of gene expression, may hold the key. This study aims to identify key miRNAs in DKD, providing crucial insights for early intervention. Methods: miRNA sequencing was performed on kidneys from 8-week-old male BTBR wild type and BTBR ob/ob mice, which lack leptin and develop type 2 diabetes with renal lesions typical of human DKD. Total RNA was extracted from kidney sections and processed using the QIAseq miRNA library kit. Sequencing was done on an Illumina NextSeq 550 platform. GeneGlobe analysis identified differentially expressed miRNAs and functional pathways, while Ingenuity Pathway Analysis (IPA) predicted master regulators and causal networks involved in DKD. Results: miRNA sequencing identified significantly differentially expressed miRNAs (p < 0.05) between 8-week-old BTBR WT and BTBR ob/ob male mice, including miR-34a (-6.86 fold), miR-122 (-5.01 fold), miR-129 (-2.23 fold), miR-142a (+2.78 fold), miR-346 (+4.66 fold), miR-547 (-2.49 fold), miR-592 (+11.81 fold), miR-802 (-6.95 fold), and miR-6539 (-7.93 fold). Qiagen GeneGlobe analysis revealed biological processes potentially targeted by these miRNAs, including endocytosis, phagocytosis, hyperglycemia (p=7.59e-3), and insulin-dependent diabetes (p=4.32e-4). IPA predicted RRAS activation (Z-score +2), with miR-34a and miR-122 targeting MYC, PI3K, and TGF-β in DKD progression in BTBR ob/ob mice. Discussion: We identified key kidney miRNA expressions in BTBR ob/ob

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mice, including miR-341a and miR-122, and pathways like Ras-related (RRAS) involved in DKD progression. These findings offer potential therapeutic targets to prevent DKD progression and improve patient outcomes.

Analysis of microglia distribution in the brain of HIV-transgenic and wild type mice

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Co-authors: Marina Jerebtsova

Antiretroviral therapy reduces HIV-1 replication and viral load, increasing the survival of people living with HIV. However, they remain at risk of developing HIV-associated neurocognitive disorder. HIV-1 infects microglia and alters their functions. Microglia distribution plays a crucial role in brain function and immune response. HIV-transgenic (HIV-Tg) mice exhibit abnormal neuronal function. We hypothesized that microglia distribution differs between wild-type (WT) mice and HIV-Tg mice. To test this hypothesis, we performed immunostaining of microglia in the brain sections of HIV-Tg and WT mice using Iba1 antibodies. Images were captured with an Olympus DP28 camera on an Olympus IX51 microscope at 400x magnification. Microglia segmentation and quantification were conducted using a machine-learning algorithm on the Fiji ImageJ platform. We evaluated the number, size, and Iba1 expression levels of microglia across different brain regions. Statistical analysis was performed using a Student's t-test. In the hippocampus, HIV-Tg mice showed a two-fold decrease in microglia numbers compared to WT controls. Microglia in HIV-Tg mice were smaller in size but exhibited higher Iba1 expression. Similarly, in the thalamus, microglia numbers were reduced in HIV-Tg mice, though their size was increased, and Iba1 expression was reduced compared to WT mice. These findings suggest that microglia distribution and activation differ between HIV-Tg and WT mice. The smaller microglia size and elevated Iba1 expression in the hippocampus of HIV-Tg mice indicate microglial activation. Therefore, the Fiji ImageJ platform proved to be effective for analyzing microglia distribution across various brain regions.

Synthesis and Characterization of Carboranyl Benzaldehydes

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Co-authors:

Antibiotic-resistant bacteria, commonly known as superbugs, have reduced the effectiveness of antibiotics, including vancomycin, which is often considered as a last-resort treatment. To address this problem, we propose developing new vancomycin analogs that incorporate carborane molecules at the N-terminus. This will be accomplished via synthesis of carboranyl aldehydes. Beginning with bromo- and bromo-fluoro-benzaldehvdes, a Sonogashira coupling was carried out with trimethylsilvlacetvlene (TMSA) and phenylacetylene to yield the desired ethynyl and fluoro-ethynyl benzaldehyde. This cross coupling reaction involves forming the carbon-carbon bond of a terminal alkyne to an aryl or vinyl halide. These reactions were carried out using schlenk line techniques to provide anaerobic and anhydrous conditions. The series of the halogenated substituted aryl aldehydes were selected and are distinguished by their arene substitution pattern of ortho-, para-, and meta- with additional varying functional groups, such as the hydroxyl group. These substitution patterns will allow us to test the importance of orientation of the carboranyl group in the vancomycin analog. The ethynyl aryl aldehyde products were characterized by 1H, 13C, 19F-NMR and SC-XRD, thus confirming the successful coupling of the terminal alkyne to the aryl benzaldehydes. Cage closings between the ethynyl arane and decaborane will be carried out by a silver mediated dehydrogenative alkyne insertion.

Investigating The Role of Vitamin D and COVID-19 Outcome

Presenter's Name: Habib Sayeeda Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Thomas Fungwe Faculty Advisor's email: thomas.fungwe@howard.edu

Co-authors:

This study investigates how vitamin D deficiency and elevated inflammatory markers affect clinical outcomes, specifically hospital length of stay (LOS) and mortality, in COVID-19 patients. The central hypothesis posits that patients exhibiting low vitamin D levels, alongside obesity, hypertension, and heightened inflammatory markers, are predisposed to prolonged hospitalization and increased mortality. Utilizing a cross-sectional design, the research analyzes secondary data from Electronic Medical Records at Howard University Hospital, covering the period from January 2020 to April 2024. Key independent variables include vitamin D levels and inflammatory markers such as D-Dimer, CRP, Lactate Dehydrogenase (LDH), Ferritin, IL-6, and Procalcitonin, as well as the presence of pre-existing conditions like obesity and hypertension. The primary outcomes are hospital LOS and mortality. Additionally, a comprehensive profile of patient health is constructed by assessing various confounding factors including immune markers, organ function tests, coagulation parameters, electrolyte levels, and metabolic panels. Vitamin D supplement intake is also documented to determine its potential mitigating effects. A range of statistical methods will be employed: ANOVA will compare inflammatory marker levels between patients who did and did not take vitamin D supplements, t-tests will evaluate the impact of vitamin D levels on these markers, logistic regression will explore the association between vitamin D deficiency and obesity, and moderation analysis will investigate the interactions among vitamin D levels, inflammatory status, pre-existing conditions, and patient outcomes. Overall, the study aims to elucidate vitamin D's role in modulating inflammation and its potential influence on the prognosis of COVID-19 patients.

ABSTRACTS

Investigating the Effect of Seaweed Bioactive Compounds on Gut Microbiota Composition and Dysbiosis: A Systematic Review

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Co-authors: Thomas Fungwe

The gut microbiota plays a crucial role in metabolism, immune function, and intestinal balance. Factors such as diet and environment can alter its composition, leading to dysbiosis. Bioactive compounds like polysaccharides, polyphenols, and fucoidan help maintain microbial balance. Seaweeds, rich in these compounds, offer antioxidant, anti-inflammatory, and immunomodulatory benefits. However, their effect on the gut microbiome remains unclear. This study systematically reviewed literature from Google Scholar and Web of Science (2014-2024) to evaluate the effects of seaweed bioactives on gut microbiota composition and function. The search yielded seven relevant studies. The studies investigated the effect of fucoidan in Helicobacter pylori eradication, gut microbiota, and macrophages, assessed the effect of Okinawa mozuku on bowel movement, evaluated the effect of seaweed polysaccharide on fecal weight and microbial imbalance, and the stability of seaweed phlorotannin in the GIT. Key findings indicate that seaweed components can increase beneficial bacteria such as Faecalibacterium prausnitzii and promote microbial diversity while reducing pathogenic taxa. Fucoidan was beneficial in mitigating the adverse effects of antibiotic-induced dysbiosis during Helicobacter pylori eradication therapy, while Okinawa mozuku improved bowel movement and stool consistency. Fucus vesiculosus phlorotannin is linked to antioxidant activity. These findings underscore the potential of seaweed bioactives as therapeutic agents for promoting and maintaining beneficial gut bacteria, reinforcing their application in dietary and clinical interventions for gut health. Building on this review, an ongoing study aims to generate preliminary data on the epigenetic effects of seaweed on microbiota and obesity.

Enhanced Enamel Remineralization through Polymer-based Fluorapatite

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Co-authors: Rochelle Michael

This study investigates the efficacy of polymer-based fluorapatite in promoting enamel remineralization. Demineralized human enamel samples were created using extracted human teeth and a acidic buffer. Samples were then treated with a gel or a solution mixture of the polymer-based fluorapatite for ~72 hours and compared to a control group. Preliminary results, obtained through SEM imaging, indicate a significant increase in surface remineralization under controlled and uncontrolled distrubution when being compared to the control group. Additional testing such as microhardness and corrosion resistance test will be performed to justify the remineralization with quantifiable results. These findings would suggest that polymer-based fluorapatite holds promise as an effective remineralizing agent for compromised enamel. Further analysis, such as mineral content analysis, is ongoing to further elucidate the remineralization mechanism and long-term effects.

Central olfactory neurons are modulated through dopaminergic synaptic transmission

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The glomerular layer of the olfactory bulb receives synaptic input from olfactory receptor neurons that send their axon from the nasal epithelium to the ipsilateral olfactory bulb. Neurons in the glomerular layer fall into three subpopulations: periglomerular (PG), external tufted and short-axon cells. PG cells receive input from the olfactory receptor neurons or dendrodendritic glutamatergic input from external tufted or mitral cells, the olfactory bulb output neurons. A large subset of PG cells contains dopamine and/or GABA and presynaptically inhibits olfactory receptor neurons through GABAergic and dopaminergic transmission. Even though dopaminergic PG neurons are critically placed at the entry to the olfactory bulb neural circuitry, their role in dopaminergic regulation of mitral cells and, therefore, output from the main olfactory bulb remains elusive. We tested the hypothesis that dopamine D2 receptors regulate mitral cell activity and, thereby, have a critical role in sensory processing of olfactory information. We used an electrophysiological experimental approach with whole-cell patch-clamp recordings from mitral cells in mouse brain slices. We recorded from mitral cells that exhibit burst-firing of action potentials. Our results showed that in voltage-clamp recordings, the dopamine antagonist sulpiride enhanced the amplitude and duration of long-lasting current in mitral cells. Similar results were obtained when GABA-A receptors were blocked with gabazine. The results indicate that blockade of dopaminergic or GABAergic synaptic transmission relieves mitral cells from inhibition and results in a significant increase of mitral cell activity which greatly enhances olfactory bulb output to higher order olfactory centers in the brain.

The Sweet Life: Optimizing Diabetic Distress Management in African Americans to Improve Patient Care and Treatment Adherence

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Introduction: African Americans face a disproportionate burden of type 2 diabetes, diabetic complications, and experience diabetic distress. Diabetic distress refers to the negative emotional or affective experiences that result from psychosocial adjustments to managing or living with diabetes. Recently, much attention has been given to diabetic distress and its impacts on glycemic control and treatment adherence. However, the effect of diabetic distress and its association with diabetic complications is not fully understood. Thus, assessing diabetic distress in African Americans provides needed insight into the impact of diabetic distress on clinical outcomes. Methods: A review of studies from the past five years was conducted using databases such as PubMed, Psycinfo and ClinicalKey. Studies were selected based on their evaluation of diabetic distress in African American patients with type 2 diabetes that utilized clinically validated tools. Interventions reviewed included diabetes self-management education, cognitive-behavioral therapy, and culturally tailored support programs. Results: The review revealed that diabetic distress is highly prevalent in this population, significantly correlating with poor glycemic control and reduced self-efficacy. Interventions demonstrated consistent improvements, with participants showing reduced distress scores and lower HbA1c levels. Culturally sensitive, patient-centered strategies emerged as particularly effective in enhancing treatment adherence and overall diabetes management. Conclusion: Effective management of diabetic distress is essential to mitigate health disparities in African American patients with type 2 diabetes. Integrating multidisciplinary, culturally sensitive interventions into standard clinical practice can enhance self-management and improve health outcomes. Further research with larger, diverse cohorts is needed to refine assessment tools and optimize intervention protocols.

Carboplatin and Tamoxifen combination treatment suppress the pro-tumorigenic activity of mutant p53 via regulating the ERbeta-p53-p73 signaling pathway in TNBC cells

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Triple Negative Breast Cancer (TNBC) affects 11% of all women with breast cancer in the United States2. It has been categorized as one of the most aggressive breast cancer subtypes. TNBCs are estrogen-receptor (ER)-negative, progesterone-receptor (PR)-negative, and human-epider-mal-growth-factor-receptor2 (HER2)-negative. Scientists have shown that neoadjuvant chemotherapy (NACT) has decreased the number of active cancer cells in patients with early-stage TNBC1. The focus drug of this work is Carboplatin, a platinum-based drug used during chemotherapy sessions for patients with early-stage TNBC. It has been found that the FDA approved drug Tamoxifen, an anti-estrogen drug, stabilizes ER-beta and increases its interaction with mutant p53 in TNBC3. The aim of this work is to understand the effects of a combination of Carboplatin and Tamoxifen on TNBC cells. Through a series of methods including proximity ligation assay (PLA), reverse-transcription polymerase chain reaction (RT-PCR), and immunoblotting, it is established

that Tamoxifen with Carboplatin not only increase ER-beta and p53 interactions, but also isolates mutant p53 from p73 leading to apoptosis, which is mediated through the restored p73 activity (upregulation of p21 and PUMA) in metastasis variant 231/LM2-4LUC+ TNBC cells. We hypothesize that Tamoxifen will decrease Carboplatin's IC50 (i.e., increase the efficacy of carboplatin) through a combination of both drugs. Experimental data of current project suggests that combination of Carboplatin and Tamoxifen may synergistically inhibit the growth of cancer cells. Our work suggests that Tamoxifen could be repurposed for treatment in ER β -positive TNBCs expressing mutant p53, due to its potential ability to increase the efficacy of Carboplatin.

SroA Modulates The Levels of Staphyloxanthin Pigment 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 multi-step 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 extracted STX using methanol 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.

ABSTRACTS

TXNIP Expression Does Not Change The Localization of EGFP-Merlin

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Background: Neurofibromatosis type 2 (NF2), a rare neurological disease, is rooted in a genetic mutation on chromosome 22 which hosts the NF2 gene. When transcribed, the NF2 gene becomes a protein called moesin-ezrin-radixin-like (Merlin) tumor suppressor. The Merlin cytoskeletal protein is partially responsible for the regulation of cellular growth. Deletions of the NF2 gene result in the formation of Schwann cell tumors and meningiomas. Thioredoxin-interacting protein (TXNIP) is associated with the suppression of tumors, cell proliferation, and aids in the regulation of oxidative stress (Shen et. al., 2015). Similar to NF2, TXNIP is associated with the suppression of tumor growth and cell proliferation. TXNIP inhibits the antioxidative functions of thioredoxin, a major regulator of cellular reduction-oxidation signaling which prevents cellular stress. Past studies have found that TXNIP is directly associated with the regulation of C-Myc, an oncogenic transcription factor that causes rapid cell growth, metastasis, and is a cause of higher mortality rates in triple negative breast cancer (TNBC) (Lim et. al. 2023). It has been found that the increased expression of C-Myc in cells alters their propensity to express growth regulating proteins. My project's goal was to investigate the interactions of TXNIP and C-Myc in NF2 positive (MDA-MB-231) and NF2 negative (ACHN) cells, accomplished through qualitative evaluation of protein expression and fluorescent visualization in TXNIP knockout (TKO) and parental cell lines.

Prevalence of FPN Q248H in People Living with HIV-1 and its Impact on HIV Restriction Factors

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Background. Increased iron stores correlate with rapid AIDS progression in HIV-1-infected patients. Ferroportin (FPN) is the only known transporter present mainly in enterocytes, macrophages, and hepatocytes. FPN exports Fe2+ from the cytoplasm to transferrin in circulation. The FPN Q248H mutation is linked to changes in iron load in Africans. Our study explored the effect of FPN Q248H mutation on HIV-1 infection. Methods. A cohort of men living with HIV-1 from the Multi-Center AIDS Cohort (MACS) containing both HIV-1+/- participants was genotyped for the prevalence of FPN Q248H mutations. Tetracycline inducible macrophages (THP-1) that expressed FPN Q248H were developed. HIV restriction factors including SAMHD1, Phospho-SAMHD1, IKBa, and p21 were analyzed in these cells. Results. MACS cohort anal-

ysis showed that the overall prevalence of Q248H mutation was 9.2% compared to 5.6% for Sickle cell trait. HIV-1+ participants had higher (9.6%) prevalence of FPN Q248H mutation compared to control participants (8.7%). We observed higher viral load but faster viral load decline coupled with an increase in CD4, CD8, and CD4/CD8 levels over 20 years follow-up in HIV-1+ participants with Q248H mutation. Analysis of antiviral factors showed increased expression of phospho-SAMHD1 in THP-1 cells expressing FPN Q248H. Expression of p21 was lower in FPN Q248H expressing cells. Conclusion. Our findings suggest that Q248H mutation can predispose to HIV-1 infection that can be due to reduced activity of SAMHD1 due to its phosphorylation. However, the long-term HIV-1 infection is likely to be suppressed and HIV-1+ patients with Q248H mutation are likely to survive better.

t-SNE Analysis of Microglial Morphology in Brain Injury

Presenter's Name: Hsu Chao-hsiung Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine Presentation Type: Poster Presentation Faculty Advisor: Tsang-Wei Tu Faculty Advisor's email: tsangwei.tu@howard.edu

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Microglia undergo dynamic morphological changes in response to brain injury, transitioning across a continuum of activation states. Traditional classification methods categorize microglia into discrete morphological classes but may overlook intermediate states. To address this, we applied t-distributed Stochastic Neighbor Embedding (t-SNE) to analyze microglial morphology in a rat cardiac arrest model, visualizing activation transitions in a continuous space. We extracted 25 morphological features from 386,000 segmented microglia and mapped them into a 3D t-SNE space. A polar colormap was developed to encode microglial activation states, revealing smoother transitions between ramified, hypertrophic, bushy, amoeboid, rod, and hyper-rod morphologies. Compared to traditional six-class classification, the t-SNE colormap provided a nuanced representation, resolving ambiguous cells and aligning morphology with expected activation patterns. Our results demonstrate that t-SNE provides a powerful framework for visualizing microglial activation as a continuum, improving morphological classification and capturing finer details of microglial transitions. This approach may offer valuable insights for studying brain injury and neuroimmune responses.

Mucin Glycosylation and Its Role in HIV-1 Virus Transmission

Presenter's Name: Iftikhar Sunniya Classification: Post Doc/Resident/Fellow/Research Associate School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Preethi Chandran Faculty Advisor's email: preethi.chandran@howard.edu

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Glycosylation, the enzymatic process of attaching glycans to proteins, involves in virus transmission by modulating virus-host interactions.

ABSTRACTS

Mucins, glycosylated rich proteins forming mucus barriers, contain extensive glycan structures including mannose-rich oligosaccharides. Mannose, a key constituent of mucins is a major component of glycan coatings in various viruses, including HIV, dengue, Ebola, and coronaviruses. Given the dense mannose-rich glycan shield of HIV, it serves as an ideal model for investigating virus-mucin interactions. Understanding how glycosylation patterns in mucins influence virus adhesion and immune evasion provides critical insights into the mechanisms of virus transmission through mucus barriers. This study explores mucin-virus interactions, focusing on the entrapment of virus particles in mucins. We developed a Dynamic Light Scattering (DLS) based non-invasive, cost-effective, and high-throughput light scattering technology to track mucin-virus interactions with minimal sample processing. Patient samples with well-characterized data capture potential contaminants influencing glycan composition. Virus binding assays were performed by incubating HIV-1 with mucin extracted from patient samples, followed by quantification using DLS and antibody-based detection methods. Magnetic bead pullout assays confirmed specificity of virus-mucin binding, while lectin-based aggregation assays profiled variations in terminal sugar to determine their impact on viral adhesion. We have successfully developed a novel light-scattering and antibody-based detection technology that reduces costs and sample handling. Our findings demonstrate variations in mucin composition and correlate with virus binding efficiency, providing crucial insights into glycosylation's role in HIV-1 virus transmission. This study will explore strategies to enhance mucin barriers to reduce HIV-1 transmission and advancing cost-effective global prevention strategies.

Enhancing Cancer Immunotherapy in HNSCC: A Literature Recuew on Epigenetic Modulation

Presenter's Name: Jester Kennedy Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Pamela Carter- Nolan Faculty Advisor's email: Pcarter-nolan@howard.edu

Co-authors:

Head and neck squamous cell carcinoma (HNSCC) affects many lives each year and remains a difficult cancer to treat, even with traditional approaches like surgery, chemotherapy, and radiotherapy. We will begin by discussing the biology of HNSCC and then review the range of current therapies before focusing on how immunotherapy is changing the game. This literature review will discuss the mechanisms, successes, and challenges associated with immunotherapy. Finally, it will examine emerging strategies, particularly epigenetic modulation, as a potential avenue to enhance immunotherapy responses and minimize side effects. Understanding these approaches could pave the way for more effective and personalized treatments, ultimately improving patient outcomes in HNSCC.

Optimizing Protein-Encapsulated Nanoparticles: A Dynamic Light Scattering Analysis

Presenter's Name: Johnson Janet Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Preethi Chandran Faculty Advisor's email: preethi.chandran@howard.edu

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Encapsulating proteins enhances their stability, bioavailability, and targeted delivery, protecting them from degradation and improving their therapeutic and industrial applications. Nanoparticles have emerged as a widely used drug delivery system due to their ability to improve the solubility, stability, and controlled release of biomolecules. However, optimizing nanoparticle formulations requires precise characterization to ensure uniformity, stability, and efficiency. Dynamic light scattering (DLS) is a key analytical technique used to assess nanoparticle size distribution, intensity, and stability. A single major peak in DLS data suggests a uniform population, while multiple peaks indicate heterogeneity, which may affect drug delivery performance and consistency. This study aims to investigate how varying protein concentrations affect nanoparticle formation and stability. We synthesized nanoparticles incorporating CAS-9 green fluorescent protein at concentrations ranging from 0 to 15 microliters and analyzed their intensity and correlation using DLS. Our results consistently showed a single major peak across samples, indicating successful and uniform nanoparticle formation. However, intensity fluctuations suggest concentration dependent effects on nanoparticle stability and potential aggregation at higher concentrations. Understanding these effects is essential for fine-tuning nanoparticle-based drug delivery systems to enhance their performance. Future research will expand on this work by testing different proteins to explore their influence on nanoparticle properties. These findings have significant implications for drug delivery, biopharmaceutical development, and enzyme stabilization in industrial applications.

Exploring Fuctionalized 1,4-Napthoquinones

Presenter's Name: Johnson Kiersten Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Oladapo Bakare Faculty Advisor's email: Obakare@howard.edu

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Prostate cancer remains one of the most prevalent and challenging malignancies to treat, particularly in cases of androgen-resistant disease. Current therapies, including androgen deprivation therapy, chemotherapy, and targeted treatments, often result in resistance and significant side effects, necessitating the development of novel therapeutic approaches. This research explores the synthesis of 1,4-naphthoquinone derivatives as potential anticancer agents, leveraging their redox activity and ability to selectively target cancer cells. A series of functionalized 1,4-naphthoquinones were synthesized via reactions with acid chlorides bear-

ing electron-donating (-OMe) and electron-withdrawing (-F, -Cl, -Ph) groups to assess their impact on chemical and biological activity. The reactions were performed under controlled reflux conditions, and the resulting compounds were purified and characterized using thin-layer chromatography (TLC), infrared spectroscopy (IR), proton nuclear magnetic resonance (H-NMR), and liquid chromatography-mass spectrometry (LCMS). Modifications to reaction conditions were necessary to optimize product formation, particularly in cases where initial methods did not yield the desired derivatives. Preliminary results confirmed the successful synthesis of several target compounds, while others deviated from expected structures, highlighting the need for further optimization. This study contributes to the ongoing search for targeted prostate cancer therapies, offering insights into the structural factors influencing 1,4-naphthoquinone-based drug development. Future work will focus on biological evaluation to determine anticancer efficacy and selectivity.

Paradoxical Relationship Between Vitamin A Deficiency and Inflammatory Bowel Disease

Presenter's Name: Jolly Victor Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

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Introduction: Vitamin A exists as preformed retinoids and provitamin A carotenoids, essential for vision, cell growth, and maintaining mucous membranes. While rare in developed countries, vitamin A deficiency (VAD) can occur due to malabsorption, liver disease, or inadequate intake, affecting gastrointestinal (GI) integrity by altering mucin production and gut permeability. Given the high prevalence of inflammatory bowel disease (IBD), understanding its association with VAD is crucial. Methods: A retrospective analysis using the TriNetX database examined 163,455,917 patient records, identifying 829,248 IBD cases. The prevalence and incidence of VAD in IBD patients were analyzed, focusing on demographic differences. Results: VAD incidence in the general population was 0.015%, with a prevalence of 0.016%. In IBD patients, incidence rose to 0.17% and prevalence to 0.183%, an 11-fold increase. Female patients comprised 52.68% of IBD cases, with a higher prevalence of VAD in White females. Discussion: The significantly higher incidence of VAD in IBD suggests a link between chronic inflammation, malabsorption, and increased metabolic demands. White females were disproportionately affected, potentially due to hormonal, genetic, and dietary factors. Routine screening for VAD in IBD patients may improve disease outcomes. Conclusion: VAD is significantly more prevalent in IBD patients, particularly White females. Screening and targeted supplementation may mitigate nutritional deficiencies and improve clinical management. Future research should explore causal mechanisms and therapeutic interventions to optimize patient care.

Exploring Protein Kinase C's Influence on Glucose Metabolism and Insulin Resistance in Skeletal Muscle

Presenter's Name: Jones Ashley Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Stanley Andrisse Faculty Advisor's email: stanley.andrisse@howard.edu

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Insulin resistance, central to metabolic diseases like type 2 diabetes, arises from impaired insulin signaling, particularly within the Akt pathway in liver and skeletal muscle tissues. This study investigates the role of Protein Kinase C epsilon (PKCE) in modulating glucose metabolism and insulin sensitivity, focusing on conditions that impair Akt signaling and contribute to insulin resistance. Insulin typically increases phosphorylated Akt (p-Akt) levels to promote glucose uptake; however, several conditions, including diet-induced obesity, chronic inflammation, glucocorticoid excess, nutrient imbalances, and chronic hyperinsulinemia, can reduce or even reverse this effect. Mechanisms such as increased protein phosphatase activity, inflammatory cytokines like TNF- α , elevated free fatty acids, and genetic mutations in insulin signaling components disrupt p-Akt activation, leading to elevated hepatic glucose production, impaired glycogen synthesis, and lipid accumulation. Using tissue-specific knockout models, I explored PKCe's influence on these signaling disruptions in skeletal muscle under various dietary conditions, including the Research Diets, Inc. (RDI) Control Diet (D12450J), a balanced low-fat diet. Findings indicate that PKCE deficiency enhances insulin sensitivity, evidenced by increased p-Akt levels and improved glucose uptake in skeletal muscle, underscoring PKCe's role in insulin resistance. This research illuminates PKCE as a potential therapeutic target, offering insight into addressing insulin resistance by restoring Akt pathway function across metabolic tissues.

Exploring Protein Kinase C's Influence on Glucose Metabolism and Insulin Resistance in Skeletal Muscle

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Co-authors:

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Exploring Phage Diversity: Discovery and Genomic Characterization of Phages Blessjoy and Temprado.

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The purpose of the SEA-PHAGES program is to isolate a phage that will infect the host cell, Mycobacterium smegmatis mc2 155, to discover an alternative to current antibiotics. By analyzing the morphology and genome of temperate phages Blessjoy and Temprado, both of subcluster A6, we aim to contribute to the expanding database of characterized bacteriophages. The phages were collected from soil located at the following GPS coordinates: (38.919056 N, 77.023222 W and 38° 55 '13"N 77° 00' 18" W). Phages Blessjoy and Temprado were subsequently isolated following standard protocols, and DNA was sent for sequencing and utilized for other downstream experiments. Sequencing identified both phages as members of subcluster A6 (temperate) with genome length between 52491 and 52541 bp and a GC content of 61.5%, between 99 to 102 genes and 3 tRNAs. Bioinformatic and annotation analysis is revealing that both phages share regions of conservation with other A6 phages yet also display some unique, significant differences. Bioinformatic analysis will focus on a detailed comparative analysis of both phages using the available bioinformatics tools. The information gathered from this study will help further the understanding of phage diversity and their potential applications in bacterial infection treatment.

The Role of Glycosylation on Biologics Transport through Mucus

Presenter's Name: Kamma Chinwe Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Preethi Chandran Faculty Advisor's email: Preethi.chandran@howard.edu

Co-authors: Jonathan Phillips, Preethi Chandran

Pulmonary diseases like chronic obstructive pulmonary disease (COPD), asthma, and lung cancer are often treated with monoclonal antibodies (mAbs) administered via the systemic routes - intravenous (IV), intramuscular (IM) and subcutaneous (SC). These routes have hampered the efficacy of administered drugs due to metabolism, elimination by endocytosis, and ending in unintended tissues and organs, like liver. Recently, there has been growing interest in inhalation mAbs in the treatment of these pulmonary diseases. However, the efficacy of this delivery method is challenged by the airway epithelium's mucus layer, which can impede the diffusion of therapeutic agents. Mucins, the primary components of mucus, are heavily glycosylated glycoproteins that play a crucial role in this barrier function. Similarly, antibodies are glycoproteins with more glycosylation sites in the fragment crystallizable (Fc) regions compared to the fragment antigen binding (Fab) regions playing a role in Fc effector functions. Here, we used fully glycosylated mAb (FgmAb), non-glycosylated mAb (NgmAb) and high mannose Fc (Rg-Fc) to investigate glycosylation's role in mucin-mAb interaction and transport through mucus. Using fluorescent recovery after photobleaching (FRAP) we show that the NgmAb recovered slowly after photobleaching compared to FgmAb and Rg-Fc. Similarly, in biolayer interferometry (BLI) we demonstrate that NgmAb has low KD's for mucin which varies with mucin glycosylation. Our study addresses a significant knowledge gap regarding the role of glycosylation in mAb-mucin interactions; understanding these interactions is essential for developing more effective inhaled antibody therapies, insights provided could inform design of antibody-based treatments with improved efficacy in pulmonary drug delivery.

Identification of key genes and pathways for Cardiovascular Disease (CVD) progression in Type 2 Diabetes African Americans in Washington D.C.

Presenter's Name: Kayembe Daniella Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Somiranjan Ghosh Faculty Advisor's email: sghosh@howard.edu

Co-authors: Tanmoy Mondal, Christopher Loffredo, Jyothirmai Simhadri, Zarish Noreen, Gail Nunlee-Bland, Brent Korba, Gemeyel Moses, Ruth Quartey, Charles Howell, Somiranjan Ghosh

Cardiovascular disease (CVD) presents a disproportionate burden on African Americans (AA's) in the United States, characterized by elevated rates of hypertension, stroke, and heart failure. Notably, type 2 diabetes (T2DM) a significant CVD risk factor exemplifies markedly higher prevalence among African Americans. Our aim is to analyze dysregulated genes and molecular pathways, to elucidate potential genetic and molecular contributors driving CVD progression in AA's with T2DM. Participants (Aa with T2DM) were recruited from Howard University Hospital T2DM research participants (n = 8, mean age 58.63 ± 6.21) and healthy controls (n = 11, mean age 55.82 ± 8.81) locally. Socioeconomic background information was retrieved from medical records. RNA sequencing were performed differential gene expression (DEG) and pathway analysis with CLC Bio, integrating IPA for visualization using datasets in Dr. Ghosh's Lab. We observed that 34 genes are involved with all types of cardiovascular disease, (viz., ARID2 EPAS1, GHD, SDHD).

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Out of 34 genes, 31 were upregulated and 3 were downregulated. STAT3 is the ley gene that was upregulated in all participants. IL6, and TNF were dysregulated those were linked and involved with the inflammatory pathways. STAT3 upregulation contributes to CVD by promoting inflammation, oxidative stress, and endothelial dysfunction. It drives pro-inflammatory cytokines like IL-6 and TNF, fueling atherogenesis and heart failure. STAT3 also increases ROS production, impairing nitric oxide signaling and vascular function, increasing CVD risk. Larger multiethnic population validation is necessary to consolidate our findings.

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Co-authors: Tanmoy Mondal, Somiranjan Ghosh

Cardiovascular disease (CVD) presents a disproportionate burden on African Americans (AA's) in the United States, characterized by elevated rates of hypertension, stroke, and heart failure. Notably, type 2 diabetes (T2DM) a significant CVD risk factor exemplifies markedly higher prevalence among African Americans. Our aim is to analyze dysregulated genes and molecular pathways, to elucidate potential genetic and molecular contributors driving CVD progression in AA's with T2DM. Participants (Aa with T2DM) were recruited from Howard University Hospital T2DM research participants (n = 8, mean age 58.63 ± 6.21) and healthy controls (n = 11, mean age 55.82 ± 8.81) locally. Socioeconomic background information was retrieved from medical records. RNA sequencing were performed differential gene expression (DEG) and pathway analysis with CLC Bio, integrating IPA for visualization using datasets in Dr. Ghosh's Lab. We observed that 34 genes are involved with all types of cardiovascular disease, (viz., ARID2 EPAS1, GHD, SDHD). Out of 34 genes, 31 were upregulated and 3 were downregulated. STAT3 is the ley gene that was upregulated in all participants. IL6, and TNF were dysregulated and linked and involved with the inflammatory pathways. STAT3 upregulation contributes to CVD by promoting inflammation, oxidative stress, and endothelial dysfunction. It drives pro-inflammatory cytokines like IL-6 and TNF, fueling atherogenesis and heart failure. STAT3 also increases ROS production, impairing nitric oxide signaling and vascular function, increasing CVD risk. Larger multiethnic population validation is necessary to consolidate our findings.

Spontaneous Corneal Perforation in Pellucid Marginal Degeneration

Presenter's Name: Kelley Francisco Classification: Professional Student School/College: Medicine Presentation Type: Poster Presentation Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu Co-authors: Mahlet Abrie, Samrawit Zinabu, Kira Yates, Luke Nelson, Ahmad Mohammed

Introduction: Pellucid Marginal Degeneration (PMD) is a rare corneal ectatic disorder that can lead to progressive visual impairment. Spontaneous corneal perforation is an uncommon but severe complication. This case highlights the need for early recognition and management of PMD to prevent vision-threatening outcomes. Case Presentation: A 28-yearold female presented with acute right eye pain, rapid visual deterioration over a few hours, and progressive bilateral visual decline over three years. Examination and corneal topographic studies confirmed bilateral PMD with spontaneous corneal perforation in the right eye. Conservative management with topical corticosteroids, prophylactic antibiotics, and patching led to symptom improvement. Discussion:PMD should be considered in patients with long-standing vision reduction and sudden corneal perforation. This is the first reported case of spontaneous corneal perforation and hydrops due to PMD in Ethiopia, underscoring the importance of awareness among eye care professionals. Conclusion: This case emphasizes the need for prompt recognition and intervention in PMD to prevent severe complications. Increased awareness of corneal ectatic disorders can aid in timely diagnosis and management, preserving vision in affected individuals.

Oral Manifestations of HIV in the Oral Cavity and its Effects on the Periodontal Health of a 46-year-old male: Prognosis after Treatment Presenter's Name: Kyla Janhvi

Classification: Professional Student School/College: Dentistry *Presentation Type: Oral Presentation* Faculty Advisor: Dr. Geetanjeli Sheogobind, M.P.A. Faculty Advisor's email: geetanjeli.sheogobin@howard.edu

Co-authors: Samim Mohammadi, Al-Yaman T. Ahmad, Kwadwo Brenya, Archana Kumar, Jahnvi Kyla

Patients with human immunodeficiency virus (HIV) are at special risk for oral health problems and when left untreated disease progression can be dramatic. Some of the most common oral manifestations for people with HIV are the following chronic oral diseases: gingivitis, periodontitis, canker sores, oral warts, fever blisters, oral candidiasis, hairy leukoplakia, dental caries and in later stages, neoplasms such as Kaposi sarcoma. In infected individuals, the virus can be found in most body fluids. The most frequent routes of transmission are sexual contact, parenteral exposure to blood or transmission from mother to fetus during the perinatal period. Oral presentations can either be asymptomatic or acute responses to the infection are observed [X]. This review explores the oral presentation of untreated HIV in a 46-year-old male, the diagnosis, the treatment of advanced chronic periodontitis as a result of HIV and the subsequent prognosis with recommended antiretroviral therapy. Keywords: "immunodeficiency virus", "candidiasis", "chronic periodontitis", "hairy leukoplakia", "Kaposi sarcoma"

Understanding the functions of SroA and SroB and their impact of Sigma S

Presenter's Name: Lee Sophie Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Karl Thompson Faculty Advisor's email: karl.thompson@Howard.edu

Co-authors: Camille Wimberly

Sigma factors play a pivotal role in bacterial gene expression by initiating DNA transcription and facilitating RNA polymerase binding to gene promoters. These proteins are regulated by environmental changes and controlled by small noncoding RNAs, which either activate or inhibit translation. Among them, Sigma S is the least understood, vet crucial for processes such as antibiotic resistance, virulence, and immune cell survival. Its activity is triggered by DNA damage and is vital for bacterial adaptation to stress. Previous research demonstrates the significance of Sigma S through experiments where its absence resulted in diminished resistance and virulence. Sigma S also regulates the expression of two specific proteins, SroA and SroB. These proteins are products of Sigma S activity and are hypothesized to share its essential characteristics. Despite their importance, the precise functions of SroA and SroB and their contributions to Sigma S-mediated resistance remain largely unexplored. Key questions include the nature of their resistance mechanisms and their influence on Sigma S expression. Understanding these relationships is crucial for figuring out the broader role of Sigma S in bacterial survival and adaptation. Preliminary results from colony assays suggest varying resistance levels influenced by SroA and SroB. The wildtype strain produced 131 colonies, while the SroA and SroB deletion strain yielded 134 colonies. Strains with single deletions showed reduced colony formation, with 95 colonies for SroA deletion and 77 colonies for SroB deletion. These results indicate distinct roles for SroA and SroB in bacterial resistance, however further investigation into is needed.

Outcome of Laparotomy vs Laparoscopy in Patients with Endometriosis

Presenter's Name: Lewter Tajah Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Nurupa Ramkissoon

Endometriosis is a chronic gynecological disorder that significantly impacts quality of life due to persistent pelvic pain and infertility. Surgical management is often required when medical therapy fails, with laparoscopy emerging as the preferred minimally invasive approach. However, laparotomy remains an option in severe cases where extensive disease involvement necessitates a more invasive approach. This study compares the outcomes of laparotomy and laparoscopy in endometriosis patients, focusing on perioperative complications, pain relief, and long-term disease control. This study utilized de-identified electronic health records from the TriNetX database, covering a 20-year period. A retrospective cohort analysis was conducted to assess outcomes in patients with endometriosis. Statistical analyses included risk difference (RD), risk ratio (RR), odds ratio (OR), Kaplan-Meier survival curves, and hazard ratios (HR). A retrospective analysis using propensity score matching demonstrated no significant difference in bleeding risk between the two procedures. However, patients who underwent laparotomy exhibited significantly lower rates of chronic pelvic pain (42.3% vs. 51.7%), dysmenorrhea (21.8% vs. 27.7%), and dyspareunia (9.0% vs. 12.2%) compared to those who had laparoscopic surgery. Kaplan-Meier survival analysis indicated that patients in the laparotomy group had a higher probability of remaining pain-free over time. These findings suggest that while both surgical approaches are effective, laparotomy may offer superior long-term pain control for endometriosis patients with extensive disease involvement. Future research should explore patient-reported outcomes and the role of interventional radiology in managing endometriosis-related pain.

PCOS and Gallbladder Disease: A Comparative Analysis of Metformin vs GLP-1 Agonists

Presenter's Name: Lewter Tajah Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@howard.edu

Co-authors: Kiara Lowery

Polycystic ovarian syndrome (PCOS) is a complex endocrine disorder affecting 5-15% of reproductive-aged birthing people, with significant implications on fat metabolism and hyperinsulinemia. Hyperinsulinemia stimulates lipogenesis and suppresses lipolysis, thus contributing to obesity. Hyperinsulinemia affects gallbladder dysmotility and enhances cholesterol production, increasing the risk of cholelithiasis, cholecystitis and cholangitis. Metformin is often prescribed to PCOS patients experiencing dyslipidemia, type 2 diabetes mellitus (DM2), and obesity. In the interest of exploring more effective medication therapies, this research aims to determine the difference in incidence of gallbladder disease in PCOS patients treated with metformin versus glucagon-like peptide-1 (GLP-1) agonists. This study used TrinetX data network to identify and analyze two cohorts via measure of association, survival, number of instances, and lab result distribution: the first matched the query criteria of PCOS diagnosis and medication metformin and the second matched PCOS diagnosis and GLP-1 agonist. After propensity matching 1:1 by age at index, DM2, obesity, fenofibrate and statins, and BMI, each cohort had 53,258 patients. Our findings indicate GLP-1 agonists may be protective against gallstone-related conditions compared to metformin, with lower incidence rates and better risk outcomes for cholelithiasis and cholecystitis, while cholangitis risk remains comparable. Investigating alternative treatments for individuals with PCOS and gallbladder disease is important, as reproductive and metabolic health are affected, requiring comprehensive treatment. GLP-1 agonists may protect against cholelithiasis and cholecystitis likely due to their weight-reducing and insulin resistance-reducing effects. Further studies are recommended to further investigate effects of GLP-1 on cholelithiasis and cholecystitis.

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Lorentzian Analysis of DGE MRI: Unveiling Glucose Metabolism Changes in TBI-Affected Brains

Presenter's Name: Liu Da-yuan Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Tsang-Wei Tu Faculty Advisor's email: tsangwei.tu@howard.edu

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Impaired glucose metabolism following TBI, a 'silent epidemic', increases neurodegenerative risk and eludes current imaging techniques. Dynamic glucose enhancement (DGE) MRI can assess brain glucose uptake and metabolism, but the impact of intravenous glucose on DGE signals remained unexplored in TBI-affected brains, where hemodynamics may largely be compromised. This study aims to understand DGE signals in TBI brains following intravenous glucose injection. DGE MRI was performed on six female rats of weight drop TBI using Bruker 9.4T, with baseline scans and post-intravenous injection of 0.3g/kg D-Glucose data collected. B0/B1 inhomogeneities were corrected using WAS-SR and two-flip angle methods. DGE Z-spectra were analyzed using a 7-pool Lorentzian approach, computing peak amplitudes and frequency offsets of water, hydroxyl, amide, amine, macromolecules and NOEs pre-injury (control), Day 1, and Day 8 post-TBI. On Day 1 of TBI, both water and hydroxyl amplitudes were aligned with controls. By Day 8, the water amplitude increased sharply after glucose injection, while the hydroxyl amplitude decreased significantly, indicating increased perfusion, but reduced glucose uptake. Comparing to controls, water frequency post glucose injection shifted 0.02 upfield on Day 1, and 0.04 ppm downfield on Day 8. No change in the hydroxyl frequency was observed post-injection in controls, while TBI showed a 0.003ppm upfield shift on Day 1, and 0.002ppm downfield shift on Day 8, reflecting distinct glucose utilization. These changes were likely attributed to altered perfusion, pH, and increased inflammation in TBI brains. Ongoing studies compares DGE with NMR and Gd-T1 imaging to further explore these effects.

Comparison of Hypertension Management Guidelines Utilizing the National Ambulatory Medical Care Survey (2019)

Presenter's Name: Lowery Jordan Classification: Professional Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Monika Daftary Faculty Advisor's email: mdaftary@Howard.edu

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Hypertension management varies based on the availability of clinical guidelines. This comparison aims to highlight the differences and similarities in hypertension guidelines, focusing on HTN cut-offs and describing antihypertensive utilization following treatment recommendations and co-morbidities. The NAMCS collects data on utilization of ambulatory medical care services provided by office-based physicians from office visits, and provides real-world data on the prevalence of hypertension and the effectiveness of different management strategies in outpatient settings. Guidelines from the American College of Cardiology (ACC), the American Heart Association (AHA) and European guidelines emphasize evidence-based thresholds for diagnosis and treatment, advocating for lifestyle modifications and pharmacotherapy based on individualized risk assessments. Key differences include the classification of blood pressure categories, target treatment goals, and recommendations for first-line agents. Of the 2480 patients diagnosed with hypertension in this dataset, only 1229 (49.6%) received antihypertensive medications. This research compares these guidelines and explore more statistics from this dataset.

Effect of Ivabradine on Heart Failure: A 2024 Meta-Analysis

Presenter's Name: Maharaj Akhay Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Nicholas Azinge Faculty Advisor's email: nazinge@huhosp.org

Co-authors:

Ivabradine is thought to be highly effective in the treatment of heart failure through its effects on heart rate (HR) and left ventricular ejection fraction (LVEF). Data from 11 randomized clinical trials including 1,687 study participants, 862 in the ivabradine treatment group, and 825 in the placebo group were included in the analysis. No significant reduction in cardiovascular mortality or hospital readmissions was noted with the use of ivabradine compared to the placebo group (relative risk (RR)). 0.79 (95% confidence interval (CI)), 0.15, 4.14) and (RR, 0.53 (95%) CI, 0.20, 1.22), respectively. In 10 of these trials, there was a significant reduction in the HR of treatment participants (mean difference (MD)), - 11.7 (95 % CI, -12.88, -10.51). There was also a beneficial association noted between LVEF and ivabradine participants (MD, 3.03 (95 % CI, 2.07, 3.98). There was a significant reduction in NT-proBNP levels (MD, -384 (95 % CI, -581.68, -187.72) in ivabradine patients, but no significant change was noted in BNP levels in this group (MD, -72.32; 95 % CI, -263.67, 119.0) The risk reduction in bradycardia and atrial fibrillation among ivabradine users versus non-users were both insignificant (RR, 1.62 (95 % CI, 0.024, 4.83) and RR, 0.93 (95 % CI, 0.014, 12.51), respectively). Conclusively, heart failure patients taking ivabradine demonstrated significant improvements in LVEF and reduction in HRs compared to the standard treatment group. No significant changes in other cardiovascular or clinical outcomes in Ivabradine users were confirmed in this meta-analysis.

MiaA is Necessary for the Expression of GroES and GroEL during Heat Shock in Escherichia coli

Presenter's Name: Malone Cai Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Karl Thompson Faculty Advisor's email: karl.thompson@howard.edu

Co-authors: Kaie Hall, Sagar Pasham PhD, Karl Thompson PhD, Alana Johnson, Kai Avilez

Escherichia coli is an facultative anaerobe and gram-negative bacteria that is a commensal in the guts of humans. Most strains are harmless, but some can cause gastrointestinal and urinary infections. When infections occur in the body the immune system sends a chemical signal to the hypothalamus which increases the body temperature. As the bacterial proteins are exposed to temperatures considerably higher than physiological temperature, they begin to denature. Heat-shock proteins (HSPs) are chaperone proteins that assist in the refolding of denatured proteins. Since HSPs are fundamental to maintaining the function of bacteria, we decided to target two HSPs from the HSP70 family, GroES and GroEL. These proteins overexpress the leucine codons UUA and UUG which are synthesized by tRNA that has been modified by the gene miaA. By deleting miaA from the genome of our E. coli strains, we hypothesize that the protein concentration will decrease due to the hindrance of GroES and GroEL production. We are currently conducting Western blots on the wild type, $\Delta miaA$, and Δhfq (a gene downstream of miaA) strains that were grown in 30mL LB media, Ez. rich complete media, and Ez. rich Leu-media to 0.5 and 1.5. After reaching the proper density, the cultures were split evenly and left to rock at 43.5 degrees Celsius and 37 degrees Celsius for an hour. After finishing the Western blots, we plan to use proteomics to identify the types of protein present in the heat-shocked strains versus the non-heat-shocked strains.

Laponite Nanocarrier for Sustained Release of Chloroquine

Presenter's Name: Maryanne Sani Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dharmaraj Raghavan Faculty Advisor's email: draghavan@howard.edu

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Chloroquine is an antiparasitic drug that effectively treats malaria and extraintestinal amebiasis. However, maintaining sustained amount of chloroquine in body for treating malaria is difficult because of rapid absorption and fast clearance of drug, leading to fluctuating plasma levels. Consequently, higher chloroquine is administered leading to high risk of side effects such as gastrointestinal discomfort, retinal toxicity, and cardiotoxicity. Laponite nanocarriers offer a promising solution to the challenges of antimalarial therapy by providing pH-responsive and sustained release of chloroquine. This study aims to investigate the drug encapsulation efficiency, release profile, and pH-responsive behavior of chloroquine loaded Laponite RD, RDS, and XLG variants. The encapsulation efficiency and intercalation was followed using UV-VIS and XRD respectively, with Laponite RDS achieving 99% encapsulation efficiency and maximal basal peak shift compared to RD and XLG, which is consistent with cation exchange capacities of various clays. The intercalation of chloroquine in Laponite was confirmed by the broadening of Si-O bonds as it relates to Laponite structure. Electrostatic interactions between Laponite and chloroquine were confirmed using zeta potential and DLS measurements. Laponite exhibited pH-responsive chloroquine release, with significant release at pH 5 and sustained release at physiological pH over 5 days. Understanding the chloroquine loading of Laponite grades (RD, XLG, RDS) and release profile helps select the best variant for optimal chloroquine delivery and desired clinical outcome.

Examining Sex-Specific Behavioral Patterns in FoxP2 +/- Female Mice

Presenter's Name: Mcaffity Tyla Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dominique Pritchett Faculty Advisor's email: Dominique.pritchett@howard.edu

Co-authors:

FoxP2, a prominent transcription factor linked to language and social interaction functions, has been identified as a contributor to differences in behavior between sexes across various species. Previous research has mainly examined FoxP2's effects in males but the function of FoxP2 in female social behavior has not been thoroughly investigated. The research examines how FoxP2 insuffiency influences social behavior in female mice through its effects on the medial amygdala (MeA), which processes social and emotional signals. The behavioral assays measure the effects of lowered FoxP2 expression on social and exploratory behaviors in FoxP2+/- female mice when compared to their wild-type counterparts. By utilizing the IMARIS imaging software to monitor FoxP2-expressing cells in the MeA, we are able to precisely measure cell distribution patterns and expression. This approach delivers complete insight into how FoxP2 expression affects behavioral results. The result of this study demonstrates how FoxP2 influences sex-specific social behaviors to expand knowledge about neural pathways that control communication and social processing in females, showing differences in behavioral responses in male versus female mice models.

Unveiling the Viral Mysteries of Phages Iridessa, Jesabah, and Chalmers

Presenter's Name: Mcbride Savannah Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Mary Ayuk Faculty Advisor's email: mary.ayuk@Howard.edu

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Bacteriophages (phages) are viruses that infect and use the apparatus of their bacterial host to replicate. The SEA-PHAGES program at Howard University seeks to isolate bacteriophages that infect Mycobacterium smegmatis mc2 155, further developing an understanding of phage diversity, evolution, and potential medical applications. The bacteriophages Chalmers, Iridessa and Jesabah were isolated from enriched soil samples that were collected from different locations around the Howard University environment with the following coordinates (38.928472 N, 77.017694 W, 38.902556 N, 77.058333 W and 38.523806 N, 77.13 W respectively). Phages were purified, lysates were collected, and DNA was isolated for sequencing and other required experiments. Upon imaging and sequencing, Iridessa and Jesabah were classified as members of the

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B1 subcluster while Chalmers was of the B3 subcluster. Their genome sizes ranged from 68178 to 69436 bp, with a GC content between 66.4% and 67.5%. Functional annotation is currently being conducted using diverse bioinformatic tools and programs such as PhagesDB BLAST, NCBI BLAST, DeepTMHMM, and HHpred digital with a cutoff E-value of 10-4 to better understand the phage's gene functions and peculiarities.

Increased Hospital Readmission After Cesarean Delivery with Epidural Anesthesia in Patients with Substance Use Disorder

Presenter's Name: Mcmillan Elijah Classification: Graduate Student School/College: Medicine Presentation Type: Poster Presentation *Faculty Advisor: Miriam Michael* Faculty Advisor's email: miriambmichael@gmail.com

Co-authors: Kamdili Ogbutor, Da'Jhai Monroe, Nurupa Ramkissoon, Miguel Ramallo, Alexis Edmonds, Shaquan Taylor, Trinity Gibbs, Samrawit Zinabu, Miriam Michael

Background: Epidural anesthesia is a routine technique for cesarean delivery, yet its impact on post-discharge outcomes in patients with substance use disorder (SUD) has not been fully elucidated. This study aims to assess whether SUD influences hospital readmission and mortality rates following cesarean delivery. Methods: We performed a retrospective cohort study using de-identified electronic health records from the TriNetX database, which aggregates data from 142 healthcare organizations. The study included patients who underwent cesarean delivery with epidural anesthesia between February 2005 and February 2025. Participants were divided into two matched groups based on the presence of a documented SUD. The primary outcomes were hospital readmissions and in-hospital mortality within 45 days post-discharge. Results: A total of 3,325 patients were readmitted within 45 days. Among these, 1,863 were from the SUD group compared to 1,462 from the control group, resulting in a risk ratio of 1.274 (95% CI: 1.200, 1.354; p-value <.005). Interpreting this ratio indicates that patients with SUD have an approximately 27% higher likelihood of being readmitted compared to those without SUD. Notably, there were no recorded cases of mortality in either group. Conclusion: These findings suggest that substance use disorder is associated with a significantly increased rate of hospital readmission following cesarean delivery with epidural anesthesia. This underscores the importance of developing tailored perioperative and postoperative care strategies for this at-risk population to improve overall outcomes.

Fracture Risk in HIV-Positive ESRD Patients: A Comparison of Femur and Hip Fractures from 2004-2013 to 2014-2023

Presenter's Name: Mehari Keleb Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Damon Ross, Justin Morrison, Ryan Mitchell

HIV-positive patients with end-stage renal disease (ESRD) face a heightened risk of femur and hip fractures due to compounded bone loss from both chronic kidney disease and antiretroviral therapy (ART). This study assesses the incidence and prevalence of femur and hip fractures in this population across two decades (2004-2013 vs. 2014-2023). Using data from the TriNetX database, we analyzed 728,161 HIV-positive ESRD patients on ART, focusing on fracture types, demographics, and comorbidities. Our findings show a marked increase in fracture rates: femur fractures increased by 71% in incidence and 127% in prevalence, while hip fractures surged by 184% in incidence and 248% in prevalence. The most notable rise in fracture incidence occurred in younger adults, particularly those aged 20-24 years, highlighting an earlier onset of osteoporotic fractures in this cohort. Women exhibited a higher increase in fracture incidence (112%) and prevalence (160%) compared to men. Racial disparities were evident, with a significant increase in fracture incidence observed among Asian patients in 2014-2023. These trends underscore the urgent need for early bone mineral density (BMD) screening and osteoporosis management in HIV-positive ESRD patients, especially those on tenofovir-based ART. Proactive fracture prevention strategies, including earlier BMD screening and fall risk mitigation, are essential for reducing fracture-related morbidity and mortality. Future prospective studies should evaluate fracture risk stratification and long-term skeletal outcomes in this high-risk population.

Decoding the Secrets of Ablatia through Isolation and Characterization

Presenter's Name: Michel Jasmine Christina Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Mary Ayuk Faculty Advisor's email: mary.ayuk@howard.edu

Co-authors:

In an era of antibiotic resistance, bacteriophage research has emerged as a promising solution to this crisis. Mycobacterium smegmatis mc2 155 was the host bacterium used to isolate and characterize Phage Ablatia. During the 2024-2025 academic year, phage Ablatia was collected from an environmental sample near the Howard University campus, then was isolated, purified, and had its' DNA extracted. Preliminary morphological and genomic analyses were then conducted to better understand Ablatia's structure and function. Using the MiSeq platform and Illumina at Pittsburg Bacteriophage Institution, Ablatia, a circularly permuted subcluster C1 phage, was sequenced with a genome length of 155,479 bps, 231 genes, 32 tRNAs, 1 tmRNA and a GC content of 64.7%, which is within 0.3% of the average, and has a Myoviridae morphotype. Currently, Ablatia is being annotated, utilizing programs such as PhagesDB and NCBI BLAST to compare phage sequences; GeneMark, Glimmer, and Starterator to call starts; and HHpred and DeepTMHMM to confirm function. Annotating phages and sequencing genomes assist in scientific advancement and research by identifying specific protein functions and tRNA sequences. Key words: Mycobacteriophage, Soil, Mycobacterium smegmatis, Myoviridae

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Neuroimmune Mechanisms Underlying Neuropsychiatric Disorders and Substance Abuse: A Role for Microglia

Presenter's Name: Miller Alani Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Sayan Nandi Faculty Advisor's email: sayan.nandi@howard.edu

Co-authors: Oluwaseun Faborode, Sayan Nandi

Despite some areas of progress over the past 3 decades, neuropsychiatric conditions such as schizophrenia, bipolar disorder, and substance abuse remain major therapeutic challenges in contemporary medicine. Recent advances in neuroscience highlight the contributions of microglia, the principal immune cell type in the brain, to the development of these conditions. Schizophrenia is often considered an adolescent-onset neuropsychiatric disorder, affecting 0.5% of the global population. Schizophrenia has a strong genetic predisposition and shows a strong bias toward immune system dysregulation relating to microglial function. This project specifically investigates the role of microglia in schizophrenia development and attempts to manipulate a microglial-specific gene, namely Allograft Inflammatory factor 1 (Aif1) encoding a proinflammatory protein, Ionized Ca+2-binding adapter protein 1 (Iba1), for a better outcome in a drug-induced model of schizophrenia in mice. Toward this end, we use genetic manipulations in microglia during adolescent development in mice, and further combine molecular, behavioral and neurophysiological approaches to study schizophrenia-related brain pathology. Using the same model, we further test the possibility of manipulating the immune system or microglia as a target for treating cognitive and mood disturbances associated with substance abuse. Overall, this project may contribute to a better understanding of the neuro-immunological basis underlying many global mental health challenges.

Using Combinatorial Gene Silencing to Interrogate the Role of Bacterial Virulence Factors During Eukaryotic Host Pathogenesis

Presenter's Name: Mohammed Meram Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Matthias Machner Faculty Advisor's email: machnerm@mail.nih.gov

Co-authors: Nicole Ellis, Matthias Machner

Legionella pneumophila, a Gram-negative intracellular pathogen, is the causative agent of Legionnaires' disease, a severe pneumonia acquired through the inhalation of contaminated water droplets. L. pneumophila relies on a vast arsenal of virulence factors, known as effector proteins, to manipulate host cellular processes and establish a replicative niche. However, the redundancy among these effectors complicates functional characterization. To overcome this challenge, a multiplex CRISPR interference (CRISPRi) tool was developed, enabling the simultaneous silencing of multiple genes. Here, I will investigate two effector-encoding genes predicted to encode transporters redundant with a known metal transporter, mavN. The hypothesized pairing of these genes was uncov-

ered during a CRISPRi screen, which reported on impaired L. pneumophila pathogenesis of eukaryotic hosts. To investigate the role of our target genes, we engineered CRISPRi plasmids with guide RNAs specific to each gene and introduced them into L. pneumophila. To validate the efficiency of CRISPRi-mediated gene silencing, we extracted RNA post-induction and quantified target gene knockdown. Finally, to determine the impact of gene silencing on bacterial replication, we conducted intracellular growth assays in macrophages. Altogether, our findings contribute to a deeper understanding of Legionella's virulence and may reveal novel targets for therapeutic intervention.

The Role of Scaffold Protein RACK1 Inhibitor Compounds in Targeting Cancer Cell Migration

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Co-authors: Hemayet Ullah

In 2024, there were an estimated 2 million new cancer cases, where approximately 310,000 women were diagnosed with breast cancer in the United States (Siegel, Giaquinto, & Jemal, 2024). Cancer metastasis, the spread of cancer cells to distant organs, remains the leading cause of cancer-related death worldwide. Despite advancements in cancer research, effective treatment targeting metastasis is still an unmet challenge. This study investigates the role of Receptor for Activated Protein C Kinase 1 (RACK1) in regulating cancer cell migration and invasion, two critical steps in metastasis. RACK1, a conserved intracellular scaffold protein, influences cancer cell adhesion and migration by interacting with key signaling proteins such as Src kinase and Focal Adhesion Kinase (FAK). These interactions regulate essential processes such as cancer cell polarity, directionality, and adhesion to the extracellular matrix. Our study focuses on a specific tyrosine phosphorylation site (Y246) of RACK1, which is crucial for its interaction with Src kinase and the activation of cell signaling. Using the crystal structure of RACK1 developed in our lab, we have designed small compounds targeting this phosphorylation site, which have shown to effectively inhibit RACK1's cellular functions. The preliminary data from our recent publication indicate that these compounds can prevent FAK-mediated cancer cell migration and invasion by affecting the development (number of connections) and growth (length) of filopodia/lamellipodia. Furthermore, we explore the effects of SD29 inhibitor compounds on MDA-MB-231, a triple-negative cancer cell line, whose proliferation and migration properties could offer novel therapeutic strategies to inhibit cancer metastasis.
ABSTRACTS

Significance of Tunneling Nanotubes in Potential Therapies for Modern Medicine

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Co-authors: Allen Washington, Jnr., Maurice Fluitt, Kanwal Gambhir

Mitochondrial dysfunction is a common feature of many metabolic processes. Specifically, cellular oxidative stress is known to contribute to deleterious effects such as insulin resistance, obesity, and hypertension, due to the mitochondria's centrality in bioenergetics and energy expenditures within the cell and throughout the collective organ systems. Furthermore, intercellular transfers of mitochondria via tunneling nanotubes (TNTs) and micro vesicles (MVs) are means in which the metabolic needs of adjacent and distant cells can be supported in a cell-to-cell manner. Therefore, the importance of mitochondrial intercellular transfer, such as by TNTs is increasingly recognized due to its potential therapeutic usefulness. Considering this new paradigm of mitochondrial mobility within the organ systems and blood, novel approaches in controlling metabolic disorders such as obesity and insulin resistance are now in much need of further exploration. In this review, we briefly discuss the field of mitochondrial transfer and possible therapeutic approaches, specifically for metabolic disorders, by summarizing the potential regulators of TNT formation.

Hepatic PKC ϵ Heterozygosity Does Not Improve Skeletal Muscle Insulin Resistance in Male Mice on High Fructose Diets

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Protein kinase C epsilon (PKCE) in the liver has been implicated as a key regulator of diet- induced insulin resistance but its role in peripheral tissues, such as skeletal muscle, remains unclear. This study highlights the role of hepatic PKCE in regulating skeletal muscle insulin sensitivity as measured by the AKT signaling pathway in response to high fructose diets. Male PKCE-heterozygous (PKCE-het) mice were fed either a high fructose or control diet for three months (Research Diets Inc, RDI). AKT protein and mRNA levels were analyzed under basal or insulin-stimulated conditions using Western Blot Analysis and qPCR, respectively. PKCe-Het mice on a control diet exhibited normal insulin sensitivity, while PKCe-Het mice on a high fructose diet displayed lowered p-AKT protein expression, suggesting skeletal muscle insulin resistance. These findings demonstrate that hepatic PKCe may not significantly regulate insulin sensitivity in skeletal muscle. Other data in our lab showed that PKCE-het was protective against HFrD-induced hepatic insulin resistance, despite a high fructose diet impairing insulin signaling in skeletal muscle. Targeting hepatic PKC ϵ could be useful in developing therapies for conditions caused by diet-induced insulin resistance, such as Type 2 Diabetes and PCOS

Cannabinoid regulation of sex-dependent murine odorant-stimulated salivation

Presenter's Name: Murataeva Natalia Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Thomas Heinbockel Faculty Advisor's email: THEINBOCKEL@HOWARD.EDU

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We investigated cannabinoid regulation of stimulated salivation using functional and protein-expression studies in mice. In developing a model of stimulated salivary responses to food-related odorants in mice, we noted sex-dependent responses to food-related cues. Only male mice learned to salivate in response to the odor of peanut butter while only female mice responded to a chocolate hazelnut spread. Both males and females responded to sugar or marmite. Testing peanut butter, we found that a cannabinoid receptor agonist lowered baseline salivation but also prevented the odorant-induced increase in salivation. Cannabinoid receptors, CB1, are expressed in axons innervating the parotid gland, paralleling our findings in the submandibular gland. Notably, we also found that CB1 deletion impaired some responses (those to peanut butter and chocolate hazelnut spread) but not others (sugar or marmite). In mice, a CB1 antagonist prevented a previously learned salivary response to peanut butter. We find that CB1 receptors are expressed in a subset of glomeruli in coronal sections of olfactory bulb that may serve as a site of action for scent-specific effects of CB1 receptors. We additionally observe CB1 expression in accessory olfactory bulb. In summary, we find a novel sex-dependence in responses to a subset of food-related odorant cues and that cannabinoid receptors regulate some of these responses. We propose that CB1 receptors act at the parotid gland to inhibit stimulated salivation but also in the olfactory system, where functional CB1 receptors are required for salivary responses to specific appetitive odors.

Weathering the Ticks: How Snowfall Affects Winter Tick Infestations and Hair Loss in Western Wyoming Moose

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Winter ticks (Dermacentor albipictus) have emerged as a significant threat to moose (Alces alces) populations, particularly in Western Wyoming, where climate change is altering environmental conditions and ex-

ABSTRACTS

acerbating tick infestations. This study investigates the long-term effects of winter tick infestations on moose calf survival and population growth, focusing on the physiological and behavioral impacts of tick loads on calves and their implications for moose population dynamics. Field data collected from moose populations in Western Wyoming reveal that winter tick infestations cause severe health declines in calves, including anemia, hair loss, and increased energy expenditure due to excessive grooming. These effects are particularly detrimental during harsh winters, as weakened immune systems and reduced fat reserves make calves more vulnerable to mortality. The study categorizes the severity of tick-induced hair loss and assesses its correlation with calf survival rates, finding that higher tick loads are associated with increased mortality among calves. Furthermore, the research explores how climate-driven changes, such as milder winters and earlier snowmelt, are contributing to the proliferation of winter ticks and their detrimental effects on moose populations. By analyzing long-term trends in calf survival and population growth, this study aims to provide critical insights into the cascading impacts of winter tick infestations on moose demographics. The findings highlight the urgent need for targeted conservation strategies to mitigate the effects of winter ticks on moose populations, particularly in the face of a changing climate. Understanding the long-term impacts of tick infestations on calf survival and population growth is essential for developing effective wildlife management practices to support moose populations in Western Wyoming.

Optimizing PEGylated Monoclonal Antibodies for HER2-Targeted Nanoparticles Using Multiscale Computational Methods

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Human epidermal growth factor receptor-2 (HER2) positive breast cancer is an aggressive subtype, affecting 20% of cases and causing 41% higher mortality in older African American women. Monoclonal antibodies, like trastuzumab and pertuzumab, have advanced treatment by targeting HER2. However, drug resistance poses challenges to their efficacy. Nanoparticles can bypass resistance and enable drug delivery. To refine nanoparticle PEGylation strategies, we employed a computational multiscale approach, integrating artificial intelligence/machine learning (AI/ML) methods for protein structure modeling, protein-protein docking, MD simulations, and free energy calculations. State-of-the-art AlphaFold2 was utilized to generate accurate 3-D structures of PEGylated anti-HER2-mAbs with N297-glycan-PEGMMA conjugates (1K, 2K, and 4K) at the FC regions. Structural validation was performed using accurate pLDDT, pTM, PAE, and low RMSD scores. Full mAbs were assembled using Protein Data Bank (PDB) and Electron Microscopy Data Bank (EMDB) fragments, achieving fit-to-map scores >0.7. Protein-protein docking explored refined binding dynamics between HER2 and mAbs using RosettAFold. Binding affinity assessments via PRODIGY determined preliminary results of ΔG of -18 kcal/mol for anti-PEGylated mAbs and ΔG of -14 kcal/mol for 2K-PEGMMA conjugates, consistent with experimental data indicating reduced HER2 binding for PEGylated Pertuzumab. To further explore, MD simulations (1-100 ns) were performed using GROMACS with CHARMM36ff. Analyses of conformational stability and MM/PBSA calculations are underway to gain further insights into binding affinity and conformational changes.

The outcome will advance the mechanic understanding of PEGylation effects on the mAb and binding, thus making significant contributions to the nanotherapeutics of anti-HER2 breast cancer therapeutics.

Rising Temperatures and Link to Increased Incidence of Latex Fruit Allergies Climate Change and the Surge in Latex-Fruit Allergies: Unveiling the Hidden Connection

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Co-authors: Samrawit Zinabu, Nima Karodeh, Shanae Henry, Jordan Young, Ahmed Mohammed, Christian Wong, Miriam Michael

Background: Latex-fruit syndrome (LFS) is characterized by hypersensitivity to plant foods in individuals allergic to natural rubber latex (NRL). The syndrome is attributed to cross-reactivity with chitinases, enzymes prevalent in various fruits and vegetables. This study investigates the increasing prevalence of latex and latex-fruit allergies in the Maryland, District of Columbia, and Northern Virginia region over the past decade. Methods: A retrospective cohort study was conducted using electronic health records (EHR) from 2014 to 2023. Patients diagnosed with latex and latex-fruit allergies based on ICD-10 codes were included. Results: The prevalence of latex or latex-fruit allergies increased from 9,405 cases in 2014 to 50,220 in 2023, a 5.34-fold increase. Allergies to fruits with high to moderate latex protein (avocado, banana, kiwi, etc.) increased 8.38-fold. Cases of combined fruit and shellfish allergies rose 6.67-fold, and dual latex and latex-fruit allergies increased 10.27-fold. Conclusions: This study reveals a significant rise in latex and latex-fruit allergies, highlighting a growing public health concern. Increased production of chitinases in plants, potentially linked to climate change and agricultural practices, may contribute to this trend. These findings underscore the need for continued monitoring and research to develop effective prevention and management strategies for these allergies.

Development of Multifunctional Nanoparticles for the treatment of Triple-Negative Breast Cancer

Presenter's Name: Obidiro Onyinyechi Classification: Graduate Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Emmanuel Akala Faculty Advisor's email: eakala@howard.edu

Co-authors: Emmanuel Akala

Triple Negative Breast Cancer (TNBC), lacking ER, PR, and HER2, accounts for 15% of invasive breast cancers and is highly aggressive with poor prognosis, therapy resistance, and early recurrence. Current chemotherapy, including paclitaxel and doxorubicin, faces challenges like resistance and toxicity. Platinum-based drugs such as cisplatin, combined with paclitaxel, show promise by inducing DNA damage and apoptosis. This study aims to enhance TNBC treatment through dual drug-loaded stealth nanoparticles for targeted cisplatin and paclitaxel delivery, reducing toxicity and improving efficacy. Multifunctional nanoparticles were fabricated using biodegradable polymers (polylactide and polycaprolactone) with a pH-sensitive cross-linker to ensure tumor-specific degradation. Polyethylene glycol (PEG) coating provided stealth properties. The nanoparticles were characterized for morphology, size distribution, surface charge, drug loading, and release kinetics. Drug release studies showed a sustained release over six days. Cytotoxicity assays on the MDA-MB-231 TNBC cell line demonstrated a synergistic effect, achieving similar efficacy at reduced drug concentrations. The results indicate that three types of multifunctional dual drug-loaded (paclitaxel and cisplatin) nanoparticles were successfully fabricated with polymer cores made of biodegradable polyesters (polylactide, polycaprolactone, and a 1:1 blend of both polymers) using a pH-sensitive cross-linking agent capable of degradation in the acidic tumor environment. The surface of the nanoparticles was covered with polyethylene-glycol to provide stealth properties. The nanoparticles have optimum particle sizes and release the loaded drugs for over 6 days. Cytotoxicity assays on the MDA-MB-231 TNBC cell line demonstrated synergistic effects of cisplatin and paclitaxel, achieving comparable cytotoxicity at reduced (half) drug concentrations.

Biodegradable Nanoparticles for the Treatment of Triple-Negative Breast Cancer Fabricated by Dispersion Polymerization Technique

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Purpose: Triple-Negative Breast Cancer (TNBC), lacking ER, PR, and HER2, accounts for 15% of invasive breast cancers and is highly aggressive with poor prognosis, therapy resistance, and early recurrence. Current chemotherapy faces challenges like resistance and toxicity. Platinum-based drugs show promise by inducing DNA damage and apoptosis. This study aims to enhance TNBC treatment through dual drug-loaded stealth nanoparticles for targeted cisplatin and paclitaxel delivery, reducing toxicity and improving efficacy.Methods: Multifunctional nanoparticles were fabricated using biodegradable polymers (polylactide and polycaprolactone) with a pH-sensitive cross-linker to ensure tumor-specific degradation. Polyethylene glycol (PEG) coating provided stealth properties. The nanoparticles were characterized for morphology, size distribution, surface charge, drug loading, and release

kinetics. Drug release studies showed a sustained release over six days. Cytotoxicity assays on the MDA-MB-231 TNBC cell line demonstrated a synergistic effect, achieving similar efficacy at reduced drug concentrations. Results: The results indicate that three types of multifunctional dual drug-loaded (paclitaxel and cisplatin) nanoparticles were successfully fabricated with polymer cores made of biodegradable polyesters (polylactide, polycaprolactone, and a 1:1 blend of both polymers) using a pH-sensitive cross-linking agent capable of degradation in the acidic tumor environment. The surface of the nanoparticles was covered with polyethylene-glycol to provide stealth properties. The nanoparticles have optimum particle sizes and release the loaded drugs for over a period of 6 days. Cytotoxicity assays demonstrated synergistic effects of cisplatin and paclitaxel, achieving comparable cytotoxicity at reduced (half) drug concentrations.

Incidence of HPV Head and Neck Cancer following Vaccination

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Co-authors: Elijah McMillan, Nurupa Ramkissoon, Da'Jhai Monroe, Samrawit Zinabu

Background: Head and neck cancer caused by human papillomavirus (HPV) is a rare form of cancer that disproportionately impacts males more than their female counterparts (11.4 per 1,000,000 compared to females 3.0 per 1,000,000). Despite the introduction of vaccination for HPV there has still been an increase in incidence within the past 20 years. This study investigates the disparities in vaccination rates among various gender and racial groups as well as subsequent head and neck cancer development. Methods: A retrospective cross-sectional study conducted via review of electronic medical records of 5.8 million de-identified patients. We assessed the rate of vaccination from January 2014 to December 2020 then stratified by race, gender, and head and neck cancer incidence in the same population. Results: Females had significantly higher vaccination rates than males (58.1% vs 41.9%). Black females were the most vaccinated subgroup (27.6%), while white males were the least vaccinated (16.8%). Among vaccinated individuals, 0.13% developed head and neck cancer. Of this percentage, there was a disproportionate representation of black females accounting for 46.7% of head and neck cancer cases despite having the highest vaccination rates. Conclusion: Despite persistent vaccination efforts, we see an unexplained high incidence of head and neck cancer affecting black females. Targeted interventions are essential to improving health outcomes in this population.

Disordered Streets, Disordered Sleep: Investigating Neighborhood-Related Social Determinants of Sleep in All of Us

Presenter's Name: Oladapo Toluwanimi Classification: Professional Student School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Joanne Allard Faculty Advisor's email: joanne.allard@howard.edu

Co-authors: Peter Barr

Background: Marginalized populations, such as racial/ethnic minorities and people with lower socioeconomic status, have a higher burden of sleep-related disorders, possibly influenced by neighborhood exposures related to historical residential segregation. Prior literature has shown that neighborhood socio-environmental factors are associated with poor sleep health and sleep disorders. Aims: The current study aims to determine if: 1) there is an association between neighborhood disorder (e.g. vandalism/graffiti, cleanliness, and sense of safety) and sleep disorders within the All of Us (AoU) Research Program database and 2) this association is moderated by racial/ethnic identity and gender. Methods: We used logistic regression on a subset of approximately 68,070 participants with electronic health record (EHR) data and neighborhood disorder survey responses. For a confirmed sleep disorder diagnosis, participants must have had at least two occurrences of sleep disorder EHR codes. Neighborhood disorder was measured using the Ross-Mirowsky neighborhood disorder scale. Results: Higher perceived neighborhood disorder was significantly associated with increased odds of sleep disorder diagnosis. This relationship was stronger for female participants compared to males. While higher neighborhood disorder led to an increased predicted probability of having a sleep disorder diagnosis in non-Hispanic White participants, the opposite trend was observed in Non-Hispanic black participants. Discussion: Findings show that sleep disorders are associated with neighborhood disorder, a relationship that varies across demographic groups. Understanding the effects of neighborhood disadvantage on sleep can help inform interventions to reduce disparate sleep outcomes and improve the well-being of medically underserved populations.

Innovative Combination Drug Therapy for Pancreatic Cancer Treatment

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Pancreatic cancer is one of the deadliest and most difficult cancers to treat. The ultimate goal of this project is to design and characterize targeted dual-drug polymer conjugate for pancreatic cancer treatment. This study aims to determine the sensitivity of pancreatic cancer to SN38 and emetine and evaluate their combinatory effect on pancreatic cancer. In vitro cytotoxicity study was carried out. CellTiter®-Glo luminescent cell viability assay (Promega) was used to assess the cell viability of the Mia-PACA-2 cells treated with emetine and SN38 at various concentrations (5 nm to 320 nm). The combination group treatment ranges from 0.625 nm to 160 nm. The percent cell viability was plotted using GraphPad Prism 10 and combination index (CI) was calculated using Compusyn® software. The results of the cytotoxicity assay reveal that Mia-PACA-2 was sensitive to both emetine and SN38 in the nanomolar ranges tested. The combination of emetine and SN38 demonstrated greater cytotoxicity, with an IC50 value approximately 3-fold and 11fold lower than that of SN38 and emetine, respectively. The combination index at all the doses show synergistic cytotoxic effects (CI < 1) suggesting that the combination of the two therapeutic agents is suitable for combination therapy. The IC50 of emetine and SN38 combination at an equimolar ratio reveal that the effect of the combination is superior to that of individual agents. This study confirms the sensitivity of pancreatic cancer to emetine, SN38 and their combination. Thus, the combination will be used for the development of the proposed targeted dual-drug polymer conjugate.

Impact of Chronic Cannabis Use on Neurotransmission Pathways, Neuroplasticity, and Cognitive Development in Young Adults

Presenter's Name: Percy Christianna Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: N/A N/A Faculty Advisor's email: christiannapercy@icloud.com

Co-authors:

Chronic cannabis use among young adults presents a significant public health challenge, yet its effects on neurotransmission pathways, neuroplasticity, and cognitive development remain insufficiently documented. I conducted a review of the top 100 most cited articles addressing these areas, identified via a Web of Science search using keywords such as "chronic cannabis use" and "cognitive development." These articles, comprising 64 original studies and 36 reviews, were analyzed using Biblioshiny and Excel to uncover citation trends, leading contributors, and key research gaps. My analysis highlights seminal contributions by Nadia Solowij and Fabiola Atzeni, with Solowij's 2016 study on cannabinoid-induced cognitive deficits receiving 459 citations-the highest in the dataset. Prominent journals such as *Psychopharmacology*, *Biological Psychiatry*, and *Addiction Biology* were identified as leading platforms for cannabis research. Publication trends indicate sustained growth over the past decade, with significant peaks in 2014 and 2021 when influential articles were published, reflecting an increasing global focus on the neurocognitive impacts of cannabis use. Preliminary findings indicate that chronic cannabis use disrupts critical neurotransmission pathways, leading to reduced neuroplasticity and impairments in memory, learning, and executive function. This growing body of evidence underscores the urgent need for comprehensive, evidence-based public health strategies to address the neurocognitive risks associated with cannabis consumption. By synthesizing insights from high-impact research, I highlight the interdisciplinary nature of cannabis research and call for longitudinal studies to inform targeted interventions and policy development, ensuring better health outcomes for vulnerable population.

ABSTRACTS

Exploring Bacterial Stress Adaptation: Sedimentation Dynamics and Gene Regulation in Staphylococcus aureus

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Co-authors: Elijah Pratt, Sarees Shaikh Shaikh, Patrick Ymele-Leki

Understanding bacterial stress response mechanisms is crucial for developing effective therapeutic strategies. This study investigates the regulatory roles of the SroA locus in the SigS sigma factor pathway of Staphylococcus aureus, a key component in bacterial stress adaptation and virulence. The SigS factor plays a vital role in bacterial survival under hostile conditions, particularly during oxidative stress and nutrient deprivation, and its regulation remains an active area of research. We hypothesize that the Δ SroA mutant will exhibit more rapid, and more uniform sedimentation compared to the wild type SH1000 strain, due to its likely compact structural conformation. Analytical Ultracentrifugation (AUC) will be incorporated to analyze sedimentation velocity, a widely accepted method for studying macromolecular assembly and conformational states. Preliminary results suggest that Δ SroA forms a more compact structure, leading to predictable sedimentation behavior, whereas SH1000 demonstrates a more dynamic profile, potentially influencing its regulatory interactions. These findings are expected to provide insight into the role of the SroA locus in S. aureus gene regulation and virulence, potentially offering a better understanding of bacterial adaptability mechanisms. Further characterization of these interactions could enhance our knowledge of microbial pathogenesis and present new targets for therapeutic intervention. Given the increasing concern over antibiotic resistance in S. aureus, elucidating these regulatory networks may contribute to the foundation for novel antimicrobial strategies. Future studies will explore the structural and functional dynamics of Δ SroA and SH1000 in greater detail, advancing efforts to combat S. aureus infections.

The Effects of Pathogenic Mutations on the Structure and Functions of the RECQ1 Helicase – A DNA Chromatin Binding Protein

Presenter's Name: Price Quentin Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Sudha Sharma Faculty Advisor's email: sudha.sharma@howard.edu

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The RECQ1 protein is a vital member of the RecQ helicase family that plays a pivotal role in maintaining genomic stability through its functions in DNA repair, replication, and recombination. Recently, scientists discovered a new RECQ helicase disorder, designated RECON syndrome attributed to biallelic mutations in the RECQL1 gene. Cells with RECQ1 deficiencies have shown genomic instability leading to breast cancer phenotypes, yet the nuanced pathogenic mutations in the RECQ1 gene have been difficult to characterize. Disruptions in helicase activity, leading to structural alterations and functional deficiencies that compromise genome integrity are expected but the pathogenic relation to the structural change remains unknown. Here, we examined 10 variants of the gene and gathered relevant data to connect their various pathogenic potentials with the different structural changes seen in the mutation.

Staphyloocus Aureus: DHT and Biofilm Formation

Presenter's Name: Pully Kendal Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Karl Thompson Faculty Advisor's email: karl.thompson@howard.edu

Co-authors: Jaymarie Ramos, Taylor Lofton

Staphylococcus aureus (S. aureus) is a gram-positive bacterium that, if left untreated, can cause life-threatening issues, including death. This project investigates the effect of the androgen Dihydrotestosterone (DHT) on biofilm growth in different S. aureus bacterial strains. DHT, primarily produced in peripheral tissue, promotes prostate growth, body hair, and sebaceous gland activity (Kinter et al.). In this experiment, we compare biofilm growth in 4 S. aureus strains. S. aureus is known to be one of the most consistent and common pathogens to form biofilms (Peng et al.), which can be found in the body and on medical implants. This study emphasizes the significance of adding DHT to strong and weak biofilm formers. By using the biofilm assay and monitoring absorbance with a Filtermax F5 machine, we discovered a significant difference when DHT was included in the bacterial strains. Biofilm assays confirmed the formation of biofilms from S. aureus bacteria in the presence of DHT. It was determined that the combination of S. aureus with DHT acts as a stressor on the bacteria, leading to an increase in biofilms.

siRNA Targeting Hepatic Androgen Receptor (AR) Ameliorates Gluconeogenesis and Insulin Resistance in PCOS Mouse Models Presenter's Name: Rahman Md Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Stanley Andrisse Faculty Advisor's email: stanley.andrisse@howard.edu

Co-authors:

Hyperandrogenism in women of reproductive age is associated with polycystic ovary syndrome (PCOS) and metabolic disorders such as diabetes, with limited treatment options. Prior studies indicate that genetic knockout of hepatocyte androgen receptor (AR) prevents PCOS-related glucose dysregulation in female mice treated with low-dose dihydrotestosterone (DHT). This suggests hepatic AR plays a key role in PCOS-related metabolic dysfunction, potentially through hepatic insulin resistance (HIR) and increased gluconeogenesis driven by elevated androgens. We investigated the efficacy of small interfering RNA (siRNA) targeting hepatic AR in female mice treated with 33 μ g/day letrozole

(LET), an aromatase inhibitor. Twenty-two 4-week-old female C57BL/6J mice were assigned into three groups and subcutaneously implanted with LET pellets (n=6) or placebo control pellets (CON, n=8). The third group (LET+siR, n=8) received LET pellets and was administered AR-siRNA (10 mg/kg) subcutaneously every two weeks. Metabolic tests were performed weekly until sacrifice. RT-qPCR analysis revealed that siRNA treatment resulted in a 60-70% knockdown of hepatic AR expression compared to the LET-only group after 120 days. Metabolic tests revealed no differences in systemic insulin resistance across groups; however, the LET group exhibited significantly impaired pyruvate tolerance, which was ameliorated in LET+siRNA group to levels comparable to controls. These findings paralleled a reduction of genes involved in the upregulation of hepatic gluconeogenesis. Western blot analysis indicated that insulin signaling intermediates (p-AKT and p-Foxo1) were rescued from LET-induced HIR in the LET+siRNA group. Taken together, our findings suggest that siRNA targeting hepatic AR holds therapeutic promise for hyperandrogenism and PCOS-related metabolic disorders.

Do MSH3 mutations really affect colorectal cells neoplastic transformation?: An evaluation of African Americans novel mutations within the MSH3 ATPase domains

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Co-authors: Hassan Brim, Adeyinka O Laiyemo, Katherine Casazza, Jennifer A. Surtees, Sobitan Adebiyi, Shaolei Teng, Zaki Sherif, Minoru Koi, John M. Carethers, Hassan Ashktorab

Background: Alterations in DNA Mismatch Repair (MMR) genes, including MSH3, contribute to colorectal cancer (CRC) by disrupting MutSß's role in repairing insertion/deletion loops during DNA replication, leading to higher mutation rates. MSH3 alterations are linked to Elevated Microsatellite Alterations at Selected Tetranucleotide Repeats (EMAST), a phenotype more frequent in African Americans (AA) and associated with poor CRC prognosis. Aim: To assess functional impact of 3 out of 4 Exomes (E) E20, E-21, E22, E23 novel deleterious AA variants within the ATPase domain of MSH3. Methods: Using CRIS-PR-Cas9, we introduced three MSH3 ATPase domain mutations (c. G2926A, c.C3028T, c.G3241A) into SW620 colon cancer cells (wildtype of MSH3), confirmed by Sanger sequencing. Functional analysis included MTT assays, tetranucleotide instability tests, immunofluorescence, Western blot, co-immunoprecipitation, and ATPase assays with purified MutSß complexes. Results: In silico analysis showed deleterious effect of the 4 novel msh3 mutants. However, biological phenotypic assays revealed no observable changes in cell morphology or proliferation between wild-type and MSH3-variant knocked-in cells, with no EMAST after 7 to 10 passages. Subcellular localization of variant MSH3 was unaffected compared to wild type MSH3, and interaction between mutant MSH3 and MSH2 proteins was not impacted, However, the ATPase activity of two of the variant MutSß complexes was affected. MSH3 c.G2759T (E20) exhibited overall reduced ATPase activity compared to wildtype and was not affected by the presence of DNA. MSH3 c.C3028T (E22) exhibited elevated ATPase activity compared to wildtype in the presence of specific (loop) or non-specific DNA (homoduplex) wheih might contributing to AA-CRC

Biomaterials as a Tool for Recreating the Pancreatic Niche for $\beta\mbox{-Cell}$ Therapies

Presenter's Name: Roberts Elizabeth Classification: Undergraduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Gagandeep Kaur Faculty Advisor's email: gagandeep.kaur@howard.edu

Co-authors: Gagandeep Kaur

Biomaterials offer a powerful toolkit for recreating the intricate pancreatic niche, a critical step towards effective β -cell therapies. The native niche provides essential cues for β-cell survival, function, and proliferation, which are often lost during in vitro expansion or transplantation. Biomaterial scaffolds with controlled porosity and architecture which can mimic the extracellular matrix, facilitating cell adhesion and nutrient diffusion. The development of biomaterial-based pancreatic niches holds immense promise for addressing the limitations of current β-cell therapies. This project compiles a comprehensive literature review on biomaterial designs based on biophysical and biochemical cues for directed differentiation of induced pluripotent stem (iPSCs) cells toward pancreatic cells. It explores diverse biomaterials, analyzing their optimization strategies and encountered challenges. By identifying critical gaps in current research, this review aims to pinpoint areas requiring further investigation, thereby guiding future biomaterial design for enhanced β-cell therapies.

CSF Biomarker Discovery for CLN3

Presenter's Name: Rodriguez Makenna Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: An Dang Do Faculty Advisor's email: an.dangdo@nih.gov

Co-authors:

This study underscores CHIT1's potential as a biomarker for CLN3, highlighting its relevance in disease monitoring and progression assessment. Future research should prioritize orthogonal validation of these findings to ensure robustness and reproducibility. Additionally, comparative studies between CLN3 and Niemann-Pick Type 1 (NP1) could provide valuable insights into the broader applicability of CHIT1 as a biomarker, particularly in distinguishing between these lysosomal storage disorders. Investigating potential overlaps and differences in biomarker profiles may enhance our understanding of disease mechanisms and improve diagnostic accuracy. Moreover, while genetic variation was considered in this study, experimental validation remains necessary to confirm the impact of genetic variability on CHIT1 expression and its re-

liability as a biomarker. Addressing this aspect in future research will be critical for establishing CHIT1 as a consistent and widely applicable biomarker across diverse patient populations. Standardizing measurement techniques and assessing longitudinal biomarker trends will further support its clinical utility. These findings contribute to the broader effort of developing reliable biomarkers for CLN3 and related disorders. Identifying and validating disease-specific biomarkers are essential steps toward improved diagnosis, monitoring, and potential therapeutic interventions. As research progresses, integrating CHIT1 biomarker studies with advanced analytical techniques and larger patient cohorts will strengthen its clinical relevance. Ultimately, this study lays the groundwork for future investigations that could refine biomarker-based strategies, facilitating early detection and better disease management for individuals affected by CLN3 and similar neurodegenerative conditions.

The Impact of Orexin Receptor-1 antagonism on the Gut Microbial Communities of Rats with Varied Feeding Phenotypes

Presenter's Name: Ryan Alexa Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Kimberlei Richardson Faculty Advisor's email: Kimberlei.richardson@howard.edu

Co-authors: Saadiya Jackson, Uthayathas Subramaniam

Our research explored how repeated doses of an orexin receptor 1 antagonist (SB-334867) may influence feeding behavior and gut microbial communities. Female Sprague-Dawley rats (n=6-7/group) underwent nine intermittent feeding tests and were given 30g of high fat, high sugar food pellets (PF) and standard rat chow for 4 hours. The PF intake, chow intake, and body weights were measured at 1hr and 4hr. Rats that consumed within the upper tertile of PF consumption were characterized as high preference (HP), those within the lower tertile were low preference and the middle tertile rats were omitted. Rats underwent drug challenges using SB-334867 (20mg/kg, i.p.) followed by a feeding test 30 minutes post-injection. A non-drug feeding test was given after a drug challenge to allow PF consumption to return to baseline. Five SB-334867-challenge tests were conducted. Fecal pellets were collected pre-SB-334867 injections, on day 1, day 3, and day 5 SB-334867 to assess the microbial communities. There was a significant reduction in PF consumption for HP rats on day 5 versus pre-SB-334867 administration (p<0.05). The most significant difference in microbial communities was observed on day 5 of SB-334867 injections versus pre-SB. We conclude that SB-334867 significantly decreased the consumption of PF, and this behavioral change may have contributed to the alteration in bacterial communities observed in rats with prior PF exposure. It is hoped that this data will contribute to our understanding of brain-gut-microbiome communication and lead to possible new treatments for binge eating disorders by targeting the orexin system.

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A stuttering case of pure alexia as a manifestation of an embolic stoke

Presenter's Name: Saint cyr Peterson Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Mosunmola Oyawusi Faculty Advisor's email: m_oyawusi@howard.edu

Co-authors: Mosunmola Oywausi, Joanne Senoga

Pure alexia (alexia without agraphia) is an acquired disconnection syndrome characterized by the inability to read with striking retention of other language components such as naming, repetition, comprehension, writing. We present the rare case of a right-handed 75-year-old woman with history of Deep Vein Thrombosis/Pulmonary Embolism who presented to the hospital with right-sided weakness. She was admitted for stroke workup. Magnetic resonance imaging of the brain (Brain MRI) reveals multifocal bilateral infarcts, including an infarct in the left splenium of the corpus callosum. Later during the hospitalization, she developed inability to read and blurry vision. This case illustrates that the

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presentation of pure alexia can be subtle and stuttering, meaning it may not always appear immediately after the stroke but can evolve over time, as in this patient's case where she first presented with right-sided weakness and later developed the reading impairment and blurry vision. The patient's case highlights the complexity of stroke presentations and the importance of considering pure alexia in patients with language impairments after a stroke, especially when lesions involve regions responsible for visual language processing. The involvement of the left splenium of the corpus callosum is key in this scenario and underscores the critical role of inter-hemispheric communication in normal reading function. Though rare, early identification and diagnosis by clinicians can lead to proper rehabilitation and management of pure alexia.

Leveraging Machine Learning and Python Libraries to Model Adhesion of Staphylococcus aureus in a Microfluidic System

Presenter's Name: Saleem Abdul nafay Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@Howard.edu

Co-authors: Sarees Shaikh, Patrick Ymele-Leki

Bacterial adhesion is the first step in biofilm formation, leading to persistent infections and surface contamination in medical and industrial environments. This study employs machine learning techniques to model the adhesion dynamics of Staphylococcus aureus on inert surfaces under varying fluid shear stress conditions. Using Python libraries such as Scikit-learn, Pandas, and NumPy, we developed and compared two regression models to predict bacterial adhesion over time. The models were trained on experimental data collected under different hydrodynamic conditions, with polynomial regression providing the best fit (R² > 0.96). By leveraging data-driven approaches, our models accurately capture the complex relationship between adhesion, shear stress, and time, improving predictive capabilities over traditional empirical methods. This computational approach reduces the need for extensive lab experiments, offering a scalable and efficient tool for assessing bacterial adhesion in diverse environments. Our findings highlight the potential of machine learning in biofilm research, aiding in infection control and surface contamination prevention strategies.

Integrating Polynomial Regression and Machine Learning to Model Growth of Staphylococcus aureus Biofilms

Presenter's Name: Saleem Abdul nafay Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@Howard.edu

Co-authors: Sarees Shaikh, Patrick Ymele-Leki

Biofilm formation by Staphylococcus aureus is a critical factor in bacterial persistence, antibiotic resistance, and chronic infections. Understanding the dynamics of biofilm growth is essential for developing effective prevention and treatment strategies. This study investigates S. aureus biofilm formation across distinct growth stages, emphasizing the role of environmental factors in modulating biofilm development. We utilized Python for data modelling to analyse experimental biofilm growth data, fitting mathematical models to describe the relationship between media concentration and biofilm development rates. A predictive model was developed to quantify the time required for peak biofilm coverage as a function of concentration, revealing an inverse correlation between nutrient availability and biofilm formation time. The data-driven approach allowed for precise characterization of biofilm growth phases, confirming a structured progression through attachment, multiplication, exodus, and maturation. By integrating computational modelling with experimental observations, this research provides novel insights into biofilm regulatory mechanisms. These findings pave the way for advanced predictive tools to mitigate biofilm-related infections in healthcare and industrial settings.

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

Presenter's Name: Sanford Sloan Classification: Staff School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: OTTO CHABIKULI Faculty Advisor's email: otto.chabikuli@howard.edu

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While efforts to decrease maternal mortality in Africa have achieved moderate success, 70% of all global maternal deaths continue to occur in Sub-Saharan Africa. In an executive summary examining trends in maternal mortality from 2000 to 2020, the World Health Organization 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. While an optimal approach would address each of these factors in a comprehensive, integrated fashion, targeted efforts to address specific causes can produce measurable improvements. Ghana's healthcare system operates as a latent dual system, which complicates its ability to offer optimal care. This bifurcated system is a colonial output and operates with a "formal" biomedical system and an "informal" traditional system. The community favors the informal system because of its affordability, accessibility, and respect for religious-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 used for religious-cultural care and delivery. With 63% of births occurring in skilled birthing centers, yet 90 percent of maternal deaths occurring in the community, prior research suggests that integration is likely the nexus to improving maternal health outcomes. This literature review will summarize and evaluate past efforts to integrate health services that will inform an integration framework to reduce maternal mortality in Ghana.

Laponite Nanocarrier for Sustained Release of Chloroquine

Presenter's Name: Sani Maryanne Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dharmaraj Raghavan Faculty Advisor's email: draghavan@howard.edu

Co-authors:

Chloroquine is an antiparasitic drug that effectively treats malaria and extraintestinal amebiasis. However, maintaining sustained amount of chloroquine in body for treating malaria is difficult because of rapid absorption and fast clearance of drug, leading to fluctuating plasma levels. Consequently, higher chloroquine is administered leading to high risk of side effects such as gastrointestinal discomfort, retinal toxicity, and cardiotoxicity. Laponite nanocarriers offer a promising solution to the challenges of antimalarial therapy by providing pH-responsive and sustained release of chloroquine. This study aims to investigate the drug encapsulation efficiency, release profile, and pH-responsive behavior of chloroquine loaded Laponite RD, RDS, and XLG variants. The encapsulation efficiency and intercalation was followed using UV-VIS and XRD respectively, with Laponite RDS achieving 99% encapsulation efficiency and maximal basal peak shift compared to RD and XLG, which is consistent with cation exchange capacities of various clays. The intercalation of chloroquine in Laponite was confirmed by the broadening of Si-O bonds as it relates to Laponite structure. Electrostatic interactions between Laponite and chloroquine were confirmed using zeta potential and DLS measurements. Laponite exhibited pH-responsive chloroquine release, with significant release at pH 5 and sustained release at physiological pH over 5 days. Understanding the chloroquine loading of Laponite grades (RD, XLG, RDS) and release profile helps select the best variant for optimal chloroquine delivery and desired clinical outcome.

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Effects of Different Drying Methods on the Bioactive Compounds of Beetroot Powder (Beta vulgaris)

Presenter's Name: Sconiers Charlie Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Andrea Calloway Faculty Advisor's email: andrea.calloway@howard.edu

Co-authors: Milcah Wambua, Richard Mulwa

Beetroot is one of the primary edible crops that contain bioactive compounds, so it is being used as a potential treatment for specific diseases, such as cardiovascular illnesses and cancers, within the kitchen. However, high moisture content within fresh beetroot shortens the shelf life of the crop and may make it unavailable to consumers during the off-season. This study focuses on increasing the shelf life of beetroot by dehydrating it and producing it into beetroot powder using different drying methods while not removing its bioactive compounds. The four drying methods concentrated on in this study were solar, freeze, sun, and oven drying. Within the study, these four samples of beetroot powder were analyzed and compared to fresh beetroot to find which drying methods preserve the most bioactive compounds within beetroot. The beetroot powder samples were tested for their betalain content from their absorbance, as well as their polyphenol and flavonoid content from their absorbance and a standard found through serial dilution. After analyzing beetroot powder produced using these four drying methods to measure its bioactive compound content, it was found that there was no significant difference between the bioactive compounds within each type of beetroot powder except in the flavonoid test. In the flavonoid test, oven drying was the most effective drying method. Since the four drying methods had similar bioactive compound contents, with flavonoids being an outlier, consumers should complete the drying method that is most accessible to them.

Comparison of KRT5 Negative Basal Cells in Distal and Proximal Pulmonary Airways

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ABSTRACTS

Co-authors:

Pulmonary basal cells reside within the epithelial layer of the lungs and serve as the resident stem cells capable of self-regeneration during homeostasis and differentiation into various epithelial cell types after acute injury. These airway cells are characterized by their expression of TP63, KRT17, and KRT5. The distal airways, located near the alveoli, are thought to play a significant role in lung regeneration. While basal cells, which are progenitor cells, are known to exist in both proximal and distal airways, it remains uncertain whether the distal basal cells are the same as or different from their proximal counterparts. Recently, it has been reported that KRT5-negative basal cells are involved in the pathogenesis of diseases such as idiopathic pulmonary fibrosis (IPF). The analysis of single-cell data from the normal lung in the Human Biomolecular Atlas Project (HuBMAP), has suggested the presence of KRT5-negative basal cells, but their localization has not been reported. This project aimed to identify basal cells positive for KRT17 and negative for KRT5 using immunofluorescence, and to compare their distribution in proximal and distal regions of the lung using QuPath Software for quantification. The analysis revealed a higher proportion of KRT5-negative basal cells in distal locations compared to proximal ones. KRT5-negative basal cells were suggested to play an important role in lung regeneration. Investigating the similarities and differences among basal cell populations contributes to a deeper understanding of healthy lung tissue and enhances our comprehension of the lung's response to injury.

Investigating the Role of sroA in Staphylococcus aureus Biofilm Formation and Growth Under Static and Hydrodynamic Conditions

Presenter's Name: Shaikh Sarees Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@Howard.edu

Co-authors: Olivia Sconyers, Karl Thompson, Patrick Ymele-Leki

The regulatory pathways governing Staphylococcus aureus biofilm formation and stress adaptation are critical to its pathogenicity. S. aureus employs alternative sigma factors, including SigS, which modulates gene expression in response to environmental stressors. Recent studies have identified SroA, a SigS-regulated protein, as a key factor influencing mRNA stability and regulatory circuits within S. aureus (Ali et al., 2023). However, its role in bacterial growth and biofilm development remains unclear. This study aims to characterize the impact of the deletion of sroA on bacterial growth kinetics and biofilm formation by comparing the wild-type SH1000 strain with the SH1000 ∆sroA(DUF1659)::ermC mutant. Initial shaking flask experiments revealed clear phenotypic differences between the two strains. The wild-type SH1000 strain exhibited visible biofilm formation on the glass surface, with bacterial adhesion leading to an uneven turbid appearance. In contrast, the Δ sroA mutant culture remained homogenous, with no biofilm formation observed on the flask surface. These observations suggest that SroA plays a role in bacterial attachment and biofilm development. Further studies are underway to establish the connection between SroA and biofilm formation. Future experiments will investigate biofilm development under stress conditions and assess hydrodynamic biofilm stability using extended BioFlux time-lapse imaging. These studies aim to determine whether SroA influences biofilm formation through mRNA stability or stress adaptation pathways, providing deeper insights into its role in S. aureus persistence and infection strategies.

Modeling Staphylococcus aureus Adhesion Under Shear Stress: A Computational and Experimental Analysis

Presenter's Name: Shaikh Sarees Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@Howard.edu

Co-authors: Abdul Nafay Saleem, Patrick Ymele-Leki

Bacterial adhesion to surfaces under fluid shear stress is a critical step in biofilm formation and the pathogenesis of medical implant-associated infections. This study investigates the adhesion kinetics and spatial distribution of Staphylococcus aureus on glass surfaces using a BioFlux 200 microfluidic system, COMSOL Multiphysics® simulations, and Python-based modeling. Real-time adhesion assays were conducted under shear stress conditions ranging from 1 to 5 dyn/cm², with adhesion quantified through phase-contrast microscopy and OpenCFU image analysis. A non-linear relationship between shear stress and adhesion was observed, with peak adhesion at 1 dyn/cm² and a significant decline at higher stress levels. Interestingly, an anomaly at 3 dyn/cm² suggested additional biological interactions influencing adhesion. Spatial analysis using MATLAB revealed that while average cell spacing remained consistent across stress conditions, localized clustering decreased with increasing shear stress. COMSOL simulations effectively predicted the inverse relationship between adhesion and shear stress but failed to capture the plateauing behavior observed experimentally, suggesting limitations in current adhesion modeling frameworks. Conversely, a Python-based polynomial regression model provided a high-accuracy mathematical representation of adhesion kinetics, achieving an R² value of 0.998 when excluding the 3 dyn/cm² anomaly. These findings highlight the interplay between hydrodynamic forces and bacterial adhesion, underscoring the importance of integrated computational and experimental approaches in biofilm research. The results provide insights into bacterial colonization mechanisms and inform the design of anti-adhesive surfaces for biomedical applications. Future work will refine computational models by incorporating additional biological variables to improve predictive accuracy.

ABSTRACTS

Sleep Duration and Pulse Wave Velocity

Presenter's Name: Sheriff Paul Classification: Professional Student School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Thomas Mellman Faculty Advisor's email: tmellman@howard.edu

Co-authors: Kevin Boyd, Pewu Lavela, Ishaan Sandhu, Thomas Mellman

Introduction: Cardiovascular Disease (CVD) remains a leading cause of death with disproportionate effects on African Americans. The pathophysiology of CVD begins early in life and is influenced by stressful environments. Sleep is a factor which can mitigate this risk. Reduction in arterial elasticity is implicated in the progression of CVD and was recently shown to be affected by sleep duration in females. Arterial elasticity is indexed by Pulse Wave Velocity (PWV). Objective: To investigate the association between arterial stiffness and sleep duration in young African Americans. Methods: This study included 71 young adults (ages 18 - 35) who identified as African American. The sample consisted of 38 males (53.5%) with an average age of 24.3 years. Participants had a healthy body mass index on average and endorsed mild levels of insomnia as assessed by the Insomnia Severity Index. Sleep was measured using actigraphy and behavioral states were recorded using digital devices in the habitual environments of participants to provide ecologically valid insights. PWV and Central Systolic Pressure were measured using the SphygmoCor CVO system. Results: A significant association was found between PWV and sleep duration (r = -0.26, p = 0.04); however, PWV was not significantly associated with sleep efficiency or insomnia severity. Conclusion: Our results replicate recent findings indicating that shorter sleep duration is linked to reduced arterial elasticity. These results highlight sleep as a modifiable risk factor to improve CV health in African Americans. Acknowledgements: This study utilizes data from a RO1 study (HL136626A) funded to Dr. Thomas Mellman.

Peak High Frequency Heart Rate During Sleep is Diminished in a Perceived Unsafe Environment

Presenter's Name: Shivers Jaleel Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Thomas Mellman Faculty Advisor's email: tmellman@howard.edu

Co-authors: Kevin Boyd, Thomas Mellman

Introduction: Cardiovascular disease disproportionately affects urban residing African American populations. Healthy sleep is thought to mitigate cardiovascular health. An important pathway for the environment to impact cardiovascular health is through the autonomic nervous system. Heart rate variability (HRV) indexes autonomic tone and has been used to demonstrate a normal increase in parasympathetic tone during sleep. The objective of our study was to relate heart-rate variability during sleep to pre-sleep emotional states including perceived safety of one's environment. Methods: Sixty urban-residing young adult African Americans completed overnight actigraphy and ECG recordings for HRV analysis. Peak high frequency was used for the analysis. Prior to sleep, participants self-reported cognitions and perceptions via digitally acquired ecological momentary assessment. Results: Perceived safety of one's sleep environment was significantly correlated with peak high frequency (r = -.40, p < .03) that was not found with non-specific stress (r = .14, NS). Conclusions: Overall, compromise of parasympathetic tone during sleep may be an important effector of how one's perceived environmental safety impacts health. Acknowledgements: Funded by HL136626A

Characterizing Macrophage Markers Within Rodent Adrenal Glands

Presenter's Name: Shockley-okeke Nnamdi Classification: Undergraduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dr. Amber Paul Faculty Advisor's email: paula6@erau.edu

Co-authors:

Exposure to the spaceflight environment can cause dysregulated immunity, as well as, significant endocrine system changes. Yet, crosstalk between endocrine and immune systems in response to the spaceflight environment are understudied. With the advent of new technologies such as spatial proteomics, we can now evaluate these interactions on a cellular level, improving our understanding on physiological crosstalk processes. We aim to characterize immune cell phenotypes influenced by the spaceflight environment in endocrine adrenal glands. For this, adrenal tissues collected from previous rodent research (RR)-8 mission will be analyzed by spatial proteomics in collaboration with the Mavo Clinic in Jacksonville. We will further characterize endocrine biochemical pathways using immunohistochemistry (IHC) and RNA sequencing. We hypothesize that spaceflight influences hormonal biosynthesis which may regulate immune dysfunction. Research on this topic will provide clarity on cell communication processes within the adrenal gland, as well as, hormonal regulation of immune populations in spaceflight compared to ground controls. Future research for this project, includes spatial transcriptomic profiling of the adrenal glands to assess larger genetic landscapes, including mRNA and miRNA profiling. Collectively, spatial proteomic analysis can provide a sophisticated level of detailed analysis immune-endocrine interactions during spaceflight that can enhance understanding of observed immune perturbations that are regulated by the endocrine response. Collectively, this research will successfully identify biosignatures and cellular pathways that may be important targets for future therapeutic intervention on exploration missions.

ABSTRACTS

High Fat, High Sugar Diet Exposure Influences Drug Preference Behaviors

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Co-authors: Alexa Ryan, Anthony Asante-Danso, Alyssa Roach, Kimberlei Richardson

It is not clear whether there are specific drugs of abuse that individuals with eating disorders more preferentially consume. Therefore, the goal of this study is to determine whether rats with varying feeding phenotypes for palatable food (PF, high fat, high sugar pellets) have distinct drug preference (morphine versus cocaine) and whether the nutritional state of rats increases drug preference. Female Sprague Dawley rats (n=16) were used in nine intermittent feeding tests to determine PF preferences. Control rats were only given standard rat chow. All rats underwent either morphine or cocaine conditioned place preference (CPP) training and tested. In another set of rats (n=10), one group underwent cocaine CPP then PF testing while the second group received the same protocol with an additional cocaine CPP test after PF exposure. The data revealed that control rats had a significantly greater preference for morphine versus rats that received PF (p<0.05). However, rats with exposure to PF showed a significant cocaine preference versus control rats (p<0.05). In the second set of studies, it was confirmed that the nutritional state of the rats was influenced by drug preference scores. Regardless of PF group (HP, LP), exposure to natural reward enhanced drug preference. It appears that prior exposure to PF alters the mesolimbic reward pathway and increases susceptibility to cocaine. Future investigations will determine whether differences in the activation of neurocircuitry involved in the reward pathway, specifically the ventral tegmental area, significantly contribute to cocaine preference in rats with PF exposure.

Li Fraumeni Incidence of Long-term Non-malignant Side Effects of Chemotherapy

Presenter's Name: Smith Peyton Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@Howard.edu

Co-authors: Jerome Watts, Syneja Richards, Ezekiah Bacchus, Divya Rath, Samrawit Zinabu, Shivani Waghmare, Miriam Michael

Abstract Background and Purpose: Li-Fraumeni syndrome (LFS) is a mostly inherited autosomal dominant disorder cancer predisposition syndrome associated with high risks for a diverse spectrum of childhood- and adult-onset malignancies. Routine oncologic management is recommended for malignancies, and most experts recommend prioritizing treatment efficacy over concerns about late effects. However, without understanding the complications associated with treatment, it is difficult to counsel patients on the risks and benefits of their choices. This study is an attempt to use a large population database to identify and quantify the long-term sequelae of multiple malignancy treatment regimens on this population of patients. Methods: A retrospective cohort study was conducted using electronic health records (EHR) from 2014 to 2023. Patients diagnosed with LFS and side effects associated with chemotherapeutic treatment of LFS based on ICD-10 codes were included. Results: The prevalence of LFS from 2014 to 2023 was 41 cases. In cases of LFS, the most common non-malignant side effects of chemotherapeutic treatment were anxiety disorder (36.6%), GERD (34.1%), vitamin D deficiency (29.3%), anemia (26.8%), hypertension (26.8%), headache (26.8%), and hypo-osmolality and hyponatremia (26.8%). Conclusions: This study reveals significant non-malignant side effects of chemotherapy on LFS, which emphasizes the importance of considering treatment side effects other than the malignant side effects and complications noted in the current literature. These findings underscore the need for continued monitoring and research to develop effective prevention and management strategies for these side effects.

Open Surgery vs Systemic Therapy for Cranial Meningioma Post Treatment Complications

Presenter's Name: Sobamowo Devonte Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Micheal Faculty Advisor's email: m_michael@howard.edu

Co-authors:

Arising from the meninges of the brain and/or spinal cord, meningiomas are the most common benign intracranial tumors. While surgery and radiotherapy are the mainstay treatments, recent studies support the efficacy of newer chemotherapeutic agents in the treatment of meningiomas. Additionally, the goal of any medical treatment is to maximize benefits for the patient, which includes minimizing adverse outcomes during or after treatment. The aim of this study is to compare the incidence of adverse outcomes between surgical resection and systemic chemotherapy. To investigate this, we used the TrinetX database to compare the posttreatment outcomes of one year after both therapies. Key findings of the study showed that, compared to chemotherapy, surgery was associated with a significantly increased risk of postoperative stroke and acute postprocedural respiratory failure. On the other hand, systemic treatment was associated with a significantly increased risk of DVT, PE, stroke, acute kidney injury, and pneumonia. Both therapies demonstrated no significant difference in the risk of cardiac arrest, UTI, chronic kidney disease, blood transfusion, or peripheral nerve injury. The results suggest that both therapies carry significant risks for the patient; however, the specific risks allow for individualized care to counteract pre existing risk factors. These risk factors emphasize the role of clinical judgment in deciding which therapeutic agents minimize harm for patients. As novel chemotherapeutic agents are continuously developed, systemic therapy may prove to be a viable alternative treatment option for meningiomas.

Effect of Relative Autonomy Index on Exercise in Black Women

Presenter's Name: Sookraj Katrina Classification: Graduate Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Adaku Ofoegbu Faculty Advisor's email: adaku.ofoegbu1@howard.edu

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Background: Exercise plays a critical role in the prevention and management of chronic conditions like diabetes, hypertension, and cardiovascular disease. Motivational factors such as the Relative Autonomy Index (RAI) may influence exercise behavior. This study aims to assess whether RAI is a significant predictor of exercise frequency in Black women. Methods: A total of 116 African American women, aged 18-65, participated in this study. Participants were recruited from community, business, and social organizations in the Midwest. Inclusion criteria included self-identifying as Black, being above 18 years old, and providing informed consent. Data were collected using the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2) to assess RAI scores. Regression and correlation analyses were conducted to examine the relationship between RAI and exercise frequency. Results: The mean age of participants was 37 years. On average, participants exercised 3.2 days per week. Regression analysis showed that RAI was a significant predictor of exercise frequency ($\beta = 0.16$, p < 0.001), indicating that higher intrinsic motivation, reflected by higher RAI scores, was associated with more frequent exercise. Conclusions: The study highlights the importance of intrinsic motivation, as measured by the RAI, in promoting exercise behavior among Black women. These findings suggest that fostering intrinsic motivation could improve exercise adherence. Further research should explore the long-term effects of motivation on health outcomes.

Endocrine Disruption and Dentistry: A Study on BPA Exposure and Prevention

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The widespread presence of Bisphenol A (BPA) in consumer and medical products raises significant health concerns due to its endocrine-disrupting properties. Within dentistry, resin-based composites, and sealants, which may contain trace amounts of BPA, pose potential risks of exposure for both patients and practitioners. This study aims to address the lack of comprehensive research on BPA exposure in dental practice and proposes strategies to mitigate associated risks. A literature review was conducted to explore the presence of BPA in dental materials and its potential release during dental procedures. Evidence suggests that BPA exposure can lead to adverse health effects, including endocrine disruption leading to carcinogenic potential. Strategies for minimizing BPA exposure include selecting BPA-free alternatives and implementing proper handling techniques and ventilation protocols. The findings emphasize the importance of prioritizing patient safety in dental practice, including the dental provider by staying abreast of BPA-related research and adopting preventive measures to mitigate exposure risks. Continued research and development of BPA-free dental materials are crucial for advancing dental care while ensuring the health and well-being of patients and dental professionals.

Small Molecule Replacement of Growth Hormone bFGF

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Co-authors:

In 2000 the Edmonton Protocol proved patients with type 1 diabetes mellitus can be treated using a pancreatic islet transplantation of deceased donors.Due to the scarcity of donors, stem cell sources are being explored for widespread practices. Differentiation protocols of human-induced pluripotent stem cells (hiPCS) to pancreatic β -cells are currently being studied. The protocols use a variety of large molecules and growth factors which increases the cost. Current protocols range from success rates from 7-15% percent of insulin-positive cells produced. A protocol consisting of small molecules and ligands will reduce cost, increase the percentage of insulin-positive cells, and make treatment more scalable. This study explores the potential of Curcumin (CUR) bonded to polyethylene glycol (PEG) hydrogel scaffold to replace basic fibroblast growth factor (bFGF).CUR, a natural inflammatory antioxidant, is reported to have enhanced TGF-B1 signaling and protect fibroblast and keratinocyte cells from damage. It is a cost-efficient replacement for the common growth hormone used bFGF. The experiment will bond the CUR to the PEG hydrogel with a stiffness of 1-1.4 kPa using a three-carbon linker containing carboxylic acid and amide. At a neutral and acidic pH, the keto tautomeric form of CUR will act as a proton donor, interacting with targeted proteins, and mimicking the signaling of bFGF. At these conditions, CUR will protect cells from oxidative stress and aid tissue repair. Based on existing literature, it is hypothesized that CUR will effectively replace bFGF in vivo, which will be tested through controlled experimentation. Experiments will validate these predictions by varying parameters and analyzing their impact on the efficiency of the reactions.

Harnessing Biomaterials to Direct Stem Cell Differentiation Towards Pancreatic Fate

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ABSTRACTS

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Diabetes presents a significant global health challenge, with current treatments limited to oral agents, insulin injections, and B-cell transplantation. Oral agents and insulin injections impose substantial patient burdens through long-term use. B-cell transplantation, while promising, is severely constrained it donor scarcity and potential graft apoptosis, rendering inaccessible to many due to high costs. Consequently, there is an urgent need for cost-effective, scalable methods for generating transplantable B-cells. This project addresses this need by focusing on the design and synthesis of a library of novel polyethylene glycol (PEG) conjugates through establishing structure-activity relationships by integrating topological cues and biological effectors into these conjugates. The project objective is to develop biomaterial scaffolds that enable the large-scale, cost-effective production of transplantable ß-cells from induced pluripotent stem cells (iPSCs). By systematically exploring the interplay between scaffold design and iPSC differentiation, this project seeks to create a platform for efficient and reproducible B-cell generation, ultimately contributing to improved and accessible diabetic treatment.

Mathematical Modeling for Glucose Regulation: Evaluating the Predictive Power of the Metabolic Disposition Index (mDI)

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This study evaluates the predictive power of the novel metabolic Disposition Index (mDI) compared to conventional markers (cDI and oDI) in assessing glucose regulation among African immigrants. Using a quantitative analysis of 131 participants (average age 39.5 years, BMI 27.7), rigorous statistical methods were employed to analyze the dataset. Correlation analysis revealed that cDI had moderate predictive power ($R^2 = 0.63$), while oDI improved to $R^2 = 0.79$. Notably, mDI demonstrated the highest predictive accuracy with $R^2 = 0.96$. ROC analysis showed mDI significantly reduced overlap between impaired glucose tolerance (IGT) and type 2 diabetes (T2D) to 88.5%, compared to 82.8% for cDI and 77.1% for oDI.Cohen's Kappa revealed good precision for diabetes detection (k = 0.72 for mDI) and moderate reliability for prediabetes (k = 0.77). These findings highlight mDI's potential as a scalable diagnostic tool for improving diabetes classification and early detection of prediabetes.

Medicaid Expansion and Lung Cancer Survival in California vs. Texas

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Introduction: The Affordable Care Act's Medicaid expansion aimed to enhance healthcare access for low-income individuals and minority groups, promoting early screening and treatment to improve health equity in the United States.OBJECTIVE: This study examines the impact of Medicaid expansion on lung cancer-specific survival (CSS) and overall mortality (OS) by comparing outcomes in Texas, which did not adopt Medicaid expansion, to those in California, which expanded Medicare policy. Methodology: We conducted a retrospective analysis using data from the SEER Cancer Registry from 2000 to 2020. The study aimed to determine the impact of Medicaid expansion on lung cancer-specific survival among individuals in California (treated state) compared to Texas (control state), which has not adopted the policy. We employed a Difference-in-Differences (DID) methodology to assess the survival gains among individuals across different racial groups. Results: Among 119,937 individuals with lung cancer, 60.8% were in California (219,859), while 39.3% were in Texas (142,045). The pre-ACA period included 60,010 individuals (53.1% in California and 46.9% in Texas), and 59,927 patients were in the post-ACA period (51.2% in California and 48.8% in Texas). Overall, Medicaid expansion was associated with a -1.12-point (-1.12, 95% CI -1.46 to -0.77) reduction in cancer-specific mortality. The policy was also associated with a 0.81-point reduction in the hazard of overall deaths (-0.81, 95% CI -1.06 to -0.57). Conclusion: Medicaid expansion was associated with a significant improvement in lung cancer outcomes among individuals with lung cancer in California, which implemented the policy in 2014, compared to Texas, which has not yet implemented the policy.

Comparing the Distressed Communities Index and Area Deprivation Index in Predicting Firearm-Related Emergency Department Visits

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Introduction:Firearm-related injuries are a major public health concern in the United States, contributing to significant Emergency Department (ED) visits. Understanding the impact of neighborhood socioeconomic status (SES) on these injuries is crucial for prevention. The Area Depri-

vation Index (ADI) has traditionally been the gold standard for assessing neighborhood SES, while the Distressed Communities Index (DCI) is a newer alternative. Objective: This study compares the predictive accuracy of the DCI and ADI in identifying ED visits due to firearm-related injuries using Maryland ED data (2019-2020). Methods: This retrospective study analyzed firearm-related ED visits in Maryland from January 2019 to December 2020. Three logistic regression models were constructed: one using DCI, one using ADI (stratified into three deprivation levels), and one incorporating both indices. Covariates included age, sex, race, insurance, and comorbidities. Model performance was assessed using Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Receiver Operating Characteristic (ROC) curves. Results:Of 643,454 injury-related ED visits, 2,593 (0.4%) were firearm-related, predominantly affecting Black individuals (84.7%) and males (88.2%), with a mean age of 29.8 ± 9.9 years. The most deprived neighborhoods (per both indices) had the highest firearm injury incidence. The DCI-only model (AIC = 12,703.88) performed comparably to the ADI-only model (AIC = 12,748.6), with no significant improvement when combined. Conclusion:DCI and ADI are comparable predictors of firearm-related ED visits. DCI alone may be sufficient for assessing neighborhood SES impact on firearm injuries.

Glycosylation-Dependent Modulation of Influenza Virus Stability and Aggregation in Different Growth Media

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The stability, aggregation, and glycosylation of Influenza A Virus (IAV) particles are critical determinants of viral infectivity, transmission, and vaccine production efficiency. This study provides a comprehensive investigation into the interplay between viral strain modifications, glycosylation profiles, and growth media-specifically allantoic fluid (AL) and Dulbecco's Modified Eagle Medium (DMEM)-in shaping the aggregation and stability of IAV particles. We examined three distinct virus groups: a low-glycosylated H1N1 strain grown in allantoic fluid (H1N1), a hyperglycosylated mutant strain of A/Puerto Rico/8/34 (aPR8) grown in allantoic fluid, and PR8 grown in Madin-Darby Canine Kidney (MDCK) cells (mPR8). Our findings reveal that IAV particles grown in AL at temperatures above 4°C exhibit reduced protein aggregation due to the enzymatic activity of neuraminidase (NA), which cleaves sialic acid residues from glycoproteins and glycolipids. NA-mediated sialic acid removal disrupts protein-protein interactions, preventing the formation of aggregates and even dispersing pre-formed ones via sialic acid-dependent cross-linking mechanisms. In contrast, treatment with neuraminidase inhibitors (NAi) reversed these effects, resulting in robust aggregate formation in the presence of IAV particles. Notably, IAV grown in AL exhibited selective binding affinities to stem antibodies, with reduced interaction with head-specific antibodies, emphasizing glycosylation's role in modulating antigenicity. This work highlights the nuanced role of glycosylation, environmental conditions, and growth media composition in determining IAV stability and aggregation. By elucidating how neuraminidase activity, glycosylation profiles, and serum proteins interact to influence these properties, our findings provide critical insights for optimizing influenza virus preparations for research, diagnostics, and vaccine production.

Exploring the distinct roles of innate and adaptive type 2 lymphocytes during Nippostrongylus brasiliensis infection

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Type 2 lymphocytes, activated by parasitic helminths and allergens, are crucial for the immune response and maintaining homeostasis following infection. These cells can be broadly categorized into innate lymphoid cells (ILC2s) and adaptive T helper 2 (TH2) cells, each playing distinct but overlapping roles in type 2 immunity. While ILC2s and TH2 cells differ in their antigen receptors and activation pathways, both produce similar cytokines, including IL-4, IL-5, IL-13, and growth factor like Amphiregulin, raising questions regarding the specific functions of these cell types. This study seeks to answer these questions by investigating the distinct roles of ILC2s and Th2 cells in regulating tissue repair and worm expulsion during secondary infection. Using a mouse model infected with the parasitic helminth Nippostrongylus brasiliensis, we analyzed bronchoalveolar lavage fluid (BALF) and fecal samples. Our findings revealed that ILC2-deficient mice were at a disadvantage compared to Th2-deficient and wild-type mice during secondary infection, suggesting a critical role for ILC2s in protective immunity upon reinfection. Immunofluorescent antibody staining and imaging of lung tissue during primary and secondary infection confirmed that ILC2s were the predominant type 2 lymphocytes during secondary infection, further supporting their dominant role in developing anamnestic immunity. While there is much to still be uncovered regarding these type 2 lymphocytes, our study offers incredible insight into an untapped aspect of type 2 immunity that could be the key to better understanding the mechanism as a whole.

Exploring Cell Density and Cortical Dyslamination in Focal Cortical Dysplasia Type 1

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Focal Cortical Dysplasia Type I (FCDI) is a malformation of cortical development (MCD) characterized by cortical dyslamination and congenital epilepsy. Individuals with FCDI often exhibit resistance to anti-sei-

zure medication with worse surgical outcomes than other FCD subtypes. In addition, FCDI can lead to cognitive disorders and developmental delays. Currently, the impact of FCDI on lesional neuronal density and layer specific identity remains understudied. I employed Nissl and NeuN staining techniques to observe and compare cortical cell density between FCDI and neurotypical individuals. To better characterize the cortical dyslamination in FCDI patients, I conducted Immunohistochemistry (IHC) staining techniques on resections of the dysplastic areas in patients with FCDI. I utilized neuronal markers unique to regional layers of the cortex, imaged the stained tissue via widefield microscopy, and analyzed the neuronal positions in FCDI and neurotypical cortical tissue. The analysis of the cell density experiments suggests a trend of decreased cell density in the intermediate layers of the cortex in FCDI affected tissue compared to a neurotypical sample. This observation may be explained by abnormal proliferation, specifically during the development of the intermediate layers. The data from the tissue staining revealed regionspecific neuron markers outside of the expected region in FCDI affected tissue, likely due to abnormal migration or misexpression of neurons.

The results from this research add to the knowledge regarding FCDI. Understanding the etiology of cortical dyslamination in FCDI can provide a framework and direction for future research such as improved diagnostic criteria.

Synthesis of Imidazole Derivatives via GBB reaction for VCP inhibition

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Imidazoles are well-known organic compounds used for antifungal and antibacterial treatments. Previous research expanded the Groebke-Blackburn-Bienayme' Reaction (GBBR), a well-established multi-component method to form imidazoles using cyclic amidines, to include acyclic amidines. We utilized the GBBR with acyclic amidines to create and test imidazole derivatives as an alternative to anticancer chemotherapies. Valosin-containing protein (VCP), also known as p97, is an overexpressed protein in cancer cells that maintains cell homeostasis by preventing the build-up of damaged proteins and cell death. The imidazole derivatives' abilities to inhibit VCP showed promise. These findings suggest that functionalized imidazoles can be developed and have the potential to treat cancerous cells.

Biomineralization: Biomimetic Growth of Enamel-like Structures from Non-enamel Substrate

Presenter's Name: Wang Tongxin Classification: Senior Faculty School/College: Dentistry *Presentation Type: Poster Presentation* Faculty Advisor: Tongxin Wang Faculty Advisor's email: twang@howard.edu

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Objectives: About 92% of adults have dental caries in US. Remineralization of enamel is a promising strategy to remineralize and recover the original structures of tooth thus can prevent caries formation. Biomimetic growth of well-organized enamel-like hydroxyapatite (HA) structures have been achieved in recent decade, however, growth of enamel-like structures from non-enamel substrate is still challenging. This study intended to develop a novel technique in order to grow well organized HA structures from non-enamel structures has been developed. Biomimetic formation of well-organized enamel-like HA structures from non-enamel substrate not only could provide in-depth understanding to the formation mechanism of enamel, but also could provide scientific guidance to produce enamel-like biomaterials for caries filling and repair. Methods: A biomimetic technique to grow well-organized enamel-like HA structures from non-enamel substrate has been developed. The effect of concentration and time on the control of crystallization were fully investigated. The orientation, diameter/length of the HA nanorods were well controlled by the concentration, ion ratio, and mineralizing time.

Results: The well-organized HA nanorods were examined by Scanning electron microscope (SEM). The HA mineral diameter, length, morphology and orientation were effectively controlled by the concentration of mineral ions and mineralizing time. Conclusions: Well-organized HA nanocrystals similar to human enamel can be grown by a biomimetic technology from a non-enamel substrate. Mineral diameter and length can be controlled by concentration, ratio, and time. This technology may provide a unique strategy to produce organized HA from non-enamel substrate for cavity filling and tooth repair.

Development of Consistent Lipid Nanoparticles for the Synthesis of Biodegradable Amino Acid Surfactants

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The demand for biodegradable surfactants is increasing across pharmaceutical, food, and cosmetic industries due to their low toxicity and environmental benefits. Among these, amino acid surfactants (AAS) are particularly promising because of their biocompatibility and rapid biodegradation. However, limited research exists on their synthesis, posing a challenge for their broader application. A key component in AAS development is lipid nanoparticles (LNPs), which can function as versatile carriers for various uses. This project focuses on synthesizing LNPs with high consistency in size using a microfluidic mixer and characterizing them through dynamic light scattering (DLS). Achieving uniform particle size is crucial, as variations can impact further AAS synthesis. The study will involve optimizing process parameters, including lipid composition, flow rate, and solvent ratios, to refine LNP formation. Repeated trials and measurements will be conducted until a reproducible and stable nanoparticle size distribution is achieved. Once consistency is established, these LNPs will be integrated into the synthesis of ami-

ABSTRACTS

no acid surfactants. The success of this approach will contribute to the development of environmentally friendly surfactants with improved performance in industrial applications.

Role of Scaffold Protein the Receptor for Activated C Kinase 1 (RACK1) in the regulation of crosstalk between ABA induced Saline Stress and Auxin Signaling

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Plant signal transduction pathways, although seemingly distinct in their operation, are beginning to be understood to be governed by crosstalk coordinating the various hormone-based developmental and environmental stress signaling processes. The recent discovery of the growth hormone auxin signaling environmental stresses including drought and saline has garnered widespread interest due to its potential relating to food security under climate change. The foundational cellular mechanisms however remain poorly defined. In previous studies, through the application of our in-house developed RACK1 Y248 phosphorylation inhibitor compounds (pharmacological downregulation), and genetic knock-out approaches, our lab independently demonstrated that the RACK1 protein plays a positive role in auxin-induced lateral root development signaling, and concurrently negatively regulates salt stress signaling in the Arabidopsis. Here we aim to test our hypothesis that RACK1 serves as the mediator in the molecular crosstalk between these auxin and salt stress signaling pathways. Employing transgenic Arabidopsis plants with the auxin reporter construct pIAA5::GUS, we investigated the cross-talk mediating function of the RACK1 protein. While pIAA-GUS plants exhibited salt-induced auxin reporter gene expression, the use of a RACK1 inhibitory compounds significantly up-regulated pIAA5::GUS expression resulting in enhanced resistance to salt stress by down-regulating a yetto-be-identified subset of auxin-regulated genes. Additionally, RACK1 deficient transgenic lines of Oryza sativa, have also shown alterations in the saline stress response at the molecular level shown by genome wide Poly-A RNA sequencing. This further supports RACK1 playing a key regulatory role in crosstalk between abiotic stressors and plant hormonal response(s).

The Impact of Paternal Immune Activation on Offspring Response to Viral Infection

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The Red Queen hypothesis describes a slow, multigenerational process of immunity build up in populations. However, we fail to understand how paternal infection could influence offspring immunity on a generational basis. Like the extensively studied maternal immune activation (MIA), paternal immune activation (PIA) has been shown to influence the behavior of offspring, but remains an understudied topic. PIA induced through exposure to Poly (I:C), a viral mimetic, has been shown to cause changes to offspring behavior through epigenetic mechanisms. Our lab has shown that Poly (I:C) activates the paternal immune system and leads to the alteration of the sperm small RNA profile. Sperm small RNAs are carriers of epigenetic information and in the context of intergenerational non-genetic inheritance can influence offspring phenotypes. While the consequences of PIA on offspring behavior have been explored, the impact PIA has on offspring immunity is poorly understood. We sought to determine the role of PIA on offspring's response to viral infection. The offspring of Poly (I:C) treated fathers were infected with Influenza A and evaluated for survival, weight change, temperature change, and clinical scores. Our study revealed that offspring sired by Poly (I:C) treated mice had a better response to a lethal viral challenge than those sired by control males. Additionally, we determined if that enhanced response was related to greater viral control by PIA offspring. Our study provides insight into the consequential, yet overlooked impact of PIA on offspring response to viral infection, opening avenues for a better understanding of intergenerational non-genetic inheritance.

Understanding an Athlete's Perception of Pain and the Body's Response to Therapeutic Modalities

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This research study investigated the usage of noninvasive therapeutic modalities, Cupping Therapy and Transcutaneous Electrical Stimulation Therapy, as they are used to help athletes alleviate pain. The goal of the research was to evaluate how athletes perceive pain and how their body responds to Cupping Therapy and Transcutaneous Electrical Stimulation as a means of pain reduction and improvements in range of motion. 20 participants (N=20), who are currently Howard University Division I athletes, were instructed to self-report how they felt before and after receiving treatment using a Numeric Rating Scale. Athletes were selected to participate in this study if they present with muscle pain, soreness, or discomfort common to their sport-related movements. Additionally, athletes were excluded from the study if the designed methodology for this experiment hindered their current rehabilitation plan and/or deemed by a certified athletic trainer out, meaning they cannot participate in any sport specific activity. These athletes were assigned therapeutic exercises to perform in addition to receiving the supplemental treatments. The study aimed to identify which therapeutic modality showed the most improvement in pain perception and range of motion among the collegiate athletes. Athletes that reported to the training room more often had a significant decrease in their perceptions of pain at the conclusion of the

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study. The study also found athletes that participated in greater amounts of physical contact during their respective sport favored Cupping Therapy for pain management over Electrical Stimulation.

Classifying Gamma Band Oscillations in the Cerebellum Using Convolutional Neural Networks

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The cerebellum, traditionally associated with balance and motor control, also plays a key role in cognitive functions. Gamma Band Oscillations (GBOs) in the cerebellum have been linked to neurological disorders such as schizophrenia, with the drug Kainate known to induce these oscillations. This study leverages Convolutional Neural Networks (CNNs), a form of artificial intelligence, to classify neural recordings, distinguishing between those induced by Kainate and those without. The findings highlight CNNs' potential in analyzing complex neural patterns, paving the way for advancements in neurological research.

Augmenting Cancer Cell-Intrinsic IFN-I Signaling Enhances Immune Responses and Controls Tumor Growth in HNSCC

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Immunotherapy, particularly immune checkpoint blockade (ICB), has shown promise in harnessing immune cells to control tumor growth. However, ICB remains ineffective in over 80% of head and neck squamous cell carcinoma (HNSCC) patients, regardless of HPV status, underscoring the need to address impaired immune responses. In ICB-refractory cancers, insufficient antigen presentation is a major barrier. Recent evidence indicates that the cyclic GMP-AMP synthase (cGAS)type I interferon (IFN-I) pathway in cancer cells can trigger immune responses, similar to its role in immune cells, but its activity in tumors is often modulated by cancer-specific factors. Using mouse HNSCC models, we identified a significantly suppressed cGAS-IFN-I pathway in the aggressive MOC2 tumors compared to MOC1 tumors. In vitro, MOC2-conditioned medium impaired dendritic cell (DC) marker expression and antigen presentation in bone marrow-derived DCs. Stimulating the cGAS-IFN-I pathway with exogenous DNA or expressing IFN-I in MOC2 cells restored DC antigen presentation capacity. Moreover, co-expressing IFN-I with granulocyte-macrophage colony-stimulating factor (GM-CSF) in MOC2 tumors increased intratumoral DC accumulation, enhanced CD8+ T cell infiltration, and significantly suppressed tumor growth. These findings suggest that augmenting cancer cell-intrinsic cGAS-IFN-I signaling, coupled with enhancing DC functionality, could improve immune system-tumor interactions and provide a novel strategy for controlling tumor progression.

A Comparative Analysis of Patient Demographics in Trabeculectomy vs. Tube Shunt Procedures

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Glaucoma affects 4.3 million adults in the U.S., with 1.5 million experiencing vision impairment. Lower socioeconomic status (SES) has been linked to later disease presentation and worse visual outcomes. This study examines the demographics of patients undergoing trabeculectomy versus tube shunt procedures to assess potential influence of SES on treatment selection. This study utilized the TriNetX database to identify who underwent trabeculectomy or tube shunt implantation. Demographic variables, including sex, race, and ethnicity, were compared between cohorts. Black and Hispanic patients have higher rates of tube shunts due to later disease presentation. Black patients were significantly more likely to undergo trabeculectomy at 61.7%. Hispanic and Other racial groups were significantly more likely to undergo tube shunt surgery at 60.5% and 59.8%. White and Asian patients showed no significant preference. This study demonstrates a significant association between race/ethnicity and the choice of glaucoma surgery ($\chi^2 = 58.54$, p < 0.001). Black patients were more likely to undergo trabeculectomy (61.73%), while Hispanic (60.58%) and Other racial groups (59.85%) were more likely to receive tube shunt surgery. White and Asian patients showed no significant procedural preference. Trabeculectomy is a first-line surgical option for glaucoma but has higher failure rates in Black patients. Despite this, Black patients had the highest rates of trabeculectomy. Tube shunt surgery was more common among Hispanic and Other racial groups, potentially reflecting delayed disease presentation or surgeon preference. These findings highlight potential biases in glaucoma management.

Spicing Up Medicine: A Comprehensive Survey of Capsaicin's Multifaceted Roles in Modern Medicine

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Capsaicin, the active compound in chili peppers, has gained attention for its wide-ranging health benefits. This project analyzed published literature on capsaicin over the past two decades. Capsaicin primarily works by activating the Transient receptor potential vanilloid 1 (TRPV1) ion channel, triggering downstream signal transduction cascades. The nociceptive effect of capsaicin is well-established, with an 8% patch available for long-lasting neuropathic pain relief. Injectable capsaicin effectively treats localized pain conditions without affecting tactile sensation. Capsaicin's metabolic effects include improved insulin secretion, reduced glucose absorption, and increased thermogenesis. While it enhances blood vessel function, its cardiac effects require further exploration. Capsaicin's neuroprotective effects on Alzheimer's and Parkinson's diseases, attributed to its anti-inflammatory potential, are noteworthy. Its anticancer properties involve inducing apoptosis in cancer cells without affecting normal cells and enhancing chemotherapy effectiveness. Additional benefits include reducing inflammation, boosting immunity, improving dyslipidemia, and enhancing vascular health. Published literature supports capsaicin as a promising therapeutic target. However, further clinical research is necessary to determine its safety, optimal dosage, and long-term effects in humans. The diverse range of potential health benefits, from pain management to metabolic regulation and cancer prevention, makes capsaicin an intriguing compound for future medical applications. This review underscores the need for continued research to fully harness capsaicin's therapeutic potential.

The Role of TikTok in Hyperpigmentation: A Cross-Sectional Analysis

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Background: TikTok has emerged as a major platform for skincare education, particularly for hyperpigmentation. Hyperpigmentation results from excess melanin production and affects all skin types due to factors like post-inflammatory responses, hormonal changes, UV exposure, and visible light. Despite TikTok's influence, the accuracy and credibility of skincare content remain concerns. This study aims to assess the source credibility, monetization, and accuracy of hyperpigmentation-related content on TikTok to evaluate its impact on consumer skincare decisions. Methods: The search term "Hyperpigmentation Black Skin" was used to identify the top 51 TikTok videos. Data were collected on the creator's profession, source credibility, brand mentions, product types, sponsorships, and accuracy. Videos under 10 seconds or not in English were excluded. Results: Among analyzed videos, 76.5% were created by content creators, 9.8% by dermatologists, 7.8% by estheticians, 3.9% by skincare companies, and 2% by esthetician students. Monetization was common, with 42.3% earning commissions and 7.7% involved in paid partnerships. Frequently mentioned ingredients included turmeric (25.5%) and kojic acid (19.6%). Conclusion: TikTok hyperpigmentation content is largely driven by influencers incentivized to promote products rather than evidence-based skincare. Greater participation by dermatologists is needed to counter misinformation and promote treatments such as retinoids, niacinamide, and sunscreen. Collaboration between dermatologists and estheticians can improve public education on ingredient safety and prevent complications like ochronosis. Social media offers an opportunity for dermatologists to enhance patient education and promote science-backed skincare.

The Role of TikTok in Health Education and Early Detection of Hidradenitis Suppurativa

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Background: Hidradenitis suppurativa (HS) is a chronic inflammatory skin condition characterized by painful abscesses, boils, and sinus tracts, often in intertriginous areas. HS disproportionately affects Black women, and delayed diagnosis-averaging 6-10 years-can lead to severe scarring and fibrosis. Social media platforms, particularly TikTok, have become valuable tools for disseminating health information. This study evaluates TikTok's role in raising awareness about HS and facilitating earlier diagnosis. Methods: The TikTok search bar was used to explore terms such as "what is HS" and "HS diagnosis." Videos containing educational content on HS, including symptoms, treatments, and patient experiences, were analyzed along with user comments. Results: Among 14 analyzed videos, 113+ comments reflected viewers realizing they might have HS. Many expressed relief in finding a community and gratitude for learning about alternative treatments such as chlorhexidine gluconate (Hibiclens) and benzoyl peroxide washes. Several videos emphasized consulting a dermatologist for proper evaluation. Conclusion: TikTok serves as a powerful platform for HS education, with patient-shared experiences garnering the most engagement. Many viewers identified symptoms in themselves, underscoring TikTok's role in fostering awareness and self-recognition. Increased exposure to HS-related content may encourage individuals to seek dermatologic care earlier, potentially reducing diagnostic delays and improving long-term outcomes.

ABSTRACTS

BUSINESS

The Evolution of Salesperson Motivation Research: A Bibliometric Analysis

Presenter's Name: Cha Claire Classification: Junior Faculty/ Lecturer/ Instructor School/College: Business *Presentation Type: Oral Presentation* Faculty Advisor: Claire Cha Faculty Advisor's email: Claire.Cha@howard.edu

Co-authors:

Researchers have sought to understand salesperson motivation and as a result have compiled a significant body of knowledge about the topic. The current study uses a bibliometric research design for performance analysis and science mapping to uncover the landscape of salesperson motivation literature published in the last 70 years. The results reveal that the number of articles pertaining to salesperson motivation markedly increased from only two in 1953 and nine in 2003 to 74 in 2021. The findings also show the intellectual structure changes in the salesperson motivation domain. Specifically, extrinsic rewards, intrinsic motivation, flexibility, psychological status and job attitudes, and self-development were the prevalent foci in pre-2017 publications, but adaptability, extrinsic rewards, intrinsic motivation, organizational climate, job satisfaction, and organizational engagement received the most attention in post-2017 publications, as ranked by theme cluster size. The prominent themes in the current scholarly works as of 2024 are extrinsic rewards, emotion and psychological well-being, salesperson adaptability, sales control system, and uncertainty and change. The paper concludes with a discussion of future research directions, which are extracted from our identification of extant research fronts.

Diversifying the Sports Industry

Presenter's Name: Grayson Zamarie Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Edgar Jackson Faculty Advisor's email: edgar.jackson1@howard.edu

Co-authors:

The growing awareness of the need to increase diversity and inclusion in professional sports has been evident in recent years. As noted by Diversio DEI Expert, diversity and inclusion are crucial for creating positive and equitable environments within sports organizations. Numerous studies and public discussions have highlighted the importance of creating more inclusive environments within sports organizations. For example, Mulcahy et al. (2023) emphasize the significance of tailored messaging and audience selection in driving change and fostering positive attitudes towards diversity and inclusion. Since the beginning of time, progressional sports have been dominated by white males; as time has progressed,

it has become more diverse and inclusive. In recent years, there has been a growing awareness of the need to increase diversity and inclusion in professional sports. The aspect of diversity and inclusion in professional sports is a representation of all. Numerous policies have aimed to create a more inclusive environment, including representing marginalized groups, implementing educational programs, and changing recruitment and hiring practices (Romero et al., 2022). This review examines diversity and inclusion (DEI) in professional sports, focusing on racial hiring, gender equity, and effective promotion strategies. It analyzes current research within a structured framework, acknowledging the impact of evolving US political and anti-DEI sentiments on these areas

The Competitive Landscape of the Lao Coffee Industry

Presenter's Name: Loke Adrian Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Adrian Loke Faculty Advisor's email: melati.nungsari@asb.edu.my

Co-authors: Thomas Maddision

Laos, a landlocked and least industrialized nation in Southeast Asia, is experiencing steady growth in its coffee industry, which contributes 0.5% to national GDP. The Bolaven Plateau serves as the heart of Lao coffee production, known for high-quality arabica beans. While the sector is expanding-supported by cooperatives and brands like Sinouk Coffeesignificant challenges exist, including climate change, labor shortages, and limited market access. However, opportunities lie in diversifying local consumption, embracing technological advancements, and aligning with sustainability trends. Sinouk Coffee has positioned itself as a premium brand by integrating local production with an international presence. A Porter's Five Forces analysis reveals intense competitive rivalry, moderate buyer power, and weak supplier bargaining power due to fragmented production. To navigate market challenges, Sinouk Coffee should maintain stringent quality control, strengthen its brand identity through storytelling, invest in technology for traceability, and establish direct trade relationships. Proactive measures in climate adaptation and labor management will be essential for long-term sustainability. With growing global demand for sustainable, single-origin coffee, Sinouk Coffee can capitalize on emerging trends by improving certification compliance and leveraging blockchain for supply chain transparency. The company can further expand through digital marketing and participation in international coffee trade events. Despite macroeconomic pressures and climate risks, Sinouk Coffee's strategic focus on quality, differentiation, and sustainability will enable it to thrive in the global specialty coffee market while contributing to the economic development of Laos.

Stigmatized Social Framing and Financial Disparities: Comparing Microfinance Exclusion in Ghana and Racialized Financial Barriers in the U.S.

Presenter's Name: Okorodudu Atuwatse Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Latanya Brown-Robertson Faculty Advisor's email: l.brown-robertson@howard.edu

Co-authors: Nashiru Kumbuni

This study explores how stigmatized social framing and stereotypes influence financial disparities and access to financial services. My motivation for this research stems from awareness of how racialized narratives in the U.S., such as redlining, which labeled certain districts as uncreditworthy or "dependents," have shaped marginalized peoples' ability to access the financial system in ways that would empower them. I sought to investigate whether similar framing exists in Ghana's microfinance sector, where access to financial resources remains uneven across different regions. Using a mixed-methods approach, I analyzed quantitative financial data on credit access, savings, and microfinance participation in Ghana while incorporating qualitative insights from interviews and literature on systemic financial exclusion. My findings reveal that while stigmatized framing plays a role in financial access disparities in Ghana, the issue is more complex than in the U.S. While clear parallels exist in how marginalized groups-such as women and economically disadvantaged populations-are framed through stereotypes that influence perceptions of creditworthiness, the factors shaping financial exclusion in Ghana are deeply tied to historical colonial structures, capital concentration, and uneven regional development. Certain groups and communities face unique forms of discrimination based on geography, economic status, and historical marginalization, leading to chronic underinvestment in specific regions. These results highlight the need for more context-specific financial policies in Ghana that address structural barriers beyond simplistic identity-based narratives. Recognizing both the similarities and complexities of financial exclusion across different contexts can inform more equitable approaches to financial inclusion, both in Ghana and globally.

Stigmatized Social Framing and Financial Disparities: Comparing Microfinance Exclusion in Ghana and Racialized Financial Barriers in the U.S.

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Entrepreneurship Connection to Social Capital- Exploring the Socio-Economic Influence of the Family on Ghanaian Self-employment

Presenter's Name: Thorpe Jazmyn Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: LaTanya Brown-Robertson Faculty Advisor's email: 1.brown-robertson@howard.edu

Co-authors:

In entrepreneurship, often defined as self-employment, the effects of families' education status, geographic location, income, age, gender, and other factors often play a significant role in individuals' pursuit of self-employment. Families in developing countries may have similar career interests due to the limited resources to explore other options. This research aims to find the connection between entrepreneurship and social capital in Ghana, focusing on the socioeconomic influences of family on entrepreneurship. This study uses a mixed-methods approach, collecting primary data through face-to-face interviews with approximately 10 participants. Secondary, supporting data will be found using a large socioeconomic data set which will be analyzed using a regression analysis. So far, the findings of the primary data suggest that family plays a major role in an individual's decision to become self-employed. However, many individuals have multiple forms of income to survive in Ghana's economy. Many people have informal and formal forms of employment. This study focuses on a small sample group of men and women between 18-60 years old. This paper aims to provide insight on the connection between entrepreneurship and social capital. Keywords: Entrepreneurship, Family, Ghana, Self-employment, Socio-economic.

ABSTRACTS

AI Use Among Marginalized Entrepreneurs: A Social Cognitive Theory Perspective

Presenter's Name: Uzuegbunam Ikenna Classification: Junior Faculty/ Lecturer/ Instructor School/College: Business *Presentation Type: Oral Presentation* Faculty Advisor: Ikenna Uzuegbunam Faculty Advisor's email: ikenna.uzuegbunam@howard.edu

Co-authors: Brandon Ofem, Joseph Fox

Artificial intelligence (AI) is reshaping economic activity, offering transformative opportunities while presenting significant challenges for marginalized entrepreneurs. Despite increasing recognition of the need to study underrepresented populations, research on their adoption of AI remains scarce. This study examines how marginalized entrepreneurs engage with AI, focusing on the interplay of personal factors, environmental influences, and behavior through the lens of social cognitive theory (SCT). Using a dataset of 1,349 U.S.-based entrepreneurs, we explore how race, gender, and disability status-and their intersections-affect AI adoption, with technological self-efficacy (TSE) as a key moderating factor. Our findings empirically document AI usage patterns among marginalized entrepreneurs and apply SCT, alongside social identity theory and the technology acceptance model as constituent elements, to explore how personal factors, environmental influences, and behaviors intersect. These insights provide a foundation for addressing systemic inequities and guiding interventions to foster equitable access to AI and create more inclusive entrepreneurial ecosystems.

Reconceptualizing Mission Drift in Social Enterprises: A Shift to a Dual Continuum

Presenter's Name: Williamson Sierra Classification: Undergraduate Student School/College: Business *Presentation Type: Oral Presentation* Faculty Advisor: Ikenna Uzuegbunam Faculty Advisor's email: ikenna.uzuegbunam@howard.edu

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Social entrepreneurship is distinguished by dual economic and social missions. Previous research has highlighted the vulnerability of social enterprises to mission drift, which results in low social value creation and high economic value creation despite social enterprises' intended social goals. Existing theoretical conceptualizations of mission drift have assumed an inherent either/or relationship between economic and social value creation, in which higher economic mission achievement is associated with social mission underperformance and vice versa. Thus, both forms of value creation are theorized as occurring in a single continuum with two extremes of absolute social value creation and absolute economic value creation. In contrast to existing research, I propose a new conceptualization of mission drift that rejects the assumption of an inherent tradeoff relationship between economic and social value creation. Instead, I separate the dual missions of social enterprises to view them as distinct but interrelated values, and then analyze the degree of mission achievement for each distinct economic and social goal in a dual continuum. Using this new conceptualization, I then construct a typology matrix of mission drift in social enterprises. This typology highlights areas of underperformance and overperformance across economic and social value creation that are overlooked in a single continuum conceptualization. For example, social enterprises that achieve low economic and low social value creation tend to have mission stagnation, while social enterprises that achieve high economic and high social value creation tend to have mission maximization. Research is ongoing to conduct qualitative case studies of this typology.

CREATIVE ARTS & DESIGN

Exploration and Evaluation of OpenVoice V2 in Multi-Accent and Multi-Lingual Voice Synthesis

Presenter's Name: Adike Noble Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors:

Author: Noble Adike

Background: OpenVoice V2 is an advanced voice synthesis system utilizing deep learning technologies, specifically designed to clone and synthesize voices with varying accents and languages. Its ability to generate natural-sounding speech from diverse voice samples positions it as a promising tool for global communication, localization, and cultural inclusivity. However, empirical analyses of its effectiveness in handling multi-accented and multi-lingual speech synthesis are currently limited. This study investigates the system's capability in accurately replicating and adapting diverse voice samples across different linguistic contexts. Methods: Experimentation followed the official OpenVoice V2 documentation, demonstrations, and an instructional video tutorial. Voice samples from various speakers were systematically collected and synthesized using Windows deployment guidelines, official OpenVoice repository resources, Jupyter notebook examples, and video tutorial procedures. Voice synthesis outputs were evaluated across multiple languages and accents, with subjective listening assessments conducted to gauge naturalness, clarity, and accuracy. Results: Successful implementation and voice sample synthesis were achieved on Windows, with substantial assistance from the documentation and video tutorials. Interactive Jupyter notebooks allowed efficient experimentation with multiple accents and languages. Preliminary results from subjective evaluations highlighted the system's proficiency in generating natural, clear speech across diverse linguistic scenarios, although inconsistencies were noted in accent authenticity and pronunciation precision. Conclusions: OpenVoice V2 effectively synthesizes diverse voice samples in various multi-accent and multi-lingual contexts, demonstrating considerable potential for global applications. Nevertheless, targeted enhancements in accent authenticity and pronunciation accuracy are recommended. Further quantitative studies are needed to robustly assess performance and user acceptance across broader linguistic demographics.

The History of Final Generation of Scarification ART & TRIBAL MAKEUP

Presenter's Name: Bethea Frankie Classification: Junior Faculty/ Lecturer/ Instructor School/College: Fine Arts *Presentation Type: Poster Presentation* Faculty Advisor: Akili Anderson Faculty Advisor's email: r v anderson@howard.edu Co-authors: Marie Faye, Paulette Robinson

This abstract presents a pioneering curriculum that merges a new college course on the history of African scarification with a foundational Basic Stage Makeup course at the Chadwick A. Boseman College of Fine Arts. Designed for Theatre Arts students, this innovative program will elevate the study of Special Effects makeup by incorporating prosthetics to create realistic molds, scars, deep cuts, and burns, while emphasizing the cultural significance of these practices. The course, titled ART and TRIBAL MAKEUP "The History of Final Generation of Scarification," aims to blend creative expression with an appreciation for diverse cultural heritages. By integrating artistic endeavors into the syllabus, students will actively engage in various artistic activities that enhance their creativity and skills while fostering a deep respect for the rich tapestry of cultures in their community and beyond. This initiative strives to promote inclusivity and cultural awareness, encouraging students to embrace the complexities of cultural diversity and develop empathy as global citizens. Through experiential learning, cultural exchanges, and exposure to various art forms, students will explore the historical context of African tribal marks and folklore, linking their significance to the seven elements of art: line, form, shape, space, color, texture, and value. Ultimately, the course seeks to cultivate not only skilled artists but also culturally sensitive individuals equipped to navigate and appreciate a diverse world.

The History of Final Generation of Scarification | Reference Article ART & TRIBAL MAKEUP 7 Elements of Art Lecture and Lab

Presenter's Name: Bethea Frankie Classification: Junior Faculty/ Lecturer/ Instructor School/College: Fine Arts *Presentation Type: Oral Presentation* Faculty Advisor: Frankie Bethea Faculty Advisor's email: frankie.bethea@howard.edu

Co-authors: Marie Faye, Paulette Robinson

Arts and Culture are foundational elements in shaping society, influencing not only our sense of identity but also our ability to connect with others across different backgrounds. Through various forms of artistic expression, whether visual arts, music, dance, or drama—individuals can explore and express creativity, fostering innovation and critical thinking. In addition, cultural education helps build an appreciation for the diverse traditions, histories, and worldviews that exist within local and global communities. By integrating Arts and Culture into education, students are not only provided with opportunities for personal expression but are also equipped to navigate a diverse and interconnected world. This curriculum seeks to develop a comprehensive Art & amp; Tribal Makeup course that merges creative expression with cultural appreciation. By embedding the arts into the curriculum, students will engage in a range of artistic activities designed to cultivate their skills and creativity, while simultaneously learning to respect and celebrate the diverse cultures that

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make up their community and the world. The program aims to promote inclusivity by helping students understand the richness of cultural diversity, thus preparing them to be more empathetic, culturally aware individuals. Through hands-on learning, cultural exchange, and exposure to different art forms, the program will contribute to shaping students who are not only creative thinkers but also global citizens. This course will delve into the history of African tribal marks and folklore, examining how they connect with the seven elements of art: line, form, shape, space, color, texture, and value.

A Redefining of the Gallery Experience Through Embodied Design

Presenter's Name: Brooks Jada Classification: Undergraduate Student School/College: Fine Arts *Presentation Type: Poster Presentation* Faculty Advisor: Jacqueline Carmichael Faculty Advisor's email: jacqueline.carmich@howard.edu

Co-authors:

Where are you the most comfortable? Where does the most collaboration happen in your life? Have you ever been to a Gallery or Museum before? How do these spaces feel? The "White Box" is a museum aesthetic that makes objects untouchable and exclusive by displaying collections on a null white wall. This design creates a sense of seriousness and confusion, hindering exploration and connection to the art, as it leaves no room for imagination. Modern art demands a white box display, intensifying aestheticization and isolating works for concentrated contemplation. This design can lead to passive viewing. To attract visitors, museums and galleries are incorporating immersive art experiences, such as "Immersive King Tut" and "Van Gogh Exhibition" shows. These experiences stimulate multiple senses and aim to evoke emotional responses. In this context, my thesis explores how design can reshape how people interact with art. By focusing on furniture and interior design as ways to stimulate the senses and center the body, this project challenges the passive viewing promoted by the "white box", and offers more inclusive curatorial strategies. Through methods of Phenomenology, Neuro-Architecture, Joy/Play, Community-Centered design, and trauma-informed design, my thesis asks, how does designing a stimulus for the body challenge the gallery experience?

How can the generational traditions of the black community influence the creation of a space that promotes the well-being of the black youth?

Presenter's Name: Connor Natalia Classification: Undergraduate Student School/College: Fine Arts *Presentation Type: Poster Presentation* Faculty Advisor: Jacqueline Carmichael Faculty Advisor's email: jacqueline.carmich@Howard.edu

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This project explores the critical need for culturally significant ""third spaces"", community spaces outside of home and work environments,

designed specifically for Black youth. In an era of increasing social isolation, prompted by technological dependence and the COVID-19 pandemic, there is a growing need for communal spaces that foster connection, self- expression, and well-being. Drawing from the discipline of interior design, this study investigates how generational traditions within the Black community such as music, dance, food, and shared cultural aesthetics can influence the design of an inclusive social infrastructure for teenagers and young adults among the black community. By using the frameworks of trauma-informed design, supportive design, and phenomenology, this research seeks to create inviting, multi-functional environments that promote healing, creativity, and mentorship. The project is centered on Anacostia and other underrepresented areas in Washington, D.C., where gentrification and limited social infrastructure have contributed to the displacement and disruption of Black communities. By analyzing existing community centers, conducting interviews, and studying case studies of successful social spaces, this research aims to develop a framework for designing third spaces that serve the younger Black generation. Ultimately, this study contributes to the discourse on inclusive design by proposing actionable solutions for fostering social engagement and empowerment. By prioritizing cultural identity and well-being, this research advocates for the creation of spaces that not only support the immediate needs of Black youth but also strengthen the social aspects of their communities.

Exploring Avant Garde Fashion: Innovation, Identity, and Boundaries in Design

Presenter's Name: Crawford Faith Classification: Undergraduate Student School/College: Fine Arts *Presentation Type: Poster Presentation* Faculty Advisor: Elka Stevens Faculty Advisor's email: estevens@howard.edu

Co-authors:

Avant Garde fashion is a distinct design language that has shaped the global fashion landscape. I will explore how Avant Garde movements have consistently pushed the boundaries of fashion through innovation. These radical design choices have not only challenged traditional aesthetics but have also introduced new philosophies in fashion, emphasizing individuality and artistic expression over conventional beauty standards. Studying the Avant Garde movement beyond superficial trends and revealing the underlying motivations and creative forces that shape its impact is crucial for designers who aim to recognize their work as Avant Garde. To conduct this study, I will use content analysis and fashion design methodologies. I will create a rubric that will allow me to identify prominent designers from the last 100 years who exemplify the essence of Avant Garde fashion. For each designer, I will examine how their work, along with the movements they represent, has continually pushed the boundaries of luxury fashion. I will delve into the pivotal role these designers have played in redefining the purpose of fashion as a means of cultural and personal expression. Finally, I will explore these concepts in relation to my work, utilizing the research to evaluate my design approaches and identity. This analysis will allow me to better understand how to incorporate Avant Garde principles into my creative process. Through this reflective process, I aim to challenge traditional

A B S T R A C T S

design boundaries, while also staying true to my unique aesthetic and perspective, ultimately shaping my growth and evolution within the fashion industry.

Digital Disruption: Exploring the Long-term Effects of AI in the Media and Entertainment Industry

Presenter's Name: Hill Robert Classification: Undergraduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Jennifer Thomas Faculty Advisor's email: jennifer.thomas@howard.edu

Co-authors:

Artificial intelligence (AI) refers to efforts used to develop simulations of human intelligence within computers to do tasks such as reasoning and decision-making. Integrating artificial intelligence into the media and entertainment industry has initiated a transformative era of technology in all types of media outlets. As AI has been designed to bring contributions to the world, it's causing an uproar of fear. Many people are against the use of AI, as they feel that it will potentially take their jobs especially within the media and entertainment industry. Public figures expressing how they feel about the advanced technology helps identify the problem that will be studied, which is AI's lack of effective governance in the media and entertainment industry. Due to the lack of governance and regulation of AI, the purpose of this research is to investigate the long-term effects that AI may have when spreading information and disinformation, creating potential biases in journalism, and on the creation process in the media and entertainment industry in the future. A qualitative analysis will be used to find different perspectives on AI in the media and entertainment field. AI is steadily progressing, and this research will correlate the intersection between technology and creativity to address the contributions and challenges brought to the media industry.

Exploring Effects of Interactive VR Sensory Environment on Anxiety Reduction in Adolescents with Autism: A Pilot Study

Presenter's Name: Keys Amaya Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Ronald Smith Faculty Advisor's email: ronald.smith1@howard.edu

Co-authors: Oyewole Oyekoya, Daniel Chan

Autism Spectrum Disorder (ASD) is a developmental disability often characterized by sensory processing difficulties that can lead to anxiety, particularly in children and adolescents. Previous research on virtual reality-based anxiety intervention tools focuses on using social skills training, exposure therapy, and meditative coaching to mitigate social and phobia related anxiety. However, minimal work has specifically evaluated the effects of virtual multi-sensory environments for people with ASD, often only testing feasibility. This pilot study aims to build on previous work by investigating how various auditory, visual, and interactive components contribute to user satisfaction and sensory-related anxiety reduction. The objective is to gain a better understanding of what features are significant towards developing a successful virtual anxiety intervention tool. Results suggest using interactive activities that promote fine motor skills can provide a healthy outlet for self-mediated stress relief. Future development aims to incorporate task-based activities, and enhance audio, visual, and lighting displays. The deployment of a full-scale study with a larger sample size and target participant pool is warranted to substantiate these initial findings.

Teaching Creative Resilience Through Doing: Sunshading

Presenter's Name: Maloo Nea Classification: Junior Faculty/ Lecturer/ Instructor School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Nea Maloo Faculty Advisor's email: nea.maloo@howard.edu

Co-authors:

This initiative examines the evolving role of architectural shading devices in contemporary design, emphasizing their capacity to address environmental challenges while enhancing human well-being. Through advances in digital design and fabrication, ornament has re-emerged as a key element in biophilic architecture, fostering a deeper connection between people and nature. By integrating aesthetic expression with functional performance, these innovations contribute to healthier, more sustainable communities. A central feature of this approach is its hands-on learning component, embedded within an active systems curriculum. Here, students explore biophilic design principles by developing climate control devices, gaining practical insights into the integration of ornament and sustainable building systems. This experiential approach underscores the role of design in advancing carbon-conscious, human-centered architecture. By demonstrating how shading devices and ornamental elements can be leveraged for sustainability and resilience, this initiative reinforces architecture's transformative power in shaping a more equitable and environmentally responsive built environment.

The Importance of Commemorating Disco as an African-American Genra

Presenter's Name: Myers Timothy Classification: Staff School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: N/A N/A Faculty Advisor's email: timyers@howard.edu

Co-authors:

Between 1971 and 1974 Isaac Hayes, Kenny Gamble and Leon Huff of Philadelphia International Records, and drummer Earl Young of MFSB orchestra developed an up-tempo style of Philly Soul which the black entertainment media would soon refer to as disco. Indeed, disco was as much of a successful and African-American genre as Motown and Hip-

Hop; and this talk will examine some ways in which disco is significant This talk will establish that in its origins and first years to this culture. disco music was completely African-American and was deeply rooted in African-American culture. We will discuss the way in which early disco actually fused three well-established African-American musical styles; specifically the percussive ride rhythm of straight-ahead jazz, the orchestration of late Motown and early Philly Soul, and funk riffs that accompanied singers such as James Brown and Betty Wright. We will also explore the influence of gospel in several disco compositions such as Put Your Hands Together by the O'Jays. We will consider the African-American artists who invented the principal percussive instrument of disco; namely the hi-hat symbol and its predecessor the sock-symbol; and examine the development of disco drumming on this instrument by Earl Young. We will explore the process by which African-American artists and TV hosts gradually christened this genre with the title "disco." We will show that ''disco" was not a label imposed from outside of the African-American community.

Artificial Intelligence

Presenter's Name: Ohashi dixon Kai Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Nea Maloo Faculty Advisor's email: nea.maloo@howard.edu

Co-authors:

Artificial intelligence (AI) has made significant advancements over the past two years, with its use becoming common practice in many fields. As AI continues to improve, its role in the built environment and the field of architecture will grow. This study explores the implications of AI in architecture, focusing on how it can optimize energy efficiency, reduce material waste, and enhance the lifecycle sustainability of buildings. While it can be used to generate initial design ideas, there should be discretion using it to complete whole building designs. AI can also be integrated into existing buildings to better support smart building technologies and enhance occupant comfort while minimizing energy consumption. By analyzing case studies and current advancements in technology, this research highlights what AI can be used for and how it can drive the architectural industry toward a more sustainable future while addressing potential risks and limitations.

Wanted: Poems in Communion with James Baldwin

Presenter's Name: Rothman Wesley Classification: Junior Faculty/ Lecturer/ Instructor School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Wesley Rothman Faculty Advisor's email: wesley.rothman@howard.edu

Co-authors:

Wanted navigates an impossible relationship: between the speaker and James Baldwin. This reach over the horizon takes surreal turns, speaks di-

rectly to Baldwin, listens and responds to his missives, and holds together others who have also modified the speaker-the lover, dear friends, acquaintances, strangers, resounding teachers, artists, rivers. This is a journey outward as much as it is a journey inward. When we, *if* we re-examine ourselves, the world changes. When we hear and heed others, we are transformed. These poems reach for the ungraspable electricity of relationship and the sharp hum of the mind in flux. They tread the wilds between the sonnet and the ragged strophe, as if resisting form even though it is inescapable. And they hold close, with both arms, the destructions of racism, the world "as it is," and the potentials of love. These poems embody confrontation and discovery, doubt and acceptance. These themes manifest through reflections on war, memories of intimacy, philosophical and critical wonderings, imagined encounters with Baldwin, all tinged by the surreal. And there is a patchwork of influence that must be apparent, not only Baldwin's but artists including Glenn Ligon, Rashid Johnson, and Phillip Lindsay Mason; poets W.H. Auden, Robert Penn Warren, and James Tate; novelists Chinua Achebe and Toni Morrison; and contemporaries Phillip B. Williams, Dustin Pearson, Jericho Brown, Eduardo C. Corral, Natasha, Trethewey, Terrance Hayes, and Jake Adam York. These poems hold together genuine wanting and the more sinister implications of being marked fugitive, being "wanted."

The Fabric of Resistance: Drag, Black Queer Textile Culture, and the Erasure in Black Studies

Presenter's Name: Russell Ama Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Elka Stevens Faculty Advisor's email: Estevens@howard.edu

Co-authors:

Black queer history-and specifically the material culture of drag-must be central to Black Studies, not as an aesthetic footnote, but as a site of radical insurgency. Drag and ballroom culture in Black liberation movements, including Black queer textile practices, have been foundational to resistance, but remain marginalized in Black Studies. Drag has served as a revolutionary tool of self-determination, defiance, and survival, key elements in the black experience. However, within Black Studies, the erasure of drag as a radical political tool, a form of life, liberation, and self-expression does not appear to be recognized as foundational to Black resistance. I explore how drag culture, including physical fabrics and the strategies of dress, challenge gender norms, and embody Black queer resistance. Blackness, inherently queer, defies traditional understandings of identity, making drag's role in Black liberation vital. The exclusion of drag ignores a crucial force in Black freedom struggles and erases a vital element of Black liberation and recasts movements from the Harlem Renaissance through the AIDS crisis. Using content analysis, I analyze Howard University's curriculum and syllabi from 1969 to the present, alongside journals such as The Black Scholar and Journal of Black Studies, noting references to drag, ballroom, and Black queer textile culture, while assessing whether these references (re)frame drag as integral to Black liberation or marginalize it. Ultimately, outcomes of this study demand a reimagining of Black Studies-one that fully integrates drag and Black queer material culture as revolutionary forces, essential to our struggle for freedom.

EDUCATION & OUTREACH

Disrupting "Push Out" and Creating Equitable Learning Atmospheres: Culturally-Responsive Alternatives to Exclusionary Discipline Practices in K-12 Schools

Presenter's Name: Abangma Yaya Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Celeste Malone Faculty Advisor's email: celeste.malone@howard.edu

Co-authors:

Critical Race Theory (CRT) asserts that racism is deeply embedded within U.S. systems, laws, and policies. In schools, white norms and cultural values are used to shape what is considered "normal" behavior. Although Black and white students exhibit the same behaviors in the public school setting, Black students are punished more severely through suspensions, expulsions, and even arrests. Removal from the school environment has negative academic, social, and psychological outcomes for marginalized students. Students who are told not to attend school are more likely to fall behind academically, become less engaged with school in general, and possibly drop out. Their relationships with teachers and peers may be harmed and their mental health may suffer. Disproportionate discipline practices are also linked to increased involvement with the criminal justice system in what is often referred to as the school-to-prison pipeline. How can school teams "push in" rather than "push out" Black students in response to disciplinary infractions? This research seeks to highlight alternative practices to zero tolerance policies that criminalize and traumatize Black students. In schools, there is a tougher response to noncompliance for Black children, which breeds classroom environments that lack support and genuine care. Through the implementation of culturally responsive interventions and trauma-informed practices, school administrators, teachers, and clinicians may work together to create safe, equitable learning spaces that uplift and celebrate Black students while prioritizing their safety and well-being.

The Impact of HBCU Dental School Education in Shaping Dental Care Across the United States

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Co-authors: Andrea Jackson, Cheryl Fryer, Minxuan Lan, Marzia Mustamand

Introduction: Evidence highlights a critical shortage of dental health professionals and the need for a stronger workforce, particularly in medically underserved communities across the U.S. Established in 1881, Howard University College of Dentistry (HUCD) is committed to training minority dental professionals and reducing oral health disparities. This study evaluates the impact of HUCD's educational program on oral health care using data from 20 years of graduates. Methods: Data was collected on HUCD graduates (2004-2023) through the NPI Registry, Google, and LinkedIn. Information on dental health professional shortage areas and medically underserved populations (MUC/Ps) was obtained from HRSA. Additional demographic data came from the 2020 U.S. Census. Spatial analysis was conducted using ArcGIS Desktop (ArcMap) 10.8.1, a leading GIS tool for mapping geographic trends. Results: Over the past two decades, HUCD has maintained a student body with over 78% underrepresented minorities, demonstrating its commitment to workforce diversity. Between 2004 and 2023, HUCD graduated 1,431 students (45% male, 55% female). Notably, 75% of graduates practice in primary care, and 47% serve in MUC/Ps and shortage areas. Conclusion: HUCD plays a vital role in addressing dental workforce shortages and improving access to care in underserved areas. Its impact on reducing oral health disparities underscores the importance of continued support for similar programs to build a more equitable and accessible oral healthcare system.

A Systematic Review of the Literature on Educational Interventions in Juvenile Justice

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Co-authors: Nathan Alexander

This systematic review examines the role of educational interventions in juvenile justice settings, focusing on their impact on the overall well-being of justice-involved youth. Juveniles in detention often face significant educational deficits, compounded by deficit-based assumptions about their abilities and academic performance. Taking a critical approach to the research literature, this review explores educational programs with the potential to improve long-term education outcomes for justice-involved youth. The review utilizes computational methods and synthesizes findings from a corpus of data U.S.-based research studies and analyzes how different interventions influence educational attainment. We develop a framework for actionable insights for improving educational practices within and outside of juvenile justice systems.

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Fighting to be Black and Joyful: Resistance and Refusal

Presenter's Name: Anthony Tatiana Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Zoeann Finzi-Adams, Ph.D. Faculty Advisor's email: zoeann.finziadams@howard.edu

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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). Historically, Black joy has been conceptualized as an act of resistance (Lewis-Giggetts, 2022). According to Stewart (2021), practices of refusals should also be acknowledged. Practices of refusal combat the notion that White supremacy holds power over the lives of Black individuals (Dunn & Tubman, 2024). A model will be proposed on the acts of resistance and refusal when engaging in Black joy. The model will suggest that these two different psychological processes and acts can be to cope with anti-Black racism and oppression.

E-learning in healthcare settings: advantages and disadvantages

Presenter's Name: Ashu-tabe Susan Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Priscilla Okunji Faculty Advisor's email: priscilla.okunji@howard.edu

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Background: E-learning has emerged as a transformative approach to education in healthcare settings, offering accessibility, flexibility, and cost-efficiency in training healthcare professionals. Challenges such as limited social interaction, technological barriers, and inability to fully replace hands-on clinical training are also analyzed. This study explores the growing need for e-learning within the healthcare industry. Method: Using a systematic literature review methodology, this study synthesizes evidence from peer-reviewed studies published between 2020 and 2024, evaluating e-learning's impact on clinical competence and continuing professional development (CPD). Results: findings showed the importance of balancing e-learning with traditional methods to ensure comprehensive skill acquisition and effective patient care. Prioritization includes diverse samples, rigorous methodologies, and innovative technologies like augmented reality to improve hands-on learning. Longitudinal and multi-center studies are needed to assess long-term impacts and broad applicability. Implication: integrating e-learning into healthcare education includes enhancing collaboration tools and addressing technological limitations to maximize its benefits. Keywords: E-learning in healthcare, Healthcare education, Technology-enhanced learning, Digital healthcare education, and advantages and disadvantages of e-learning.

The History of Final Generation of Scarification | Reference Article ART & TRIBAL MAKEUP 7 Elements of Art Lecture and Lab

Presenter's Name: Bethea Frankie Classification: Junior Faculty/ Lecturer/ Instructor School/College: Fine Arts *Presentation Type: Oral Presentation* Faculty Advisor: Frankie Bethea Faculty Advisor's email: frankie.bethea@howard.edu

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Arts and Culture are foundational elements in shaping society, influencing not only our sense of identity but also our ability to connect with others across different backgrounds. Through various forms of artistic expression, whether visual arts, music, dance, or drama-individuals can explore and express creativity, fostering innovation and critical thinking. In addition, cultural education helps build an appreciation for the diverse traditions, histories, and worldviews that exist within local and global communities. By integrating Arts and Culture into education, students are not only provided with opportunities for personal expression but are also equipped to navigate a diverse and interconnected world. This curriculum seeks to develop a comprehensive Art & amp; Tribal Makeup course that merges creative expression with cultural appreciation. By embedding the arts into the curriculum, students will engage in a range of artistic activities designed to cultivate their skills and creativity, while simultaneously learning to respect and celebrate the diverse cultures that make up their community and the world. The program aims to promote inclusivity by helping students understand the richness of cultural diversity, thus preparing them to be more empathetic, culturally aware individuals. Through hands-on learning, cultural exchange, and exposure to different art forms, the program will contribute to shaping students who are not only creative thinkers but also global citizens. This course will delve into the history of African tribal marks and folklore, examining how they connect with the seven elements of art: line, form, shape, space, color, texture, and value.

What Is The Social Media Presence Of Minimally Invasive Gynecologic Surgery (MIGS) Fellowship Programs?

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Co-authors: Vania Nwokolo, Shannon Wentworth

Introduction: Social media is a valuable resource and influence on residency applicants' decisions. Many residency programs have a strong social media presence--however, there is little research on Gynecology fellowship programs. MIGS is a competitive fellowship, and social me-

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dia can be used to assist applicants in assessing programs and help guide their decisions. The study will identify the number of MIGS fellowship programs with social media accounts. Methods: The AAGL Fellowship in MIGS listing was searched and 62 programs were identified. An internet search found 2 additional MIGS programs. A Google search was utilized and included "program name+MIGS+X/Instagram/Facebook". Information on creation date, number of followers, and total number of posts were recorded. Data were collected from January to May 2024. Results: 64 MIGS programs were identified, and 14 (21.8%) had social media accounts. 8 (12.5%) had an Instagram, 5 (7.8%) had an X account, and 1(1.5%) had a Facebook. 2 (3.1%) programs had both Instagram and X. 50 (78.1%) had no formal social media. The creation dates for Instagram ranged from February 2021 to November 2023 with an average of 203 followers and 45 posts. The creation dates for X ranged from August 2017 to March 2024 with an average of 179 followers and 70 posts. Conclusions/Implications: This study showed that most MIGS programs have no social media. Of the MIGS programs with social media, Instagram was the most common. MIGS programs should consider creating and maintaining social media platforms. Further research regarding applicant engagement with programs' social media is warranted.

Online Learning and Learner's Challenges Across States

Presenter's Name: Gebremariam Kidest Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Priscilla Okunji Faculty Advisor's email: priscilla.okunji@howard.edu

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Background: Online Learning and Learner's Challenges Across States Abstract Background: online learning is a process in which learners use internet platforms, applications, and multimedia electronically to participate in the teaching-learning process. Other terms like computer-assisted learning, e-learning, internet-based learning, or web-based learning can be used. Online learning became very prominent after the COVID-19 pandemic. Little is known about online learning and its challenges. This study aims to analyze research on learners' different challenges in online learning across states. Method: the research design used is a systematic review of 20 articles extracted from renowned search engines. Key challenges related to online learning were isolation resulting in a lack of student-teacher interaction, poor time management, lack of motivation, destruction, technology, and technical issues. Results: besides it was found that women were significantly more likely to keep their cameras off during Zoom classes (83.9%) than men (71.5%). Close to 80% of respondents disagreed that they marked themselves as attending but did not participate in their remote coursework. Class type preferences differ significantly among different racial and ethnic groups. Black students prefer Zoom classes at a higher rate (31.4%) than online asynchronous ones (16%), and Hispanic students prefer asynchronous courses (32.2%) to Zoom classes at 14.1%. Implications: teachers and parents acknowledged the importance of having a stable internet connection and wellequipped facilities for effective online learning. Future research should be conducted in different educational institutions as future studies could benefit from including multiple institutions across several regions.

Exploring AI Chatbot Effectiveness in Enhancing Pharmacy Education

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Co-authors: Mallorie Holmes

Background: Artificial intelligence (AI) chatbots have emerged as potential tools to support pharmacy education by providing students with instant feedback and personalized learning. However, concerns regarding accuracy, reliability, and adaptability to complex pharmacy-related questions remain. This study evaluates the reliability of AI chatbots in answering pharmacy-related questions, assessing their accuracy across different question complexities and formats. Purpose: The study aims to determine the accuracy and consistency of AI chatbots in pharmacy education by analyzing their performance on a dataset of pharmacy-related questions. Additionally, it explores the potential for AI-driven consensus accuracy to enhance reliability and support next-generation pharmacy training programs. Methods: A total of 500 randomized pharmacy-related questions from established question banks were analyzed, with 389 included after applying exclusion criteria. Seven AI models were tested individually, with responses categorized by complexity (simple vs. complex) and question type. A consensus accuracy method was applied, combining multiple AI responses to improve reliability. Accuracy rates were compared using statistical analysis. Results: AI chatbots demonstrated varying accuracy, with higher performance on simple questions and reduced reliability on complex, case-based questions. However, applying a consensus method significantly improved accuracy, mitigating errors from individual models and enhancing overall reliability. Conclusion: As AI technology advances, chatbots may become integral to pharmacy education, offering scalable and adaptive learning tools. By refining AI models and integrating consensus-based accuracy improvements, pharmacy programs can leverage AI-driven education to enhance student training, reduce faculty burden, and attract future pharmacists into a technologically advanced profession.

High School ELA Teachers' Preparedness & Its Impact on Black Students' Writing Literacy

Presenter's Name: Harvey Nailah Classification: Graduate Student School/College: Education Presentation Type: Poster Presentation *Faculty Advisor: Kathryn Wiley* Faculty Advisor's email: kathryn.wiley@howard.edu

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A student's high school performance is a strong predictor of success in transfer-level college courses. However, data indicate that many high school students in the U.S. are unprepared for college, as reflected in low College Readiness and College Breadth Index scores, which are based on Advanced Placement (AP) or International Baccalaureate (IB) exam results and state assessments. Writing proficiency is a critical skill for

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academic success, yet disparities persist, particularly among Black high school students. This study examines high school English Language Arts (ELA) teachers' preparedness in teaching writing instruction and its impact on Black students' writing literacy. It explores the level of preparation required for teachers to effectively instruct Black students and how their preparedness influences student outcomes. Through qualitative analysis of teacher experiences, instructional practices, and student performance, my research aims to highlight the relationship between teacher preparedness and student writing success. Findings from this study will provide insights into best practices for writing instruction while identifying gaps in teacher training and support. By understanding the role of teacher preparedness, I seek to develop a framework that enhances high school ELA teachers' ability to teach writing effectively to Black students. My research advocates for culturally responsive instructional approaches to improve literacy outcomes and promote equity in education.

Development of a Novel Health Literacy Tool for A Free Student-Run Orthopaedic Clinic for Underserved Patients

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Co-authors: nadia hackett, damon ross, Lucia guo, rolanda willacy

Introduction: Health literacy is crucial for patient care in underserved populations, influencing their ability to navigate the healthcare system and make informed decisions. Effective communication from practitioners enhances outcomes and reduces health disparities. We are aiming to improve health literacy for equitable access to care. Methods: In this study, health literacy is defined as the ability to find, understand, and use health-related information and services. Medically underserved populations often face limited access to primary care. A scoping review of the NIH's PubMed database was conducted for literature published since January 2015, using search terms such as "health literacy" and "underserved populations," yielding 695 results. Results: Our literature search identified several health literacy tools, including REALM (Rapid Estimate of Adult Literacy in Medicine), Test of Functional Health Literacy in Adults (TOFHLA), and NVS (Newest Vital Sign), which assess patient health literacy. Additionally, the Literacy in Musculoskeletal Problems (LiMP) tool evaluates literacy in musculoskeletal conditions. We plan to adapt these tools to assess patient literacy and create patient-centered care. Our approach involves a questionnaire with musculoskeletal terms relevant to patients' conditions to assess their current level of literacy. Conclusion: Health literacy is essential for effective care in underserved populations, influencing patients' understanding of diagnoses, treatment options, and post-operative care. In orthopaedic surgery, complex terminology can hinder comprehension, leading to poor treatment adherence. Bridging the gap between medical jargon and patient understanding is vital for enhancing engagement and empowering individuals in recovery.

The Role of Artificial Intelligence in Higher Education

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Background: Artificial intelligence (AI) has gained increased interest, as well as its incorporation into the lives of humans worldwide. However, the rapidly growing development of AI has recently been a recurring topic of discussion. The inclusion of AI has also been discovered to be advantageous for a plethora of other reasons, such as being an effective learning tool, filling in the gaps of the shortage of educators, improving classroom management, and the opportunity to transform the traditional concepts of both teaching and learning. Nonetheless, it is imperative to note that establishing AI in higher education may still be challenging as many people are still becoming familiar with what artificial intelligence truly is. This article examined how AI has influenced learning and institutional dynamics in higher education. Method: Data from 20 scholarly journal articles were extracted and synthesized to gather an understanding of the topic. Through a systematic review, this article addresses both the advantages and challenges of AI in higher education. Results: The results showed that although AI is still a tool that the higher education system is unacquainted with, it has created a lasting impact on our society, making its presence permanent. A need for policy guidelines and professional training on incorporating its usage was addressed as an implication.

A Systematic Review of Factors Influencing Black Male Educator Retention

Presenter's Name: Jackson Jahmere Classification: Undergraduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Nathan Alexander Faculty Advisor's email: nathan.alexander@howard.edu

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We conduct a systematic review of the research literature on the retention of Black male educators in the United States. Our analysis uses computational methods to focus on the unique challenges Black male educators face and how a series of interconnected factors contribute to low retention rates in U.S. schools. Findings indicate that Black male educators often take on additional responsibilities beyond their standard teaching duties, such as being perceived primarily as disciplinarians and being expected to connect with "troubled" students due to a racialization process that reinforces deficit-based assumptions. Additional factors such as low wages, lack of representation, and feelings of being undervalued, significantly impact retention. This study seeks to establish a framework for understanding the state of the research literature on Black male educators and to identify strategies for improving retention, including mentorship, professional development opportunities, and supportive work environments.

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Oral COVID-19 Therapy Utilization in an Outpatient Urban Facility

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Co-authors:

Purpose: This study investigates the utilization of oral COVID-19 therapies, specifically nirmatrelvir/ritonavir and molnupiravir in the outpatient setting among an urban population in Washington, D.C. Despite documented availability and efficacy in reducing severe outcomes from COVID-19, these therapies are often underutilized. Factors contributing to their underutilization includes a lack of public awareness, concerns about side effects, patient demographics, co-morbidities and physician hesitancy. The study aims to analyze trends in the prescribing and treatment rates of these medications from January 2022 to January 2023. Methods: A retrospective analysis of electronic medical records evaluating the utilization of nirmatrelvir/ritonavir and molnupiravir within the outpatient setting. The main objective was to assess the rates of antiviral utilization, while secondary objectives examined the influence of demographics, comorbidities, and socioeconomic status on prescription patterns. The primary outcome variable was receiving a prescription for nirmatrelvir/ritonavir and molnupiravir in the outpatient setting. Data were collected from Howard University Hospital's Faculty Practice Plan among patients diagnosed with COVID-19 or confirmed SARS-CoV-2 test results. Patients were identified using ICD-10 codes between January 2022 and January 2023. Inclusion criteria included adults over 18 years with outpatient encounters and excluded patients with inconclusive PCR results.

American K-12 Parasitic Syndrome: Examining the Systemic Exploitation of Black Women Educators Through a Structural-Historical Epistemology

Presenter's Name: Joseph Jamela Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Kathryn Wiley Faculty Advisor's email: kathryn.wiley@howard.edu

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This study examines the historical and ongoing exploitation of Black women educators within the American K-12 education system through the theoretical framework of American K-12 Parasitic Syndrome (APS). APS conceptualizes the system as one that thrives on the intellectual, emotional, and often unpaid labor of Black women teachers while systematically depleting their resources and professional agency. Grounded in Critical Race Theory (CRT) and Black Feminist Thought (BFT), this study operates within a structural-historical epistemology, recognizing that education policies are neither neutral nor objective but are designed to uphold systemic power imbalances. The research explores how policies have historically facilitated labor extraction from Black women educators, how these patterns persist today, and how Black women teachers navigate these exploitative structures. Through a qualitative historical analysis, this study reviews systemic racism in education, emotional and invisible labor, and labor extraction in educational policy. It asserts that both historical records and lived experiences serve as critical sources of knowledge, challenging dominant narratives in educational research. Findings aim to expose and disrupt the systemic exploitation of Black women educators by critically analyzing the policies and practices that sustain inequities. This research not only identifies oppression but also seeks to challenge and transform the structures that uphold it, contributing to broader discussions on racial and gendered labor justice in education.

Exploring the Impact of School Mobility on Academic Achievement: A Focus on Foster Children and Educational Equity"

Presenter's Name: Laraque Scheleck Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Kyndra Middleton Faculty Advisor's email: kyndra.middleton@howard.edu

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Frequent school changes, known as school mobility, can significantly disrupt a student's academics, particularly in foundational subjects such as mathematics and reading. Students, including those in foster care, who experience high school mobility often struggle with maintaining consistent learning, leading to lower standardized test scores, increased risk of grade retention, and long-term setbacks in educational attainment. These educational disruptions are not experienced equally, as students from marginalized backgrounds, particularly Black, Hispanic, low-income, and foster children, are more likely to experience school instability, further highlighting existing educational inequities. This study examines the relationship between school mobility and academic performance among elementary and middle school students, with a specific focus on foster children. Using ANOVA, the research assesses variations across demographic groups and determines whether the frequency of school changes has a statistically significant impact on test scores and overall academic achievement. Preliminary results suggest that foster children experience significantly lower math and reading scores compared to their peers who experience fewer school changes, with notable differences also observed across other demographic groups, including low-income and multilingual learners. The findings from this study aim to contribute to the broader discussion on educational equity by highlighting the extent to which school mobility disrupts academic progress, particularly for foster children. Understanding these patterns can inform school policies, resource allocation, and intervention strategies to better support foster children and other highly mobile students. By addressing these challenges, educators and policymakers can work toward creating a more equitable learning environment for all students affected by school mobility.

Breaking Stereotypes: How Gender and Racial Bias Shape Caregiving and Childrearing Expectation

Presenter's Name: Lewis Zipporah Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Celeste Malone Faculty Advisor's email: celeste.malone@howard.edu

Co-authors:

Societal expectations of caregivers are influenced by gender and racial norms that influence who is assigned to caregiver roles and how others engage with caregivers. Childrearing and parenting are specific caregiver roles that are typically assigned to women. I found that men often conform to the gender stereotype of being providers, while women are seen as caretakers. This stereotype has historical roots, often illustrated by examples of men as hunters and builders who provided food and shelter, while women were to care for children and manage household tasks. For example, the female parent is assumed to be most knowledgeable about the child in schools and health settings. Rarely are questions directed to the male parent. This can lead to male parents being excluded from discussions related to their children's education or health. When examining the intersection of gender and race, Black women encounter both societal and cultural expectations to bear the brunt of childrearing labor, while Black men are assumed to be either absent or disinterested. These gendered and racialized assumptions of childrearing shape how educational and health professionals respond to Black male caregivers and limit Black men's access to resources that could support their ability to be more involved in childrearing (e.g. support groups, parenting workshops, financial resources). This literature review will describe how intersectional race and gender bias influences childrearing expectations and dynamics, highlight how these biases limit Black men's ability to be more active caregivers, and provide recommendations for equitable policies and systems.

Exploring the Idolization of the Hourglass Figure in Black Women

Presenter's Name: Martin Lorraine Classification: Undergraduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Chimene Castor Faculty Advisor's email: chimene.castor@howard.edu

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The hourglass silhouette remains a prominent ideal within African American beauty standards, profoundly influencing cultural aesthetics and body modification approaches. This systematic review explores the evolution of the hourglass silhouette in African American beauty standards, from corsetry to modern waist training. It highlights this ideal's physiological and psychological impacts and examines the media, social factors, and dietary influences that sustain it despite biological constraints. This comprehensive review will synthesize research from diverse databases, examining studies on body perception, weight management strategies, and outcomes of waist training and surgical interventions among African American women. The investigation will also assess potential litigation against waist trainer companies regarding advertising claims. The synthesis of existing literature is expected to demonstrate connections between hourglass figure pursuit and increased body dissatisfaction, potentially harmful dietary behaviors, and various health complications. Evidence suggests waist trainers primarily function as temporary cosmetic solutions rather than effective fat reduction tools. This review aims to highlight the importance of culturally informed approaches to body image discussions, greater accountability in media representations, and targeted public health strategies that celebrate body diversity and promote sustainable nutritional practices within African American communities. The findings will provide valuable insights for healthcare providers, policymakers, and consumers regarding body modification practices and their implications.

Prepare, Repair, Defend: A Toolkit for Reparations 2.0

Presenter's Name: Mcdougall Harold Classification: Senior Faculty School/College: Law *Presentation Type: Oral Presentation* Faculty Advisor: Harold McDougall Faculty Advisor's email: hmcdougall@law.howard.edu

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To address systemic inequities in education, economic mobility, health, urban planning and criminal justice. I have developed a curriculum for high school students and community members to teach them how to immediately protect their legal rights in the face of racially charged challenges in those areas. The curriculum aims to empower participants by (1)preparing them to respond to discrimination faced in inequitably designed and managed urban spaces like stores, schools, workplaces and housing as well as to gain power through voting and citizen action. (2) educating them about race-based trauma that has damaged community resources-e.g. redlining, gerrymandering, urban renewal, exposure to toxic waste, food deserts, and racial violence-and empowering them to repair the damage as it relates to physical health, mental health and civic, cultural, financial and environmental ecosystems and, (3) helping them organize to defend the resources repaired, strengthened and expanded under (1) and (2). The curriculum is designed for execution by schoolteachers and community organizers. Their programs would use dialog and information-sharing to identify and address systemic inequities in Black communities, exposing the truth about racially charged challenges and harms. It also creates spaces in which community-based knowledge can be synthesized with professional research, broadening the base of participation and diversifying the storehouse of social justice strategies and tactics available to build and expand equity. (See, Harold A. Mc-Dougall, Reconstructing African American Cultural DNA: An Action Research Agenda for Howard University, 55 HOW. L.J. 63, 64 (2011)

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Preparation and Application of Carboranyl Ionic Liquids for Rare Earth Element and REY Recovery from Coal Fly Ash

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Co-authors:

Modern technologies heavily depend on rare earth elements (REEs) and yttrium (REYs) for applications ranging from electronics to renewable energy systems. Despite their name, these elements are not truly rare; rather, their extraction and purification are complex and costly due to their typically low concentrations and co-occurrence with other minerals. Coal fly ash (CFA), a byproduct of coal combustion, is enriched with REEs, with concentrations reaching up to 500 ppm. With global annual production of 750 million tons, CFA presents a potentially valuable secondary source of REYs, estimated at 75,000 to 375,000 tons. However, conventional extraction methods face challenges due to environmental concerns, inefficiency, lack of specificity, and high costs. Our lab is investigating the use of carborane-based ionic liquids (CILs) as a novel approach for REY recovery from CFA. Carborane anions, known for their exceptional stability and weak coordination, are combined with imidazolium, pyridinium, and ammonium cations to form highly tunable ionic liquids. It is proposed that CILs offer a greener alternative to traditional methods, providing high REE selectivity, lower environmental impact, and improved recovery and reusability. We have determined the crystal structures of REY-carborane complexes using single-crystal X-ray diffraction (sc-XRD), nuclear magnetic resonance (NMR), and Fourier-transform infrared spectroscopy (FT-IR). Notable spectroscopic interactions were observed when the carborane ionic liquid was coordinated with REEs such as neodymium (Nd, purple) and holmium (Ho, pink) under fluorescent conditions. Additionally, some carborane-based ionic liquids exhibited thermomorphic behavior, presenting a promising approach for the energy-efficient and sustainable extraction of REYs from CFA.

How Does Culturally Responsive Practices Impact Pre-Literacy Outcomes in Young Black Children

Presenter's Name: Mitchell Lashondra Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Andrea Toliver-Smith Faculty Advisor's email: andrea.toliversmith@howard.edu

Co-authors:

Rationale: Early literacy practices help build the foundation for learning and are essential for young children from birth to kindergarten. According to The American Speech-Language-Hearing Association (ASHA), Speech-Language Pathologists (SLPs) have a key role in promoting children's emergent literacy skills as part of early speech/language development, as spoken/oral language and literacy are connected. It is important to examine culturally responsive practices and how they impact pre-literacy outcomes in young Black children. Problem: As early interventionists, SLPs provide intervention and coach caregivers regarding strengthening early literacy skills. There is a United States (U.S.) crisis of students not having the ability to read. Black students who are unable to read are at risk of being incarcerated later in life. There is a disproportionate number of SLPs to Black children needing/receiving speech/ language services to improve communication skills and develop emergent literacy skills. With 92% of SLPs in the U.S. being White women, the activities and practices used to implement cultural responsiveness and equity of access to services needs examination. Methodology and Results: Review of literature revealed discussion of literacy interventions for children from culturally and linguistically diverse (CLD) backgrounds. In general, guidelines for Evidence-Based Practice (EBP) for SLPs rarely address issues of CLD. There is an imbalance of SLP providers with similar cultural backgrounds as the population of children served. Implications: Culturally responsive practices are critical for fostering inclusive and supportive environments to improve literacy skills for CLD backgrounds. More examination is needed regarding culturally responsive practices and the impact on pre-literacy skills in young Black children.

Exploring the Role of Mental Health Services in Promoting the Well-Being of Black Adolescent Boys in Schools

Presenter's Name: Warren Makinzie Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Celeste Malone Faculty Advisor's email: celeste.malone@howard.edu

Co-authors:

When people hear the term "mental health," they often think of illness rather than overall well-being. Mental health plays a crucial role in student's academic, social, and emotional well-being. School plays a vital role in shaping students' development not only for learning but also in an environment where students spend the majority of their time growing into young adults and discovering their identities. This is why schools need to have the necessary tools and resources to help students navigate the complexities of life, education, and family dynamics. Suicide is the second leading cause of death among U.S. adolescents and young adults, after COVID, the suicide rates increased. Views on mental health treatment can stem from the negative stigma, barriers to accessing treatment, and cultural backgrounds that can significantly impact the ability to ask for help when needed or feel uncomfortable sharing their trauma with someone they do not know. Mental health in schools is multifaceted across individual, familial, and systemic levels. Cultural narratives and historical injustices have contributed to a pervasive mistrust of mental health services, further exacerbating the reluctance to seek care. Additionally, structural barriers, including limited access to care, fragmented services, and ongoing poverty, continue to perpetuate disparities in mental health treatment, underscoring the need for targeted, trauma-informed, and culturally competent interventions. By investing in comprehensive mental health support, schools can create an environment where all students thrive emotionally, socially, and academically.

ABSTRACTS

Empowering Educators: Unveiling the Potential of the ECHO Autism Model in Enhancing Autism Related Knowledge and Competency

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Background: The increasing prevalence of autism prompts educators and childcare providers to adopt approaches that accommodate diverse learning styles and sensory sensitivities. However, many educators report feeling less confident in their ability to teach autistic children, attributing it to inadequate training, preparation, and understanding of the disability. Misconceptions among early childhood educators and school staff may include assumptions about limited social abilities, rigid behavior patterns, or challenges in communication, which can impact the effectiveness of teaching supports. Enhanced autism-specific learning opportunities for educators are essential for establishing more inclusive learning opportunities and fostering an environment that promotes understanding and tailored support for neurodiverse students. The present study seeks to assess the viability of employing the ECHO Autism model as a tool for enhancing knowledge and self-reported competency in autism among educators and early care providers. Methods/Design: Consistent with the ECHO Autism model, educators and a multidisciplinary team of autism specialists participated in 90-minute virtual clinics involving case presentations and autism-specific didactics. Clinics met bimonthly over the course of 6-months. Participants received no-cost professional development units, and incentive pay was provided for participation in quality improvement (QI) focused research via Redcap surveys. Results/Discussion: Data analysis provided demographic information about ECHO Autism Educator participants, as well as potential benefits related to autism knowledge and self-reported efficacy in autism care as a result of participation in ECHO Autism clinics. The study offers an innovative learning opportunity geared towards enhancing the understanding of autism among educators and early care providers.

The Impact of Librarian Research in Higher Education

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Librarians do more than connect people with books—they are active researchers whose work strengthens teaching, learning, and scholarship across disciplines. This presentation will highlight the types of research librarians conduct, from improving student research skills to advancing open access and equity in publishing. We'll explore how this research benefits faculty, staff, and students by shaping institutional policies, enhancing information access, and supporting innovative teaching. Attendees will discover how librarian-led research contributes to academic success and how you can collaborate with librarians to enhance your own work.

A B S T R A C T S

ENVIRONMENTAL SCIENCES & STUDIES

Evaluation of Aerosol Models with Topological Data Analysis

Presenter's Name: Barnes Jonathan Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Joseph Wilkins Faculty Advisor's email: joseph.wilkins@howard.edu

Co-authors:

Wildfires, intensified by climate change and human activities, release aerosols that degrade air quality and amplify radiative forcing, necessitating advanced tools for predictive modeling and mitigation. This project evaluates the effectiveness of Topological Data Analysis (TDA) in analyzing historical and contemporary Aerosol Optical Depth (AOD) data, comparing its performance to traditional model evaluation metrics (e.g., RMSE, MAE). By leveraging multi-decadal satellite observations from NASA's MISR instrument and climate model outputs (AerChemMIP's PiClim-Control and PiClim-2xFire), this research identifies TDA's capacity to capture complex aerosol patterns—such as smoke plume clusters and voids—through persistent homology and Wasserstein distance metrics. These topological features, often overlooked by pixel-based statistical methods, reveal biases in aerosol transport simulations and improve the characterization of fire-induced aerosols, particularly black carbon (BC) and organic carbon (OC).

Disproportionate Air Pollution Exposure in Birmingham, Alabama

Presenter's Name: Humes Cameron Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ronil Hira Faculty Advisor's email: ronil.hira@bison.howard.edu

Co-authors:

Birmingham, Alabama is known for the Civil Rights Movement, fighting injustice, and building resilient communities. It is the third worst city in the Southeast for ozone pollution, and the city's housing conditions are linked to worsening health effects such as eczema and asthma, exasperating the consequences of air pollution. This study aims to articulate the patterns of discriminatory laws and corporate actions that have led to disproportionate air pollution exposure between Black and White communities in Birmingham, Alabama. Environmental injustices such as these have led to generations of Black families being more susceptible to respiratory illnesses, cancer, and cardiovascular diseases. Aside from health issues, this inequity has led to severe infrastructural damage, unsafe housing, and a lack of socioeconomic opportunities. Communities like the predominantly Black neighborhoods in Birmingham have been dealing with various unfair consequences for decades, if not centuries, due to the blight of environmental racism. Due to the lack of awareness and care for solving environmental injustices seen in Birmingham, Alabama, countless Black and other minority and low-income communities and neighborhoods deal with this issue around the nation and world.

Investigating Atmospheric Effects on Lithium-Ion Battery Thermal Management in Electrified Transportation Systems

Presenter's Name: Jones Ayanna Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors:

As electrified transportation systems expand, optimizing battery thermal management under varying atmospheric conditions is essential for performance and safety. This study models the impact of altitude, temperature, pressure, and humidity on the thermal performance of lithium-ion battery thermal management systems (BTMS) using phase change materials (PCM). Leveraging BTMS simulation frameworks, we integrate hypsometric equations, Clausius-Clapeyron relationships, and atmospheric thermodynamics to analyze how environmental variations influence heat dissipation, PCM phase transitions, and overall cooling efficiency. The simulation examines thermal management efficiency at varying altitudes and humidity levels, assessing how reduced atmospheric pressure affects cooling rates and whether humidity-induced shifts in PCM latent heat absorption alter thermal performance. By comparing heat generation and dissipation rates under these conditions, the aim is to quantify potential inefficiencies and identify optimal PCM properties for real-world application in electric vehicles. This research provides a simulation-driven approach to optimizing BTMS designs, ensuring efficient thermal regulation across diverse environmental conditions. The results will inform future experimental work and help improve battery reliability and safety in varying climates.

Unplugged: Policy, Poverty and Energy in Ghana

Presenter's Name: Mitchell Kadisha Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Lemir Teron Faculty Advisor's email: Lemir.Teron@howard.edu

Co-authors:

With three-fourths of global greenhouse gas emissions stemming from non-renewable energy, transitioning to renewable sources is widely regarded as essential for mitigating climate change. However, given energy's critical role in economic development and well-being, it is equally important that renewable energy systems are reliable and resilient to worsening climate impacts. This study examines how access to sustain-

able energy influences climate resilience and socio-economic well-being in Ghana, where energy access remains uneven, and many communities continue to depend on fossil fuels and traditional biomass. Employing a mixed methods approach, the research integrates national survey data with qualitative insights from interviews to assess energy consumption patterns, adaptive strategies during extreme weather events, and the broader socio-economic implications of energy access. It also evaluates how Ghana's energy policies address these challenges, particularly in balancing renewable energy adoption with economic and infrastructural constraints. Preliminary findings suggest that while Ghana has made progress in promoting renewable energy and rural electrification, gaps in affordability, infrastructure, and policy implementation remain significant barriers.

Green Hydrogen in the Built Environment

Presenter's Name: Ohashi dixon Kai Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Nea Maloo Faculty Advisor's email: nea.maloo@howard.edu

Co-authors:

Hydrogen is the most abundant element in the universe, and also the simplest. Researching ways to redefine clean energy by using hydrogen offers many possibilities, with green hydrogen being the most sustainable option. Green hydrogen, produced through electrolysis using renewable energy sources, presents a promising solution for reducing carbon emissions in the built environment. As architecture moves toward net-zero and sustainable energy solutions, green hydrogen offers an alternative to fossil fuels by providing clean, storable, and transportable energy. Its integration into architecture can be achieved through hydrogen fuel cells for on-site power generation, district heating systems, and backup energy storage, enhancing energy efficiency heavily. Challenges such as production costs, storage, and distribution infrastructure must be addressed to allow for widespread adoption. However, with advancements in hydrogen technology and supportive policies, green hydrogen has the potential to revolutionize architectural sustainability, leading the way for a healthier built environment.

Enhancing Aerosol Classification through Semi-Supervised Learning: A Novel Approach Using Single-Particle Mass Spectrometry Data

Presenter's Name: Perez chavez Jose Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Christopher Boxe Faculty Advisor's email: christopher.boxe@howard.edu

Co-authors: Maria Zawadowicz, Christopher Boxe, Joseph Wilkins

Understanding atmospheric aerosol composition is crucial for climate modeling and air quality assessment, yet their classification remains challenging due to complex chemical signatures and limited labeled data. This study presents a novel semi-supervised learning approach to enhance aerosol classification using Single-Particle Mass Spectrometry (SPMS) data. We developed and compared four machine learning models: a supervised Support Vector Machine (SVM), a self-training SVM, a stacked autoencoder classifier, and an innovative mean teacher framework. The models were evaluated using a comprehensive dataset of 18,827 labeled and 14,478 unlabeled mass spectra representing 20 distinct aerosol types. The stacked autoencoder models demonstrated superior performance, achieving overall accuracies exceeding 91%, with particularly strong results in classifying aerosols with limited representation in the dataset. Notably, the models effectively distinguished between different feldspar species and accurately classified challenging samples like soot and biological aerosols. This research advances our ability to automatically classify atmospheric aerosols, contributing to improved understanding of aerosol-climate interactions and more accurate climate modeling. The study demonstrates the potential of machine learning approaches in atmospheric science while highlighting areas for future development in handling complex spectral data.

Advancing Solar Adoption and Sustainability at HBCUs: Barriers, Opportunities, and Pathways Forward

Presenter's Name: Quarkume Amy Classification: Senior Faculty School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Amy Quarkume Faculty Advisor's email: amy.yeboah@howard.edu

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Historically Black Colleges and Universities (HBCUs) are at the forefront of renewable energy transitions, yet many still rely on fossil fuels due to persistent barriers in solar adoption and broader sustainability initiatives. This study examines the key obstacles preventing HBCUs from fully integrating solar energy, as identified through survey responses from campus stakeholders. The findings highlight cost and funding limitations as the most significant challenge, followed by institutional support gaps, grid infrastructure constraints, policy and regulatory hurdles, and technical or structural barriers. Despite the availability of grants and funding opportunities, execution delays, competing institutional priorities, and knowledge gaps further hinder progress. Additionally, some respondents cite community resistance and cultural or behavioral hesitations as factors influencing the slow adoption of clean energy solutions. This research aims to provide a data-driven roadmap for accelerating solar energy adoption at HBCUs by exploring best practices, innovative financing models, and strategic partnerships that can overcome these challenges.

Climate Change and its Impacts on Women's Health

Presenter's Name: Simms Christina Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Maurice Fluitt Faculty Advisor's email: maurice.fluitt@Howard.edu
ABSTRACTS

Co-authors: Naomi Jeffries, Joshua Green, Lakelle Bridges, Amara Mendes

Women's physical and mental health are disproportionally affected in a negative way by climate change and its effects. Climate change worsens existing disparities while heightening risks of mental health issues and complications during pregnancy, which underscores the urgency of addressing these inequities. Familial ties are broken during relocation after climate-related disasters like tsunamis, which leave women vulnerable to domestic violence, sexual abuse, and depression. Due to the patriarchal society in countries like India, women tend to be the last to receive information about any incoming climate threats and have very little time to prepare themselves. In certain climate related disasters, like drought, women tend to give their food to children, which leaves them with a lack of nutrients. This can be especially harmful in lactating mothers with newborn babies, as they will not be able to receive proper nutrients from their mother's milk. The current lack of comprehensive research on these specific impacts leaves a critical gap in understanding and response strategies. To ensure equitable climate resilience, it is essential to prioritize research that highlights the needs of these communities, ultimately fostering more inclusive and effective support systems in the face of the changing climate.

An Observational and Hysplit Modeling Study on the Impacts of Summer 2023 Canadian Wildfire Smoke on Air Quality Across the United States

Presenter's Name: Smith Lauryn Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Osinachi Ajoku Faculty Advisor's email: osinachi.ajoku@howard.edu

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The 2023 Canadian wildfires were among the most extensive and intense on record, highlighting a global trend of escalating wildfire severity due to climate change. In early June, smoke from Quebec's wildfires caused an unprecedented air quality crisis in the northeastern United States. This event yielded a daily maximum air quality index (AQI) of 157 and 181 on June 7th and 8th in Washington, DC. PM2.5 levels reached a height of 222 ug/m3, making it unhealthy for anyone to be outdoors. The smoke disrupted daily activities and led to the cancellation of major events, such as a New York Yankees game. This study employs predictive modeling approaches to investigate the transport and dispersion of wildfire smoke and air quality impacts, as well as assess public health implications. To analyze smoke movement, the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model was used to simulate wildfire smoke transport to and from the receptor located at Howard University's Beltsville campus. As environmental conditions continue to evolve, improved mitigation strategies, enhanced predictive modeling, and adaptive management approaches will be critical in addressing the growing wildfire crisis.

Exploring the Role of Natural Ecosystems in Mitigating Tropical Cyclone Impacts

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Tropical cyclones are large, rotating low-pressure systems that form over warm ocean waters (≥80°F), drawing energy from heat and moisture. As warm air rises, it cools and condenses, releasing heat that fuels the system. Atmospheric instability creates low-pressure zones, drawing in surrounding air and strengthening the storm. These powerful systems cause widespread devastation, particularly in low-income regions, where economic recovery is challenging. With climate change increasing the frequency and intensity of extreme weather, climate adaptation strategies are essential. Nature-based solutions offer cost-effective disaster mitigation. Forests reduce landslide and wind risks, wetlands regulate flooding, and coastal vegetation like mangroves buffer storm surges. This study examines the protective role of forest vegetation in the Caribbean, a region highly vulnerable to tropical cyclones. Using data from the Emergency Events Database (EM-DAT) (2000-2020), we analyzed climate-related disaster impacts. Global Land Analysis & Discovery data (Impact Observatory and Esri) was used to quantify forest cover on Caribbean islands. We then compared forest coverage to the number of people affected by tropical cyclones. We hypothesize a negative correlation between vegetation density and storm impacts, where areas with more forest cover experience fewer adverse effects. If supported, these findings reinforce the need for integrating nature-based solutions into climate resilience strategies. Preserving natural ecosystems is not only crucial for biodiversity but also for safeguarding human communities against worsening climate threats.

Climate Change's Impact On The Marginalized Mind

Presenter's Name: Thomas Mila Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Maurice Fluitt Faculty Advisor's email: maurice.fluitt@howard.edu

Co-authors: Joseph Clayton, Oluwagbemisoke Soneye, Kaylah Benton

Climate change, defined by the United Nations as a long-term shift in temperature and weather patterns, has profound implications for both environmental stability and human well-being. One of the most critical yet overlooked consequences of climate change is its impact on mental health, particularly among underserved communities. These communities—composed of low-income individuals, racial minorities, Indigenous populations, children, and older adults—experience heightened vulnerability due to systemic inequities, socioeconomic disparities, and environmental injustices. The mental health consequences of climate change manifest both directly and indirectly. Direct effects include but

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are not limited to: acute psychological distress, such as anxiety, depression, PTSD, and suicide, following extreme weather events like hurricanes, wildfires, and floods. Indirectly, climate change contributes to chronic stressors such as displacement, environmental destruction, and climate anxiety, a growing phenomenon in which individuals experience deep psychological distress over environmental uncertainty. Notably, conditions like solastalgia-a sense of loss and grief over environmental changes-are particularly pronounced in communities facing displacement and habitat destruction. Empirical studies on climate change's psychological effects highlight the necessity of targeted interventions, emphasizing the Vulnerable Populations Conceptual Model, which assesses risks before, during, and after climate events. Policy recommendations call for interdisciplinary research, standardized data collection, and equity-centric climate action frameworks. Strengthening community-based mental health support, incorporating culturally relevant practices, and investing in climate resilience can mitigate the psychological toll on atrisk populations. Addressing these interrelated crises is imperative for ensuring both environmental justice and global mental health equity.

Investigating the Gasdermin- B Gene to Address Early-Onset Asthma in Adolescent African Americans

Presenter's Name: Tongue Morgan Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Darnell Davis Faculty Advisor's email: darnell.davis@bison.howard.edu

Co-authors:

The 17q12-21 asthma locus, a widely recognized biomarker for early-onset asthma and susceptibility to respiratory viruses, provides critical insights into airway responses to environmental pathogens. However, its scope is limited in accounting for the cumulative effects of multiple genetic variants and environmental exposures, particularly in African Americans, who experience a higher prevalence and severity of asthma compared to European populations. Despite this disparity, asthma research predominantly centers on Europeans, leaving an urgent need to explore susceptibility factors in African Americans. Recent findings have highlighted the gasdermin-B gene and its associated single nucleotide polymorphisms (SNPs) as key contributors to asthma risk in African Americans. This study aims to investigate the role of the gasdermin-B gene through gene-environment interaction (GxE) analyses to identify precise biomarkers for early-onset asthma in African American children. By elucidating the molecular and cellular mechanisms of gasdermin-B, this research will inform the development of targeted strategies to reduce its expression. These findings promise to advance practical interventions and preventative measures, ultimately reducing asthma prevalence in this high-risk population. This work aligns with precision medicine and public health goals by addressing critical gaps in asthma research and providing actionable insights to mitigate health disparities.

Exploring the Socioeconomic Impact of Water Pollution: Unemployment Trends in Flint, Michigan Post-Water Crisis

Presenter's Name: Yuan Adeline(haining) Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Swinton Omari Faculty Advisor's email: oswinton@howard.edu

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This study explores the relationship between water pollution and unemployment in Flint, Michigan, following the 2014 water crisis. When the city switched its water source from Lake Huron to the Flint River, aging infrastructure led to widespread lead contamination in the water supply. Although the water supply was restored in 2016 and legislative efforts such as the Families of Flint Act (H.R.4479) were enacted, the community continues to face lasting economic challenges. Using post-crisis unemployment data, this research examines the economic impact of the crisis, focusing on marginalized communities. These groups, already vulnerable, experienced significant unemployment spikes due to business closures, health-related workforce declines, and the stigma surrounding Flint. The study underscores the need for recovery strategies rooted in environmental justice, ensuring that economic revitalization efforts are inclusive and equitable. Furthermore, while targeted efforts to rebuild infrastructure and enhance public health are expected to create jobs in new sectors over time, the success of these efforts depends on their ability to address the specific needs of historically disadvantaged communities. The study also delves into the long-term economic recovery of the region, emphasizing the importance of economic diversification and community resilience.

ETHICS, LAW & RELIGION

Spirituality, Religiosity and their Relative Impacts on Quality of Life

Presenter's Name: Roy Abhijit Classification: Senior Faculty School/College: Business *Presentation Type: Oral Presentation* Faculty Advisor: Abhijit Roy Faculty Advisor's email: abhijit.roy@howard.edu

Co-authors:

In the past two decades, there has been significant research in the domain of the spirituality and religiosity of individuals in the workplace and elsewhere. With rapid, dynamic changes in the global environment, there has also been rising interest in understanding our values and their respective consequences, and an increased need by many to seek spiritual and religious solutions. Furthermore, there is also a profound change in social consciousness taking place globally as exemplified by a spiritual and religious renaissance in culturally diverse regions, as well as a growing sense of corporate social responsibility as it relates to how these constructs impact materialism, community connectedness, and consumer well-being, in general. Results from a study using Structural Equations Modeling (SEM) in the United States with a primarily Catholic population show that there are indeed two discernible forms of religiosity (i.e., intrinsic and extrinsic), and both constructs were shown to be independent from spirituality. After demonstrating discriminant validity between these three exogenous constructs, intrinsic religiosity was shown to negatively influence materialism, while extrinsic religiosity was shown to positively influence materialism and community connectedness. Spirituality negatively influenced materialism and positively influenced life satisfaction. Finally, materialism negatively influenced community connectedness but not life satisfaction while the latter two constructs were shown to be strongly positively correlated. Implications for understanding human values, the theoretical and practical implications, as well as future research questions are also discussed.

A B S T R A C T S

HUMANITIES

The Aestheticization of Racial History in Deus Ex: Mankind Divided and Detroit: Become Human

Presenter's Name: Anderson Andrew Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Emily Kugler Faculty Advisor's email: emily.kugler@Howard.edu

Co-authors:

This presentation examines how two award-winning games appropriate historical narratives of racial oppression and resistance without substantive engagement with their political implications. I begin with Deus Ex: Mankind Divided (2016), which uses South African Apartheid as an aesthetic marker and narrative reference while failing to meaningfully address racial oppression, identity, or politics-a process I term the aestheticization of racial history. This concept refers to the reduction of historical and racial struggles to surface-level visuals or plot devices that strip them of their political and systemic dimensions, turning racial protest into a scenic backdrop rather than a site of critique. I then turn to Detroit: Become Human (2018) as another example of the aestheticization of racial history, this time rewriting the U.S. Civil Rights Movement. This process rewrites Civil Rights history to align with neoliberal racial fictions that frame the American Civil Rights Movement as a struggle that purportedly defeated racism through the individual greatness of singular men and passive non-violence. This intentional fiction erases the radical and collective struggles that defined the actual Civil Rights Movement. Together, these games exemplify how racial recursivity operates by depoliticizing racial history to serve narratives of neoliberal multiculturalism.

Estate Planning and Black Wealth: A Case Study of the DMV Region

Presenter's Name: Burnette Hailey Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Jevay Grooms Faculty Advisor's email: jevay.grooms@howard.edu

Co-authors: Felipe Juan

What role does access to wills, living trusts, and other estate planning instruments have in generational wealth? The racial wealth gap has persisted and has grown during the COVID-19 Pandemic. One of the forms in which generational wealth is transferred is through wealth transfers. Consequently, Black families generally have a proportionally smaller probability of having an inheritance to pass on. Using unique data on established or working real estate planning instruments, this research aims to project the potential wealth transfers of individuals that uptake legal services to transfer assets within the Washington D.C., Maryland, and Virginia region. This research compares those who do not receive such services and those who do, and analyzes the disparities and costs associated with these services. Within this initial dataset alone, there is a total of \$18 million concerning the individuals receiving these legal services.

Black Thought: African American Perceptions and Depictions of Whiteness and White Sexuality

Presenter's Name: Charlton Bria Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Sean Pears Faculty Advisor's email: sean.pears@howard.edu

Co-authors:

Black people in the United States have acted as ethnographers storing critical presumptions of whiteness that is a different viewpoint from that of even liberal whites. This oppositional gaze, in the words of bell hooks, has been cultivated from the time the first enslaved Africans arrived in 1619, as demonstrated by Nikole Hannah-Jones. W.E.B. Du Bois's term "double consciousness" is the ability of minoritized subjects to view themselves through the eyes of others, but a more important facet of this state of being is the ability to understand and scrutinize whiteness. Du Bois writes "Of them I am singularly clairvoyant. I see in and through them. I know them from unusual points of vantage." Theodore W. Allen has concluded that whiteness is the consequence of a white plantation bourgeoisie refusing to permit class solidarity amongst poor whites and enslaved African Americans. Applying these tenets of whiteness studies to twentieth-century literature reveals how white sexuality is understood through the projection of unacceptable feelings onto Black subjects and produces sexual anxiety. This dysfunctional and abusive behaviors of white sexuality is explored in the post-war white life novel by Black authors. Langston Hughes's short story, "Slave on the Block" shows how a white couple understands their own sexuality by fetishizing the Blackness of their servant Luther. Ann Petry has reached similar observations that white sexual anxiety debilitates the white male, and the false construction of whiteness leaves white women longing to break free from its constraints in her novel Country Place.

Coming of Age in Crisis: Visualizing Liberation in Civil Rights Photobooks

Presenter's Name: Chery Cherline Classification: Graduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Nina Gjoci Faculty Advisor's email: nina.gjoci@howard.edu

Co-authors:

Childhood is not a concept that is often associated with the modern civil rights movement, yet some of the most pivotal moments of change for the movement were historical events in which African American children were primary actors. Fortunately, the conventional narrative of the movement has expanded in recent decades to consider the lived experiences and perspectives of individuals who came of age during the civil rights era. African American children in the South, frequently referred to as the Emmett Till generation, were regularly exposed to photographic news coverage of martyred black youth, which played a significant role in inspiring a generation of black youth activism. At the same time, the few images of black childhood that existed in mainstream children's literature were often stereotypical and limiting. Examining the intersection of youth, civil rights, and photography, this paper explores alternative photographic and textual articulations of black childhood that were also available to black child readers during this era. Relying heavily on African American produced photobooks such as Jane Dabney Shackelford's My Happy Days (1944), Ellen Tarry's My Dog Rinty (1946), and Langston Hughes and Roy DeCarava's The Sweet Flypaper of Life (1955), this paper applies historical-critical method and argues that each text engaged civil rights work through visual arguments about the need for social transformation. Documenting this history is critical in that it disrupts standard conceptions of childhood in modern history and contributes to a growing body of literature that chronicles childhood agency in relationship to the civil rights era.

Binti by Nnedi Okorafor: The Connection Between African Spiritual Systems, Quantum Physics and Africanfuturisim

Presenter's Name: Danley Lori Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Mario Beatty Faculty Advisor's email: mario.beatty@howard.edu

Co-authors:

Mathematics is often considered a universal language, but its cultural roots and applications are far from monolithic. In African spiritual systems, mathematical principles are deeply intertwined with cultural practices and cosmological understandings, from the binary patterns of Ifa divination to the geometric calculations in sand readings and Dogon's sophisticated numerology. These systems not only organize knowledge but also offer profound insights into the universe, bridging the tangible and the metaphysical. In Nnedi Okorafor's Binti Series, Mathematics becomes a narrative device that reclaims the indigenous African knowledge systems, challenging Western-centric notions of science and technology. Through her protagonist, Binti, Okorafor illustrates how African mathematical traditions serve as tools for problem-solving, communication, and identity, aligning her work with the frameworks of Afrofuturism and Africanfuturism. Both movements center African heritage in reimagining futures, positioning traditional knowledge systems as vital to cultural preservation and innovation. My paper examines the mathematical foundations embedded in African spiritual traditions - such as the binary patterns of Ifa, the geometrical calculations of sand readings, Sikidy and Dogon numerology - and connects them to their portrayal in Binti. By exploring these parallels, I argue that Okorafor not only bridges cultural heritage with futuristic technology but also redefines the role of Mathematica as a multidimensional tool for navigating identity and understanding the universe.

The Tear Between Two Timelines Abstract

Presenter's Name: Davis Rebbie Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Jennifer Williams Faculty Advisor's email: jennifer.williams2@howard.edu

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Trauma theory suggests that the descendants of enslaved people experience psychological issues and epigenetic inheritances due to intergenerational trauma such as Post Traumatic Slave Syndrome (PTSS). However, in my concept of "dual existence" I offer that we experience this trauma in a far more first-hand instance that, in significant ways, is unaffected by differences in time and displacement. Dual existence here means that, in a metaphysical sense, descendants of enslaved people hold existence in both the present and the past. That this tether, or inescapable tie, between us and slavery, goes beyond passed-down trauma but serves as a personal recurrence. This then manifests into the term, explored in the Disney Series Loki, time slipping or the temporal displacement of an individual. My paper will draw on how our dual existence causes us to metaphysically timeslip to times of slavery when we are "triggered" through learning or simply engaging with our history. Additionally, I will use the novel Kindred written by Octavia Butler to dive deeper into what this temporal displacement looks like for Black people and how it points to this theory of dual existence within Blackness. This concept expands the ways in which we come to understand Black existence and challenges thoughts of historical overemphasis or cultural pathology. Lastly, it frames our history to be much more immersive than we believe it to be-asserting that history is more than just remembered but relived.

The Moderating Effects of the Nguzo Saba on College Freshman Adjustment

Presenter's Name: Hightower Chloe Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Zoeann Finzi-Adams Faculty Advisor's email: zoeann.finziadams@howard.edu

Co-authors: Tatiana Anthony

Freshman year is a transitive experience where individuals navigate the shift from adolescence to adulthood, accompanied by vast psychological and environmental shifts (Purnamasari et al., 2022). There are several notable stressors experienced by adolescents as they enter college in their freshman year; students have their first brush with adulthood, independence, relationship building, and decision-making (Macmillan, 2006). The sudden shift in environment and the onset of new stressors can be distressing for freshmen and hinder their mental health and aca-

demic abilities, making positive adjustment pertinent to well-being and success (Purnamasari et al., 2022). African American students navigate nuanced challenges related to racial identity and belonging, making it necessary to address these cultural dynamics. Wellness strategies that incorporate cultural aspects were proven to be beneficial in the psychosocial development of African American students (Johnson, 2021). African-centered interventions have also been found to facilitate positive outcomes in the development of self-concept, coping skills, and mitigating depressive symptoms (Lateef et al., 2022). Positive coping strategies and self-efficacy were factors positively correlated with college adjustment, factors that can be improved through African-centered interventions (Purnamasari et al., 2022). The seven Nguzo Saba principles are a framework based on African American values, aiming to connect African Americans to their African heritage and identity. These principles center African American values in mental health practice and provide strategies students can employ that align with their cultural identity. I propose these principles as a model for wellness that can be applied in the lives of African American freshmen.

"From Be-Bop To Hip-Hop": Vocality and Embodiment in the 1960-1990 Music of Quincy Jones

Presenter's Name: Kenlon William Classification: Junior Faculty/ Lecturer/ Instructor School/College: Fine Arts *Presentation Type: Oral Presentation* Faculty Advisor: William Kenlon Faculty Advisor's email: william.kenlon@howard.edu

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The long and highly varied career of Quincy Jones (1933-2024) is wellknown for spanning a wide range of genres, styles, and media. It is perhaps this stubborn avoidance of genre pigeonholing that has (thus far) made scholarly analysis of his work rare. From his earliest gigs with Lionel Hampton and Dizzy Gillespie, through his career producing artists from Ray Charles to Lesley Gore to Michael Jackson, to his ultimate embrace of Hip-Hop, Jones's path as a musical artist may at first seem random and unpredictable. However, careful and thorough analysis of his music from approximately 1960 to 1990 reveals an observable progression in which Jones embraces new forms of Black American music as they rise to cultural prominence. I posit here that the most reliable signs of this embrace are highly individualistic uses of the human voice, including vocal effects from instrumentalists, thus giving performers' bodies a centered role in music-making. Most frequently, this quality of intensified vocality and embodiment calls attention to the Black musical and cultural identities of its performers, thus illuminating a clear path from Jones's origins in jazz to his eventual collaborations with the highest caliber of R&B and Hip-Hop artists.

The Privilege of Choice: Racial Identity and the Limits of Self-Identification in Jesmyn Ward's Cracking the Code Presenter's Name: Littlefield Brie

Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Susan Mockler Faculty Advisor's email: susan.mockler@howard.edu

Co-authors:

In Cracking the Code, Jesmyn Ward reflects on her mixed racial identity, drawing from her family history and DNA results to explore the complexities of race. While Ward affirms her Black identity, she suggests that racial identity is shaped by personal experience and cultural connections. However, this perspective overlooks the lived reality of monoracial Black individuals, for whom Blackness is not a matter of choice but is imposed by society based on phenotype and discrimination. This essay critiques Ward's view by highlighting the privilege mixed-race individuals have in self-identifying, a privilege not afforded to monoracial Black people. It also examines the consequences of self-identification, particularly in media and leadership, where mixed-race individuals are often prioritized, contributing to the erasure of monoracial Black experiences. Ultimately, the essay calls for a more nuanced understanding of Blackness as a lived reality shaped by systemic oppression. While Ward's argument emphasizes personal and cultural influences, it does not fully address the societal forces that dictate racial identity. By analyzing her perspective alongside broader social patterns, this essay highlights the need for discussions of racial identity to account for structural oppression and its impact on lived experiences.

Rethinking Informed Consent for Equitable Healthcare Access

Presenter's Name: Mckenzie Jennifer Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Eleanor King Faculty Advisor's email: emking@howard.edu

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Informed consent is a vital ethical standard in the medical field. However, marginalized groups—such as those with low income, immigrants, and people with limited educational backgrounds—can face systemic barriers that impair their ability to make informed healthcare decisions. While progress has been made in eliminating these barriers, this study examines whether factors such as socioeconomic status, language barriers, and education continue to influence patient comprehension of informed consent, leading to disparities in access to healthcare and decision-making. A preliminary analysis of existing literature, case studies, and healthcare data indicates that typical informed consent procedures often presume a certain level of literacy and language skills that many patients do not possess. Long-standing ethnocentric attitudes, such as the belief that all patients are proficient in English, also influence healthcare policies, particularly disadvantagering non-English speakers. Disparities in education lead to lower health literacy, affecting patients' ability to

evaluate medical risks, treatment options, and procedures. Ethical challenges arise when patient autonomy is jeopardized due to insufficient translation services or the conflict between patient independence and paternalistic tendencies from providers. The emergence of ableist language marginalizes individuals with disabilities, raising issues about biased consent practices. On the other hand, initial findings also indicate that using simplified, multilingual consent documents, culturally sensitive communication techniques, and interactive methods like the "teachback" approach enhances patient understanding and the attainment of quality healthcare services. This study will summarize the results to date and offer bio-ethically sound suggestions for equitable, patient-centered practices in informed consent.

Maroon Mothers and Maternal Moors

Presenter's Name: Robinson-leary Anjali Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Michael Ralph Faculty Advisor's email: michael.ralph@howard.edu

Co-authors:

This proposal seeks to complicate our conceptions of what a maroon is and how women maroons safeguarded the livelihood of the Black community. By parsing the archaeological record so as to tease out the complex infrastructures of maroon populations in the Great Dismal Swamp, the present study places domesticity in the center of the analytic it seeks to build out regarding child birthing and childrearing. Through this analysis, Black maternal health and the contours of child-raising are studied throughout the eighteenth and nineteenth centuries and placed into the contemporary discourse surrounding Black maternal health and critiques of social services. I intend to employ historical research methods that include analyzing primary and secondary archival sources while engaging in source criticism, when required, in order to cultivate a conceptual analysis that heavily draws upon the tradition of cultural archaeology.

Minimizing the Impact of Brain-Drain in Afro-Descendent Communities in the Latin- American and Caribbean Region: The Role of HBCUs

Presenter's Name: Sainten Tamryn Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Clarence Lusane Faculty Advisor's email: clarence.lusane@howard.edu

Co-authors:

This thesis provides an analysis of the 'brain-drain' phenomenon through the lens of a small, but often overlooked subgroup of students with invaluable educational and economic intellectual capital: Afro-Descendent young adults from the Latin American and Caribbean. The goal of this research paper is to examine the issue using three levels of analysis to build a wholistic understanding of how Historically Black Colleges and Universities present a unique solution to mitigating the impact of 'braindrain' in this region, thereby promoting international development. By first understanding the historical context of racism that fuels migration, the study's mixed method portion utilizes available data about international student enrollment by country in Latin America and the Caribbean across the Top 10 HBCUs in the country along with institutional incentivization tactics. The last quantitative method looks at anecdotes institutions that have pursued partnerships with source countries and analyzes the impact of collaborations on brain-drain. The results of this study will illustrate the draw factors and benefits of an HBCU education for Black Afro-Descendent students from Latin America and the Caribbean, while providing quantitative examples of solutions to this complex issue. *RE-SUBMISSION FOR HONORS PROGRAM

Minimizing the Impact of Brain-Drain in Afro-Descendent Communities in the Latin- American and Caribbean Region: The Role of HBCUs

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ABSTRACTS

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This thesis provides an analysis of the 'brain-drain' phenomenon through the lens of a small, but often overlooked subgroup of students with invaluable educational, economic, and intellectual capital: Afro-Descendent young adults from the Latin American and Caribbean. The goal of this research paper is to examine the issue using three levels of analysis to build a wholistic understanding of how Historically Black Colleges and Universities present a unique solution to mitigating the impact of 'brain-drain' in this region, thereby promoting international development. By first understanding the historical context of racism that fuels migration, the study's mixed method portion utilizes available data about international student enrollment by country in Latin America and the Caribbean across the Top 10 HBCUs in the nation and their respective incentivization tactics. The quantitative method looks at anecdotal evidence from institutions that have pursued partnerships with source countries, and analyzes the impact of these collaborations on the brain-drain. The results of this study will illustrate the draw factors and benefits of an HBCU education for Black Afro-Descendent students from Latin America and the Caribbean, while providing quantitative examples of solutions to this complex issue.

Minimizing the Impact of Brain-Drain in Afro-Descendent Communities in the Latin- American and Caribbean Region: The Role of HBCUs

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The Silent Power of Silence

Presenter's Name: Smalls Milan Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Sarah Ingle Faculty Advisor's email: sarah.ingle@howard.edu

Co-authors:

Within the majority of slave narratives, silence is used as a symbol to represent how slavery stripped Black people of their voices and autonomy. Within these narratives, silence is only used to showcase how enslaved people were systematically stripped of their voices through the banning of their native languages, oppression, and denial of literacy enforced by slavery. However, Octavia Butler's novel Kindred provides an alternate perspective that illustrates how silence was also used by enslaved people as a source of power to rebel against slave masters and gain autonomy. This research paper uses literary analysis to examine the dual role of silence in Kindred, focusing on the character of Carrie, a mute enslaved woman who communicates through sign language. By analyzing key moments in the novel alongside historical perspectives from Angela Y. Davis and Frederick Douglass, this study investigates how silence functioned as both an instrument of oppression and a means of defiance. The analysis reveals that during slavery, silence was a complex and multifaceted phenomenon as it displays how silence could be used to force submission, become a source of power for enslaved people, and provide protection and empowerment to slaves. While silence has historically been interpreted as a means of subjugation, Kindred challenges this notion by showcasing how silence could also enable autonomy, protect communities, and resist oppression. This reexamination of silence shifts the discourse from victimization to resilience, highlighting the adaptability and strength of enslaved individuals had in reclaiming their agency.

"Whoever Controls Cinema, Controls History": How Lovecraft Country Disrupted the United States' Historical Imaginary

Presenter's Name: Uptgrow Nicholas Classification: Graduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Nina Gjoci Faculty Advisor's email: nina.gjoci@howard.edu

Co-authors:

What we know about history is informed by much more than the actual facts of what happened. The historical imaginary refers to a "socially constructed understanding of the past" based on representations in entertainment, politics, education, and more (Guthrie, 2019; Guthrie, 2023). The historical imaginary is subject to dominant, hegemonic ideology and is, therefore, constantly being challenged and renegotiated as shifts take place. Because of this, many nondominant historical narratives have been pushed to the shadows of history and essentially silenced, rendered invisible in the historical imaginary (Trouillot, 2015). Popular media plays a large part in how the general public remembers and conceptual-

izes the past (de Groot, 2016; Landsberg, 2015; Hume, 2013). However, the reach of media has allowed for marginalized communities to counter the historical imaginary and reintroduce their erased historical narratives back into the public historical conscious (Rosenstone, 1998; Craig & Rahko, 2024). This research will examine how Black popular culture has been able to provide alternative historical narratives that challenge the dominant narratives and reinsert their history into the historical imaginary by analyzing 2020's Lovecraft Country. It will do so by examining historical record, as well as the representation of it in Lovecraft Country. Lastly, it will analyze how these events challenged the dominant history. Initial analysis finds that this show disrupted the United States' historical imaginary of the past, in particular Jim Crow and early Civil Rights eras, by reintroducing the muted history of African Americans into the country's public consciousness.

The Founding of the All-African People's Revolutionary Party (A-APRP) 1968-1998: A Pivotal Moment in Black Internationalism

Presenter's Name: Wheatland-disu Tiffany Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Jean-Michel Mabeko-Tali Faculty Advisor's email: jmabeko-tali@Howard.edu

Co-authors:

President Kwame Nkrumah's convening of the historic 1958 All-African People's Conference in Accra and his 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 study examines the collaboration between President Kwame Nkrumah of Ghana, President Sekou Touré of Guinea, and pan-Africanist, Black Power advocate Kwame Ture, formerly known as Stokely Carmichael in founding the A-APRP as perhaps the most significant pan-African, mass-based, socialist political formations of the 20th century. This qualitative study engages a multi-archival, multi-national review of sources collected from archives in Guinea, Ghana and the U.S. and oral histories conducted with affiliates of the A-APRP and Parti démocratique de Guinée (PDG), to construct a people's history of the party. It engages the analytical framework of Black internationalism, which transforms the sentiments of pan-Africanism into an ideology grounded in the politics of anti-imperialism to examine the collective struggle of African-descended people against racial oppression, white supremacy and the structures of racial capitalism upon which they rest. In so doing, it frames the A-APRP as constituent of the worldwide socialist revolution and the project of "Third Worldism," situating its emergence along a continuum anti-imperial movements expressing transnational solidarity of colonized people towards liberation, development and political non-alignment.

Tracking the Water: Mapping Transitioning Dominican Waterbodies in Rita Indiana's Tentacle and Elizabeth Acevedo's Family Lore

Presenter's Name: Yuli Paola Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Curdella Forbes Faculty Advisor's email: ceforbes@Howard.edu

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How do women writers from the Dominican Republic and diaspora use water as a trope to discuss the ecological, social, political, and economic conditions that shape marginalized experiences in their societies? This paper examines water tropes in Dominican writer Rita Indiana's 2015 novella Tentacle (La mucama de Omicunlé) and Dominican-American writer Elizabeth Acevedo's 2023 novel Family Lore. Tentacle is a non-linear, post-apocalyptic novel that follows transgender protagonist, Acilde in Santo Domingo after biological weapons spill into the Caribbean Sea and causes an apocalypse. And, jumping between the memories of Dominican and Dominican-American mothers and daughters in the Marte family in 20th century Santo Domingo and 21st century New York City, Family Lore begins in New York City with seventy-year-old Dominican-born seer Flor, who prophesizes her own death, prepares her own living wake, and washes in tub for a final bath at the end of the novel as she remembers the canal she bathed in back in Santo Domingo fondly. This paper reads Acilde and Flor as bodies of water whose births or deaths occur in or around water. Humans are bodies of water (Astrida Neimanis 2017), and Caribbean people live closely and intimately with larger bodies of water (Geoffrey McGuire 2024) in the literary tradition (Michelle Cliff 1990). Through a tidalectic approach (Kamau Brathwaite 1983), this paper argues that Indiana and Acevedo use water tropes through setting, metaphor, and paradox that demonstrate how Dominican bodies are fluid bodies of water that transition with/against colonialism, capitalism, and patriarchy in the literature.

The Limits of Race in the Work of Haslanger

Presenter's Name: Zeppeiro Alexandra Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Assya Pascalev Faculty Advisor's email: apascalev@Howard.edu

Co-authors:

This paper engages with Sally Haslanger's social constructionist perspective on race, particularly addressing a significant gap in the literature concerning multiracial identities. Although Haslanger acknowledges mixed-race individuals in her work, her frameworks often rely on rigid binary classifications that inadequately capture the nuanced experiences that these identities entail. I argue that multiracial identities challenge conventional notions of subordination and privilege, positioning individuals within both marginalized and privileged spectrums simultaneously. While I align with key aspects of Haslanger's framework, this analysis critiques her approach for its insufficient treatment of the complexities

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surrounding mixed-race experiences, especially in communities where whiteness is not deemed an ultimate goal. The primary aim of this paper is not merely to delineate what race is; rather, it is to highlight how Haslanger's existing categorizations of subordination and privilege fail to accommodate the dynamics of mixed-race identities and the lived experiences they encompass. In examining Haslanger's approach to racial categorization, I assert that the categorizations she employs must evolve to adequately represent the fluidity and overlap that characterize multiracial identities in today's society. This premise sets the stage for an examination of how the interplay of privilege and subordination emerges in the lives of individuals who must navigate the complexities of racial identity amidst systemic and interpersonal pressures that defy simple classification. Through this lens, I intend to contribute to a more comprehensive understanding of race that reflects the diverse realities of identity formation and social interaction in contemporary United States contexts.

PHYSICAL SCIENCES & ENGINEERING

Navigating the High Seas: Evaluating Zero-Shot Vision Language Models for Maritime Object Identification

Presenter's Name: Abram Nicholas Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors:

Working in collaboration with the Office of Naval Research, our project explores the zero-shot capabilities of open-source vision language models for maritime object detection and identification. Specifically, we assess whether these models can determine if an image contains a ship, classify its type, and identify its country of origin using binary yes/no queries. To support this investigation, we assembled a diverse dataset of over 100 ship images spanning various vessel classes and nationalities, with variations in image quality and viewing angles. Then we evaluated several models available on Hugging Face in a true zero-shot setting, meaning they were not pre-trained on any maritime-specific data. Our findings indicate that while many models perform well in basic object detection, they encounter significant challenges with fine-grained classification. In particular, the models struggled to distinguish between similar ship types and to correctly assign national identifiers. This suggests that further domain-specific training or fine-tuning may be required to improve accuracy. We aim to provide a detailed overview of our methodology, experimental design, and analytical results, offering critical insights into both the potential and current limitations of zero-shot vision language models in maritime applications. Ultimately, our work advances the field of computer vision and lays a foundational framework for future research aimed at enhancing automated maritime object recognition for both military and civilian applications.

AI Assitant Device For Coginitive Decline

Presenter's Name: Acharya Aayush Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors:

The rising prevalence of cognitive decline among aging populations necessitates the need to assist caregivers. This research presents the development of a device that supports individuals with cognitive impairments, such as dementia and Alzheimer's disease. The device integrates various artificial intelligence (AI) models, including large language models (LLMs), to create a personalized assistant that patients can interact with. This solution aims to improve the quality of life for patients and streamline caregiving processes.

CrossViewMatcher: Fusing GNSS, Visual Cues, and Focal-Stack Depth for Robust AR Localization

Presenter's Name: Acharya Sameer Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors:

Humans naturally compensate for imprecise GPS signals using visual cues and spatial awareness. In our research, we fuse raw GNSS data with computer vision to enhance localization for augmented reality (AR) applications. Traditional filtering techniques such as Kalman Filters are effective under stationary conditions but falter in dynamic scenarios. For stationary objects, when using only Kalman Filters over a period of one minute (approximately 100 measurements), our system converges to about four candidate locations, failing to pinpoint the true position. By integrating Hidden Markov Models (HMMs) on top of the Kalman Filter, we refine the localization process to converge to a single, accurate point, which represents the true location. Our proposed system, a CrossViewMatcher, leverages a single ground image to retrieve the corresponding geo-tagged satellite image, significantly reducing data requirements compared to multi-image approaches. The model comprises dual ResNet50 encoders-one for street-level imagery and one for satellite views-along with a cross-view attention module and projection heads, and is optimized using a combination of contrastive and triplet loss functions. In addition, for depth prediction, we adopt an existing hybrid approach using focal stacks, which further enhances spatial accuracy. Preliminary experiments on a subset of 8,000 ground-satellite image pairs demonstrate promising performance, achieving Top 1 accuracy of 33%, Top 5 accuracy of 75%, and Top 10 accuracy of 84% after only 20 training epochs. This work provides an efficient alternative for dynamic GNSS localization, with significant implications for AR applications such as moving AR objects.

Electronic Modeling and Simulation of Zinc Sulfide (ZnS) Piezoelectric Quantum Dots for Application in Quantum Computing and Sensing

Presenter's Name: Adams iv Chase Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors: Wisdom Benson

Quantum dots (QDs) are spheres of atoms that act as one collective atom which possesses discrete energy levels (ELs). QDs exist on the nanoscale (10nm-100nm). Larger QDs have smaller bandgaps (and vice versa).

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Bigger bandgaps block flow of electrons between states. To maximize electricity from QDs, we need smaller bandgaps (larger QDs).Piezoelectric QDs use the Piezoelectric effect; the ability to generate electricity via mechanical stress. When force is applied, electrons migrate from a lower EL to a higher EL, creating an energy band.Zinc Sulfide (ZnS) QDs have low bandgaps, strong piezoelectric coefficients, and behave like semiconductors, making them good candidates for our research. ZnS QDs have many uses; cell and tissue imaging, electric sensing, and storing energy. This study explores potential applications of ZnS piezoelectric QDs in quantum computing and sensing technologies. We are using Quantum ESPRESSO (QE) and VESTA software for our research. We calculated the band structure, density of states, and charge density of the unit cell using QE, and designed the crystal structure in VESTA. Additionally, we conducted self-consistent field (scf) and non-self-consistent field (nscf) calculations on both non-optimized and optimized ZnS cells. The band structure and density of states (DOS) for these cells were graphed to compare their electronic properties. Results provide insights to the suitability of ZnS QDs for advanced technological applications. Our next step is performing phonon calculations on the molecule and quantum dot structures, which provides important information about acoustic and optical vibrational properties, and helps determine conductivity and stability.

Predictive Modeling and Experimental Analysis of Membrane Fouling in Nuclear Wastewater Treatment

Presenter's Name: Adelegan Josephine Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Sanjib Sharma Faculty Advisor's email: sanjib.sharma@howard.edu

Co-authors: Sanjib Sharma, Kimberly Jones

Membrane fouling in nuclear wastewater treatment at the Hanford and Savannah River Sites presents significant challenges, particularly in crossflow filtration systems used to separate low-activity waste from highly radioactive materials. Traditional models fail to predict membrane performance due to complex inorganic scaling and deposition behaviors. This study develops a predictive AI-driven model, coupled with fluorescence microscopy, to enhance fouling management in nuclear waste treatment. Building on prior artificial neural network (ANN) modeling, this research refines the approach by integrating experimental validation of foulant deposition patterns. Data preprocessing in Excel and ANNbased analysis in MATLAB will identify key variables impacting filtration efficiency. Fluorescence microscopy will offer insights into foulant characteristics, aiding model optimization. Preliminary results suggest AI-enhanced models significantly improve predictive accuracy for fouling rates, potentially enabling real-time filtration adjustments. By combining experimental data with AI insights, this study aims to optimize membrane lifespan and treatment efficiency in high-risk waste management. The outcomes will support adaptive fouling control strategies at Hanford and Savannah River Sites and inform sustainable filtration applications in regions like Nigeria. Future research will focus on real-time monitoring frameworks to further enhance predictive capabilities and advance AI applications in environmental engineering.

Raman spectroscopy of lunar analog minerals using machine learning modeling and simulation

Presenter's Name: Adeyeye Oluwaseun Classification: Undergraduate Student School/College: Engineering & Architecture Presentation Type: Oral Presentation Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors: Prabhakar Misra, Tibebu Ayalew

Raman spectroscopy is a powerful tool for mineral identification, particularly for planetary exploration. This project leverages machine learning to classify lunar analog minerals based on their Raman spectra, optimizing models for robust performance in low signal-to-noise conditions and dusty environments. By integrating convolutional neural networks (CNNs) and traditional machine learning techniques, we validate previous research findings and enhance spectral classification accuracy using the Machine Learning Raman Open Dataset (MLROD) and Spec-CNN framework. The approach includes preprocessing spectral data, extracting features with wavelet transformation, and training deep learning models to classify minerals. We compare Spec-CNN with similar models to evaluate accuracy and efficiency. Confusion matrix analysis and performance metrics refine the model, ensuring its adaptability for planetary spectroscopy. This research advances autonomous mineral identification for lunar and Martian exploration. This project leverages machine learning to classify lunar analog minerals based on their Raman spectra, optimizing models for robust performance in low signal-to-noise conditions and dusty environments. By integrating convolutional neural networks (CNNs) and traditional machine learning techniques, we validate previous research findings and enhance spectral classification accuracy using the Machine Learning Raman Open Dataset (MLROD) and Spec-CNN framework. The approach includes preprocessing spectral data, extracting features with wavelet transformation, and training deep learning models to classify minerals. We compare Spec-CNN with similar models to evaluate accuracy and efficiency. Confusion matrix analysis and performance metrics refine the model, ensuring its adaptability for planetary spectroscopy. This research advances autonomous mineral identification for lunar and Martian exploration.

FinEmpower.AI: Fair And Accessible Credit Score Enhancement Through AI

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FinEmpower.AI is AI-driven research designed to promote financial equity by providing personalized credit score enhancement solutions. It addresses systemic biases in traditional credit scoring models, which disproportionately impact marginalized communities, by offering tailored strategies to improve financial mobility. Many individuals strug-

gle with limited access to financial education, transparent credit scoring processes, and customized credit-building opportunities, often leading to persistent disparities in credit scores and financial access. Leveraging AI and machine learning, FinEmpower.AI aims to provide secure data-driven credit analysis to identify key areas for improvement, adaptive financial education tailored to user behavior and demographics, and interactive decision support tools that offer real-time credit impact simulations and "what-if" scenario modeling. By democratizing access to financial expertise and providing actionable pathways to better credit, the platform empowers historically underserved communities. With a strong commitment to transparency, ethical AI, and financial inclusion, FinEmpower.AI aims to break down systemic barriers and create a more equitable financial future for all.

Improving Machine Translation With Context-Aware Entity-Only Pre-translations with GPT40

Presenter's Name: Agyemang-prempeh Jabez Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Aryal

We present a novel 3-Step GPT Translation pipeline designed to enhance the translation of named entities in machine translation. Our approach integrates external knowledge from Wikidata with two GPT-based processes: one that refines entity translations and another that incorporates the refined entities into full-sentence translation. In the first step, named entities are detected and enriched with metadata retrieved from Wikidata. In the second step, a GPT model refines the translation of each entity by leveraging the additional context. Finally, in the third step, the refined entities are integrated into the overall translation to ensure consistency and cultural relevance. Preliminary results on a validation set covering six languages-Arabic, German, Spanish, French, Italian, and Japanese-indicate significant improvements over baseline systems without dedicated entity handling. Notably, our pipeline achieved per-language scores as high as 90.15 for Korean, 89.90 for Japanese, and 89.73 for Spanish, with an overall final score of 84.44. Although challenges remain for languages with sparse Wikidata coverage, such as Chinese, these results demonstrate that structured external knowledge and targeted refinement can yield robust improvements in translation quality. We discuss the replicability of our approach, address observed challenges, and propose future directions to further expand language coverage and enhance computational efficiency.

Logit-based Supervised Token Classification for Multilingual Hallucination Span Identification Using XGBOD

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Co-authors: Aryal Saurav

Large Language Models (LLMs) are revolutionizing technology with capabilities like human-like text generation and complex question answering. However, a significant challenge is "hallucination," where LLMs produce inaccurate or fabricated information. This unreliability poses risks as these models are used in critical sectors such as healthcare, education, and finance. Addressing hallucinations is vital for responsible AI deployment. Our research focuses on detecting "hallucination spans"sections of LLM output that are factually incorrect-especially in multilingual contexts. We propose a method that uses the LLM's internal "logits" (numerical representations) to detect errors. By treating hallucination detection as an anomaly detection problem, we analyze logit values as time-series data, identifying patterns that signal deviations from factual generation. Our approach extracts key features from token-level logits to distinguish between reliable and hallucinated text. A machine learning model then identifies these anomalies, enabling granular, probabilistic predictions of hallucinations. This system operates solely on the LLM's output, without relying on external sources or pre-processing. In evaluations, our method outperformed baselines, achieving significantly higher Intersection-over-Union (IoU) scores. For example, in French, our system scored 0.4164 IoU, nearly four times higher than the baseline. We also saw improvements in Finnish and Arabic, demonstrating the method's effectiveness across languages. This work addresses the risks of misleading content in LLMs, aiming to improve AI reliability and fairness, particularly for diverse linguistic and cultural contexts, ensuring equitable access to trustworthy AI technologies.

Synthesis of Polymer Grafted Nanoparticles for use in Dielectric Application

Presenter's Name: Alaba Olusegun Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Dharmaraj Raghavan Faculty Advisor's email: draghavan@howard.edu

Co-authors: Ikeoluwa Apata, bhausaheb Tawade

Solid-state film capacitors are commonly used in modern electronic devices. However, their energy density does not meet the demands of advanced applications. Polymer nanocomposite integrates the positive attributes of polymer and inorganic nanomaterials to significantly improve dielectric properties of material. Use of homopolymer grafted nanoparticles in polymer matrix facilitates good dispersion and improved interfacial interaction leading to good dielectric properties. Sequential arrangement of the nanoparticles in polymer matrix can further

enhance the dielectric properties. The thruway to achieve sequential alignment involves the use of block copolymer grafted nanoparticles in polymer matrix. The focus of this study is to synthesize homopolymer grafted nanoparticles (PSgTiO2) and block copolymer nanoparticles (PMMA-b-PSgTiO2) using grafting-from method (click chemistry) and compare their dielectric properties. PSgTiO2 was synthesized using ATRP method and the char yield, molecular weight and graft density was 74.9%, 38739 g/mol, 0.033 chain/nm3 respectively. PMMA-b-PSgTiO2 was synthesized using ARGET ATRP method and the char yield, molecular weight and graft density was 74.9%, 38739 g/mol, 0.033 chain/nm3 respectively. The energy density of a pristine PS capacitor was 1.5 J/cm³ at a field of 487 MV/m, while 15nm PSgNPs at 10 wt% in PS was 4.5 J/cm³, and at 20 wt% in PS was 7.5 J/cm³. The dielectric measurement of PMMA-b-PSgTiO2 in polymer matrix is underway. The findings of the study can have a strong bearing on the design of next generation capacitor.

Health Monitoring by Radial Pulse

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Co-authors: Brady Osvalte, Souma Ewoudou, Itunuoluwa Akarakiri, Darnyieh Brewer

The hypothesis of this research is that radial pulses indicate cardiovascular health status of students. To test this hypothesis, we collected normal pulses from published sources to be used as reference data against measured pulses of the students. To measure the pulses, a hardware system was developed with a pressure sensor with a data acquisition program. A few tens of pulses were measured using the system from the students. In comparing the measured pulses against the reference normal pulse data, we devised two classifying approaches. The first approach was centered on the shapes of the pulses while the second one, Artificial Neural Network and Machine Learning. The first approach analyzed the pulse shape by identifying key features: systolic and diastolic peaks, the ratio of their amplitudes, and the time between them. The feature based identification was applied to multiple cycles of measured pulse, and the final identification was aggregated from each of the individual results. The second approach converts each pulse into a pixel data array, as input to a neural network. The reference dataset was used to train the network through backpropagation. Once satisfactory accuracy was achieved after several training epochs, the learned weights were integrated into our pulse measurement system. We are presently developing a real-time pulse reader that will classify pulse as normal or abnormal. A system like this, installed in campus buildings, would make early screening of cardiovascular health conditions readily available to students.

Exploring the Supercapacitor Potential of Folic Acid-Conjugated Dipeptide-Melamine Architectures

Presenter's Name: Amaeze Nzube Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Gagandeep Kaur Faculty Advisor's email: gagandeep.kaur1@howard.edu

Co-authors:

Porus carbon materials, valued for their chemical stability, conductivity, and high surface area, are widely investigated for supercapacitor applications. However, their low energy density and wettability limit specific capacitance. To address this, we synthesized a folic acid-conjugated tyrosyl phenylalanine dipeptide, which self-assembles into nanosheets and explored its co-assembly behavior with melamine. These co-assembled scaffolds were carbonized at 900°C to produce nitrogen-doped porous carbon materials, which were subsequently evaluated for electrochemical capacitive performance in energy storage applications. These carbonized samples showed the specific capacitance of 38, 19, 14 and 1.5 F/g at current densities 1, 1.5, 2 and 3 A/g respectively in energy storage application.

Investigating Factors That Enhance Methane Monooxygenase (MMO) Activity for Methanol Production

Presenter's Name: Apet Maasia Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Cristiano Reis Faculty Advisor's email: cristiano.reis@howard.edu

Co-authors: Cristiano Reis

Methane is a potent greenhouse gas, with a global warming potential significantly greater than carbon dioxide. As methane emissions continue to rise through agricultural and industrial processes, effective mitigation strategies are urgently needed. Methanotrophs-methane-consuming bacteria-can play a crucial role in harnessing methane from diverse sources by oxidizing it into valuable products such as methanol and biopolymers. This study focuses on methane monooxygenases (MMO), enzymes produced by methanotrophs that exhibit high catalytic efficiency in methane oxidation. A kinetic model based on Michaelis-Menten was developed to simulate both classes of MMO-particulate-bound (pMMO) and soluble (sMMO)-under varying environmental conditions, including inhibitors and activators (primarily copper and iron), as well as different ratios of the substrates (O₂ and CH₄). The goal is to determine optimal conditions for enhanced methanol production yield. This research relies on literature data and remains in an exploratory phase. It aims to advance the understanding of MMO enzyme regulation and contribute to the development of sustainable methane mitigation and methanol production strategies.

Optoelectronic Characterization of MoS₂: Bandgap Analysis & Layer Determination via UV-Vis and Raman Spectroscopy

Presenter's Name: Bandopadhyay Saumika Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: PRABHAKAR MISRA Faculty Advisor's email: pmisra@howard.edu

Co-authors: Prabhakar Misra, Sugata Chowdhury, Arun Bansil, Swastik Kaur

Monolayer molybdenum disulfide (MoS₂), a two-dimensional transition metal dichalcogenide (TMD), which shows distinct optical and electronic properties due to its nonzero bandgap and layer-dependent characteristics. In this study, we have shown the layer thickness and optical band gap of MoS, thin films with the help of Raman and UV-Vis spectroscopy. Raman measurements reveal two prominent vibrational modes: the inplane E2g1 mode (384-387 cm⁻¹) and the out-of-plane A1g mode (403-408 cm⁻¹). The frequency difference between these peaks, along with an intensity ratio of these reveal the layer number of the sample. Additionally, UV-Vis spectroscopy, analyzed using the Tauc plot method, provides an estimation of the optical band gap. A strong absorption feature at lower wavelengths in the ultraviolet region further underscores the potential of MoS, for optoelectronic applications. These findings establish Raman and UV-Vis spectroscopy as effective tools for layer determination and band gap characterization, facilitating the development of MoS₂-based devices for photodetectors and flexible electronics.

Computational Study of ZnS for Quantum Dots

Presenter's Name: Baral Basanta Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors:

Zinc sulfide (ZnS) is a promising wide-bandgap semiconductor with potential applications in quantum technologies, optoelectronics, and spin-based electronics. In this study, we examine the electronic and excited-state characteristics of ZnS in the wurtzite phase using first-principles density functional theory (DFT). The wurtzite structure was chosen because of its inherent asymmetry, which can improve quantum confinement qualities and affect spin-orbit coupling effects, both of which are critical for applications such as spin qubits and quantum dots. We used the Perdew-Burke-Ernzerhof (PBE) functional to calculate the self-consistent field (SCF) and non-self-consistent field (NSCF) in order to determine the density of states (DOS) and band structure. Our results confirmed that ZnS is a semiconductor with an indirect bandgap in the range of 2.5-3.0 eV, which is lower than the experimentally reported 3.6-3.8 eV due to PBE's known band gap underestimation. The DOS analysis further confirms a clear separation between valence and conduction states, supporting the material's potential for quantum applications. To extend this study, we are now employing Time-Dependent Density Functional Theory (TDDFT) to analyze excited-state properties and optical absorption spectra, which are crucial for designing ZnS-based quantum dots. The insights gained from this work will contribute to the development of nanostructured materials for next-generation quantum and optoelectronic devices.

Computational Study of ZnS for Quantum Dots

Presenter's Name: Baral Basanta Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: jiang li Faculty Advisor's email: li@Howard.edu

Co-authors:

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A Novel Approach to Quantum Decoherence in Spin Qubits Using ZnO Piezoelectric Quantum Dots

Presenter's Name: Benson Wisdom Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Misra Prabhakar Faculty Advisor's email: pmisra@howard.edu

Co-authors:

One of the main obstacles to creating scalable quantum computers is quantum decoherence. Unwanted interactions between the quantum system and its surroundings cause decoherence, which results in the loss of quantum information. Using ZnO piezoelectric quantum dots' special

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electrical and piezoelectric characteristics to construct resilient spin qubits is a viable method of reducing decoherence. ZnO is a great candidate to host spin qubits because of its large bandgap (3.37 eV at ambient temperature), strong exciton binding energy (60 meV), and significant piezoelectric coupling. We suggest a novel decoherence suppression approach for spin qubits in ZnO quantum dots by utilizing the piezoelectric features of ZnO quantum dots, strain engineering, Rashba spin-orbit coupling, and piezoelectric-induced electric fields. Through strain-engineering, modifying Rashba SOC, offering a feasible route to scalable and noise-resistant quantum computing. By adjusting SOC and strain, master equation analysis demonstrates notable improvements in T1 and T2. Rabi oscillations and spin-echo signals will be measured under adjustable strain as part of the experimental validation process.

Predicting lead contamination risk with machine learning

Presenter's Name: Bhattarai Yogesh Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Sanjib Sharma Faculty Advisor's email: sanjib.sharma@howard.edu

Co-authors: Dylan Darling

Water quality degradation poses significant risks to human health, ecosystems, and community resilience. Many cities rely on outdated pipes and water distribution networks that are susceptible to leaks, corrosion, and lead contamination. The key objective of this study is to predict lead contamination risk, identify dominant risk factors, and map risk hotspots. We focus our analysis on the Washington, D.C. metropolitan area, where lead contamination remains a persistent challenge. Random forest and adaptive boosting algorithms are trained using boil water advisories, infrastructure conditions, meteorological variables, and social vulnerability index. Our result shows that machine learning can simulate lead contamination risk by identifying critical non-linear relationships between urban processes and risk factors. We find that lead contamination hotspots are more prevalent in marginalized and low-income communities. Insights gained from this study can inform targeted interventions to mitigate lead contamination risk.

Integrating open-source geospatial data and machine learning for enhanced disaster resilience

Presenter's Name: Bhattarai Yogesh Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Sanjib Sharma Faculty Advisor's email: sanjib.sharma@howard.edu

Co-authors:

Disaster risk reduction and resilience requires technological innovation that can integrate novel data and models. However, many sources of disaster dataset come with restrictions on data sharing; hence, the datasets are not accessible to the public or research communities. We are currently underutilizing various disaster datasets that could be used for training AI/ML algorithms. We integrate open-source massive geospatial data, high performance computing and machine learning to develop an open-access, high-resolution flood predictive system tailored for urban environments. We will discuss the capabilities of open-source data and AI/ML algorithms for developing predictive systems to enhance disaster resilience.

The serpentinization-driven magnetic catalysis hypothesis for the emergence and modulation of homochiral life

Presenter's Name: Bility Moses Classification: Junior Faculty/ Lecturer/ Instructor School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Moses Bility Faculty Advisor's email: moses.bility@howard.edu

Co-authors:

In agreement with Ozturk and Sasselov, 2022 in Proceedings of the National Academy of Sciences, I propose that magnetite-derived spin-polarized electrons and coupled magnetic field mediated biomolecular chiral symmetry breaking and homochirality. I propose that in the weak geomagnetic field in the Hadean-Eoarchean eon, cosmic iron nuclei-derived spin-polarized muons ejected spin-polarized electrons from magnetite in serpentinization-driven hydrothermal systems to generate homochiral life. This hypothesis posits a coupling between serpentinization and the biosphere, which I propose was imprinted in the biosphere as biomolecular chiral-induced spin selectivity and is manifested as die-offs and rapid evolutionary changes in a weakened geomagnetic field. Like Cooper et al. 2021 in Science, I propose that weakening in the geomagnetic field and coupled increasing cosmic radiation drives die-offs, albeit via spin-controlled synthesis. I show that cosmic iron nuclei-derived spin-polarized muons could alter the spin state of serpentinization-derived magnetite, resulting in an aberrant resonant lithospheric magnetic field that mediates the spin-controlled synthesis of iron oxides and aberrant chiral biomolecules. For the first time, using spin chemistry, I provide a mechanism for directly incorporating biomolecular chiral symmetry breaking and enantioselective synthesis into the well-established serpentinization-driven origin of life model. Most importantly, for the first time, I provide a mechanism via which serpentinization modulates homochiral life (the biosphere) across geologic time via magnetite-mediated spin-controlled synthesis and biomolecular chiral-induced spin selectivity. This work has broad implications for understanding how planetary processes generate and modulate life and could spur innovations at the interface of the physical and biological sciences.

Instinctual Neural Networks for Time Limited Edge Environments

Presenter's Name: Bogroff Malcolm Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Eric Seabron Faculty Advisor's email: eric.seabron@howard.edu

ABSTRACTS

Co-authors:

Neural networks are a marvel of computing technology allowing for the most recent technological boom in industry and academia. However, too often these neural networks are very large and take a significant amount of time to train and utilize. In edge computing, resources are very limited by the principle of SWaP-C. This necessitates a new paradigm of neural networks which are fundamentally instinctual and are built to "react" in a very limited amount of time. We have created several demonstrations showing how an instinctual approach to neural networks can provide an advantage in edge environments where every millisecond of compute time matters.

Frequency Shift Keying Transmission of an Image File Using GNU Radio, HackRF One, and the GR-Control Module

Presenter's Name: Brunson Aniyah Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Marcus Alfred Faculty Advisor's email: maralfred@howard.edu

Co-authors:

This project is an initial step in the construction of a satellite ground station at Howard University for the 3UCubed project which is a partnership between the University of New Hampshire, Sonoma State University, and Howard University to investigate the cause of unexpected drag of some low Earth-orbiting satellites. The problem addressed is whether a simple image file can be transferred between two HackRF One SDRs using GNU Radio and an open-source gr-control module using Frequency Shift Keying. The approach used incremental modifications of code supplied with the gr-control module. The project results indicate the file was transmitted and hardware and software may be used as the basis for exploring hardware and software for the Howard University ground station. Since then, packet communication between the receiver and transmitter has been established and construction of the ground station is nearly complete. For the academic year of 2024-2025, future goals and objectives include sending larger and more complex packet communication between the two HackRF One SDRs and initial construction of the CubeSat satellite.

Computational Analysis of Additively Manufactured Inconel Alloys for Turbine Blade Applications

Presenter's Name: Budhathoki Aavash Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Gbadebo Owolabi Faculty Advisor's email: gbadebo.owolabi@howard.edu

Co-authors: Gaurav Sharma, Zayd El Alaoui, Caleb Trevant, Kenneth Looby

Additive manufacturing (AM) has revolutionized the production of high-performance alloys for aerospace and energy applications, offering greater design flexibility and material efficiency. Our study focuses on simulating the mechanical behavior of Inconel 718 and Inconel 625 fabricated using Laser Powder Bed Fusion (LPBF) and Wire Arc Additive Manufacturing (WAAM) for rotating turbine blades. Using ANSYS, we analyze equivalent stress, total deformation, and fatigue life across an operational RPM range of 8,000 to 12,000. The simulations capture the effects of centrifugal forces and thermal stresses, providing insights into how different AM processes influence material performance in high-temperature, high-stress operating environments. The findings aim to guide material selection and process optimization for more reliable and efficient turbine blade manufacturing.

Haptic Feedback for Tonal Language Learning: A Culturally Responsive Approach to Preserving Linguistic Diversity

Presenter's Name: Campbell Kamili Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Jaye Nias Faculty Advisor's email: jaye.nias@howard.edu

Co-authors: Jaye Nias

Tonal languages like Yoruba use pitch variations to change word meanings, making them challenging for language learners to master. This project explores how haptic feedback-vibrational cues felt through a game controller-can help users better understand and reproduce these tones. We developed a prototype 2D game where players interact with Yoruba heteronyms, words that look the same but have different meanings depending on their tone. As users attempt to pronounce the words correctly, they receive haptic reinforcement that mirrors tonal differences, providing a multi-sensory learning experience. Beyond the technical innovation, this project examines the socio-cultural impacts of AI in language learning, particularly in the context of mother tongue preservation and culturally responsive technology design. Many indigenous and African languages are underrepresented in AI-driven applications, exacerbating linguistic inequities. By embedding multi-sensory AI-driven interactions, this project demonstrates how AI can be leveraged not just for efficiency but for equity and cultural sustainability. The study also raises questions about risks-such as bias in language-learning AI models-and opportunities-such as expanding access to historically marginalized languages through AI-assisted education. Future work will focus on refining AI-driven tone assessment models, expanding user testing, and exploring AI's broader role in supporting non-Western linguistic frameworks. By bridging AI, haptics, and human-centered design, this research contributes to the ongoing discourse on how AI can be harnessed for linguistic justice and global inclusivity.

ABSTRACTS

Investigating the impact of protein content in proteo-lignocellulose materials on their dietary fiber classification through tribo-electrostatic separation

Presenter's Name: Chimere Divinegift Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Solmaz Tabtabaei Faculty Advisor's email: solmaz.tabtabaei@howard.edu

Co-authors: Solmaz Tabtabaei

This study examines the separation behavior of protea-lignocellulose materials using a dry, chemical-free tribo-electrostatic separation (TES) technique to evaluate how the presence of proteins affects the classification efficiency of dietary fiber. Due to their varying protein contents, finely milled wheat bran and oat hulls are selected as base materials. The former consisted of protein and dietary fiber, while the latter mainly comprised dietary fiber. All milled flours were evaluated for their fractionation efficiency using a two-stage TES approach in a laminar airflow environment. This was achieved with PVC and PTFE tribo-charger tubes and an electric field strength ranging from 7 to 10 kV. The results showed an improved classification efficiency of dietary fiber particles when protein particles were absent. Future studies will evaluate fiber and protein separation efficiencies for a variety of proteo-lignocellulose materials, including oilseed meals, at different operation conditions while examining the effects of different operating factors such as tribo-charging tube size and material, number of TES stages, and the original flour composition. ACKNOWLEDGMENTS. This project was funded in part through NSF-HBCU-UP-RIA Grant (#1900894).

Development of the TIGERISS Thermal Control System: Design and Analysis

Presenter's Name: Clark Mykenzie Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Nicholas Cannady, Stephane Coutu, John Krizmanic, Brian Rauch, Makoto Sasaki, Sonya Smith

The Trans-Iron Galactic Element Recorder on the International Space Station (TIGERISS) is a payload designed to fly on the Internation Space Station (ISS), adapted from previous balloon flight technology to collect data on ultraheavy Galactic cosmic rays. The goal of this mission is to further our understanding of the origins of the universe. To ensure continuous data collection while abord the ISS, the payload's internal components must be maintained within operational and survival temperature limits, preventing overheating or freezing in the extreme thermal environment of low Earth orbit. A thermal control system (TCS) is implemented to regulate the payload's temperature throughout all mission phases. The TCS design is driven by the predicted orbital thermal environment, internal power dissipation, and required temperature limits. It incorporates passive and active thermal management strategies, such as heaters and radiators to maintain stable thermal conditions. To evaluate different TCS configurations, a thermal model of TIGERISS is developed using Thermal Desktop. This model enables the assessment of multiple component arrangements and their effectiveness in maintaining thermal stability. The heaters, radiator placements, and Printed Circuit Board thermal analysis all contribute to refining the thermal model, ensuring an accurate representation of the payload's thermal behavior. By continuously updating the model with new analyses and design considerations, the TCS is improved to meet mission requirements across all operational phases.

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Optothermal Metrology of Phase Change Chalcogenide Thin Films

Presenter's Name: Coleman Robert Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Eric Seabron Faculty Advisor's email: eric.seabron@howard.edu

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ABSTRACTS

Photonic Integrated Circuits (PICs) play a critical role in quantum photonics by enabling the miniaturization, integration, and scalability of quantum devices. They allow for the integration of multiple photonic circuit elements on a single chip and facilitate the creation and manipulation of quantum states. Nonlinear optical processes, such as spontaneous parametric down-conversion, can be implemented on a PIC to generate entangled photon pairs for quantum cryptography or quantum computing operations. The ability to create interference patterns and control photon polarization, phase, and temporality on a chip is crucial for quantum algorithms and quantum communication protocols. However, their widespread adoption faces a significant challenge: variability. Fabrication imperfections in circuit elements can lead to inconsistent optical properties and unexpected device behavior, such as phase mismatches and insertion losses. This variability undermines performance, reducing efficiency and reliability. Typically, active tuning mechanisms, such as electrical heaters and PN junctions, are incorporated to compensate for these errors. The addition of these components results in a larger device footprint and higher power consumption. Alternatively, heterogeneous integration of materials, such as Lithium Niobate and various Phase Change Materials (PCMs), has been introduced as a path towards non-volatile functionality in PICs, allowing for defect compensation without active tuning, large power requirements, or electrical component integration. We propose a co-design model for the heterogeneous integration of PCMs on SOI waveguides for tunable phase shifting in linear PIC components, allowing for post fabrication tunability in PICs

Augmented Reality for Emergency Decision Making Support: A Design Approach

Presenter's Name: Davis Alexis Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Gloria Washington Faculty Advisor's email: Gloria.washington@howard.edu

Co-authors: Simone Smarr, Nia Anderson, Khloe Wright, Niya Traynham

In high-stakes environments, rapid decision-making is critical, yet traditional information displays can overwhelm users, increasing cognitive load and stress. This research explores the design of an augmented reality (AR) interface to support emergency response decision-making by providing intuitive alerts and guidance. This first stage of the research focuses on designing an AR decision support system informed by literature on human-computer interaction, alert design, augmented reality, and decision support. Following a human-centered design approach, we developed an initial interface concept incorporating three key features: context-aware alerts to notify users of critical events, a response manager to assist with real-time decision-making, and a control panel to maintain a clear and navigable display. Future work will involve evaluating the usability and effectiveness of the design through user testing with an interactive prototype. Insights from this study will contribute to the broader understanding of AR-based decision support tools in high-pressure environments, particularly regarding their role in mitigating cognitive load and improving response efficiency.

Computational Fluid Dynamics Methods for Measuring the Material Properties of Superconductive Materials at Unexplored Temperature Ranges

Presenter's Name: Davis Kayin Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Kirsten Lovelace, Sonya Smith

Superconductivity is an important phenomenon that, once it can be properly and efficiently controlled, has the potential to rapidly advance technology. Due to the condition of superconductivity being extremely low temperatures, it is critical to study how these materials behave at these temperatures. By using computational fluid dynamics, this project aims to simulate tests to calculate the Residual Resistivity Ratio (RRR) and Thermal Conductivity of Niobium and Tantalum. The ANSYS software is utilized to generate temperature ranges at 293K, 77K, and 4K, which align with room temperature, and the temperatures of liquid nitrogen and liquid helium, respectively. Then, the software is used to simulate the four-point colinear probe method and cut-bar method to find the RRR and thermal conductivity, respectively, for each temperature range. This simulation data is to be compared with the experimental data that measures these same properties using cryogenic cycling of liquid nitrogen and liquid helium. The results of this study will serve to strengthen our understanding of niobium and tantalum and evaluate their potential use in practical applications.

Estimating Floor Stiffness in Multi-Story Buildings for Structural Condition Assessment

Presenter's Name: Davis Miles Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Claudia Marin Faculty Advisor's email: cmarin@howard.edu

Co-authors:

Today, we face more earthquakes, hurricanes, and aging buildings, all of which can significantly impact the condition of structures. The structural conditions can be assessed by measuring stiffness before and after extreme events. A reduction in stiffness indicates potential damage to the structure. Therefore, the floor stiffness of multi-story buildings must be determined to ensure they can handle extreme forces, reduce damage during intense events, and ensure the safety of everyone within them. In this project, we aim to assess the stiffness of existing structures by analyzing their dynamic response under extreme events. This project uses numerical and experimental settings to estimate floor stiffness of one-story, two-story, and three-story buildings using the inverse problem approach. The primary technique used in this study is modal analysis, assuming that damping and deformation are minimal, so the problem is treated as an undamped system. Experimentally, scale models of oneto-three-story buildings are subjected to dynamic excitations on a shake

table, using accelerometers to measure the motion. The three models are created numerically using the structural analysis software, STAAD Pro, where potential weaknesses and stiffness within the floors are found. After testing, a code was developed to obtain modal properties from the building's response data, finding the building's natural frequencies, and stiffness using the system's dynamic equations. Assessing stiffness across different stories helps identify irregularities that can lead to undesirable behaviors during events like earthquakes. This study will help improve damage detection frameworks by highlighting changes in stiffness values that indicate potential structural issues.

Artificial Intelligence Meets Anaerobic Digestion: Improving UASB Reactor Efficiency with Data Augmentation and Dropout Regularization

Presenter's Name: Davis jr. Alrick Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Kimberly Jones Faculty Advisor's email: kljones@howard.edu

Co-authors:

Anaerobic digestion (AD) reactor systems are pivotal in advancing sustainable wastewater treatment by enabling both pollutant removal and energy recovery. This study focuses on the performance optimization of Upflow Anaerobic Sludge Blanket (UASB) reactors and explores the transformative potential of integrating artificial intelligence (AI) into their operation. An Artificial Neural Network (ANN) model was developed to predict Chemical Oxygen Demand (COD) removal efficiency. Initial model experiments exposed significant challenges-marked by premature training termination, near-zero and even negative correlation coefficients, and evidence of overfitting-attributable to an imbalanced and limited dataset. To address these issues, dropout regularization and data augmentation techniques were employed, which extended training from four to eleven epochs and improved model performance substantially (with overall correlation rising to 0.91, training set $R \approx 0.9997$, and a moderate test set correlation). Despite these improvements, limitations persist in data diversity and the interpretability of AI predictions, compounded by intrinsic reactor challenges such as sludge management, fouling, and lengthy start-up times. Recommendations include expanding and standardizing more real-world datasets, developing hybrid models that combine mechanistic and AI approaches, and integrating IoT-enabled real-time monitoring systems to enhance operational control. Hence, building on these insights, our focus is now transitioning to incorporating full-scale reactor modifications from DC Water, which will provide real-world operational data to further enhance and validate our ANN model for reactor performance optimization. Collectively, the findings underscore the potential of AI-enhanced AD systems to revolutionize reactor performance and wastewater management, while also outlining critical avenues for future research and development.

Investigation of Compressed Stabilized Earth Bricks (CSEBs) for Vaulted Floor Systems

Presenter's Name: Decuir Jaydn Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: John Ochsendorf Faculty Advisor's email: jao@mit.edu

Co-authors:

Many less economically developed countries are experiencing rapid population growth. Consequently, affordable and sustainable housing is a pressing need in these countries. One major roadblock is the high construction cost and carbon footprint associated with fired-clay bricks. There have been multiple materials suggested to decrease cement use such as geopolymers and industrial waste; however, for LEDCs, it is vital to consider the materials that will be readily available. Compressed stabilized earth blocks (made from sand, clay, and a cement or lime stabilizer) can serve as a sustainable, cost-efficient alternative, due to the decreased amount of embodied carbon produced. This project performs material testing of three different sand-heavy CSEB mixes for their maximum compressive stress, and modulus of elasticity to test both how clay affects durability and how different stabilizers affect the CSEBs' performance. An embodied carbon investigation is performed to evaluate the difference between CSEBs and traditional bricks' carbon footprint. The CSEBs decreased the embodied carbon by 70%; however, had an average compressive strength of only 5 MPa (a traditional brick typically has a compressive strength of 15 MPa). As these mixes were quite sandheavy, it is evident that clay plays an important role in CSEBs' compressive strength. Although the CSEBs were weaker than traditional bricks, they still serve as suitable and sustainable building materials. Overall, this project corroborated that CSEBs could be the future of sustainable and affordable housing for LEDCs.

Leveraging LLMs with Ensemble Meta-Classification for Robust Multilingual Multi-Label and Multi-Class Classification of Entity Roles and Narratives in News Articles Presenter's Name: Dhungana Prasun Classification: Undergraduate Student School/College: Engineering & Architecture Presentation Type: Poster Presentation Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Aryal

The media landscape today provides direct channels between content producers and audiences, revolutionizing access to information. However, it also simultaneously exposes the public to heightened risks of deception and manipulation, especially during crisis events. Our paper details our approach to SemEval 2025 Task 10, titled "Multilingual Characterization and Extraction of Narratives from Online News", which tackles these challenges by automatically identifying narratives by determining the roles of key entities in news articles based on author sentiment. The dataset articles span five languages: English, Portuguese, Russian, Bul-

garian, and Hindi, focusing on two critical topics: the Ukraine-Russia War and Climate Change. By formulating Entity Framing as a multi-label, multi-class classification problem, our work distinguishes entities into Protagonist, Antagonist, and Innocent roles, and further refines these into fine-grained roles based on contextual cues. Using advanced LLMs, namely Llama 3.1:8b, Mistral, Phi4, and Gemma2, we leverage natural language processing and prompt engineering to parse article contexts across languages and perform the classifications. Each LLM's individual predictions are combined through an ensemble meta-classification strategy, which boosts the accuracy in role assignments. Our solution system outperforms the provided baseline in terms of metrics such as Exact Match Ratio (~154%), micro P (~74%), micro R (~250%), micro F1 (~135%), and Accuracy for main role classification (~64%). These results are the averages for all five languages.

VLSI Chip Design and Fabrication for Solar Panel Diagnosis System

Presenter's Name: Divi Abhitej Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Cui Suxia Faculty Advisor's email: sucui@pvamu.edu

Co-authors:

Solar power is widely utilized as a renewable energy source, capturing sunlight to generate electricity. As global fuel reserves are anticipated to deplete within the next 50 years, the demand for renewable alternatives like solar energy is escalating. It is currently among the most favored choices, employed on rooftops and expansive solar fields where clusters of panels are installed. However, when a few panels within these clusters malfunction, it becomes challenging for most individuals to pinpoint the issue. This highlights the necessity of a specialized chip capable of identifying problems within groups of solar panels, ensuring the uninterrupted operation of our renewable energy systems. To detect malfunctioning panels in a cluster, a tiny chip is designed and attached to a solar panel. A 32-pin chip is developed, incorporating voltage-sensing and current-sensing circuits, along with logical blocks that generate an alert when an open or short circuit occurs in the solar panel. A memory unit with a reset button is also included in the circuit. So, until the problem is resolved, the alarm indicator remains on. The designs were implemented in Cadence Virtuoso IC 6.18 and the Layout Suite using TSMC 180 nm technology for tapeout. The schematic design, layout design, error testing were successfully completed. Functional components were tested and verified through the ADE L environment. LVS and DRC error tests were successfully completed using Assura. A 32-pin pad frame was designed and connected to the corresponding pins.

Modeling the Integration of Anaerobic Digestion (AD) for Methanotrophic Production of Methanol

Presenter's Name: Donaldson Clarke Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Cristiano Reis Faculty Advisor's email: cristiano.reis@howard.edu

Co-authors: Cristiano Reis

The integration of anaerobic digestion (AD) with methanotrophic processes provides a novel approach for producing sustainable methanol. AD is frequently used to turn organic waste or wastewater into biogas, which primarily consists of carbon dioxide, methane, and hydrogen sulfide. Methanotrophs use this biogas as a substrate to oxidize methane and create methanol, a useful chemical feedstock and alternative fuel. The Anaerobic Digestion Model No. 1 (ADM1), is used in this work to describe the AD process, utilizing MATLAB to simulate the system. ADM1 simulates methane generation and optimizes biogas yield through evaluating key parameters including pH, temperature, and feedstocks. Methanotrophic colonies obtain methane-rich biogas produced by AD, which serves as a sustainable feedstock to produce methanol. Using ADM1 simulations in MATLAB, biogas development may be optimized ensuring sufficient methane concentration for effective methanotrophic conversion. Given the preliminary findings, ADM1 supports the connection of biogas composition and methane production by accurately predicting the overall behavior within anaerobic digestion process. This investigation illustrates the potential of integrating AD and methanotrophs to convert waste-derived resources into high-value materials, supporting the growth of a sustainable future. This research establishes a basis to optimize the ADM1-based models toward maximum methane production leading to efficient methanol production via methanotrophic activity.

Modeling the Integration of Anaerobic Digestion (AD) for Methanotrophic Production of Methanol

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ABSTRACTS

Methanotrophic colonies obtain methane-rich biogas produced by AD, which serves as a sustainable feedstock to produce methanol.

Using ADM1 simulations in MATLAB, biogas development may be optimized ensuring sufficient methane concentration for effective methanotrophic conversion. Given the preliminary findings, ADM1 supports the connection of biogas composition and methane production by accurately predicting the overall behavior within anaerobic digestion process. This displays the potential of integrating AD and methanotrophs to convert waste-derived resources into high-value materials, supporting the growth of a sustainable future. This research establishes a basis to optimize the ADM1-based models toward maximum methane production leading to efficient methanol production via methanotrophic activity.

Insight into the influence of nanoparticles stabilizing agents on modulated metal organic frameworks crystallinity

Presenter's Name: Fidelis Timothy tizhe Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Steven Cummings Faculty Advisor's email: steven.cummings@howard.edu

Co-authors: Noah Martin, Alexander Tewobola

Modulated metal organic frameworks (MOFs) are considered a promising strategy to improve MOFs crystallinity and introduce defects within the MOFs matrix. This can afford a wide range of applications of the modulated MOFs such as in catalysis and nanoparticle (NPs) support. Different modulators like acetic acid (CH3COOH), formic acid (HCOOH), amino acids and aromatic system bearing -SH, -COOH, -NH2 have been employed and shown to enhance MOFs crystallinity and engineer defect within the MOFs. Despite the use of modulators improving MOF crystallinity and defect presence, incorporation of NPs into the MOF tends to result in a loss of MOF crystallinity. To address this degradation, it is imperative to understand the causes. Herein, we present the influence of NPs stabilizing agent on the crystallinity of modulated Zr-based MOFs (UiO-66 and UiO-67). Prior to incorporating of NPs into the MOFs, key peaks at 2-7°, 7.3°, 8.3° and 25.8° showed a significant decrease in their full-width-half-height which correlates with increased UiO-66-HCl crystallinity. These peaks are not well defined with diffraction peak of unmodulated Zr-MOFs. Afterwards, UiO-66-HCl/Amino acids were impregnated with gold nanoparticles (AuNPs). The PXRD analysis revealed the corresponding peaks at 38.3°, 44.4°, 64.6° and 77.5° in agreement with the standard Bragg reflections of 111, 200, 220 and 311 for AuNPs planes. These PXRD analyses suggest competitive reactions of the carboxylate groups from citrate NPs stabilizing agent with the zirconium node linkers. Work is currently ongoing in our lab to unravel the mechanistic insight into how NPs stabilizing agent affect Zr-MOFs crystallinity.

Structure-Property relationship of laponite/polyacrylate terpolymer nanocomposite

Presenter's Name: Gebreyohans Measho Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Professor Raghavan Dharmaraj Faculty Advisor's email: draghavan@howard.edu

Co-authors: Weldejeworgis Gebrehiwot, Nadiya Evans

Acrylic polymers have been widely used for interior and exterior sealants and adhesives because they offer distinct advantages such as low cost, low viscosity, low volatile organic compound, and high solid content. However, they have limitations, including poor mechanical properties at ambient or high temperatures. One approach to improve the mechanical properties of acrylic polymer is to use a copolymer acrylate latex loaded with nanoclay filler to reinforce the polymer matrix. Enhancements in properties of nanocomposites depend on nanofiller dispersion and interaction with the polymer. This study investigates factors influencing the properties of polyacrylate copolymer latex loaded with laponite. Variables investigated include latex acid content, pH of laponite dispersion and latex, and laponite loading. FTIR, XRD, DMA, and TGA characterization of nanocomposites provided macrostructural to atomic-level insights. A blue shift in the carboxylic acid peak of latex was observed at pH 7 when loaded with laponite. The maximum IR peak shift, 12 cm-1, occurred at 5 wt% laponite loading and latex with 7.5 pphm acid content. XRD results suggested variation in the amorphous content with laponite loading, which was supported by NaI sorption studies. Nanocomposites with the highest laponite loading and latex with high acid content, exhibited storage modulus which was nearly 70 times higher than the latex, and the measured Tg value was -14 oC. Also nanocomposites exhibited superior performance than micron-sized filler-filled latex composites. Understanding nanofiller effects on bulk latex properties can be extremely useful in formulating next-generation adhesives.

Advancing Yellow Pea Ingredients for 3D Food Printing: Tribo-electrostatic Separation and Rheological Insights

Presenter's Name: Ghadiri gargari Sama Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Solmaz Tabtabaei Faculty Advisor's email: solmaz.tabtabaei@howard.edu

Co-authors: Solmaz Tabtabaei

As the demand for sustainable protein sources rises, innovative processing techniques are essential for plant-based ingredient enrichment. This study integrates tribo-electrostatic separation (TES) and extrusion-based 3D food printing to enhance the nutritional value of yellow pea-derived protein- and starch-rich products. First, tribo-charging behaviors of yellow pea powders were assessed to optimize protein enrichment via TES and milling. Pin milling, rather than Ferkar milling, with fine screening under laminar airflow (7 LPM) and moderate plate voltage (± 6.5 kV) produced a protein concentrate with 57% protein content and 62%

ABSTRACTS

protein recovery, outperforming conventional dry fractionation methods. The study established the first evidence of a triboelectric series of food powders as (+) nylon> protein> polyvinylchloride (PVC)> starch> polytetrafluoroethylene (PTFE)> copper alloy (-). Longer tribo-charger tubes and turbulent airflow maximized protein and starch chargeability only at <500 g/h particle dosing rate. Tribo-charging combined with TES analysis revealed that particle-particle collisions played a dominant role in charge acquisition of particles in moderately concentrated mixtures. At the same time, particle-wall interactions predominated when either protein or starch was the dominant component. Second, the rheological properties of additive-free protein- and starch-rich pastes were evaluated for extrusion-based 3D food printing. Best-performing pastes exhibited shear-thinning behavior, with protein-rich pastes (17%) demonstrating higher yield stress, viscosity recovery, and thermal stability than starchrich pastes, directly correlating with their ability to support multiple printed layers. This study provides insights into optimizing yellow pea components for advanced food applications, paving the way for tailored, nutritionally enhanced 3D-printed foods.

Anisotropic Magnetic Entropy Changes in Single Crystal CrSBr

Presenter's Name: Goswami Anirban Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Samaresh Guchhait Faculty Advisor's email: samaresh.guchhait@howard.edu

Co-authors:

CrSBr is a layered van der Waals material with unique magnetic properties, attracting significant research interest. In this study, we examined the magnetic behavior of a single-crystal CrSBr sample, synthesized using the two-zone chemical vapor transport (CVT) method. Testing revealed a rapid shift in the peak temperature of the magnetic entropy change as the magnetic field increased: from 132 K at 0.1 T to 170 K at 9 T for the in-plane direction, and from 132 K at 0.1 T to 159 K at 9 T for the out-of-plane direction. This indicates strong magnetic interactions within the layers above the Néel temperature (TN = 132 K). Analysis of relative cooling power (RCP), the full width at half maxima of the magnetic entropy peak (δ TFWHM), and the critical exponents showed that CrSBr transitions between magnetic states in a way consistent with three-dimensional behavior. These findings highlight the potential of CrSBr for intriguing magnetic properties and its importance in studying layered magnetic systems.

Investigation of the Electronic and Piezoelectric Properties of ZnS Quantum Dots

Presenter's Name: Gyawali Bipul Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors:

This research explores the electronic and piezoelectric properties of ZnS quantum dots using first-principles Density Functional Theory (DFT) simulations within the Quantum Espresso framework. Band structure calculations reveal a direct band gap ranging from 2.2 to 3.0 eV, depending on the computational parameters. Structural optimization has been performed, showing minimal atomic relaxation, while further analysis on convergence testing is ongoing to refine accuracy. Additionally, the study is investigating the piezoelectric response of ZnS quantum dots under external stress. These findings contribute to a deeper understanding of ZnS quantum dots, with potential applications in nanotechnology and materials science.

Lunar Regolith Exploration Via Standoff Raman Spectroscopy Using the Cube Rover Platform

Presenter's Name: Hare Laray m. Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors:

Lunar exploration is experiencing a resurgence in the modern era due to renewed interest from NASA, particularly through the Artemis program. As our closest neighbor in space, the moon has been the subject of constant fascination, exploration, and research. This project focuses on the study of lunar analog minerals through direct measurement, collection, and standoff Raman spectroscopy. Throughout the course of this project a complete mission concept is being developed using the Cube Rover platform for a future lunar mission. We are examining the parameters around a potential lunar mission involving a long-distance microscope to collect Raman photons in situ on the lunar surface. In documenting the specific constraints of this endeavor, the overall mass, pavload capacity, internal pavload dimensions, pavload nominal thermal environment, payload comms, data storage, and mission duration are being explored and determined for such a mission to be executed. The integration of standoff Raman Spectroscopy is of particular interest to this project, as the transport, operation, and deployment of an in situ compact and efficient standoff Raman instrument has been a goal for lunar exploration. Financial support from the NASA M-STAR Award No. 80NSSC21M0301 is gratefully acknowledged.

Optimizing Camera Calibration and Lucas-Kanade Optical Flow for High-Precision Structural Displacement Measurements

Presenter's Name: Hewitt Jordaina Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Claudia Marin Faculty Advisor's email: cmarin@howard.edu

Co-authors:

The increasing availability of cost-effective, high-resolution cameras has significantly advanced the application of computer vision techniques to estimate the conditions of civil engineering structures. These cameras uniquely serve as low-cost, non-contact sensors, delivering full-field measurements at high spatial density. However, extracting accurate displacement data from videos remains a challenge due to low vibration levels, lens distortions, and camera settings. This research addresses these issues by optimizing camera calibration and geometric corrections for vision-based displacement measurement. A Checkerboard Calibration process is combined with Homography Rectification and the Lucas-Kanade method to capture directional displacement values of points of interest that correlate to frame and pixel data coming in from the video. The calibration methods were systematically tested to determine the optimal calibration method for straight and distorted video frames comparing the accuracy between displacement data and the acceleration readings that are taken in conjunction with the video. In a lab experiment, results demonstrate that the method works to obtain accurate displacements with errors ranging from 6-13%. This approach is applied in an existing structure on the Howard University campus to obtain displacement of the structure under strong winds. This method offers a robust, cost-effective alternative to traditional displacement sensors through precise, non-contact measurements with consumer-grade cameras. With optimized calibration and geometric corrections, it addresses low-amplitude vibrations and lens distortions, making it suitable for a wide range of infrastructures-including bridges and buildings-using readily available hardware and software.

Reducing Energy Consumption and Carbon Emissions in Paper Pulping: The Role of Deep Eutectic Solvent Cellulase Enzymes in Sustainable Manufacturing

Presenter's Name: Hill Amirah Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@Howard.edu

Co-authors: Nyah Burnett, LaShae Patoir, Sarees Shaikh, Patrick Ymele-Leki

The paper industry is a major source of carbon emissions due to its high energy consumption and reliance on mechanical and chemical pulping technologies. This study analyzes the use of Deep Eutectic Solvent (DES) cellulase enzymes in the pulping process as a method of reducing energy consumption and environmental impact. Cellulase enzymes serve as catalysts in the hydrolysis of lignocellulosic fibers by weakening the raw materials and lowering the mechanical energy required for decomposition. Our experimental method begins with three hours of heating wood chips, followed by enzymatic treatment. Then, the chips undergo an ethylene oxide reaction, with phase separation achieved through vacuum filtering. This approach aims to reduce the need for mechanical processes, energy consumption, and carbon emissions by improving fiber degradation through enzymatic catalysis. The findings of this study may lead to more sustainable paper manufacturing, supporting the industry's initiative to meet higher environmental standards and reduce reliance on fossil fuels. This enzymatic technique is a potential step toward greener, more energy-efficient pulp and paper production.

Optimizing Urban Mobility and Patterns throughout the DC Metropolitan Area to Surrounding Neighborhoods: A New Innovative Way of Travel

Presenter's Name: Holmes Jaylin m Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Luwei Zeng Faculty Advisor's email: luwei.zeng@howard.edu

Co-authors:

With the DC Metropolitan area being a residential hotspot, the demand for efficient, sustainable, and safe mobility solutions has increased. In recent years, residents have incurred a substantial expenditure on housing, making Washingtonians choose to reside in communities around the borders to make the living cost friendlier.

This research examines bicycle travel patterns and urban mobility strategies to improve

commuter accessibility between Washinton, D.C., Arlington, Virginia, and Bethesda, MD using historical bikeshare data, transportation surveys, and GIS mapping analysis. The methodology combines comprehensive literature review, in-person site analysis of existing bicycle infrastructure, and technical modeling of optimal routes that consider topography, traffic volume, and safety measures. Analysis of Capital Bikeshare data and USDOT statistics indicates significant transportation challenges. Zillow reported that "the median price for a home in D.C is \$585,000 and the median price for rent is \$2,700 in 2018, nearly twice the national average median". Meanwhile, the Washington Post cited USDOT data showing average travel time had increased about 20 percent, to 35 minutes between 2019 and 2022 across DMV region.

This research develops a sustainable bicycle travel pattern system that reduces commute times while improving safety and accessibility. The findings provide a foundation for implementing innovative bicycle infrastructure connecting residential neighborhoods to urban centers, potentially alleviating transportation constraints while offering cost-effective alternatives for DMV residents facing growing housing and transportation challenges.

Assessing the Impact of Bike and Scooter Initiatives on Transportation Behavior in Washington, D.C.

Presenter's Name: Howard Merssaideiz Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Luwei Zeng Faculty Advisor's email: luwei.zeng@howard.edu

Co-authors:

Transportation accessibility and sustainability have become pressing concerns in urban planning, especially in densely populated areas like

Washington, D.C. In recent years, shared mobility initiatives such as bike and scooter programs have been introduced to provide low-emission alternatives to traditional transportation modes. However, the effectiveness of these initiatives in shifting commuter behavior and reducing reliance on personal vehicles remains underexplored. This study analyzes the impact of bike and scooter programs on transportation behavior by examining mode choice trends before and after their implementation. Using a mixed-methods approach combing survey data from a demographically diverse sample of D.C. residents with trip data from shared mobility service providers and DDOT records, this research evaluates changes in travel patterns, frequency of use, and demographic adoption rates. Outcomes of this work suggests that bike and scooter initiatives can contribute to a measurable increase in micro-mobility use, particularly among short-distance commuters and younger populations. However, barriers such as accessibility, infrastructure limitations, and safety concerns continue to affect adoption rates. The findings highlight the role of shared mobility in promoting sustainable transportation and provide evidence-based insights for policymakers to enhance infrastructure and regulatory frameworks that support equitable access to these alternatives, ultimately contributing to reduced traffic congestion and environmental pollution in urban centers.

Combining Expert Personas via Prompting for Enhanced Multilingual Emotion Analysis

Presenter's Name: Ince Amir Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Aryal

This presentation introduces a multi-level assessment framework for multilingual emotion analysis in Natural Language Processing (NLP). Unlike conventional Emotion Analysis (EA), which identifies explicitly expressed sentiment, our framework detects the emotion evoked in the author, which may differ significantly from the emotion conveyed in the text. This is particularly challenging in multilingual environments, where connotation, tone, and idiomatic phraseology differences impact emotion comprehension. Our framework uses small-parameter large language models (LLMs) as expert personas-Cultural & Linguistic, Psychological & Cognitive, Communication & Pragmatics, and Ethics & Philosophy. Individual predictions from these experts are combined through a larger aggregator model for final classification. This ensemble-based approach allows the models to analyze the text from different perspectives, enabling a more comprehensive and nuanced understanding of perceived emotion. We use the Llama 3.2 (3B) as the expert personas and the DeepSeek R1 (32B) as the aggregator model, both under the guidance of carefully crafted prompts without fine-tuning. We evaluate this approach on languages predominantly spoken in regions with limited NLP resources, including Africa, Asia, Eastern Europe, and Latin America. Our results show improved performance on high-resource languages and lower performance on low-resource languages (i.e., those with little available training data or computational tools), highlighting the need for more balanced AI models. This research contributes to making AI technology more representative and fair by bridging the gap in linguistic diversity for more accurate emotional recognition. We present our results as well as proposed areas for refinements.

Visualizing Flow Effects on a Quadcopter to Optimized Atmospheric Sensor Placement

Presenter's Name: Jackosn Dayna Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Anaiya Reliford

This project focuses on optimizing the placement of atmospheric sensors on quadcopters by investigating the aerodynamic behavior of their propellers. This is crucial for accurate environmental data collection. With the growing integration of small, Uncrewed Aerial Systems (sUAS) across industries, understanding airflow dynamics around quadcopters has become essential. The rotor-induced airflow disturbances of quadcopters pose a unique challenge to sensor accuracy. To address this, the research combines computational fluid dynamics and smoke tests to visualize air flow observing the forces and moments. A downscaled, 3D-printed model of the quadcopter will be used in wind tunnel experiments to observe airflow patterns. Smoke tests will be conducted in turbulent conditions. The results from these tests are compared to computational simulations, providing a comprehensive analysis of how airflow interacts with the body of the drone. By identifying optimal sensor placement, this study aims to minimize aerodynamic interference from the propellers and improve the reliability of real-time atmospheric data gathered by quadcopters in diverse environments.

Enhancing Transportation Safety Through a Computer Vision System: Case Study of Georgia Ave & Irving St Intersection in Washington, D.C.

Presenter's Name: Jacobs Kelsea Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Luwei Zeng Faculty Advisor's email: luwei.zeng@howard.edu

Co-authors:

Traffic safety at urban intersections is a growing concern, particularly in densely populated areas like Washington, DC. This study aims to investigate traffic patterns and pedestrian behavior at the Georgia Ave & Irving St intersection using computer vision techniques to identify safety risks and improve transportation infrastructure. By leveraging YOLOv8 for object detection, OpenCV for image processing, and AI-based tracking algorithms, this research develops an automated system to analyze vehicle movements, pedestrian crossings, and potential conflict zones. The methodology includes collecting 24-48 hours of traffic video footage across various environmental conditions, preprocessing data with reso-

lution adjustments and frame optimization, applying deep learning models to detect and track road users, and validating results against historical traffic incident reports. Key performance metrics including Multiple Object Tracking Accuracy (MOTA). Time-to-Collision (TTC), and conflict event detection rate will assess the system's reliability. This analysis will identify high-risk areas, traffic violations, and pedestrian-vehicle interactions at this high-traffic intersection near Howard University, which experiences significant multi-modal activity. The findings will contribute to data-driven urban planning, enabling policymakers to optimize pedestrian safety measures, signal timing adjustments, and traffic management strategies. This study demonstrates the potential of AI-powered traffic monitoring systems in enhancing road safety and supporting Vision Zero initiatives for accident reduction in metropolitan areas.

New Occurrences of the Central Delannoy Numbers in Z2[x] and Related Generalized Second Order Lattice Path Set Moments

Presenter's Name: Johnson Azaria Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Timothy Myers Faculty Advisor's email: timyers@howard.edu

Co-authors: Camereron Paxton, Olayinka Mofijioluwa

The sequence of central Delannoy numbers Dn counts the number of paths in a rectangular lattice from (0,0) to (n,n), wherein each such path consists of single steps to the east, north, and northeast. A generalized weighted second moment of a lattice path is the average of the square of the heights of its vertices multiplied by the product of weights assigned to its steps. We shall refer to the sum of such averages for the paths in a given set as a generalized second order lattice path set moment when a function of each vertex height is squared. In this talk we will discuss new occurrences of Dn in special classes of polynomials in the ring Z2[x] and also show that Dn counts some special generalized second order lattice paths and elevated Schroder paths associated with such polynomials.

Surrogate Modeling for Rapid Thermal Analysis of ISS Payload

Presenter's Name: Johnson Jayson Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Mykenzie Clark, Sonya Smith

The ability to efficiently analyze spacecraft thermal behavior is critical for optimizing mission performance and reliability. Traditional high-fidelity simulations using Thermal Desktop require extensive computational time and manual intervention, limiting the number of cases that can be evaluated. To address this challenge, an automated data processing pipeline was developed, enabling batch modification of simulation boundary conditions and rapid extraction of thermal data. Additionally, a machine learning-based surrogate model was implemented to predict node temperatures in the Japanese Experiment Module (JEM) aboard the International Space Station (ISS) based on key thermal parameters, including yaw, pitch, roll, incident heating, and ISS beta angle. The model produces temperature predictions within 1°F of accuracy while achieving results 200,000x faster than conventional methods. This workflow significantly reduces computational costs, automates large-scale analysis, and enables near-instantaneous thermal assessments. Future work will refine the model by incorporating uncertainty quantification, expanding the dataset, and integrating it into a broader digital twin framework for spacecraft thermal analysis.

Machine Learning-Based Surrogate Modeling for Thermal Analysis

Presenter's Name: Johnson Jayson Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors:

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Standoff Raman Spectroscopy: A Proof-of-Concept for Advancing Lunar Science and Exploration

Presenter's Name: Jones Anverly Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors: David Mugisha, Chase Adams

ABSTRACTS

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.

Floating Offshore Wind Turbine Wake Modelling and Prediction in Changing Climate Patterns

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Co-authors: Sonya Smith, Maureen Ramaube

Modeling the complex nature of the floating offshore wind farm environment is crucial for the future of wind energy production. Due to the nature of the offshore environment, full-scale predictive modeling and simulations which include validation and data assimilation are essential for simulating floating offshore wind farms. Wind turbines are affected by climate change through changing atmospheric conditions, such as wind patterns, temperature and humidity. All these atmospheric conditions impact 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 wakes, the Weather Research & Forecasting Model (WRF), is used to model the effects of climate change on atmospheric conditions that create wind wakes, including wind patterns, temperature, and stratification. This weather data is integrated into the AMR-Wind software, which will enable the creation of Large Eddy Simulations (LES) models of potential wind farms wakes created. Additionally, this analysis will be executed with the Energy Research and Forecasting (ERF) modeling software, a new modeling software that would integrate atmospheric conditions and LES modeling. The data collected from both models is analyzed to assess the potential risks and vulnerabilities of the wind farm to climate change, with regards to energy production, maintenance requirements and infrastructure resilience. Offshore wind turbine efficiency is essential for meeting national energy demands and supporting the transition to renewable energy.

Investigating the Role of Tryptophan Analogs as Substrates for LAT1: A Novel Approach Using Surface Plasmon Resonance and Nanoparticle Technology Presenter's Name: Joshua Kehinde Classification: Graduate Student School/College: Arts & Sciences Presentation Type: Poster Presentation Faculty Advisor: Jacqueline Smith Faculty Advisor's email: Jacqueline.Smith1@howard.edu

Co-authors:

The Large and neutral amino acid transporter (LAT 1) protein, also known as the L-type amino acid transporters, play a crucial role in transporting large neutral amino acid analogs across various cell membranes. This transporter is essential for diverse physiological processes including neurotransmitter synthesis and cellular signaling. Dysregulation of LAT1 has been studied in multiple pathological conditions like cancer and neurological disorder making it significant target for therapeutic investigation. This research aims to investigate the binding and transport mechanism of the (LAT1) protein, which has been identified as a target to facilitate the transport of compounds across the cell membranes of cancer cells and endothelial blood brain barrier. The main type of LAT 1 amino acid transporters is tolerant to complex synthetic compounds: gabapentin, melphalan, 4- chlorokynurenine, L-DOPA; amino acids: Leucine, and tryptophan; and amino acid drug conjugates: such as Valacyclovir due to their structural dynamics and conformation. According to our plan, we will investigate the use of fluorescence substrates, to quantify transport through LAT 1. We have used a cell-based fluorescent assay to study LAT 1-mediated transport in living cells by using amino acid derivatives or probes that can enable monitoring or high throughput screening, and quantification of LAT 1 in different cell models. Employing chemical synthesis approaches, we have synthesized amino acid analogs with unique fluorescent properties and performed several protections and deprotection steps on these compounds to synthesize our target compounds. The future work will use nanoparticle technology and Surface plasmon resonance to identify other fluorescent LAT1 subtrates.

Crack the Interviews with InterviewBot: AI-Powered Interviews, Bias-Free Practice

Presenter's Name: Khanal Abhishek Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Aryal, Legand Burge, Dagmawi Workineh Yemesgen, Donald Echefu, Saharsha Tiwari

Large Language Models (LLMs) have exhibited substantial capabilities in natural language understanding, making them well-suited for interactive applications such as interview preparation. Conventional mock interviews facilitated by human interviewers introduce unintended cognitive biases. This research presents InterviewBot, an LLM-powered,

speech-to-speech platform designed to deliver standardized, bias-mitigated interview practice. While existing AI recruitment technologies focus on resume screening, InterviewBot addresses the critical gap in interview practice facilitation. Empirical evidence shows human interviewers exhibit significant inconsistency in evaluation, influenced by non-content factors such as speech patterns, vocal characteristics, and perceived confidence-variables that introduce assessment variability. InterviewBot mitigates these issues through LLM-driven automation, implementing consistent evaluation rubrics across all interviewees and eliminating the assessment inconsistencies that result in disparate judgments for comparably qualified candidates. The system architecture integrates: (1) Voice Activity Detection for precise speech recognition, (2) Speech-to-Text conversion for accurate linguistic transcription, (3) LLM agent orchestration using Llama 3.1 8b with guardrails for response generation and evaluation, and (4) Text-to-Speech synthesis for naturalistic interaction. Our methodology evaluates system effectiveness through metrics targeting response relevance assessment, interview realism, and user experience satisfaction. InterviewBot has been deployed in controlled simulated environments to assess functionality and performance. The system successfully conducts real-time interview simulations, dynamically adjusting questions based on candidate responses. Preliminary findings indicate consistent assessments that mitigate the variability seen in human-led interviews. Current limitations include challenges in soft skill assessment and constraints in pre-trained model performance. Future work will focus on refining these capabilities and expanding the platform's applicability beyond technical interviews.

Functional Properties of Tribo-Electrostatically Separated Yellow Pea Protein Concentrates

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Co-authors: Solmaz Tabtabaei

A solvent-free pneumatic tribo-electrostatic separation method was utilized to fractionate yellow pea flour, processed through two distinct pin and Ferkar milling techniques at two different fine and coarse intensities, into protein-rich and starch-rich fractions. The protein-enriched fraction demonstrated superior oil absorption capacity, whereas the starch-enriched fraction exhibited enhanced water absorption capacity. The emulsion activity index was slightly higher for the protein-rich fraction than the original milled yellow pea flour, except for the protein-rich fractions obtained from fine pin-milled yellow pea flour, which displayed emulsion activity values comparable to its original flour. Emulsion stability was improved across all electrostatically enriched protein fractions compared to the original flour. Additionally, protein-rich and starch-rich fractions showed a notable increase in foam expansion compared to the original flour. Furthermore, these results were compared with commercially available yellow pea protein isolate, which exhibited even higher water and oil absorption capacity than all the other tested electrostatically enriched fractions. These findings provide a good insight into the applicability of these enriched fractions as novel food formulation ingredients and an understanding of their 3D food printing potency. Acknowledgments: This project was funded through a USDA-NIFA-AFRI Grant (#2020-67021-31141).

Using GPT 4o and CLIP-ViLTto Decode Figurative Language Across Text and Images

Presenter's Name: Lawal Abdulmujeeb Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Aryal

Correctly identifying the usage of idiomatic compounds has been a major challenge in the field of Natural Language Processing(NLP). The SemEval-2025 Task 1 presents two subtasks, A and B, which challenge participants to identify idiomatic expressions by using multimodal data which includes text and images. This paper, however, focuses on subtask A which is to identify which of 5 images best represents the usage of an idiomatic expression in a sentence. To solve this problem, we prompted GPT-40 to analyze the sentences and extract keywords and sentiments. Then a CLIP-VIT model ranks the images in order of how best they represent the idiomatic expression in the sentence. Our results showed decent performance compared to feeding the inputs directly into the models. Our approach performed better in English (Top1=0.67) than in Portuguese (Top1=0.23). Our work connects to AI in Practice: Impacts, Risks, and Opportunities because it highlights the potentials and the limitations of AI in real-world applications. On one hand, combining language and vision models helps AI understand human communication, which could improve translation tools, content moderation, and cross-cultural communication. On the other hand, we see that AI still struggles with multilingual fairness-our model didn't perform well in Portuguese, which raises concerns about bias and the need for diverse training data. This project is a good example of how AI can make technology more intuitive and useful, but also why we need to be thoughtful about the gaps in performance across different languages and contexts.

(r,k)-Zebra Tree and Schroder Paths

Presenter's Name: Lee Ashlyn Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Dennis Davenport Faculty Advisor's email: dennis.davenport@howard.edu

Co-authors:

An ordered tree, also known as a plane tree or a planar tree, is defined recursively as having a root and an ordered set of subtrees. An (r,k)-zebra tree is an ordered tree where all edges connected to the root (call this height 1) are r -colored as are all edges at odd heights and edges at even heights are k -colored. In this talk, we will discuss the special case when

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r = 3 and k = 2, and show that the generating function that counts such trees also counts the

number of Schroder paths with bicolored down steps.

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

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Specially in the Washington, DC area, 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.

Evaluating the Acoustic Impact of OPC-N3 PM 2.5 Accuracy Aboard sUAS

Presenter's Name: Mackie Myles Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Anaiya Reliford

The use of small, Uncrewed Aerial Systems (sUAS) for atmospheric sensing is a cheaper and faster alternative to traditional means of gathering particle mass concentration and meteorological data. Early results with a DJI Matrice 100 quadcopter equipped with an Alphasense OPC-N3 and i-Met XQ2 sensor suite reveal a positive correlation be-

tween onboard optical particle counter (OPC) data and ground-based measurements. However, greater variance in airborne data suggests an unaccounted source of noise affecting accuracy. Rotorcraft of this scale largely generate broadband noise with pressure fluctuations on the order of µPa, while particle mass loadings the OPC collects are on the order of μ g/m3 for particles larger than 0.05 μ m in diameter. These fluctuations in sound pressure level may contribute to noise in the OPC's mass concentration readings compared to ground sensors. To investigate this, flow fields are modeled computationally using Unsteady Reynolds-Averaged Navier-Stokes (URANS) equations, with acoustic analysis conducted via PSU-WOPWOP. The software uses the Ffowcs Williams-Hawkings and Brooks-Pope-Marcolini equations to quantify tonal and broadband noise, respectively, and returns the overall sound pressure level in the frequency and time domains. Results are expected to indicate that rotor-induced noise and vibrations at the OPC's location may contribute to discrepancies in airborne mass concentration measurements relative to ground-based sensors.

Computing the Heat of Vaporization (Δ Hvap) of Concentrated Commercial Lysol All Purpose Cleaner

Presenter's Name: Maya Monica Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Shawn Abernathy Faculty Advisor's email: sabernathy@howard.edu

Co-authors: Shawn Abernathy

The usage of commercial household cleaning products such as Lysol all-purpose cleaner (Lysol-APC) has drastically increased since the SARS-COVID-19 pandemic. Benzalkonium chloride (BAC) is the antimicrobial active ingredient found in Lysol APC. BAC is classified as a quaternary ammonium compound (QAC) which is a nitrogen compound containing typically four organic ligands. Lysol-APC has a pungent odor suggesting it contains a volatile organic compound (VOC). This is reflected from the strong vapors sensed by the nostrils upon removal of the cap from a bottle Lysol-APC. The EPA has also designated BAC as a pesticide. Prior research shows a strong correlation between protracted indoor exposure to QACs vapors to asthma and other respiratory diseases. Vapor pressure (VP) is a consequential physical property of liquid VOCs closely associated with volatility. The heat of vaporization $(\Delta Hvap)$ is a thermodynamic quantity denoting volatility computed from VP data. In this investigation, Δ Hvap of concentrated Lysol-APC was calculated by measuring the VP as a function of temperature (T) from 20.0 - 100.0 C at 10.0 C intervals using an ebulliometer. The ingredients label on Lysol-APC indicates BAC is dissolved in water. Thus, we hypothesized AHvap will be analogous to water (40.7 kJ/mol) due to heating 100 ml of concentrated and dilute Lysol-APC in open beakers simultaneously and observing normal boiling points of 99.4 C. A linear least square fit was applied to the empirical data plotted as ln P versus 1/T(K) to predict Δ Hvap of Lysol-APC. Future research entails computing Δ Hvap of pure BAC.

Synthesis of Carborane Containing Vancomycin Analogs as Novel Glycopeptide Antibiotics for Combatting MultiDrug Resistant Bacteria

Presenter's Name: Menefee Brittney Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Steven Cummings Faculty Advisor's email: steven.cummings@howard.edu

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Our lab is looking to take advantage of the electronic and structural properties of o-carborane based compounds to functionalize vancomycin to increase the efficacy of vancomycin. Carboranes have gained traction recently due to their potential applications in medicinal, electronic, environmental, and catalytic fields. This is due to carboranes exhibiting high stability, modifiable electronic and hydrophobic properties, low nucleophilicity, and low toxicity. They have also shown the ability to transport protons through lipid membranes and mitochondria; an important property in anti-cancer drug design. We have employed Sonogashira coupling and alkyne insertion chemistries to prepare two series of o-carboranylaldehyde compounds that will target the N-terminus of vancosamine. We are studying these compounds for their capacity to be an alternative to traditional organic-based vancomycin analogs to serve as new novel class of glycopeptide antibiotics. Type I functionalized o-carboranes are carboranylaarylaldehydes that are to mimic the chlorobiphenyl (CBP) N-terminus vancosamine modification on the current vancomycin analog oritivancin. Type II functionalized o-carboranes are arboranylalkylaldehydes bearing alkyl chains of various length to ascertain the importance of sterics and length for optimal efficacy. The first step is to synthesize a terminal ethynyl-arylaldehyde using the Sonogashira reaction with yields being in the range of 70%. Step two is to form the carboranylarylaldehyde and carboranylalkylaldehydes, type I and type II respectively, using an ionic-liquid-mediated dehydrogenative insertion to isolate the carboranylarylaldehyde directly or carboranylalkylalcohol followed by an oxidation with yields being 60-80%. The final step is a base assisted Schiff base condensation and reduction amination reaction.

Anxiety Support in Academic Faculty

Presenter's Name: Michaels Praise-el Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Anietie Andy Faculty Advisor's email: anietie.andy@howard.edu

Co-authors:

Anxiety among academic faculty remains a critical yet understudied public health concern because of comorbidity with depression and other mental health disorders. Here, we present the largest study to date examining faculty anxiety, analyzing data from 2,106 professors across 62 U.S. higher education institutions using the Generalized Anxiety Disorder (GAD-7) assessment. This comprehensive dataset revealed previously unknown patterns in how familial relationships and academic lineage influence faculty anxiety. Results: Our analysis uncovered a clear relationship between academic rank and anxiety levels, with tenure-track assistant professors showing the highest anxiety scores (predicted GAD-7 = 7.9) compared to full professors. While academic discipline explains only 0.32% of anxiety variance, we identify institutional factors and family support as major moderators of faculty mental health. We find that close family relationships significantly moderated anxiety across institution types, with particularly strong protective effects at HBCUs/ HSIs (b = -4.24, p = .015). Having an academic parent emerged as a novel protective factor, especially for faculty in STEM and Humanities (p < .018 and p < .010, respectively). These findings address a crucial gap in understanding faculty mental health and suggest that institutions should implement targeted interventions focusing on reinforcing social support systems, particularly for early-career academics.

Disclosure of Anxiety Concerns on Social Media: Do Concerns Vary by Age and Forum?

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Co-authors: Oluwadara Kalejaiye, Anietie Andy, Oluwajuwon Fawole

Background: Anxiety complaints have increased since COVID-19, but limited providers hinder efficient anxiety screening. People often turn to social media for relief, advice, or community, potentially offering insights into anxiety-related mental health needs. Since these social media posts often detail anxiety concerns, they may be a source of information to understand anxiety-related mental health needs. Objective: This study examines support-seeking posts on social media related to anxiety, investigating whether anxiety concerns follow similar cross-posting patterns across different forums and age groups as observed in previous loneliness-related research. Methods: The study analyzes posts from online anxiety and general forums across different age groups. A large language model extracts anxiety-related concerns from these posts. Analyses are conducted to determine if anxiety concerns vary significantly by forum type and age group. Results: Our findings demonstrate that anxiety concerns - identified using a large language model - vary across forum types and age. Our results show that users between the ages of 18 and 24 years old express the following anxiety concerns more than chance: "academic/work stress", "family issues", "financial problems", "health", "self image" or "physical appearance", and "social interaction". Users between the ages of 25 and 34 did not express the anxiety concern: "academic or work concerns" more frequently by chance but were more likely to express all the other anxiety concerns that the 18 to 24 year old users expressed. While there were fewer users belonging to the age group 35 - 65, users in this age group tended to publish more posts in the general forum.

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Understanding the Expressions of Loneliness on Social Media Across Racial Groups, Age Groups, and Genders.

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Loneliness affects 58% of adults in the United States and is linked with a 26% increase in mortality risk among middle-aged adults - this is comparable to the mortality risks of obesity, substance use, and smoking cigarettes. Loneliness is a risk factor for depression, coronary heart disease, and stroke. In a small population in the United States, a study showed that loneliness was higher among African Americans and Latinos/Hispanics than White Americans[1]. To provide appropriate loneliness interventions, it is important to identify individuals who experience loneliness and belong to these groups (i.e. race/ethnicity, age group, gender) and determine the variations in their expressed support needs and responses to support provided on social media. Existing work does not consider race/ ethnicity in the expression and manifestation of loneliness on social media, which limits the ability to design and implement appropriate loneliness treatments and interventions that can be used by different races/ ethnicities. To tackle this, we will develop artificial intelligence, natural language processing, and machine learning algorithms to determine the differences/similarities in the expression and manifestation of loneliness on social media by individuals belonging to racial and ethnic minority groups in the United States (specifically African Americans and Latinos/ Hispanics) compared to White American individuals and how these expressions and manifestations of loneliness may (or may not) vary when stratified by race/ethnicity, age group, and gender.

PedAlert: A Smart App to combat pedestrian distraction at intersections

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Co-authors: Prakriti Subedi, Abdul Nafay Saleem, Sanjib Sharma

Pedestrian distraction caused by the use of cell phones is an increasing public safety issue, which leads to accidents and injuries on the road. As the use of mobile phones becomes more prevalent, the necessity for efficient intervention methods to reduce the hazards of distracted walking also increases. To address this issue, we are developing an iOS application designed to alert pedestrians when they are using their phones near roadways, prompting them to put their devices down by sending a notification to focus on their surroundings. The app leverages the recent advances in Global Positioning System (GPS) and iOS Software Development Kits (SDK) to detect pedestrian movement and proximity to intersections, triggering real-time alerts when potential hazards are detected. In initial test cases, the app will be evaluated in local environments around the Howard University Campus to measure response rates and the effectiveness of notifications in reducing distraction. By providing an automated, real-time intervention, this app has the potential to enhance pedestrian safety, reduce accident risks, and contribute to broader public awareness regarding the dangers of distracted walking.

Optimization of Standoff Raman Spectroscopy for Lunar Mineral Characterization: A Proof-of-Concept Demonstration

Presenter's Name: Mugisha David Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors: Anverly Jones, Prabhakar Misra

For this project, we have developed a novel manual approach to standoff Raman spectroscopy for the characterization of lunar minerals, addressing the current limitation of a 7-meter range in the state-of-the-art systems due to restricted telescope aperture and signal collection efficiency. Our method relies on precise tweaking and adjustment of the experimental apparatus to optimize backscattered spectral radiance by maximizing the spatial distribution of laser excitation and enhancing the angular collection of Rayleigh and Raman signals from our analog lunar minerals. We utilize 520 nm and 532 nm green lasers, as well as a 650 nm red laser, to achieve optimal excitation and signal detection. In laboratory tests, we successfully demonstrated this proof of concept using samples such as chalcopyrite, corundum, and limonite at distances of 1 m, 10 m, and 30 m, with ongoing evaluations at 60 m. Additionally, we are extending these trials to a lunar mare simulant (JSC-1A) from the Johnson Space Center. In partnership with NASA Goddard Space Flight Center and Astrobotic Technology, Inc., this experiment is intended to serve as a fundamental proof of concept for upcoming lander missions, with potential implementation on an Astrobotic Raman Cube Rover.

Understanding the prevalence of the pseudo Jahn-Teller distortion in defects in hexagonal boron nitride

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Co-authors: Suryakanti Debata, Sharmila Shirodkar, Pratibha Dev

Since the discovery of quantum emission from defects in hexagonal boron nitride (hBN), theoretical works [1,2] have predicted pseudo Jahn-Teller (pJT) distortion in a few of the candidate defects. We show that the pJT distortion, which occurs in systems with non-degenerate ground state, results from a strong vibronic coupling between the occupied and the unoccupied defect states. In accordance with Bersuker's analysis, the pJT distortion in defective hBN increases the system's covalency [3]. Using several prototype defects that undergo pJT, we also create a quantita-

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tive measure for this added covalency. This measure helps us to create a greater physical understanding of pJT in hBNs' defects.

Nanofluids in Modern Engineering: Fundamentals, Applications, and Challenges

Presenter's Name: Nerolu Meenakshi Classification: Junior Faculty/ Lecturer/ Instructor School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Meenakshi Nerolu Faculty Advisor's email: meenakshi.nerolu@howard.edu

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Nanofluids-suspensions of nanoparticles in base fluids-have emerged as a promising solution for enhancing heat transfer in various engineering applications. Their superior thermal conductivity and altered thermophysical properties make them attractive for use in cooling systems, electronic devices, biomedical applications, and energy-efficient heat exchangers. This talk presents an overview of the fundamental principles governing nanofluid behavior, with a specific focus on Rayleigh-Bénard convection and stability analyses. A major challenge in understanding nanofluid dynamics is accurately modeling heat transport and flow stability. Using the single-phase approach, this work explores the role of thermophysical parameters such as nanoparticle concentration, viscosity, and thermal conductivity in influencing convective heat transfer. The generalized tri-modal Lorenz model and the Ginzburg-Landau amplitude equation are employed to analyze stability and quantify heat transport enhancements. Results indicate a significant reduction in the critical Rayleigh number, suggesting an earlier onset of convection in nanofluids compared to conventional base fluids. Furthermore, the Nusselt number computations reveal that nanoparticle-enhanced thermal conductivity is the primary factor driving improved heat transport. The session will conclude with a discussion on future research directions, including the development of hybrid nanofluids, AI-driven optimization techniques, and novel synthesis methods to improve thermal efficiency. These advancements hold promise for revolutionizing the field of heat transfer engineering and unlocking new possibilities in sustainable energy solutions.

Modeling Nanosensor Devices with Piezoelectric Materials Using COMSOL Multiphysics

Presenter's Name: Ogbuka Jefferson Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Misra Prabhakar Faculty Advisor's email: pmisra@howard.edu

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Piezoelectric materials exhibit a unique property where applied mechanical strain induces an electric field, making them highly effective for sensing applications, particularly gas detection. Surface Acoustic Wave (SAW) sensors leverage this piezoelectric effect to detect gas adsorption via resonance frequency shifts. This study focuses on using COMSOL Multiphysics to design, build, and model SAW-based ZnO nanosensor devices for gas sensing applications. Unlike traditional quantum dots, ZnO exhibits strong piezoelectric and semiconducting properties, enhancing its sensitivity to external perturbations.Unlike traditional quantum dots, ZnO exhibits strong piezoelectric and semiconducting properties, enhancing its sensitivity to external perturbations. The adsorption of gas molecules on the ZnO sensing layer induces mass loading effects, which alter SAW propagation characteristics and piezoelectric response. By simulating these interactions, we can analyze resonance shifts, charge redistribution, and mechanical stress variations in ZnO-based nanosensors. This research aims to optimize the sensor's sensitivity and selectivity for industrial and environmental applications, contributing to the advancement of piezoelectric nanosensing technologies.

sUAS and AI/ML Technologies for High-Resolution Air Quality Monitoring in Urban and Industrial Regions

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Co-authors: Anaiya Reliford

This study explores the design and implementation of 3D-printed sensor mounts for small, Uncrewed Aerial Systems (sUAS) to enhance atmospheric research capabilities with the help of AI and machine learning within the Atmospheric Boundary Layer (ABL). Most atmospheric sensing methods struggle to provide the efficient, high-resolution data often required for numerous applications. These traditional approaches not only consume significant resources but also demand substantial human involvement. By leveraging AI/ML and sUAS platforms, researchers can develop new atmospheric sensing techniques that reduce costs and risks while increasing data acquisition efficiency. Although sUAS have been used for various atmospheric missions, they have not been extensively used for in-situ particulate matter monitoring. This research utilizes a DJI Matrice 100 drone equipped with an Alphasense Optical Particle Counter (OPC-N3) and an InterMet-XQ2 (iMet) sensor to measure particulate matter (PM), temperature, and humidity at varying altitudes. The challenge of securely attaching these sensors without interfering with flight dynamics or causing sensor turbulence is addressed using custom 3D-printed mounts. Flight tests demonstrated the drone's ability to gather precise atmospheric data while maintaining full operational capabilities with a total payload of 753g. Results from the OPC-N3 and iMetXQ2 sensors were consistent with stationary measurements, confirming the system's viability for high-resolution atmospheric studies. Future work includes conducting additional flight tests and automating the flight path will enhance data precision and contribute to the advancement of environmental monitoring techniques.

Using Open-weight BART-MNLI for Zero Shot Classification of Food Recall Documents

Presenter's Name: Pant Kritika Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

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Food safety is a critical global issue, with foodborne illnesses affecting millions annually and causing significant economic losses. Rapid and accurate detection of food hazards is essential to mitigate these risks, but the sheer volume of food-incident reports makes manual monitoring impractical. Automated systems that classify hazards from textual data, such as recall notices, offer a promising solution. However, these systems must be both accurate and explainable to ensure transparency and trust in food safety applications. In this work, we address the challenge of classifying food hazards and products using zero-shot classification, which eliminates the need for task-specific fine-tuning. Our system leverages the BART-large-MNLI model, a pre-trained open-weight model known for its strong performance in natural language understanding. The task involves two subtasks:predicting hazard and products " and products ", "biological hazards" or "meat, egg, and dairy products") and identifying exact hazards (e.g., "salmonella") and products (e.g., "ice cream") from short texts.

Evaluating Methods for Identifying the Spin Glass Transition Temperature: A Comparative Study

Presenter's Name: Pradhan Sahil Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Samaresh Guchhait Faculty Advisor's email: samaresh.guchhait@howard.edu

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The spin glass transition temperature, often denoted as Tg, marks the point where a material undergoes a phase transition from a high-temperature paramagnetic state to a low-temperature spin glass state. There are several experimental signatures that have been used to determine this transition temperature. Spin glasses were first discovered from a peak in the ac susceptibility and the low frequency ac susceptibility peak is often used as the transition temperature. Researchers have also used the peak of the zero-field cooled (ZFC) magnetization [Phys. Rev. B 40, 869 (1989)] or the peak in the field-cooled (FC) magnetization [Phys. Rev. Lett. 54, 150 (1985)] as the transition temperature. However, others have taken the onset of irreversibility as the transition temperature [Phys. Rev. Lett. 66, 2923 (1991)]. If these techniques truly determined the phase transition temperature Tc, we would expect the measured Tg to be consistent across all methods, with similar behavior, such as a uniform response to varying magnetic fields. This study on a single crystal Cu0.94Mn0.06 sample presents the first comparative analysis of these different techniques for determining the spin glass transition temperature through static and dynamic measurements.

Fatigue Behavior of Cu-Zr Metallic Glasses under Cyclic Loading

Presenter's Name: Priezjev Nikolai Classification: Junior Faculty/ Lecturer/ Instructor School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Nikolai Priezjev Faculty Advisor's email: Nikolai.priezjev@howard.edu

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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 study a well-annealed Cu-Zr amorphous alloy subjected to periodic shear at room temperature. Published in Metals 2023 and 2024.

Language Features and Emotional Intensity in Black Lives Matter Posts: An Eight-Year Analysis Using Large Language Models

Presenter's Name: Reid Doron Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Anietie Andy Faculty Advisor's email: anietie.andy@Howard.edu

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On social media platforms, such as X (formerly Twitter), users publish Black Lives Matter (BLM) related posts. Prior work studied the emotions users express in these posts. Also on these posts, users express the following language features: a call to action, persuasion, the purpose of the post, sentiment, use of emojis, the topic expressed in the post, hashtags, and mention entities. In this work, we hypothesize that the intensity with which these users express emotions in these BLM related posts varies across these language features state why studying this is important. To study this, using a large language model (LLM), we extract the emotional intensity expressed in BLM related social media posts published over a period of 8 years; similarly, we extract several language features from these posts. With this dataset, we conduct analyses to determine the relationship between the emotional intensity expressed in these posts and each of these language features. We find that the following language features were correlated with emotional intensity: Persuasiveness: (Pearsonr= 0.3434), Call to action: (Pearsonr = -0.2464), and Purpose:(Pearsonr = 0.101). We discuss these results and their implications in the discussions section.

Crosslingual Fact-Checked Claim Retrieval-Combining Zero-Shot Claim Extraction and KNN-Based Classification for Multilingual Claim Matching Presenter's Name: Rijal Suprabhat

Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

ABSTRACTS

Co-authors:

The rapid spread of misinformation on social media highlights the need for automated, multilingual fact-checking systems. Leveraging the Multiclaim Dataset, we propose a novel approach for cross-lingual factchecked claim retrieval, combining zero-shot classification, semantic similarity matching, and K-nearest neighbors (KNN) search. Our system bridges the gap between high- and low-resource languages by eliminating the need for language-specific training data, promoting equitable access to fact-checking tools. The system comprises three components: text translation, knowledge base creation, and fact-check retrieval. Social media posts and fact checks are translated into English, and a pretrained model (all-MiniLM-L6-v2) generates embeddings stored in a vector database for efficient similarity searches. A large language model (Deepseek-r1:14B) extracts core claims, while retrieval combines KNN search and zero-shot classification to identify semantically equivalent claims.Experimental results show competitive performance, achieving a Success@10 (S@10) score of 0.59225, ranking 21st on the SemEval Task 7 leaderboard. KNN search outperformed zero-shot classification (S@10 scores of 0.59 and 0.47, respectively), revealing challenges in zero-shot methods for cross-lingual claim matching. While promising, the system faces limitations, including computational intensity and potential loss of linguistic nuances during translation.Future work will focus on optimizing classification, exploring multilingual embedding models, and fine-tuning models for claim extraction and matching to improve accuracy and scalability. This research advances multilingual misinformation detection, demonstrating the feasibility of zero-shot approaches for cross-lingual fact-checking.

Augmenting Naval Ship Images for Viewing Distance using Adobe Generative Fill

Presenter's Name: Sankah Joseph Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Jazmine Dennis

Image augmentation is essential for enhancing the quality and diversity of datasets in machine learning. This abstract focuses on augmenting 98 US Navy ship images, particularly generating high-quality zoomed-out images while preserving subject integrity, dimensions, and background consistency. Zooming out poses unique challenges as it requires expanding the image context while maintaining realism. To address this, a two-step methodology was employed. First, images were zoomed out using OpenCV at factors of 0.5, 0.25, and 0.125, generating three distinct datasets centered on a white background. Next, these datasets were processed using Adobe Photoshop's Generative Fill, which proved more effective compared to custom GPTs from OpenAI, MidJourney, Google Vertex AI, and Meta LLaMA. Two approaches were used: one with the prompt "sea" and another without any prompt, in both batch and manual modes. This resulted in a total of 882 augmented images. Images were evaluated using a color-coded system (red, yellow, green) based on subject integrity, dimensions, background quality, consistency, and artifact presence. This systematic labeling ensured rigorous quality assessment. The findings demonstrate the potential of generative AI to enhance image datasets for real-world applications, such as defense and autonomous systems, while highlighting the importance of rigorous evaluation and human oversight. This work contributes to the evolving field of AI in practice by showcasing its transformative potential and emphasizing robust methodologies to ensure data reliability and trustworthiness.

Raman Spectroscopy of Lunar Analogs

Presenter's Name: Sexton Jordan Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors:

Raman Spectroscopy is a spectroscopic tool that aids in the identification of molecular compounds by measuring the shift in wave number between the incident light shined upon a sample and the scattered light from the collision between the incident photons and the sample. Collecting a sample's Raman spectrum is a non-invasive process, which suit the needs of mineral identification of the lunar regolith during missions conducted by the National Aeronautics and Space Administration (NASA). This project focuses on a proof-of-concept for the functionality of a long-range stand-off Raman spectroscopy system aboard an Astrobotic rover-lander spacecraft, which supports the development of technology that will allow lunar rovers to collect the Raman spectra of the lunar regolith from distances up to tens of meters. Our experiments utilize a manual Raman set up in a closed dark box, where the scattered light is collected through a fiber optic cable at varying lengths (1 m, 10 m, 30 m, 60 m) and analyzed for Raman scattering. The samples used in the experiments are minerals collected from Earth, such as Talc and Chalcopyrite, and powder samples of the lunar regolith analog sample. The success of this research will aid in the acquisition of more data about the Moon and potentially find utility in identifying minerals and compounds during upcoming space missions.

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Using Maclaurin Series to Simplify Mathematical Transformations

Presenter's Name: Shrestha Sijan Classification: Undergraduate Student School/College: Arts & Sciences Presentation Type: Oral Presentation *Faculty Advisor: Meenakshi Nerolu* Faculty Advisor's email: meenakshi.nerolu@howard.edu

Co-authors: Meenakshi Nerolu, Pradeep Siddheshwor

Transform methods play a fundamental role in solving differential equations and analyzing mathematical functions. This research explores how a transformation can be derived using the Maclaurin series expansion, a special case of the Taylor series centered at zero. By leveraging the structure of Maclaurin series, we systematically develop transformation rules that simplify differential equations and facilitate solution techniques. The study also examines the connections between series expansions and established transformation methods, such as the Differential Transform Method (DTM), which is widely used for solving ordinary and partial differential equations. Through analytical derivations and computational visualizations, we demonstrate the effectiveness of this transformation approach and compare its advantages with traditional numerical methods. This work provides an accessible introduction to transformation techniques, offering insights for students interested in applied mathematics, mathematical modeling, and computational methods.

Enhancing Drone-Based PM2.5 Monitoring: A Machine Learning Approach to Improve OPC-N3 Sensor Accuracy

Presenter's Name: Stewart Angelica Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Sonya Smith Faculty Advisor's email: ssmith@howard.edu

Co-authors: Anaiya Reliford

Accurate PM2.5 measurement is crucial for monitoring air pollution and protecting public health. Traditional stationary sensors provide high-accuracy data but are limited in spatial coverage, whereas drone-mount-

ed sensors offer mobility and flexibility, enabling real-time air quality monitoring in areas where stationary sensors are unavailable. However, drone-based measurements are often compromised by environmental factors such as wind turbulence, altitude variations, and platform vibrations, leading to slight inaccuracies compared against ground-based sensors. This project focuses on the Alphasense OPC-N3, an optical particle counter (OPC) that estimates PM2.5 concentrations by measuring the intensity and pattern of light scattered by airborne particulates. As particles pass through a laser beam inside the sensor, they scatter light at various angles, with the amount of scattered light correlating to particle size and concentration. While effective in controlled environments, this method is highly sensitive to external disturbances. When mounted on a drone, vibrations, altitude shifts, and air turbulence can disrupt light scattering, distorting the sensor's readings and introducing biases that reduce data reliability. To address these challenges, a machine learning model will be trained on PM2.5 measurements from both stationary and drone-mounted OPC-N3 sensors. The trained model will perform comparative analysis, predict PM2.5 concentrations, and derive a correction equation to reduce measurement errors. By improving drone-based air quality monitoring, this research aims to make airborne pollution tracking a more precise and scalable solution.

Kinetic Control of Competing Carborane Functionalization Reactions

Presenter's Name: Sweet Carrie Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Steven Cummings Faculty Advisor's email: steven.cummings@Howard.edu

Co-authors:

Carboranes are of interest because of their 3-dimensional bulk, permanent internal dipole, general robust nature, and good solubility in a variety of solvents. These compounds are not only comparable in size to benzene but also are of great interest as an aryl-group analogue due to the structure's inherent pseudo-aromaticity. Significant progress has been made towards vertex-selective functionalization allowing research into carboranes potential to serve in catalytic, medicinal, electronic, and optical applications. In this study, Kumada couplings of 9-iodo-1,2-diphenyl-ortho-carborane are conducted with several alkyl-Grignard reagents with the intent to form boron-carbon bonds on the B(9) vertex. However, a mix of alkylated compounds substituted at both the B(4) and B(9) vertex is seen. It was observed that temperature plays a key role, with the B(9)-alkylation being the main product when the reaction is conducted at room temperature while the B(4)-functionalization predominates at elevated temperatures. This is a result of competing catalyzed processes; the Kumada coupling reaction produces the B(9)-alkylated carborane, while the B(4)-alkyl carborane is a result of a beta-hydride elimination at the B(9) followed by a nucleophilic attack by the Grignard reagent at the B(4). The presence of beta-hydride elimination is strongly confirmed as when aryl-Grignard reagents are utilized three distinct products are present with none being the result of a beta-hydride elimination. The mixture of these structural isomers suggests the possibility of palladium-mediated cage-walking induced by the aromaticity of the aryl-Grignard. This mechanism is being investigated.

Synthesis and Characterization of Emetine-Podocarpic acid Hybrid for Studies in Prostate Cancer

Presenter's Name: Tadesse Endalkachew Classification: Post Doc/Resident/Fellow/Research Associate School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Oladapo Bakare Faculty Advisor's email: obakare@howard.edu

Co-authors: Tadesse E., Alkahashi J., Butcher R., and Bakare O.

Emetine(1) is a natural product alkaloid found in the root of Psychotria ipecacuanha, which is the active ingredient in the ipecac root that has long been used in traditional folk medicine as an emetic and expectorant. As a protein synthesis inhibitor, its anticancer activities have been investigated in several phase I-II clinical trials for a number of solid tumors. However, emetine was reported to have a very narrow therapeutic index, and dose-dependent side effects, such as muscle fatigue and cardiac toxicity, were observed in clinical studies. Based on this toxicity effect, development of emetine as an anticancer drug was ceased, but recent investigations in cell biology and pharmacology involving invitro studies have revealed the potency of emetine in modulating different biological pathways associated with cancer growth. In continuation of our studies in developing emetine-based compounds with reduced toxicity in our prostate cancer drug development program, we are synthesizing emetine-podocarpic acid hybrids. The synthesis and characterization of these novel compounds will be presented.

A Solution to Rising Asthma Rates due to High-Traffic Areas in Washington D.C. - Green Buffer Zones

Presenter's Name: Thaha Nuha Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Luwei Zeng Faculty Advisor's email: luwei.zeng@howard.edu

Co-authors:

In Washington D.C., environmental justice concerns affect low-income and minority communities exposed to transportation pollution. Asthma rates increase as high-traffic area expand, with African Americans more vulnerable due to residential patterns and socioeconomic factors. The research explores how implementing green buffer zones in urban transportation corridors can mitigate air pollution as an intervention to address health disparities. This study examines the relationship between transportation infrastructure and asthma rates in Washington D.C. through health data analysis, while investigating whether green buffer zones effectively reduce pollutants to develop integration strategies for transportation infrastructure. The methodology involves identifying high-traffic corridors in D.C., analyzing DC Health data for asthma-related hospital discharge records, researching optimal pollution-capturing plant species for buffer zones, and comparing health outcomes between areas with and without green buffers. UCLA research found asthma sufferers living near heavy vehicular traffic are nearly three times more likely to visit emergency department than those in low-traffic aera, creating disproportionate burdens for racial/ethnic minorities and low-income households. A Washington D.C. study demonstrated that poverty contributes to asthma through limited healthcare access, poor housing conditions, increased smoking rates, and environmental hazards exposure. Environmental modifications may offer solutions for families with limited healthcare access, as proximity to freeways and lack of green space correlates with asthma. Results will inform urban planning and policy interventions addressing pollution and community disparities, promoting sustainable transportation infrastructure in Washington D.C.

DeepTabCoder - Code-based Retrieval and In-context Learning for Question-Answering over Tabular Data

Presenter's Name: Tiwari Saharsha Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Saurav Keshari Aryal Faculty Advisor's email: saurav.aryal@howard.edu

Co-authors: Saurav Keshari Aryal

This paper introduces DeepTabCoder, a method for leveraging large language models (LLMs) in question-answering over tabular data. DeepTabCoder leverages a code-based retrieval system combined with in-context learning to generate and execute Python code for answering queries over structured datasets. By utilizing DeepSeek-V3 for code generation, DeepTabCoder effectively integrates dataset-specific metadata into tailored prompts, enabling the model to reason over complex tabular structures without directly exposing full table contents. Our approach follows a three-step process: first, dataset-specific schema information is extracted and integrated into the prompt; second, in-context learning is employed to generate executable code for retrieving relevant answers; finally, the generated code is executed in a controlled environment to ensure correctness. This modular framework enhances generalization across diverse datasets while minimizing hallucinations in query responses. Results demonstrate the effectiveness of DeepTabCoder in handling various question types, including Boolean, categorical, numerical, and list-based queries. Our model achieves an accuracy of 81.42% on the DataBench dataset and 80.46% on the DataBench Lite dataset, significantly outperforming the baseline model, which achieves 26% and 27% accuracy, respectively. Notably, our approach excels in Boolean reasoning and numerical queries, though challenges remain in handling complex aggregation tasks requiring multi-hop reasoning. These findings reveal the potential of code-based retrieval and execution in tabular question-answering tasks. Future work will focus on advanced prompt engineering and execution strategies to improve performance on more complex queries, such as leveraging smaller LLMs to verify code execution for multi-hop reasoning and broader generalization.
Machine Learning-based Adaptive Fault-Tolerant SRAM-based FPGA designs for Medium Earth Orbit

Presenter's Name: Tolentino Harrell Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Hassan Salmani Faculty Advisor's email: hassan.salmani@howard.edu

Co-authors:

Field-programmable gate arrays (FPGAs) are becoming increasingly prevalent in space applications due to their high-performance computing capabilities, low non-recurring engineering (NRE) costs, and reconfigurability compared to application-specific integrated circuits (ASICs). However, FPGAs in space are vulnerable to radiation effects, ranging from transient faults to destructive failures. To address these issues, FP-GAs must incorporate fault-mitigating techniques or be radiation-hardened by design (RHBD). Techniques such as Triple Modular Redundancy (TMR), though robust, require significant resources, power, and design space, leading to performance trade-offs. In this work, we propose an adaptive fault-tolerant FPGA design, utilizing Machine Learning (ML) to dynamically reconfigure the FPGA for either performance or reliability based on the expected radiation environment. Specifically, we focus on Medium Earth Orbit (MEO) Global Positioning Satellites (GPS), where Solar Particle Events (SPEs) significantly affect radiation levels. Using CRÈME, a tool for estimating Single Event Upset (SEU) rates, we train an ML model on historical GPS proton flux data to predict SEU rates during future SPEs. The model informs the threshold for reconfiguring the FPGA to a more robust or performance-oriented state as needed. The results demonstrate the potential for reducing unnecessary mitigation while ensuring system reliability during space missions.

Bioremediation of Iodate Contamination via Planktonic Shewanella Oniedensis MR-1 Cells – Kinetics and Reactor Design

Presenter's Name: Uyanne Tochukwu Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Patrick Ymele-Leki Faculty Advisor's email: patrick.ymeleleki@howard.edu

Co-authors: Treylin Lewis, Mahtab Waseem, Tafadzwa Chigumira, Olabisi Bello, Brady Lee

Nuclear waste produced at the Hanford site, a decommissioned nuclear weapons plant, has contaminated the Columbia River system and the surrounding area with over a million gallons of radioactive wastewater. Radioiodine-129, a key component of this waste, has serious negative effects on the ecological health of the area and the quality of life of thousands of people who depend on the Columbia River system. Research has shown that Shewanella Oneidensis MR-1 (MR-1), a gram-negative bacterium, can reduce heavy metals such as silver, lead, and uranium via dissimilatory microbial reduction. Prior work from our laboratory has shown that, through this mechanism, S. oneidensis can reduce iodate to iodide, which can more easily be removed from wastewater. Thus, in

this study, we hypothesized that planktonic S. oneidensis cells could be used as microbial reduction agents within a bioreactor to reduce radioiodine content in wastewater. The focus of this study was to investigate and determine the kinetic parameters associated with this process. To that end, using the method of initial rates, the kinetics parameters were determined to be:

r=k*Framing Mental Health: Sentiment Analysis

 $\llbracket [IO] _3^{-}] \land a^* \llbracket [MR-1] \land b$

[k = 0.2120; a = 0.3579; b = 0.7530]

The derived kinetic data was then used to model and evaluate batch and continuous bioreactor systems for conversion of iodate to iodide. The result of this work could further the development, deployment and commercial scaling of bioreactors to address radioiodine contamination at the Columbia River and other places experiencing heavy metal pollution.

AI-Driven Decision Support Systems for Tactical Decision Making: Enhancing Accuracy and Reducing Stress with Retrieval-Augmented Generation

Presenter's Name: Christopher Watson Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Gloria Washington Faculty Advisor's email: gloria.washington@Howard.edu

Co-authors:

Author: Christopher Watson

Background: Our research aims to develop a usable and explainable language model that enhances tactical decision-making in military operations and emergency response. The key research questions driving our work include: (1) How can open-source large language models (LLMs) assist in tactical decision-making? (2) How effective are zero-shot prompts in assessing threats, such as approaching objects, when using fixed LLMs? (3) Can response quality be improved through retrieval-augmented generation (RAG) with domain-specific documents? Methods: Our current research milestone focuses on optimizing a RAG pipeline tailored for tactical decision-making. This involves refining retrieval mechanisms, curating domain-relevant corpora, and systematically evaluating how retrieved knowledge improves response accuracy and contextual relevance compared to previous experiments without RAG. Results: Some preliminary results of our experiment identify optimal models based on both retrieval and generator metrics. Retrieval performance was evaluated using metrics such as F1 score, Mean Average Precision (MAP), Mean Reciprocal Rank (MRR), Normalized Discounted Cumulative Gain (NDCG), and Precision. The quality of generated responses was assessed using BERTScore and BLEU score, METEOR and ROGUE. Conclusions: The tracked metrics provided valuable insights into the effectiveness of the retrieval mechanism and the quality of generated responses, including fluency, coherence, and semantic accuracy. These evaluations played a crucial role in identifying the most effective configurations, ultimately enhancing the performance of our eventual integration to a real-time decision support LLM.

Characterizing the Electron Transport of Various Semiconductor Materials using Fourier Transform Infrared Spectroscopy

Presenter's Name: Whylie Osei-sekou Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Brandon Ash Faculty Advisor's email: brandon.ash@howard.edu

Co-authors:

This project was hosted at the National Synchrotron Light Source-II (NSLS-II) on the Brookhaven National Labs grounds. The task was to characterize the electron transport in doped and undoped Gallium Arsenide (GaAs) and Silicon using infrared light. The primary tool, a Bruker 80v Fourier transform infrared (FTIR) spectrometer, employs a Michelson interferometer to split projected infrared light into two arms. A movable mirror then introduces a path difference, creating an interference pattern upon recombination. This interferogram, captured by a detector, is processed into a power spectrum representing absorption at various wavelengths. Initially, the power spectrum of a gold mirror, with nearly 100% reflectivity in the infrared, serves as an optical reference. The semiconductor's power spectrum is then measured, and reflectance is determined by comparing it to the gold mirror's spectrum. The resulting reflectance vs. wavenumber graph is crucial for characterizing electron transport properties and can be fitted to learn about the material's properties. The purpose of this project is to develop an Infrared Nanospectroscopy (AFM-IR) method that offers a quantitative approach similar to FTIR for determining a material's transport properties. The research conducted was to get an accurate reference of the material's electron transport properties with FTIR to be then compared to AFM-IR. This research was the preliminary step to determining more accurate transport quantities for materials due to the inherent capability of AFM-IR to create high-resolution images of nanoscale surfaces.

Hack-Proofing the Commute: Cybersecurity in Modern Transit Systems

Presenter's Name: Wilkins Dyani Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Luwei Zeng Faculty Advisor's email: luwei.zeng@howard.edu

Co-authors:

With time the public transit system and digital technologies have greatly intergraded with innovations such as real-time rider information displays, electronic fare payment systems, and network communications. This has made public transportation susceptible to cybersecurity threats. This has made public transportation susceptible to cybersecurity threats. The research explores the cybersecurity risks that modern public transportation faces narrowing down on the Washington D.C. Metro (WMATA) and the New York City Subway (MTA). The aim of this study identifies vulnerabilities in fare collection systems, communication networks and more while assessing the impact on safety and service reliability. Using comprehensive vulnerability assessments, comparative case-studies analysis, and structured system evaluations methodologies guided by established framework including the National Institute of Standards and Technology (NIST) Cybersecurity Framework, Department of Transportation Cyber Security Risk Management protocols, and transit-specific security standards, the research develops practical and implementable strategies to enhance security. The findings highlight critical attack vectors in payment systems and operational networks, propose cost-effective protective solutions tailored to transit environments and advocate for greater awareness and cross-disciplinary collaboration between transportation engineers and cybersecurity professionals. By addressing these vulnerabilities, this study contributes to strengthening the resilience of urban transit infrastructure against possible cyber-attacks.

Modeling and Simulation of Piezoelectric Zinc Sulfide Quantum Dots and Its Potential Applications

Presenter's Name: Williams Zakiya Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Prabhakar Misra Faculty Advisor's email: pmisra@howard.edu

Co-authors: Wisdom Benson, Chase Adams

Zinc Sulfide (ZnS) quantum dots (QDs) are a semiconducting nanocrystal material that undergoes a quantum mechanical process called quantum confinement. Multiple particles compacting into one or more dimensions enhance their piezoelectric capabilities. The mechanical stress induces an amount of energy charge indicated by the piezoelectric capacity. 3-D data visualization of the crystal structure is created using VESTA, then the data is extacted into Quantum ESPRESSO to produce output calculations of the self-consistent field (scf) and non-self-consistent field (nscf). Zinc Sulfide is used in some LEDs and medical imaging. Because of its wide band gap, strong piezoelectric coefficients, and semiconducting properties, ZnS QDs are expected to return useful energy outputs. Further study of Zinc Sulfide quantum dots could add value to various areas. Medical imaging, sensor technology, and LEDs could be improved due to their high luminescence properties. Additionally, ZnS quantum dot qubits could make quantum computing faster and more accurate.

Modeling Diffusion-Reaction Dynamics in Immobilized Methanotrophs for Methanol Production

Presenter's Name: Wood Gabrielle Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Cristiano Reis Faculty Advisor's email: cristiano.reis@howard.edu

Co-authors: Cristiano Reis

Methane is classified as the second major greenhouse gas, with a global warming potential 25 times that of carbon dioxide. Previous studies have explored the biological conversion of methane to methanol (biofuel) and

other useful chemical products under ambient physiological conditions by microorganisms known as methanotrophs. However, there are major obstacles to the use of methanotrophs for methanol production, including low methanol-production stability of cells and poor solubility of CH4 in the medium. Several studies explore the immobilization strategies of methanotrophs on solid supports to address these issues. In this study, a diffusion-reaction model is proposed coupling the diffusion of gaseous reactants (CH4 and O2) following Fick's law and Michaelis-Menten enzymatic reactions inside immobilized methanotroph systems. The model was used to simulate how different immobilization materials impact the substrate transport and methanol yield, and to analyze how different substrate conditions, such as methane-oxygen ratio, affect the methanol yield. This model offers a predictive framework for optimizing experimental parameters, such as substrate ratio and immobilization material concentration, which allows for informed decision-making and reduced material costs in laboratory studies towards the development of largescale bioproduction of methanol from methane.

Fine Tuning Perforamce of Li-ion Batteries via Experimental Technique

Presenter's Name: Yakubu Emmanuel Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Quinton Williams Faculty Advisor's email: quinton.williams@howard.edu

Co-authors:

Every battery cell's capabilities depend heavily on how it is prepared. The experimental process can be broken down into parts: slurry mixing, dried electrode treatment, cell fabrication, and measurements. Tuning parts of the experimental process directly reflects on the data measured. Quantities such as Specific Discharge Capacity, Current, Cycle Index, and Voltage, are primary determinants of how the process affects the battery performance. This research addresses each stage of the experimental process to achieve a cell operating at maximum capabilities.

Evaluating Prevention Strategies for Impaired Driving: An Integrated Assessment of Community Perceptions and Response Intentions

Presenter's Name: Zeng Luwei Classification: Post Doc/Resident/Fellow/Research Associate School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Claudia Marin Faculty Advisor's email: cmarin@howard.edu

Co-authors:

The Research and Education for Promoting Safety (REPS) Tier 1 University Transportation Center, led by Howard University in collaboration with the University of Maryland, San Jose State University, and the University of Nevada, Las Vegas, focuses on enhancing transportation safety through multidisciplinary research that combines civil engineering and computer science expertise. A recent study conducted through REPS investigated behavioral responses to impaired driving prevention through community survey analysis. This investigation explores the determinants of behavioral response to impaired driving prevention through analysis of community survey data. Utilizing ordinal logistic regression modeling, we examined the relationship between prevention strategy perceptions and intended behavior modification. The analysis revealed that receptiveness to educational outreach served as the strongest behavioral predictor, complemented by local safety concerns and attitudes toward enforcement checkpoints. While demographic factors of age and education level showed positive trends without reaching significance, previous encounters with impaired driving demonstrated an unanticipated negative correlation. Content analysis of qualitative responses identified dual themes emphasizing both enforcement strategies and educational initiatives. The results suggest that optimal prevention approaches should synthesize educational outreach with enforcement visibility while remaining responsive to community safety priorities. Methodological limitations include the cross-sectional nature of the data and sample concentration among younger, educated demographics. Future studies would benefit from longitudinal designs and expanded demographic representation to strengthen conclusions about intervention efficacy.

ABSTRACTS

SOCIAL SCIENCES

Empowering Psychology Undergraduates at HBCUs: Establishing a Comprehensive Professional Development Network

Presenter's Name: Adeyeri Tiwa Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Davis Dixon Faculty Advisor's email: davis.dixon@howard.edu

Co-authors: George Daniel, Deon Auzenne, Davis Dixon

Undergraduate psychology students often face challenges in accessing resources essential for their professional growth, a concern amplified among underserved minority students and women in STEM fields (Plantae., 2024; Fry et al., 2021. This study aims to assess the necessity and feasibility of establishing a professional development organization for psychology students at Howard University (HU), specifically focusing on bridging these gaps and fostering academic and career success. Methods: To identify existing support gaps, consultations will be conducted with graduate students and faculty members. A survey will be distributed to HU undergraduate psychology students, gathering data on their access to career resources, perceived obstacles, and interest in a dedicated support organization. A Google Form will be utilized to collect responses, facilitate resource sharing, and encourage community engagement. Data will be analyzed using Microsoft Excel for descriptive statistics, allowing a comprehensive understanding of student needs and preferences. Discussion/Future Directions: This study anticipates a high demand for mentorship, internship opportunities, and graduate school guidance, with strong student interest in a professional development organization. Beyond benefiting HU students, findings may indicate a broader need for such initiatives across other institutions. Future efforts will focus on formalizing the organization, expanding membership, and developing an evidence-based curriculum featuring workshops, mentorship programs, and networking events. Long-term impact assessments will explore scalability, potentially extending access to psychology students at other HB-CUs and beyond.

"Bendición, mami". Exploring Cultural Identity Formation of Millennial "DiaspoRican" Mothers and Their Nurturing Process in the U.S.

Presenter's Name: Agosto maldonado Lillian Classification: Graduate Student School/College: Communications *Presentation Type: Oral Presentation* Faculty Advisor: Loren Saxton Coleman Faculty Advisor's email: loren.coleman@howard.edu

Co-authors:

Puerto Rico is considered a "Diasporic Community" (Ayala, 2020) and a "nation on the move" (Duany, 2002). Given its political relationship with the United States and its status as a "commonwealth," Puerto Rico has experienced migration from the start. After undergoing my identity formation as a "DiaspoRican," I have been exploring the experiences of various "Puertorriqueños y Puertorriqueñas" who left their homes and moved to the United States in search of new opportunities. One particularly intriguing scenario to me is being a mom as a "DiaspoRican" and belonging to the Millennial demographic. This phenomenological study examines the cultural identity formation perspectives of Millennial "DiaspoRican" mothers and their nurturing process in the United States. Preliminary findings highlight the preservation of Puerto Rican identity through language, food, and traditions, the necessity of a support network post-migration, and the fear of discrimination surrounding the use of the Spanish language.

Cultural and Demographic Drivers of Maternal Mortality in Ghana

Presenter's Name: Akintonde Morayo Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Latanya Brown-Robertson Faculty Advisor's email: l.brown-robertson@howard.edu

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Maternal mortality is a pressing issue faced by the public health sector in Ghana, influenced by a complex interplay of cultural and demographic factors. This study explores the intersection of these factors through a mixed-methods approach with data from the Ghana Maternal Health Survey (2017) and primary data collected from interviews with pregnant women, nurses, and midwives. Preliminary analysis shows that women with no formal education or only primary education face significantly higher risks of maternal complications and mortality. Interviews confirm that those with lower education levels are more likely to adhere to traditional cultural practices such as the use of herbs and reliance on traditional birth attendants. This study aims to educate vulnerable groups in Ghanaian society and potentially inform policymakers to drive positive change in the country.

Black Love on Screen: Exploring the Impact on Black Women and Intimate Partner Violence

Presenter's Name: Allen Tatiana Classification: Undergraduate Student School/College: Communications *Presentation Type: Oral Presentation* Faculty Advisor: Jennifer Thomas Faculty Advisor's email: Annenberg@howard.edu

Co-authors:

Black women have been statistically shown to have the highest rates of experiencing intimate partner violence (IPV) among racial demographics (Rice, J. et al. 2020). Yet, the crisis is rarely highlighted in the me-

dia, leading to a lack of advocacy and stigmatization. This study seeks to determine if there is a connection between the messaging in Black love films and the IPV Black women face in their communities. The researcher will use a mixed-method approach of surveys, interviews, and focus groups to analyze participants' perspectives on films' themes while gaining insight into participants' perceptions of IPV. Black women from ages 18-26 attending Howard University will be selected through convenience and purposive sampling. The researcher hypothesizes that Black romance films have further diminished awareness of IPV within the Black community. The research aims to understand the impact that Black romance films can have in shaping societal attitudes toward IPV advocacy and recognition of victimization.

Black Hair on Howard's Campus

Presenter's Name: Alston Kristal Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Jules Harrell Faculty Advisor's email: jharell@howard.edu

Co-authors:

Black women's hair carries cultural importance, often serving as a reflection of identity and self-expression. Yet on college campuses, Black female students may encounter multifaceted pressures to conform to beauty standards, including Eurocentric ideals and critical reactions from peers. This thesis explores the impact of these experiences on the mental health and well-being of Black college women. Literature suggests that microaggressions, social stigma, and external judgment can create significant stressors, influencing self-esteem, sense of belonging, and academic engagement. Conversely, supportive peer networks, inclusive campus policies, and visible representation of diverse hair textures can strengthen resilience and foster positive self-perception. Using surveys, the research aims to document the range of lived experiences and identify potential areas for intervention. By acknowledging the interplay between societal expectations, peer influence, and cultural identity, colleges can more effectively support the psychological well-being and academic success of Black female students.

Looking Beyond the Monolith: A Mixed Design Study Exploring Identity, Community, and Support for HBCU STEM Students

Presenter's Name: Anderson Gelysia Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Afiya Fredericks Faculty Advisor's email: afiya.fredericks@udc.edu

Co-authors: Niya Mogheeth, Yanique McKenzie, Patrice Greene, Afiya Fredericks

Historically Black Colleges and Universities (HBCUs) are one of the most renowned contributors to America's top Black STEM profession-

als. (Toldson 2019). HBCUs continuously enroll students from minority groups and provide support and nurture to first-generation and low income students (Toldson et al., 2022). HBCU students are significantly more likely to experience positive relationships with their faculty and peers. However, there is a paucity of literature that explores community, support, and Black STEM student experiences at HBCUs across institutions and the diaspora. Utilizing an explanatory sequential mixed-method design (Creswell et al., 2015) our study examines the following questions: 1. What percentage of HBCU STEM students express feeling a sense of community at their institution? 2. How are STEM HBCU students describing community and support on their campuses? 3. What are the challenges they encounter in creating and sustaining community and support? Surveys were distributed and completed by 1072 students representing 35 HBCUs. We conducted 60-90 minute virtual interviews with 11 students from 9 HBCUs. Key findings revealed that though 75% of students felt a sense of community at their HBCU, there were challenges highlighted by international and immigrant students who experienced financial strains, communication barriers among accents/languages, and difficulty in forging connections and relationships amongst students of different ethnicities. Implications from the results of this study suggest the importance of faculty involvement and the necessity of activities and initiatives to enhance cohesivity amongst the Black diaspora on the HBCU campus.

A framework for sustainable development without falling into a debt trap.

Presenter's Name: Archibald-drew Kathlyn Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Cyril Hunte Faculty Advisor's email: chunte@Howard.edu

Co-authors:

This paper creates a framework developed for promoting economic growth in Less Economically Developed countries without falling into cycles of revolving debt to global north nations. This paper evaluates existing strategies for sustainable growth, and amends them into a plug-and play style model for developing nations to create their own sustainable growth institutions.

The Relationship Between Perceived Racism, Self-Rated Health, Inflammation and Personality

Presenter's Name: Arkorful Simona Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Alfonso Campbell Faculty Advisor's email: acampbell@howard.edu

Co-authors:

The connection between stress and chronic conditions like cardiovascular disease (CVD), obesity, and Type II diabetes is well-established.

Racism, as a psychological stressor, has been linked to poorer physical and mental health outcomes. African Americans experience disproportionately higher rates of chronic conditions like CVD compared to Whites. This study examines the relationship between perceived racism and self-rated health in African Americans, using Interleukin-6 (IL-6), an inflammatory biomarker, as a mediator and neuroticism, a Big Five personality trait, as a moderator. The sample includes 108 African American men and women from the Minority Organ Tissue Transplant Education Program (MOTTEP) Stress and Psychoneuroimmunological Factors in Renal Health and Disease Study. Perceived racism is measured using the Perceived Racism Scale (PRS), which assesses workplace and public racism (recent and lifetime). Health perception is evaluated via the Short Form-36 Health Survey (SF-36), neuroticism through the NEO-PI-R, and IL-6 levels through blood samples. Multiple linear regression analyses are conducted using the Hayes PROCESS macro in R. Results show neuroticism moderated the indirect effect of recent public racism on health, suggesting elevated neuroticism may worsen health through increased IL-6 levels. However, this was not consistent across all contexts. Direct negative effects on health perception were significant across all contexts, while IL-6 partially mediated the relationship in public domains. The study highlights how chronic exposure to racism may drive health disparities through unhealthy coping strategies and inflammation, providing insights into the biopsychosocial mechanisms contributing to health inequities in African Americans.

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Exploring the Prevalence of Exercise Addiction Among Female Collegiate Basketball Players.

Presenter's Name: Arnold Jasmine Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Seanta Cleveland Faculty Advisor's email: seanta.cleveland@howard.edu

Co-authors:

This study will examine the prevalence of exercise addiction (EA) among female collegiate basketball players. The significance of this study lies in addressing a critical gap in literature, and these findings will inform the development of effective preventative strategies tailored to this understudied population. The study will be conducted at Howard University, an HBCU. The theoretical framework guiding this research is the Self-Determination Theory (Deci & Ryan, 1985), which suggests that athletes' needs for autonomy, competence, and relatedness can contribute to maladaptive behaviors, such as EA. Data will be collected using the Exercise Dependence Scale (Hausenblas & Symons Downs, 2002) to assess EA and related psychological factors. A sample of 14 female collegiate basketball players will be recruited to participate in the study. Convenience sampling will be utilized for this study. This study is expected to reveal key risk factors and whether EA is prevalent in female collegiate basketball players. Keywords: Exercise Addiction, Student-athletes, Collegiate Sports, HBCU

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Exploring the link between undergoing an oophorectomy and surgically induced menopause and how anxiety and depression affect patients as a result

Presenter's Name: Baker Tiffani Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Seanta Cleveland Faculty Advisor's email: seanta.cleveland@howard.edu

Co-authors:

This literature review explores the relationship between undergoing an oophorectomy, surgically induced menopause, and how patients can experience depression and anxiety as a result. This topic is significant because it helps to answer the knowledge gap related to the long-term mental effects of oophorectomy and surgically induced menopause. This research topic was answered using a reflexive thematic analysis to organize secondary data. This method consisted of creating codes based on the themes found in the secondary data. This study concludes that there is a link between the research variables. Surgically induced menopause and an oophorectomy do increase the risk of anxiety and depression in patients. However, other factors can contribute to why patients experience these psychological conditions. These factors include whether patients had pre-existing conditions before the surgery. Overall, this literature review informs medical professionals about making sound surgical decisions that promote whole-body health for their patients with gynecological conditions. Keywords: oophorectomy, ovaries, side effects, surgery, depression, anxiety, premature menopause, surgical menopause, hysterectomy, mental health

The Role of Racial Socialization Competency and Coping Self-Efficacy in Black Emerging Adults: Moderation and Mediation Effects on Childhood Trauma and Race-Related Stress

Presenter's Name: Barber Maegan Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: GiShawn Mance Faculty Advisor's email: gishawn.mance@howard.edu Co-authors: GiShawn Mance

Objective-The study aimed to assess whether racial socialization competency serves as a cultural protective factor for Black emerging adults with childhood trauma and race-related stress experiences. Additionally, the study sought to examine whether the effects of trauma on internalizing symptoms were explained through coping self-efficacy. And to determine whether racial socialization competency buffered the potential moderating effects of race-related stress on the relationship between trauma and coping self-efficacy in predicting internalizing symptoms. Methods-Black emerging adults were recruited through academic and social media platforms and completed demographic, trauma, race-related stress, coping self-efficacy, and psychological symptoms measures. Data were analyzed to examine the mediational and moderating effects of coping self-efficacy and racial socialization competency on race-related stress and internalizing symptoms. Results-Analyses comprised of 259 Black emerging adults (52.9% African American; Mage=20.4; 69.9% women). Coping self-efficacy mediated the relationship between trauma and symptoms. Race-related stress did not moderate the relationship between trauma and coping self-efficacy. Similarly, race-related stress did not moderate the relationship between trauma and symptoms indirectly through coping self-efficacy. A double moderated mediation analysis was insignificant; however, racial socialization competency moderated the relationship between childhood trauma and coping self-efficacy, with coping self-efficacy as the mediator and predicted decreased internalizing symptomology in the absence of race-related stress. Conclusions-Findings highlight the critical role of racial socialization competency and coping self-efficacy in mental health outcomes for Black emerging adults with childhood trauma histories.

Where Are We in Creativity Research: Trends and Relationships in Black Creativity

Presenter's Name: Bell Kymberly Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Monique Major Faculty Advisor's email: m_major@howard.edu

Co-authors:

In this study, we are performing a content analysis to analyze how Black creativity has been studied within the field of psychology. This research is important because creativity as a construct has predominantly been explored through a westernized lens on people of European descent (Jenkins, 2005). The purpose of this study is to identify major themes, their relationships, and trends within the published research about Black creativity. We collected journal articles relating to Black creativity from APA's Psycinfo database. Seventy-one articles met our search criteria and were classified into 3 areas of creativity; visual, verbal, and performance arts. The criteria for deciding whether or not a publication was relevant to our research was (1) the article must include participants from the Black diaspora, (2) it must be centered around visual arts, verbal arts, or performance art, and (3) it must investigate at least one psychological variable. To analyze the data we will evaluate the most frequently occurring keywords, as well as calculate co-occurrences between them, and

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then use a clustering algorithm to determine major themes. The results will tell us the most frequently researched topics about Black creativity in the identified areas. We will also use bibliometric mapping with publication year, authors, and institutions where the research is conducted to discover if there is a relationship between these variables and the themes. This study is beneficial for psychological researchers, educators, and artistic creators. It will show where there is a gap in research relating to Black creativity.

Bottled Up or Spoken Out? How Gender and Socialization Shape Stress Responses in Black Communities

Presenter's Name: Berthoud Maya Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Dr. Davis Dixon Faculty Advisor's email: davis.dixon@howard.edu

Co-authors:

Stress is a key determinant of mental health, particularly in Black communities, where individuals face systemic racism, economic instability, and cultural expectations. While research has explored stress and coping mechanisms, less is known about how gender and socialization shape coping strategies among Black men and women. This study examines this intersection, focusing on venting and substance abuse as distinct coping mechanisms. Prior research suggests that Black women often use venting, seeking social support to manage stress, while Black men are more likely to engage in avoidance-based coping, including substance use, due to societal expectations of emotional restraint. These coping strategies are rooted in gendered racial socialization. Black men are often socialized to exhibit toughness and emotional suppression, leading to increased substance use as self-medication. In contrast, Black women are socialized to be resilient caretakers, fostering a reliance on verbal processing and communal support. This study explores whether these patterns are reinforced through socialization and how they contribute to differing mental health outcomes. Using a mixed-methods approach, this research will employ the Coping Inventory for Stressful Situations (CISS), the Gendered Racial Socialization Scale, and the Cultural Identity Questionnaire to assess coping styles among Black male and female college students. By examining these factors, this study aims to fill gaps in knowledge regarding gendered socialization and stress responses. Findings will inform culturally relevant mental health interventions, helping professionals design community-centered strategies that address the specific coping needs of Black men and women.

Hustle and Flow: The Intersection of Hip-Hop, Black Sex Work, and Crime in Black Communities

Presenter's Name: Blue Tyler Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: N/A N/A Faculty Advisor's email: N/A@gmail.com

Co-authors:

This thesis explores the intertwined influence of hip-hop culture and Black sex work on crime patterns and societal perceptions within Black communities, aiming to highlight their potential for empowerment, resilience, and cultural innovation. While acknowledging the darker aspects—such as the commodification of crime and sexuality, and their role in perpetuating harmful stereotypes-this research contends that both hip-hop and Black sex work are complex cultural phenomena that extend beyond their critiques. Through a nuanced analysis of lyrical narratives, representations of sex work in hip-hop, and the socio-economic contexts that shape these industries, this study seeks to uncover their capacity to foster agency, challenge systemic oppression, and inspire social change. Hip-hop has long been a vehicle for storytelling, protest, and cultural pride. At the same time, Black sex work, when viewed through a lens of autonomy and self-expression, can be understood as a reclamation of power in an inequitable system. By balancing critical examination with recognition of their transformative potential, this thesis celebrates how hip-hop and Black sex work contribute to the vibrancy and resilience of Black communities, ultimately advocating for a more supportive and informed cultural understanding.

Adultified & Angry: Examining the Effects of Adultification on Black Youth's Anger Responses

Presenter's Name: Bogler Taniya Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Marie Claude Jipguep Faculty Advisor's email: mjipguep-akhtar@howard.edu

Co-authors:

Adultification bias is a phenomenon that causes Black children to be perceived as more mature and less innocent than their peers of other races. As a result, they are treated differently and receive harsher treatment from adults. Adultification is closely linked to another harmful stereotype, anger bias. Both stereotypes impact how Black children are perceived by their counterparts. Prior research focuses on adult perceptions, but little is known about how Black children experience and respond to biases. This study seeks to investigate how adultification affects the emotional and psychological development of Black children, particularly in relation to their anger responses. The main hypothesis is that higher anger responses are associated with greater experiences of adultification. By exploring this connection, the research aims to reveal how these biases shape emotional expression, peer and adult relationships, and the overall development of Black youth.

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The Context of Coping Dynamics: Understanding Mental Health Disparities ?and Coping Strategies among Urban Youth of Color?

Presenter's Name: Bonner Mharisi Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Mercedes Ebanks Faculty Advisor's email: mebanks@howard.edu

Co-authors:

Children of color, particularly Black children, are disproportionately diagnosed with conduct disorder (CD) and oppositional defiant disorder (ODD) (Bird et al., 2001; Fadus et al., 2019; Lahey et al., 1995; Yu et al., 2022). These diagnoses can lead to severe consequences, including involvement with the criminal justice system and long-term mental health challenges (Loeber et al., 2009, as cited in Ballentine, 2019). Although White children have been found to exhibit higher levels of clinical aggression, they are diagnosed with these disorders less frequently than Black and Hispanic children (Cameron & Guterman, 2007). This discrepancy highlights the persistent racial bias in psychological assessments and diagnostic practices. Moreover, there is a lack of current research on ODD and CD despite their significant impact on children of color. Further investigation is needed to understand how coping strategies develop in response to environmental stressors and how these strategies are expressed differently across racial groups. By reframing maladaptive coping behaviors as adaptive responses to challenging environments, this research seeks to clarify how children, adolescents, and young adults navigate situational stressors in ways often misinterpreted as defiance or disorder (Lazarus, 1993).

Prevalence of Head and Neck Injuries in Black NFL Players

Presenter's Name: Branch Jasmine Classification: Graduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Alaina Davis Faculty Advisor's email: alaina.davis@howard.edu

Co-authors: Jasmine Branch, Eme Offiong, Amanda Melendez, Sharon Davis, Rose Langdon, Victoria Steele

Sport-related concussions are considered a silent, but significant injury to the brain. Injuries to the brain are often the result of head to body, head to ground, and head to object contact. Each year, there are an estimated 1.6–3.8 million sports-related concussions (Langlois et al., 2006). More specifically, the incidence of concussion in the National Football League (NFL) is 27.8 per 1,000 athletes (Lawrence et al., 2015). Over half of NFL players identify as Black and concussion is a concern in this population as related to healthcare disparities. Healthcare disparities are differences in access to and the quality of healthcare received between two or more groups (Ellis & Jacobs, 2021). Researchers have found that Black athletes Black athletes reportedly are less likely to receive a concussion diagnosis or information about concussion (Wallace, Biedler, Kerr, et al., 2021). In 2020, 68% of NFL players who were reported to sustain concussion/neck injuries during the 2020 NFL season identified

as Black (or within the diaspora; Davis, 2023; NFL, 2021). To date, there is limited data on the incidence and prevalence of concussions among current Black NFL players. Therefore, the authors aimed to identify the prevalence and incidence of concussion and neck injuries among Black NFL players for the past five years. The relationship between concussion/neck injuries and player demographics will be analyzed. Preliminary data indicates that Black NFL players maintain the highest prevalence of concussion and/or neck injuries when compared to the players from other racial backgrounds for the past five years.

Understanding HBCU Undergraduates Students' Basic Needs: A Capacity Building Study

Presenter's Name: Carter Erinn Classification: Graduate Student School/College: Education *Presentation Type: Oral Presentation* Faculty Advisor: Jorge Burmicky Faculty Advisor's email: jorge.burmicky@howard.edu

Co-authors:

This paper aims to understand HBCU undergraduate students' basic needs while exploring the capacity that HBCUs possess to address such needs. Guided by a basic needs services implementation rubric, this paper collected interview and focus group data from two research-intensive HBCUs, totaling 25 participants, including undergraduate students, faculty, staff, and senior leaders. Findings indicate that participants experience notable challenges in providing timely, accessible, and comprehensive basic needs resources and services with clearly navigable systems and outcomes. Furthermore, findings demonstrate how faculty and staff use various approaches to alleviate the stigma associated with utilizing basic needs services, especially considering the stigma that many Black communities face surrounding basic needs services and resources.

Lekol, Legliz, Lakay: A Comparative Analysis of Cultural Identity and Urban Form in Saint-Louis du Nord and Little Haiti

Presenter's Name: Charles Shanora Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Eleanor King Faculty Advisor's email: emking@howard.edu

Co-authors:

This study examines the extent to which cultural, political, and economic factors shape the built environments of Saint-Louis du Nord, Haiti, and Little Haiti, Florida. While both communities are rooted in Haitian heritage, they diverge in their urban morphology due to distinct economic conditions and policy frameworks. Saint-Louis du Nord reflects an informal, self-organized urban fabric driven by resource constraints, while Little Haiti navigates cultural preservation amid external economic pressures and gentrification. Through a comparative analysis of housing, street layouts, public spaces, and infrastructure, this research investigates how migration, historic events, and urban planning policies have

influenced spatial development in both locations. The study employs a mixed-methods approach, including historical research, spatial analysis, and an examination of urban planning documents and census data. By mapping urban patterns and analyzing zoning laws and development strategies, this research highlights the interplay between economic disparities, policy interventions, and cultural resilience. Key sources include urban studies literature on Haitian migration, community development reports, and historical accounts of both regions. Findings suggest that while Saint-Louis du Nord's built environment continues to be shaped by necessity and self-organization, Little Haiti undergoes constant transformation due to shifting economic forces and culture preservation efforts. This research contributes to a broader discourse on how historically marginalized communities negotiate spatial identity in different political and economic contexts. It also highlights the vital role preserving cultural identity plays in shaping immigrant enclaves in America. Understanding these dynamics can inform more inclusive urban planning approaches that recognize cultural specificity and community agency.

More than a Statistic: Analysis of the Black Mind Post-Incarceration

Presenter's Name: Clark Amaria Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Dr.Debra Roberts Faculty Advisor's email: ddroberts@howard.edu

Co-authors:

Across the United States of America, Black people are incarcerated at an increasingly alarming rate. Previous studies have examined the psychological effect of incarceration; this study analyzes a secondary data set with a novel perspective to provide findings surrounding Black mental well-being. Many social factors influenced by imprisonment, such as education, employment, and socioeconomic status are identified as risk factors for mental illness. It is hypothesized that individuals will score low in mental well-being compared to individuals who have not been convicted. The purpose of this study is to understand the lingering effects of imprisonment on Black Americans' psychological well-being post-imprisonment within the Washington D.C. metropolitan area. The research is intended to expand on the extant literature on vulnerable populations including incarcerated and marginalized individuals. Implications of the findings are discussed within the context of better understanding research on Black psychological well-being and enhancing Black mental health awareness.

Examining the Influence of ICT Adoption on Agricultural Commercialisation in Rural Rwanda

Presenter's Name: Collier Garland Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Tingting Xiong Faculty Advisor's email: tingting.xiong@howard.edu

Co-authors:

The commercialisation of the agricultural sector is an essential element of Rwanda's development priorities, with substantial implications for poverty reduction and food security, as well as wealth building and rural economic growth. The national government's agricultural policy has focussed on promoting production intensification and market access, and while progress has been made in increasing the market orientation of the agricultural sector, there still exist significant barriers to entry, resulting in maintained high levels of subsistence agriculture across the country. Information communication technologies (ICTs) present a promising solution to many of the issues surrounding information and access to input, output, capital, and financial markets. However, there has been limited scholarly attention paid directly to the relationship between ICT adoption and agricultural commercialisation among Rwandan farmers. Hence, this study aims to evaluate the impact of the access to and usage of key ICT tools on market participation levels in Rwanda. Drawing from the FinScope Rwanda 2020 survey and the Rwanda Season Agricultural Survey 2020, this study utilizes a binary logistic regression approach to analyse the impact of cellphone, computer, and internet access, as well as mobile money usage. Preliminary findings suggest that access to and usage of ICTs are associated with a higher propensity to farm primarily for sale on the market; access to a computer or internet appears to have the strongest relationship, and access to a cellphone the weakest.

I'm Just a Girl: The Effect of Pop Culture's Adaptation of Anti-Feminist Rhetoric on Gen-Z and Millennial Women in the Digital Age

Presenter's Name: Cummings Zoe Classification: Undergraduate Student School/College: Communications *Presentation Type: Oral Presentation* Faculty Advisor: Fatou Sow Faculty Advisor's email: fatou.sow@howard.edu

Co-authors:

This study will evaluate the way that "anti-feminist" rhetoric is spread on social media through digestible phrases, and its effects on Gen-Z and Millennial women. The researcher will evaluate the language of previous feminist waves, as well as how that language was communicated through different media outlets during each period. It will also evaluate the language and dissemination techniques of those opposed to the women's rights movement, and how the media plays a role in influencing people on both sides of the movement. Using historical context as the foundation of this research, the study will employ a mixed methodology that evaluates the modern-day phenomenon categorized as "anti-feminist" language and its dissemination on social media. The goal of this study is to evaluate the impact of antifeminist language on Gen-Z and Millennial women of different racial groups.

Fostering Friendships: Black College Women at HBCU's

Presenter's Name: Dean Mia Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Zoeann Finzi-Adams Faculty Advisor's email: zoeann.finziadams@howard.edu

Co-authors: Chloe Hightower

Black women college students experience a number of stressors, such as race-related stressors, interpersonal stressors, and academic stressors. Race-related stressors consist of racial discrimination, prejudice and culture shock, and stereotype threat. Interpersonal stressors consist of feelings of loneliness, isolation, and self-esteem. Lastly, academic stressors include: academic performance, test anxiety, and time management (Neville et. al., 2004; Schmader et. al., 2008; Shahid et. al., 2018). Black college women rely on protective factors to navigate their unique experiences. Some of the protective factors include: reliance on the Black community, "kin" networks, and spiritual or religious practices (Shahid et. al., 2018; Tatum, 1987; Terhune, 2008). Research has consistently described aspects of community to be strategies for coping with the adversity faced by Black college women (D'Augelli & Hershberger, 1993; Leath et. al., 2022; Shahid et. al., 2018). One specific aspect of relationships noted as significant is the role of Black women friendships (Leath et. al., 2022). Affirmation of self-image, discussion of intersectional identity development and experiences, and examining the role of settings have been found as social support factors within Black women friendships (Leath et. al., 2022). Research has shown that a shared racial identity provides safety and empathy in relationships, while relationships with those from a different race may complicate the support one receives due to differing perceptions (Davis, 2015; DeFrancisco & Chatham-Carpenter, 2000; Davis & High, 2019). To expand the discussion of Black women college student friendships, a poster presentation will provide a model that explores barriers to fostering friendships at HBCU's.

Tweeting Trust: The Influence of Social Media Consumption On Public Confidence in Elections

Presenter's Name: Diallo Leila Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: John Sides Faculty Advisor's email: john.m.sides@vanderbilt.edu

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The factors influencing public opinion on electoral legitimacy have been widely studied at the macro level, but little research explores what shapes individual confidence in elections. This paper investigates how news consumption through social media platforms affects public trust in election results. I hypothesize that individuals who rely on social media for news express greater distrust in electoral processes than those who use traditional media. Previous research links partisanship and polarization to declining confidence in elections, but I examine whether social media exposure exacerbates this trend. Using survey data from the 2019-2021 Nationscape Project, I analyze how personalized news consumption impacts trust in election outcomes. Preliminary findings suggest that individuals who consume news through social media in tandem with other sources express lower confidence in election results compared to those who use traditional media exclusively. As news delivery shifts from mass broadcasting to algorithmically curated content, understanding the political implications of this shift becomes increasingly critical.

Framing Mental Health: Sentiment Analysis of News Coverage on Racial-Ethnic Minority Groups in 2024

Presenter's Name: Dismuke Toni Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Lucretia Williams Faculty Advisor's email: lucretia.williams1@howard.edu

Co-authors: Sarah Kabbo, Erica Okeh

Mental health news content on racial-ethnic minority (REM) groups often discusses the cultural nuances and lack of representation in mental health resources in the United States. Despite the increased advocacy for better mental health resources for REM, there is still a constant comparison between REM groups and White groups. Oftentimes, news content heavily focuses on the negative challenges instead of the positive highlights that can call for better mental health care with readers seeking help and resources. We investigate the sentiments of mental health news content in the year 2024, sourced from Google News. We conducted a content analysis of mental health news articles on the various cultural groups in America-African, Asian, Latino, Native, and White Americans-and analyzed the sentiment of each article. Here, we will present our initial results with an analysis of how cultural representation is addressed, the presence of stigmas, biases, and stereotypes, as well as comparisons between cultural groups. Understanding the sentiment and the ways in which current mental health content is being disseminated will allow us to create more effective science communication for healthy and constructive messaging.

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From Culture to Code: An Intersectional Analysis of AAVE Slang in Large Language Models

Presenter's Name: Douglass Thane Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Jaye Nias Faculty Advisor's email: jclarknias@gmail.com

Co-authors:

As large language models (LLMs) become increasingly embedded in digital communication, their ability to accurately process diverse linguistic varieties remains a critical concern. African American Vernacular English (AAVE), a legitimate linguistic system with its own grammatical and cultural complexities, is often misinterpreted or marginalized in Al-driven language processing. This study evaluates the performance of three prominent LLMs GPT-40, Claude 3.5, and Llama 2 in interpreting AAVE slang across five culturally significant categories: Churchy, Queer, Family, Collegiate, and General. Using a structured evaluation framework assessing Accuracy, Cultural Context, and Appropriateness, we analyze the models' strengths and limitations in processing AAVE expressions. Findings indicate significant inconsistencies in LLMs' ability to contextualize slang, with particular challenges in interpreting terms from LGBTQ+ and Black Greek Letter Organization (BGLO) subcultures. Misclassification, surface-level definitions, and a lack of cultural nuance highlight the broader issue of linguistic bias in AI. This work underscores the need for more inclusive and community-centered Al development approaches, advocating for dataset diversification, culturally informed annotation practices, and model fine-tuning that prioritizes linguistic equity. By foregrounding intersectional perspectives in NLP, this research contributes to ongoing efforts to create Al systems that equitably represent and respect Black linguistic traditions. Preliminary results indicate that LLMs struggle with accurately interpreting AAVE slang, often providing surface-level or outdated definitions that overlook cultural and situational nuances. Errors were particularly pronounced in LGBTQ+ and Black Greek Letter Organization (BGLO) subcultures, highlighting the need for more inclusive training data and culturally aware model adjustments.

TikTok Made Me: The Impact of Social Media Sites in Ethnic & Racial Identity Development

Presenter's Name: Dyson Nia Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Woodson Kamilah Faculty Advisor's email: kwoodson@howard.edu

Co-authors:

This research study examines the role of modern-day social media sites in the development and maintenance of ethnic and racial identities. During the current age of virtual networking, this study explores the use of technology as a space for interaction and connection to individuals based on group identity and belonging. Current findings suggest that narrative social media posts, such as "point of view" stories, and engagement in community-based initiatives, are likely to affect saliency of and belongingness to minority ethnic and racial identities. This supports the idea that social media sites are adding to or replacing in-person ethnic and racial socialization experiences. A theorized model details the ways in which narrative information from social media sites may be incorporated into the schema of oneself, leading to a possible increase in the strength of group phenomenon or the complete disregard of information. As individuals interact with narrative-based social media posts, it is likely they are constantly making unconscious judgements about the information in relation to themselves. As a result, they impact their own understanding of and belonging to personal group identities. This study also examines how this process may be key to the modern socialization of individuals' ethnic and racial identity development. Which historically has been done through in-person conversation and physical experiences. Further research looks to test this theoretical model and continue to understand the implications of social media sites in the development of individual and group identities.

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the implications of social media sites in the development of individual and group identities.

Using The Collective Impact (CI) Model for the Creation of Interventions to improve the health and wellness of Expectant and Parenting Teenagers (EPTS) in Washington DC

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Co-authors:

Background: Many organizations, addressing a common social problem, are working in isolation from one another. Interdisciplinary partnerships are the cornerstone of creating successful and sustainable health interventions, yet there are few models to guide this work.CI model offers a structured framework, rooted in interdisciplinary partnerships, to achieve change and solve complex problems with a shared vision and goal. DC Network for Expectant and Parenting Teens (DC NEXT!) is a CI innovation network of young parents, community providers, educational institutions, health care agencies, and government partners Grounded in the principle that young people who are valued and respected by responsive adults hold the keys to reducing teen pregnancy, reducing sexually transmitted infections, and achieving optimal health. In this study, we describe the CI model and its key dimensions using DCNEXT as a case study. Method: EPTS and organizations in Washington DC focused on programs for EPTS were recruited to form DCNEXT!. MOUs and consents were signed. Howard University IRB approval was used for this study. 3-6 months of monthly meetings were used to develop the common agenda among network partners. Results and Conclusion: DC-NEXT used Collective Impact to achieve the same outcomes, analyze the same data, to continuously improve practices over time. Interdisciplinary collaborations are crucial to achieving sustained progress and change for adolescent health interventions. This is particularly important in a post pandemic world, an unchartered arena in which innovation, collaboration, and constant evaluation are necessary to best promote the wellness of adolescents and young adults.

The Right to Remain Silent: The Impact of Colorblind Ideologies on Engagement in Intergroup Dialogue

Presenter's Name: Faison Jaelle Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Katherine Picho-Kiroga Faculty Advisor's email: Katherine.picho@howard.edu

Co-authors:

Reports highlight the underrepresentation of "race-related constructs in top educational psychology journals" (DeCuir-Gunby & Schutz, 2014),

alongside increasing bans on race-related teachings and books. These trends have intensified debates on race and multiculturalism in education. Avoiding race-related discussions risks perpetuating racial disparities. The U.S. sociopolitical climate, interwoven with publicized police brutality and other race-related concerns, emphasizes the need for intergroup dialogues, which researchers identify as crucial for dismantling unjust systems and advancing equity. This study examines whether colorblind ideologies hinder American adults' willingness to engage in intergroup race-related dialogues. It aims to foster self-reflection, enhance intercultural competencies, and develop practical strategies to increase engagement in intergroup dialogues, broaden representation in educational psychology, and influence publishing practices. Focusing on Black and white racial identities, the study also considers intersections with age, gender, sexual orientation, economic status, religion, education level, and political affiliation. Using a descriptive, non-experimental survey design and interviews, this mixed-methods study will assess the prevalence of colorblind ideologies and their relationship to willingness to engage in race dialogues. A diverse sample of adults aged 18 and older will be recruited via online platforms, email outreach, and community partnerships. The survey includes self-reported demographics and a Likert scale to measure colorblind ideologies and engagement willingness. Findings will bridge communication gaps and inform classroom and policy recommendations, contributing to a more equitable society.

Who Consents: Legacies of Harm and the History of Medical Research -A Critical Textual Analysis of Informed Consent

Presenter's Name: Farquharson Kenja-rae Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Jae Eun Chung Faculty Advisor's email: jaeeun.chung@howard.edu

Co-authors:

The legacy of medical and scientific racism serves as a barrier to participation in clinical research. Informed consent is a vital element of research ethics and procedures, and the consent process communicatively transforms a person into a research subject. This is most clearly seen on the signature page of most consent forms. For marginalized people, like Black birthing people, being a research subject is a historical trauma that haunts healthcare interactions. This study problematizes how the language and practices of medical research may not work to build trust and ensure the safety of the most vulnerable individuals by asking: How do current informed consent protocols potentially perpetuate legacies of harm done among pregnant Black people? This study utilizes a critical textual analysis to analyze the informed consent forms of 30 studies from ClinicalTrials.gov with the key phrase "pregnancy", from January 2019 to January 2024. The analysis focused on the linguistic consistencies across studies and the mention or lack thereof of historical harm. Studies often conflated the language of rights with responsibilities thus creating a sense of participant obligation to the research study. Additionally, many studies combined consent to participate with permission to access medical records. The co-mingling of consent denies participants the opportunity to consider their desire to participate and the use of private health information (PHI) separately. While these forms cannot be fully under-

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stood without the coinciding interpersonal interaction, the language of these documents demonstrates the ideologies and interests researchers prioritize.

If One Is Hurting, We Are All Hurting: An Islamic Theological and Psychological Science Framework

Presenter's Name: Fathima Sana Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ezer Kang Faculty Advisor's email: ezer.kang@howard.edu

Co-authors: Ezer Kang, Sade Akinkuotu

Many political and social psychological models have been used to explain motivators and behaviors that contribute to collective mobilization. Yet, often overlooked is the role of allyship and methods to achieve enduring, sustainable collectives who effect policy and social change. The Islamic theological concept of ummah helps to address this by suggesting that enduring movements prioritizes allyship and resource mobilization. Drawing from Islamic theological work of the Qur'an (final holy book in Islam) and the Hadith (oral histories of the final prophet Muhammad [peace be upon him]), ummah defines a collective consciousness and unifying identity for both Muslims and non-Muslims, emphasizing the shared connections and history of all humans. As such, allyship is defined as a method to address power imbalances by rejecting discrimination and acting to eliminate discrimination through overt resistance to oppressive ideologies and communities, and unwavering support of oppressed communities (Scholz, Gordon, & Treharne, 2021). Overall, clarifying the role of allyship and prioritizing resource mobilization and education will help foster longevity and authenticity in collective movements. Through a case study of the Black Lives Matter movement, a practical model will be proposed to guide how a diverse group of psychologists, community leaders, activists, and allies can act on a common goal to effect meaningful change. This transformative model aims to counteract the ignorance towards political plight, encourage inner and intergroup reconciliation, and promote longevity of political allyship and activism, ultimately making the fight for justice and equity central and accessible.

Supporting Persons Affected by HIV and Cancer: A Family Matter

Presenter's Name: Fathima Sana Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ezer Kang Faculty Advisor's email: ezer.kang@howard.edu

Co-authors: Persis Andrews, Rajni Herman, Ezer Kang

Background: HIV and cancer are highly stigmatized health conditions in India, affecting patients and their family members. Currently, support for individuals living with HIV and/or cancer and their caregivers are limited. Several interventions have focused on family communication, with a focus on strengthening cognitive, affective, and behavioral skills, sustained social support, and religious coping. However, few of these interventions have been adapted in India. Methods: To address this gap, the Global Community Health Lab at Howard University and Shalom Hospital in Delhi are collaborating on a study to identify strengths and vulnerabilities in households affected by HIV and/or cancer. This project aims to (1) develop a model to understand four factors - life and caregiver stressors, courtesy stigma, and religious coping - that potentially influence family wellness; and to (2) design and evaluate an intervention based on this model in partnership with affected families. Results: Family members (immediate or extended \geq 18yo) of persons receiving HIV (n=~70) and/or cancer (n=~60) services at Shalom will be invited to participate. Trained staff will conduct one-hour interviews using validated measures of family functioning, life stressors, caregiver, courtesy stigma, and religious coping. We hypothesize that higher life stressors and courtesy stigma will be independently associated with increase caregiver stress. Additionally, increase religious coping and family function will mediate this relationship - suggesting a focus for future support interventions. Conclusion: Clarifying the factors that impede and improve family functioning can guide interventions that improve well-being for persons living with HIV and/or cancer in India.

Policy Advocacy, Implementation and Educational Inequities (PIE): A Critical Study of State Actors' Influence on College Affordability at Public HBCUs.

Presenter's Name: Frederic jr. Arsene Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Jorge Burmicky Faculty Advisor's email: jorge.burmicky@howard.edu

Co-authors:

Over the past five years, enrollment at Historically Black Colleges and Universities (HBCUs) has grown significantly, driven by increasing awareness of racial inequities and the value of culturally affirming education. However, affordability remains a major barrier, particularly for low-income Black students. For instance, State-level policies, such as performance-based funding, often fail to account for the unique financial challenges faced by public HBCUs. This research, through three interrelated qualitative studies, applies Sabatier and Jenkins-Smith's Advocacy Coalition Framework as an analytical tool to examine how state legislators in Florida, Georgia, and Maryland navigate affordability and education policy issues at public HBCUs. Using a multiple case study approach, this study draws on policy document analysis, semi-structured interviews, and observations with state legislators from each state. Preliminary findings reveal how coalitions actively shape funding decisions for public HBCUs, uncovering the political negotiations, compromises, and alliances that influence educational opportunities for low-income Black students.

They Didn't Give a Damn: The Robert Taylor Homes v.s. Chicago

Presenter's Name: Garcia Payton Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Amirhossein Amini Behbahani Faculty Advisor's email: amirab86@gmail.com

Co-authors:

This essay examines the decline of household income levels in the Robert Taylor Homes in Chicago during the 1970s. The primary goal of the writing seeks to concentrate the previous findings of scholars, largely those detailing economic investigation, and begin to form connections amongst each other. Using a convergent parallel mixed-methods approach, which integrates both qualitative and quantitative data, the study analyzes challenges which project residents faced in accessing employment and livable earnings in the housing project through three categories. The analysis takes into account the impact of geographical barriers, social services offered by the local and federal government, and Chicago's changing landscape over the late 1960s and 1970s. Evidence in categories vary, but primarily consists of first-hand accounts both of residents and social workers, satellite imagery, project demographics, and federal reports of welfare benefits. By highlighting the role of administrative failures by the Chicago Housing Association, housing discrimination, and public policy, this study offers a reflection on the affordable housing measures influenced by the Federal Housing Act of 1949.

Exploring the Impact of Perceived Neighborhood Disorder on Mental Health Outcomes among Black Emerging Adults

Presenter's Name: Garrett Kelly Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: GiShawn Mance Faculty Advisor's email: gishawn.mance@howard.edu

Co-authors: GiShawn Mance

Perceived neighborhood disorder (e.g., dilapidated buildings, drug use) has been found to be associated with mental health symptoms such as depression, anxiety, and post-traumatic stress disorder (PTSD) among Black Americans. Despite these linkages between perceived neighborhood disorder and mental health symptoms among Black Americans being well-established, there is a dearth of research that explores these relationships among Black emerging adults. In addition, there is a limitation in our understanding of protective factors that could potentially buffer the detrimental effects of exposure to neighborhood disorder. To address this gap in the literature, the proposed study aims to examine associations between perceived neighborhood disorder and depression, anxiety, and PTSD symptoms among Black emerging adults. Additionally, the role of potential protective factors (i.e., self-efficacy, social support, collective efficacy) will be explored to determine whether they create a stress-buffering effect in the relationship between perceived neighborhood disorder and mental health symptoms. The proposed research will utilize a cross-sectional design, including questionnaires and surveys, to collect data on perceptions of neighborhood disorder, self-efficacy, social support, collective efficacy, and mental health outcomes. The findings of this study can potentially contribute to a better understanding of how perceived neighborhood disorder may impact Black emerging adults while also considering factors that may be protective for this population.

Global Governance or Global Domination? The United Nations and the Legacy of Post-Colonial Power Structures

Presenter's Name: Gebru Lydia Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: John Patrick Ifedi Faculty Advisor's email: jifedi@howard.edu

Co-authors:

The legacies of colonialism and neocolonialism continue to shape the global order, where former colonial powers exert lasting influence over post-colonial states through economic, political, and cultural mechanisms that sustain inequality and dependency. This thesis examines the integration of post-colonialism in our global landscape, with a focus on the role of the United Nations (UN). The theoretical frameworks utilized in this research include Post-Colonial Theory and Dependency Theory, examining how the UN contributes to mitigating and reinforcing neocolonial power structures through cultural influence and economic policies. This research holistically looks at how these practices both benefit and harm post-colonial nations, with a focused assessment of their impacts in the Middle East and Sub-Saharan Africa. The study also references other significant international organizations such as the North Atlantic Treaty Organization (NATO), and the International Monetary Fund (IMF) to understand how global military and trade frameworks contribute to the preservation of neocolonial dominance. A mixed-methods methodology will be utilized, incorporating transregional case studies to analyze how these countries' post-colonial or occupational experiences have been shaped by the policies and actions of global institutions. The research will examine how these international institutions influence both the sovereignty and development of states and analyze how they might be better positioned to overcome the structural barriers imposed by international organizations. By assessing the lasting impact of these global structures on development, the thesis proposes potential reforms to international organizations and alternative models of cooperation that could better support the autonomy and sustainable development of post-colonial nations.

Rebuilding Bonds: Examining Family Dynamics During the Reentry Process of Formerly Incarcerated Individuals

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Co-authors:

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This research examines the complexities of re-entry into society following incarceration, with a particular focus on the role of family dynamics, mental health, and support systems in facilitating or hindering successful reintegration. The studies reviewed explore various perspectives, including the experiences of at-risk incarcerated mothers, the challenges faced by male prisoners returning to their families, and the broader impact of incarceration on family relationships. Key findings highlight the significant mental health challenges many formerly incarcerated individuals face, the strain placed on family members who serve as primary support systems, and the financial and emotional burdens of reintegration. Research also underscores the importance of structured community programs and employment opportunities in reducing recidivism and aiding re-entry. Additionally, studies explore the unique struggles of young adults transitioning into society post-incarceration, as well as the heightened risks of familial violence upon re-entry. The findings suggest that successful reintegration depends not only on individual resilience but also on external factors such as strong family bonds, community support, and policy-driven rehabilitation efforts. This review provides a comprehensive understanding of the challenges of re-entry, emphasizing the need for holistic interventions that address both the incarcerated individuals' needs and the well-being of their families.

Unseen and Unsupported: Addessing Racial Trauma in Therapeutic Spaces

Presenter's Name: Griffin Kayla Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Ivory Toldson Faculty Advisor's email: itoldson@howard.edu

Co-authors:

Racial trauma remains an underrecognized and inadequately addressed phenomenon within mental health practice, particularly for Black individuals exposed to systemic racism. This study examines why helping professionals frequently fail to address their clients' racial trauma, despite its profound psychological and physiological consequences. Drawing from contemporary research, it underscores the unique symptomatology of racial trauma, which includes hypervigilance, flashbacks, avoidance, and negative mood alterations-paralleling symptoms of PTSD while remaining distinct in its cumulative and generational nature. Key contributors to this gap include insufficient clinical training in recognizing and treating racial trauma, inequitable representation of Black clinicians, the persistence of racism within psychological frameworks, and the limitations of emerging research on race-based interventions. Predominantly white training environments fail to prepare clinicians to address race-related stressors, often resulting in misdiagnoses or culturally insensitive treatment approaches. Moreover, the lack of diversity among mental health professionals exacerbates mistrust and stigma in Black communities, further hindering access to effective care. This study also highlights promising avenues for addressing racial trauma through qualitative research and culturally informed practices. Constructivist and cognitive-behavioral theories are leveraged to propose interventions that integrate racial socialization and culturally relevant adaptations to existing trauma-focused therapies. By amplifying lived experiences and prioritizing systemic change, clinicians can begin to dismantle the barriers to adequately addressing racial trauma. Ultimately, this study calls for a paradigm shift in mental health practice—one that prioritizes cultural competence, increases Black clinician representation, and centers race-informed therapeutic frameworks. These efforts are essential for healing racial trauma and fostering equity in mental health care.

Designing an Open-Source Tool to Investigate Demographic Shifts in U.S. Urban and Rural Communities

Presenter's Name: Gupta Jibek Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Nathan Alexander Faculty Advisor's email: nathan.alexander@howard.edu

Co-authors: Nathan Alexander

We report on the development of an interactive, open-source dashboard to explore changes in demographic trends in U.S. states from 2009 to 2023. Using the U.S. Census Bureau's American Community Survey (ACS) 5-year estimates, this computational analysis evaluated population distribution, growth rates, and diversity trends in large urban centers and rural areas with a focus on racial and ethnic categorizations. Preliminary findings reveal that urban areas exhibit greater changes in racial diversity compared to rural areas. Notably, however, while rural areas remained less diverse overall, they have experienced increasing racial and ethnic diversity over the study period. These findings contribute to a better understanding of the dynamic demographic changes in the United States and emphasize the importance of analyzing dynamic, intersectional measures of diversity to inform policies and programs that address the needs of an increasingly diverse U.S. population.

The Importance of Correct Classification of the Prescription Drug Monitoring Programs Effectiveness

Presenter's Name: Gutema Tewodros Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Jevay Grooms Faculty Advisor's email: jevay.grooms@howard.edu

Co-authors: Jevay Grooms, Gulriz Kurban

Prescription Drug Monitoring Programs (PDMPs) are policies at the state level, aimed at providing information to combat the opioid crisis by monitoring the prescription of controlled substances across the United States. Although previous research has evaluated the effectiveness of PDMPs, the results have varied, leading to questions about how these studies defined the implementation dates of PDMPs (for example, Electronic PDMP, Operational PDMP, or must-access PDMP). This study examines whether researchers correctly classified these implementation dates, as misclassification or incorrect dates could either exaggerate or underestimate the effectiveness of PDMPs. We established specific

inclusion and exclusion criteria and utilized GPT-4 for analysis. We identified 214 relevant articles from 660 in the RAND database in the first phase. During the second round, the research team conducted a manual review to assess the accessibility and relevance of the extracted articles. In the final step, we compared the selected articles with the current and comprehensive OPTIC Vetted PDMP Policy data set and systematically analyzed them. Preliminary results revealed that 54.5 percent of the articles examined identified discrepancies in the dates about the PDMP implementation referenced in their analysis. These inconsistencies vary from three months to five years. Conversely, no date deviation was observed in the remaining 45.5 percent of articles. These findings will enhance the clarity of evaluating PDMP effectiveness for policy purposes, emphasizing the importance of correct classification and current data sets.

Comparing Programs Addressing Gender-Based Violence in Two African Countries

Presenter's Name: Hammond Holiday Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Eleanor King Faculty Advisor's email: emking@howard.edu

Co-authors:

Gender-based violence (GBV) is a universal problem and a threat to women everywhere. Female genital mutilation (FGM) is a common form of GBV that has become a target issue for international humanitarian aid programs, especially in Africa, where the practice is common. Various programs promise to reduce the instances of FGM and change the dialogue around the practice while providing support to girls and women seeking to avoid the practice. Which approaches are the most effective, however? Western-based organizations tend to have greater resources, and therefore, more capabilities than local grassroots organizations. However, local humanitarian groups may have a more long-lasting impact due to their cultural knowledge. This study investigates the effectiveness of the two different types of aid by analyzing the approach to reducing FGM taken by CARE International, a Western, U.S.-based organization, in Somalia, and that taken by Women in Liberation and Leadership in The Gambia. The study will analyze the methods of support each organization offers and its organizational culture, review their self-assessments, as well as assessments by independent scholars, and analyze Somalian and Gambian government statistics on the prevalence of FGM over time to gauge the effectiveness of each intervention. Due to the more personal connection between the organization and the community it seeks to support, it is predicted that the Gambian-based organization will have more positive outcomes than the Western-based one. By exploring the differences, this study hopes to bring attention to the vital role culturally nuanced intervention plays in promoting sustainable, community-led change.

Exploring How Exposure to Violence Impacts Depressive Symptoms, Drug Use, and Risk-Taking Behaviors in African American Youth

Presenter's Name: Harris Mikayla Classification: Professional Student School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Forough Saadatmand Faculty Advisor's email: frough.saadatmand@howard.edu

Co-authors: Forough Saadatmand

Children and adolescents who are exposed to violence (ETV) may observe lasting psychological and physical effects into adulthood. Risk-taking, as it relates to sexual behaviors and alcohol, tobacco, and other drug (ATOD) use, has a known association with youth experiencing stressful life events. There are limited studies further exploring the impact of ETV on individuals entering adulthood. In this study, we examine different categories of ETV in African American young adults during their childhood before the age of 18 and in their community as young adults and the association between such exposures and depressive symptoms, risky sexual behaviors, and ATOD use. The data for this study is from experiences collected in a survey of 440 self-identified African American men and women ages 18-25. The participants are from socio-economically disadvantaged wards in Washington, DC, USA. Using factor analyses, we identified six different types of childhood ETV and seven different types of community ETV. Regression analysis data reveals a significant association between depressive symptoms and lifetime ATOD use with each type of childhood ETV. Additionally, there is a significant correlation between feeling unsafe, exposure to drug sales, and direct personal violence and sexual risk-taking behaviors. We identified an association between depressive symptoms and specific kinds of exposure to violence that are most likely to impact risk-taking such as ATOD use, and risky sexual behaviors. These findings reveal areas for further research. This research aims to inform and highlight the areas for specific programming and mental health services for African American young adults.

Seen but Misunderstood: An Intersectional Analysis of the Portrayal of Black Women within Pop Culture

Presenter's Name: Hash Lauryn Classification: Undergraduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Jennifer Thomas Faculty Advisor's email: jennifer.thomas@howard.edu

Co-authors:

This research aims to aid in unveiling how Black women are portrayed in pop culture. This thesis will provide an overview of the concept of intersectionality and its relevance to the experiences of Black women in popular culture. Furthermore, it will delve into the various ways in which Black women are portrayed, including the different stereotypes that they have been associated with. This research seeks to determine whether or not the intersectional experiences of Black women influence the content produced by pop culture. It will also aid in determining if the exposure to specific representations of Black women in mass media affects thier

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societal perceptions. This analysis will yield both quantitative and qualitative data to complete this research. Finally, this thesis will serve as an analytical contribution to the study of intersectionality and its effects on Black women within pop culture and mass media, emphasizing their experiences shaped by race and gender.

Understanding Religious Experiences of American Muslim Youth: Early Findings from a Community-Based Study

Presenter's Name: Hijazi Hannan Classification: Graduate Student School/College: Social Work *Presentation Type: Oral Presentation* Faculty Advisor: Altaf Husain Faculty Advisor's email: altaf.husain@howard.edu

Co-authors: Altaf Husain, Madiha Tahseen, Samuel Ross

Religious identity plays a critical role in shaping the mental, emotional, and social well-being of American Muslim youth (AMY), yet their experiences are often misrepresented or oversimplified in research (Shams, 2018). AMY navigate complex intersections of faith, cultural expectations, and societal pressures, which influence their identity formation and overall adjustment (Wang et al., 2020). Given the historical lack of research engagement with this community and concerns about anonymity and confidentiality in survey participation (Mohebbi et al., 2018), this study employs a community-based, ecological systems approach to explore religious trends, with a specific focus on the factors that influence religious affiliation and disaffiliation among Muslim youth. The study includes three phases: instrument validation through academic and community workshops and town halls, and a cross-sectional survey of 604 youth, aged 14-24, from diverse racial/ethnic and socioeconomic backgrounds. Early findings highlight the varied pathways of religious engagement and disengagement, examining how peer relationships, family dynamics, cultural influences, and societal factors contribute to shifts in religious identity. However, further data analysis is needed to clarify these trends and provide a comprehensive understanding of the factors contributing to religious affiliation and disaffiliation. As data collection nears completion, this presentation will share insights on AMY's religious profiles, including key influences on affiliation and disaffiliation. The discussion will provide insight into the complexity of religious identity among AMY and its broader implications for understanding youth identity formation in diverse, multicultural societies.

Uncaged Voices: Women's Narratives of Incarceration, Relationships, Reproductive Health and Reentry

Presenter's Name: Hollins Whitney Classification: Post Doc/Resident/Fellow/Research Associate School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Bahiyyah Muhammad Faculty Advisor's email: bahiyyah.muhammad@howard.edu

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The number of incarcerated women in the United States has increased exponentially since the 1980s. According to The Sentencing Project, "Between 1980 and 2022, the number of incarcerated women increased by more than 585%" (Budd, 2024). In addition to this rapid rise, it is important to note that 58% of incarcerated women are mothers to minor children (Prison Policy Initiative, 2023). While the number of incarcerated women may appear minimal in comparison to that of incarcerated men, the rapid growth of this population and the implications of that growth requires its own dedicated research. The societal ideals of motherhood and femininity are at odds with perceptions of incarcerated people and criminality. This tension often causes incarcerated women to be overlooked despite facing additional challenges due to their gender. More research is needed to explore the unique circumstances incarcerated women encounter within the carceral apparatus. Using an intersectional lens, this study aims to explore women's experience with parenting and reproductive health while incarcerated. It features narratives from formerly incarcerated women that highlight their experiences while incarcerated and life after reentry. Preliminary findings include the normalized misuse of authority to abuse incarcerated women, the breakdown of relationships, the systemic neglect of reproductive healthcare and the sustaining power of sisterhood. This research hopes to shed light on the ways misogyny ignores the boundaries of bars, making jails and prisons a particularly dangerous place for women.

The Effects of the BBI in the Black Community

Presenter's Name: Ifeanyi Amanda Classification: Undergraduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Chimene Castor Faculty Advisor's email: chimene.castor@howard.edu

Co-authors:

Introduction: A Brazilian butt lift is a specialized fat transfer procedure that augments the size and the shape of the buttocks without the usage of implants. Excess fat is removed from specific areas of the patient, such as the hips and thighs, using liposuction. The surgery enhances the size of the buttocks, creating a curvaceous appearance from the transferred fat. People may want to help their clothes fit their body more attractively, and give a more youthful shape to flat buttocks. But for some, it's the social pressure to keep up and emulate trends. There has been a general shift towards emphasizing curves and fullness in the buttocks area, which is why women, specifically Black women, have sought out this procedure more and more. Purpose: This study aims to examine the physical, psychological, and social effects of the Brazilian Butt Lift (BBL) procedure within the Black community, exploring its impact on health outcomes, body image, and cultural perceptions of beauty. Methods: This study will utilize a systematic review to analyze a comprehensive study over the topic. Databases including PubMed and Google Scholar were sourced using key words such as "Brazilian Butt Lift", "social media", "Black women surgical procedures," "Brazilian Butt Lift and diet", and "Black women mental health outcomes". Expected Outcome: This study should illustrate diet-related, scientifically related, and psychologically related outcomes of the Brazilian Butt Lift procedure to give women a clear picture as to what they are getting involved in.

Exploring Professional Help-Seeking among American Muslims: A Health Belief Model Perspective

Presenter's Name: Jackson Zainab Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Shareefah Al Uqdah Faculty Advisor's email: shareefah.aluqdah@howard.edu

Co-authors:

As the Muslim American population grows in both size and diversity, understanding the factors influencing mental health help-seeking behaviors within this community is increasingly important. Despite rising mental health concerns, Muslim Americans often face unique barriers to accessing professional mental health care, including stigma, cultural and religious influences, and discrimination. This study will explore existing literature on the factors shaping professional help-seeking behaviors among Muslim Americans through the Health Belief Model (HBM) lens. Specifically, it will examine how perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy influence help-seeking attitudes and behaviors. Additionally, this study investigates how demographic factors, such as age and gender, moderate the relationship between perceived barriers and help-seeking behaviors. This study will use a quantitative research design to collect survey data from a diverse sample of Muslim Americans across the United States. The survey will incorporate validated measures to assess key HBM constructs and help-seeking behaviors. Multiple regression and moderation analyses will be employed to identify the predictors of professional mental health service utilization. Findings from this research will contribute to a deeper understanding of the barriers and facilitators of help-seeking among Muslim Americans, informing culturally competent interventions and outreach strategies. This study seeks to enhance mental health support and accessibility for this diverse and often underserved population.

The Impact of Fibromyalgia on Cognitive-Communicative Skills and Dysphagia

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Fibromyalgia is a chronic condition that is characterized by widespread pain, and symptoms such as fatigue, sleep disturbances, memory and cognitive dysfunction, and depressive episodes. Cortical and subcortical structures involving cognition and motor skills such as dysphagia (swallowing disorders) are believed to be compromised for persons with a diagnosis of fibromyalgia including the frontal lobe, cerebellum, and hippocampus. It is believed that Fibromyalgia is linked to hippocampal atrophy and dysfunction due to overuse of responding neurotransmitters because of chronic pain (Ibraheem et al., 2021). Current studies suggest correlations with fibromyalgia, cognition and swallowing; however, the relationships to cognition and swallowing have not been studied extensively or as the primary focus of research. Speech-language pathologists (SLP) are not often aware of the impact of fibromyalgia symptoms on cognition and swallowing, and rheumatologists are not often aware of the changes in cognition and swallowing as well as the role of the SLP in the clinical care of persons diagnosed with fibromyalgia. The purpose of this survey study is to identify the relationships between fibromyalgia symptoms, and symptoms related to impaired cognitive-communication and swallowing skills. The author will identify common themes across fibromyalgia symptoms and symptoms associated with SLP. Overall, the goal is to gain a better understanding of the relationship between fibromyalgia and disorders of communication, as well as to increase awareness for the SLP and rheumatologists.

Understanding the Language Use Differences between Reviews Associated with Star Rated Restaurants on Yelp

Presenter's Name: Kalejaiye Oluwadara Classification: Graduate Student School/College: Engineering & Architecture *Presentation Type: Poster Presentation* Faculty Advisor: Andy Anietie Faculty Advisor's email: anietie.andy@howard.edu

Co-authors:

Background: In the analyses conducted in prior works using YELP reviews, reviews associated with 2-star and 4-star rated businesses were not analyzed. This was partly due to the assumption that the language used in reviews associated with 1-star rated businesses differs from that of reviews associated with 2-star rated businesses; the same applies to reviews associated with 4-star and 5-star rated businesses. However, no research has validated this assumption. Methods: This work aims to address this, using word-score-based methods and a psycholinguistic dictionary, Linguistic Inquiry and Word Count (LIWC) to quantify these language use differences. Results:For example, we find that the LIWC categories on Negative Emotion (Cohen's D = 0.492) and Anger (Cohen's D = 0.369) are more associated with 1-star reviews compared to 2star reviews. Conversely, the LIWC categories on Positive Emotion (Cohen's D = 0.628) and Sadness (Cohen's D = 0.133) are more associated with 2-star reviews than with 1-star reviews. Additionally, we find that the LIWC category on Focus Present is more associated with both 1-star and 5-star rated reviews, suggesting that reviewers tend to express dislike and approval while present at the restaurant.Conclusion:Therefore, when analyzing Yelp reviews- specifically restaurant reviews- 1-star and 2-star reviews should not be analyzed together; the same is true for reviews associated with 4-star and 5-star restaurants.

Assessing the Impact of Implicit Biases on People with Disabilities

Presenter's Name: Kearney Sunlyn Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Joyvina Evans Faculty Advisor's email: joyvina.evans@howard.edu

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Introduction: In the field of healthcare, there are many confounding factors that go into decision and policy making. Implicit bias attributes to attitudes toward certain groups of people that can lead healthcare providers to incorrectly make decisions impacting those patients. One issue is that because this bias is subconscious, the people having these attitudes towards different groups of people may not even be aware of them doing this or where the bias originated from. This type of bias can be related to gender, age, race, and many other identifiers. Disabled individuals are often overlooked as it pertains to implicit biases within the healthcare industry. There are an estimated sixty-one million people in America that have disabilities. Although there are laws in place such as the Americans with Disabilities Act, there is evidence showing that these people still deal with healthcare inequalities. The goal of this review is to evaluate the relationship implicit biases of healthcare workers towards people with disabilities and their treatment within the healthcare field. Methods: Peer-reviewed articles over the last twenty years will be reviewed. The search terms are disabilities, disabled, implicit bias, unconscious bias, competency, discrimination, disparities, physically challenged, and differently abled. Conclusion: The results of this review may lead to an increase of health equity practices being put in place and maintained, further strengthening the reputation and trust for the field of healthcare administration. Additionally, it can decrease health disparities and inequities among disabled individuals.

Self-Efficacy In Undergraduate Chemistry Students

Presenter's Name: Keita Saley Classification: Undergraduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Elizabeth Ricks Faculty Advisor's email: elizabeth.d.ricks@Howard.edu

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Self-efficacy plays a crucial role in college chemistry students success, influencing their motivation, confidence, and ability to grasp complex concepts. Research suggests that teaching styles and learning formats significantly impact students self efficacy and willingness to continue in chemistry (Bilgin, 2005). Studies indicate that problem solving strategies incorporating cooperative learning enhance performance more than traditional methods (Bilgin, 2005). Interactive and discussion-based approaches also foster engagement and deeper understanding, particularly in online learning environments. Feedback, mentorship, and structured learning experiences further strengthen students belief in their ability to succeed. These findings highlight the importance of effective teaching strategies in shaping students' motivation and persistence in STEM. Motivating students to remain in STEM majors, particularly chemistry, is challenging due to difficulty in learning. This study highlights how self-efficacy directly influences students motivation and persistence. When students believe they can succeed, they are more likely to stay engaged, even when faced with difficult concepts. Examining the impact of cooperative learning and interactive discussions of this research will highlight how collaborative teaching methods boost confidence and encourage students to tackle complex problems. Additionally, feedback and mentorship provide structured support that enhances self-efficacy, promoting long-term success in STEM.

Exploring Relationships Between Trauma-Informed Practice Training and Elementary School Teacher Efficacy, Burnout, and Intent to Remain in the Profession

Presenter's Name: Knobloch Najma Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Kimberley Freeman Faculty Advisor's email: kefreeman@howard.edu

Co-authors:

This proposed presentation will present research in progress. This thesis study aims to use quantitative survey research to describe the relationships between teachers' exposure to trauma-informed practice training and their feelings of efficacy, burnout, and intent to remain in the teaching profession. Elementary teachers (K-5) from Washington, D.C. Public Charter Schools will complete a demographic questionnaire and respond to the Teacher Self-Efficacy Scale (TSES) and the Maslach Burnout Inventory-Educator Survey (MBI-ES). Additionally, teachers will indicate how long they intend to stay in the profession. A multiple regression analysis will be conducted to determine whether exposure to trauma-informed practice training predicts teacher efficacy, burnout, and intent to remain in the profession. This study employs a cross-sectional design to compare teachers with and without trauma-informed practice training and those who have received different components of trauma-informed practice training in various settings. The research seeks to address gaps in existing literature by exploring these relationships. The findings aim to influence the development of teacher education programs and support the use of trauma-informed training to reduce teacher stress, burnout, and turnover. The proposed presentation will focus on a discussion of findings in the extant literature on the impacts of trauma on learning, trauma-informed practice training, teacher efficacy, burnout, and attrition. The presentation will also provide preliminary results from the ongoing study.

Unseen Wounds: The Prevalence of Psychiatric Disorders in Foster Care Populations

Presenter's Name: Koroma Neemah Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: miriambmichael@gmail.com

Co-authors: Tia Tyson, Nima Karodeh, Samrawit Zinabu, Miriam Michael

Introduction: Children in foster care and institutional settings are at an increased risk for psychiatric disorders, including oppositional defiant disorder, major depressive disorder, post-traumatic stress disorder

(PTSD), and reactive attachment disorder. This study aims to examine the prevalence of psychiatric comorbidities in children from foster care and institutional settings to better understand the mental health burden in this vulnerable population. Methods: A retrospective cohort analysis was conducted using the TriNetX platform to query de-identified patient data. The study cohort consisted of 95,764 children who entered foster care or institutional settings, identified through relevant ICD-10-CM codes. The cohort was analyzed for demographic characteristics and psychiatric diagnoses. Descriptive statistics were used to summarize the prevalence of psychiatric diagnoses and comorbidities. Results: The cohort had a mean age of 12.2 years (SD \pm 7.62), with a mean age at entry into foster care of 6.62 years (SD \pm 6.87). Over half (56%) of children were diagnosed with at least one psychiatric condition within one year of entering foster care, with 30% diagnosed with two or more comorbid conditions. Common diagnoses included Attention Deficit Hyperactivity Disorder (ADHD, 21%), PTSD (12%), and Major Depressive Disorder (5%). Conclusion: Children in foster care and institutional settings exhibit a high prevalence of psychiatric comorbidities, with a significant portion diagnosed with multiple disorders. ADHD, PTSD, and mood disorders were the most common diagnoses. These findings underscore the urgent need for targeted mental health interventions to support the well-being of children.

Urban Class Structure in Post-Apartheid South Africa's Gauteng Province: Case Studies from Johannesburg and Tshwane (Pretoria)

Presenter's Name: Lawrence Daquan Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Krista Johnson Faculty Advisor's email: kmjohnson@howard.edu

Co-authors:

Background: Amid the 30th anniversary of South Africa's transition to a democratic and post-apartheid society, this research project consists of an investigation of the class structure in post-apartheid South Africa's municipalities of Johannesburg and Pretoria. The core research question for this study is: how does race continue to shape class and urban class constructions in South Africa, or, how is the middle class defined in urban South Africa?Methods: Primary research methods include participatory observation and interviews. The study also includes analysis of data from household and internet-based surveys, social media engagement, GIS and aerial photography, as well as historical information, public policies, and sociological studies to construct rudimentary but sophisticated class categories that are informed by South Africans. Utilizing class analysis tools provided by African diaspora scholars the theoretical bases of class in advanced industrialized societies of Western civilization are revised in order to allow application to 21st century, urban South African conditions. This includes examinations of class and the social dimensions of inequality, with emphasis on the differences and distinctions between urban Black South Africans via social and economic factors relevant in the current and future information age society. Conclusions: Whereas previous research has shown that there is a strong correlation between class and income, children's schooling and aspects of health, yet the study of class in South African society has waned in the post-apartheid era.

Indepdendentist/Anti-colonial milestones across Francophone Africa under the late IIIe, IVe, and early Ve republics: An exercise in modelling Presenter's Name: Lee Daniel

Classification: Graduate Student School/College: Graduate School Presentation Type: Poster Presentation Faculty Advisor: Krista Johnson Faculty Advisor's email: KMJohnson@Howard.edu

Co-authors:

the last fifteen years, tensions have risen between France and their former colonies, with seismic flashpoints since the pandemic. The impetus for these changes stems from the neocolonial dynamics extant within these polities which have carried over from the imperial era of Franco-African relations. This project looks back at indigenous challenges to imperial dynamics leading into decolonization to examine how anticolonial mobilization impacted avenues for political independence. This project also inquires about the relationship between the process of decolonization and extent of neocolonialism present in those polities. Integrating prevailing theories on civil conflict from peace/conflict and political science literatures (namely social conflict & social movement), this project develops a model for the key components to anti-colonial mobilization, attainment of political independence, and presence of neocolonialism. This project uses Tunisia as a case study for model-building (CFA/SEM), digitizing the archival colonial datasets from 1913-1956. Then, the robustness and external applicability of the model are tested on French African polities from 1939-1973, again through the digitization of archival colonial datasets. This project hypothesizes a processual link between longstanding conditions captured in these datasets to the pathways indigenous actors took in seeking political equality, then nationalist independentism-namely in which bases of power actors mobilized against-which now defines the postindependence dynamics between these polities and France. Ultimately the project seeks to provide a means by which to operationalize metrics of independentism, unearth and digitize historical data from the African continent, and a cross-cultural and cross-temporal model of mobilization across Franco-African contexts.

Exploring Racial Differences in Mother-Daughter Communication about Sex and Relationships, and Their Impact on Women

Presenter's Name: Lucas Haley Classification: Undergraduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Ryan Hill Faculty Advisor's email: ryan.hill@howard.edu

Co-authors:

This thesis aims to explore the ways mothers from diverse racial backgrounds communicate with their daughters about sex and the implications the communication has on the women they become. The researcher strives to find out how mothers from diverse racial backgrounds navigate these topics and how the conversations contribute to the development of their daughters. By looking at the experiences of both mothers and

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daughters, the study seeks to understand the long-term outcomes of these conversations on women. To achieve these goals, a mixed-methodology approach will be employed, incorporating surveys and private interviews to collect quantitative and qualitative data from Black and White daughters, aged 18 to 23 and their respective mothers. No age restriction will be placed on the mothers, as motherhood can begin at any age, and the focus will remain on their role in raising daughters within the specified age range.

Breaking Barriers: A Gamified Intervention Supporting First-Generation College Students at HBCUs

Presenter's Name: Lufumpa Mwela Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Darren Bernal Faculty Advisor's email: Darren.Bernal@howard.edu

Co-authors: Brooklyn Compton, Bree Arceneaux, Darren Bernal

Historically Black Colleges and Universities (HBCUs) attract students from diverse backgrounds. While these institutions offer a supportive environment, they often fail to recognize first-generation students (FGS) as a vulnerable population, despite a history of underperformance. FGS face an elevated risk of not completing their college education (Stebleton & Soria, 2012). Just over half (56%) of FGS complete their baccalaureate degree within 6 years compared to 74% of non-FGS (Ives & Castillo-Montoya, 2020). This disparity is influenced by challenges navigating the hidden curriculum, as well as sociocultural and financial barriers (Fokas & Coukos, 2023; McFadden, 2016). A key contributor to these challenges is FGS' mismatch in cultural capital, which is knowledge, skills, or other advantages that facilitate success in higher education (Housel & Harvey, 2009, p. 59). We are presenting findings from our novel evidence-based intervention aimed at improving outcomes of first-generation emerging adults at HBCUs. Our intervention addresses five key areas: social support, academic preparedness, financial challenges, psychological wellbeing, and student transition. Social support will be fostered through peer and mentor relationships. Academic preparedness will be strengthened through increasing their understanding of the hidden curriculum. Financial challenges will be addressed through increasing financial literacy. Psychological hurdles will be mitigated through mental health support. Lastly, student transition will focus on orienting students to the first-generation student experience in higher education. Methodology and findings from the focus group of gamified skills-building and psychoeducational intervention will illustrate future directions of gamification, targeted interventions, and strategies for addressing social inequity in higher education.

More Than a Game Abstract

Presenter's Name: Manuel Alana Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Marie Jipguep-Akhtar Faculty Advisor's email: mjipguep-akhtar@howard.edu

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Prior research on collegiate athletics has largely centered on the student-athlete experience at Predominantly White Institutions (PWIs), highlighting issues such as commodification, social isolation, and academic marginalization. However, limited attention has been given to how structural financial disparities between PWIs and Historically Black Colleges and Universities (HBCUs) affect the availability and quality of student-athlete support services. Financial resources are critical for providing academic advising, career development, and mental health services-core components of student-athlete success. This study uses archival methodology to analyze financial data from NCAA institutions, drawing from sources including the Equity in Athletics Disclosure Act (EADA) reports, U.S. Department of Education data, and NCAA financial statements. Quantitative analysis is employed to identify disparities and trends over time. Preliminary findings are expected to show significant financial gaps between HBCUs and PWIs, particularly in areas affecting academic achievement, mental health access, and post-graduation opportunities. These disparities may contribute to broader inequities in student-athlete outcomes. By linking institutional finances to student-athlete support structures, this research aims to contribute to the discourse on equity in collegiate athletics. The results will offer evidence-based recommendations to address financial imbalances and the socioeconomic factors that sustain them. Ultimately, this study supports a call for comprehensive reform within the NCAA, advocating for a multipronged approach to closing the resource gap and enhancing student-athlete well-being at HBCUs.

Identity in a Global Context: The Emphasis of Personal Background in Navigating Your World

Presenter's Name: Martin Maya Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Clarence Lusane Faculty Advisor's email: clarence.lusane@howard.edu

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Throughout the 20th century, the United States became known as the great melting pot, a term popularized by British writer Israel Zangwill in 1908 to celebrate America's union of nationalities, cultures, and ethnicities. However, given a history rooted in slavery and policies that marginalized communities of color and those who deviate from white, affluent, heteronormativity, America's socio-political culture remains turbulent. As a result, the melting pot metaphor is often replaced with the more accurate imagery of a salad bowl, signifying a multicultural society with distinct identities. In the U.S., discussions of identity are deeply

embedded in everyday interactions, with individuals frequently prefacing experiences with phrases such as "As a []." While this emphasis on identity is a defining aspect of American discourse, outside the U.S., this practice is often perceived as unnecessary or obsessive, prompting the question: Why do Americans fixate on race, gender, and background? However, this phenomenon extends beyond the U.S., as identity politics and DEI initiatives take different forms across the world. While some nations actively implement policies promoting diversity and inclusion, others reject such frameworks, emphasizing national unity over individual identity. This paper examines the global landscape of identity politics, analyzing how historical, political, and cultural factors shape discourse in various societies. By comparing international approaches, we can better understand whether the American model of identity discourse is an anomaly or part of a broader global trend toward identity visibility and intersectionality.

The Modern Southern Strategy: Enhancing the Advancement of Civil and Social Rights for Black Americans through the Utilization of the Electoral Process

Presenter's Name: Mcclain Courtney Classification: Graduate Student School/College: Arts & Sciences Presentation Type: Poster Presentation Faculty Advisor: Daryl Harris Faculty Advisor's email: dbharris@Howard.edu

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The American South has become synonymous with the prejudices, bigotry, and racism deeply embedded within the daily lives of Black Americans, shaping Southern culture and normative expectations. The electoral process and denial of access to it away from the Black community have directly resulted in the normalization of the aforementioned aspects. The normalization of these negative aspects has created a system that works against the rights and power of Black Southerners, hindering the progress and empowerment of this community and perpetuating systemic inequality. The dismantling of oppressive systems within the American South through the electoral process with a concentration on the Black southern electorate in South Carolina, North Carolina, Georgia, and Alabama is the center of this thesis. The political and quantitative data collected post Shelby v Holder, will be anafor utilizing the power of the Black vote and the electoral process to drive reformation and enhance the advancement of civil and social rights for Black Americans in this region through the enhanced ability to remove the elected officials who place oppressive policies and systems in place.

Partners in Survival: A Revolutionary Model for Empowering Male Caregivers in Oncology

Presenter's Name: Mcfarland Brian Classification: Graduate Student School/College: Social Work *Presentation Type: Oral Presentation* Faculty Advisor: Victoria Poku Faculty Advisor's email: victoria.poku@howard.edu

Co-authors: Marc Heyison

Male caregivers play a vital yet often overlooked role in cancer survivorship, facing unique challenges that affect their well-being and patient outcomes. Research highlights disparities in their experiences, including emotional isolation, societal stigma, and limited access to structured support services (Ng et al., 2023; Bamgboje-Ayodele et al., 2020). Despite evidence linking effective caregiving to improved treatment adherence and patient quality of life, survivorship programs primarily cater to female caregivers, leaving male caregivers underprepared and unsupported. This study introduces the first-of-its-kind program tailored to the distinct needs of male caregivers in oncology. This initiative integrates structured training, peer support networks, and culturally competent resources by utilizing the Partners in Survival[™] framework and the COPE Model (Creativity, Optimism, Planning, and Expert Information). A Train-the-Trainer approach ensures the development of sustainable, scalable, and community-driven caregiving programs, particularly in underserved populations. Research demonstrates that structured caregiver interventions improve mental health, reduce caregiver burden, and enhance patient survivorship rates (Ramchand et al., 2014; Srinivasan & Williams, 2014). This pioneering program is a strategic blueprint for academic institutions, healthcare organizations, and policymakers aiming to expand male-centered caregiving research and survivorship care. Integrating caregiver training into health equity frameworks and social work principles is essential to closing gaps in oncology support. Now is the time to act-by prioritizing male caregivers, we can reshape survivorship care and ensure they receive the support and recognition they deserve.

"He desperately wanted help": A causal analysis of the use of force cases and mental health outcomes

Presenter's Name: Mcneill Angelina Classification: Graduate Student School/College: Social Work *Presentation Type: Poster Presentation* Faculty Advisor: Janice Edwards Faculty Advisor's email: janice.edwards@howard.edu

Co-authors:

The National Use of Force Data Collection was created in 2015 by the Federal Bureau of Investigations (FBI). The collection provides data on law enforcement use of force incidents. The data collection includes national-level statistics on law enforcement use of force cases and basic information on the circumstances, subjects, and officers involved. The proposed research study will evaluate whether the data captures the impacts of the use of force on Black male young adults ages 18 to 25, with mental health disabilities. In the U.S., "use of force" is the amount of effort by law enforcement to compel compliance from an unwilling subject, i.e., verbal commands to physical restraint (Graham v. Connor,1989). The data is compared with other national data sources. The collection does not assess whether they followed their department's policy or acted lawfully. This study aims to evaluate the best practices and establish policy recommendations for officers and national data-collecting sources. The preliminary results of the proposed study show that only 6% of the national data show those impacted by medical, welfare assistance, or

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mental health outcomes. The most reported type of force used overall is a firearm. Other sources such as the Police Data: Mapping Police Violence show over 1 million reported use of force cases nationally. Of the 1 million involving mental health, 5,150 cases were individuals who were reportedly released on the scene without being taken into custody. It is reported that law enforcement used force against them. National data sources should be further evaluated.

Exploring the Prevalence of Psychological Distress in Black International Students and First-Generation Black American Students at HBCUs

Presenter's Name: Mdluli Thandwa Classification: Graduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Ivory Toldosn Faculty Advisor's email: itoldson@howard.edu

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Psychological distress is more prevalent in college students than the general population (Acharya, Jin & Collins, 2018). Existing research suggests that psychological distress for international students stems from acculturative stress, academic pressure, loneliness, discrimination, negative stereotypes and hate crimes which were pronounced during the COVID-19 pandemic (Cheng-Ching et al., 2024). However, the current literature primarily samples Asian international students, and samples international students at predominantly white institutions (PWIs) (Zhang & Goodson, 2011). This presents a key gap in our understanding of Black international students and their experiences at Historically Black Colleges/Universities (HBCUs). This poster hypothesizes that psychological distress will be lower in students who have lived or studied in the US for longer than a year. The psychological distress of Black international students and first-generation Black American students will be explored via a narrative systems framework. These two populations stem from community-based systems of community, thus, to explore their constructed stories of psychological distress as mediated by social networks, sense of belonging, and acculturation, it is vital to use framings that are congruent with their cultural values. The variables would include (a) social networks, (b) acculturation, (c) sense of belonging, (e) length of stay in the US, and (f) SES and financial stress, as well as exploring how age and school year affect these. The future study will use network analysis to explore the level of interconnectedness of variables and to identify the most central factors in psychological distress in Black international students and first-generation Black American students at HBCUs.

The Impact of Home and School Environment on Academic Achievement in Children Presenter's Name: Mewborn Sade

Classification: Undergraduate Student School/College: Education *Presentation Type: Poster Presentation* Faculty Advisor: Elizabeth Ricks Faculty Advisor's email: elizabeth.d.ricks@howard.edu

Co-authors:

This study investigates the impact of peer relationships, parental involvement, and home environment on the academic achievement of African American girls, using Bronfenbrenner's Ecological Systems Theory (1979) and Bandura's Social Cognitive Theory (1977) as guiding frameworks. Bronfenbrenner's theory emphasizes how interactions within various social systems-family, school, and peer groups-shape a child's development. At the same time, Bandura highlights the role of observational learning and self-efficacy in academic motivation. Prior research suggests positive peer relationships enhance academic engagement, whereas negative experiences, such as exclusion or peer conflict, can diminish self-efficacy and performance. Similarly, parental involvement, including school participation and academic encouragement, has been linked to improved educational outcomes, particularly for African American girls. Our research focused on the data surrounding black girls and how their home and school environment relate to their academic achievement. Using data from the Early Childhood Longitudinal Study, Kindergarten Class of 2010-2011 (ECLS-K:2011), this study conducts multiple linear regression analyses to examine the predictive relationships between these factors and academic success. Preliminary findings indicate that a supportive home environment and strong parental involvement correlate positively with higher academic achievement, while peer relationships exert positive and negative influences. These results highlight the need for educational policies and interventions that promote strong familial support and healthy peer interactions to enhance the academic experiences of African American girls. Implications for fostering environments that nurture academic success, and personal development will be discussed.

The Practicing Authority of Non-MD Healthcare Professionals and Patient Outcomes

Presenter's Name: Mooney Olivia Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Jevay Grooms Faculty Advisor's email: jevay.grooms@howard.edu

Co-authors:

Nurse practitioners (NPs) and physician assistants (PAs) are certified through nationally administered exams. However, their practice authority is determined at the state level. At the highest level of practice authority, they are able to order and interpret diagnostic results, prescribe medications, and operate independently of a MD. Those in states that restrict their practice authority are subject to additional oversight and are unable to practice the full extent of their training. The American Academy of Physician Assistants and the American Association of Nurse Practitioners support laws granting a full scope of practice. NPs and PAs represent an important population for improving medical access of patients in underserved communities because NPs and PAs are more likely than MDs to reside in a rural or underserved community. NPs and PAs are also growing faster than MDs and represent more diverse communities. This research focuses on the effect of the practice authority of NPs and PAs on patient outcomes using data of Medicaid recipients from 2016-

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2020. Preliminary results show that full practice authority of NPs is associated with a decrease in the incidence of heart failure, hypertension and chronic kidney disease. Full practice authority of PAs is associated with a decrease in the incidence of heart failure and hypertension. The most restricted practice authority of PAs is associated with an increase in the incidence of heart failure. These results will be examined in future research to understand the complex relationship between NPs/PAs and patient outcomes.

An Exploration of the Inconsistencies Surrounding Government Support for Afro-Colombians

Presenter's Name: Moorer Marena Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Jo Von McCalester Faculty Advisor's email: jovon.mccalester@howard.edu

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In Colombia, support from the government to minority groups continues to be a concern that has considerable political, economic, and social ramifications. Additionally, there is an intricate connection to many elements of political science. For example, political science has many disciplines, including public policy and social justice. The focus of this thesis will be to explore how the Colombian government supports marginalized groups, specifically Afro-Colombians inconsistently. The Afro population makes up between ten and twenty-five percent of the total population according to the 2018 Census. Within these numbers, all these people face unique obstacles to obtaining economic opportunity, political representation, and social justice. As a result, in the present time, many Colombians who do not fit into these marginalized groups do not see the extremity of problems like racism and discrimination because they are not directly affected by it. For this reason, it has proven difficult to formulate policies and or laws to correct such a long-standing problem. This thesis will highlight the different ways that marginalized groups, specifically Afro-Colombians, continue to be mistreated and overlooked and will conclude with some alternative ways like the implementation of new policies and more government funding that could help the country improve the lives of minorities that make up a large part of the population.

Striking the Curse: The Global Energy Transition as an Opportunity for Sustainable Development in the Democratic Republic of Congo

Presenter's Name: Muderhwa Louis-léopold Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Amirhossein Amini Behbahani Faculty Advisor's email: amirhossein.aminibe@howard.edu

Co-authors:

Faced with significant economic and social challenges, the Democratic Republic of Congo's widely discussed natural resources represent key components for the race to green energy not solely in the West but also in Sub-Saharan Africa. With widely underexploited and misappropriated resources, there are significant prospects for the development of the green energy sector. The DRC could become a key player in the development of clean energy, which could, in turn, contribute to lifting millions of Congolese out of poverty. Despite ranking among the world's richest nations in terms of natural resources, the country has long fought entrenched economic challenges, and millions of Congolese still live below the poverty line. This thesis aims to elucidate the geographic distribution and economic significance of the natural resources of the country for the worldwide green energy transition, including the substantial cobalt and coltan reserves and the dominant mining sector which has upheld most of the country's economic performance over the past decades. The rampant corruption and mismanagement of resources, coupled with the illegal mining practices in Eastern Congo have prevented the country from fully harnessing its potential, and has highlighted the further necessity of addressing the socio-economic challenges of the country. Therefore, it is vital for the country to establish frameworks to develop sustainable mining practices, which can provide critical resources for investments in renewable energy capacity and power the global transition to green energy.

Black Tutors Matter: Centering Undergradutate Student Tutors for Education in Prison at Howard University Through the Petey Greene Program

Presenter's Name: Muhammad Bahiyyah Classification: Senior Faculty School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Bahiyyah Muhammad Faculty Advisor's email: bahiyyah.muhammad@howard.edu

Co-authors:

The Howard University Petey Greene Program (PGP) has offered undergraduate students the opportunity to provide GED tutoring for currently incarcerated scholars. This presentation will discuss the history of the Howard University PGP, the significant role the Black tutors play in higher education in prison, and the experiences of students in the tutoring program. Findings suggest that program participants advances student success in criminology and sociology courses, empowers students to highlight their own experiences of familial incarceration and helps students prepare for post-graduation careers in the criminal legal system. This study extends evidence on the importance of HBCUs providing educational experiences, resources and opportunities for incarcerated students that aids in breaking the intergenerational cycle of incarceration and builds a pipeline from prison to HBCU.

Breaking Generational Curses: Success and Opportunity Among Black Children of Incarcerated Parents

Presenter's Name: Muhammad Bahiyyah Classification: Senior Faculty School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Bahiyyah Muhammad Faculty Advisor's email: bahiyyah.muhammad@howard.edu

Co-authors: Gatewood Britany, Sydni Turner

Black children are disproportionately represented among the children of incarcerated mothers and fathers in the United States. Research has largely focused on negative life outcomes (e.g., incarceration, negative behaviors, school dropout rates) of these children. Recently, studies have begun to look at success; however, children of incarcerated parents are typically placed into a homogenous group without considering racial implications. Using a critical race theoretical perspective, this study highlights the counternarrative of success by analyzing 59 in-depth interviews. Findings center on the ways adult Black children of incarcerated parents define success, which differs from middle-class, Eurocentric definitions of economic success, college graduation, marriage, and children as the success indicators. Success in relationships, community, education, and mental health emerged as the themes that define success. Findings show that their relationship with others (including their incarcerated parent), giving back to the community, educational experiences, and improving their mental health were indicators that they have "made it." With support from their personal networks, they can succeed despite institutional and structural barriers. This study may assist policymakers, organizations, and schools with shifting societal perceptions to tailor resources for Black children of incarcerated parents to help invest in their futures.

Multi-Sensory Learning and Child Development in Elementary School Students

Presenter's Name: Mutagoma Darby Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Debra Roberts Faculty Advisor's email: ddroberts@howard.edu

Co-authors:

The current status of education systems highlights significant disparities in access to equitable learning opportunities. Many children experience challenges including access to limited resources and teaching methods that do not cater to their diverse learning needs. In particular, this inequity disproportionally impacts students from low socioeconomic status communities. In order to address this gap, the purpose of this study is to explore the potential benefits of the multi-sensory approach to learning. Previous literature examined the benefits of using the multi-sensory approach, where auditory, visual, and kinesthetic modalities are integrated into the traditional approach to learning. This study investigates the potential effect of multi-sensory learning on self-esteem, self-efficacy, and literacy skills among boys and girls (n=37; girls=25), ages 7 - 9, who were recruited from a Boys and Girls Club within a metropolitan city in the Northeast US. As part of their literacy initiative to bridge the educational gap for children living in this area's impoverished neighborhoods, the summer program housed over 100 children who were provided the opportunity to participate in this study. It was hypothesized that children in the 2nd – 4th grades would have better self-esteem, self-efficacy, and literacy skills following two weeks of multi-sensory learning. Preliminary analysis suggests partial support for the hypotheses where children's self-efficacy improved following exposure to the multi-sensory approach to learning. Results are discussed within the context of bettering education systems and finding a way to meet the educational needs of children who have been marginalized.

Precarious Work and Mental Health in US Post-COVID-19: Self-Employment and Health Insurance

Presenter's Name: Ndolo David Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Professor Jevay Grooms Faculty Advisor's email: Jevay.Grooms@Howard.edu

Co-authors: Professor Jevay Grooms

Pandemics such as COVID-19 exacerbate labor market inequalities, with precarity of work being a significant factor affecting mental health, as job insecurity increases in the phase of pandemics, severely impacting vulnerable groups. In this paper, we analyze the impact of precarious work on mental health post-COVID-19. We employ the Behavioral Risk Factor Surveillance System (BRFSS), a cross-sectional reliable dataset that captures health-related risk behaviors, and chronic health conditions. Using the logistic model, our findings consistently show that precarity of work is associated with the severity of mental health worsening, particularly in the context of a pandemic such as COVID-19 which affects mental well-being. Our findings highlight that the mental health burden was more severe among minority groups in the US labor force; Hispanics/ Latinos are significantly faced with mental health deterioration relative to Whites. The implication for this is that the impact of precarious work during crises such as COVID-19 is not only a consequence of job precarity but also race and ethnic disparities. Smoking and being alcoholic are associated with high chances of negative mental health. Possession of a college degree increases mental health while race has no significant impact. Physical activity and being married improves mental health for precarious workers. The disproportionate mental health affecting precarious workers, particularly from minority groups, underscores the need for targeted interventions by the government. This study proposes the implementation of safety measures for precarious workers during crises as they mitigate the health risks for minority groups.

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Not an Isolated Incident The Ongoing Violations of Prison Experiments

Presenter's Name: Newcombe Ayiana Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Michael Ralph Faculty Advisor's email: michael.ralph@howard.edu

Co-authors:

"Not an Isolated Incident: The Ongoing Violations of Prison Experiments" examines the Holmesburg Prison experiments, a 23-year-long program of medical testing on incarcerated men in Pennsylvania, and their enduring consequences for returning citizens and their families. Conducted under the direction of Dr. Albert Kligman, these experiments generated significant profits for several pharmaceutical companies while leaving many participants with chronic illnesses and psychological trauma. Drawing on historical analysis, and insights gained from an ethnographic study on community engagement with The Black Voice Project, this connects the Holmesburg experiments to contemporary struggles faced by formerly incarcerated individuals. By amplifying the voices of those directly affected, the research highlights the mental, physical, and emotional impact of these experiments on survivors and their descendants. The study critically engages with three central themes: coercion and misconceptions surrounding informed consent, the racialized nature of medical experimentation, and the lasting trauma experienced by the returned citizens. This research situates the Holmesburg experiments within a broader historical pattern of systemic exploitation, revealing how past abuses continue to shape contemporary understandings of incarceration, exploitation, and human rights. By highlighting lived experiences of returning citizens, the study underscores the need for justice, reparative measures, and ongoing advocacy to address the long-term consequences of medical exploitation in prisons. Through this lens, it becomes clear that the violations of Holmesburg were not isolated incidents but part of a continuing legacy of racialized medical harm inflicted upon incarcerated individuals.

Algorithmic Injustice: The Racial Bias of Risk Assessment Tools in Sentencing

Presenter's Name: North Lauren Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Keneshia Grant Faculty Advisor's email: keneshia.grant@howard.edu

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The criminal justice system has long demonstrated disparities in how it treats minority defendants, particularly Black individuals, in sentencing. Numerous cases show that Black defendants often receive harsher sentences than white counterparts for similar offenses, raising concerns about justice and fairness. While the system is intended to promote justice, ensure fairness, and protect society, it frequently fails to do so for Black communities. This paper focuses specifically on the use of risk assessment tools in sentencing and examines whether these tools promote equitable outcomes for Black defendants. The central research question is: Does the use of risk assessment tools in determining sentencing ensure justice and fairness for Black defendants? I argue that these tools do not support just or fair outcomes for Black individuals and may, in fact, reinforce existing racial disparities. To explore this, I will examine how judges determine sentencing, the origins and evolution of risk assessment tools, and how they shape sentencing today. I will also define what justice and fairness should look like in this context and present data showing how risk assessment tools impact sentencing outcomes for Black defendants. Ultimately, I contend that the use of these tools exacerbates racial inequities and should be eliminated from sentencing practices to promote true justice for all defendants.

Racial and Ethnic Inclusion in Atopic Dermatitis Clinical Trials

Presenter's Name: Nwaneri Uchechi Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Dr. Ellen Pritchett Faculty Advisor's email: ellen.pritchett@howard.edu

Co-authors: Ellen Pritchett, Samrawit Zinabu

Background: Atopic dermatitis (AD) disproportionately affects historically marginalized racial and ethnic minority groups, including Black and Asian populations. However, underrepresentation of these groups in clinical trials limits the generalizability of research findings and perpetuates disparities in dermatologic care. Objective: This study examines racial and ethnic representation in AD clinical trials from 2013 to 2023, evaluating trends in minority inclusion. Methods: A systematic search of ClinicalTrials.gov identified AD clinical trials conducted in the U.S. from October 2013 to July 2023. Trials that reported race and ethnicity demographics were analyzed. Participant demographics included White, Black or African American, Asian, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and Hispanic or Latino populations. Results: Of 283 identified trials, 46 were completed with published results, and 19 (41.3%) reported race and ethnicity data, including 7,522 participants. White individuals consistently comprised the majority, often exceeding 70-90% of participants. Black and Hispanic or Latino representation varied but generally remained below 20%. American Indian/Alaska Native and Native Hawaiian/Pacific Islander groups were nearly absent. Statistical analysis confirmed significant racial and ethnic disparities (p < 0.0001). Conclusion: While regulatory changes and advocacy efforts have contributed to increased diversity in some trials, particularly from 2017 to 2019, disparities persist. Targeted recruitment strategies and community engagement are essential to improving minority inclusion in AD research. Addressing these gaps is critical to ensuring equitable dermatologic care and optimizing treatment outcomes for diverse populations.

Implications of Involuntary Commitments Laws on Admissions by Race, Ethnicity & Job types

Presenter's Name: Pandey Subodh raj Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Jevay Grooms Faculty Advisor's email: jevay.grooms@howard.edu

Co-authors:

Involuntary Commitment law allows a person diagnosed with mental illness to receive treatment without personal consent. This law dates back to 1971, with most states (15 states) passing it in 2018, while others (16 states) are yet to pass this law. Thus, this study evaluates if this law has an impact on the number of admissions based on alcohol, cocaine/crack, and heroin abuse by race, ethnicity, and job types. To achieve this objective, a difference-in-difference approach was used, utilizing the Treatment Episode Dataset (TEDS-A) and National Welfare dataset. It was found that the number of admissions for both male and female increased after this law was passed, with a higher impact on males as compared to females. The number of admissions for black, white, cubans, hispanics, and mexicans increased, with higher impact on black and white population, while the number of admissions decreased for asians. Regarding job types, the number of admissions increased for full-time workers and unemployed people, with a higher impact on unemployed people. Conversely, the number of admissions decreased for part-time workers and the people who are not in the labor force.

Construction and Validation of the Dispositional and Affective Frequency Questionnaire (DAF-Q)

Presenter's Name: Pannell Davynte Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Alfonso Campbell Faculty Advisor's email: acampbell@howard.edu

Co-authors:

What beliefs are the best? This study involved the construction of an instrument to measure a novel concept - Psychological Advantageousness (PA). Psychological Advantageousness refers to the relationship between and individual's Mental and Emotional Intrapsychic Infrastructure (MEII) and their Quality of Life (QOL). PA is a metric by which we can judge beliefs - for better or worse. Using an online questionnaire, 170 participants endorsed beliefs and completed three Quality of Life assessments - (1) the DAF-Q which involved a Likert-scale ranging from (Strongly Disagree to Strongly Agree) capturing the typicality of 57 affective and dispositional experiences; (2) the Psychological Wellbeing Scale (PWS); and (3) the Patient Health Questionnaire 4. Construct, concurrent, and discriminant validity hypotheses were assessed and partially supported. Results indicated that the DAF-Q yielded a 12 factor structure with loadings primarily on 3 factors. DAF-Q and PWS total scores were significantly positive correlated (Pearson correlation = .554; p<.001) and DAF-Q and PHQ-4 were significantly negatively correlated (Pearson correlation = -.249; p<.001). The top 5 highest quality-of-life-yielding beliefs (i.e. the best beliefs) were identified according to each of the 3 QOL measures. The purpose of this study was to begin the process of illuminating QOL statistics to attach to beliefs so people can make more informed decisions about what to believe. Future studies will futher the investigation into the relationship between beliefs and QOL.

The Burden of Care: Analyzing the Dual Burden of Caregiving and Incarceration

Presenter's Name: Peay Janesha Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Bahiyyah Muhammad Faculty Advisor's email: bahiyyah.muhammad@howard.edu

Co-authors:

There are social, economic, gendered and political injustices that disproportionately affect Black women and their experiences with the criminal justice system. This honors thesis analyzes the systemic inequalities that shape the caregiving responsibilities and incarceration experiences of system impacted Black women. Using a qualitative methodology of content analysis, that systematically reviews several articles written by Black women to identify the dominant themes related to the unique experiences of system impacted Black women. The coding process used thematic analysis to identify five key themes; forced caregiving in a historical context, traumatized offending, the role of institutional frameworks, maternal and paternal incarceration, and mothering during and post incarceration. The findings suggest that Black women are often the ones to take on the caregiving responsibilities when parental incarceration occurs. For example, it can be the mother when the father is incarcerated or the grandmother when the mother is incarcerated. This study also demonstrates the role socioeconomic status plays and how it impacts the ability to care for the child(ren) left behind. In addition, themes highlight the importance of maintaining the relationship between the child and parent during incarceration. Finally, study findings will highlight the challenges faced post incarceration by mothers who experience challenges with parole requirements and navigating the foster care system. This honors thesis research expands insight into how trauma and institutional frameworks influence the caregiving responsibilities and incarceration experiences of system impacted Black women. Highlighting how the research can produce new policy, community, and practical implications for the future.

Born Black but Not Breathing: A Medical and Autobiographical Account of the Black Experience in Chicago

Presenter's Name: Phillips Kinara Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Mario Beatty Faculty Advisor's email: mario.beatty@howard.edu

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Meconium Aspiration Syndrome is a syndrome that occurs when a baby secretes Meconium, their first feces, while still in the womb, then inhales a mixture of Meconium and amniotic fluid into their lungs. In Born Black but Not Breathing, the author compiled research from pediatric research journals, maternal health journals, and the city of Chicago to explore how black babies born with MAS fared in comparison to other babies. She focused specifically on the years between 1980 and 2010 as those years include the author's birth year, and the year ECMO (Extracorporeal Membrane Oxygenation), a revolutionary treatment for severe MAS started to spread across the country, including into the city of Chicago. The author explored how the financial burden of health care, the geography of the city, and racism in maternal health care could negatively affect the outcomes of Black babies born with MAS. Those outcomes could include long-term disability or even death of a newborn child. Preliminary results suggested that Black babies born with MAS are more likely to develop delays in speech, reduced muscle mass, seizures, and increased mortality risk for those without treatment. Key Terms: Meconium Aspiration Syndrome, Extracorporeal Membrane Oxygenation, amniotic fluid, Meconium Stained Amniotic Fluid, Neonatal Intensive Care Unit

Hamstring Strains and the Mental Health of Howard University Athletes

Presenter's Name: Ray Nya Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Seanta Cleveland Faculty Advisor's email: seanta.cleveland@howard.edu

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Hamstring strains are among the most common athletic injuries, particularly in sports like football, soccer, and track, which demand explosive movements. While physical rehabilitation is critical, the mental health implications of such injuries are often overlooked. This research investigates the connection between hamstring tears and the mental health of Howard University football athletes. Using a mixed-methods design, the study combines qualitative interviews and quantitative surveys to explore how hamstring injuries impact emotional well-being, motivation, and stress. Preliminary findings suggest that the inability to train or compete during recovery may lead to stagnation, increased anxiety, and a decline in mental health. By identifying this relationship, the research aims to provide actionable insights for developing rehabilitation programs that address both physical and psychological recovery. Given the unique pressures faced by collegiate athletes at HBCUs, such as limited resources and high performance expectations, this study underscores the need for holistic care strategies that include mental health interventions. These findings contribute to the growing awareness of the importance of mental health in collegiate sports and advocate for integrated care approaches to enhance athlete well-being.

Efforts of our Forefathers: A Comparative Analysis of Calls for Reparations between the 19th, 20th, and 21st Centuries

Presenter's Name: Richardson Ellison Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Johnpatrick Ifedi Faculty Advisor's email: jifedi@howard.edu

Co-authors:

The definition and purpose of reparations, as it relates to a human population, is one consistent across disciplines: serve to acknowledge the legal obligation of a state, or individual(s) or group, to repair the consequences of violations - either because it directly committed them, or it failed to prevent them. They also express to victims and society that the state is committed to addressing the root causes of past violations and ensuring they are not repeated. Such a definition serves as the basis and argument for reparations, circumscribed to Black Americans. Yet, with time comes evolution (or devolution), and the idea of reparations is not immune to the inexorable marching of time. This paper undertakes a comparative analysis of 19th and 20th-century records and literature, juxtaposed with contemporary conceptions of reparations in both political discourse and scholarly works of the 21st centuries, to explore the hypothesized decline in the depth of reparations dialogue. Beyond providing a novel examination of how demands for reparations for Black Americans have evolved, this study aims to underscore the importance of a liberated existence over one of assimilation within American society. By illuminating the era-specific approaches to reparations, this paper ultimately argues that modern frameworks lack the comprehensive, community-centered focus that characterized earlier calls for reparative justice in the sphere of politics.

Leading Revolution from the Left: An Exploration of Marxist-Leninist Thought and Praxis in Sudan

Presenter's Name: Rivers Miranda Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Amsale Alemu Faculty Advisor's email: amsale.alemu@howard.edu

Co-authors:

This study explores Sudan's different periods of revolutionary upheaval, paying particular attention to the country's fight to obtain independence in 1956 and in its struggles for democratic rule, which led to major political transitions in 1964 and 1985. The focus will be on the role played by the Sudanese Communist Party (SCP), one of Africa's strongest Marxist-Leninist formations at the time, in leading and bringing about these revolutionary moments in Sudan's history. The research seeks to better understand how the SCP organized amongst workers and peasants in the lead up to, during, and in the aftermath of these political uprisings. It will draw on the party archives and other historical materials to better understand the party's strategies and tactics for bringing about a national democratic revolution and ushering in a socialist transition. Emphasis

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will also be placed on how the SCP fits within broader understandings and expressions of Marxism-Leninism in Africa.

Beyond Western Frameworks: How Culture Shapes the Expression of Depression

Presenter's Name: Rokaya Garima Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ezer Kang Faculty Advisor's email: ezer.kang@Howard.edu

Co-authors:

This review looks at the emic and etic perspectives of depression and gives a comparative view on the similarities and differences of patient expression of depression across different cultures. It examines the socio-cultural influences on the prevalence and symptom expression of depression across cultures. Although most of the global population resides in non-Western countries, diagnostic criteria for depressive disorders have been primarily shaped by research in North America. These frameworks often overlook cross-cultural variations in depression symptomatology. For example, ubiquitous features like social isolation, crying, anger, and general pain are absent from the DSM-5 diagnostic criteria, despite being reported globally. Additionally, "worry," a common symptom in South Asian and Southeast Asian populations, is not included in the DSM-5. Evidence shows that cultures express symptoms in ways that reflect their social norms and assign diverse meanings to illness and distress. The omission of culture-bound syndromes, unique to specific ethnic groups, may lead to misdiagnosis in non-Western settings. Understanding the socio-cultural context of these experiences is essential to appreciating the diversity and commonality of depression worldwide. It is very common in India for patients to often present with somatic symptoms such as fatigue, sleep disturbances, and generalized aches rather than identifying psychological distress. Such presentations are often framed within a biopsychosocial lens, where life stressors like financial hardship, interpersonal conflicts, bereavement, and caregiving challenges are perceived as central to distress. This context underscores the need for culturally adapted diagnostic and management approaches to address the unique socio-cultural landscape of depression.

Beyond Western Frameworks: How Culture Shapes the Expression of Depression

Presenter's Name: Rokaya Garima Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ezer Kang Faculty Advisor's email: ezer.kang@Howard.edu

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expression of depression across different cultures. It examines the socio-cultural influences on the prevalence and symptom expression of depression across cultures. Although most of the global population resides in non-Western countries, diagnostic criteria for depressive disorders have been primarily shaped by research in North America. These frameworks often overlook cross-cultural variations in depression symptomatology. For example, ubiquitous features like social isolation, crying, anger, and general pain are absent from the DSM-5 diagnostic criteria, despite being reported globally. Additionally, "worry," a common symptom in South Asian and Southeast Asian populations, is not included in the DSM-5. Evidence shows that cultures express symptoms in ways that reflect their social norms and assign diverse meanings to illness and distress. The omission of culture-bound syndromes, unique to specific ethnic groups, may lead to misdiagnosis in non-Western settings. Understanding the socio-cultural context of these experiences is essential to appreciating the diversity and commonality of depression worldwide. It is very common in India for patients to often present with somatic symptoms such as fatigue, sleep disturbances, and generalized aches rather than identifying psychological distress. Such presentations are often framed within a biopsychosocial lens, where life stressors like financial hardship, interpersonal conflicts, bereavement, and caregiving challenges are perceived as central to distress. This context underscores the need for culturally adapted diagnostic and management approaches to address the unique socio-cultural landscape of depression.

The Effects of Childhood Trauma on Affective Engagement Among College-Aged African American Students

Presenter's Name: Salako Michael Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ayu Oritsegbubenmi Faculty Advisor's email: oayu@howard.edu

Co-authors:

The impact of adverse childhood experiences (ACEs) on interpersonal relationships has been widely explored, but less attention has been paid to how adverse childhood experiences affect affective engagement in academic settings among African American young adults. Childhood trauma remains prevalent in the Black community, with over 60% of Black children experiencing at least one ACE. Yet only around 25% seek mental health support later in life. Trauma resulting from physical, sexual, and emotional abuse, as well as neglect, often disrupts emotional regulation, self-perception, and interpersonal interactions. While ACEs are known to contribute to mental health struggles, difficulties in emotional regulation, and relationship challenges, the unique adversities faced by African Americans and their effects on academic engagement have not been explored in depth. Black culture, which significantly influences values and behaviors, shapes how individuals emotionally engage in various contexts, including academic environments. For example, cultural values around vulnerability and independence can affect how African American students engage with peers, teachers, and educational activities. This thesis aims to bridge the gap by examining how childhood trauma impacts affective engagement in academic settings. It will focus on how these early experiences influence students' academic relation-

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ships and their emotional and attitudinal feelings toward their learning experiences and environments. Additionally, the thesis seeks to propose strategies for fostering healthier affective engagement and sustainable academic relationships for African American students, ultimately enhancing their success in educational environments.

Debt sentence: Financial and debt stress in student well-being?

Presenter's Name: Sanchez Helena Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Darren Bernal Faculty Advisor's email: darren.bernal@howard.edu

Co-authors: Delaney Leonard, Darren R. Bernal

The student loan crisis in the United States has increased in severity in the past 20 years, impacting the pursuit of higher education and their mental health. The relationship between financial and debt-related stress and the mental health of psychology graduate students has been minimally researched independently and in conjunction with each other. Psychology doctoral students experience significant stress related to their financial and debt situations, impacting their mental health and well-being (Jones-White et al., 2022; Szkody et al., 2023). The Stress Process model (Pearlin et al., 1981) is a theoretical framework that suggests that coping and social support mediate the relationship between stress appraisals and manifestations of stress. The present study aims to understand how social support, coping, and sense of belonging influence the relationship between financial and debt-related stress and mental health within this population to highlight additional resources that may be critical to implement to minimize this potential effect. A survey compiled of validated and reliable scales will be sent to approximately one hundred clinical and counseling psychology PsyD and PhD programs (N = 500), measuring financial stress and debt stress as predictor variables with anxiety and depression as outcome variables. Hierarchical regression analysis will be conducted to determine if social support, coping, or a sense of belonging mediates these relationships. This presentation will use pilot data to examine how sociodemographic factors and additional variables, such as debt literacy and subjective social status, influence findings to elucidate avenues of support to promote student mental health and well-being.

Voices Lost in the Rubble: Women Proprietresses on Black Wall Street in Tulsa, Oklahoma

Presenter's Name: Shaw Raven Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Michael Ralph Faculty Advisor's email: michael.ralph@howard.edu

Co-authors:

This project examines the extensive property loss Black women proprietors in Tulsa, Oklahoma's Greenwood District experienced due to the 1921 massacre. By merging analysis of documented monetary losses from "Events of the Tulsa Disaster" by Mrs. Mary E. Jones Parrish with current economic evaluations, this study aims to quantify the financial consequences of the massacre on residences, businesses, and public properties that Black women owned. This quantitative assessment seeks to provide a detailed portrayal of the economic devastation, highlighting not just the immense scale of destruction but the specific losses that disrupted lives and livelihoods in the Greenwood community. Building upon the foundational research of scholars like Tim Madigan, Carlos Moreno and Hannibal B. Johnson, this study delves deeper into the economic consequences of the riot by including the narratives of a group of women who were overlooked amidst the chaos of the riot. Ultimately, this research contributes to the broader scholarship on wealth and inequality by uplifting the voices of women who played a profound role in the economic functioning of the Greenwood community to provide a clearer, more nuanced understanding of the massacre's effects on race and property ownership in Tulsa.

Stuck in the Trap: The Dual Impact of Violent Trap Music on Black Youth's Self-Perception and Lifestyle Choices in the Era of Celebrity Culture

Presenter's Name: Shirley Raevin Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Terri Dilmore Faculty Advisor's email: terri.dilmore@howard.edu

Co-authors:

The influence of music and culture on youth behavior has been widely discussed; however, few studies specifically measure its impact on problematic behaviors in youth. Multiple factors contribute to crime among young populations, yet the effects of violent messages in music and their influence on youth behavior remain less understood. This research explores the influence of music on adolescent behavior, particularly among Black male youth. Albert Bandura, a social scientist, introduced Vicarious Learning to describe how children's behavior is shaped by observed actions. This theory serves as the framework for the present study. This thesis examines the relationship between violent trap music, self-perception, and lifestyle choices, emphasizing celebrity culture and social media influence. Rooted in Bandura's theories, the study investigates how exposure to violent lyrics and the glamorization of harmful behaviors shape identity, attitudes, actions, and risk-taking behaviors. By analyzing the historical and contemporary influence of hip-hop and trap music, as well as empirical studies on music's psychological effects, this research distinguishes between artistic expression, lifestyle promotion, and idolization. Additionally, it examines parasocial relationships between fans and artists, highlighting how social media strengthens these connections and influences youth behavior. Through this analysis, the study advocates for increased media literacy, critical engagement with music, and community-based interventions to mitigate negative influences while preserving trap music's cultural and artistic significance. Ultimately, the research seeks to provide a balanced perspective on music as both a tool for self-reflection and a potential driver of behavioral patterns in Black youth.

Examining the Legacy of Black Male Emasculation: Historical Damage, Masculinity, and Family Relations

Presenter's Name: Sims Cody Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Jay Stewart Faculty Advisor's email: j stewart@bison.howard.edu

Co-authors:

This research examines the impact of Black male emasculation on African American family relationships through the framework of James Baldwin and Nikki Giovanni's interview on Soul. This discussion delves into the psychological and emotional load bore upon black men and how these same stresses manifest within the black family household. The investigation traces the historical roots of emasculation, from the dehumanization of Black men during slavery, highlighted in Sexuality and Slavery, to systemic socioeconomic challenges explored in The Negro Family: The Case for National Action. These pieces of literature encapsulates how Black men's position in society has been extinguished, leaving a legacy of trauma and marginalization. The research additionally analyzes how the forever shifting societal standards and financial constraints form modern views of Black masculinity. I'm a Hustler examines how people transcend oppression by aligning with different masculine personas, while Ron Eyerman's Cultural Trauma and Emma-Lee Amponsah's On Black Cultural Memory addresses how historical trauma reflects contemporary Black families. Furthermore, Dr. Joy DeGruy's Post-Traumatic Slave Syndrome and research on racial prejudice's affect on mental health illuminates how systemic oppression elevates family discourse. Lastly, works like The Intersection of Race and Gender by Lauren Wesley and Deconstructing Hypermasculinity by Aliyah Abu-Hazeem clarify the burdens Black men endure in conforming to or revolting against hegemonic masculinity. Reinventing Black manhood past damaging stereotypes is crucial to restoring Black family systems. This study contends that confronting both historical and contemporary emasculation is vital to strengthening resilience and unity within Black communities.

To what extent does the homophobic discourse surrounding men who have sex with men (MSM) have a corresponding influence on the perceived politics of their sexual behavior and struggle to maintain healthy, successful romantic relationships.

Presenter's Name: Small Warren Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Ravi Perry Faculty Advisor's email: ravi.perry@Howard.edu

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Men who have sex with Men, MSM, have been continuously ridiculed for their "promiscuous" sexual behaviors. The stereotype of MSM searching simply for sex instead of meaningful relationships has been projected onto MSM for decades. My thesis solidifies the connection that the sociopolitical factors that marginalize men who have sex with men (MSM) have a corresponding influence on their perceived overly sexualized behaviors and struggle to maintain healthy, successful romantic relationships. Society has crafted The National Gay Narrative, which seeks to depict MSM as strictly sexual beings and negates the romantic connection between them, which is universal in the human experience. As a result of the cruel societal attitudes, society has had an irrefutable role in forming the politics of their sexual behavior and struggle to maintain healthy, successful romantic relationships. Through legislative and political analysis, scholarly research and scientific studies, firsthand testimony from MSM, and interviews of various religious perspectives regarding the subject of "homosexuality," my thesis uncovers where the true villainization of MSM has stemmed from and the political impacts on their behaviors as individuals and their community at large.

Exploring the Intersectionality of Flow State Experiences Among Marginalized Athletes: A Qualitative and Quantitative Study

Presenter's Name: Smith Jada Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Kamilah Woodson Faculty Advisor's email: kwoodson@howard.edu

Co-authors:

This study explores how intersectional identities—such as race, gender, and socioeconomic status—shape flow state experiences among marginalized athletes. Using a mixed-methods approach, the qualitative component examines personal narratives to identify factors facilitating or hindering flow, including systemic barriers and discrimination. The quantitative component applies the Flow State Scale (FSS) to measure flow intensity and its dimensions across diverse athlete groups, analyzing variations linked to demographic differences. By integrating qualitative and quantitative findings, the research highlights the complex interplay of social and psychological factors affecting flow. The results aim to inform inclusive training practices and culturally sensitive mental health interventions, addressing critical gaps in sports psychology and supporting marginalized athletes' performance and well-being.

Employing commonly used model-based predictions for snowfall to determine best practices for forecasters

Presenter's Name: Smith Jaren Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Sen Chiao Faculty Advisor's email: sen.chiao@howard.edu

Co-authors:

Precise snowfall forecasting is important for many different reasons that affect a multitude of situations such as public safety, transportation, and

resource management. Snowfall predictions are also important for agriculture preparations, infrastructure, and for any economic impacts that could possibly occur due to the amount of snow that is predicted. In this research project, I will be analyzing 2 different models, the Numerical Weather Prediction (NWP) model and Environmental Modeling System (ESM)model to answer the question of how two models of recent DC snowfall compare, and which model provides the most accurate results. The NWP model uses dynamics and physics equations pushed by global data. On the other hand, the EMS model relies on comparing and using old data to forecast snowfall. During this research, we will determine the best practices for forecasters who utilize model output for snowfall predictions in the DMV area. The two objectives during this study are to do a model to model comparison for snowfall predictions using observations and determining which model provides the most accurate results based on archived data. All of the snowfall that will be observed is from this current winter season in the DC area specifically. This study and examination of the 2 models will help us determine which model is more efficient and will help us stay prepared in the aspects of proper transportation, agricultural planning, economic stability, public safety, and the health of all people.

Media Sentiment Analysis for Social Event Prediction

Presenter's Name: Smith Justin zaire Classification: Undergraduate Student School/College: Engineering & Architecture *Presentation Type: Oral Presentation* Faculty Advisor: Charles Kim Faculty Advisor's email: ckim@Howard.edu

Co-authors: Leule Bantywalu, Manoj Nath Yogi

This project aims to predict and detect significant social, political, and economic events by analyzing the sentiment and frequency of words used in online new media. By tracking word occurrences and assigning sentiment scores using the VADER (Valence Aware Dictionary and Sentiment Reasoner) sentiment analysis tool, we hypothesize that major events can be correlated with the overwhelming usage of specific words on particular days. The sentiment scores, positive, negative, or neutral, are calculated for each word, and the total sentiment value for each day is derived by multiplying the sentiment score by the word count. The results are visualized using bar and line graphs to identify trends and anomalies. The sentiment analysis reveals clear spikes in sentiment totals on specific days. For example, a sudden increase in negative sentiment words (e.g., "crisis," "attack," "disaster") coincides with reports of a natural disaster, terrorist attack, or political unrest. Also, a spike in positive sentiment words (e.g., "celebration," "victory," "achievement") aligns with events like sports victories, national celebrations, or economic breakthroughs. Additionally, the findings are cross-verified with other news sources to confirm the occurrence of significant social, political, and economic events on the identified dates. This approach provides a data-driven method to detect and predict major events based on media sentiment and word frequency, with applications in economic and political domains.

How Clinician Bias Leads to the Misdiagnosis of ODD and CD in Incarcerated Black Youth Within the U.S. and Ultimately Contributes to Racially Disparate Recidivism Rates Presenter's Name: Smith Madison Classification: Undergraduate Student School/College: Arts & Sciences Presentation Type: Poster Presentation Faculty Advisor: Ezer Kang Faculty Advisor's email: ezer.kang@Howard.edu

Co-authors:

BACKGROUND: Mental health clinician bias is when clinicians' implicit or explicit racial bias negatively influences their diagnostic procedure. This bias reinforces a system that denies incarcerated Black youth adequate behavioral treatment, which potentially exacerbates criminality and recidivism. Specifically, these youth may be disproportionately diagnosed with Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), which are linked to defiant and violent behavior. This may be largely attributed to biased perceptions that criminalize the behavior of Black youth, overlooking or minimizing other contributing factors - namely exposure to traumatic events and abuse. METHODS: A systematic review of grey and peer-reviewed literature published within the last 5 years was conducted to understand clinician bias toward justice-involved Black youth, focusing on the scope and determinants of the problem. RESULTS: Studies reviewed highlighted that up to 70% of court-involved youth have a mental health disorder, with 30% of them having behavior disorders. As of 2022, 41% of incarcerated youth are Black. A significant portion of Black youth are being diagnosed with behavioral disorders like ODD and CD. However, up to 84% of detained youths have reported experiencing several traumatic experiences that may better account for their behavior. Youth labeled with ODD and CD are strongly associated with recidivism because of their frequent contact with the justice system. CONCLUSION: Reducing potential clinician biases towards justice-involved Black youth helps ensure timely referral to mental health and supportive services to mitigate the likelihood of reoffending and re-entering the carceral system as adults.

Mental Health Practitioners' Perception of the Quality of Care Provided to Residents in Kwaprow, Ghana

Presenter's Name: Smith Toni Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Debra Roberts Faculty Advisor's email: ddroberts@howard.edu

Co-authors:

The international domination of Western psychology has historically ignored African psychological perspectives, leading to the marginalization and neglect of the mental health care of Africans globally. This exclusion of the African perspective in standard international texts (Diagnostic and Statistical Manual of Mental Health, International Classification of Diseases, etc.) and psychological academia is problematic because it high-

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lights uninformed perspectives and prioritizes European-based theories over the lived experience of diasporic Africans, often leading to ineffective treatment, such as misdiagnosis and unimproved mental well-being. The current research addresses this gap in the literature by investigating the quality of mental health care provided to an African population in a non-Western country, using the Kwaprow population in the Cape Coast Metropolitan Area in Ghana. This is a multistage, non-experimental, mixed-methodology design. The primary data will be collected using an interview methodology. In contrast, the secondary data will be obtained through a large socioeconomic survey (ISSER-Northwestern-Yale Long Term Ghana Socioeconomic Panel Survey). The data will be analyzed in an exploratory sequential design to comprehensively analyze the perception of mental health care available to Africans in Kwaprow, Ghana, with several indicators of quality of care. The long-term objective of this analysis is to provide evidence-based interventions that can inform how international mental health care can be tailored to serve the diverse needs of Africans better worldwide.

African American Happiness and its Impact on Political Behavior

Presenter's Name: Springfield Brooke Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Ben Fred-Mensah Faculty Advisor's email: kwamensah51@yahoo.com

Co-authors:

When happiness, as an abstract feeling, is sought after by African Americans, they perceive its achievability as being directly intertwined with their experience as a racial minority. African Americans' complex history in the United States and understanding of how systematic oppression has impacted their ability to obtain social and economic merit leads them to examine their livelihood and act politically through a racial lens. African Americans tend to define happiness based upon capitalistic standards- meaning wealth accumulation- as a result of being discriminated against through this free-market system for centuries. Higher rates of satisfaction for these individuals are reported in various areas of their lives contingent upon economic stability and guiding their political behavior. Hence, the areas of life observed: academia, politics, spirituality, and relationships tend to flourish when the African Americans surveyed are somewhat affluent. This phenomenon guides African American political behavior and is the framework for the African American political agenda. African American political behavior reveals that as a collective, they seek to ensure financial stability to support the concept of 'Black Liberation,' with the ultimate goal of improved whole life satisfaction.

Identities at the intersection: Identity formation among African American queer late adolescents

Presenter's Name: Starks Assata (ari) Classification: Professional Student School/College: Education *Presentation Type: Oral Presentation* Faculty Advisor: Angela Ferguson Faculty Advisor's email: adferguson@howard.edu

Co-authors:

African American queer late adolescents are more susceptible to negative experiences (like discrimination or harassment) and negative mental health consequences because of the multiple marginalized identities they possess. While research has increased regarding the LGBTQ+ population and their particular lived experiences, minimal research has examined outcomes that specifically pertain to African American LGBTQ+ late adolescents. Although the risk factors associated with being queer is something African American LGBTQ+ late adolescents face, they also encounter unique challenges such as systemic racism and racial inequities. This presentation will discuss how possessing these intersecting identities can influence identity formation, more specifically, the way this population conceptualizes their identities. Identity formation is a process in which individuals develop a sense of who they are within the world, their values, and beliefs, and how they establish themselves within social contexts. Utilizing intersectionality theory and constructivist grounded theory, this presentation will explore how possessing multiple marginalized intersecting identities can influence how African American queer late adolescents view themselves and interact with people and the world around them. This presentation will examine how the conceptualization of identity for African American queer late adolescents is distinctive from other racial and minority groups, producing a unique lived experience for this aforementioned population.

Understanding Predominant Emotion Regulation (ER) Strategies in Black People

Presenter's Name: Stevenson Hannah Classification: Graduate Student School/College: Education *Presentation Type: Oral Presentation* Faculty Advisor: Katherine Picho Faculty Advisor's email: katherine.picho@howard.edu

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This presentation will focus on describing the intent of the literature review in progress. The literature review is intended to support research focused on understanding emotion regulation strategies in Black STEM students to contribute to the important and growing field of BIPOC population-focused emotion regulation (ER) research. The present literature review specifically aims to conduct a critical analysis focused on understanding where the emotion regulation strategies used by Black people are situated among the most common ER strategies discussed in psychological literature – cognitive reappraisal and emotion suppression. The review will seek to understand the effects of emotion suppression on the health of Black people, as well as investigate whether utilization

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of emotion suppression as a primary emotion regulation strategy impacts academic outcomes for Black students. This review deviates from the larger field of emotion regulation research in that it chooses to focus on the frequency of use and types of effectiveness of emotion regulation strategies in a specific racial group (Black people; Black students). Much of the existing emotion regulation research is focused on understanding gender-related differences in ER strategy use and type. As individuals of color, and Black people specifically, are identified as being highly susceptible to stereotype threat, the strategies by which they manage the emotional stress of this threat are of interest and value to the field.

Prevalence of Depression among Black International Graduate Students

Presenter's Name: Swaby Christian Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Darren Bernal Faculty Advisor's email: darren.bernal@howard.edu

Co-authors: Deon Auzenne

Graduate students are six times more likely to experience depression, with 39% of graduate students experiencing moderate to severe symptoms, compared to 6% of the general population (Evans et al., 2018). International graduate students are at increased risk for psychological problems due to challenges like discrimination, language fluency, and acculturation-related stress (Lee, 2021). Acculturative stress, the stress that comes with operating in a different culture, has a positive relationship with depressive symptoms among international students (Jung et al., 2007). Shadowen et al. (2019) found that 38.1% of graduate students met the criteria for depression, compared to 45.3% of international students. Black international graduates who attend universities in the U.S. navigate the intersection of ethnic minority and international minority identities, due to their non-US citizen status. This intersectional identity can vary their experience adjusting to cultural norms in their host country (acculturation), based on the norms of their home country, where relocation and cultural differences both increase risk for depression (Xiong et al., 2024). While the current literature supports that regional differences are related differences in depression outcomes between ethnic groups (Shadowen et al., 2019), there is a dearth of research that aims to distinguish within group ethnic differences in prevalence of depression. This study aims to quantify the prevalence of depression among Black international graduate students in a sample of N = 71 PhD students, comparing PHQ-9 scores across three different racial-ethnic groups: Caribbean, Afro-Latino, and African PhD students.

Beyond Hidden Figures: The Presence of Black Workers in Computing Before Silicon Valley

Presenter's Name: Swann Lacoya Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Haydar Kurban Faculty Advisor's email: hkurban@howard.edu Co-authors: Felipe Juan

This paper builds on the use of highly educated Black mathematicians and early computer scientist to help the government and then "old line" industry move into the computer age. The paper uses census data to track the geography and concentration of Blacks in computing ahead of Silicon Valley. It shows a mapping of these jobs and the occupations with high Black presence.

The Political Economy of Self Determination

Presenter's Name: Talton Kimathi Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Mazaher Korouzhde Faculty Advisor's email: mazaher.Kourouzhe@howard.edu

Co-authors:

The creation of the Alliance of Sahel States (AES) by Mali, Burkina Faso, and Niger is a radical geopolitical shift in West Africa away from traditional Western alignments and towards regional and non-Western blocs. The research examines the political and economic challenges faced by the AES and evaluates structural weaknesses that are likely to undermine its effectiveness. Politically, all three regimes have legitimacy issues, domestic opposition, and the challenge of combating counterterrorism in the absence of institutionally based organizations like ECOW-AS and France. In addition, diplomatic isolation due to their withdrawal from ECOWAS poses long-term dangers, particularly with regard to receiving international aid and investment.

Economically, the AES states are resource-rich but financially weak with limited independence, over-reliance on foreign trade, and fiscal vulnerability through international sanctions. The transition from Western economic patronage to alternative alliances, particularly with Russia and China, is dubious on long-term sustainability and economic independence. Furthermore, security concerns-coupled with jihadist insurgencies and compromised government institutions-tend to further destabilize investment climates and trade flows. This study employs the political economy framework to analyze these challenges, utilizing case studies, trade records, and policy analysis to assess the AES's viability. The findings shall contribute to broader discourses on regionalism, economic sovereignty, and security in postcolonial West Africa. Through a discussion of the alliance's institutional limitations, this research seeks to clarify whether the AES can offer an alternative to Western-led regional integration or otherwise continue to foster economic and political instability.

Rewiring Trauma: Can Ayurvedic Medicine HelpTreat PTSD?

Presenter's Name: Thayalan Nishevithaa Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Eleanor King Faculty Advisor's email: emking@howard.edu
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Co-authors:

Post-Traumatic Stress Disorder (PTSD) is a complex psychiatric condition characterized by maladaptive stress responses and impaired neuroadaptability. While Western psychological frameworks emphasize pharmacological and behavioral interventions, integrating Avurveda, an ancient Indian medical system, may offer a complementary approach to enhancing neuroadaptation and regulating cortisol. Cortisol, a vital stress hormone, becomes deregulated in individuals with PTSD, leading to symptoms of hypervigilance and heightened fear response, while also directly disrupting neuroadaptability, the brain's ability to rewire neural pathways to process new information. The negative effect of cortisol on neuroadaptability creates a feedback loop, reinforcing many symptoms of PTSD like rigid stress response, memory issues, and emotional dysregulation. Ayurveda's emphasis on mind, body, and soul wellness provides a theoretical framework explaining symptoms of mental distress as an imbalance in psychological resilience, akin to neuroadaptability. Mind-body exercises like yoga meditation activate areas of the brain that promote stress reduction, while adaptogenic herbs like ashwagandha and Tulsi, used in remedies, support synaptic plasticity and regulate cortisol. This study examines the validity of Ayurveda as an effective treatment to alleviate PTSD symptoms by addressing PTSD's effect on cortisol and neuroadaptability. It first examines how Ayurvedic approaches align with contemporary research on neuroadaptability and cortisol regulation, then analyzes how these approaches can alleviate Western PTSD symptoms, as outlined in the Diagnostic and Statistical Manual of Mental Disorders. Preliminary results suggest that Ayurveda's holistic framework, with its emphasis on mental resilience and overall well-being, offers a complementary approach to symptom reduction and long-term relief of PTSD.

Double Headed War: An Examination of African American Participation in the Vietnam War

Presenter's Name: Thiam Seriane Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Oral Presentation* Faculty Advisor: Sheneese Thompson Faculty Advisor's email: sheneese.thompson@howard.edu

Co-authors:

The Vietnam War was the first integrated American war, where people of all races and creeds fought alongside each other to protect and serve our nation's flag. It is often analyzed that the environment of war erases the lenses of prejudice and racism as soldiers are all there for the same reason, no matter their race, socioeconomic status, or ethnicity. However, many Black Veterans would open a new page of that book, removing the patriotic and individualistic lenses that often blurred the visions of many Americans. The United States government would send over 300,000 African American men to the jungles of Vietnam, and while the number was intended to function as an example of American democracy and racial progress, it would tell a different story. The African-American men who would immerse themselves in this divisive war would come in completely reshaping not only the physical look of the war, but how we conceptualized the war's place in our timeline as a country. This paper will examine the experiences of African American men in the Vietnam War. How did these men maneuver in militarized environments where racial inequality transcended geographical boundaries? This research will add to the current body of existing research to extend the conversations surrounding African American participation in the war and the unique experiences that explore the duality of fighting in the Vietnam War as an African American man.

Ethics of True Crime: Analyzing Public Fascination and the Impact on Victims

Presenter's Name: Thompson Allana Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Marie-Claude Jipguep Faculty Advisor's email: mjipguep-akhtar@Howard.edu

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As media entertainment has evolved, the popularity of true crime has surged. True crime is a nonfiction narrative genre that focuses on real, often violent, crimes and their investigation, prosecution, and impact, blending journalistic reporting with dramatic storytelling. This thesis first explores the mass appeal to true crime and examines why individuals are drawn to it. Additionally, it examines the ethical concern of the potential exploitation of survivors and individuals of fatal crimes in the production of true crime media. Data for this study will be collected through an online survey distributed across social media platforms, resulting in a convenience sample primarily composed of young adults and college students. The qualitative analysis is conducted to assess consumers' perceptions of the accuracy and intent behind true crime media, their motivations for engaging with it, and their attitudes toward the potential exploitation of victims. The study aims to evaluate whether consumers recognize or consider the ethical implications of true crime content and how such media impacts survivors of these real-life tragedies.

Collaborative Approaches to Fire Detection and Response: Insights from Meteorologists and Land Managers

Presenter's Name: Triplett Alycia Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Terri Adams Faculty Advisor's email: tadams-fuller@Howard.edu

Co-authors:

NOAA's Fire Weather Testbed is a joint endeavor between the Office of Oceanic and Atmospheric Research (OAR), the National Weather Service (NWS), and the National Environmental Satellite, Data, and Information Service (NESDIS) to enhance decision support during all phases of the fire cycle. In June of 2024, OAR's Global Systems Laboratory facilitated the second evaluation of the testbed. Four NWS meteorologists and five state land managers participated in a week-long experiment assessing the utility of the Next Generation Fire System (NGFS) and In-

tegrated Warning Teams (IWT) for Fire Warnings in their fire operations. This research focuses on the data collection activities used during the evaluation, with a specific focus on steps taken to analyze semi-structured focus groups conducted at the end of the evaluation. Participants were separated into two occupation-based focus groups and asked a series of questions related to the performance, feasibility, and cohesiveness of each product. Each focus group was recorded, and thematically analyzed. Our preliminary findings revealed that both meteorologists and land managers saw the potential benefits of incorporating these tools into their fire operations and collaborating with one another during wildfire events. As wildfires continue to intensify, it is becoming increasingly important to tailor decision support services to user needs and encourage interagency partnerships to address them. This analysis is an important step in identifying key collaborators and their exigencies.

Cost-effectiveness of Sulopenem versus Ciprofloxacin for the Treatment of Uncomplicated Urinary Tract Infections in Women: A Decision Analysis

Presenter's Name: Uprety Rakchhya Classification: Graduate Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: La'Marcus Wingate Faculty Advisor's email: lamarcus.wingate@howard.edu

Co-authors: Faith Ogini

Introduction: The emergence of antibiotic resistance has complicated treatment strategies for urinary tract infections (UTI). Sulopenem has demonstrated promise in treating uncomplicated UTIs with comparable efficacy to Ciprofloxacin. Objectives: This study aimed to assess the cost-effectiveness of Sulopenem compared to Ciprofloxacin for managing uncomplicated UTIs in women. Methods: A decision-analytic model was developed using data from the SURE-1 trial, which compared the efficacy and safety of Sulopenem and Ciprofloxacin for treating uncomplicated UTIs. The analysis was conducted from the pavers' perspective using direct medical costs. The model incorporated cure status (complete or incomplete), adverse drug reactions (mild or severe), and 28-day allcause mortality. Patients with incomplete clinical cure were assumed to require additional follow-up treatment with second-line antibiotics. The model used a 28-day time horizon and all cost inputs were indexed to 2024 USD. Data analysis was performed using Excel. Results : The expected total cost of treatment was \$9,480.77 for Sulopenem and \$629.38 for Ciprofloxacin. The quality-adjusted life years (QALYs) were 0.90 for Ciprofloxacin and 0.89 for Sulopenem. Ciprofloxacin was found to be the dominant therapy given its lower cost and slightly higher QALY. Conclusion: Ciprofloxacin was found to be the cost-effective choice for treating uncomplicated UTIs in women under typical clinical scenarios. Sulopenem adds value in cases involving resistant infections or severe ADRs to Ciprofloxacin.

The Relationship Between Psychosocial Support Service Utilization, Coping and Post-Traumatic Growth Among Breast Cancer Survivors

Presenter's Name: Vinod Naomi Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Teletia Taylor Faculty Advisor's email: t r taylor@howard.edu

Co-authors:

Background: Breast cancer is the most diagnosed cancer among US women, and with increased survival rates over the years due to early detection/intervention. This increase in survival rates has made it necessary for cancer care teams to attend to psychosocial concerns of cancer survivors. While data show that psychosocial support services are effective mechanisms for improving the psychological well-being of breast cancer survivors, reviews indicate that more research is needed to confirm this finding especially among diverse populations. The current study examined the relationship between psychosocial support service utilization on adaptive coping and post-traumatic growth among breast cancer survivors. Methods: Seventy-two Non-Hispanic Black and Non-Hispanic White breast cancer survivors completed a survey assessing socio-demographic/clinical characteristics, psychosocial support service utilization (none, one type, multiple types), adaptive coping, and post-traumatic growth. Analysis of covariance was used to examine the relationship between psychosocial support service utilization and adaptive coping/ post-traumatic growth indices. Results: Seventy-two percent of all respondents indicated utilizing one or more psychosocial support services. Among all respondents, as psychosocial support service utilization increased, all measures of adaptive coping and post-traumatic growth significantly increased (p<0.05). Analyses within race/ethnic groups showed similar patterns. Conclusions: This study provides evidence of the positive relationship between psychosocial support service utilization and psychological well-being among a diverse group of breast cancer survivors. Evidence linking psychosocial support services and improved outcomes for cancer patients may contribute to a growth in support services that would assist in helping a larger number of cancer survivors.

The Relationship Between Community-Level Urban Life Stress and Depression among Breast Cancer Survivors: The Mediating Influence of Concerns of Recurrence

Presenter's Name: Warren Jenna Classification: Graduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Teletia Taylor Faculty Advisor's email: t r taylor@howard.edu

Co-authors: Lucille Adams-Campbell, Chiranjeev Dash, Jennifer Sween, Naomi Vinod, Teletia Taylor, Judith Barrow, Kepher Makambi, Nicholas Johnson

Purpose: Cancer survivors living in metropolitan settings frequently experience stressors related to metropolitan areas known as communi-

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ty-level urban life stress (CULS). More work is needed exploring the relationship between CLULS and mental health as well as potential mediators. This study seeks to explore the relationship between CULS, depression, and the mediating effects of concerns of recurrence (COR). Methods: This cross-sectional study sampled 72 (35 Non-Hispanic Black, 37 Non-Hispanic White; mean age = 55.19 years) female breast cancer survivors from the metropolitan Washington, DC area. Self-report data from a sociodemographic/clinical questionnaire, Concerns About Recurrence Scale, Center for Epidemiologic Studies Depression Scale-Revised, and Urban Life Stress Scale were utilized. Bootstrapping estimated the indirect effect, and separate mediation analyses were performed. Five analyses were performed to reveal whether the relationship between CLULS and depression was mediated by COR subscales: overall, health, womanhood, role and death worries. Results: Higher levels of CULS significantly predicted depressive symptoms (b = 0.229, CI: 0.126,0.333). Three statistically significant mediators of CULS and depression were revealed: health worries (b = 0.05, SE = 0.02, 95% CI: 0.0059, 0.1023), womanhood worries (b = 0.04, SE = 0.02, 95% CI: 0.0042, 0.917) and role worries (b = 0.07, SE = 0.03, 95% CI: 0.0144, 0.1498). Conclusions: In breast cancer survivors residing in a metropolitan urban area, health, womanhood, and role worries influenced the relationship between CLULS and depression. Interventions addressing these specific concerns could help reduce depressive symptoms in the context of urban community stress.

What Black Female Hip-Hop and R&B Artists Can Teach Us About Womanism

Presenter's Name: Webster-bass Trinity Classification: Undergraduate Student School/College: Communications *Presentation Type: Oral Presentation* Faculty Advisor: Kehbuma Langmia Faculty Advisor's email: klangmia@howard.edu

Co-authors:

Black female hip-hop and R&B artists have become the faces of what it means to defy patriarchy and be exemplary leaders in the new age of womanism to young Black women across the world. This is because they have proudly reclaimed intimacy and their bodies as their own. For many Black women, sex and their body representation have often been policed and weaponized against them. Therefore, this research aims to investigate how Black female hip-hop and R&B artists present themselves to their fans and the public, their efforts of sexual agency, and when, and if so, how they assert control of their bodies as a reflection of womanist ideals. To address the problem of this investigation, the researcher will examine a series of different Black female hip-hop and R&B artists' aesthetics and images, as well as their music and lyrics, to determine to what extent they embody the principles of womanism. This study will also include personal experiences and anecdotes of those who identify with major Black female hip-hop and R&B artists of both the past and present. This presentation is on behalf of the Cathy Hughes School of Communication Annenberg Honors Program.

"I Feel Seen": Insights from Using Raceless Population Descriptors in Hair Research

Presenter's Name: Welch Dantasia Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Candrice Heath Faculty Advisor's email: candrice.heath@howard.edu

Co-authors: Candrice Heath

Introduction: In dermatology, race is often used as a proxy for skin tone, hair texture, and styling practices.1 However, as a social construct, race fails to capture diversity,2,3 overlooking biological, cultural, and social dynamics that influence hair care. This study was intentionally designed to focus on tightly coiled hair across generations, using raceless population descriptors. Methods: Participants were recruited from a dermatology clinic. Inclusion criteria simplified to individuals aged 0-25 with tightly coiled/textured hair or were of any age accompanying someone who did. The research team obtained consent, images, and questionnaires. Results: Of 104 participants, ranging in age from 0-58 years, those who selected African ancestry, either fully or partially (78, 75.7%), reported having mothers who grew up in seven different countries and one US territory. Additionally, a range of hair textures were self-selected by participants with partial or full African ancestry, including naturally tightly coiled (n=54), slightly wavy (n=14), loose curls (n=13), and naturally straight (n=1). Overall, 7/104 participants reported having more than one hair texture. Limitations: Self-assessments may introduce reporting bias. Discussion: These findings highlight the complexity of people and hair. Hair care practices may be influenced by parental culture, and hair texture can vary even within a single person. Using raceless population descriptors in research capture this variability better than traditional racial categories. Conclusions: Incorporating raceless population descriptors may better represent populations under study,1-3 helping patients feel seen and enhancing researchers' understanding of diverse factors influencing people, hair, and scalp health.

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Our Voice Matters: A Critical Discourse Analysis of Black Women on Cable News Outlets

Presenter's Name: White Joslynn Classification: Graduate Student School/College: Communications *Presentation Type: Poster Presentation* Faculty Advisor: Loren Coleman Faculty Advisor's email: loren.coleman@howard.edu

Co-authors:

For nearly 20 years, cable news has increased in popularity becoming the foremost medium for Americans to receive national and global news. In recent years, racial and gender tensions have been on the rise precipitating media coverage surrounding these issues, which include Black Lives Matter and the me too movement. Essentially the majority of on-air personalities and analysts are white men and women with no experience or comprehension outside of their 'dominate culture'. Due to the lack of representation and diversity on cable news outlets, there have often been biased and/or false narratives in reporting on these issues, specifically on cable news. This research explores the need for an influx of Black women on cable news. These women accurately address issues pertaining to gender and racial issues being discussed on a national platform during a prominent hour in American television-primetime. Keywords: Broadcast media, cable television, cable news, primetime, Black women, Black journalists, female journalists, feminist, gender inequality, racial discrimination, intersectionality, hegemony, critical race theory, media coverage, Black Lives Matter, #metoo

Learned Helplessness in Black Americans

Presenter's Name: Williams Amber Classification: Graduate Student School/College: Education *Presentation Type: Oral Presentation* Faculty Advisor: Angela Ferguson Faculty Advisor's email: adferguson@Howard.edu

Co-authors:

Racism remains a persistent and pervasive stressor in the lives of Black Americans, with well-documented consequences for mental health, including depression, anxiety, and chronic stress. However, what may present as depression in clinical settings may, in some cases, be learned helplessness-a psychological state in which repeated exposure to uncontrollable adversity results in passivity, disengagement, and diminished motivation. This presentation explores the intersection of chronic exposure to racism, learned helplessness, and attribution styles, offering a theoretical framework for understanding how Black Americans process and respond to systemic oppression. Drawing from existing literature, this presentation will examine how attribution styles-the ways in which individuals explain the causes of events-moderate responses to racism. Specifically, it will highlight how global, internal, and stable attributions may exacerbate learned helplessness, whereas specific, external, and unstable attributions may serve as protective factors. Additionally, it will discuss how clinicians may misinterpret learned helplessness as depression, leading to potential misdiagnoses and less effective interventions. By integrating psychological theories of stress, coping, and motivation, this presentation seeks to expand the discussion on the broader psychological consequences of racism and their implications for clinical practice. Attendees will gain insight into how historical and contemporary racial stressors shape Black Americans' psychological experiences and how mental health professionals can better recognize and address learned helplessness in therapeutic settings.

Examining Racial Disparities in U.S. Incarceration Rates and Capital Punishment

Presenter's Name: Williams Zoe Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Nathan Alexander Faculty Advisor's email: nathan.alexander@howard.edu

Co-authors: Nathan Alexander

We investigate racial disparities in U.S. incarceration rates and capital punishment to highlight systemic inequities within the criminal justice system. Our hypotheses align with research literature and historical data, indicating that Black Americans are incarcerated at disproportionately higher rates than other groups; we take a particular focus on southern states. We also examine racial bias in the administration of the death penalty, specifically analyzing data on Black defendants. By utilizing multiple sources of state-level data, we aim to uncover how race influences patterns of incarceration and sentencing, emphasizing the need for reforms to address persistent inequities and promote fairness in the justice system.

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Reconceptualizing Black Female Anger in Sport

Presenter's Name: Williams, m.s. Dara Classification: Graduate Student School/College: Graduate School *Presentation Type: Oral Presentation* Faculty Advisor: Ivory Toldson Faculty Advisor's email: itoldson@howard.edu

Co-authors: Brittany Copeland, M.Ed., LPC

Black women student-athletes (BWCA) face unique stressors navigating the intersections of their multiple marginalized identities. Research addressing racially minoritized athletes remains nuanced and complex (Tran, 2021). A study by the National College Athletic Association (NCAA) on student-athlete wellbeing revealed BWCA reported higher levels of overwhelming anger, hopelessness, financial worries, personal experiences of racism, COVID-19 health concerns, and political disagreements compared to other racial groups of student-athletes during the 2022-2023 academic year (NCAA, 2023). More specifically, anger enhances and impairs performance depending on the context. It can influence performance through decision-making and attention (Bartlett et al., 2018) or be positively correlated with antisocial and aggressive behaviors towards teammates and coaches (Bartlett et al., 2018). Anger may operate as a signal for more complex emotions and is linked to mental health concerns. Anger is linked to depression (Busch, 2009) and may present as an overlooked symptom of depression within the Black community (Aalong, 2018; Bailey et al., 2011). Furthermore, anger and Black womanhood often carry negative connotations due to stereotyping (Ashley, 2014; Lewis et al., 2016). However, Psychodynamic Theory values anger as a useful indicator for vulnerabilities experienced through rejection and loss, self-esteem concerns, conflicted feelings, and relationship difficulties (Busch, 2009; Manfredi & Tagiletti, 2022). Using this theory, anger is reconceptualized with compassion, dignity, and boundary recognition. Therefore, this discussion will critically examine the underlying beliefs and assumptions about the function of anger in Black women collegiate athletes, highlighting the urgent need to humanize their experiences and implement effective mental health interventions.

Beyond the Screen: Parasocial Bonds and their Impact on Human Behavior

Presenter's Name: Zarrieff Amaar Classification: Undergraduate Student School/College: Communications Presentation Type: Poster Presentation Faculty Advisor: Jennifer Thomas Faculty Advisor's email: jennifer.thomas@howard.edu

Co-authors:

This research explores parasocial relationships, where individuals develop one-sided bonds with media figures, often leading to significant emotional investment without reciprocal interaction from the performer. It examines how these relationships contribute to the rise of social media influencer culture and influence consumer behavior. The study focuses on Generation Z (ages 18-22), one the first generations to grow up with social media, and investigates how influencers shape behaviors such as purchasing decisions and communication styles. Additionally, the research looks at the impact of parasocial interactions on political behavior, particularly in relation to elections. The study also delves into "stan culture," where fans become intensely loyal to celebrities, often defending them to extremes, including engaging in cyberbullying. The research aims to understand the effects of parasocial relationships on both individual behavior and the success of public figures, with a particular focus on the music industry, where these bonds are most prevalent.

TRANSLATIONAL & CLINICAL SCIENCES

Cold Clots: A Case of Cold Agglutinin Associated Pulmonary Embolism Following Caesarean Section

Presenter's Name: Adeleye Folake Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Alicia Thomas Faculty Advisor's email: alicia.thomas@howard.edu

Co-authors: Chinyere Ikwu, Uchenna Amaechi, Alicia Thomas

Introduction: Pulmonary embolism is a rare but life-threatening pregnancy complication, with maternal mortality rates of 0.7-1.56 per 100,000 in high-resource settings. Incidental cold agglutinins are typically benign but may exacerbate thrombotic risk in prothrombotic states such as postpartum, surgery, or immobility. This case highlights the challenges of managing PE after cesarean section, emphasizing a multidisciplinary approach in high-risk scenarios with significant bleeding. Case Description: A 36-year-old female with prior provoked deep venous thrombosis underwent a repeat cesarean section complicated by placenta previa and breech presentation. Intraoperatively, she developed dyspnea, bradycardia, and massive hemorrhage (>3 L). CT angiography confirmed acute PE. Anticoagulation with heparin and subsequent enoxaparin was complicated by severe vaginal bleeding and extensive pelvic hematomas. Laboratory findings revealed hemolytic anemia with cold agglutinins (titer 1:40), raising suspicion of cold agglutinin disease. Despite therapeutic anticoagulation, she developed a left popliteal vein thrombosis after a missed enoxaparin dose due to bleeding concerns. Repeat imaging showed increased pulmonary emboli in the left lower lobe branches but an unchanged right-sided embolus, managed by switching to fondaparinux. Inferior vena cava filter placement was considered but deferred due to technical challenges, with clot progression monitored. Subsequent imaging showed no new thrombosis, and she was discharged on fondaparinux with subspecialty follow-up. Discussion: Cold agglutinins may amplify thrombotic risk in the postpartum period, particularly in the setting of hemorrhage and transfusion. This case underscores the importance of maintaining a high index of suspicion for thromboembolic complications and highlights the need for careful anticoagulation management in complex postpartum cases.

Electronic Health Records: Alert Optimization

Presenter's Name: Ahaneku Esther Classification: Graduate Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Priscilla Okunji Faculty Advisor's email: priscilla.okunji@howard.edu

Co-authors:

Background: Electronic Health Records (EHRs) are essential tools in contemporary healthcare systems, functioning as a digital medium for

collecting, storing, and disseminating patient information across diverse clinical environments, optimizing patient data administration, and enhancing clinical decision-making. Clinical Decision Support (CDS) systems, a crucial element of EHR, improve patient safety by issuing alarms to avert errors like drug interactions. Despite the myriad benefits, the intricacy of EHR systems has also engendered considerable obstacles, including concerns about clinical burnout and alert fatigue. Excessively constructed warnings lead to alert fatigue and clinician burnout, reducing the effectiveness of these systems. This study examines the development of EHRs, the function of CDS alerts, and methods to enhance their efficacy for better clinical results and professional welfare. Method: a systematic literature analysis assessed 20 peer-reviewed articles published between 2020 and 2024. We investigated independent variables like alert style and customization features alongside dependent variables like doctor response rates and patient outcomes. Results: Collaborative design procedures involving clinicians, IT specialists, and governance frameworks, crucial for effective optimization were identified. Strategies include tiered alert systems, data analytics for evaluating alert efficacy and integrating patient participation in decision-making surfaces as essential options. These strategies seek to harmonize safety and efficiency, reducing unproductive alert processing and cultivating a supportive atmosphere for healthcare practitioners. Implication: The necessity for ongoing enhancements to EHR systems, concentrating on evaluating long-term patient outcomes, determining effective deployment strategies, tackling interoperability issues, and reducing provider weariness. Keywords: Electronic Health Records, Clinical Decision Support, Alerts, Healthcare, Optimizing.

The Unexpected Role of Stimulant Medications in Heat-Related Illnesses for ADHD

Presenter's Name: Ahmed Sumaiya Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors:

Introduction: ADHD is commonly treated with stimulant medications, which, while effective, have been linked to thermoregulatory dysfunctions and increased heat-related illness risk. However, their precise impact remains unclear. This study assessed whether stimulant medications influence the risk of heat-related illnesses in ADHD patients. Methods: A retrospective cohort study analyzed de-identified electronic medical records from a Global Research Network. ADHD patients aged 6-24 were categorized into stimulant-treated and non-treated groups. Patients were followed for one year, tracking heat-related illnesses (e.g., dehydration, hyperthermia, heat stroke). Propensity score matching balanced baseline characteristics, and statistical analyses, including risk ratios, hazard ratios, and Kaplan-Meier survival analysis, evaluated differences in incidence. Results:The stimulant group had a significantly lower

risk of heat-related illnesses (risk ratio: 0.559, 95% CI: 0.485–0.644). The mean number of heat-related events was also lower (p=0.028). Kaplan-Meier survival analysis showed a higher probability of remaining free from heat-related illnesses in the stimulant group (log-rank test, $\chi^2 = 93.035$, p < 0.0001). Discussion: Findings suggest stimulant medications may reduce heat-related illness risk in ADHD patients, contrary to prior concerns about thermoregulation. Possible mechanisms include altered autonomic responses and changes in physical activity. Conclusion: Stimulant medications may offer a protective effect against heat-related illnesses in ADHD patients. Further research should explore physiological mechanisms and confirm findings across larger, more diverse populations.

Time to clozapine initiation in treatment-resistant schizophrenia (TRS): A retrospective analysis of disparities in access to clozapine and medication trial factors

Presenter's Name: Ahmed Sumaiya Classification: Professional Student School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Miriam Michael, Aaron Mack, Samrawit Zinabu

Clozapine remains the gold standard for treatment-resistant schizophrenia (TRS), demonstrating superior efficacy in symptom reduction and relapse prevention compared to other antipsychotics1. Despite clinical guidelines recommending its use after two failed antipsychotic trials, clozapine remains significantly underutilized, with delays in initiation that may disproportionately impact marginalized populations2.Racial and ethnic disparities in schizophrenia treatment contribute to inequitable access, as Black patients are more likely to be prescribed first-generation antipsychotics and experience longer delays in transitioning to clozapine3. This retrospective analysis aims to investigate the time interval between the failure of two antipsychotic trials and the initiation of clozapine in a cohort of patients with TRS. Additionally, it will analyze demographic differences in treatment initiation, examining factors such as race, age, and prior medication use. Lastly this research aims to identify potential disparities and barriers to timely clozapine access, with the goal of informing clinical decision-making and guiding the development of interventions to address these issues.

Evaluating Therapeutic Efficacy of Ivosidenib in Ameliorating Macrocystic Lymphatic Malformations Arising from Pathogenic IDH1 Variants

Presenter's Name: Amedume Rachel Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dominique Prichett Faculty Advisor's email: dominique.pritchett@howard.edu

Co-authors: Sarah Sheppard, Georgia Krikorian, Ben Sempowski, Chris Marshall

Cystic lymphatic malformations (LMs) are benign lesions caused by abnormal lymphatic vessel development, often resulting from pathogenic single nucleotide variants, more commonly referred to as mutations, most commonly PIK3CA and BRAF. Molecularly targeted therapy is efficacious. Recent unpublished data from the Sheppard lab shows that mosaic pathogenic variants in the IDH1 gene may also contribute to the pathogenesis of LMs. However, the molecular mechanisms that drive the pathogenesis are not yet fully understood. This study aims to explore the therapeutic potential of Ivosidenib and Vorasidenib, IDH1-specific inhibitors, in ameliorating IDH1-driven LMs. Using a zebrafish model of IDH1-driven LMs, we investigated the effects of Ivosidenib on lymphatic vessel development and malformation. The maximum safe dosage of Ivosidenib was determined using an LD50 assay in zebrafish embryos. Drug screening assay performed over 5 days in the IDH1-zebrafish model revealed that Ivosidenib at 3uM slowed the pathogenesis of macrocystic LMs and showed promising results in resolving the cysts in some embryos. However, a stronger dose may be required to completely ameliorate the cysts. These results suggest that Ivosidenib could be a potential therapeutic option for patients with IDH1-associated lymphatic malformations. This study has the potential to broaden the understanding of IDH1 mutations in lymphatic malformations and its impact could lead to the development of more targeted, effective treatments to reduce the recurrence rates and to improve patient outcomes.

Projecting Perfection, Masking Mental Strain: How "False Facebook-Self" Predicts Psychological III-Being in HBCU Students

Presenter's Name: Austin Chase Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Amy Yeboah Faculty Advisor's email: amy.yeboah@Howard.edu

Co-authors:

Time spent on social networking sites has skyrocketed in recent years, making their presence nearly inescapable without isolation. However, frequent exposure to idealized depictions of everyday life-whether through friends, influencers, or celebrities-may distort reality and contribute to the development of an inauthentic online self, referred to in the literature "False Facebook Self" (Gil-Or et al., 2015). Limited research has investigated this condition among ethnic minority groups. Therefore, given the unique sociocultural experiences of students attending a historically Black university in the Northeastern U.S., this study further examines the role of ethnic identity in shaping this paradigm and its potential psychological consequences. This study modifies an existing model to test if self-esteem, authenticity and ethnic identity predict the development of a False Facebook Self while also assessing if the phenomenon is associated with ill-being, specifically symptoms of depression, anxiety, and stress. It was hypothesized that self-esteem, authenticity, and ethnic identity would negatively correlate with both False Facebook Self and ill-being. Participants included 188 undergraduate students (ages 18-24) at an HBCU, who completed questionnaires that included standardized measures of self-esteem, authenticity, ethnic identity, social media behaviors, and psychological ill-being. Linear regression analyses revealed significant relationships confirming several hypothesized associations

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within the proposed model. These findings provide insight into how personality shapes online self-presentation and mental health outcomes. By understanding these relationships, targeted interventions can be developed to promote authenticity and psychological resilience online, particularly among underrepresented populations. Keywords: False-Facebook Self, ill-being, linear regression

Unbiased CSF Proteomic Profiling Reveals Distinct Neuroinflammatory Signatures in Pediatric Neurologic Diseases

Presenter's Name: Broudy Taylor Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Terry Dean Faculty Advisor's email: tdean@childrensnational.org

Co-authors: Akilah Pascall, Ankush Bansal, William Suslovic, Meghan Delaney, Daniel Donoho, Terry Dean

Background: Unbiased cerebrospinal fluid (CSF) proteomics has significantly advanced the characterization of neuroinflammation in several adult CNS disorders; however, similar profiling in pediatric neurologic diseases remains limited. Evaluations of the CSF proteome in pediatric CNS disorders may uncover distinct inflammatory and neuronal signatures that can aid in disease diagnosis/prognosis and identify targets for new treatment strategies. Methods: Patients CSF samples with the following diagnoses were selected: Post Hemorrhagic Hydrocephalus (PHH) (n=9), Tumor (n=10), NMDARE (n=6), and Controls (n=5). Samples were analyzed using the Olink® Explore platform, quantifying 736 proteins via Proximity Extension Assay (PEA); 507 proteins were retained post-quality control. Data were analyzed using R-based pipelines, including tidyverse, ggplot2, and OlinkAnalyze. Results: The CSF from PHH, Tumor, and NMDARE patients segregated into distinct proteomic clusters. Disease-specific changes in protein expression were seen in PHH, including upregulation (e.g. IL7, WNT9A, SCGN, and LY6D) and downregulation (i.e. NELL2). In brain tumors, LRRN1 and ACHE were specifically downregulated compared to other diseases. While NMDARE induced marked changes in inflammatory protein expression compared to controls, it did not demonstrate disease-specific differences. Conclusions: The CSF in PHH showed disease-specific upregulation of proteins consistent with immune activation, dysregulated developmental signaling, altered secretory functions, and B-cell activation. The PHH-specific downregulation of NELL2 may be a specific marker of neuronal injury. Brain tumor CSF exhibited decreased expression of proteins consistent with neuronal disruption and impaired cholinergic signaling unique to the group. These may serve as clinically useful biomarkers and help identify specific targets for future therapeutics.

Pathway-Focused Analysis of BTBRob/ob Mice Kidneys Reveals Critical Chromatin Modification Enzymes involved in Progressing Diabetic Kidney Disease Presenter's Name: Clarke Kemuel Classification: Undergraduate Student School/College: Arts & Sciences Presentation Type: Poster Presentation Faculty Advisor: Maurice Fluitt

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Co-authors:

Diabetic kidney disease (DKD) is a leading cause of end-stage renal disease (ESRD), with epigenetic modifications playing a critical role in its progression. However, the role of epigenetics in DKD remains unclear due to limited animal models that mimic human disease. This study examines chromatin-modifying enzymes in the BTBR ob/ob murine model, an accelerated DKD model. Total RNA was isolated from whole kidneys of 12-week-old wild-type and BTBR ob/ob mice (n=3/group), and a pathway-focused array identified differentially expressed chromatin modification enzymes. Mice body weight was significantly higher in the BTBR ob/ob group $(63.52\pm2.41 \text{ g})$ than in the WT group $(33.44\pm0.51 \text{ g})$ g). Random blood glucose was also significantly higher in BTBR ob/ob mice (408.4±54 mg/dL vs. 232.3±17 mg/dL in WT). Pathway analysis revealed significant upregulation of Aurkb (7.71-fold, p=0.009), Esco2 (3.87-fold, p=0.003), and Aurka (3.72-fold, p=0.001), while Gusb was downregulated (-2.20-fold, p=0.000090). Aurkb may suppress p53, reducing renal cell sensitivity to hyperglycemic injury. Esco2, involved in chromatid cohesion and DNA repair, may drive renal cell proliferation and apoptosis, accelerating DKD. Aurka, a mitotic regulator, contributes to cell-cycle dysregulation in chronic hyperglycemia. These findings suggest key epigenetic alterations disrupt renal homeostasis, promoting fibrosis and kidney dysfunction. Understanding these molecular mechanisms may enable the development of novel epigenetic biomarkers and therapeutic targets for DKD.

Racial Disparities in the Treatment of Rheumatoid Arthritis

Presenter's Name: Cotton Jaide Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@howard.edu

Co-authors: Samrawit Zinabu

Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with joint destruction and systemic complications. Early treatment with disease-modifying antirheumatic drugs (DMARDs) is critical to prevent disability and comorbidities. Prior research identified significant racial and socioeconomic disparities in RA management, suggesting that African American patients experience delays in treatment initiation and underrepresentation in research. This study evaluated treatment utilization disparities between white and Black patients. Methods: A retrospective cohort study was conducted using the TriNetX Global Network, a database of 160 million patients. RA patients were identified

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using ICD-10-CM codes and classified into white and African American cohorts, matched 1:1 based on demographics, comorbidities, and social factors. Treatment utilization, including DMARDs, NSAIDs, corticosteroids, biologic therapies, and interleukin inhibitors, was analyzed using RxNorm codes. Group differences were assessed using Z-tests and Kaplan-Meier survival analysis. Results: DMARD utilization was similar between white (33.35%) and African American (34.45%) patients. However, African American patients had higher NSAID (22.70% vs. 16.89%) and corticosteroid (5.56% vs. 4.29%) use, while white patients were more likely to receive biologic therapies (13.62% vs. 11.29%) and interleukin inhibitors (2.78% vs. 2.00%). White patients were also initiated on biologic and interleukin inhibitor therapies earlier. Conclusion: This study highlighted important differences in treatment utilization between white and African American patients. These differences in therapeutic approaches appear to contribute to poorer prognosis, accelerated disease progression, and diminished quality of life among African American patients. This emphasizes the need for targeted interventions to promote equitable care.

A Comparison of the ASCVD vs. PREVENT Calculators in Urban HIV-infected Affected Cohort.

Presenter's Name: Crentsil Nana Classification: Graduate Student School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Monika Daftary Faculty Advisor's email: mdaftary@howard.edu

Co-authors: Dasia Simmons, Mary Awounda, Monika Daftary

This study aims to compare the performance of the ASCVD calculator and the PREVENT equations in predicting cardiovascular risk among urban HIV-infected populations. By examining the predictive accuracy and clinical utility of these risk assessment tools, the study seeks to identify potential disparities in risk estimation and explore factors influencing the effectiveness of cardiovascular risk prediction in this demographic. Through comprehensive data analysis and evaluation, the research aims to explain the strengths and limitations of the ASCVD and PREVENT models in the context of urban HIV-infected cohorts. By shedding light on the predictive capabilities of these risk assessment tools, the study aims to inform evidence-based approaches to cardiovascular risk management and prevention strategies tailored to the unique needs of urban populations affected by HIV. The study seeks to investigate whether social determinants of health contribute to an increased risk of ASCVD and if patients previously deemed ineligible for statins according to the Atherosclerotic Cardiovascular Disease (ASCVD) calculator are noweligible when assessed using the PREVENT calculator. This analysis will uncover overlooked opportunities for statin use in HIV patients.

Pain Management in Prostate Cancer Patients in Africa

Presenter's Name: Curry Alexandria Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: michaelclarkefamily@gmail.com

Co-authors:

Prostate cancer is the second most common malignancy and the leading cause of cancer death in men across Sub-Saharan Africa (SSA). Despite lower reported incidence rates compared to African American men, actual prostate cancer prevalence in SSA is under-reported and likely underestimated due to inadequate screening and limited access to healthcare. This study analyzed registry data from 13,170 prostate cancer cases across 11 SSA countries to evaluate trends in incidence rates over time. Findings revealed a significant increase in cumulative risks (CR) and age-standardized incidence rates (ASR) over time. Despite this increasing incidence, opioid consumption for pain management in cancer care remains low and stagnant across the continent, reflecting an important gap in palliative care services. As cancer incidence in SSA is projected to rise dramatically by 2050, there is an urgent need for policy interventions to improve access to diagnostic services, cancer care, and adequate pain management.

The Role of Angiogenesis in Follicle Activation and Fertility Preservation Following Chemotherapy and Oophorectomy

Presenter's Name: Davis Khari Classification: Undergraduate Student School/College: Arts & Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Dr. Dominique Pritchett Faculty Advisor's email: dominique.pritchett@howard.edu

Co-authors: Dr. Veronica Gomez-Lobo, Mary Soliman, Elizabeth Varghese, Taylor Badger, Christophe Vanpouille, Raghu Kavarthapu, Natalie Hanby

Advancements in pediatric cancer treatment have significantly improved survival rates, yet chemotherapy's long-term effects on ovarian function remain a critical concern, particularly for prepubertal girls. Alkylating agents, such as cyclophosphamide, accelerate follicle depletion, increasing the risk of premature ovarian insufficiency (POI) and infertility. While ovarian tissue cryopreservation (OTC) via unilateral oophorectomy (UO) is the current gold standard for fertility preservation, its long-term effects, especially when combined with chemotherapy, remain poorly understood. Existing research suggests that angiogenesis, the formation of new blood vessels, plays a crucial role in follicle activation, but its potential therapeutic application in fertility preservation has yet to be fully explored. This study utilizes a prepubertal mouse model to investigate the combined effects of chemotherapy and UO on ovarian reserve, fecundity, and fertility outcomes. It also examines the role of angiogenesis in activating dormant follicles, hypothesizing that increased vascularization may enhance follicle survival and activation post-treatment. While prior studies indicate a strong correlation between blood

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vessel contact and follicle activation, the precise mechanisms remain unclear, particularly in the context of chemotherapy-induced ovarian damage. Our research aims to fill this knowledge gap by analyzing how angiogenesis influences ovarian recovery and whether it can be leveraged as a therapeutic strategy. Understanding these interactions is critical for optimizing fertility preservation approaches in young cancer patients. However, further studies are needed to determine how targeted pro-angiogenic interventions might improve reproductive outcomes.

Modernizing Neuroprosthetic Interfaces Through Multi-Modal Sensory Integration

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Despite advances in motor control for neuroprosthetics, integrating sensory feedback remains a significant challenge in allowing users to naturally interact with their environment. With approximately 5.6 million people living with limb loss in the U.S. alone, and abandonment rates of 30-50% among upper limb prosthetic users due to lack of feedback and control, there is a critical need for improved sensory integration in these devices. This research examines the modalities of sensory input (touch, temperature, and proprioception) and their encoding methods to bridge the gap between sensory feedback and neuroprosthetic functionality. Using R programming, we analyzed 746 research articles from the Web of Science database focused on Brain-Computer Interfaces and sensory feedback integration. Our systematic review revealed prominent approaches including peripheral nerve stimulation, targeted muscle reinnervation, and direct brain-computer interfaces. Preliminary results indicate that journals emphasizing neuroengineering, robotics, and rehabilitation engineering contributed significantly to the development of multi-modal sensory integration in neuroprosthetics. Studies implementing multiple sensory feedback channels demonstrated improved user control during BCI operation. The interdisciplinary nature of successful implementations spans robotics, bioengineering, and neural engineering, with leading institutions and senior authors showing concentrated expertise in specific research centers. These findings suggest that comprehensive sensory feedback integration is crucial for advancing practical BCI applications and reducing device abandonment rates, potentially leading to more intuitive and functional neuroprosthetic devices.

Trends in Caffeine Toxicity and Cardiac Arrhythmias: A Retrospective Study of U.S. Health Data from 2011-2024

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Excessive caffeine intake has been associated with adverse health outcomes, including life-threatening cardiac arrhythmias such as ventricular fibrillation and flutter. This study aimed to assess the incidence of caffeine toxicity from 2011-2017 and 2018-2024, considering the impact of the U.S. Food and Drug Administration's (FDA) 2018 warnings regarding highly concentrated caffeine powders and liquids. A retrospective cohort analysis was conducted utilizing 155,583,827 de-identified electronic health records (EHRs) from the TriNetX database, spanning January 1, 2011, to December 31, 2024. A subgroup analysis was performed on 72,554 patients diagnosed with caffeine toxicity and associated arrhythmias, including atrial fibrillation, ventricular fibrillation, tachycardia, and flutter. The incidence rate of caffeine toxicity declined from a mean of 0.097 per 1,000 person-years to 0.022 per 1,000 person-years (p value 0.0052), representing a 4.4-fold reduction. However, the incidence rate of ventricular fibrillation, flutter, and tachycardia increased by 2.21-fold between 2011-2017 and 2018-2024. Unlike traditional caffeine sources (e.g., coffee, tea), energy drinks contain rapidly absorbed caffeine, sugar, and additional stimulants, which may potentiate arrhythmic risk even at lower doses. Although these effects do not always result in overt caffeine toxicity, they may still precipitate severe cardiac events, contributing to the observed rise in ventricular arrhythmias despite the overall decline in poisoning rates. In conclusion, our findings necessitate further investigation into regulatory deficiencies, particularly the current classification of energy drinks as dietary supplements, which allows their unregulated distribution; enhanced public awareness of high-caffeine products'cardiovascular risks may improve early clinical recognition of arrhythmogenic complications.

MELAS Syndrome: Case of MT-TL1 c.3243A>G Mutation and Cardiogenic Shock

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The MT-TL1 c.3243A>G mutation is a common mitochondrial DNA mutation associated with MELAS (mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes), affecting multiple organ systems, including the heart. Cardiac involvement, though underexplored, includes

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cardiomyopathy, conduction abnormalities, and arrhythmias, often progressing to heart failure. This study presents a case of severe cardiogenic shock secondary to MELAS, highlighting the potential role of mitochondrial-targeted therapies like elamipretide. 44-year-old male with ME-LAS syndrome due to known MT-TL1 c.3243A>G mutation was diagnosed with cardiogenic shock secondary to mitochondrial dysfunction, complicated by acute renal failure, liver failure, and encephalopathy. He exhibited severe left ventricular dysfunction (EF 25-30%), metabolic acidosis, hyperlactatemia, and despite intensive metabolic stabilization and supportive care, his condition deteriorated. Elamipretide, a mitochondrial-targeted tetrapeptide therapy that stabilizes cardiolipin was considered and efforts made to explore access through clinical trials, however the patient passed away several days later. Cardiac involvement in MELAS remains underdiagnosed and undertreated. The heart's high metabolic demand makes it most vulnerable to mitochondrial dysfunction. 55 % of patients with the m.3243A>G mutation have cardiac involvement. Traditional heart failure treatments like beta-blockers and ACE inhibitors may be ineffective due to bioenergetic deficits, emphasizing the need for more research and use of mitochondrial-targeted therapies. Elamipretide enhances inner mitochondrial membrane stability, improves ATP synthesis and has shown to improve cardiac function in clinical trials for Barth syndrome. Given the phenotypic variability and risk of severe morbidity, early recognition of the cardiac complexity of MELAS could optimize patient outcomes with mitochondrial targeted approach.

Double Jeopardy: The Impact of Diabetes on Guillain-Barré Syndrome Outcomes

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Co-authors: Amara Chike, Quinton Johnson, Jeffrey Palmer, Samrawit Zinabu, Miriam Michael

Background: Guillain-Barré Syndrome (GBS) is associated with significant morbidity, and coexisting diabetes mellitus (DM) may further increase the risk of adverse outcomes. This study compares the incidence of severe complications in GBS patients with and without DM. Methods: A retrospective cohort study was conducted using TriNetX data, including GBS patients with DM (n = 10,574) and a propensity score-matched control group without DM (n = 10,574). Outcomes of interest-respiratory failure, cardiac arrest, pulmonary embolism (PE), and sepsis-were analyzed within a one-month follow-up period. Odds ratios (OR), risk differences, Kaplan-Meier survival analysis, and logrank tests were used for statistical evaluation. Results: The GBS+DM cohort had significantly higher rates of respiratory failure (13.02% vs. 9.36%, OR = 1.449, p < 0.0001), cardiac arrest (1.47% vs. 0.82%, OR = 1.793, p < 0.0001), sepsis (7.85% vs. 3.93%, OR = 2.085, p < 0.0001), and PE (2.31% vs. 1.57%, OR = 1.481, p = 0.0001). Kaplan-Meier survival analysis demonstrated lower survival probabilities in the GBS+DM cohort, with log-rank tests confirming significant differences (p < 0.0001for most outcomes). Conclusion: GBS patients with DM experience significantly higher rates of adverse outcomes compared to those without DM. These findings emphasize the need for heightened clinical vigilance and early intervention in this high-risk population.

Sexual Health Matters: Group C Streptococcus Infection leading to Bacteremia and Pelvic Inflammatory Disease

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Pelvic Inflammatory Disease (PID) is a serious condition often affecting reproductive-age women. PID is commonly associated with sexually transmitted infections due to pathogens such as Chlamydia Trachomatis (CT) and Neisseria Gonorrhoeae (NG). However, Group C Streptococcus (GCS), a human pathogenic β-hemolytic Streptococcus, is an uncommon cause of PID. We present a case of bacteremia secondary to PID due to GCS in a 31 year old female who presented to the emergency department with fever, vomiting, hematuria, vaginal bleeding, dyspareunia, and mild non-radiating lower abdominal pain of two days duration. She reported a 3-month history of "rough" penile-vaginal intercourse with a male sexual partner, a sick contact experiencing vomiting. On examination, she was afebrile with suprapubic and right lower abdominal tenderness. Pelvic exam noted malodorous yellow-brown discharge. Laboratory studies were notable for leukocytosis, but negative CT, NG, and Trichomonas. Blood cultures grew GCS while the urine culture had no growth. Computed Tomography of the abdomen and pelvis with contrast found no acute intra-abdominal pathology. She was evaluated by the Gynecology, Urology, and Infectious Disease (ID) teams who recommended medical management with intravenous ceftriaxone, metronidazole, and doxycycline. After three days on antibiotics, her abdominal pain and vaginal discharge diminished while her leukocytosis, hematuria, and bacteremia resolved. She was discharged home on oral antibiotics and counseled about safe sex practices. This case highlights the importance of obtaining pertinent sexual history, sexual health education, antibiotic management of bacteremia, and clinical vigilance for unusual presentations of GCS bacteremia via genital mucosal injury from penetrative intercourse.

Hidden Infections, Hidden Risks: Unveiling the Connection Between Chlamydia and Preeclampsia

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Background: Preeclampsia, a major cause of maternal and perinatal morbidity, is characterized by new-onset hypertension and organ dysfunction after 20 weeks of gestation. While abnormal placental development, endothelial dysfunction, and systemic inflammation contribute to its pathophysiology, infections like Chlamydia trachomatis may play a role. Chlamydia trachomatis, a common sexually transmitted infection (STI), often asymptomatic, can cause chronic inflammation and vascular damage-mechanisms also implicated in preeclampsia. Identifying this link could aid in early detection and prevention strategies. Methods: This cohort study compared preeclampsia incidence in women with and without a history of Chlamydia trachomatis infection. Two groups were defined based on medical records using TriNex Research Network: women with documented Chlamydia infection and a control group without prior infection. Propensity score matching balanced baseline characteristics. Statistical analyses included risk ratios, odds ratios, Kaplan-Meier survival analysis, and propensity-matched comparisons. Results: Women with a history of Chlamydia infection had a modest but significant increase in preeclampsia risk and occurence. Although Kaplan-Meier analysis showed no difference in timing of onset, infection history correlated with higher preeclampsia frequency, suggesting a potential role in severity or recurrence. Conclusions: Chlamydia trachomatis infection may contribute to preeclampsia through inflammation and vascular dysfunction. Given its high prevalence, even a small increase in risk has significant public health implications. Further research is needed to explore the underlying biological mechanisms, assess targeted screening and intervention strategies, and investigate the potential link between Chlamydia infection, progression to eclampsia, and maternal mortality.

Social Needs, Life Purpose, Cancer History and Psychological Stress among U.S. Adults: a Moderated Mediation Model

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Background: Social, psychological, and health factors commonly contribute to psychological distress across the U.S adult population. This study aims to examine how social needs and one's sense of purpose in life can impact psychological distress in individuals both with and without a history of cancer. Methods: This study was conducted through a secondary data analysis using the 2022 Health Information National Trends Survey that included a total of 6,252 complete respondents. Social needs and cancer history were assessed directly via survey questions. Psychological distress was measured using the PHQ-4 scale and life purpose was measured using the PROMIS Meaning and Purpose scale. A simple-mediation and moderated-mediation analysis were conducted to investigate the relationships between these variables. Results: Study findings showed that a higher number of social needs significantly predicted psychological stress (b=.63,t=13.16, p<.001). Life purpose was found to be a significant mediator of the relationship between social needs and psychological distress (ab = 0.17, Boot SE = 0.02, Boot 95% CI = [0.12, 0.22]). Cancer history did not moderate the effect of social needs on life purpose (b=-0.08, t=-0.12, p=.90) or social needs on psychological distress (b=0.12, T=0.85, p=.40). The significant mediation effect exists for both cancer and non-cancer groups (b=.008, Boot 95% CI=[-0.16, 0.19]). Conclusion: Social needs and life purpose were found to have significant effects on psychological distress in U.S adults. These findings can contribute to the development of interventions to decrease psychological distress in U.S adults that are linked to social, psychological, and health factors.

Vestibular Schwannoma Dementia and Hearing 10-Year Outcomes with Surgical Treatment

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Co-authors: Devonte Sobamowo, Miriam Michael

Vestibular schwannomas (VS) are slow-growing tumors that despite their benign nature, exhibit a malignant course, resulting commonly in hearing loss, tinnitus, vertigo, headache, and facial paresthesia. Unexamined in the literature is the potential for dementia, the top risk factor of which is hearing loss and can result from the VS itself or from treatment. The two mainstays, stereotactic radiosurgery (SRS) and microsurgical techniques (open surgery) both can result in inadvertent hearing deficits. This study aims to elucidate whether SRS or open surgery leads to increased incidence of dementia in VS patients. To investigate this connection, we conducted a 10-year retrospective cohort study using a global TriNetX database. Patients with benign cranial schwannomas were further subdivided into an open surgery cohort (Cohort 1, N=933) and an SRS cohort (Cohort 2, N=106), excluding patients with confounding deficits. After propensity matching for demographics and substance use, 70 patients remained in each group, and the risk difference of dementia and hearing loss was assessed. Both cohorts exhibited hearing loss, with significantly more hearing loss and dementia only in Cohort 1 and no dementia patients in Cohort 2. SRS has emerged as a mainstay treatment for VS and runs the risk of delayed hearing loss, which is thus underexplored in the literature. Open surgery is indicated for larger tumors, which may lead to a greater risk of iatrogenic injury, subsequent hearing loss, and, in turn, dementia. Change in the treatment paradigm is necessary to account for the risk of dementia in pre- and post-operative care.

Vestibular Schwannoma Dementia and Hearing 10-Year Outcomes with Surgical Treatment : A TriNetX Study

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ABSTRACTS

Co-authors: Devonte Sobamowo, Samrawit Zinabu, Miriam Michael, Noor Malik

Vestibular schwannomas (VS) are slow-growing tumors that despite their benign nature, exhibit a malignant course, resulting commonly in hearing loss, tinnitus, vertigo, headache, and facial paresthesia. Unexamined in the literature is the potential for dementia in VS patients, either from the lesion itself or its treatment; a top risk factor for dementia is hearing loss, persistent across dementia subtypes. This study aims to elucidate whether the two mainstays of treatment, stereotactic radiosurgery (SRS) or microsurgery lead to increased incidence of dementia in VS patients without preexisting hearing loss. To investigate this connection, we conducted a 10-year retrospective cohort study using a global TriNetX database. Patients with benign cranial schwannomas were further subdivided into a microsurgery cohort (Cohort 1, N=933) and an SRS cohort (Cohort 2, N=106), excluding patients with confounding deficits. After propensity matching for demographics and substance use, 70 patients remained in each group, and the risk difference of dementia and hearing loss was assessed. Both cohorts exhibited hearing loss, with statistically significant hearing loss and dementia only in Cohort 1 and no dementia patients in Cohort 2. SRS has emerged as a mainstay treatment for VS and runs the risk of delayed hearing loss, which is thus underexplored in the literature. Microsurgery is indicated for larger tumors, which may lead to a greater risk of iatrogenic injury, subsequent hearing loss, and, in turn, dementia. Change in the treatment paradigm is necessary to account for the risk of dementia in pre- and post-operative care.

Vestibular Schwannoma Dementia and Hearing 10-Year Outcomes with Surgical Treatment: A TriNetX Study

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Vestibular schwannomas (VS) are slow-growing tumors that despite their benign nature, exhibit a malignant course, resulting commonly in hearing loss, tinnitus, vertigo, headache, and facial paresthesia. Unexamined in the literature is the potential for dementia in VS patients, either from the lesion itself or its treatment; a top risk factor for dementia is hearing loss, persistent across dementia subtypes. This study aims to elucidate whether the two mainstays of treatment, stereotactic radiosurgery (SRS) or microsurgery lead to increased incidence of dementia in VS patients without preexisting hearing loss. To investigate this connection, we conducted a 10-year retrospective cohort study using a global Tri-NetX database. Patients with benign cranial schwannomas were further subdivided into an microsurgery cohort (Cohort 1, N=933) and an SRS cohort (Cohort 2, N=106), excluding patients with confounding deficits. After propensity matching for demographics and substance use, 70 patients remained in each group, and the risk difference of dementia and hearing loss was assessed. Both cohorts exhibited hearing loss, with statistically significant more hearing loss and dementia only in Cohort 1 and no dementia patients in Cohort 2. SRS has emerged as a mainstay treatment for VS and runs the risk of delayed hearing loss, which is thus underexplored in the literature. Microsurgery is indicated for larger tumors, which may lead to a greater risk of iatrogenic injury, subsequent hearing loss, and, in turn, dementia. Change in the treatment paradigm is necessary to account for the risk of dementia in pre- and post-operative care.

APOE Genotype-Dependent Effects of Exercise on the

Short Chain Fatty Acid and Brain Function in Mice Presenter's Name: Grahamhyatt Shantol Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Dr Karl Thompson Faculty Advisor's email: karl.thompson@howard.edu

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It is well-known that exercise is beneficial for brain health and function. However, individual genetic variances may impact the specific outcomes of an exercise intervention. Studies show that exercise has beneficial effects on the incidence and progression of Alzheimer's disease, and some studies indicate that there may be a differential impact based on the APOE gene. The apolipoprotein E gene (APOE) is a cholesterol trafficking protein and its E4 variant increases the risk for Alzheimer's disease. One way exercise may influence the brain is via increased production of short chain fatty acids which are byproducts of dietary fiber breakdown in the gut by bacteria. There are three main SCFAs namely propionate, butyrate and acetate, which functions in gut health, brain function and regulates metabolism. The aim of this study is to determine and compare the impact of APOE genotype on exercise-induced changes in the short chain fatty acids and brain function. Thirty-two, 10-month-old mice, homozygous for APOE3 and APOE4 genotypes were used. Mice from each genotype were randomly assigned into either exercise or sedentary groups. Mice in the exercise groups were placed in a cage containing a voluntary run-wheel for 8 weeks. Following the novel object recognition test of memory, mice were sacrificed, and brain tissue and fecal samples were collected. Short chain fatty analysis was conducted using GC-MS. Both exercise and APOE genotype affected the levels of short chain fatty acids measured in fecal samples. Additional analyses are needed to specify detected changes in SCFAs.

The Role of Body Mass Index in Perioperative Complications Among Patients Undergoing Total Hip Arthroplasty

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ABSTRACTS

Introduction: Obesity is a well-established risk factor for osteoarthritis (OA). It increases mechanical stress on the joints and contributes to systemic inflammation. While total hip arthroplasty (THA) is an effective treatment for end-stage OA, the impact of body mass index (BMI) on perioperative and post-operative outcomes remains a topic of debate. This paper aims to evaluate the effect of BMI on perioperative outcomes in THA. Methods: A retrospective cohort study of the TriNetX US Collaborative Network, an electronic health record repository of United States healthcare organizations including over 117 million patients, was conducted. Patients were stratified into five BMI categories: underweight, normal, overweight, Obesity Class I, Obesity Class II, and Obesity Class III. Outcomes were compared between each BMI group to normal weight and post-operative outcomes and BMI were evaluated for clinical significance. Results: During the study period 110,282 patients underwent a total hip arthroplasty. After 1:1 propensity score matching, patients with Class II were less likely to develop acute kidney failure and more likely to develop cerebral infarction and anemia. For Class III obesity, there was a statistically significant difference in developing acute kidney failure and acute embolism. Discussion: Our study focuses on total hip arthroplasty in osteoarthritis and the relationship between a patient's BMI and postoperative outcome. We found that higher BMI categories demonstrated a lower incidence of acute kidney failure but had a greater likelihood of anemia and cerebral infarction. Further research is needed to develop preoperative management strategies and guidelines to reduce patient morbidity.

The Association Between Marijuana Use and Hypertensive Disorders of Pregnancy

Presenter's Name: Haley Terinney Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Shannon Wentworth Faculty Advisor's email: shannon.wentworth@howard.edu

Co-authors: Shannon Wentworth, MD

Background: With the increasing legalization of marijuana in the U.S., its use during pregnancy has risen. While marijuana is linked to cardiovascular risks, its impact on blood pressure remains unclear. Hypertensive disorders complicate approximately 10% of pregnancies, increasing the risk of severe maternal and fetal complications. Understanding whether marijuana use contributes to hypertension in pregnancy is essential for risk assessment and maternal health. Objective: This study examines the association between marijuana use and hypertensive disorders of pregnancy at Howard University Hospital. By categorizing pregnant patients based on marijuana use, we assess whether there is a correlation with chronic hypertension, gestational hypertension, and pre-eclampsia. Methods: A retrospective chart review was conducted to compare hypertension-related pregnancy outcomes in marijuana users and non-users. Logistic regression was performed to assess odds ratios, adjusting for age, BMI, and preexisting conditions. Results: The odds ratio (OR) for hypertension in marijuana-positive patients was 1.25 (95% CI: 0.775-2.03, p = 0.355), indicating no significant association. The odds ratio suggests 25% higher odds of hypertension in marijuana users, but the Chi-squared statistic (0.855) confirmed marijuana use did not significantly predict hypertension. Further analysis will adjust for confounders and categorize hypertensive disorders. Conclusion: No significant association was found between marijuana use and hypertension in pregnancy. While it is not statistically significant, there was a trend towards increased risk of hypertension in marijuana smokers. Future research should include a larger sample size, adjust for confounders, and examine specific hypertensive disorders to enhance statistical power and clinical relevance.

Beyond the Gap: Reimagining Breastfeeding Support for Black Communities

Presenter's Name: Haley Terinney Classification: Professional Student School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Shannon Wentworth Faculty Advisor's email: shannon.wentworth@howard.edu

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Background: Breast milk provides optimal nutrition with immunologic benefits for infants, while offering birthing person health advantages including reduced risk of ovarian and breast cancers-diseases disproportionately affecting Black individuals. Despite these benefits, significant disparities exist in the United States. While national breastfeeding initiation is 84.1%, only 73.6% of African American parents initiate breastfeeding, with just 49% continuing beyond six months-far below rates for Asian (90.3%), White (85.5%), and Hispanic (87.4%) individuals. This disparity contributes to higher infant mortality and chronic illness risks. Methods: A systematic literature review was conducted to examine the multifactorial influences on breastfeeding behaviors in African American lactating individuals. This research utilizes the Wholistic Model for African American Breastfeeding (WMAAB), developed by the author to expand the Conceptual Model for Breastfeeding Behavior by incorporating health systems, structural factors, media representation, industry influence, racism and bias. Through systematic review of quantitative and qualitative studies (2001-2023), we examine structural, sociocultural, and individual factors influencing African American breastfeeding behaviors. Results: Breastfeeding disparities persist even when controlling for education and socioeconomic status. Effective interventions include peer counseling, home visits, professional support, group prenatal care, and breastfeeding-specific clinical appointments. Programs providing inter-pregnancy birth support, workplace accommodations, and doula support show significant improvements in breastfeeding initiation and continuation. Conclusion: Addressing African American breastfeeding disparities requires comprehensive, culturally tailored interventions engaging healthcare providers, public figures, and community health workers. By tackling these multifaceted challenges, we can reduce infant health disparities and improve birthing person and child health outcomes in African American communities.

Addressing Breastfeeding Disparities Among African American Women: A Systematic Review

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Co-authors:

Background: Breast milk provides optimal nutrition with immunologic benefits for infants, while offering maternal health advantages including reduced risk of ovarian and breast cancers—diseases disproportionately affecting Black women. Despite these benefits, significant disparities exist: national breastfeeding initiation is 84.1%, but only 73.6% for African American women, with just 49% continuing beyond six months (versus 90.3% Asian, 85.5% White, and 87.4% Hispanic women). This disparity contributes to higher infant mortality and chronic illness risks.

Methods: A systematic literature review was conducted to examine the multifactorial influences on breastfeeding behaviors in African American women. This research utilizes the Wholistic Model for African American Breastfeeding (WMAAB), developed by the author to expand the Conceptual Model for Breastfeeding Behavior by incorporating health systems, structural factors, media representation, industry influence, racism and bias. Through systematic review of quantitative and qualitative studies (2001-2021), we examine structural, sociocultural, and individual factors influencing African American breastfeeding behaviors. Results: Breastfeeding disparities persist even when controlling for education and socioeconomic status. Effective interventions include peer counseling, home visits, professional support, group prenatal care, and breastfeeding-specific clinical appointments. Programs providing inter-pregnancy birth support, workplace accommodations, and doula support show significant improvements in breastfeeding initiation and continuation. Conclusion: Addressing African American breastfeeding disparities requires comprehensive, culturally tailored interventions engaging healthcare providers, public figures, and community health workers. By tackling these multifaceted challenges, we can reduce infant health disparities and improve maternal-child health outcomes in African American communities.

Polygenic Risk Scores as Predictor for Attention Deficit/Hyperactivity Disorder within BIPOC Communities

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Co-authors: Dr. Nilanjan Chatterjee, Dr. Ziqiao Wang

Attention deficit/hyperactivity disorder (ADHD) is a heritable neurobiological disorder characterized by a pattern of attention difficulty, impulsiveness, and/or hyperactivity. Black children are underdiagnosed for ADHD compared to their white peers due to a negative perception of their displays of common ADHD behavior. Undiagnosed ADHD can lead to harmful outcomes such as poor academic success, substance abuse, self-harm, and untimely death. Polygenic risk scores (PGS/PRS) estimate an individual's susceptibility to a trait or disease due to a combination of genetic variants identified to predict individuals' genetic liability to ADHD in previous studies, however only in participants of European descent. We hypothesize a PRS for ADHD that was developed from a white population can predict the risk of the disorder within a Black population. We used the Boston Birth Cohort (BBC) as our examining database and repository of gene-environmental factors for Black, Indigenous, and People of Color (BIPOC) women and children. We constructed PRS and principal components (PCs) of genetic ancestry using genome-wide genotype data. Then we tested for the association of ADHD risk with the PRS with logistic regression after adjustment for PCs, sex, and status of preterm birth. The estimate from the genetic score is -0.03643 and the p-value is 0.7640. We found that the PRS from an external source is not an accurate predictor for ADHD within the Black community of the Boston Birth Cohort. In the future, large-scale genetic studies are needed for better characterization of genetic risks of ADHD in Black populations.

Subclinical Hyperthyroidism: a risk factor for heart failure.

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Subclinical hyperthyroidism (SH) is a metabolic disorder characterized by low levels of Thyroid Stimulating Hormone (TSH), normal Free thyroxine (FT4), and normal Free triiodothyronine (FT3) levels. This condition affects 1-2% of the general population. We report the case of a 31 year old female who presented with frequent episodes of intermittent palpitations with associated 20lb weight gain over the last 12 months. Laboratory studies were unremarkable except for a low level of TSH at 0.364 mU/L. FT4 and FT3 were within normal limits. Thyroid antibodies were within normal limits. Ultrasound of the thyroid noted thyromegaly and a simple cyst of her left lobe. A 2-week-holter monitor noted occasional premature ventricular contractions. Given the finding of symptoms of hypothyroidism and hyperthyroidism, she was referred to the endocrinology clinic where she was diagnosed with subclinical hyperthyroidism. However, she reported dyspnea on exertion during a follow-up visit 1 month after her initial presentation. She was referred to the cardiology clinic where an echocardiogram noted a mildly reduced left ventricular ejection fraction of 45-50%. The American Association of Clinical Endocrinologists recommends treatment in patients less than 65 years of age with a history of heart disease and TSH < 0.1mU/L, but recommends a consideration for treatment in patients with TSH between 0.1 and 0.5 mU/L. This case highlights a major cardiac risk of untreated SH and the need for research to evaluate benefits of treatment in asymptomatic patients before emergence of major complications.

Leveraging Generative artificial Intelligence (AI) Large Language Models (LLMs) and Reinforcement Learning in Medicinal Chemistry Patent Review

Presenter's Name: Hayes Jennifer Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Xiang Wang Faculty Advisor's email: xiang.wang@howard.edu

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Medicinal chemistry patents are crucial in drug discovery, providing a wealth of information on the scope and state of the art, disease targets and mechanisms, novel compounds, bioactivity data, formulations, methods of treatment, and synthesis methods. However, patent literature can be overlooked as a relevant resource by medicinal chemists due to the legalese used to draft patent applications and difficulties in extracting and interpreting chemical structures and particularly Markush chemical structures in patent claims. Herein we report on our efforts to leverage Generative Artificial Intelligence (GenAI), especially large language models (LLMs), such as GPT-3.5, GPT-4, GPT-4Turbo, GPT-4 Vision and Llama3.1-8B-Instruct, to explore the capability and efficiency of LLMs to evaluate, assess questions of patentability, validity, and/or infringement. We focused on a particular drug class, i.e., glucagon-like peptide 1 (GLP-1) receptor modulators, a class of drugs known to be useful for the treatment of type 2 diabetes and obesity. We are aiming to: (1) develop a comprehensive dataset of GLP-1 R modulator patents for use with LLM to evaluate, assess questions of patentability, validity, and/ or infringement; (2) analyze and evaluate the capability and efficiency of LLMs in processing and interpreting complex patent documents, and (3) employ reinforced learning to enhance the patent review capacity of LLMs with the aim of developing a tool for assessing questions of patentability, validity, infringement, and/or freedom to operate. We have made progress in addressing the bottleneck problem of extracting relevant information and deciphering chemical Markush structures provided as images in patent claims.

Trends in Hidradenitis Suppurativa: A 10-Year Analysis in the United States of America

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Background and Aims: Hidradenitis suppurativa (HS) is a chronic skin condition marked by painful nodules and abscesses, predominantly affecting intertriginous areas. It is commonly seen in women, individuals with a family history of HS, and those with comorbidities like obesity and inflammatory bowel disease. This study aimed to assess the demographic and prevalence trends of HS in the U.S., critical for developing

public health strategies and improving early diagnosis and intervention. Methods: We conducted a retrospective cohort study from January 1, 2014, to December 31, 2024, using de-identified electronic health records from the TriNetX platform. Patients with an HS diagnosis (based on ICD codes) were included, and outcomes measured included incidence proportion, prevalence, and incidence rate. Stratified analyses were performed by age, race, and ethnicity. Results: The study involved 196,067 patients. Incidence and prevalence rates showed significant increases, especially in 2024 compared to 2014. The youngest age groups exhibited the highest growth in both incidence and prevalence, with a notable peak in 2024. Racial disparities were evident, with marked increases in American Indian/Alaska Native and Asian populations, while White and Other Race groups showed slower trends. Hispanic or Latino and Not Hispanic or Latino groups had similar rates, with the former slightly higher. Conclusion: HS incidence and prevalence have increased over the past decade, particularly among younger populations and certain racial/ethnic groups. These trends suggest enhanced detection and healthcare access, highlighting the need for innovative treatment strategies and further research into underlying genetic and metabolic factors.

Ocular Syphilis: Analyzing Rising Incidence and Inequities Over the Past Decade

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Purpose: To assess the incidence and disparities of ocular complications in patients with syphilis in the United States over the past decade. Methods: This study utilized De-identified electronic health records (EHRs) from the TriNetX database. The cohort definition required patients to have at least one visit between January 1, 2014, and December 31, 2023. The analysis included stratification by age, sex, race, and ethnicity, with a lookback period extending from any time to one day before the start of each defined time window. Five-time windows, 2014-2015, 2016-2017, 2018-2019, 2020-2021, and 2022-2023, were used to evaluate temporal trends. The primary event of interest was syphilitic eye disease. Results: The large database analysis revealed an increasing incidence of syphilitic eye disease from 2014 to 2023. The data also showed disparities in incidence between those of different age, sex, race, and ethnicity. Syphilitic oculopathy disproportionately affects men, Alaska Natives, and Hispanic individuals. Conclusion: With rising rates of syphilis, ocular syphilis is becoming increasingly prevalent. Therefore, it should be considered in the differential diagnosis for all patients presenting with ocular inflammation. Early diagnosis and treatment generally improve patients' post-treatment visual acuity. Interventions should be targeted given disparities in disease burden by age, sex, race, and ethnicity. Translational Relevance: This study highlights the increasing incidence and demographic disparities of syphilitic eye disease, informing targeted interventions and early diagnosis to improve patient outcomes.

Ketamine as Prophylaxis for Depression and Post-Traumatic Stress Disorder Post-Burn Injury

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Background: Mental health issues, including depression and PTSD, are common after burns. This study evaluates ketamine's efficacy in preventing these conditions in burn patients. Methods: A retrospective cohort study using de-identified electronic medical records from TriNetX included burn patients aged 12-90 with third-degree burns covering at least 10% of total body surface area (TBSA). Patients were divided into two groups: those who received ketamine and those who did not. ICD codes identified patients diagnosed with depression or PTSD. Propensity score matching was used to balance the cohorts. Rates of depression and PTSD one year post-burn were compared. Results: Of 361,639 patients, 344,290 were in the control group, and 17,349 in the experimental cohort. The analysis found that patients who received ketamine had a higher risk of developing depression and PTSD (risk ratio 2.285, 95% CI: 2.166, 2.409; odds ratio 2.661, 95% CI: 2.502, 2.831). Kaplan-Meier survival analysis showed lower survival probability (71.74%) in the ketamine group compared to the control group (85.94%). The log-rank test showed statistically significant differences ($\chi 2 = 924.760$, p = 0.000), with a hazard ratio of 2.370 (95% CI: 2.238-2.510, p = 0.000). Conclusion: Ketamine treatment was associated with a significantly higher risk of depression and PTSD in burn patients compared to those who did not receive the drug.

Barriers to Aural Rehabilitation and Communication Access for Deaf and Hard-of-Hearing Individuals in the Caribbean Presenter's Name: Linton Kristen

Classification: Graduate Student School/College: Graduate School Presentation Type: Poster Presentation Faculty Advisor: Dr. Andrea "Andi" Toliver-Smith Faculty Advisor's email: andrea.toliversmith@howard.edu

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Access to aural rehabilitation services and communication modes for Deaf and Hard-of-Hearing (DHH) individuals in the Caribbean remains an under-researched issue. This study highlights disparities in hearing care and linguistic accommodations, emphasizing the need for awareness and inclusive healthcare policies to improve the quality of life for DHH individuals. Caribbean nations face a shortage of audiology services, trained professionals, and government support, creating barriers to rehabilitation and communication. The lack of dedicated schools for the Deaf, interpreter services, and widespread sign language use further marginalizes DHH individuals. This literature review examines aural rehabilitation and communication access in the Caribbean. Sources include an interview with Dr. Martin, Au.D., discussing rehabilitation challenges in the Cayman Islands, a World Health Organization report on hearing loss disparities (2021), a genetic study on hearing loss in the Caribbean (Peart & Tekin, 2024), and research on emerging sign languages (Braithwaite, 2016). Aural rehabilitation services remain severely limited, with little access to hearing aids, cochlear implants, or auditory training. Healthcare systems remain fragmented, exacerbating these challenges (Independent Study, 2025). Many Caribbean nations have low sign language use, limited interpreter availability, and rely on written communication as a substitute (Braithwaite, 2016). Additionally, diverse genetic factors contribute to hearing loss, requiring specialized but largely unavailable diagnostic approaches (Peart & Tekin, 2024). Urgent policy interventions are needed to expand audiology services, increase funding, and recognize sign language. Addressing these gaps will enhance education, employment, and healthcare access, promoting the social integration of DHH individuals across the Caribbean.

Telemedicine and Health Information Exchange Challenges

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Background: The practice of telemedicine started in the early 20th century, with the inventions of communication tools, such as the telegraph and telephone. The evolution of telemedicine advanced with the internet, telephones, and modern digital technologies. The purpose of telemedicine is geared to be both patient-centered and protect patients and physicians using the Health Information Exchange (HIE) and the delivery of healthcare services done remotely using telecommunications and information technology. The increase of telemedicine remained steady due to the beginning of the COVID-19 pandemic now remains an integral part of medical care. This paper will discuss the challenges of Telemedicine and Health Information Exchange. Method: This study used 20 articles from 2020-2024. The search engines used were google scholar, Science Direct, PubMed, and ResearchGate. Results: the results showed that Telemedicine and Health Information exchange have been beneficial to the world but has some challenges that need to overcome strategic interventions for better care between patient and provider. Telemedicine is serving its purpose in the delivery of healthcare services because it is remotely using telecommunications and information technology is to aid in communication. Implication: telemedicine is currently evolving and may dominate the medical field in the near future. Therefore, more studies are needed to understand, enhance technology, and build on the use of telemedicine. Healthcare institutions would be significantly affected if patients' health information are not adequately protected which can become a nationwide concern for patients and providers if policies are not put in place to enhance and control healthcare technologies.

Cardiac Complications in MELAS: Quantifying the Burden in a Retrospective Study

Presenter's Name: Meepagala Shawn Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

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Background: Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS) syndrome is a rare mitochondrially inherited genetic condition that has variable multisystem manifestations. Approximately one-third of patients with MELAS syndrome experience cardiac manifestations such as cardiomyopathy, arrhythmias, and conduction defects, which can contribute to patient morbidity and mortality. Due to the rarity of MELAS, it is difficult to study the rates of these cardiac manifestations. This study conducts the first large-database retrospective study to quantify the rates of cardiac manifestations in patients with MELAS syndrome. Methods: A retrospective study was conducted using de-identified electronic health records (EHRs) from the TriNetX database. Data of patients diagnosed with MELAS syndrome were extracted from the database over a 20-year period (February 2005 to February 2025). The rates of select cardiac manifestations were extracted using associated ICD-10 codes. Results: A total of 4,799 patients diagnosed with MELAS syndrome were identified. Among these, 1,557 (32.4%) exhibited cardiac manifestations. Notably, arrhythmias were observed in 898 patients (18.71%), cardiomyopathy in 471 (9.81%), nonrheumatic valvular disease in 380 (7.92%), conduction disorders in 360 (7.50%), heart failure in 353 (7.36%), and cardiomegaly in 331 (6.90%). Conclusion: Patients with MELAS syndrome were found to have a variety of cardiac manifestations, the most common manifestations were arrhythmias, cardiomyopathy, valvular disease, conduction disorders, and heart failure. The high rates of these conditions highlights the importance of early screening and periodic monitoring for cardiac conditions in patients with MELAS syndrome.

How Does Culturally Responsive Practices Impact Pre-Literacy Outcomes in Young Black Children

Presenter's Name: Mitchell Lashondra Classification: Graduate Student School/College: Graduate School *Presentation Type: Poster Presentation* Faculty Advisor: Dr. Andrea "Andi" Toliver-Smith Faculty Advisor's email: andrea.toliversmith@howard.edu

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Early literacy practices help build the foundation for learning and are essential for young children from birth to kindergarten. According to The American Speech-Language-Hearing Association (ASHA), Speech-Language Pathologists (SLPs) have a key role in promoting children's emergent literacy skills as part of early speech/language development, as spoken/oral language and literacy are connected. It is important to examine culturally responsive practices and how they impact pre-literacy outcomes in young Black children. As early interventionists, SLPs provide intervention and coach caregivers regarding strengthening early literacy skills. There is a United States (U.S.) crisis of students not having the ability to read. Black students who are unable to read are at risk of being incarcerated later in life. There is a disproportionate number of SLPs to Black children needing/receiving speech/language services to improve communication skills and develop emergent literacy skills. With 92% of SLPs in the U.S. being White women, the activities and practices used to implement cultural responsiveness and equity of access to services needs examination. Review of literature revealed discussion of literacy interventions for children from culturally and linguistically diverse (CLD) backgrounds. In general, guidelines for Evidence-Based Practice (EBP) for SLPs rarely address issues of CLD. There is an imbalance of SLP providers with similar cultural backgrounds as the population of children served. Culturally responsive practices are critical for fostering inclusive and supportive environments to improve literacy skills for CLD backgrounds. More examination is needed regarding culturally responsive practices and the impact on pre-literacy skills in young Black children.

When the Cold Takes Hold: The Devastating Progression of Severe Trench Foot

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Trench foot was first widely recognized among soldiers during World War I, when prolonged exposure to cold and wet conditions (particularly in the trenches) led to debilitating foot injuries. The pathophysiology involves direct tissue damage from sustained cold exposure and subsequent microvascular dysfunction, often leading to sensory loss, edema, and neuropathic pain. Although trench foot is commonly associated with military settings, it remains a relevant concern among individuals experiencing prolonged exposure to wet and cold conditions, especially the homeless population. This case report highlights the diagnosis and management of a 51-year-old African American male with bilateral trench foot that progressed atypically into gas gangrene, ultimately requiring amputation. Unlike the typical 6-8 hour onset, gas gangrene developed later than expected despite a 10-day treatment with cefepime, linezolid, zosyn (piperacillin/tazobactam), and a day of clindamycin. By day 12 of admission, both feet were necrotic, necessitating bilateral guillotine amputation to prevent sepsis. This report underscores the importance of recognizing and treating trench foot, as its presentation and progression may be unpredictable. It emphasizes the need for early diagnosis, appropriate antibiotic therapy, and targeted prevention efforts, particularly in high-risk populations such as the homeless or those exposed to cold, wet environments for prolonged periods. Educating these individuals on modern causes and prevention strategies is crucial in mitigating the risk of severe complications.

A Silent Threat: Uncovering the Severe Complications of Group C Streptococcus Bacteremia in PID

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Co-authors: Chidiebube Nzeako, MD, Chinemere Ekezie, MD, Oluwatobi Iasisi

Pelvic Inflammatory Disease (PID) is a common and serious condition among reproductive-age women, caused by ascending infections of the female reproductive tract. It is most often linked to sexually transmitted infections, such as Chlamydia trachomatis and Neisseria gonorrhoeae. However, Group C Streptococcus (GCS) as a causative agent of PID is relatively uncommon.

We present a case of bacteremia secondary to PID with GCS in a thirty-one year old female who presented to the emergency department with fever, vomiting, hematuria and lower abdominal pain of two days duration. Abdominal pain was mild, non-radiating with no known aggravating or relieving factors. She denies dysuria or urinary frequency. She endorsed that she engages in "rough sex intercourse" with her new sexual partner, who also experienced vomiting. She denied dyspareunia, vaginal bleeding or discharge. On examination, she was afebrile with suprapubic and right lower abdominal tenderness. Pelvic exam showed copious amounts of foul-smelling yellow-brown discharge. Labs showed leukocytosis, negative chlamydia, neisseria gonorrhoeae and trichomonas. Blood cultures grew GCS and urine culture showed no growth. CT abdomen and pelvis with contrast was negative for appendicitis and cholecystitis. The patient was evaluated by Gynecology, Urology, and Infectious Disease teams. IV ceftriaxone, metronidazole, and doxycycline were recommended. After three days, abdominal pain improved, vaginal discharge reduced, and leukocytosis and hematuria resolved. The patient was discharged on oral antibiotics. In conclusion, this case highlights the importance of thorough clinical evaluation, early recognition of bacteremia, and timely initiation of treatment to prevent complications such as septic shock.

Navigating Complexities: A Case of Multiple Abdominopelvic Vascular Compression Syndromes in Ehlers-Danlos Syndrome

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Introduction: Abdominopelvic vascular compression syndromes (VCS) occur when blood vessels are compressed by surrounding anatomical structures, leading to various clinical manifestations. These conditions include superior mesenteric artery syndrome (SMAS), nutcracker syn-

drome (NCS), May-Thurner syndrome (MTS), and median arcuate ligament syndrome (MALS). Ehlers-Danlos syndrome (EDS), a connective tissue disorder, has been linked to VCS due to its effects on vascular and soft tissue integrity. Methods: We report a case of a 26-year-old woman with EDS who presented with multiple VCS, including NCS, MTS, SMAS, and MALS. Her symptoms included severe abdominal pain, weight loss, postural hypotension, leg swelling, and hematuria. Diagnostic imaging confirmed vascular compressions. Despite conservative management, her condition deteriorated, necessitating gastrostomy tube placement for nutrition. Results: Her case highlights the complexity of managing multiple VCS in an EDS patient. Conservative interventions, including nutritional support and symptom management, were insufficient, necessitating surgical planning. However, fragmented medical follow-up impeded continuity of care. Discussion: The overlap of EDS and VCS complicates diagnosis and management. The inherent connective tissue fragility in EDS may predispose patients to multiple compressions, emphasizing the need for a multidisciplinary approach. Surgical correction of multiple VCS may offer better outcomes compared to isolated treatment. Conclusion: This case underscores the importance of early recognition, comprehensive vascular assessment, and coordinated care for patients with EDS and multiple VCS. Further research is needed to refine treatment strategies and improve outcomes for this complex patient population.

A Survey Evaluating Dermatology Awareness, Skincare Practices, Concerns and Consumer Preferences Among HBCU Undergraduate Students at Howard University

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Co-authors: Shanae' Henry, Cheri Frey

Background: Skin Scholars, a Howard University College of Medicine student-led initiative, empowers Washington D.C. youth through education on dermatological conditions affecting skin of color. The program addresses skin science, proper care, and pathways to dermatology careers. Recurring themes from past events include assumptions that skincare education is gender-specific, misconceptions about skincare for skin of color, and limited awareness of common skin conditions. Methods: Undergraduate students from Howard University were recruited and consented to participate in a 27 question survey administered electronically via SurveyMonkey in September 2024. Responses to each question were voluntary. Respondents received a bag of skincare products as compensation upon completion of the survey. Results: There were a total of 1133 participants, predominantly female (87.29%) and aged 18-20 years (85.66%). A significant portion identified as Black (96.29%). 94.33% acknowledged the necessity of daily sunscreen for people of color, and 96.89% recognized their susceptibility to skin cancer. Although 35.70% sought care from dermatologists, a significant portion did not seek care. 47.35% felt underrepresented in skincare advertising. Consumer choices emphasized strong preferences for brands with social impact (72.54%) and sustainability. Discussion: The data highlights a need

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for targeted interventions to address dermatologic misconceptions, promote care-seeking, and enhance representation. Leveraging social media for education and partnering with brands for diverse, accessible products can help bridge care gaps and improve skin health outcomes for college students of color.

Bullous Pemphigoid Outbreak After a Series of Multiple Vaccinations: A Case Report

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Background: Bullous pemphigoid (BP) is an autoimmune subepidermal blistering disorder caused by IgG-mediated destruction of hemidesmosomes, leading to dermoepidermal separation. While BP is classically associated with aging and comorbidities, external triggers such as medications and vaccinations have been implicated in disease onset. Case Presentation: A 63-year-old male with a history of hypertension and type II diabetes presented with a diffuse, pruritic, and painful bullous eruption, evolving four days prior to admission. He had no recent medication changes but reported receiving COVID-19 and pneumococcal vaccines approximately 1.5 weeks prior. Examination revealed tense bullae on the trunk, extremities, and buttocks with an erythematous background but no mucosal involvement. Laboratory findings included neutropenia, hyperglycemia, acute kidney injury, and elevated inflammatory markers. Skin biopsy with direct immunofluorescence confirmed BP. The patient was treated with Solumedrol 125 mg IV once daily for two days and a prednisone taper after the completion of the IV treatment. After stabilization of his condition, he was discharged from the hospital after four days. However, he was lost to outpatient follow-up. Discussion: This case highlights a possible association between BP onset and recent vaccination, particularly following the co-administration of pneumococcal and COVID-19 vaccines. Given the increasing number of BP cases reported after vaccinations, clinicians should consider vaccination history in new-onset blistering dermatoses, particularly in patients with predisposing factors such as hypertension and metabolic disorders. Further research is needed to clarify the immunological mechanisms and potential risks associated with vaccine-induced BP.

The Impact of Discordant Health Insurance Policies on Health Care Provider Reimbursement for Opioid Use Disorder Treatment

Presenter's Name: Ofoegbu Adaku Classification: Junior Faculty/ Lecturer/ Instructor School/College: Pharmacy *Presentation Type: Poster Presentation* Faculty Advisor: Earl Ettienne Faculty Advisor's email: adaku.ofoegbu1@howard.edu Co-authors: Oluwateti Omilana, Aaren Berkley, Danielle Hicks, Katrina Sookraj, Faith Ogini, Rakchhya Uprety, Rashidat Elesho, Earl Ettienne, Edwin Chapman

PURPOSE: Health insurance coverage provides access to care for patients and reimburses services delivered by health care providers (HCPs). Washington D.C. has one of the highest opioid overdose mortality rates in the nation, and increasing access to care may improve outcomes. The purpose of this research is to demonstrate the impact of differing evaluation of services rendered by two Medicaid MCOs on one patient with OUD on HCP reimbursement. METHODS: A chart review was conducted for a patient who was insured by Amerigroup and Amerihealth during different time periods. Patient demographic data, review of systems data, comprehensive medical exam data, withdrawal symptomatology, urine toxicology. date of service, Current Procedural Terminology (CPT) code, and insurance type are the independent variables and reimbursement amount is the outcome variable. RESULTS: The patient was seen by their HCP four (4) times while enrolled in Amerigroup from April 20, 2023 to August 10, 2023, and was seen six (6) times while enrolled in Amerihealth from February 7, 2024 to July 11, 2024. Although the patient received a similar level of care for all 10 visits, Amerigroup approved reimbursement for the four visits, while Amerihealth denied reimbursement for the six visits. The HCP lost \$1500 due to the denied Amerihealth claims. CONCLUSION: Differences in the evaluation of services rendered to the patient by Amerigroup and Amerihealth led to a financial loss to the HCP. Such reimbursement denials may discourage HCPs from treating patients with OUD, resulting in reduced access to care and a worsening epidemic.

Cost-Effectiveness of a Pharmacological Agent for the Prophylaxis of Delirium Among Adult ICU Patients

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OBJECTIVES: Delirium is highly prevalent among Intensive care unit (ICU) patients, resulting in increased healthcare costs, exacerbation of health outcomes, and higher mortality rates. There is currently no medication approved by the FDA for ICU delirium prevention. Ramelteon, an approved insomnia medication. , has been shown to prevent delirium in ICU and general acute ward patients. This study aims to evaluate the cost-effectiveness of Ramelteon 8mg as prophylactic therapy for delirium among ICU patients. METHODS: A decision tree comprising delirium incidence and mortality rate was constructed to compare the incremental cost per QALYs between Ramelteon and Placebo. Transition probabilities were obtained from a parent RCT study. Mortality rate and QALY values were obtained from previous studies with similar patient characteristics. The time horizon was set to the longest ICU stay among the RCT participants (2 weeks). The cost of delirium comprised medication expenses, staff wages, diagnostics, bed expenses, and other direct medical costs. RESULTS: The transition to delirium was higher in the

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placebo group. (24.4% vs 46.5%) The mean QALYs for the Ramelteon and placebo groups were 0.51976 and 0.512353 respectively. The expected cost for patients on Ramelteon was 1142.79 USD and 2064.08 USD for those on placebo. Ramelteon was dominant in the prevention of delirium. CONCLUSION: Ramelteon is cost-saving and cost-effective in preventing delirium and lowering the mortality rate among ICU patients compared to no treatment.

Vertebral Artery Stenosis

Presenter's Name: Oluwatowoju Ifeoluwa Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Finie Richardson Faculty Advisor's email: fkhunter@howard.edu

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Background: Vertebral artery stenosis (VAS) is a leading cause of posterior circulation ischemia, most commonly due to atherosclerotic changes, though other factors such as fibromuscular dysplasia, arterial calcification, or anatomical compression can contribute. VAS can lead to severe neurological deficits and stroke, making early diagnosis and treatment essential. Case Summary: An 80-year-old female with multiple comorbidities, including rheumatoid arthritis and Sjogren's disease, presented with dizziness, posterior headache, nausea, and vomiting. Imaging revealed moderate-to-severe stenosis of the vertebral arteries. She was diagnosed with vertebrobasilar insufficiency and was started on dual antiplatelet therapy (DAPT). Conclusion: This case highlights the importance of considering vertebral artery stenosis in elderly patients who present with unexplained dizziness and neurological symptoms. Early diagnosis, appropriate medical management, and vigilant follow-up are key to improving outcomes in such patients.

Outcomes in Guillain-Barré Syndrome (GBS) Between Black/African American and White/Caucasian Patients

Presenter's Name: Palmer Jeffrey Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Quinton Johnson, Somtochi Edeh, Amara Chike, Emmanuel Kerolle

Introduction: Guillain-Barré Syndrome (GBS) is an acute autoimmune neuropathy that can lead to paralysis, muscle weakness, sensory deficits, and mortality. Racial disparities in healthcare access and disease outcomes are well-documented, but their impact on GBS outcomes remains unclear. This study examines one-year outcomes (paralysis, numbness, muscle weakness, and mortality) in Black/African American and White/ Caucasian patients matched for comorbidities. Methods: A retrospective cohort study was conducted using propensity-matched Black/African American and White/Caucasian patients diagnosed with GBS. Matching criteria included comorbid conditions such as diabetes, obesity, pregnancy-related conditions, respiratory diseases, and circulatory diseases. Risk analysis, Kaplan-Meier survival analysis, and t-tests were performed to assess differences in outcomes between racial groups. Results: No statistically significant differences were found between Black and White patients for paralysis (p = 0.163), numbress (p = 0.849), muscle weakness (p = 0.333), or mortality (p = 0.694). Kaplan-Meier survival analysis also showed no significant difference in time-to-event for any outcome. Conclusion: This study suggests that, after adjusting for key comorbidities, racial background does not significantly influence one-year outcomes in GBS. These findings highlight the importance of equitable medical care and early intervention. Future research should explore healthcare access, treatment differences, and long-term functional recovery to further understand potential disparities.

Examining The Effectiveness of Church Participation on Black Americans Quality of life and Black Americans Perceptions of Occupational Therapy Addressing Spirituality and Church Participation

Presenter's Name: Parks Michael Classification: Professional Student School/College: Nursing & Allied Health Sciences *Presentation Type: Poster Presentation* Faculty Advisor: Joylynne Wills Faculty Advisor's email: jwills@howard.edu

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Historically, the church is a pillar for African Americans to come together for fellowship and worship. As one of the oldest and traditional institutions, the church has been a major contributor for helping African Americans to improve their overall health and quality of life. Studies have attested that churches have been successful in promoting and establishing positive health behaviors in African Americans (Brewer & Williams, 2019). Despite the church's successful contributions in promoting positive health behaviors, many healthcare professionals disregard and fail to implement spiritual practices and elements of spirituality associated with the church in patient care. Consequently, studies have strongly suggested that occupational therapy practitioners feel unprepared and uncomfortable discussing spiritual practices and spiritual needs of their patients (Metzger et al., 2024). As part of its holistic and client-centered framework, occupational therapy is well-equipped to address spiritual practices. Therefore, it is important for occupational therapists (OT) to acknowledge and implement skilled services to address the spiritual needs of their clients or patients. As a research design study, the objectives of this research study are to (1) examine if church participation is associated with higher quality of life outcomes for Black Americans and to (2) examine Black Americans perceptions and recommendations on how occupational therapy practitioners can better address church participation and spirituality needs of Black Americans.

Secondary Analysis of the Recover Study: Analyzing the Acceptability/ Adherence of Innovative Concussion Treatments

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This study focuses on the acceptability and adherence (A&A) of innovative concussion treatments in adolescents participating in the RECOVER Study, a clinical trial aimed at improving recovery protocols for sports-related concussions (SRCs). SRCs are a significant public health concern, often leading to behavioral, emotional, and cognitive disruptions. While various treatments exist, it is unclear whether patient adherence and acceptability differ across protocols, impacting recovery effectiveness. This quantitative study analyzes data from a randomized sample of adolescents (ages 12-17) assigned to one of four treatments: aerobic exercise (AE), screen-time restriction (STR), AE+STR, or stretching (control). Data collection included questionnaires, the Treatment Evaluation Inventory, accelerometers, and heart rate monitors to assess adherence and acceptability. 7-point Likert scales were used to evaluate differences across treatment groups. It was hypothesized that A&A would vary by treatment, with the stretching-only group showing the highest levels. However, results indicate that adolescents generally accept and adhere to all treatments, with no significant differences between groups. The findings of this study provide valuable insights into pediatric concussion recovery, helping clinicians recommend effective protocols that optimize adherence and improve long-term health outcomes.

Distressed Communities Index and Utilization of Total Hip Replacement in Maryland

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Background: Neighborhood socioeconomic status (nSES) is a critical determinant of healthcare access and outcomes. The Distressed Communities Index (DCI) is a composite measure of economic well-being, yet its association with orthopedic surgical utilization remains unclear. Objective: This study examines the relationship between DCI and the utilization of total hip replacement (THR) in Maryland, as well as its impact on post-surgical outcomes, including prolonged hospital stay and readmission rates. Methods: We conducted a retrospective analysis using the Maryland State Inpatient Database (2016–2020). Adults aged 18 to 90 years undergoing THR were included. Multiple imputation was employed to address missing data, and logistic regression models were used to assess the association between DCI and THR utilization, extended

hospital stay, and 30-day readmission rates. Models were adjusted for demographic and clinical covariates. Results: Among the 61,228 THR cases, the majority were White (74.2%) and female (58.9%), with a mean age of 72.5 \pm 14.2 years. Individuals from the most socioeconomically distressed neighborhoods were significantly less likely to undergo THR compared to those from more affluent areas (OR=0.89, 95% CI 0.86-0.92, p <0.001). Additionally, patients from highly distressed communities had a higher likelihood of experiencing prolonged hospital stays post-surgery (OR=1.13, 95% CI 1.04-1.23, p=0.04). However, no significant association was found between DCI and 30-day readmission rates following THR. Conclusion: Our findings suggest that socioeconomic disadvantage, as captured by the DCI, is associated with disparities in THR utilization and post-surgical hospital stay in Maryland.

Artificial Intelligence in Healthcare

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Background: Artificial intelligence (AI) integration into healthcare has accelerated rapidly, particularly in electronic health records (EHR), medical imaging diagnostics, and predictive analytics, yet the ethical implications remain understudied. Method: 20 peer-reviewed studies published from 2020-2024 were categorized using the Evidence Quality Hierarchy framework to systematically examine AI implementation benefits, challenges, and ethical considerations in healthcare. Results: the study revealed that AI integration improved medical imaging diagnostic accuracy in simulated settings and enhanced clinical decision support in EHR systems despite implementation challenges. Predictive analytics showed superior disease detection performance with large datasets but demonstrated limitations with smaller populations. Only two studies addressed ethical implications, exposing a critical research gap. Implication: while AI shows promise in enhancing healthcare delivery, particularly in diagnostic accuracy and data analysis, future research must incorporate ethical frameworks and examine real-world clinical applications. Cross-training healthcare workers in AI applications may facilitate more effective integration while maintaining ethical standards.

Demographic Variability Across Sites in the Beta-Agonist versus onabotulinumtoxinA Trial for Urgency Urinary Incontinence (BEST Trial) Presenter's Name: Simms Ava-gaye

Classification: Staff School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: Tatiana Sanses Faculty Advisor's email: tatiana.sanses@howard.edu

Co-authors: Angela Silva, Pamela Coleman, Tatiana Sanses, Ava-Gaye Simms, MBBS, Angela Silva, DBA, Pamela Coleman, MD, Tatiana Sanses, MD

ABSTRACTS

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Objectives: The BEST Trial is a multicenter pragmatic clinical trial comparing two treatments for urgency urinary incontinence (UUI): botulinum toxin A (onabotulinumtoxinA) injections and beta-3 agonists (mirabegron or vibegron). This study aimed to evaluate demographic differences among women across five sites: Women and Infants Hospital in Rhode Island (WIH), University of New Mexico (UNM), University of California, San Diego (UCSD), University of Alabama, Birmingham (UAB) and Howard University (HU). Methods: Women recruited from clinics and communities through advertisements and community engagement efforts began on October 1, 2022 and is ongoing until April 15, 2026. Baseline demographic data were collected and analyzed. Chisquare tests were performed to assess significant demographic differences between HU and other study sites with statistical significance defined as p < 0.05. Results: A total of 266 participants have been randomized to date. HU had a predominantly African American population (70% vs 18%, p < 0.01), higher rates of women covered by Medicaid (47% vs 25%, p <0.01) with a high school education or less (50% vs 27%, p = 0.01) compared to other sites. No significant difference was observed in the category of age ≥ 65 years across sites (p = 0.4). Conclusion: HU study population comprised mostly of African American women with Medicaid and lower levels of formal education compared to other sites.

Ghost in the Machine: A Rare Case of Factor 9 Hyperactivity that Indicates Unmet Need for Genetic Testing

Presenter's Name: Suresh Advith Classification: Post Doc/Resident/Fellow/Research Associate School/College: Medicine *Presentation Type: Oral Presentation* Faculty Advisor: James Taylor Faculty Advisor's email: james.taylor2@howard.edu

Co-authors: Kamdili Ogbutor, Nurupa Ramkissoon, Mirza Baig

Background: The clotting cascade is composed of over 20 proteins, the collective function of which is required in order to mediate appropriate hemostasis in response to vascular injury.1 Factor 9 is predisposed to inversion duplication, triplication, and deletion due to its location in the Xp22.31 region, a known homologous recombination hotspot. Objective: To investigate a case of factor 9 gene hyperactivity and discuss the need for increased gene sequencing evaluation in patients with strong family history of hypercoagulability. Methods and Results: The patient presented with 3 days of shortness of breath and a recent fall. The patient was noted to have left calf swelling, in the setting of known history of DVT. CTA confirmed that the patient had a large saddle pulmonary embolus and the patient was started on heparin drip. Following anticoagulation and supportive care, the patient improved. However, it was unclear why the patient had a history of recurrent DVT, CVA and strong family history of sudden death from thrombotic events. Patient underwent a pedigree, which revealed likely X-linked dominant pattern of inheritance and raised a high degree of suspicion for F9 duplication. Conclusion: Lab testing for F9 hyperactivity confirmed the patient had >150% function, which clinically considered to be elevated. The patient was informed of these findings and made aware of the need to obtain comprehensive genetic testing in order to confirm the nature of F9 duplication/triplication. Efforts to obtain genetic testing continue to be complicated by low availability, inaccessible pricing and processing times in excess of 6 months.

Uncovering the Hidden Cardiovascular Risks of Psoriasis: A Deep Dive into the Data

Presenter's Name: Ugarte Armando Classification: Professional Student School/College: Medicine Presentation Type: Poster Presentation Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@howard.edu

Co-authors: Nima Karodeh, Shanae' Henry, Jordan Young, Ugonna Nwannunu, Christian Wong, Jamon Thomas, Ahmad Mohammed, Samrawit Zinabu, Miriam Michael

Background: Psoriasis, a chronic inflammatory skin condition, is linked to an increased risk of cardiovascular diseases due to shared inflammatory pathways. However, the direct impact of psoriasis on cardiovascular risk factors remains underexplored. This study investigates the relationship between psoriasis and cardiovascular events, including myocardial infarction (MI), stroke, heart failure, arrhythmias, and thromboembolic diseases.Methods: A nationwide retrospective cohort study was conducted using de-identified electronic health records (EHRs) from 93 healthcare organizations over 20 years. Two cohorts were analyzed: psoriasis patients (Cohort 1) and non-psoriasis controls (Cohort 2), aged 18-60 years. Propensity score matching (PSM) balanced baseline characteristics, and the primary outcome was the occurrence of cardiovascular events within 10 years. Survival analyses and risk ratios (RR) were used to assess the relationship between psoriasis and cardiovascular outcomes. Results: After matching, each cohort included 120,527 patients. Psoriasis patients had a significantly higher risk of cardiovascular outcomes, with a 28% increased risk of acute MI (RR: 1.28), 23% higher stroke risk (RR: 1.23), 40% higher heart failure risk (RR: 1.40), 60% higher arrhythmia risk (RR: 1.60), and 46% higher thromboembolism risk (RR: 1.46). Psoriasis patients also had higher risks of ischemic heart disease and transient ischemic attacks. Survival analyses showed lower survival probabilities for psoriasis patients across most outcomes. Conclusion: Psoriasis is significantly associated with an increased risk of cardiovascular events, underscoring the need for proactive cardiovascular risk management in psoriasis patients.

Lobular Capillary Hemangioma of the Nasal Septum During Pregnancy: A Case Report

Presenter's Name: Vuillier Jonathan Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Adedoyin Kalejaiye, MD

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ABSTRACTS

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Introduction: Lobular capillary hemangioma (LCH), or pyogenic granuloma, is a benign, rapidly growing vascular tumor that is most commonly found in the oral cavity but can rarely develop in the nasal cavity. It is hypothesized that hormonal fluctuations, particularly elevated estrogen levels during pregnancy, contribute to its pathogenesis. LCH frequently occurs in the second or third trimester, presenting with epistaxis and nasal obstruction, mimicking neoplastic or granulomatous processes. Case Report: A 32-year-old gravida 1 para 0 woman at 7 months gestation presented with recurrent severe epistaxis and progressive right-sided nasal obstruction. She reported a rapidly enlarging nasal mass. Examination revealed a 2 cm pedunculated, erythematous lesion on the right anterior nasal septum, nearly occluding the nasal passage. Nasal endoscopy confirmed a highly vascular lesion with active epistaxis. The patient denied trauma but was taking aspirin 81 mg daily. Due to significant symptoms, surgical excision under local anesthesia was performed. The lesion was resected at the stalk using bipolar cautery and adequate hemostasis was achieved. Histopathology confirmed LCH. Conclusion:

Nasal LCH is a rare but clinically relevant entity that should be considered in the differential diagnosis of pregnant patients presenting with epistaxis and a nasal mass. While it may regress postpartum, symptomatic cases may warrant intervention due to severe epistaxis and obstruction. Surgical excision under local anesthesia provides a safe and effective treatment, with minimal recurrence risk. Early recognition is essential to prevent complications and ensure optimal maternal and fetal outcomes. Keywords: Lobular capillary hemangioma, pregnancy, nasal septum, epistaxis, pyogenic granuloma

Neuroprotective effects of CCBs on Parkinson's Disease development: Population cohort study

Presenter's Name: Waghmare Shivani Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Dr. Miriam Michael Faculty Advisor's email: m michael@howard.edu

Co-authors:

Background and Purpose: Parkinson's disease (PD) is the second most common neurodegenerative disorder. There have been studies showing that Hypertension (HTN) has an increased risk for PD as well as numerous studies published which show an overall neuro-protective effect on the prevention of PD. Although this correlation is established, the potential role of antihypertensives, especially Calcium channel blockers (CCB), in preventing PD has not been studied extensively in the US with a diverse set of racial groups. Methods: This study employed a retrospective cohort study using the TriNetX database, investigating the incidence of Parkinson's disease in hypertensive patients from a wide variety of racial groups prescribed calcium channel blockers compared to those receiving beta-blockers. Results: In this large cohort study, 364.898 patients were included in each group for the final analysis. The analysis revealed that the risk of developing Parkinson's disease (PD) in the CCB group was 0.003, while in the BB group, it was 0.004%. The risk difference between the CCB and BB groups was -0.001 (95% CI: -0.001, -0.001). This indicates a statistical significance of an overall protective effect of CCBs on the development of PD. Conclusion: These results suggest that both CCBs provide a slight protective effect against developing PD. Further research may be warranted to explore underlying mechanisms and validate these findings.

A Case Report of Oral Abscesses in the Context of Sickle Cell Disease: Concerns for Ludwig Angina and Lemierre Syndrome

Presenter's Name: Watts Jerome Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: James Taylor Faculty Advisor's email: james.taylor2@Howard.edu

Co-authors: Ayana Crawl-Bey, Advith Suresh

Sickle Cell Disease (SCD) is an inherited and potentially debilitating hematopathology, affecting the shapes of red blood cells. Acutely, it is typically characterized by vaso-occlusive events, sickle cell pain crises, acute chest syndrome, stroke, organ infarction, avascular necrosis, and infection. This case report presents a clinical course of a 52-year-old African American female patient with SCD who had oral sequelae of sickle cell disease, specifically multiple odontogenic abscesses with clinically significant concern for Ludwig Angina and Lemierre Syndrome. The patient's medical course was handled successfully with the appropriate caution and care. This case underscores the importance of early recognition and multidisciplinary approach in the management of patients with SCD to optimize patient outcomes and quality of life, specifically dental and oral care. Further research is needed to improve upon our understanding and management of such presentations and disorders, educating and supporting patients to receive adequate and appropriate oral and medical health.

Cardiotoxicity of Immune Checkpoint Inhibitors: Risks and Clinical Implications Presenter's Name: Wong Christian

Classification: Graduate Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Advaith Suresh, Samrawit Zinabu, Shahnoza Dusmatova, Krushi Suresh, Girma Ayele, Miriam Michael

Background: Immune checkpoint inhibitors (ICIs) have revolutionized cancer treatment by enhancing the immune system's ability to target malignancies. These agents, which block inhibitory checkpoint proteins such as PD-1 and PD-L1, promote antitumor immunity but have been associated with immune-related adverse events (irAEs), including cardiovascular complications. This study investigates the incidence of cardiovascular complications among patients prescribed ICIs compared to

a control group. Methods: A retrospective cohort study was conducted using de-identified electronic health records (EHRs) from the TriNetX database. Patients diagnosed with malignancies and treated with ICIs between January 1, 2022, and December 31, 2022, were compared to a matched cohort of cancer patients not receiving ICIs. Cardiovascular outcomes, including myocarditis, acute myocardial infarction (MI), pericarditis, cardiomyopathy, and heart failure, were assessed over a one-year follow-up period. Results: Propensity score matching ensured balanced baseline characteristics between the cohorts (5,163 patients per group). The ICI cohort exhibited a significantly higher incidence of myocarditis (1.0% vs. 0.2%, p < 0.001), acute MI (3.6% vs. 2.1%, p < 0.001), cardiomyopathy (3.6% vs. 2.4%, p < 0.001), and heart failure (8.0% vs. 5.8%, p < 0.001) compared to controls. Pericarditis incidence was similar between groups (0.3%, p = 0.465). Kaplan-Meier survival analysis indicated reduced survival probabilities in the ICI cohort. Conclusion: These findings underscore the need for vigilant cardiovascular monitoring in patients undergoing ICI therapy. Further studies are warranted to elucidate mechanisms and optimize risk mitigation strategies for ICI-associated cardiovascular toxicity.

When Scars Come Alive: Spontaneous Keloid Eruption in an African American Woman on Dialysis

Presenter's Name: Young Jordan Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Nima Karodeh, Shanae' Henry, Samrawit Zinabu, Ugonna Nwannunu, Ahmad Mohammed

Background: Keloids are benign fibrous tissue overgrowths resulting from an abnormal wound-healing response. They typically develop within three months of trauma, surgery, burns, or inflammation, though some may emerge up to a year later. These lesions often present as firm, pruritic, and painful nodules or plaques. Keloid pathogenesis involves genetic and environmental factors, with individuals of darker skin tones-especially African Americans-having a significantly higher risk (15 times more likely). While keloids usually arise from previous injury sites, spontaneous keloid formation in the absence of trauma is rare and has been linked to conditions such as nephrogenic systemic fibrosis (NSF). Methods: We present a case of a 74-year-old African American woman with a long-standing history of rheumatoid arthritis and chronic kidney failure due to amyloidosis, currently undergoing hemodialysis. She developed spontaneous keloids at old scar sites and dialysis access points without recent trauma or tight clothing. Three months prior, she had undergone an MRI with gadolinium contrast. Examination revealed mildly tender, pinkish-red, hyperpigmented plaques with irregular borders at the left elbow flexure, left upper chest, and right upper abdomen. Results: The firm, pruritic, and painful keloid-like lesions confirmed spontaneous keloid formation. Given her history of kidney failure and gadolinium exposure, NSF was considered, as it similarly presents with excessive fibrosis and keloid-like changes. Conclusion: This case suggests a potential link between NSF and spontaneous keloid formation in dialysis patients. The overlap in fibrotic mechanisms highlights the need for increased awareness, particularly after gadolinium exposure.

Exploring GLP-1 Agonists as a Therapeutic Option for Hidradenitis Suppurativa: A Retrospective Cohort Analysis **corrected final submission**

Presenter's Name: Young Jordan Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m_michael@howard.edu

Co-authors: Nima Karodeh, Shanae Henry, Ugonna Nwannunu, Samrawit Zinabu

Hidradenitis Suppurativa (HS) is a chronic inflammatory skin disorder marked by painful nodules, abscesses and scarring. Treatment remains challenging, with suboptimal outcomes despite available therapies. Glucagon-like peptide-1 (GLP-1) receptor agonists, widely used for type II diabetes and obesity, exhibit anti-inflammatory properties and may offer therapeutic benefits in HS. We aim to perform a retrospective study exploring the potential of GLP-1 analogs in treating HS. Methods: A retrospective cohort study was conducted using the TriNetX database. HS patients prescribed GLP-1 agonists (Cohort 1) were compared to those without such prescriptions (Cohort 2). Cohorts were matched 1:1 by age, gender, race, overweight, obesity, and diabetes. Primary outcomes included emergency visits and incision and drainage (I&D) procedures within one year. Statistical analysis employed propensity score matching, risk ratios, and Kaplan-Meier survival estimates. Results: Matched cohorts included 19,030 patients each. The GLP-1 group had fewer emergency visits (30.5%) compared to controls (36.9%), with a risk difference of -6.4% (95% CI: -7.4% to -5.5%, p<0.001). The risk of I&D procedures was lower in the GLP-1 group (6.6% vs. 9.6%), with a risk difference of -2.9% (95% CI: -3.5% to -2.4%, p<0.001). Hazard ratios and odds ratios confirmed significant reductions in both outcomes. Conclusion: GLP-1 agonists demonstrate a protective effect against HS-related complications, likely due to their anti-inflammatory and weight-reduction properties. These findings suggest potential for GLP-1 agonists as adjunctive HS therapies, warranting further investigation.

Exploring GLP-1 Agonists as a Therapeutic Option for Hidradenitis Suppurativa: A Retrospective Cohort Analysis

Presenter's Name: Young Jordan Classification: Professional Student School/College: Medicine *Presentation Type: Poster Presentation* Faculty Advisor: Miriam Michael Faculty Advisor's email: m michael@howard.edu

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ABSTRACTS

Background: Hidradenitis Suppurativa (HS) is a chronic inflammatory skin disorder marked by painful nodules, abscesses and scarring. Treatment remains challenging, with suboptimal outcomes despite available therapies. Glucagon-like peptide-1 (GLP-1) receptor agonists, widely used for type II diabetes and obesity, exhibit anti-inflammatory properties and may offer therapeutic benefits in HS. We aim to perform a retrospective study exploring the potential of GLP-1 analogs in treating HS. Methods: Data were obtained from the TriNetX global health research network, encompassing records from January 2004 to December 2024. After excluding patients with a prior history of depressive disorders and applying propensity score matching, two balanced cohorts of 6,741 patients each were formed: one cohort received ketamine during cesarean delivery, and the other did not. The study employed risk analysis, Kaplan-Meier survival analysis, and hazard ratio estimation over a one-month, six-month, and one year follow-up period. Results: In the ketamine group, 8.0% of women developed PPD compared to 2.6% in the control group, resulting in a risk difference of 5.3%, a risk ratio of 3.02, and an odds ratio of 3.19. Kaplan-Meier analysis further demonstrated a lower probability of remaining PPD-free in the ketamine group (90.78% versus 96.60% at six months), with a hazard ratio of 2.87.

Conclusion: Ketamine use during cesarean delivery appears to elevate PPD risk, warranting cautious use, particularly in patients with predisposing risk factors. Future research is necessary to refine dosing strategies and explore combination therapies to improve long-term postpartum mental health outcomes. These findings underscore the urgent need for cautious clinical application.

ABSTRACTS

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