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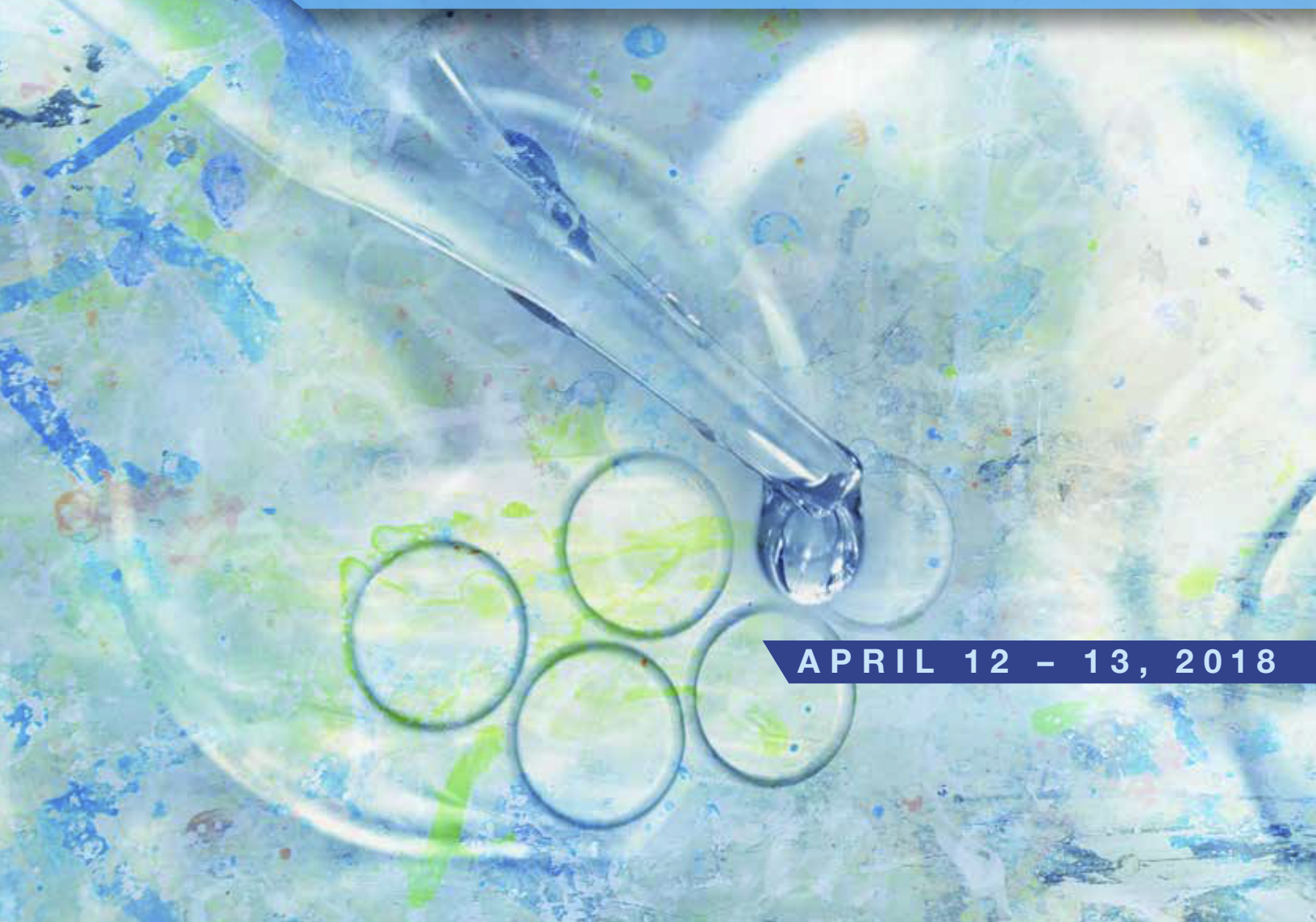
# RESEARCH SYMPOSIUM

# ABSTRACT BOOK



APRIL 12 – 13, 2018

HOWARD UNIVERSITY

# RESEARCH SYMPOSIUM

# *Abstract Book*

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# T A B L E O F C O N T E N T S

# Biological & Biomedical Sciences

**The Race to Find TayK47**

Presenter's Name: Riham Abbas
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney Robinson, Swagota Roy, Tori Guillory

**Background**: The SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) program is an international program hosted by Howard Hughes Medical Institute at the University of Pittsburg. The program focuses on the exploration of Bacteriophages in order to further understand their mechanisms. Bacteriophages are viruses that infect a bacteria host and take over its mechanics and reproduces inside of it. These phages then either undergo the lytic or lysogenic cycle. Bacteriophages can be used by researchers in various areas of the medical field. **Methodology**: The phage studied in this study was locate in the Valley at Howard University more specifically at 38° 55'19'' N 77° 1'12'' W in a flower bed. An enrichment was then performed on the sample to amplify the amount of phages present. Following that multiple rounds of purification and isolation were formed in order to single out a single morphology and ultimately a single phage. After the phage was singled out, its DNA was extracted and analyzed. **Results**: The phage discovered in this study is called TayK47 and created small clear plaques possibly making it a lyric phage. It had a titer of 3.3 x 10^10 pfu/mL. **Conclusion**: Through further experimentation it was proven that the phage was indeed a lytic phages and also capable of creating lysogens.

**Comparative analysis of PSA, T2:ERG and PCA3 screening markers among African American Men for Prostate Cancer Risk**

Presenter's Name: Heran Abiye
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Tamaro Hudson
Faculty Advisor's email: t_hudson@howard.edu

The current gold standard for screening prostate cancer risk is serum PSA testing followed by a DRE. PSA has been shown to be inconsistent leading to over and under-treatment of prostate cancer. Recent studies of a new biomarker, PCA3 has been proven more sensitive and less invasive. Our study examines PCA3 values to determine improvement in screening for prostate cancer risk among African American men. Our participants were 197 African American men aged 35-85, screened at the Men Take Ten Screening Program at Howard University who were recruited for the study. Participants' medical history, digital rectal exam results, blood and urine samples were collected. The urine was sent to HOLOGIC for analysis. We performed univariate, t-test analysis, ANOVA, and frequency analysis to identify relationships across these items. There were 168 men who had normal DREs, 51% of them had negative PCA3 values, while 49% had positive PCA3 values, denoting abnormality. The 52% of the men with normal DRE scores had T2:ERG scores above 8, implying an abnormal result despite the results of the rectal exam. Similarly, 55% of the men with mildly enlarged prostates on rectal exam had T2:ERG score above 8. Overall, the regression analysis demonstrated that compared with PSA, T2:ERG had significant association with DRE. However, PCA3 in comparison with PSA showed no significant association with the DRE. Further studies are needed with biopsies from participants with abnormal DREs to make a definitive classification of risk.

**Ceruloplasmin, Orosomucoid and Hepatocyte Growth Factor-like are Associated with Progressive Chronic Kidney Disease Stage in Patients with Sickle Cell Anemia**

Presenter's Name: Nowah Afangbedji
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@Howard.edu

Coauthors: Simran Soni, Gillian Lee, Santosh L. Saraf, Namita Kumari, Victor R. Gordeuk, Sergei Nekhai, Marina Jerebtsova

Sickle-cell disease (SCD) is a hereditary disorder that affects millions of people worldwide, primarily those of African descent. The polymerization of SCD hemoglobin leads to the hemolysis of red blood cells (RBC), vaso-occlusion and organ damage. Advances in the management of SCD have led to the increase in life expectancy with a concomitant increase in the prevalence of chronic disease which is three-fold higher among SCD patients. Because the universal urine concentration defects in the SCD patients, current clinical markers (proteinuria and albuminuria) do not detect ongoing renal damage until it is severe. Thus, the discovery of novel noninvasive biomarkers of early stages of CKD is needed. The objective of this study was to assess ceruloplasmin (CP), orosomucoid (ORM) and hepatocyte growth factor-like (HGFL) protein levels in the urine of SCD patients with different stages of chronic kidney disease. Spot urine samples were collected from fifty-four SCD patients with different stages of CKD (stage 0-5) at the University of Illinois at Chicago (UIC) and nineteen healthy participants at Howard University. Using mass spectrometry, ELISA and Western blot, Urinary concentrations of CP, ORO, HGFL and creatinine (CRE) were determined. CP/CRE and ORO/CRE ratios demonstrated a positive correlation with CKD stages and hemoglobinuria, a recently identified marker of CKD progression. In contrast, HGFL positively correlated with estimated glomerular filtration rate (eGFR) and negatively correlated with CKD stages. In Conclusion, CP, ORM, and HGFL represent candidate non-invasive biomarkers of risk for CKD in SCD patients that reflect different pathological processes in SCD patients.

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**HPV, HIV and male gender as major risk factors for anal neoplastic transformation in African Americans**

Presenter's Name: Ali Afsari
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Hassan Ashktorab
Faculty Advisor's email: hashktorab@howard.edu

Coauthors: Nazli Atefi, Reza Hashemipour, Babak Shokrani, Edward Lee, Seyed Mehdi Nouraie, Tammy Naab, Abbas Muneer, Zaki Sherif, Nicole Retland, Adeyinka Laiyemo, Hassan Brim

**Background**: Human Papilloma Virus (HPV) is the most common sexually transmitted infectious agent. The incidence HPV-related anal cancers increased among HIV infected people. **Aim:** To assess risk factors of anal lesions among African Americans in an inner city Hospital. **Methods**: We reviewed medical records of 370 African Americans with anal lesions at Howard University Hospital from Jan. 2007 to Dec. 2015. Demographic, clinical and pathological data including; HPV, HIV, HCV (hepatitis C virus), diabetes mellitus (DM), hypertension (HTN) and body mass index (BMI) were collected. Statistical analysis was performed using Chi-square and Student's t-test. **Results**: 276 (75%) patients were male, with the median age of 44 years and BMI of 25.8. The frequency of condyloma, high-grade dysplasia, squamous cell carcinoma (SCC) and adenocarcinoma was 191 (52%), 26 (7%), 31 (8%) and 8 (2%), respectively. The prevalence of HPV, HIV, and HCV was 231 (68%), 147 (43%) and 42 (12%), respectively. HPV and HIV were risk factors for condyloma and dysplasia.

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**HIV-1 Restriction Factors TRIM, APOBEC, MX2 and RSAD2 Contribute to HIV-1 Inhibition in Sickle Cell Disease**

Presenter's Name: Asrar Ahmad
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai

Faculty Advisor's email: snekhai@howard.edu

Coauthors: Namita Kumari, Miguel Mulder, Songping Wang, Sharmeen Diaz, Douglas Nixon, Sergei Nekhai

We recently showed inhibition of ex vivo HIV-1 infection in peripheral blood mononuclear cells (PBMCs) from patient with Sickle Cell Disease (SCD). This inhibition was mediated partly by anti-viral restriction factor SAMHD1 activated by the expression of iron export protein, ferroportin. Here we analyzed additional HIV-1 restriction factors in SCD PBMCs and further established the role of ferroportin in HIV-1 inhibition. Over expression of ferroportin in cultured cells induced expression of SAMHD1 and HO-1, both of which inhibits HIV-1. To identify additional factors, we used a customized array that measures expression of 43 known anti-HIV-1 restriction factors. We detected increased expression of APOBEC3A, APOBEC3C, TRIM5α, TRIM22, MX2 and RSAD2 in SCD PBMCs comparing to normal controls. Expression of these factors was also confirmed by quantitative real time PCR. Knockdowns by shRNA of APOBEC3C and TRIM5α, but not APOBEC3A or TRIM22 induced HIV-1 replication. We also mimicked SCD conditions by treating PBMCs from healthy donors with hemin and iron chelators. APOBEC3A, RASD2 and MX2 mRNAs were overexpressed in PBMCs treated with hemin, whereas TRIM5α expression was stimulated in PBMC treated with either hemin or iron chelators. In Conclusion, APOBEC3A, APOBEC3C, TRIM5α, TRIM22, MX2 and RSAD2 may additionally contribute to HIV-1 restriction in SCD. Expression of these factors are likely to be modulated by hemolysis and intracellular iron levels, similar to the previously shown upregulation of SAMHD1 and HO-1. Our findings further point to the hemolysis and deregulated iron metabolism as major contributors of HIV-1 restriction in the conditions of SCD.

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**Ecomorphotypes In The Family Phocidae (True Seals) Supported by Evidence From Other Terrestrial and Marine Vertebrates**

Presenter's Name: Ashley Alexander
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Sulman Rahmat
Faculty Advisor's email: sulman.rahmat@howard.edu

Coauthors: Irina Koretsky, Sulman Rahmat

The Family Phocidae (true seals) has four subfamilies: three extant (Cystophorinae, Monachinae, Phocinae) and one extinct (Devinophocinae). Each subfamily is classified based on distinguished morphological characters, mainly from the skull, with other characters separating them into ecomorphological groups. In the Family Phocidae, ecomorphs of only representatives of the subfamily Phocinae have been demonstrated. This study will compare morphological characters of the other three subfamilies with those already described in Phocinae. Remains of fossil seals fall into analogous morphological and ecological groups. This research will expand the already known ecomorphs of representatives of phocine seals to the other subfamilies. In each subfamily, (Cystophorinae, Devinophocinae, Monachinae) characters do not fit precisely into the groups already created for members of subfamily Phocinae. The ecology of fossil seals will be extrapolated from what is known in modern seals, when they are within same ecomorph group. Fossil seals have natural morphological units similar to those of Recent species, providing a rationale for associating the many dissociated fossil elements. In order for fossil seals to be placed into ecomorphological groups, three of the most commonly found bones are used for examination: the mandible, humerus, and femur. Specific ecological distinctions (diving depths, environment, diet, speed, size, and body type) of extant seals are examined to correlate to analogous fossil seals. Placing seals into specific ecomorphological groups does not use alpha taxonomy, instead combining morphological and ecological characters. Ecomorphs are also found in other vertebrates, including but not limited to: rabbits, anole lizards, and finches.

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**Understanding the Development, Variations and Defects of the Muscular System in Normal Human Embryos, Fetuses and Newborns**

Presenter's Name: Malak Alghamdi
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Rui Diogo
Faculty Advisor's email: rui.diogo@howard.edu

Coauthors: Janine Ziermann, Rui Diogo

There has been a limited knowledge on the development of the human muscular system, as most textbooks and atlases describe in detail the development of the skeletal system without mentioning the muscular system. Moreover, within the few published works on the ontogeny of muscles, most of them were restricted to a single muscle, muscle group, region, or at a specific period of time (e.g. before 7 weeks of gestation). This makes the study of muscle anomalies and variations very difficult due to lack of good comparative models. We recently dissected 17 normal human individuals between 7-39 weeks of development and compared our results with the scarce literature on the normal development of the muscular system. Importantly, in the individuals dissected, there was an indirect relationship between the ages of the fetuses and the number of seemingly fused (i.e. undifferentiated) muscles. This would contradict what is often described in the literature that by end of week 7 of gestation, all muscles resemble those of the adults (i.e. differentiated). In addition, the number of the variations per upper limbs dissected is significantly higher than the number of variations per lower limb studied, a pattern that is similar to that often reported in the literature about birth defects, which support Alberch's (1989) ill-named "logic of monsters" theory. Furthermore, we present, for the first time, detailed data about the development head and limbs muscles from late embryonic stages to newborn configuration, and discuss the broader implications within a broad comparative and developmental framework.

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**Inhibition of Extreme Drug-Resistance Acinetobacter baumannii by Isolates of Lactobacillus rhamnosus and paracasei**

Presenter's Name: Rachelle Allen-McFarlane
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Broderick Eribo
Faculty Advisor's email: beribo@howard.edu

Coauthors: Garima bansal, Selina Anosike, Adrian Allen, Broderick Eribo

We previously reported that Lactobacillus parafarraginis (KU495926) inhibited the growth of 14 multidrug-resistant and extended spectrum β-lactamase Gram-negative bacteria. In this study, we report 5 other strains of Lactobacillus; two strains of Lactobacillus rhamnosus and three strains of Lactobacillus paracasei subsp. tolerans that exhibited antimicrobial activity against an extreme drug-resistant (XDR) Acinetobacter baumannii from clinical source. The antimicrobial activity was observed using the cultured supernatant of the lactobacilli in well-diffusion assays and flow cytometric analyses. Flow cytometry detected up to 4-fold reduction in the number of live XDR A. baumannii when compared to the control, de Man Rogosa Sharpe broth following 24h of incubation at 370C. Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) of the cultured supernatant showed varying numbers of protein bands suggesting the inhibitory agent(s) maybe bacteriocins. Bacteriocins are ribosomally synthesized, antimicrobial peptides, polypeptides or protein complexes produced by bacteria and usually inhibits the growth of closely related strains. **Methods:**The lactobacilli were characterized by genotypic and phenotypic methods. Their identities were determined by 16S rRNA gene sequences and phenotypic characterization by API 50 CHL system. **Results:** They are Gram-positive, contain no plasmids, oxidase and catalase-negative, non-motile rods capable of utilizing esculin and D-fructose. These results bear much significance considering the need to find viable alternatives to the currently used antibiotics.

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**Role of E4orf3 in Cell Cycle Progression, Immune Response and Cell Death**

Presenter's Name: Nujud Almuzaini
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Thomas
Faculty Advisor's email: michael.thomas1@howard.edu

Coauthors: Michael Thomas

Adenovirus (Ad) with deletion in early region 1B55K (ΔE1B55K), like dl1520/ONYX-015 and H101, selectively kill tumor cells in the clinic. Disruption of the gene encoding the viral early region 4 (E4) open reading frame 3 (E4orf3). Results in a vector with enhanced oncolytic ability by an unknown mechanism. E4orf3 disrupts the function of the MRN complex by redistributing NBS1. Cells with functional NBS1 show normal cell cycle profile, while those with no NBS1 show accumulation in G2/M and a large fraction with DNA content greater than G2/M (DNA >4n). It may be that

disruption of NBS1 by E4orf3 supports the accumulation of cellular DNA >4n. Using flow cytometry, we show that cells with E4orf3 have higher cellular DNA>4n than those without E4orf3. In experiments using immunofluorescence microscopy, we show that viruses with E4orf3 re-localize NBS1 away from viral replication centers. Viruses lacking E4orf3 do not. In addition to cell cycle progression, NBS1 is reported to modulate immune responses. We evaluated the cellular distribution of nuclear factor-kB (NF-kB) as it is involved in both DNA damage and immune responses. This factor was enhanced with the presence of E4orf1 showing the potential for redundancies in Ad-initiated survival signals. Thus, we hypothesize that in Ad-infected cells E4orf3 disruption of NBS1 overrides cell cycle checkpoint, modulates immune responses, and allow infected cells to survive. With this study we seek an improved understanding of signals initiated by E4orf3. This knowledge will enable us to design and develop treatment options where currently there are none.

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**Identifying Single Nucleotide Polymorphism in Vitamin D Receptor (VDR) gene that is relevant to Breast Cancer Risk in African American(AA) Women**

Presenter's Name: Abrar Aloufi
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Muneer Abbas
Faculty Advisor's email: m_abbas@howard.edu

Coauthors: Georgia Dunston, Yasmin Kanaan, Areej Alyahyawi, Afnan Shakori, Nicole Retland, Muneer Abbas

**Introduction**: Breast cancer (Bca) is a heterogeneous disease, and has more prevalence in African American (AA) population. The incidence of Bca in the united states shows a similar number of white and AA females, but, the mortality is higher in AA. Vitamin D Receptor(VDR) gene was found to be highly polymorphic with more than 618 reported variants. Several studies have revealed an association between single nucleotide polymorphisms (SNPs) in the VDR gene and Bca risk in European and Asian populations. The goals of this research is to identify and select SNPs' in VDR with greater Minor Allele frequency (MAF) in AA when compared to European-American. MAF comparison will help to select SNPs that could be implicated in BCa of AA females. **Methods**: 1000 Genome project data (http://www.internationalgenome.org/)" was used to identify and compare MAFs in AA to European descents. National Center for Biotechnology Information (https://www.ncbi.nlm.nih.gov/gene and University of California Santa Cruz (http://genome.ucsc.edu/index.html) were used to identify the SNPs location. **Results** and Discussion: 2750 SNPs in the VDR gene were identified using the 100 genome available databases. The location of the SNPs in the genes was determined using National Center for Biotechnology Information. In this stud we selected: Two SNPs found in exonic region that resulted in non-synonymous (missense), rs731236, rs7975232, and seven SNPs were in splice junctions, promoter and 3′ untranslated regions (UTRs) , rs1544410, rs3782905 rs2239185, rs2289179, rs10783218, rs4516035 and rs2853563. The future plan is to genotype these SNPs and study their associations with Bca in AA women.

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**miRNA 144 and miRNA 451 as Biomarkers of Human Red Blood Cell Aging in African American Adults.**

Presenter's Name: Ghadi Alsharif
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Gambhir Kanwal
Faculty Advisor's email: Kgambhir@howard.edu

Coauthors: Ibrahim Jafri, Ghadi Alsharif, Nesreen Haghamed, Gail Nunlee-Bland, and Kanwal Gambhir (Department of Genetics and Human Genetics and Department of Medicine.
College of Medicine)

MiRNAs are the novel critical regulators of cell proliferation, human diseases including diabetes, and cancer. The aim of this study is to evaluate circulating erythrocytes (E,RBC) miRNAs- mi-144 and miR-451 expressions in African Americans (AA) as potential biomarker of cell aging. The blood samples were collected and miRNAs were isolated from the control group (18-80 year old) (n=9) after a period of 8-12 hours fasting (IRB13-MED-73). Taqman primers were used for detection and quantification of miRNAs (miR-144, and miR-541). E were further subfractionated into young (y) (1.07-1.09 g/ml), mid (m) (1.09- 1.11 g/ml), and old (o) (1.11-1.12 g/ml) age by using discontinued Percoll gradient (35%, 40%, 45%, 50%, 55%, 65%, 80%, and 100%). Total

RNA, including miRNA, was isolated from E using miRNA Isolation kit. The miRNA 451 and 144 were expressed as 1:1.74:3.1 and 1:1.6:1.82 in y, m, and o respectively. These results clearly showed that the o cells significantly expressed more miRNA than y and m. Further, there was a minimum expression of 144 in these cells. These studies clearly indicate that miRNAs can be used as biomarkers of RBC aging.

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**Single nucleotide polymorphism in the serotonin receptor 2A gene and its association with C-reactive protein in African Americans**

Presenter's Name: Areej Alyahyawi
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Muneer Abbas
Faculty Advisor's email: m_abbas@howard.edu

Coauthors: Abrar Alofi, Afnana Shakoori, Nicole Retland, Georgia Dunston, Frough Saadatmand, Muneer Abbas

**Background**: Serotonin is a monoamine neurotransmitter that is synthesis mainly in the brain and intestine and plays a crucial role in regulation of several body and psychological functions including immune system regulation through binding to 7 groups of receptors. One of them is serotonin receptor 2A (HTR2A). Studies showed that the presence of single nucleotide polymorphism (SNP) in some of these serotonin receptors may associate with immune system dysregulation. Accordingly, we hypothesized that the presence of specific SNP in 5HT2A receptor may modulate serotonin binding to immune cells and result in a possible higher risk of immune system dysregulation. This result in significant change in the C-reactive protein the biomarker for inflammation. **Methods**: 603 young African American male and female subjects between 18-25 years were recruited. Saliva samples were obtained followed by genotyping for 4 SNPs in 5HT2A which are rs6304, rs6310, rs6312 and rs4942578 using TaqMan. **Result:** Genotype frequency for each SNP were determined using SNPSTAT software. We found that in rs6310 female subjects with C/C genotype is associated with lower level of CRP. Haplotype association analysis showed that TTTG haplotype was also associated with a lower level of CRP. **Conclusion**: Our result showed a possible association between SNPs in the serotonin receptor 2A gene and CRP levels. These results indicate that SNPs and haplotypes in the 5HT2A gene are associated with lower levels of CRP, and can be used to study the impact of these SNPs on the immune system in cell cultures to confirm these outcomes.

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**Protein Phosphatase-1 as a Target for Antiviral Small Molecules against Ebola and Marburg Infections**

Presenter's Name: Tatiana Ammosova
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@howard.edu

Coauthors: Xionhao Lin, Colette Pietzsch, Andrey Ivanov, Palaniappan Ramanathan, Bersabeh Tigabu, Namita Kumari, Alexander Bukreyev, Sergei Nekhai

The recent largest Ebola virus (EBOV) outbreak in West Africa underscored the need for novel antiviral therapeutics. We developed a novel approach targeting host protein phosphatase-1 which we tested against EBOV and Marburg virus (MARV). The ribonucleoprotein complex of filoviruses includes VP30 protein in addition to NP, VP35 and the polymerase (L). The polymerase complex can mediate both the transcription of individual genes and replication of the whole genome and VP30 functions as a switch in this process, as its phosphorylation blocks the ability of the viral polymerase to function during transcription. We show that protein phosphatase-1 (PP1) controls VP30 phosphorylation in vivo. We also recently found that phosphorylation of EBOV VP35 protein regulates EBOV transcription. EBOV can be efficiently inhibited in infected cultures with PP1-targeting small molecule, 1E7-03. We also tested the effect of 1E7-03 on MARV and showed efficient inhibition which correlated with increased MARV VP30 phosphorylation. Unlike in EBOV transcription, VP30 is dispensable for MARV transcription but its non-phosphorylated form strongly enhanced both transcription and replication of MARV. Overall, our findings suggest that targeting PP1 with small molecules is a feasible approach to achieve EBOV and MARV inhibition. This novel approach may be used for development of antivirals against filoviruses.

**Discovery of Bangtan**

Presenter's Name: Gabrielle Anderson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Bacteriophages are viruses that inject their own genetic material into the DNA of their bacterial host, reproduce during the bacteria's asexual reproduction, and later kill their host during cell lysis. Phages can be utilized as a method of ending the anti-biotic resistant bacteria epidemic. The current aim at the study is to study Bangtan on a genetic level, so there will be a larger understanding of the phage as a whole. Bangtan was found in the soil sample that was collected in front of the Douglass building on Howard University's campus. The methods of enrichment isolation, full plate titer and DNA extraction have been utilized while researching the phage. Bangtan produces plaques around .25 cm wide, and with turbulent edges. The titer of Bangtan was found to be 8.69 pfu/mL the phage has a low concentration of 89.7 ng/ul with a purity of 1.7. The bacteriophage, Bangtan, is a lysogenic phage that will contribute to alleviate the anti-biotic resistant bacteria issue that is currently affecting our population. Bangtan can be used to combat and cure diseases that are caused by bacteria related to those that resulted in tuberculosis and leprosy because Bangtan's host Mycobacterium smegmatus MC 2 155 is related to the bacteria's Mycobacterium tuberculosis and Mycobacterium leprae.

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**Geospatial analysis of arterial disease in the Cobb Collection**

Presenter's Name: Blake Archer
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Cardiovascular disease (CVD) is one of the major leading cause of death in African Americans (AA). A serious component of CVD are diseases of the arteries. Arteries function to move blood away from the heart. Issues can arise when deposits of fat, cholesterol or other substances build up over time constricting blood flow to the rest of the body. Restriction in blood flow is a major cause of tissue damage. Diseases of the arteries has been a major hindrance in the quality of life for AAs historically as a result of socio-economic status, diet, and lifestyle. Unlocking the reasons behind this health disparity may be evident in the past. A combined genetic, anthropological, and geospatial approach can unearth behavioral and biological factors contributing to disproportional rate of disease in AA communities. After cataloging the 1900-1960's CVD death rates in the AA community, as depicted in the Cobb Collection (CC), there is adequate geospatial data on arterial disease. These data suggest that the environment and health are linked in CVD rates across the United States for AA populations. The geography of the area affects people's health status in terms of access to resources, as well as race, class, environmental factors, and health care. Geospatial analyses compare and contrast environmental factors as a variable influencing arterial disease in AA communities. These data from the CC provide detailed access to the medical demographics of the AA past, and provides a historically contextualized approach for future medical research.

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**Sporadic Colonic Neoplasia in IBD and Non-IBD/ Noninfectious Colitis in Minority Patients**

Presenter's Name: Hassan Ashktorab
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Poster Presentation*
Email: hashktorab@howard.edu

Coauthors: Sally Hassan, Mehdi Nouraei, Babak Shokrani, Edward Lee, Adeyinka Laiyemo, Agazi Gebreselassie, Alex Onyemeh, Mustafa Mustafa, Ayah Zaki, Angesom Kibreab, Hassan Brim

**Background**: the aim was to determine the prevalence of colorectal polyps in IBD patients and Non-IBD/Non-Infectious Colitis (NIC) patients. **Methods**: 485 patients with clinical, endoscopic and tissue-validated colitis were selected. Logistic regression analysis was applied to estimate the risk of polyps in patients with IBD compared to those with NIC. A subgroup analysis within the IBD group was performed. **Results**: There were 415 (85.5%) Non-IBD

colitis patients and 70 (14.4%) IBD colitis patients. Forty-six percent of IBD and 41% of NIC cases were male. IBD patients were younger (median of 38 vs. 50, P < 0.001). 73% of the NIC patients and 81% of the IBD patients were African Americans (AAs). The prevalence of all kinds of polyps was 15.7% and 8.1% in the IBD and NIC patients, respectively (P=0.045). Inflammatory polyps were more prevalent in the IBD group (54.5%) [NIC group (11.7%, P=0.007]. Adenoma prevalence was 4.2% and 3.9% in IBD and NIC patients, respectively (P=0.25). After adjusting for age, sex and race, Odds ratio of IBD for inflammatory polyps were 7.8 (P =0.013). Polyps occurred predominantly in the colitis field. The subgroup analysis showed that most polyps were present in the UC group when compared to CD patients (27 vs. 5%, p=0.0001). **Conclusion**: Inflammatory polyps are more common in IBD patients than NIC patients. The prevalence of adenomatous polyps was not statistically different between the two groups. This is in line with the view that most neoplastic transformation in IBD occurs in an inflammatory surface.

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**Identifying ETR-1 as a novel player in the engulfment of physiological germline apoptotic cells**

Presenter's Name: Sofiat Atoba
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

Coauthors: Ruby Boateng, Anna Allen

**Background:** ETR-1 is a highly conserved ELAV-type RNA-binding protein that plays a developmental role in muscle formation and has recently been identified by our lab as functioning during engulfment of germline apoptotic cells. etr-1(RNAi) animals have a reduced brood size and an increase in physiological germline apoptotic cells. Co-depletion of ETR-1 and CED-1, an engulfment gene, rescued the phenotypes associated with ETR-1 depletion. This suggested that ETR-1 might be playing a role in the engulfment pathways. The purpose of this research is to investigate which engulfment pathway ETR-1 functions in during physiological germline apoptosis. **Method:** To enhance this study, we obtained a deletion allele etr-1(tm6221) that we balanced over the egl-26(ku228) allele. We are generating both double and triple mutants by crossing engulfment mutants with etr-1(tm6221)/ egl-26(ku228) and egl-26(ku228). We then performed fertility assays and quantified the apoptotic cells in the germlines using Differential Interference Contrast microscopy. **Results:** Upon characterizing the etr-1(tm6221)/ egl-26(ku228) and the engulfment mutants, the etr-1(tm6221) allele and five out of six engulfment mutants showed a reduced brood size compared to wild-type animals. Also, the germlines of etr-1(tm6221)/ egl-26(ku228) and the single engulfment mutants have a significant increase in apoptotic cells compared to control animals. **Conclusion:** The increased number of apoptotic cells in etr-1(tm6221)/ egl-26(ku228) germlines may be a contributing factor to this allele having a low brood size. However, further analysis on the double and triple mutants will determine the specific engulfment pathway that ETR-1 functions in.

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**Development of Protein Phosphatase 1 Inhibitors as Inhibitors of the Ebola Virus**

Presenter's Name: Sajith Ayyiliath Meleveetil
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Amol Kulkarni
Faculty Advisor's email: amol.kulkarni@howard.edu

Coauthors: Aziza Frank, Lin Xionghao, Colette Pietzsch, Namita Kumari, Andrey Ivanov, Marina Jerebtsova, Tatiana Ammosova, Michael Petukhov, Aykut Uren, Alexander Bukreyev, Sergei Nekhai, Amol Kulkarni

Infection from hemorrhagic fever-causing viruses, like the Ebola virus (EBOV), are associated with high rates of morbidity and mortality. The current interventions primarily target the symptoms but not the virus itself. Indeed, the development of small molecules that specifically target EBOV remains an urgent and unmet challenge. EBOV is critically dependent on a host protein, protein phosphatase-1 (PP1) for its replication. Small molecules, such as 1E7-03, that thwart the interaction of a viral protein, VP30 in EBOV and PP1 have shown promising results in blocking EBOV replication. Despite its promising EBOV-inhibitory activity, 1E7-03 has a relatively short plasma half-life, thus limiting its clinical utility. Our drug development efforts are

directed at improving the stability of the parent compound primarily focused on making chemical modifications of its hydrolytically vulnerable site(s). Using high-throughput screening with EBOV-GFP and a library of 80 chemical analogs of 1E7-03 we identified 3 best inhibitors of which one, HU-6 showed the best inhibitory activity and also significantly better stability than 1E7-03. HU-6 also protected mice from lethal effect of EBOV infection. Thus, these studies have resulted in the refinement of the pharmacophore model and have identified critical molecular features necessary for potent EBOV-inhibitory activity and good plasma stability.

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**Molecular analysis of the Qahtani and Adnanite Tribes: Tracing Ancestry and Reconstructing Migration Patterns in the Arabian Peninsula**

Presenter's Name: Njlaa Bakhsh
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

It has long been debated whether the earliest human migration into the Arabian Peninsula (AP) from Africa occurred via the northwestern or southwestern part of the AP. Further, the demographic complexity of the current tribes suggests that subsequent transmigration patterns shaped the genomic diversity of the region. Today, the AP currently consists of the "original Arabs" of South Arabia (the Qahtan), and the "Arabized Arabs" of North Arabia (the Adnanites). This tribal distinction presents an opportunity for reconstructing ancestry through analysis of genetic markers expressed by the tribes. Our aim is to analyze the genomic make-up of 3 Qahtani tribes (Shummer, Hadhrami, and Asir) and one Adnanite tribe (Anazzah) possibly associated with the two distinct migration routes, and to determine differences between the two major tribal branches, and within individual tribes from each branch. We hypothesize that the genomic landscape of the AP has been influenced by tribal migration, admixture, and successive gene flow from their origins, and also by sustained fidelity to their ancestry. We propose to measure the frequency and composition of key ancestral markers based on sequencing uni-parental markers (i.e., paternal Y chromosome, maternal mitochondrial DNA), and by genome-wide analysis of autosomal DNA. In doing so, we will analyze and untangle whether the genetic signals are indicative of early prehistoric or more recent historic migration and settlement in the AP. This will help us accomplish our objective, to determine how migration and genetic admixture contributed differently to the modern genetic makeup of the AP.

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**A Comparison of Wing Development Genes in Deformed and Asymptomatic Honey Bees**

Presenter's Name: Olubukola Banmeke
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Clarence Lee
Faculty Advisor's email: cmlee@howard.edu

Wing deformities in honey bees (***Apis mellifera***) have long been associated with an ectoparasitic mite; Varroa destructor that transmits deformed wing virus (DWV). The mite inflicts direct damage on honey bees by feeding on bee hemolymph thereby causing varroosis. One of the symptoms of varroosis is deformed wings of newly emerged bees. Although, only a fraction of the DWV positive bees develop deformed wings, little is known about how the wing development genes are affected by the DWV. Here, we compared the differential expression of DWV and some wing developmental genes in three tissue parts of deformed and asymptomatic honey bees. Using qPCR, deformed bees contained the highest viral loads. In addition, asymptomatic honey bees (parasitized) showed higher titer than non-parasitized bees. There was an upregulation of the wing development genes in both non-parasitized and asymptomatic bees but those genes were down regulated in the deformed bees. Highest titers of these wing development genes were found in the thoracic segment, suggesting that these genes are tissue-specific.

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**Clonality, Virulence and Integron Characterization of VIM Metallo-β-lactamase Producing Isolates of Acinetobacter baumannii From Washington DC Hospitals**

Presenter's Name: Garima Bansal

Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Broderick Eribo
Faculty Advisor's email: beribo@howard.edu

Coauthors: Rachelle Allen-McFarlane, Junia Jean-Gilles Beaubrun, Broderick Eribo

Recent studies have reported the rise of carbapenem resistance in ***Acinetobacter baumanni*** strains in the USA leading to longer hospital stay and high mortality. Metallo-β-lactamases (MBLs) confer high carbapenem resistance in ***A. baumannii*** due to their strong hydrolytic efficiency against these antibiotics. To date, little have been reported regarding the incidences of carbapenem resistance in ***Acinetobacter baumannii*** from hospitals in Washington DC area. The present study aims to determine the clonality and prevalence of virulence, integron and MBL genes in twenty-eight ***Acinetobacter baumannii*** isolates from four hospitals in Washington DC. Thirty-six percent isolates belonged to Global clone II and twenty-nine percent isolates assigned to Group 4 category by tri-locus multiplex PCR. PFGE clustered the isolates into seven clonal complexes. PCR analysis confirmed the presence of Class I integron in all of the ***A. baumannii*** isolates. Five different types of gene cassettes were observed in class 1 integron-carrying strains. MBL gene blaVIM were detected in 68% of the isolates and associated with carbapenem resistant phenotypes. The prevalence of biofilm associated virulent genes epsA, bfms, aba1, csu and bap among the isolates were 75%, 86%, 71%, 46% and 32% respectively. The results of the study indicated the high prevalence of class 1 integron and blaVIM MBL gene among the clinical isolates. This is the first report of blaVIM positive isolates of ***Acinetobacter baumannii*** from Washington DC. The findings highlight the need of continuous surveillance and effective control measures to prevent dissemination of antibiotic resistance among ***A. baumannii*** strains in Washington DC.

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**Analysis of the MFSD12 Skin Pigmentation Gene**

Presenter's Name: Michele Basden
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Campbell
Faculty Advisor's email: michael.campbell1@howard.edu
Coauthors: Michael Campell

Variation in human skin pigmentation is one of the most striking aspects of our human biology, and explaining this diversity is one of the central questions of human evolution. While many candidate genes, associated with human skin pigmentation, have identified based on prior nonhuman studies, one novel pigmentation gene, MFSD12 on chromosome 19, was recently uncovered in a genome-wide association analysis of human populations. However, little is known about the range of nucleotide and haplotype variation at MFSD12, or the evolutionary forces that have shaped patterns of diversity at this locus. In an effort to expand our current knowledge of this gene, we examined sequence variation across the 19,320 base pair length of MFSD12 in 1461 individuals from 15 worldwide populations. Here, we report striking patterns of diversity at MFSD12, including highly population-differentiated variants and an excess of low-frequency alleles in the non-coding region in East Asian populations, indicative of recent positive selection. In addition, we observed a paucity of amino acid substitutions relative to synonymous changes in the exons of MFSD12 in East Asians, suggestive of strong purifying selection. Therefore, we contend that positive and purifying selection have influenced levels of diversity in different regions of MFSD12, implying that these distinct genic regions are, or have been, functionally important. Overall, this study provides additional insights into the evolutionary events that have contributed to the frequency and distribution of alleles that play a role in the development of a highly variable trait in humans.

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**Comparative Analysis of Black Males vs. Black Females after Bariatric Surgery**

Presenter's Name: Edward Bauer
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Terrence Fullum
Faculty Advisor's email: tfullum@howard.edu

Coauthors: Margaret Pichardo, Gezzer Ortega, Maria Nunez, Maya Spencer, Marcus Wooten, Terrence Fullum, Daniel Tran

**Background**: Few studies focus solely on the outcomes of Black bariatric surgery patients. Our aim is to evaluate and compare the effectiveness of bariatric surgery on weight loss and resolution of co-morbidities among Black males and Black females. **Methods**: Retrospective study of bariatric surgery patients at a single academic institution between 2008 to 2016. Data included demographics, pre- and post-operative weight, height and co-morbidities (diabetes mellitus type II [DM], hypertension [HTN], and hypercholesterolemia [HC]), and surgical procedures (laparoscopic roux-en y gastric bypass (LRYGB), laparoscopic sleeve gastrectomy (LSG), and laparoscopic adjustable gastric band (LAGB)). All analysis compared males to females and stratified by surgical procedure. Primary outcomes interested were weight loss by 12 months. Secondary outcomes were resolution of co-morbidities by 12 months. Adjusted multivariable regression analysis was performed to assess the relation between sex and outcomes of interest. **Results**: At one year postoperatively, the mean BMI was 39 kg/m2 for males and 40 kg/m2 for females. Among these patients, 15% of males and 9% of females had DM, 47% of males and females had HTN, 15% of males and 25% females had HC. There was no statistical significance between male and female outcomes in EWL% (OR=1.89, 95% CI=-6.78-4.46), BMI point difference (OR=3.60, CI=-19.03-26.23), resolution of DM (OR=1.55, CI=0.67-3.57), HTN (OR=1.13, CI=0.62-2.05), and HC (OR=1.87, CI=0.69-5.06). **Conclusion**: Black females showed better outcomes for the resolution of diabetes mellitus type II after the LRYGB. Bariatric surgery was equally effective for Black males and females, with similar outcomes in terms of resolution of HTN and HC, and change in BMI.

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**Maturation Of HIPSC-CMS Using ECM Proteins And Genome Editing**

Presenter's Name: Fikru Bedada
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Marguerite Neita
Faculty Advisor's email: mneita@howard.edu

Coauthors: Sunny Chan, Michael Kyba, Joseph Metzger

**Purpose:** Human induced pluripotent stem cell-derived cardiac myocytes (HiPSC-CMs) hold great promise for study of developmental, disease processes (patient in a dish) and pharmacogenomics. Thus acquisition of adult gene and mature morphology akin to adult heart is important. **Goal:** To develop an in vitro platform for assessing contractile performance of HiPSC-CMs using extracellular matrix (ECM) proteins and adeno associated virus safe harbor integration site 1/ zinc finger nuclease (AAVS1/ZFN) based genome editing. **Methods**: hiPSC-CMs were seeded in ECM proteins coated culture plates for attachment, long term survival and acquisition of mature structure and gene expression. Cellular morphology, sarcomere, and gene expression was assessed by immunofluorescence. AAVS1/ZFN was used to generate inducible hiPSC expressing adult motor αMHC gene. We used this platform to measure contractility of hiPSC-CMs by edge detection in Ionoptix system. **Results**: hiPSC-CMs attached to either laminin or fibronectin coated plates. HiPSC-CMs remained bound efficiently to combination of fibronectin and laminin. We combined the two ECM substrates which allowed attachment and maturation. Using immunohistochemistry and western blotting; we verified dox-induced αMHC protein expression and sarcomere incorporation. We determined the effects of αMHC expression on myocyte contractility using edge detection. Replacement of ßMHC with αMHC augmented contractility conferring positive inotropy compared to ßMHC dominant isogenic controls. **Conclusion:** This approach can be used to study the contractile strength and kinetics of hiPSC-CMs in a model of acquired and inherited cardiac diseases. Further, these systems facilitate studies of hiPSC-CMs maturation, disease modeling, drug screening, pharmacogenomics and fundamental aspects of human cardiac contraction.

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**Lauriel-Sky**

Presenter's Name: Mia Blocker
Classification: Undergraduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacterial phages are recognized as viruses that infect and live in bacteria cells to survive. They come in many shapes and sizes, but majority are tailed viruses containing double-

stranded DNA. Like most viruses, phages depend on their host cell to live and reproduce. In order for the phages to live and reproduce once their genome is injected into the host DNA they use the lysogenic cycle by integrating its DNA amongst the host DNA or use the lytic cycle which takes over the DNA of the host and multiply and eventually destroy the host cell causing it to lysis.The current study was undertaken to: (a) isolate the environmental sample, process and plate it to check if it contains any phages, and verify putative plaques, (b) purificate to sure the phage sample is pure and plaques are due to a single phage type, (c) prepare a high titer lysate of the phage, and pick a single isolated plaque, (d) extract clean DNA for sequencing, restriction digests, and further investigations, (e) annotate phage genomes and establish gene prediction and functional assignments. The current soil sample was discovered in "The Yard" at Howard University with coordinates being 38.9231° N, -77.0204°E. The phage and the corresponding host, mycrbacteria smegmatis mc^2 155, were isolated using enrichment and standard plate count respectively at 30°C for 18-24hr. Subsequently, enriched samples were assayed (plaque and spot) using 40 pure bacterial isolates. The putative plaques were purified further using quadrant streaking, and medium/high titer lysates being 5.0x10^9pfu/ml.

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**Computational Analysis of the Disease-Causing Mutations in Phosphodiesterases**

Presenter's Name: Kristodea Boadum
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaolei Teng
Faculty Advisor's email: shaolei.teng@Howard.edu

Coauthors: Lindelwa Mamba, Stacy Polanco

Phosphodiesterases (PDEs) are a group of enzymes that catalyze cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP), which are important second messengers in signal transductions. The catalysis of cAMP and cGMP by PDE is very important in drug discovery because of the various signaling pathways regulated by these second messengers. For example, PDE4 is responsible for the hydrolysis of the cAMP, downstream activation of protein kinase A, and subsequent phosphorylation of the transcription factor cAMP-response element binding protein. Because the activation of this pathway modulates gene transcription of numerous cytokines, disruption of PDE4 results in suppression of Tumor necrosis factor α production and eventual inhibition of their proinflammatory and destructive properties, leading to mental disorders including schizophrenia and major depression. Several missense mutations have been identified in PDEs. These mutations reduce the binding efficiency of rolipram, a prominent PDE4 inhibitor, and result in continuous activation of cAMP and/or cGMP downstream signaling. In this study, we applied a computational approach to investigate the damaging mutations in PDEs. The FoldX was used to determine the energetic effects of point mutations on protein stability and protein-protein interaction. The energy calculation revealed that the disease-causing mutations could reduce folding energy and affect binding energy. The results suggest that the bioinformatics analysis can provide useful information for understanding the roles of coding mutation in the development of complex disorders.

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**Elucidating the mRNA targets of ETR-1 Utilizing RNA Immunoprecipitation Coupled with deep Sequencing**

Presenter's Name: Ruby Boateng
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

**Introduction:** ELAV-Type RNA Binding protein, ETR-1, is one of two CELF-family RNA binding proteins that exist in C. elegans; with the other being UNC-75. Studies have shown that ETR-1 depletion via RNAi **Results** in defects in muscle development and reproduction function, however, the mechanism of ETR-1 remains unknown. The absence of any previously identified mRNA targets of ETR-1 has made it difficult to characterize or place ETR-1 in a genetic pathway; either in muscle development or reproduction. This research aims to elucidates the mRNA targets of ETR-1 using RNA Immunoprecipitation coupled with Deep-Sequencing (RIP-Seq) to further characterize the mechanism of this gene. **Methods:** RNA Immunoprecipitation was performed in wild-type, fem-3(q20)IV and glp-4(bn2ts) using a polyclonal ETR-1 antibody. Samples were depleted of ribosomal RNAs

and RIP-Seq libraries of approximately 300bp including adaptors were constructed according to manufacturer's protocols (NEB). cDNA libraries were quantified using PicoGreen and Agilent 2100 Bioanalyzer high sensitivity DNA Chip. Libraries were combined into equimolar amounts and submitted for sequencing to the NIH/NIDDK Genomics Core Facility. qRT-PCR was utilized to quantify the mRNA levels of vit-2 (vitellogenin). **Results and Conclusion:** High-quality RNA was isolated after IP and cDNA libraries were generated. The RIP-Seq dataset is currently being processed. Preliminary qRT-PCR assays on the IPed samples showed the mRNA levels of vit-2 was higher than of tbb-2 (control) indicating that vit-2 mRNA is a possible mRNA target of ETR-1. vit-2 mRNA was confirmed as a possible ETR-1 target when etr-1(RNAi) animals showed a lower vit-2 mRNA expressions levels.

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**Potential Novel Therapeutic Targets for Trypanosoma cruzi Parasitic Infection**

Presenter's Name: Nivedita Bondhu
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Clarence Lee
Faculty Advisor's email: cmlee@howard.edu

Coauthors: Nivedita Bondhu, Thomas Boddie, Destiny Johnson, Jasmine Jones, Thomas Heslop, Veronica Marquez, Zoe Parker

***Trypanosoma cruzi*** is an intracellular protozoan parasite that infects humans and other mammalian hosts and causes Chagas disease (CD). CD is a zoonotic disease that can be spread to humans via blood-sucking triatomine insects. The exact mechanism how the parasite invades the host cell is still unclear. Acute symptoms of infection are local swelling, fever, headache, and swollen lymph nodes. Chronic stage complications include Chronic Chagasic Cardiomyopathy (CCC), enlarged esophagus or colon. The two drugs currently used to treat ***T. cruzi*** infection, benznidazole and nifurtimox, are expensive, harmful and have limited efficacy only during acute stage infection. Here, we present the current understanding of CD and newly identified potential therapeutic targets for T. cruzi. Potential post-invasion targets during the proliferative stage include a heme-induced ROS (Reactive Oxygen Species) triggered CaMKII-like facilitating epimastigote proliferation, and Ca2+ pool/expression of an acidocalcisomal calcium pump that are upregulated in intracellular parasites. Targets during acute infection include host cell's Low-Density Lipoprotein Receptor (LDLR) acting as an anchor for parasitic invasion. Potential chronic stage targets include SIRT1, a member of SIRT1-PGC1α-NFκB axis of inflammatory and oxidative stress, in improving heart function. Currently no vaccine against ***T. cruzi*** is available. A combination of ***T. cruzi*** derived TLR agonists (PAMPs) with known adjuvants may derive effective vaccines driving the Th1 mediated immune response with enduring immunological memory. These are new promising therapeutic targets for ***T. cruzi*** infection. However, extensive further studies are required to shed light on the precise molecular mechanisms to capitalize them for future drug-designing.

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**Investigation on the Increase of Obesity in South Africa Following the Apartheid**

Presenter's Name: Imani Boykin
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Amy Yeboah
Faculty Advisor's email: amy.yeboah@howard.edu

**Introduction:** The effects of Apartheid not only disrupted South African's culture, but it also included the manifestation of Eurocentric fast food restaurants. In 2016, almost 70% of women and 40% of men were categorized as either overweight or obese. We traveled to South Africa to verify the validity of this epidemic, study primary, causative sources of this epidemic, and investigate the effects Apartheid. **Methods:** Our research implemented a cross method of a qualitative and an observational study. For the qualitative aspect, individuals of the working class, between the ages of 23-80, were randomly selected to conduct interviews. The observational aspect included a surveillance of the restaurants, gyms, and environment. **Results:** Per the answers of the interviewees, South Africans have a prevalent definition of health as a state of being free from illness and maintaining optimal mental and spiritual conditions. The typical meals are healthy and served in reasonable portions. Additionally, low to moderate exercise is practiced daily. One potentially negative factor is the frequency of food consumption from fast food restaurants. **Conclusion:** The

proclaimed epidemic of overweight and obese individuals in South Africa might be misleading. While in South Africa, many of the people seemed to be a healthy size for their height-to-weight ratio. The rapid modernization and urbanization of South Africa has brought many fast food restaurants to the country. Obesity is becoming a problem in South Africa, but mass media and researchers seem to exaggerate the issue.

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**An Assessment of the Treatment of Special Needs Adults by Pediatric Dentists**

Presenter's Name: Premjeet Brar
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. LaToya M. Barham
Faculty Advisor's email: latoya.barham@howard.edu

Coauthors: Dr Premjeet Brar D.D.S, Dr LaToya Barham D.D.S.

**Background:** According to the 2011/20l2 National Survey of Children with Special Care Needs, there are approximately 14.6 million children with SHCN (Special Health Care Needs), under 17 years of age. According to the AAPD membership statistics as of June 2016, there are 6344 active pediatric dentists. This relatively small number and distribution of pediatric dentists mean that broader involvement by general dentists is necessary to address access to care issues, especially transition of young adult patients with Special Health care needs. There is also a need to establish a standard residency/formal training for dental students and dentists who want to train and specialize in special needs adult dentistry. This will serve as an effective health care reform to increase access to oral health care for special needs adults. **Methods:** A confidential self administered survey instrument was developed with consultation with experts in survey design and methodology. Specialist in the field of dentistry assisted with the content and pre-tested the survey tool. The survey was modified to reflect changes adjusted from these reviewers and then it was transferred to an electronic format using a web-based service (Survey Monkey). 21 items questionnaire was sent to 5937 AAPD members.

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**Is Short Interval Colonoscopy at the Discretion of the Gastroenterologist?**

Presenter's Name: Hassan Brim
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Hassan Brim
Faculty Advisor's email: hbrim@howard.com

Coauthors: Abhimanyu Tushir, Shahidhar Manchegowda, Negin Farsi, Edward Lee, Babak Shokrani, Adeyinka Laiyemo, Mehdi Nouraie, Hassan Ashktorab

**Background**: Short interval colonoscopies are recommended at the discretion of gastroenterologists depending on various factors. We here evaluated such factors in an African American population. **Aim**: To assess factors contributing to short interval colonoscopies. **Methods**: Data was retrieved from Howard University Hospital database (2010 to 2016). African American patients who had repeated colonoscopies within a period of 3 months were selected for this study. We analyzed patients' demographics, family history, polyp characteristics, and reasons for repeat colonoscopy along with latest follow-up findings. **Results**: There were 36 patients who underwent two colonoscopies within 3 months, 13 females and 23 males with mean age of 61 years. Out of these, 7 patients (19.4%) had poor bowel preparation. For the remaining 29 patients, the reason for the second colonoscopy was partial removal and suspicion of partial removal (61.1%), difficult access (16.7%), follow-up for Crohn's disease (2.8%). Follow-up of these 36 patients after their last colonoscopy revealed that 8 patients (22.2%) had colon cancer/resection, 4 other patients (11.1%) had cancer of other organs. Of the remaining, 6 (16.6%) had future colon polyp resection, 3 (8.3%) had normal screening colonoscopy and 4 (11.1%) visited the hospital for reasons unrelated to gastroenterology and 11 patients (30.6%) with no follow-up. **Conclusion**: Endoscopists performing short interval colonoscopies at their own discretion benefited high-risk individuals with poor bowel preparation, multiple lesions, flat lesions and resection clearance. A significant number of patients in our study had colon cancer/resection on eventual follow-ups.

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**The Isolation and Purification of BlueLam0831 a Bacteriophage that Infects Mycobacterium Smegmatis**

Presenter's Name: Nina Brown
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: Courtney.Robinson@howard.edu

Coauthors: Lauren Jackson, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh

**Background**: The purpose of this project is to study mycobacteriophage diversity and to contribute the data added to Genbank for this group of viruses. A bacteriophage or phage is a virus that parasitizes a bacterium by infecting it and reproducing inside it. **Methodology**: A sample of soil was collected, filtered, serially diluted, and tested for the presence of viable bacteriophages, which would be indicated by the formation of plaques (clear areas) on plates containing growth medium and the host bacteria Mycobacterium Smegmatis mc-155. If the phage was capable of infecting the bacteria cell, then one of two kinds of plaque would form. A cloudy plaque signifies that the phage is a temperate phage and some of the infections in the plaque in the lysogenic cycle, and does not destroy the host cell. The lytic life cycle is the other possible path for phages, where the phage uses the bacteria's functions to replicate itself and immediately lyse the host cell. DNA was extracted and lysogeny experiments were conducted. **Results and Conclusions**: Phage BlueLam0831 was extracted from soil collected outside the Blackburn Building. The phage infected the host bacteria and entered the lytic phase, as indicated by clear plaques. The lysate of phage BlueLam0831 had a titer of 1.81 x10^10 pfu/ml. A DNA concentration of 1.25ng/uL was determined using a Nanodrop Spectrophotometer. Extended incubation for growth and patch assays have shown that BlueLam0831 can also enter the lysogenic pathway and is likely a temperate phage.

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**Cosmos: A Mycobacteriophage Isolated in Washington DC**

Presenter's Name: Abbiih-Gail Browne
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson.howard.edu

Coauthors: Lourds M Fernando, Adrian Allen, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Hemayet Ullah, Leon Dickson

**Background**: Bacteriophages make up a vast population with over 1031 phage particles in our biosphere; but scientists have only genomically characterized fewer than 3, 000 of them. With the rise of antibiotic-resistant bacteria there has been a redeveloped interest in utilizing phages to create an alternate solution to treat common infections in humans and animals. As a participator of the HHMI SEA-PHAGES program, the Fall 2017 BIO101 class completed experiments to isolate and characterize mycobacteriophages from Howard University's campus that infect Mycobacterium smegmatis. **Methods**: Soil sample was collected at the College Hall North sign. Phages were then isolated and purified via an enrichment and plaque purification assays. After nine trials of purification a lysate was harvested. DNA of Cosmos was extracted and visualized using gel electrophoresis. Lysogenic studies performed to see whether Cosmos was a temperate phage. The mesa growing on the spot plates have been streaked and isolated colonies are assayed for potential lysogen. **Results and Conclusion**: The plaque morphology for Cosmos was small, circular and cloudy plaques with a diameter of 2.5 mm. The HTL concentration was 1.17 x 1012 pfu/mL. DNA extracted was intact when visualized. Lysogeny studies confirm Cosmos is a temperate phage and will be used for sensitivity and immunity studies. These results are vital when characterizing mycobacteriophage diversity, identifying new genes of the phages, and the potential of the bacteriophage to infect other closely related pathogenic bacteria.

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**An analytical Method to Study the Effect of Fluid Shear Rates and Media Strength on Kinetics of Biofilm Formation**

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

Bacterial biofilms in diseases and in nature are subjected to dynamic conditions and fluid flow forces. These forces are present in blood vessels as well as in natural lakes or other aquatic habitats. This study focuses on the use of a Fluxion image analysis software to determine the growth rate of staphylococcal biofilms on immobilized surfaces under fluid flow conditions. A differential method of kinetic analysis is used to study surface colonization by biofilms under varied shear rates (10 s-1,50 s-1, 100 s-1, 200s-1) and media concentrations (2x, 1x, and 0.5x-TBS) in a flow chamber system (the BioFlux 200). Bacterial surface colonization is monitored by videomicroscopy, and images are recorded at 30-minute intervals for data analysis. The images are analyzed by grayscale intensity quantification with a Fluxion software to calculate extents of surface area coverage. Time-scale data are then evaluated to find the rates of surface area coverage by bacterial biofilms under varied experimental conditions. The data found in this study suggests that higher shear rates leads to a lower overall growth rate of the biofilm and that the concentration of TBS can significantly affect the growth rate of the biofilm. Within the duration of biofilm formation considered, analytical data were robust and reproducible. The kinetic curves that were obtained had coefficient of determinations greater than 0.99. However, further methods of analysis will have to be considered to analyze biological events such as biofilms breaking up or dispersing due to flow forces.

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**Structure-based Drug Discovery of Human C-C Chemokine Receptor 4(CCR4) Ligands**

Presenter's Name: Jeffery Bullock
Classification: Graduate Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Simon Wang
Faculty Advisor's email: x.simon.wang@gmail.com

Human C-C Chemokine Receptor 4(CCR4) plays fundamental roles in the development, homeostasis, and function of the immune system, and has profound effects on endothelial cells involved in angiogenesis or angiostasis. A defucosylated human monoclonal Ab targeting CCR4, Mogamulizumab, has been approved in Japan for the treatment of Adult T-cell leukemia-lymphoma (ATL). Considering the high cost of antibody treatment, there is an urgent need to develop small-molecule based anti-CCR4 therapeutics. Since there exists no crystal structure for human CCR4, we are dependent upon the structures of other chemokine receptors as well as G Protein-coupled receptors (GPCRs). Though a new algorithm in Maestro 11.1, we constructed consensus homology models of CCR4 using multiple templates with success. Given the ECLs are constrained by disulfide bonds fairly close in proximity, we identified theses disulfide bonds linking Cys2.97(4.86) to another Cys110(4.22). The binding compound utilized in the 4MBS pocket may have a salt bridge interaction with Glu2837.12. Its carbox-amide nitrogen forms a hydrogen bond with Tyr251(7.31). The best quality CCR4 model is expected to have over 93% of its amino acids in the Most Favored Region [A, B, L] per residue, the Lowest Number of Disallowed Regions, the Over-all G Factor, and the Parameter G-Factor. Those premium models provide a more accurate determination of both the global structure and binding sites for human CCR4. The structure-based drug discovery efforts based on them are currently underway.

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**Bacteriophage Research as an Undergraduate Student**

Presenter's Name: Naji Cameron
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacteriophages were discovered in the early 1900s by Twort and d'Herellex. A bacteriophage is a virus capable of infecting a bacterial cell. They inject their genetic material forcing the bacteria to form bacteriophage DNA and proteins for synthesis. The ultimate goal of PHAGES students is to isolate a pure bacteriophage. After enriching a soil sample from the environment, the solution is collected and filtered. Ridding it of any bacteria and preserving the integrity of any bacteriophages present in solution. I then performed phage purification until I obtained a unique pure bacteriophage. I isolated the phage, Naji, which I named after myself. I then conducted a titer assay, ultimately ending in a titer calculation. The titer of a bacteriophage is the calculated amount of bacteriophage particles that performs a complete lysis of a plate. The verified titer of Naji is 4x10-10pfu/ml. Among purification and titer assay protocol, we also used conducted DNA isolation, gel electrophoresis,

sequencing and annotating. The isolation of the DNA allows researchers to examine it and manipulate it in various ways. The gel electrophoresis examines the quality of the DNA and determines its length. After DNA sequencing, the annotation of its sequence can begin. The purpose of annotating to categorize and compare the genes of the phage. Bacteriophages are critical tools in today's times.

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**Protocol Development for The Collection of Cytokines**

Presenter's Name: Ashley Cannon
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Campbell
Faculty Advisor's email: michael.campbell1@howard.edu

Coauthors: Stephanie Gilbertson-White, Rachel Dahl

**Background**: Despite notable advances in cancer treatment and symptom management interventions during the past decade, cancer-related symptoms continue to be a source of burden for many patients1. Pain, depression, fatigue, and sleep disturbance (collectively called sickness symptoms) are extremely common in cancer patients and associated with decreased function and quality of life2. There is a large body of evidence suggesting that these symptoms are associated with inflammatory cytokines2. Given this evidence, inflammatory cytokines are an increasingly important marker of patient response to treatment in the area of oncology. The majority of published protocols for proper collection and processing of blood samples for cytokine analysis describe ideal collections3,4,5. However, community cancer centers in rural areas are unable to follow these conditions due to the lack of proximity to research laboratory equipped to readily process samples for storage. **Purpose:** To develop a blood collection protocol that will compare cytokine values from ideal blood collection with field blood collection to determine if field collection procedures yield reliable results. **Method:** Two tubes of blood were collected from 22 healthy adults. One tube followed the Ideal Collection procedure and the other tube followed the Field Collection procedure. High sensitivity ELISA kits, descriptive statistics, and T-tests were used to evaluate the differences in ideal vs field blood collection. **Conclusion**/**Results**: Statistical analysis revealed NO significant differences in field collection vs ideal collection for IL-6. Statistical analysis revealed significant differences in field collection vs ideal collection for IL-1b and TNF-a.

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**Let's Not Get Physical: Evidence for a Defense Tradeoff in a Ni-Hyperaccumulator Plant**

Presenter's Name: Kortland Casselberry
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Mary McKenna
Faculty Advisor's email: mmckenna@howard.edu

Coauthors: Mary McKenna

Plants inhabiting unusual soil environments provide a fascinating system for studying ecological and evolutionary responses to novel stresses. Some species from serpentine communities evolved the ability to hyperaccumulate Ni from the soil into shoot tissue where it forms an "elemental" defense against herbivory. "Elemental" defense can increase fitness if it is less energetically costly than production of chemical or physical defenses. Chemical and physical defenses are normally induced by a volatile signal (jasmonic acid or JA) after herbivore attack. This study explores the possibility of a defense tradeoff where plants with elemental defenses save energy by inhibiting physical defenses (trichome production) after a JA signal. We compared two species in the genus Alyssum: A. murale (Ni-hyperaccumulator) and A. montanum (non-accumulator) grown on soil with and without Ni. The mean density of leaf trichomes was recorded on plants grown in both soil environments. Plants were treated to volatile JA exposure in a closed system (Rasmann et al 2015), and trichome density was measured again on leaves that developed immediately after JA exposure. For the non-accumulator, GLM analysis showed a significant increase in trichome production after JA exposure as expected in both soil types ($p = 0.000$). For the Ni-hyperaccumulator, JA exposure also had a significant effect on trichome production ($p=0.000$) but there was a significant interaction between JA exposure and soil type ($p = 0.000$) because A. murale did not increase trichome production on soil with Ni, where plants had access to elemental defense.

**The Development & Evolution of the Multi-Chambered Heart in Vertebrates**

Presenter's Name: Delaena Cline
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Janine Ziermann
Faculty Advisor's email: jziermann@yahoo.de

Coauthors: Haripreet Mayo, Bernard Brown, Janine Ziermann

The human heart is a complex four chambered structure derived developmentally and evolutionarily from a simple tube-like structure. Its complexity of development makes the heart vulnerable to a number of morphological and functional defects that can affect each of its four chambers, the outflow and inflow vessels, and the septa in between atria and ventricles. Here we have dissected a multitude of vertebrate hearts, each containing chambers differing in number and structure. Our study supports previous views that the vertebrate heart evolves from a simple tube with contractile regions in lampreys, through different chamber types and forms in fishes, to the three chambered heart in amphibians to the four chambered heart in mammals. The mammal heart develops from an extremely simple tubular structure through folding, fusion, and separation of its parts into a four chambered mammalian heart, paralleling in its ontogeny its phylogeny. This shows us that as vertebrates evolve from respiration in water to that in air the heart adapts to shunt that oxygenated and deoxygenated blood properly and pump it more efficiently throughout the body. Understanding the evolution of the vertebrate heart provides insights into developmental mechanisms. This will also help to understand many congenital anomalies, such as Tetralogy of Fallot, Ventricular Septal Defects, etc. Our research may therefore contribute to understanding such defects and to developing diagnostics, treatments, or therapy suggestions. Source of research support provided by Howard University College of Medicine.

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**Towards the Creation and Characterization of an Effective Prophylactic Zika Vaccine**

Presenter's Name: Kadijah Dansby
Classification: Staff
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Thomas
Faculty Advisor's email: michael.thomas1@howard.edu

Coauthors: Michael Thomas

Zika virus infection is associated with fetal microcephaly, Guillain-Barre Syndrome, placental insufficiency, intrauterine growth retardation, and other congenital complications. These health and eventual financial burdens attributable to Zika may be reduced by an effective prophylactic vaccine. In that regard, replicating Adenovirus represents a viable vaccine delivery vector, in part because Ad surface proteins enhance the immune responses to the transgene it carries. Replicating Ad vaccines have been shown to elicit potent humoral and cellular immunity against HIV, SIV, SHIV, and Influenza. Given these qualities, our goal is to create a replicating Adenovirus vector expressing Zika Envelope. We hypothesize that this recombinant Ad-Zika vaccine will induce higher levels of Zika-specific immune responses than current available candidates. To create our recombinant E1B55K and E4orf1-4 deleted Ad-Zika vaccine, a shuttle plasmid containing the right hand part of the proposed recombination was created by PCR. Next, we inserted Zika Envelope into the E3 region using NEB 'Hi-Fi DNA Assembly' cloning. The newly constructed E4orf1-4 Zika shuttle plasmid was digested with BamHI, separated on a 0.8% agarose gel and the larger fragments isolated. DNA isolated from dl1520 was digested with SpeI and the larger fragments isolated. The left and right hand fragments were co-transfected into Hek293 cells, incubated at 37°C and monitored for the presence of cytopathic effect (CPE). Once our vaccine vector is developed and characterized, we hope to induce a positive immune response in our animal models. Furthermore, we are hopeful that our vaccine will elicit a similar response in humans.

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**Sexually Dimorphic Ethanol Consumption and Behavior Among P Rats**

Presenter's Name: Philippe Darius
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Marjorie Gondre-Lewis
Faculty Advisor's email: mgondre-lewis@howard.edu

Coauthors: Marjorie Gondre-Lewis

Excessive alcohol drinking is a nationwide problem, which is not extensively and specifically investigated in women. The CDC reports that amongst the heaviest drinkers, women are more susceptible to heart disease, stroke, and liver cirrhosis. The NIAAA published that female alcoholics have death rates 50 to 100 percent higher than males, including deaths from suicides and alcohol-related accidents. In the current study, we quantify sex differences in alcohol drinking behavior using an operant self-administration model in rodents. Genetically alcohol-preferring (P) rats, trained in an operant drinking chamber to lever press for a 10% ethanol reward delivered on an FR4 schedule; i.e., they must press the lever 4 times to receive access. Using the drinking-in-the-dark multiple scheduled access (DIDMSA) protocol for three thirty minute sessions. In addition, naïve P rats were placed in elevated zero maze (EZM) and open field testing (OFT) chambers to record innate sexually dimorphic behaviors. Our binge drinking paradigm revealed that over a three-week period, male P rats were motivated to work equally or slightly harder for the ethanol reward. However, female P rats consistently consumed significantly more ethanol per kg than males . Furthermore, female P rats demonstrate a heightened level of locomotion, greater rearing and exploratory behavior in the OFT with no significant differences in relative open arm time or entry for the EZM, implicating preponderance for hyperactivity/exploratory over anxiety-associated behaviors. These data provide an innate biological basis for studying sexually dimorphic brain mechanisms associated with alcoholism.

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**Clinical and molecular genetic characteristics of Sessile Serrated Adenomas and Polyps**

Presenter's Name: Don Delker
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Hassan Ashktorab
Faculty Advisor's email: hashktorab@howard.edu

Coauthors: Nazli Atefi, Babak Shokrani, Edward Lee, Ali Afsari, Mehdi Nouraei, Adeyinka O. Laiyemo, Hassan Brim, Hassan Ashktorab

**Introduction**: Sessile Serrated Adenoma/Polyps (SSA/P) are difficult to detect, leading to faster cancer development. To better define patients at risk for these lesions, we examined multiple gene expression, mutation and immunomarkers profiles of SSA/Ps. **Methods**: We identified 4070 patients (2010-2015) with polyps, of whom 252 (6.2%) had SSA/Ps. Gender, age, location, clinical symptoms and reason for colonoscopy were analyzed. DNA, RNA and a tissue microarray (TMA) were prepared for 56 patients (30 SSA/Ps and 26 HPs). qRT-PCR in 30 SSA/Ps, 5 uninvolved normal colon (normal) and 3 adenomas samples' RNA was performed to assess markers form a panel of 51 candidate transcripts. **Results**: SSA/Ps incidence was 5.3%. 54.5% of these patients were females. SSA/P locations were: rectal: 32.1%; rectosigmoid: 18.6%; sigmoid: 16.8%; Ascending Colon: 13.2 %; and Descending Colon: 7.1%. 70.5% of patients were 50-64 years of age. MUC6, SEMG1, and TRNP1 showed higher expression in SSA/Ps compared to normal colon ($p<0.05$) by a two-tailed Mann-Whitney t-test. MUC6 was the best discriminating marker between the two groups. BRAF mutation was 50% (15/30) and 11%(3/26) among SSA/P and HP patients, respectively. PDl-L, CD8, and MSH3 were altered in SSA/P sections on the TMA. **Conclusion**: Three markers were highly expressed along with the high prevalence of BRAF mutation in SSA/Ps. The common age range for SSA/Ps is 50-64. This age range is younger than conventional adenomas. It is worth noting that SSA/Ps were predominantly distal in our population. Previous studies report proximal location.

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**Identifying Single Nucleotide Polymorphisms (SNPs) in the SIRT1 Gene and its Potential Role in the Inflammatory Response**

Presenter's Name: Emanuel Demissie
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Muneer Abbas
Faculty Advisor's email: m_abbas@howard.edu

Coauthors: Dr. Georgia Dunston, Dr. Clarence Lee, Dr. Muneer Abbas

**Introduction**: Inflammatory response is crucial in the body's immune response, and has shown to increase susceptibility to disease. Sirtuin genes, located on chromosome 10, are a class of NAD+ dependant enzymes that modulate proteins such as NFkB transcription factor,

a regulatory of inflammation. In-Silico analysis helps to identify SNPs in candidate genes implicated in health and disease. The goal of this research is to implement bioinformatics tools to identify SNPs in the SIRT1 gene and determine the largest differences in SNP distribution between African-American (AA) and European American (EA) populations which can be an ideal target for further studies. **Methods**: In Silico analyses were used to identify differences between allele frequencies in both populations. 1000 Genome Browser, was used to identify all SNPs in the SIRT1 gene, while NCBI Gene Viewer and the University of California Santa Cruz Genome Browser, both identified the functionality and location of the SNPs. Genes that were missense, synonymous, or exonic, with allele frequencies between 0.30-0.50, were considered when identifying region chr10:67874669..67928390 in the UCSC Genome Browser. **Results/Conclusion**: In Silico analysis within UCSC's Genome Browser database, yielded no significant allele frequency differences found within the exonic region of the chromosome. However, a significant allele frequency difference of 0.7 was found within the coding-synonymous SNP rs2273773. In using the 1000 Genome Browser, two intronic SNPs, rs35620729 and rs1467568, held differences in allele frequencies of 0.62 when compared in AA and EA.These SNPs should be considered candidates in causing disease related to inflammation and disease association in health disparities.

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**Assessment of Bacteriophages, Extraction, and DNA Sequencing of MaryLola**

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

Coauthors: Alyssa Mccall, Jerome Oliver, Hemayet Ullah, Ayele Gugssa, Ph.D., Mary Ayuk, Broderick Eribo, Somiranjan Ghosh, Winston Anderson, Leon Dickson, Courtney Robinson

Bacteriophage discovery consists isolation, purification, and amplification of new phages from environmental samples by using a specific bacterial host. The bacterial host in our case is Mycobacterium smegmatis. This is done by using techniques like aseptic technique, serial dilution, filtration, extraction, and restriction enzymes. Bacteriophages have played central roles in the fundamental basics of molecular biology. Bacteriophages are important because they can impact the development of vector systems, the development of microbial computers, mutant construction, and transposon delivery. On September 11th, 2017, a soil sample was collected came from a bush in front of Blackburn Café, with coordinates reading 38°55'25"N and 77°1'11"W. The temperature was 75 degrees Fahrenheit. Phages and corresponding hosts were isolated using enrichment and standard plate count respectively at 30°C. Subsequently, enriched samples were assayed (plaque and spot). The putative plaques were purified further using quadrant streaking, and medium/high titer lysates (MTL/ HTL) were collected for DNA extraction. They were further characterized through restriction digest and gel electrophoresis. Further studies will be undertaken to characterize phages and hosts whole genomic DNA sequencing, followed by genome annotation and western blotting, at the Pittsburgh Bacteriophage Institute. MaryLola yielded plaques of a single morphology with a diameter of 0.5 mm. The phage's titer was 1x109 pfu/mL. The concentration of MaryLola's DNA obtained from the nanodrop was 0.0109 µg/µl. After streak testing to confirm whether or not MaryLola created a lysogen, research will be continued by analyzing the DNA sequence of a phage and coming to conclusions about the phage characteristics.

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**The Howard University Mid-Atlantic Megalopolis Education Module**

Presenter's Name: Amber Durand
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu

Coauthors: Janelle Burke

The Mid-Atlantic Megalopolis Project at Howard University was launched in the Howard University Herbarium in the Spring of 2017. Howard University is one of twelve institutions across the Mid-Atlantic commencing the digitization of approximately 700,000 herbarium specimens. The objective of this project is to understand the vascular

plant distribution in urban corridor between Washington, D.C. to New York City. Presently, the Howard Herbarium has uploaded over 7,000 of our 12,000 specimen images onto the online data portal (midatlanticherbaria.org, and is in the process of transcribing the specimen label information online. In an effort to demonstrate the significance of these records, we are developing an outreach program that will produce an education module for middle school and high school students. The goals for this program include teaching students that dead plants (in the form of natural history collections) have value and can be used to study major topics in Botany, and that herbarium specimen records can be utilized to study the effects of urbanization on our natural habitats. Training students in transcription will provide a hands-on approach to developing awareness of ecological studies. This module would serve as a useful supplement to programs that are already in place to increase the student's knowledge of biological systems, such as the DC School Garden Program. The Howard University Mid-Atlantic Megalopolis Education Module will produce lesson plans and training videos that will assist educators in their goal to increase the number of students involved in environmental science.

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**Exploring the Role of Nkx2.5 & Islet1 during Development of Cardiopharyngeal Mesoderm**

Presenter's Name: Dameel Edwards
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Janine Ziermann
Faculty Advisor's email: jziermann@yahoo.de

Coauthors: Natalia Siomava, Janine Ziermann

Nkx2.5, a homeodomain protein, is important for the proper differentiation of cardiogenic mesoderm from the cardiopharyngeal field into the functional heart musculature. Furthermore, Nkx2.5 has been shown to interact with transcription factors such as GATA4 to regulate cardiomyocyte development. Due to this involvement, mutations in Nkx2.5 have been implicated in many congenital heart malformations, e.g., Tetralogy of Fallot. To better understand the role of Nkx2.5 in normal development and to gather insights into malformations observed, we observed Nkx2.5 expression in whole-mount in-situ hybridization embryos of Xenopus laevis. We analyzed the expression in stages 18 to 45, and compared the results to those of Islet1, which is another important marker of cardiopharyngeal mesoderm differentiation. Furthermore, we compared our data with published studies in Xenopus and other model organisms in developmental biology (e.g., mice, chickens). Most embryos showed a Nkx2.5 expression pattern limited to the heart region, which was to be expected. Further expression was observed in the head, which supports the findings in mice that Nkx2.5 plays an important role in pharyngeal mesoderm differentiation. The comparison with Islet1 provides information about the differential role of both investigated genes during cardiac and craniofacial muscle development.

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**The Future Implications of Bacteriophage Research on Global Crisis Agenda: Discovery of Exodus-0, a Bacteriophage Isolated from the Campus of Howard University Utilizing Bacterial Host Mycobacterium smegmatis MC 2155**

Presenter's Name: Shuhab Elhag
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Shuhab Elhag, Tajahane Francis, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney Robinson

**Background:** Bacteriophages are characterized as viruses that are non-pathogenic to humans and only infect bacterial hosts. The two types of bacteriophages that can be found, are lytic and temperate. There are 1031 different bacteriophages in the biosphere and the objective of this research is to discover the diversity of bacteriophages that exist on Howard University's campus. These discoveries could lead to advancements in the utilization of bacteriophages to help create cures and vaccines against bacterial pathogens that have become resistant to antibiotics. In the experiments conducted, Mycobacterium smegmatis MC2155 was used as a bacterial host. **Methodology:** A soil sample was collected on the campus of Howard University, in Washington, D.C., northwest end of the football stadium.

The sample was subject to several direct isolation techniques and several enrichment procedures. Spot testing followed by serial dilutions were used for isolation and purification purposes. After completing purification to a uniform plaque population, a high titer lysate was prepared. This lysate was used for DNA extraction, electron microscopy grid preparations and lysogeny experiments. **Results and Conclusions:** The isolated phage was named Exodus-0 and the resulting plaques formed were determined to be temperate based on turbidity. Exodus-0 had a calculated high titer lysate concentration of 2.2 x 10 8 pfu/mL and an average DNA concentration of 18.2 ng/ul. Several putative lysogens were isolated. This finding indicates that Exodus-0 is, in fact, a temperate phage, however additional testing is needed to confirm this.

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**Isolation of Phage Umami, a Mycobacteriophage Discovered on the Campus of Howard University**

Presenter's Name: Shalom Entner
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Quinlyn Highsmith, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney Robinson

**Background**: Through the Science Education Alliance: Phage Hunters Advancing Genomic and Evolutionary Sciences (SEA-PHAGES) program funding is provided to Howard University to research bacteriophages. A bacteriophage is a virus that infects bacteria. Some phages, called temperate phages, insert their DNA into the DNA of the bacteria that they infect and some phages, called lytic phages, cause the bacteria to immediately begin creating more phage particles. When phages infect bacteria, they reproduce until the cell lyses, or bursts. This can be seen on petri dishes by the formation of plaques which are clearings on a petri dish. **Methodology**: A sample of soil was collected from underneath the Howard sign at 4th and Bryant Streets at 38.920556 N, 77.017778 W. After direct plating yielded plaques, serial dilutions were performed to isolate a single phage population. Once a single population was isolated, DNA was extracted and analyzed. In order to determine whether the phage could generate lysogens, infected plates were incubated for up to one week. **Results**: The phage Umami created plaques that were approximately 4 mm in diameter. The a titer of Umami was 1.61011 pfu/ml, which was determined by a spot titer. The concentration of the sample of DNA was 115.35 ng/ul as determined using a Nanodrop spectrophotometer. No lysogens were isolated. **Conclusion**: Umami appeared to be temperate due to edges that were turbid and indistinct. However, Umami did not yield any lysogens. Additional experimentation is needed to confirm these findings. Future studies will also determine Umami's ability to superinfect.

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**Non- Culture Based Approach for Taxonomic and Resistome Profiling of 'Kitfo', an Ethiopian Beef Steak Tartar**

Presenter's Name: Behailu Eshetea
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Broderick Eribo
Faculty Advisor's email: beribo@howard.edu

Coauthors: Junia Jean-Gilles Beaubrun, Laura Ewing, Nicole Addy, Broderick Eribo

Several studies using culture method have reported Kitfo to be a potential source of various foodborne pathogens including Salmonella. The present study employs metagenomic shotgun sequencing to determine the microbiome and antibiotic resistance profile of Kitfo. Twenty-five grams of retail samples were homogenized in 225ml of trypticase soy broth and the homogenate were incubated at 37oC for 18-24h with and without corn oil. DNA was extracted and sequenced using illumina miseq platform. The DNA sequences were compared to CARD, ARG-ANNOT and Res finder databases to predict the presences of antimicrobial resistance genes. The microbiome was distributed among 26 different bacterial genera, the read counts were used to estimate the relative abundance, Lactococcus (0.0-89.2) and Enterococcus (0.2-43.2) being the most predominant genera after 24h. The relative abundances of the other genera were Acinetobacter (0.0-20.2), Escherichia (1.8-17.3), Enterobacter (0.0-15.6), Klebsiella (0.0-10.8), Cronobacter (0.0-0.2) and

Citrobacter (0.0-4.9). Twenty-Two Antimicrobial Resistance Genes (AMR) were identified and the mean number of AMR genes identified per sample were: 10.5±3.6, and the most abundant classes of antibiotic were β-lactam (blaADC-25, blaLEN2, blaOXA-51, blaSHV-12, blaFOX-1, blaLEN2, blaACC-2 and blaCMY-18) and tetracycline (tet(H), tet(S), tet (39), tet(M), tet(L), tetB(P), and tetA(P). Resistance genes to fosfomycin (fosA), macrolide (lsa(A), quinolone (oqxB), sulphonamide (sul2) and trimethoprim (dfrA7) were also observed. Overall, relative abundance of microbiome and their associated resistome suggests the need to consider meat based foods that are served raw or undercooked as a potential reservoir for the spread of food borne pathogens and antibiotic resistance genes.

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**Evaluating the Efficacy of Tilia americana and Convolvulus spp. (bindweed) Extracts on the growth of Multiresistant Bacteria**

Presenter's Name: Hope Ezemobi
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Adrian Allen
Faculty Advisor's email: adriandallen@yahoo.com

Coauthors: Norman Francis, Adrian D. Allen

**Background:** The significance of multiresistant bacteria in disease pathogenesis in humans cannot be underestimated. Although numerous strategies have been recommended for mitigating the incidence of antimicrobial resistance in humans, only minimum emphasis has been placed on the utilization of natural plant extracts. In the current study, the efficacy of extracts from Tilia americana and Convolvulus spp. (bindweed), was evaluated against several multiresistant bacteria isolated from patients at a local hospital in Washington, DC. **Materials and Methods:** Plant samples were collected from the campus of Howard University, air dried at room temperature and pressure, and the chemical constituents extracted using methanol, chloroform and water. The Kirby-Bauer disk diffusion susceptibility method was used to evaluate the efficacy of plant extracts against multiresistant bacteria which include Escherichia coli, Pseudomonas aeruginosa, Acinetobacter baumannii, Enterobacter aerogenes, Proteus mirabilis, Staphylococcus aureus and Klebsiella pneumoniae. Gentamicin was used as a positive control. **Results**: Data analysis shows that the growth of Staphylococcus aureus was inhibited by chloroform and methanolic extracts of Convolvulus spp. (bindweed) and Tilia americana. All other isolates showed resistance at the dosage evaluated. **Conclusion:** Tilia americana and Convolvulus spp. (bindweed) may be ideal alternatives for mitigating the effects of multiresistant bacteria on humans. Further studies are underway to determine the minimum inhibitory concentration (MIC) of the extracts against the aforementioned bacterial isolates. It is likely that extracts are either bacteriostatic or bactericidal against all of these multiresistant bacterial isolates.

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**Novel regulatory roles of 19S RP components of the 26S proteasome in C. elegans reproduction**

Presenter's Name: Lourds Fernando
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

Coauthors: Anna Allen

**Introduction**: Recent studies have shown that the 26S proteasome can perform non-proteolytic functions in chromatin structure, transcription, mRNA export and cell cycle regulation. We showed in Caenorhabditis elegans that when specific subunits of the proteasome 19S lid were co-depleted via RNAi with the Myt1 ortholog WEE-1.3, this rescued the infertility of wee-1.3(RNAi) hermaphrodites. Since not all proteasome components tested suppress the wee-1.3(RNAi) infertility, we hypothesize that specific proteasome components may play a non-canonical role in C. elegans reproduction, potentially through regulation of the cell cycle inhibitory kinase WEE-1.3. **Methods**: RNAi, standard brood size analysis, spinning disk confocal microscopy, qRT-PCR, immunohistochemistry and CRISPR/Cas9 genome editing technology. **Results**: Down-regulation of specific proteasome components showed aberrant nuclear localization of WEE-1.3 in oocytes compared to the perinuclear localization observed in control animals. The depletion of the subunit RPN-12 via RNAi showed the highest nuclear expression of WEE-1.3. We obtained

a viable rpn-12(av93) mutant and characterization of this mutant showed defects in reproduction, such as low sperm count in hermaphrodites, aberrant oocyte structure and reduced brood size, and a modest delay in the timing of the developmental growth of the mutant animals. **Conclusion**: Our data suggests a previously unknown mechanism by which specific proteasome components, such as RPN-12, may be playing a role in reproduction that is separate from the proteasome's well-defined role in proteolysis. This is possibly via interactions with WEE-1.3, and this is an area we are actively investigating using CRISPR/Cas9 endogenous genome editing.

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**Isolating Phage FEST, a Virus that Infects Mycobacterium smegmatis**

Presenter's Name: Tajahane Francis
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: Bacteriophages are viruses that infect certain bacterial host cells; they work by injecting their DNA into the host and lysing the cell after replication and formation of new viral particles. Phages can burst cells immediately after the infection process (lytic) or burst cells after several generations or seemingly never (temperate). Research of phages can assist with different medical illnesses that affect humans, especially those caused by infectious, antibiotic resistant bacteria. **Methods**: The host used for infection is named ***Mycobacterium smegmatis*** mc2 155. An original soil sample was collected at Greene Stadium (38.928333 N, 77.019444 W). The soil was enriched to increase the number of phages and then filtered, however there was no evidence of phages, as indicated by the absence of plaques (clear areas on plate). Eventually, a phage that was discovered from a soil sample collected from 38.919353 N, 77.015769 W was used in further experimentation. This phage was used to perform purification, create a lysate, and to extract DNA. It was also subjected to lysogeny studies using longer growth periods than usual and patch assays. **Results**: The phage being researched, FEST, produced an original high titer lysate of 1.7x1010pfu/mL, with the DNA concentration being ~7.0µg/uL FEST produced turbid plaques, and was concluded to be a temperate phage. This was verified with both patch assays and streaking. Colonies were consistently produced after streaking isolated potential lysogens. The next experiments will determine which phages can infect FEST lysogens and which lysogens can phage FEST infect.

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**Investigation of sexual systems associated with species of the genus Rumex using compared reconstructed molecular phylogenies**

Presenter's Name: Kirstie Grant
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu

The genus Rumex is a unique member of the Polygonaceae (Buckwheat) family of plants. A source of intrigue for Rumex lies in the diversity of the sexual systems associated with the subgenera, species, and subspecies within this genus. Four currently recognized subgenera, some 200 species, and a number of subspecies comprise the collective Rumex genus. These exhibit monoecious, dioecious, hermaphroditic, gynodioecious and polygamous sexual systems. Moreover, some of the dioecious species contain sex chromosomes, a phenomenon that occurs in roughly 1% of angiosperms. Apart from the confirmed morphological and phytogeographical distinctions, two of the four subgenera, Acetosa and Acetosella, are distinctive in their mode of sex-determining mechanisms, sex- chromosome systems, and resulting sexual systems. We reconstructed a phylogeny to test the evolution of different sexual systems and sex chromosome systems within Rumex. To date, we have observed three chloroplast molecular markers, rbcL, trnH-psbA, 3'trnLUAAF-trnFGAA, and increased taxon sampling compared to previous work. The phylogeny resolves two clades in Rumex: Rumex subgenus Rumex, (Clade 1) sister to a clade containing the rest of the subgenera, plus the genus Emex (Clade 2). Furthermore, the species with sex chromosomes are resolved in two different clades with different sex chromosome systems. These results suggest that the species with divergent sexual systems are more closely related to each other than to other species comprising the rest of the genus.

**Presence of Rib Notching as an indicator of Cardiovascular Disease in Skeletal samples**

Presenter's Name: Nicholas Guthrie
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Coauthors: Obinna Asawabelem

Cardiovascular diseases (CVD) are responsible for over 17.3 million deaths per year, and are the leading causes of death in the world. Constant findings portray that African Americans have the highest rates of CVD in comparisons with any other racial/ethnic group in the United States. Associated with a wide range of congenital and chronic disorders, rib notching is an important diagnostic marker used in the practice of medicine today. Unfortunately, rib notches have not been studied in a human skeletal collection, and furthermore, a historical African American (AA) collection. This presents a unique opportunity to evaluate rib notching in the Cobb Collection (CC), originally comprised of 987 de-fleshed human cadavers donated between 1931 and 1965. The historical context, combined with preliminary analysis of the clinical records on these individuals indicates a stress intensive lifestyle that imposed CVD risk factors. A sample of 84 CC individuals were selected and placed into groups to explore the hypothesis that rib notching can be used to indicate cardiovascular disease (CVD) in a skeletal collection. A strong link between CVD and rib notching is portrayed from our results of this study. As a result, this study further provides a useful tool for diagnosing historical skeletal samples, using modern techniques to confirm previous diagnoses. This study also provides a significant advantage in improving the inventory of literature on AA and on the subject of rib notching in addition to informing clinicians and advancing personalized medical treatments geared towards treating CHF and CVA in AA.

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**Role of Allograft Inflammatory Factor-1 in Directing Inflammatory Responses of Macrophages to Leishmaniasis Infection**

Presenter's Name: Naomi Haddock
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Lipscomb
Faculty Advisor's email: michael.lipscomb@howard.edu

Coauthors: Thomas Boddie, Diana Elizondo, Temesgen Andargie, Ricardo Louzada da Silva

Leishmaniasis is a vector-borne parasitic disease that manifests itself as cutaneous, mucocutaneous or visceral states of pathology. The first line of immune defense to control pathogenesis by the parasite is by macrophage immunity. Although macrophages are able to keep infection somewhat in check by way of inflammatory activities, some individuals are highly susceptible to immune evasion strategies employed by the parasites. A candidate gene for control of the magnitude and direction of immune responses in macrophages is Allograft Inflammatory Factor-1 (AIF1). To date, no study has investigated its role in directing inflammatory responses to infectious diseases. To investigate the potential role of AIF1 in modulating immune responses during Leishmania infections, we employed RNAi approaches to ablate expression of AIF1 in macrophages in vitro. Results revealed that in absence of AIF1, macrophage ability to mount inflammatory response against Leishmania was significantly diminished. There was an impaired ability to produce pro-inflammatory cytokines and trigger iNOS pathways responsible for controlling intracellular parasitic load. In turn, loss of AIF1 in macrophages resulted in significant increased Leishmania proliferation, as determined by flow cytometric analysis and fluorescence microscopy. Future studies aim to recapitulate these results in vivo by way of transgenic mouse models. Results from the studies may eventually lead to identifications of key gene polymorphisms that encode variant AIF1 transcripts in certain populations that confer increased susceptibility to Leishmania. Better understanding of defense against Leishmania will assist in development of novel therapeutic treatments.

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**Behavior of Eosinophils in The Tumor Microenvironment**

Presenter's Name: Paulette Harris
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Oral Presentation*

Faculty Advisor: Clarence Lee, Paulette Furbert-Harris
Faculty Advisor's email: cmlee@howard.edu, pfurbert-harris@howard.edu

Coauthors: Nivedita Bondhu

Eosinophils, differentiate from myeloid precursor cells of bone marrow, are the most versatile cells of the immune system. They comprise the "destructive" taskforce for anti-helminthic infection, asthma/allergy and inflammation. Eosinophils have recently been recognized as "primary cells", having the capacity to serve as "Antigen Presenting Cells" driving immune responses. They express various surface receptors, PRRs (Pattern Recognition Receptors), adhesion molecules, cytokine and chemokine receptors, and harbor a range of proteins, MBP, ECP, EDN, EPO, growth factors, cytokines, and chemokine [IL-2, IL-3, IL-5, IL-6, IL-10, IL-12, IL-13, IFN-γ, TNF-α, NGF, GM-CSF, SCF, TGF-α, Rantes (CCL5), eotaxin (CCL11), GRO-α and ENA/78/CXCL5], orchestrating immuno-regulation, immune-modulation, tissue remodeling, glucose metabolism and thermogenesis. Recent studies intend to revisit an old phenomenon, that eosinophils infiltrate and destroy solid tumors, with a fresh excitement considering its therapeutic potential. Prostate cancer clinical reports indicate the absence of eosinophils but remaining presence of the eosinophil granular protein, charcot leyden crystal protein (Galectin-10) in transurethral surgical specimens. Additional studies revealed eosinophil cell free granules as independent entities which act as "cluster bombs". We want to challenge 3D-multicellular tumor spheroids with eosinophils and cell free granules. This established tumor model with eosinophil invasion will mimic the in vivo tumor microenvironment, facilitating the evaluation of the anti-cancer role of eosinophils and cell free granules in vitro. My preliminary data demonstrates the interaction and binding of eosinophils with 3D-multicellular spheroids (African American prostate cancer cell-lines: E006AA and HPC1L). Our study may portray novel roles of eosinophils, redefining them as Our study may portray novel roles of eosinophils, redefining them as therapeutic targets for cancer.

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**Authentication of *Uncaria tomentosa* in Herbal Supplements**

Presenter's Name: Monique Harvey
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu

Dietary supplements are regulated by the FDA, but they are not regulated like food or medication. Recent studies have found that due to less regulation, many dietary supplements contain ingredients that are not stated on the bottle's nutritional label. ***Uncaria tomentosa***, or Cat's Claw is a popular herbal supplement because it is said to boost immune systems, combat cancer, and can be used as contraception. This study uses DNA barcoding on six different brands of supplements to determine if they actually contain ***Uncaria tomentosa***. DNA barcoding consisted of extracting DNA from the supplements, amplifying said DNA using rbcL and trnH-psba gene regions, and comparing the gene sequences against the NCBI sequence database using the BLAST algorithm. The PCR results showed three samples amplified. Based on sequencing results, not all brands advertising ***Uncaria tomentosa*** supplements contain the plant. Of the three samples that amplified one only contained rice powder. Another sample contained sequences that could not definitively be identified as ***Uncaria tomentosa***, but the sample could be traced to the family same family as ***Uncaria tomentosa***. The last sample that was sequenced did not have enough identifiable data. None of the results confirmed ***Uncaria tomentosa*** was present.

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**Establishing a model to study the Entry and Transport of Pseudorabies Virus Infection in Central Nervous System Neurons**

Presenter's Name: Rukia Henry
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Clarence Lee
Faculty Advisor's email: cmlee@howard.edu

Pseudorabies virus (PRV) is a pathogen of the alphaherpesvirinae family and is neurotropic in nature. PRV is of swine origin and infection is initiated in the epithelium, primarily infecting the peripheral nervous system of the host. This propensity makes PRV a useful and safe model for studying the pathogenesis of alphaherpesvirus in the nervous system. Upon infection with PRV, the virus travels retrograde from the epithelium inside the axon of neurons, and can

establish a quiescent infection in the host. Upon reactivation, the virus travels anterograde to either the epithelium and on rare occasions, the virus can spread to the central nervous system (CNS), causing lethal encephalitis. The infection of the CNS by alphaherpesvirus is rarely studied, hence, developing a useful model for studying alphaherpesvirus infection of the CNS is highly recommended. This study seeks to investigate the entry and transport of PRV in a CNS cell line. We designed experiments using Cath.a-differentiated cells, (CAD). CAD cells were established from a brain tumor in transgenic mice. Neuronal differentiation of these cells can be induced by serum deprivation and can be maintained without addition of protein. We analyzed the CAD cells using immunofluorescence neuronal makers. The CAD cells were then infected with PRV and the entry and transport of the virus was studied using live-cell fluorescence imaging techniques. We observed that CAD cells were permissive to PRV infection by detecting fluorescently tagged viruses in the nucleus and axons. Our findings will help to establish a useful model for further studies.

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**Isolation and Sequencing of Mycobacteriophage Mecca**

Presenter's Name: Quinlyn Highsmith
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Quinlyn Highsmith, Shalom Entner, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, and Courtney J. Robinson

**Background**: The purpose of this study was to isolate a new bacteriophage using the bacterium Mycobacterium smegmatis as a host because it is fast growing. A bacteriophage is a virus that infects a bacterium and reproduces inside of it. The phage either enters the lytic or lysogenic life cycle. This research is important because studying bacteriophages in detail will help us to understand their benefits like serving as an alternative to antibiotics for many antibiotic resistant bacterial infections. **Methodology**: Soil was collected from the Howard University campus, at 4th and Bryant at 38.920556 N, 77.017778 E. The direct isolation protocol was followed, then serial dilutions were used to purify phages. After a single phage population was obtained, DNA was extracted and quantified. The DNA was then submitted for sequencing. In order to determine whether the phage was temperate or lytic, elongated infection times were used. **Results and Conclusions**: A phage was isolated that created clear plaques of two sizes, 1mm and 3mm. The phage was named Mecca. DNA from the phage had a concentration of 175.1 ng/µl. After sequencing, Mecca was found to be a member of the B1 cluster of phages and its genome was found to be 68,890bp in length. Mecca was originally thought to be lytic due to its clear plaques; however putative lysogens were isolated.

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**Documenting and identifying invasive snails in the Hawaiian Archipelago**

Presenter's Name: Nile Hodges
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Kenneth Hayes
Faculty Advisor's email: kenneth.hayes@howard.edu

**Background**: Invasive species, habitat destruction, and climate change are driving biodiversity loss. Isolation and high levels of endemism have made the Hawaiian archipelago famous for biodiversity, but equally infamous for its invasive species and high extinction rates. Non-native species have devastating impacts on the Hawaiian fauna, and the loss of Hawaiian land snails are a prime example of such impacts. In the battle to prevent the introduction and spread of invasives, a complete knowledge of established non-native species is necessary. Unfortunately, there is no comprehensive guide to the introduced snails in Hawaii. **Methods**: To fill this knowledge gap, we have begun developing a comprehensive guide to invasive snails in Hawaii by reviewing published literature, museum collections, and recent biotic surveys. The guide includes digital images, updated taxonomy, identification keys, current distributions, and potential threats. We have also used DNA barcoding to examine species boundaries. **Results**: We recorded 45 non-native species in 25 families. Four of which are on the six largest Hawaiian Islands, while the remainder are less widespread. Three species were introduced intentionally for biocontrol, and the remainder were unintentional. **Conclusion**s: Of the 46 snail species considered to be of quarantine importance

to the United States, 22% are established in Hawaii. Many of which pose a threat to ecosystems, agriculture, and public health. The data provided in our guide along with the barcode database provide a key resource for quarantine officials, conservation and resource managers, and agricultural workers with which to mitigate the impacts of invasive snails in Hawaii.

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**Age-Dependent Anti-seizure and Neuroprotective Effect of Cannabidivarin in Neonatal Rats**

Presenter's Name: Megan Huizenga
Classification: Graduate Student
School/College: Other
*Presentation Type: Oral Presentation*
Faculty Advisor: Patrick Forcelli
Faculty Advisor's email: paf22@georgetown.edu

Current clinical trials report that modulation of the cannabinoid system with the phytocannabinoid cannabidiol exerts anti-seizure effects in children with epilepsy. While cannabidiol and the propyl analog cannabidivarin (CBDV) display anti-seizure efficacy in adult animal models of epilepsy, they remained unexplored in neonatal models. Therefore, we investigated the therapeutic potential of CBDV in multiple neonatal rodent seizure models. We tested the anti-seizure efficacy of CBDV in five models of neonatal seizures, each representing a different clinical seizure phenotype. We also evaluated the preclinical safety profile in the developing brain. Postnatal day (P) 10 or P20 male, Sprague-Dawley rat pups were pretreated with CBDV or vehicle prior to chemical or hypoxia induced seizures. CBDV only displayed anticonvulsant effects in P20 rat pups in two seizure models, with no effect on seizure severity or latency in the P10 animals. Therefore, we next measured the relative expression of known targets for CBDV (TRPV1, TRPA1) to determine a mechanism for which CBDV is anticonvulsant in P20, but not P10 animals. The P20 animals show increased expression of TRPV1 in key brain regions implicated in epileptogenic activity. Finally, CBDV was administered to P7 rat pups and neuronal cell death was examined via Fluoro-Jade B staining, 24 hours post-treatment. CBDV did not enhance developmental apoptosis above vehicle control levels. These results indicate that modulation of the cannabinoid system provides age specific seizure control in developing animals without developmental toxicity effects. These results provide some of the first systematic, preclinical data evaluating CBDV in pediatric epilepsy models.

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**More the Meets the Eye: Tracing Ancestry, Demography, and Population Substructure in South Carolina**

Presenter's Name: Esohe Irabor
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

SC has a very rich history, and its unique style of slavery played a pivotal role in the wider identity of its residents, as well as related populations that have migrated. Much is known about the cultural identities of the famous microethnic groups in SC such as the Gullah-Geechee and Brass Ankles, but not much is known about the genetic identities of these groups, except for what vague historical records. DNA analysis on these African American (AA) populations would be ideal to gain a more complete picture of who these people were, where they came from and who they are now. Recent advances in sequencing technologies make the present an attractive time to study the genomic profiles of these understudied groups, leading to exciting new insights about their biological history and more precise characterizations the past. Investigations in this study are focused on contemporary general AA (GAA) and microethnic AA (MEAA) populations in SC. Upon discovering their ancestry, the next steps include determining the degree of relatedness between these populations and the extent of the genetic distinctiveness of SC MEAA groups from GAA populations. The hypotheses are: the ancestry of the historic population is predominantly west-central African, including the Congos and Angola, there is substantial relatedness between GAA population and the MEAA populations, there is substantial relatedness between MEAAs, MEAA are not significantly genetically distinct from the GAA, but MEAA status is an important and influential factor in residential patterns, differential ancestry and health disparities.

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**Ebola Virus Nuclear Capsid Protein (NP) Binds Host Protein Phosphatase 1**

Presenter's Name: Andrey Ivanov
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@howard.edu

Coauthors: Tatiana Ammosova, Christian Parry, Sergei Nekhai

Ebola virus (EBOV) is a non-segmented negative-sense RNA virus that causes severe hemorrhagic fever with a case fatality of up to 90%. EBOV replication is regulated by host protein phosphatase-1 (PP1) which dephosphorylates EBOV transcription activator (VP30) protein. EBOV transcription complex is formed by nucleoprotein (NP), VP30, polymerase cofactor (VP35) and RNA-dependent RNA polymerase (L). VP30 phosphorylation blocks EBOV transcription. We previously showed that PP1 inhibitory small molecules efficiently blocked EBOV replication in culture cells. PP1 catalytic subunit (PP1α, PP1β/δ or PP1γ) forms a holoenzyme with a host of regulatory subunits that target PP1 to specific cellular substrates. In viral infections, viral proteins such as HIV-1 Tat and RSV P protein can bind directly PP1 thus functioning as regulatory subunits. Here, we analyzed EBOV transcription regulatory proteins to determine if they can bind PP1. We co-expressed PP1 pairwise with individual EBOV proteins, NP, VP30 and VP35 and immunoprecipitated PP1 or the corresponding protein. Our analysis showed that PP1 interacted with NP but not with other tested EBOV proteins. We further investigated the interaction of PP1 with NP by using a split NanoBit system (Promega) in which nano luciferase is split into small and large bits and interacting proteins are fused to the bits. Protein interaction reconstitutes luciferase activity which is detected in live cells. We fused PP1 to the small bit and EBOV NP to the large bit. As controls, we used host peptide, central domain of nuclear PP1 inhibitor (cdNIPP1) and HIV-1 Tat protein which were fused to the small bit.

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**Epigenetic manifestations of slavery-associated trauma and chronic institutionalized racism**

Presenter's Name: Latifa Jackson
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Latifa Jackson
Faculty Advisor's email: latifa.jackson@howard.edu

Coauthors: Fatimah Jackson, Zainab Elradi-Jackson

The large-scale capture, forcible kidnapping, and subsequent forced labor exerted tremendous stress on the biology of enslaved Africans. This stress provided the substrate for natural selection in New World African populations. The environmental and social conditions of enslavement, post-civil war reconstruction, and Jim Crow racism in the United States have had an enduring impact on African Americans and their descendants. Chronic stress associated with enslavement is manifested partially in elevated stress levels and, in turn, have served as catalysts for other adverse health outcomes. Elevations in circulating cortisol levels have been indicated as a significant influencing factor in psychological stress disorders such as depression and post-traumatic stress disorder. Stress responses were reinforced no doubt by the long-term food insecurity associated with enslavement. Chronic food deprivation and food instability are thought to have further exacerbated the trauma associated with other adversarial environmental influencers. The picture we can paint suggests long-term negative implications of slavery and institutionalized racism for enslaved African Americans and their descendants. However, the picture would also have to include significance evidence of resilience and adaptive survival mechanisms emerging that ameliorated many of the disadvantageous consequences of a sub-optimal environment. Epigenetic changes associated with significant trends in African American biological history provide a context for understanding the implications of this history on contemporary health disparities.

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**Effects of Metformin in Combination with Voluntary Exercise in a Female Transgenic Mouse Model of Alzheimer's Disease**

Presenter's Name: Aida Jaldi
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Joanne Allard, Ph.D.
Faculty Advisor's email: joanne.allard@howard.edu

Coauthors: Oluwaferanmi Bello, Tosin Ajisebutu, Toyosi Falegan, Dexter Lee, Verona Mulgrave, Talia Smith, Joanne Allard

Epidemiological evidence strongly suggests that Type-2 Diabetes Mellitus (T2DM) is a risk factor for the development of Alzheimer's disease (AD), a severe neurodegenerative disease characterized by progressive cognitive impairment. Interestingly, it has also been demonstrated that AD brains, regardless of the presence of diabetes, exhibit insulin resistance or insulin insufficiency. Thus, it would be important to elucidate any potential risks or benefits of commonly used diabetes treatments, such as the heavily used oral antidiabetic agent metformin, on overall brain health. The goal of this study is to elucidate the impact and mechanisms by which insulin sensitizing strategies affect brain function, neuronal insulin signaling and the progression of neurodegenerative disease. Specifically, to determine how metformin and voluntary aerobic activity affects insulin signaling and AD pathology in the adult mouse brain. Adult, female APP/PS1 transgenic mice were categorized into exercise, sedentary, metformin treated and untreated groups. Voluntary running-wheel activity was monitored and metformin was given at a daily dose of 70 mg/kg body weight for one year. Glucose metabolism and amyloid plaque deposition were analyzed. These results provide new information on the effects of metformin in combination with voluntary running activity on AD-like pathology and brain biochemistry.

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**Influence of genetic variation in SNP rs2854464 within the ACVR1B gene on muscle strength in Caucasian cohorts**

Presenter's Name: Whitney Jones
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Laura Tosi
Faculty Advisor's email: LTOSI@childrensnational.org

Coauthors: Danny Lee, Steven McKenzie, Helen Miller, Zachary Zeller, Mohamed Al-Amoodi, Seth Stubblefied, Susan Knoblach, Heather Gordish-Dressman, Dustin Hittel, Laura Tosi

Skeletal muscle strength is highly influenced by genetic variation in the ACVR1B gene, particularly the single nucleotide polymorphism (SNP) rs2854464. Non-athletes with the AA allele of this SNP were associated with 2% increase in knee muscle strength as well as increased sprint/power performance in a Caucasian cohort, but not a Brazilian cohort. This study seeks to expand our understanding of the influence of genetic variation in SNP rs2854464 on muscle strength in additional cohorts of young adults. DNA samples were obtained from the Functional Single Nucleotide Polymorphism Associated with Human Muscle Size and Strength, FAMuSS (n= 441; males: n =165, females: n =276, average age 23 years) and the Assessing Inherited Markers of Metabolic Syndrome in the Young, AIMMY University of Calgary (UC) cohorts (n= 209; males: n= 102, females: n= 107: average age 23 years). Analysis of covariance (ANCOVA) was used. Significant association was observed between rs2854464 and baseline 1-RM strength in the dominant arm of males in the FAMuSS cohort. Homozygotes of the common allele AA (29.37±0.59) had significantly greater baseline 1-RM strength versus homozygotes for the rare allele GG (23.51±2.17; $p = 0.0300$). This is one of the first studies to demonstrate the influence of the A allele of rs2854464 in ACVR1B on muscle strength in a sexually dimorphic manner, which may be due to role of ACVR1B in myostatin signaling. This study successfully replicated the results of previous studies by showing a positive correlation between increased muscle strength and the rs2854464 common variant of ACVR1B.

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**Disruption of a Short Open Reading Frame (sORF) In The mRNA 5' Leader Sequence (5'LS) of the Type 1 Angiotensin Receptor (AT1R) Increases Angiotensin II (Ang II)-Induced AT1R Internalization and Signaling through the Extracellular Signal-Regulated Kinases**

Presenter's Name: Parnika Kadam
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Kathryn Sandberg
Faculty Advisor's email: sandberg@georgetown.edu

Coauthors: Hong Ji, Amrita Pai, Robert Speth, Susette Mueller, Kathryn Sandberg

**Background**: Antagonists of the AT1R are widely prescribed clinically to treat hypertension and associated cardiovascular and renal diseases. We investigated the effects of a sORF in exon(E) 2 in the AT1aR mRNA 5' leader sequence on Ang II-induced AT1aR internalization and ERK1/2 signal transduction pathway. **Methods**: Human embryonic kidney-293 (HEK) cells transfected with intact [E1,2,3-AT1aR] or disrupted sORF [E1,2(-108T),3-AT1aR] plasmids were used to perform radioligand binding studies and western blotting. **Results**: Binding assays demonstrated that disruption of the sORF increased AT1aR binding by 1.4-fold after 30 min of Ang II stimulation [AT1aR (cpm): E1,2,3-AT1aR, 5865±1040 vs. E1,2(-108T),3-AT1aR, 8201±878; $p<0.05$; n=2;] and 1.3-fold more AT1aR was internalized after 15 min of Ang II treatment [AT1aR (cpm): E1,2,3-AT1aR, 9576±399 vs. E1,2(-108T),3-AT1aR, 12,440±292; $p<0.05$, n=2]; however, the rate of Ang II-induced AT1aR internalization did not differ between the two constructs. Western blotting showed Ang II stimulation led to peak increase followed by decline in ERK1/2 activity between 10-40 min in cells expressing the intact sORF but disruption of the sORF led to sustained ERK1/2 activation up to at least 40 min. A dose response curve indicates that disruption of this sORF increases ERK1/2 signaling induced by an AT1aR biased agonist which selectively activates the β-arrestin-ERK1/2 signaling cascade. **Conclusion**: This study supports previous findings that a seven amino acid peptide (PEP7) encoded by this sORF is a selective inhibitor of AT1R-mediated ERK1/2 activation. PEP7 may act as a potential therapeutic by dissecting the physiological and pathophysiological role of β-arrestin-dependent and -independent AT1R signaling cascades.

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**Trees, Traffic, and Health: An Analysis of Aerial Particulate Matter on Four Streets in Washington DC**

Presenter's Name: Daniel Koenemann
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: George Middendorf
Faculty Advisor's email: gmiddendorf@gmail.com

Particulate matter can adversely affect human health causing respiratory irritation and chronic asthma. While often thought to be restricted to dust inhalation associated with mining, high particulate matter concentrations in cities are increasingly recognized as a health issue. Particulate matter levels in cities are determined by two key factors: exposure to vehicular traffic (volume and distance) and the presence/absence of street trees. We measured particulate matter at weekly intervals on four streets (Q, R, S, and T) in NE and NW Washington DC over a period of two months. These data were then correlated with relative tree cover and known traffic volumes in the sampled area using data from the District of Colombia Department of Transportation (DDOT) and satellite imagery. We hypothesized that locations closest to major thoroughfares and commuter arteries would show higher levels of particulate matter but that these levels would be reduced by the presence of trees. Preliminary data analysis revealed particulate matter levels to be positively correlated to traffic flow, with streets nearer major thoroughfares exhibiting higher levels of particulate matter. Specifically, Q street contained the greatest amount of particulate matter coupled with the historically highest level of vehicular traffic. The relationship between tree cover and particulate matter revealed that streets with greater tree density showed reduced particulate levels.

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**Restriction of ex vivo HIV-1 Infection in SCD Trait is Mediated by HO-1, IKBα and RNR2**

Presenter's Name: Namita Kumari
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Namita Kumari
Faculty Advisor's email: namita.kumari@howard.edu

Coauthors: Javed Khan Khan, Asrar Ahmad Ahmad, Patricia E Houston, Nowah Afangbedji, Tatyana Ammosova, Sharmeen Diaz, Sohail Rana, Sergei Nekhai

We recently demonstrated that activation of anti-viral restriction factor SAMHD1 and NF-κB inhibitor, IkBα, mediated inhibition of ex vivo HIV-1 infection of peripheral blood mononuclear cells (PBMCs) from Sickle Cell Disease (SCD). HIV-1 inhibition is mediated by low intracellular iron levels, maintained by iron export protein, ferroportin, which inhibited CDK2 activity and prevented SAMHD1 phosphorylation leading to SAMHD1 activation. Here, we further analyzed ex vivo HIV-1 infection in SCD and SCD

trait (HbAS) PBMCs using replication competent HIV-1 IIIB which showed inhibition of the infection. Analysis of a hazard ratio associated with HIV infection showed that in a group of 11, 412 SCD trait subjects it was 1.0% comparing to >2% among African-Americans in USA. Thus, we compared HIV-1 viral load in 9 HbAS HIV-1 infected individuals with 107 HbAA or HbAC enrolled at Howard University clinic. Although hemoglobin levels in these two groups were not significantly different, HIV-1 viral load and HIV-1 associated complications (hospitalizations) was significantly lower in HbAS group. Levels of HIV-1 env and gag were significantly lower in HIV-1 infected SCD trait subjects. Also expression of HO-1 and IKBα mRNAs were upregulated. In non-infected SCD trait individuals, expression of HO-1 mRNA was also increased suggesting potential protection from HIV-1 infection. Analysis of CDK2 activity, SAMHD1 phosphorylation and RNR2 expression in SCD trait PBMCs showed no change in CDK2 activity and SAMHD1 phosphorylation. However, RNR2 expression was reduced. Our findings collectively suggest that HO-1, IKBα and RNR2 might play a role in HIV-1 restriction in SCD trait.

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**Isolation and Characterization of Mycobacteriophage CamL**

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

Coauthors: Madison Moore, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Ghosh Somiranjan, Winston Anderson, Mary Ayuk

**Background:** Mycobacterium smegmatis is one of the species that make up the genus Mycobacterium within the phylum Actinobacteria. Within the Mycobacterium genus, many species affect human-health such as M. tuberculosis (tuberculosis) and M. leprae (leprosy) but M. smegmatis is commonly found within environmental samples. From the environmental samples, we study how bacteriophages can assist in understanding the diversity and evolution of the phages. This helps the understanding of phages, their benefits, and uses against antibiotic resistant bacteria. **Methodology:** CamL was collected in a soil sample in front of the Howard University sign on Georgia Avenue and Howard St (38.91778 N, 77.01694 W). The phage was processed through a series of spot tests, plaque purification assays, and empirical tests to calculate the titer of the phage lysate. DNA was then utilized for gel electrophoresis, restriction enzyme digests, transmission electron microscopy and sequencing to characterize the phage. Currently, lysogenic work is being conducted to determine whether or not the phage CamL is a lysogenic phage through streaking protocols and patch assays. **Results/Conclusion**s: CamL produced plaques 5 mm in diameter with a titer of 1.45x1010 pfu/ml. The DNA was extracted with a concentration of 184.2 ng/ul and a purity of 1.86 (λ 260/280). From the first experiment of testing the soil sample through direct isolation, CamL revealed itself to be a fast-growing phage. CamL's DNA is currently being annotated so as to understand its uniqueness, the function of the genes, and compare it to other known characteristics of other phages.

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**Characterization of the Bacteriophage Imani**

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

Coauthors: Courtney Robinson, Somiranjan Ghosh, Broderick Eribo, Ayele Gugssa, Ph.D., Winston Anderson, Leon Dickson, Jerome Oliver, Mary Ayuk, Jesrite Michaels

Bacteriophages, colloquially known as phages, are bacterial viruses that are capable of infecting only bacterium. Phages are dynamic such that they vary in their morphology, size, turbidity, host range, type (lysogenic or lytic), and genome sequence. Characterization of phages allows for phage therapy to become more of a probable and realistic approach to battling issues such as antibiotic resistance and human diseases. The environmental samples were collected on September 11th from 38°55'18" N and 77°1'9" W of the corner between 4th and Bryan street. The samples were assayed using spot assay and plaque assay to confirm the presence of the putative phage. The putative phage underwent three rounds of purification to decrease the amount of variation of the phages.A high titer lysate was generated based on web plate calculations. PCR (polymerase chain reaction)

was used to amplify the amount of DNA and the high titer lysate was used for DNA extraction. Restriction enzymes were used to cut the DNA that loaded into a well for gel electrophoresis which exhibited a faint band. The titer of the lysate was calculated to be 1.7*109 pfu /ml. The titer produced clear individual plaques that were 2mm in diameter. After completing DNA isolation the DNA concentration of the titer was determined to be 78.7 ng/µl. The next step is using quadrant streaking and sensitivity assays to test for the presence of lysogens. The program DNA Master will be used to annotate and identify the phage and its' potential benefits.

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**The Characterization of Phage NEDRA12**

Presenter's Name: Arden Leblanc
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Leon Dickson, Lourdes Fernando, Adrian Allen, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, Hemayet Ullah

**Introduction**: Bacteriophages, more commonly known as phages, are viruses that infect bacterial cells. Phages are ubiquitous and highly diverse. The discovery of phages took place about a century ago, yet only a fraction of phages has been categorized genomically. Because of this, several organizations such as the Science Education Alliance- Phage Hunters Advancing Genomics and Evolutionary Science have commenced research efforts intended to isolate, characterize, and discover as much information on phages as possible. The aim of my project is to characterize Phage Nedra12 that was isolated from soil at Howard University's campus. **Materials/Methods**: Standard microbiology and molecular biological techniques were used in this experimentation. This data subsequent assays were used to determine the lysogenic characterization of Nedra12. The aseptic technique was practiced throughout the experimentation for the prevention of microbial contaminants. **Results**: Phage Nedra12 was obtained from the garden of the Harriet Tubman Quadrangle, isolated, purified and gave clear plaques <1mm in diameter. The lysate obtained yielded a titer of 8.94x105 pfu/ml. Lysogeny testing confirmed that Nedra12 was a lytic phage. **Discussion/Conclusion**: This is a purely lytic phage that makes plaques with a diameter smaller than 1mm. Because of these very small plaques, it was difficult to obtain a high titer lysate Future experimentation of phage Nedra12 can have its DNA analyzed, be sent for DNA sequencing.

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**Utilizing CRISPR/Cas9 genome editing system as a tool to generate exon-specific GFP-tagged etr-1 strains for investigation of novel roles of ETR-1 in C. elegans**

Presenter's Name: Lakai Legg
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

Coauthors: Ruby Boateng

**Background**: ETR-1 is an ELAV-type RNA-binding protein in C. elegans whose human homologue, CUGBP-1, has been implicated in Duchenne myotonic dystrophy. Previous studies(1,2) have implicated ETR-1 in muscle development(1), when progeny of ETR-1 depleted animals arrested at an embryonic stage, and in reproduction(2), as ETR-1 depletion resulted in a reduced brood size. Upon further investigation, we observed that etr-1(RNAi) animals accumulate apoptotic cells in their germlines2 and ETR-1 seems to be acting in the CED-1 engulfment pathway regulating the timing of engulfment of apoptotic cells(2). Other ETR-1 depletion phenotypes observed include smaller oocytes size and decreased yolk accumulation in maturing oocytes. These observed phenotypes indicate that etr-1 may play additional roles in reproduction besides engulfment of apoptotic germ cells. etr-1 exhibits 19 alternatively spliced isoforms and we hypothesize that specific isoforms of etr-1 are important for muscle function and different isoforms are important for reproduction. **Methods**: Using CRISPR/Cas9 genome editing technology we are generating exon-specific and C-terminus GFP-tagged strains to study the spatiotemporal expression of the 19 isoforms of ETR-1. **Results**: Upon tagging exon 8 (isoforms: A and B) and exon 2 (isoforms: A, D, E F, G, and L) we found that the aforementioned isoforms are expressed in the germline, apoptotic germ cells, spermatheca, and polar bodies of developing embryos. **Conclusion**s: Using CRISPR/Cas9 technology, we were successfully able to tag etr-1 and observed

that certain ETR-1 isoforms are expressed in reproductive tissues, apoptotic germ cells and embryos. Therefore, ETR-1 is playing roles in reproduction and germline.

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**The Life of Kahirah: Phage Discovery, Purification and Characterization**

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

Coauthors: Madison Moore, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background:** The purpose of the project is to isolate, purify and characterize new bacteriophages from environmental soil samples. Bacteriophages are viruses that infect bacteria. In this project we are looking for phages that infect the bacterium Mycobacterium smegmatis, this is one of more than 100 species that make up the genus Mycobacterium, with some members of the genera affecting human health such as M. tuberculosis and M. leprae, which cause tuberculosis and leprosy respectively. **Methods:** Phage Kahirah was collected from a soil sample outside of the Biology building on the campus of Howard University (38.9217 °N, -77.0200 °W), 5.8 cm deep. An enrichment filtrate was used to increase the number of bacteriophage particles in the sample and the probability of isolating one of them. Through a series of plaque purification assays, same morphology plaques of phage Kahirah were isolated. Webbed plates were generated, lysate collected and quantified. Phage DNA was isolated and used for restriction digest and the lysate was used for transmission electron micrograph preparations. **Results:** Plaques were 2 mm in diameter and were clear. Lysate titer was 1.55 x 1010 pfu/ml. DNA concentration of 264.4 ng/µl and purity of 1.87 (λ260/280) was recorded. **Conclusion**: Phage Kahirah was isolated, purified and the lysate is currently being used for lysogen sensitivity assays.

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**Bacteriophage Isolation, Purification, and Analyzation: Chargie21**

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

Coauthors: Jerome Oliver

Bacteriophages (phages) are viruses that infect bacterial hosts; the phages replicate within the bacteria and then destroys them through either the lytic or lysogenic cycle. The host bacterium strain that will be used and infected by the phages in the experiments carried out throughout this program is Mycobacterium smegmatis mc2155 (M. smeg or "smeg"). This host bacterium is ideal because it is easy to handle, easy to grow, and most importantly nonpathogenic. The soil sample was collected on September 11, 2017, underneath the Howard University sign on the corner of 4th Street and Bryant Street at the coordinates 38°55'18"N and 77°1'9"W 7.5cm deep. Following collection, phages in the sample were isolated through both direct and enriched isolation. Standard 10-fold dilutions in conjunction with the protocol for picking plaques were used to dilute the sample. Three successful rounds of serial dilution were followed by the production of a webbed plate later used to gather lysate. The high-titer lysate collection, spot titer, and a full plate titer were used to determine the phage had a titer of 3 X 109 pfu/ml. Next for purposes of creating and testing possible lysogens in the isolated phage sample a spot test was conducted. Mesas produced from said spot test were picked, purified and verified by streaking and patch assay. In addition, DNA has been extracted from the phage and a high concentration of the DNA was found and led to the sequencing of its genome.

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**Radioactive Iodine Bioremediation**

Presenter's Name: Haley Lowe
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Leslie Mckinnon, Daphne Owens

**Background**: The Hanford Site, in the state of Washington, was chosen by the United States government for plutonium production in support of the Manhattan Project in 1942. For four decades, radioactive byproducts were stored in single- and double-sided tanks, steel drums and wooden boxes, and sometimes in unlined pits and trenches. As a result, leaks, spills and diffusion have contaminated the environment at Hanford with plumes of radioactive materials such as chromium, tritium, iodine-129, and carbon tetrachloride. Collaborators at the Pacific Northwest National Laboratory have isolated a small number of bacteria that are indigenous to Hanford and can transform iodine. Understanding the metabolic properties of these organisms is vital to establishing bioremediation protocols. The goal of this study was to identify and characterize additional bacteria isolated from Hanford. **Methodology**: Sequencing of 16S rRNA genes was used to identify isolates. Biochemical tests investigating nitrate reduction, and glucose and oxygen utilization were used to characterize metabolic properties, as well as identify other properties that may be useful in the context of bioremediation. Q-PCR was used to detect genes that encode nitrite reductases. Additionally, assays were conducted to quantify iodate reduction to iodide. **Results**/**Conclusion**s: Isolates included Bacillus, Pseudomonas, and Sphingomonas. Isolates of particular interest included Arthrobacter and Enterobacter that contained nitrite reductase genes and were positive for iodate reduction. These data support previous studies that suggested that bacteria native to the Hanford Site have the potential to be applied in bioremediation efforts to reverse the effects of years of unregulated radioactive waste disposal.

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**Analyzing Bacteriophage 'Basquiat'**

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

Coauthors: Briana Louis, Jerome Oliver, Mary Ayuk, PhD., Broderick Eribo, PhD. , Ayele Gugssa, Ph.D., Courtney Robinson, PhD., Somiranjan Ghosh, PhD., Winston Anderson, PhD., Leon Dickson, PhD., Hemayet Ullah, PhD.

Bacteriophages, more commonly known as phages, are viruses specific to particular bacterial cells. Phages are characterized by the bacteria they infect, also know as the hosts. Phages are specific to their hosts, and only can overtake and reproduce by altering their hosts' DNA. The phages the researcher cultured was specific to the bacteria called Mycobacterium smegmatis, so these phages are Mycobacteriophages. The main purpose of this study is to identify, characterize, and ultimately discover one specific phage. This research can because phages have the ability to attack and destroy bacteria, which can be useful in discovering methods to treat bacterial infections. Phages were harvested from soil on the corner of 4th and Bryant Street NW, near the Howard University sign (38.921667 N, 77.019167 W). Those phages were isolated through many rounds of Phage Purification, using serial dilutions. After observing a consistent morphology amongst the small, round, lytic plaques, a Full Plate Titer was conducted, and 26 plaques were counted on one of the plates. The researcher concluded the titer to be 1.3x10^10 pfu/ml. DNA isolation was performed to obtain the phage DNA. After using a NanoDrop Spectrophotometer the DNA concentration of said phage was obtained, and the researcher discovered the concentration of their phage's DNA was 201.3 ng/ul. The isolated phage DNA, named Basquiat, was transported to Pittsburg Bacteriophage Institute for sequencing. The shotgun sequencing method used to sequence Basquiat's DNA was done with Illumina Sequencing, and it's genome length was 154,283 base pairs long.

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**Antimicrobial Activities Associated with Lactic Acid Bacteria in Laban and Greek Yogurt**

Presenter's Name: Abdullah Mashraqi
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Broderick Eribo
Faculty Advisor's email: beribo@howard.edu
Laban and Greek yogurt are fermented products made from lactic fermentation of milk by thermophilic starter cultures such as Streptococcus thermophilus and Lactobacillus delbrueckii subsp. bulgaricus. Laban is a fermented yogurt-like milk product that exists in different forms in the

Middle East countries, while the Greek yogurt is a rather concentrated and strained yogurt consumed worldwide. Lactic acid bacteria (LAB) have a very significant role in most fermentation **Methods:** Because of their ability to enhance the organoleptic properties such as taste and flavor, in addition to imparting a unique preservative that increase their shelf life. In this study, LAB were isolated from eight commercial brands of Laban and Greek yogurt obtained from retail outlets in Washington D.C. area. Representative isolates were identified by phenotypic and genotypic characterization. The 16S rRNA sequencing analysis identified the isolates as ***Streptococcus thermophilus, Lactobacillus helveticus, Lactobacillus casei, and Staphylococcus epidermidis***. All isolates except ***Staphylococcus epidermidis*** exhibited antimicrobial activities against several indicator pathogenesis, ***Escherichia coli*** O157:H7, ***Shigella sonnei, Listeria monocytogenes, Pseudomonas aeruginosa, Bacillus cereus and Enterobacter aerogenes.*** Further analysis of the nature of antimicrobial activities suggests that they may be bacteriocins.

**Keywords:** Lactic acid bacteria (LAB), LAB isolated from Laban and Greek yogurt, antimicrobial activity of LAB, bacteriocins, Antibiotic resistance, Laban, Greek yogurt, food borne bacteria.

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**Exploring SLC24A3 Association with Salt-Sensitivity in Various Populations**

Presenter's Name: Bryttany Mcclendon-Weary
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Campbell
Faculty Advisor's email: michael.campbell1@howard.edu

Salt-sensitive hypertension (SSHTN) is characterized by a rise in blood pressure in response to increased dietary salt intake, which can lead to a number of complications, including kidney disease and stroke if left uncontrolled. While multiple factors likely contribute to SSHTN in general, it has been hypothesized that elevated risk for SSHTN may be due in part to genetic adaptations in ancestral human populations. To explore this hypothesis and to better understand the genetic architecture of salt-sensitivity, we examined sequence variation in the SLC24A3 gene on chromosome 20, which plays a role in the transport of sodium, in 1461 individuals from 15 globally diverse populations. Our analyses uncovered a significant excess of nonsynonymous alleles in the coding region of SLC24A3 in non-African populations consistent with a model of positive selection for protein-altering variation. **Results:** These results suggest that there is bias towards mutations that result in amino acid substitutions in some human populations which could affect gene function and the risk for disease. Overall, this population genetic study sheds new light on the genetic basis and evolutionary history of a medically-relevant trait in humans.

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**Characterization of Mycobacteriophage RoliPoli**

Presenter's Name: Zion McCoy
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michelle Fernando
Faculty Advisor's email: lourdsmfernando@gmail.com

Title: Characterization of Mycobacteriophage RoliPoli

Authors: Zion McCoy; Michael Smith; Mary Ayuk; Leon Dickson; Somiranjan Gosh; Ayele Gugssa, Ph.D.; Courtney Robinson; Adrian Allen

**Introduction**: Bacteriopahges are viruses that infect bacteria. As a part of the SEA-PHAGES program I have isolated the page RoliPoli to add to the bacteriophage collection. This will increase our knowledge in enormous bacteriophage diversity and someday aid in discovering treatments for antibiotic resistance bacteria. **Methods**: Phage particles were isolated using enrichment of the soil and plating with Mycobacterium smegmatis MC2155. Then, purified by several rounds of plaque purification assays until only one morphology of plaques were present. RoliPoli was then harvested by flooding webbed plates. Characterization of RoliPoli started by fixing for TEM and DNA extraction. Restriction enzyme digest that was performed followed by agarose gel electrophoresis. Lysogeny testing performed. **Results**: RoliPoli is a lytic phage that produces small circular plaques that are about 1.6 mm diameter with a very high titer of 3.8 x 10^10 pfu/ul. The DNA concentration of RoliPoli was found to be 181ng/ul and the purity (260/280)

1.86. RoliPoli is a lytic phage because it did not produce a "mesa". **Conclusion**: RoliPoli is a completely lytic phage that was found right on the grounds of Howard University. Further characterization will be done to identify it unique characteristics.

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**Pediatric foreign body ingestion and aspiration trends and burden on United States Emergency Departments between 2006 and 2014**

Presenter's Name: Jamiela McDonnough
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Adedoyin Kalejaiye
Faculty Advisor's email: adedoyin.kalejaiye@howard.edu

Coauthors: Iasson Yi, Gezzer Ortega, Adedoyin Kalejaiye

Pediatric foreign body aspiration is a serious event that can lead to subsequent infection, illness, and death. We aim to describe the epidemiological characteristics of pediatric patients aged 0-17 years of age presenting to the emergency department (ED) to examine outcomes, airway management, and resource utilization to determine their burden on emergency departments and hospitals. Using the Nationwide Emergency department Sample (NEDS) database, we reviewed all ED visits between 2006 and 2014 for patients 0-17 years old with a primary diagnosis of foreign body aspiration or ingestion in parts of the airway (ICD9 -934, 933.1, 935.1). We collected information including demographics, ED/inpatient charges, advanced airway interventions, length of stay, and mortality. Results were compared across insurance status, hospital type, and socio-economic status.52,646 patients met our criteria. The mean age was 4 years, with 56.4% males. Total mean ED charges were $2,594 and mean inpatient charges were $16,881, with a mean length of stay of 1.6 days. A majority percentage of 69% were routinely discharged from all hospital types, and 10% were admitted. Less than 1% of all patients required advanced airway management. Medicaid patients represented 57.5% of all admissions and 68.9% of all who died in the ED. The overall mortality rate was 0.12%. Foreign body aspiration, although with a mortality rate less than 1%, is a safety concern for the pediatric population with numerous ED visits nationwide. Medicaid patients represents the majority of admitted patients and majority of those who died in ED. Airway intervention was most prevalent in the inpatient setting.

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**The Role of Adenovirus Type 5 E4orf 1 gene in inducing genome content >G2/M Via Rac1 P13Kinase and NFkB manipulation**

Presenter's Name: Madison Moore
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Michael Thomas
Faculty Advisor's email: michael.thomas1@howard.edu

Coauthors: Michael Thomas

Genome content >G2/M is a phenomena that has been observed in various different forms of cancer. The lack in knowledge of the mechanisms by which cancer causes >G2/M in the cell must be overcome because it may lead to an improvement in cancer therapy. Adenovirus Type 5 induces genome content >G2/M[1], and here I will show the role that E4orf1 plays in this process. E4orf1 gene in adenovirus manipulates PDZ domain containing proteins which induce a variety of different cellular signaling and downstream effects including Rac1 and Pi3Kinase activation[2]. We hypothesize that E4orf1 induces DNA content >G2/M through manipulation of Rac1, PI3Kinase and there downstream signals to NFkB. Using Wild Type Adenovirus type 5, E1b55k/E4orf1 deleted double mutant, and E1b55K deleted mutant(dl1520) we show that E4orf1 gene contributes to DNA content greater then G2/M. Additionally we show that Rac1, PI3Kinase, and NFkB are involved in >G2/M in vivo using biochemical inhibitors NSC23766, LY294002, and SC75741. We use Flow cytometry to display a reduction in DNA content >G2/M in wild type and Dl1520 mutant treated with the inhibitors above by. Understanding the cell signaling cascade by which Adenovirus genes induce genome content greater the G2/M may shed light on transformed cells and the way they are able to continuously proliferate and push through the cell cycle.Additionally, the more we learn about Ad genes the better we can manipulate viral vaccine vectors as well as contribute to oncolytic virus design to create more efficient biomedical treatments.

**The Verification of Hawaiian Rumex Reproductive System**

Presenter's Name: Nwerebuaku Mpi
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: Janelle.burke@howard.edu

Rumex is a genus in the buckwheat family Polygonaceace that has a wide variety of species across the world. The main focus of this research is the Hawaiian Rumex species: ***Rumex albescens, Rumex giganteus, and Rumex skottsbergii***. Hawaiian Rumex are known to be monecious plants. Monoecious plants are species in which male and female organs are found on the same plant but in different flowers. With this information, the Hawaiian Rumex specimens were obtained from the National Museum of Natural History for scoring of the sex ratio of the flowers in order to document their plant reproductive system. This was done by first verifying the identity of each specimen, and then using a microscope to analyze 3-4 branches on each plant and recording the ratio of male and female flowers. Observing the results proved that Hawaiian Rumex specimens are in fact monecious with female biased ratio. In all three Hawaiian specimens, female flowers were more common than the male flowers. This could possibly be because female flowers have organs that produces seeds and fruits which results in the low ratio of male flowers.

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**Development of an EGFR and EGFRvIII-targeted Recombinant Immunotoxin for Cancer Treatment**

Presenter's Name: Kulsoom Naqvi
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Liang Shan
Faculty Advisor's email: liang.shan@howard.edu

**Purpose:** Epidermal growth factor receptor (EGFR) and its mutated form, EGFRvIII, are overexpressed in various types of cancer, serving as an optimal target for cancer therapy. To develop an EGFR/EGFRvIII-targeted recombinant immunotoxin (RIT) for cancer treatment, we generated a bivalent RIT (DT390-HuBiscFv806) by fusing the humanized antibody 806 (mAb806)-derived bivalent single-chain variable fragment with an engineered diphtheria toxin fragment, DT390. DT390-HuBiscFv806 has been extraordinarily cytotoxic against various human cancer cell lines expressing EGFRvIII and has shown to significantly inhibit the growth of established glioblastoma xenografts in immunodeficient mice following systemic administration. This study is designed to evaluate the efficacy of DT390-HuBiscFv806 in an immunocompetent mouse model. **Methods**: We first transfected a chimeric EGFRvIII DNA sequence (cEGFRvIII) (murine EGFRvIII with mAb806-recognized human epitope) into the murine GL261 glioma cell line and established a cEGFRvIII-expressing subline GL261-cEGFRvIII. A syngeneic C57BL/6 mouse model was then established using the GL261-cEGFRvIII cells. **Results**: The GL261-cEGFRvIII stably expressed cEGFRvIII, which could be recognized by DT390-HuBiscFv806. The cytotoxicity (the half maximal inhibition concentration, IC50) was 7x10-12 M for GL261-cEGFRvIII cells. In immunocompetent mice, the expression of cEGFRvIII did not affect the tumor take rate. Intratumor administration of DT390-HuBiscFv806 (2 μg/day for 5 days) significantly inhibited the growth of GL261-cEGFRvIII tumors and improved the mouse survival ($P<0.05$). **Conclusion**: The results indicate that DT390-HuBiscFv806 is promising for treatment of tumors with the EGFRvIII mutation. We are currently investigating whether DT390-HuBiscFv806 indues any anti-tumor immune response besides its direct cell-killing effect in immunocompetent mice.

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**Phage Nathani: a bacteriophage isolated from the campus of Howard University**

Presenter's Name: Vishal Nathan
Classification: Undergraduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Idalis Sosa, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney Robinson

**Background**: The Science Education Alliance: Phage Hunters Advancing Genomics and Evolutionary Science

(SEA-PHAGES) program is supported by the Howard Hughes Medical Institution and is at multiple universities, including Howard. The program supports research on bacteriophage diversity. A bacteriophage is a virus that parasitizes bacteria. They infect and reproduce themselves inside their bacterial hosts. The phage can undergo either a lytic or lysogenic life cycle. When a host bacterium dies due to phage replication plaques are formed. The bacterial host used for this project is Mycobacterium smegmatis mc2 155. Procedure: Phages were extracted from a soil sample in front of Just Hall at 38.9218 N, 77.0188 W. An enrichment technique was used to increase the number of phages in the soil sample. This was followed by isolation and purification. Serial dilutions and plaque assays were used to purify the phages and to obtain a single isolated plaque morphology. Then phage DNA was extracted. Lysogeny experiments were conducted using patch assays and streaking. **Results**: A single phage population was isolated and named Nathani. Its plaques were ~1.0 mm in diameter and its lysate had a titer of 2.15 x 1010 pfu/mL. DNA extraction resulted in a concentration of 217.1 ng/µL. **Conclusion**s: Clear plaques formed, which indicated that Nathani was a lytic phage. However, current experiments have shown that Nathani is also capable of the lysogenic life cycle. Continued research will be done to obtain clarity regarding Nathani's life cycle capabilities and its ability to infect lysogens made by other phages.

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**Characterization of a homozygous viable proteasome mutant, rpn-12(av93), in C. elegans**

Presenter's Name: Victoria Nguyen
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

Coauthors: Victoria Nguyen, Lourds Michelle Fernando

**Background**: Proteasomes are known to play a vital role in the protein degradation mechanisms of eukaryotic organisms, but very little is understood about whether proteasomes influence other cellular processes. We are using C. elegans to investigate the role of specific proteasome subunits and attempt to determine if individual subunits play roles distinct from protein degradation. Recently, a deletion of the proteasomal lid subunit, rpn-12, in C. elegans was shown to result in animals that were viable and capable of reproduction. Our research focuses on the further characterization of this specific rpn- 12(av93) allele in C. elegans. **Methods**: Fertility, mating, and lifespan assays were conducted at 20 °C and 24 °C. **Results**: Our findings demonstrated a significant decrease in the fertility of rpn-12(av93) animals at both temperatures, the rescue of rpn-12 mutants' fertility at 20 °C when mated with a wild-type male, and an increase in the average median lifespan of rpn-12(av93) at 20 °C. **Conclusion**: These results indicate that RPN-12 is not an essential proteasome subunit in C. elegans, but that it potentially plays a distinct role in the fertility and lifespan of the organisms. Further research involves analyzing how effective the mutant sperm are in comparison to the wild-type sperm, and endogenously tagging rpn-12 with GFP using CRISPR/Cas9 to further characterize rpn-12.

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**Status of ARNT and CYP2D6 gene in relation to Metabolic Dysfunction and Neurobehavioral Disease in Pakistani Participants: A quick look**

Presenter's Name: Zarish Noreen
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Somiranjan Ghosh
Faculty Advisor's email: sghosh@howard.edu

Coauthors: Jessica DeJesus, Afnan Shakoori, Attya Bhatti, Christopher A. Loffredo, Somiranjan Ghosh

**Background**: The epidemic of Type 2 Diabetes Mellitus (T2DM) and the possibility of it contributing to the risk of Alzheimer's disease (AD) have become an important health concern in Pakistan, and globally. To gain insights on their molecular imprints, the status of two biomarker genes, ARNT- for T2DM and CYP2D6- related to Neurobehavioral disorders (AD here), as identified earlier in this laboratory, and were evaluated under this investigation. **Materials & Methods**: Out of the total research participants (n=770) that were recruited earlier from four cities of Pakistan, eight participants were chosen as per their HbA1c status for the T2DM patients (n=3). Medical interviews, neurological examinations, and Magnetic Resonance Imaging (MRI) were done to categorize AD patients (n=4). High-throughput qPCR

Taqman Low Density Arrays (TLDA) were preformed on a predesigned custom array (16 formats, Applied Biosystem) and results were analyzed towards the relative quantification of these genes in these two groups compared to controls (n=2). **Results & Discussion**: the genes ARNT and CYP2D6 were both down-regulated in T2DM and AD groups, respectively. This has a clear corroboration with our earlier studies, where we observed the same scenario in heavily exposed subjects with chemical exposures that also aligned with our mechanistic study in vitro. Microarray studies for the global gene expression are underway on the Affymetrix platform along with Ingenuity Pathway Analysis (IPA) to connect the affected genes to divulge their mechanistic pathways that may be common or different under these two disease conditions.

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**Trends in Socioeconomic Disparities of Hernia Presentations at Emergency Departments**

Presenter's Name: Maria Nunez
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Daniel Tran
Faculty Advisor's email: Daniel.tran@howard.edu

Coauthors: Lucas Souza Mota, Gezzer Ortega, Iasson Yi, Daniel Tran

**Introduction**: Hernias represent the most common group of elective procedures performed by general surgeons. Our objective was to determine if ED utilization for uncomplicated hernias differs by demographics, socioeconomic-status, insurance-status, and complexity at presentation among a national sample. **Methods**: Retrospective analysis of 2006–2014 data from the Nationwide Emergency Department Sample, identified adult patients with a diagnosis of inguinal, femoral, and umbilical hernia. Cases were dichotomized: complicated and uncomplicated hernia. Groups were compared with unadjusted and adjusted analyses to determine factors that influence ED presentation.**Results**: Among 597,246 patients included, 73% were male and had a mean age of 55 years. Most patients had Medicare (37%), followed by Private insurance (27%), uninsured (20%), and Medicaid (16%). With respect to median household income (MHI) the majority were in the lowest income quartile (32%). Most were treated at an urban hospital (86%), and most had uncomplicated hernias (84%). Of those uncomplicated, 74% were male, 34% had Medicare and 33% were in the lowest income quartile. Uninsured patients made up 22% of the uncomplicated hernia group vs 12% of the complicated hernia group ($p<0.05$). On adjusted analysis, there was a higher likelihood of presenting as uncomplicated hernia for patients with Medicaid (OR 1.45 95%CI1.41-1.50), uninsured (OR 1.54 95%CI 1.50-1.58), and Medicare (OR 1.02 95%CI 0.99-1.05). And less likely if they were in the third and fourth MHI quartile (OR 0.86 95%CI 0.84-0.88 and OR 0.77 95%CI 0.75-0.78), respectively. **Conclusion**: Uninsured, publicly-insured, and low-MHI patients were more likely to present to ED with an uncomplicated hernia.

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**Exploration of bacterial DNA from New York African Burial Ground soil samples**

Presenter's Name: Ugonna Nwannunu
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Coauthors: Babajide Owosela, Carter Clinton

Preparation for the future is baseless without proper understanding of the past. At the Cobb Research Laboratory, we seek to illuminate the past through research of the remains and soil samples of peoples buried in the New York African Burial Ground (NYABG). The NYABG is a cemetery located in lower Manhattan that was established in the 17th Century. In it lies the remains of free and enslaved Africans, many executed for their participation in the African rebellions of 1712. Grave soil samples are used to analyze bacterial DNA samples—an effort significant to the goal of expanding knowledge on the genomic variation, evolutionary processes, and individual and cultural identities of the Africans whose remains were found in the NYABG. This could lead to the creation of a reference genomic database for this historic population to be available for data mining and expanding the presence of African descended peoples in genome-wide association studies. Presently, we have successfully extracted genomic DNA from the remains of burial sites 9, 148, 197, and 287—belonging to peoples estimated to be aged 12-55 years at time of death, each with their own unique histories.

In the initial reports, Burial 9 displays trace elemental signature analysis (ESA) clusters—suggesting that the male subject was born in and migrated directly from Africa. Other burial subjects display evidence of skeletal and joint related conditions such as osteoarthritis. The analysis of this bacterial DNA can potentially support these findings by displaying the unique microbiome signatures of each individual.

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**Inhibiting amyloid fibril formation using phenothiazine derivatives to stabilize an immunoglobulin light chain variable domain**

Presenter's Name: Janet Nwokolo-Aniekwu
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Coauthors: Boris Brumshtein, David Eisenberg

Amyloid fibrils are pathogenic protein deposits appearing in aggregation diseases such as systemic light-chain amyloidosis (AL). In AL, the variable domains of immunoglobulin light chains are overproduced. These variable domains exist in equilibrium between their monomeric and dimeric forms, with the monomeric form leading to formation of fibrils. To date, there is no known method of inhibiting fibril formation, but previous studies demonstrate possible strategies through stabilizing specific conformations of globular light chains. Using a chemical ligand to stabilize the cavity within the dimer is hypothesized to inhibit disintegration into amyloid-prone monomers. Mcg, a variant of a light chain variable domain taken from a patient, is used here as a model to investigate the specific binding of ligands to these dimers in fibril inhibition. The small molecule methylene blue has been discovered to specifically bind to the dimeric form of Mcg, and a class of chemical ligands called phenothiazines shares similar chemical structures with this molecule. Here, the efficacy of Mcg dimer stabilization at various phenothiazine derivative concentrations is analyzed under both acidic and pseudo-physiological pH conditions. Using thioflavin t (Tht), an amyloid fibril-binding fluorophore, we assessed relative fibril presence at various phenothiazine derivative concentrations. When normalized to Background ligand fluorescence, the derivative 2-Chlorophenothiazine exhibited low levels of overall fluorescence at concentrations of 0.8, 0.6 and 0.4 millimolar in the acidic buffer solution, suggesting inhibition of amyloid fibrils. These data implicate 2-Chlorophenothiazine as a potential Mcg dimer stabilizer, consistent with the hypothesized role of its chemical class.

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**The Isolation, Purification and Characterization of Phage Oleum**

Presenter's Name: Toluwani Odu
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Young Shaunda
Faculty Advisor's email: shaunda.young@howard.edu

Coauthors: Kristodea Boadum, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson,Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background:** Bacteriophages are viruses that infect bacteria. The aim of this project is to isolate and characterize bacteriophages. The study of bacteriophages could be helpful in understanding the viruses that affect humans as well as treatment of bacterial infections. **Methods:** Phage Oleum was collected from an environmental sample on September 15, 2017 in front of the Howard sign on Georgia Avenue, 38.9223°N, 77.0218°W, at 30°C and a depth of 13cm. The host bacteria, Mycobacterium smegmatis mc^2 155 is being used. Oleum was isolated using the direct isolation protocol. Spot tests and plaque purification assays were conducted. By obtaining webbed plates, flooding them with phage buffer for 3-4 hours and harvesting the phage buffer, a concentrated liquid phage sample (lysate) of Oleum was generated. Phage Oleum's DNA was extracted. Oleum was also characterized by transmission electron microscopy and restriction enzyme digests. **Results:** Through a spot test, it was confirmed that phage Oleum could infect the host bacteria. Plaques formed were round, clear and had a diameter of 5 mm. Through spot titer and full plate titer assays, the titer of the lysate was calculated to be 1.9 x 10^10 pfu/ml. After DNA extraction, a spectrophotometer was used to

determine that the DNA had a concentration of 196.6ng/μl and purity of 1.86 (λ 260/280). **Conclusion:** From the results gathered so far, we can conclude that Oleum can infect the host bacterium being used and after further characterization, we could learn about its physical characteristics. Phage Oleum is currently being used for lysogeny studies.

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**Self-Interactions of a virus glycan shield**

Presenter's Name: Eric Ogharandukun
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Preethi Chandran
Faculty Advisor's email: preethi.chandran@Howard.edu

Coauthors: Hashanthi Abeyratne-Perera

Viruses are able to infect cells because they possess a cell-surface component which enables them to bind on host cells, escape the surveillance of the immune system, and survive harsh environments. These physical properties on virus surface come from a coat or shield of carbohydrates present on it. These carbohydrates are attached to proteins embedded within the virus envelope or membrane. Current research in this field focuses on the chemical recognition of the sugars or proteins on the virus coat by receptors on host cells. Our goal is to interrogate the physical interactions of the virus coat in order to research broad-spectrum strategies that will disrupt the protection afforded by carbohydrate shield. The specific aim of the presented research is to test the propensity of sugar residues constituting the virus glycan shield to self-interact. The pseudovirus HIV pol- env- / VSV-G has a glycan shield that composed of mannose, galactose, sialic acid, and glucosamine residues. We synthesized gold nanoparticles coated with these sugars and tested the interaction with the pseudovirus. UV-VIS spectrophotometer results show that the plasmon resonance peak of the sugar-coated nanoparticles shifted in the presence of several of these sugars, but not in the presence of the control citrate-coated nanoparticles. The shift in colors is consistent with the coating on the nanoparticles being modified, possibly by binding to viruses. The UV studies were complemented by Dynamic Light Scattering studies which show a larger aggregate virus+nanoparticle species developing when there is a plasmon shift. AFM imaging was performed.

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**Fascin-1 interacts with Angiotensin Converting Enzyme 2 and modulates its enzymatic activity**

Presenter's Name: Blessing Ogunlade
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Catalin Filipeanu
Faculty Advisor's email: catalin.filipeanu@howard.edu

Coauthors: Eric Lazartigues, Jesse Guidry, Catalin Filipeanu

Angiotensin converting enzyme 2 (ACE2) catalyzes the conversion of Angiotensin (Ang)-II to Ang-(1-7) which by signaling through the Mas1 receptor prevents the pathologic effects of Ang-II activation of angiotensin type 1 receptor (AT1R) in the cardiovascular system. We showed for the first time that ACE2 expression and activity is decreased by enzyme internalization and degradation in lysosomes through an AT1R-dependent manner. The mechanisms involved in the downregulation of ACE-2 remains unknown, but proteins interacting with one of the two proteins may be important modulators of this process. Therefore, we performed a proteomic experiment in Neuro2A cells to find binding partners of ACE2. Only fascin-1, an actin-bundling protein interact differentially with ACE2 after Ang-II treatment (100 nM, 4 h). Confocal microscopy experiments confirmed these interactions. These complexes are colocalized in basal conditions at the plasma membrane and treatment with Ang-II (100nM, 4h) induced their internalization in the cytoplasm. Preliminary experiments in transfected HEK293 by western-blot demonstrated that Ang-II treatment for 18h significantly decrease the cellular enzyme levels. In contrast, in cells overexpressing fascin-1, ACE2 cellular levels were preserved despite treatment with Ang-II. Similarly, in HEK293T cells co-transfected with ACE2 and AT1R, treatment with Ang-II (100 nM, 4h) diminished the basal enzymatic activity (18381.51 ± 2429.94) by 36.04 ± 11.81%. Overexpression of fascin-1 did not significantly change ACE2 basal activity (85.57 ± 24.19), but Ang-II was unable to decrease enzymatic activity (85.03 ± 27.75). In conclusion our results suggest a potential role of fascin-1 in cardiovascular diseases by regulating ACE2 activity.

**A Brighter Future: How light pollution influences the attraction or repulsion of arthropods**

Presenter's Name: Lauren Okafor
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu

Coauthors: Kyle Haynes

Light has strong and direct impacts on organismal behavior, reproduction, movement, and other natural functions. Thus, the increasing human introduction of light into normally dark nighttime environments, known as light pollution, is of significant concern to ecologists. In addition, the recent adoption of light emitting diode (LED) over high-pressure sodium (HPS) and other older lighting technologies may be increasing the attraction of insects to artificial lights. Effects of this attraction can include greater exposure to predators in these lit areas. In this study, the attraction or repulsion of arthropods to two different colors of LED lights ("white" and "soft white") was examined in a field experiment. There was also a control treatment which featured no light source. Specimens captured in directional traps 3 m and 6 m from a lamp post with either an LED light or no bulb (control) were categorized by morphospecies and taxonomic order. The emission spectra of the "white" and "soft white" bulbs used in the experiment was also quantified. This study has provided insight on the impact light pollution has on invertebrate behavior as they can be actively attracted to or repulsed by the light, and the awareness that LED color does in fact play a role in these responses. Thus, this study provides a deeper understanding to the impact of light pollution on ecological communities.

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**Racial Composition of Hospital and Myocardial Infarction: Inpatient Outcomes**

Presenter's Name: Priscilla Okunji

Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Nursing & Allied Health Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: n/a
Faculty Advisor's email: priscilla.okunji@howard.edu

Coauthor: Johnnie Daniel

**Introduction**: Depending on hospital characteristics, patients with myocardial infarction (MI) reportedly have different outcomes. In the present study, we evaluated the differences in the outcomes of patients with MI between a predominantly black private non-profit (PNP) medium urban teaching hospital (MUTH) and predominantly white PNP MUTHs. The differences between the categories such as private investor owner (PIO), and government non-federal (GNF) hospitals were investigated. **Method:** Discharged patients diagnosed with myocardial infarction in 2012 were extracted from a U.S. nationwide patient dataset. International Classification Data, ICD 9 codes (41000 for MI) was used for the extraction, according to hospital setting, size, and teaching status. This dataset was then compared with another dataset extracted from a private non-profit (PNP) medium urban teaching, predominantly black hospital. Comparisons were made among the hospital categories. **Results**: The results showed that the MI patients discharged from the predominately black MUTH had a higher percentage of female patients, tended to be younger with higher incomes, and had a much higher percentage of patients who stayed in the hospital two or more weeks than was the case for the MI patients discharged from the predominantly white MUTHs. The total hospital charges for the predominantly black MUTH were similar to the charges from the predominantly white PNP teaching hospitals and the GNF teaching hospitals. **Conclusion**: This was a comparative pilot study to ascertain the differences in outcomes between the urban teaching hospital and other comparable national hospitals. Additional research may further explore these differences in depth.

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**Journey of Characterizing Cluster B Mycobacteriophage Omniscient**

Presenter's Name: Boluwatito Oladeinde
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourds Fernando, Adrian Allen, Mary Ayuk, Ghosh Somiranjan, Ayele Gugssa, Ph.D., Courtney Robinson, Hemayet Ullah, Leon Dickson

**Introduction**: Bacteriophages are viruses that infect bacteria. We intend to identify bacteriophages in the environment as a part of the SEA PHAGES program to catalog bacteriophages in the soil that infect Mycobacterium smegmatis. This would add to the understanding of the diversity of phages on earth. I named the phage I purified omniscient which is a cluster B and subcluster B1 pahge and being further characterized to identify its uniqueness. **Methods**: Soil was collected from the garden outside the Harriet Tubman Quad. Standard microbiology techniques were used to isolate mixed population of phages by enriching soil sample and plating with M. smeg that was later purified by plaque purification assays until it formed plaques with similar morphology. After collecting a lysate with high titer fixed for TEM and genomic DNA was extracted to send for illumina sequencing. Lysogenic studies were performed. **Results**: Phage Omniscient is a purely lytic phage that forms plaques with a diameter of 8.4mm. Lysate with a titer 6.3x109 pfu/ml gave us 454.4ng/ul DNA with a 260/280 value 1.85. After genome sequencing it was categorized as cluster B sub cluster B1 phage with a genome size of 69197bp. **Conclusion**: Genome sequencing revealed that phage Omniscient is a unique phage. TEM images will reveal the structure of the phage particles. Genome annotation is underway to further characterize Omniscient.

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**Evaluating the Activity of Community 31 Bacteria from the Hanford Site in the Bioremediation of Iodate.**

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

Coauthors: Tafadzwa Chigumira, Deondre Glover, Yaolin Fennell, Kimberly Jones, Patrick Ymele-Leki

This research aims to develop methods for in situ microbial reduction of radioactive iodate (I129) from radioactive waste contaminated groundwater at the Hanford Nuclear Site in Washington State. A microbial community, named "Community 31", was isolated from the Hanford site. The community has yet to be characterized but was suspected by researchers at the Pacific Northwest National Laboratory (PNNL) to have iodate reducing potential. Microbial reduction is the use of microorganism to decrease the oxidation number of a chemical species. In this case, Iodate (oxidation state of +5) was targeted to be reduced to Iodide (oxidation state -1). Community 31 was cultivated in a specially designed minimum media (Glover's M9) that allowed for analysis of iodate concentration with UV spectrophotometry. A batch culture of the microbial community was exposed to an initial concentration of 100micromole/Liter of iodate with constant shaking under anaerobic conditions. The experiment was carried out in the dark to reproduce groundwater conditions and was monitored over 24 hours for growth and iodate reduction. Samples were taken every 4 hours and measured in the UV-Spectrophotometer. Approximately 40% reduction in iodate was recorded after 24 hours. The data suggests that Community 31 may reduce iodate. This could have significant environmental implications as it suggests another approach for remediation of contaminated groundwater at the Hanford site.

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**Nisin enhances uptake of RNA-DNA Hybrids in Breast Cancer Cells**

Presenter's Name: Jerome Oliver
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Broderick Eribo
Faculty Advisor's email: beribo@howard.edu

Coauthors: Broderick Eribo, Lorena Parlea

Nisin is a polycyclic bacteriocin that is produced by the bacterium, Lactococcus lactis that is used as a food preservative. Nisin exhibits characteristics that have an effect on cancer cells, mainly in its ability to target and kill different cell lines. This study focuses on its ability to change the uptake of fluorescence RNA-DNA hybrids on breast cancer cell membrane. Non-fluorescence Green Fluorescence Protein (GFP) Breast Cancer cells were cultured and plated on a 24 well polystyrene plates at approximately 30,000 cells per well. After a 24 hour incubation, cells were treated with various concentrations of RNA-DNA Hybrids (5nM & 10nM), nisin (500-900 ug/ml), and transfection reagent (2 uL) in a reduced serum media. After four hour incubation, cells were analyzed by BD- Accuri flow cytometry. The results show that there was a 3-fold increase with nisin at

500ug/ml compared to the control with the transfection reagent at 5uM H-Al546 only. The highest level of uptake (63.3%) was observed at 900 ug/ml of nisin and 10uM (at 100%) hybrid nucleotides concentrations. The results show that nisin may be a better alternative to the transfection reagent used traditionally to perform uptake experiments.

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**Phage Naija**

Presenter's Name: Charity Onwuchekwa
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacteriophages are viruses that infect bacterial hosts. Bacteriophages have properties like other viruses. They cannot replicate by themselves hence they require a host bacterial cell to reproduce. The central dogma theory explains how bacteriophages use host cell machinery to replicate. Bacteriophage tail fibers recognize and bind to their host bacterial cell. The phage then injects DNA into the host cell. The phage captures host replication machinery to replicate. The phage DNA is then transcribed to RNA which is then translated to phage proteins.This project included a series of protocols to collect, isolate, purify, amplify, and eventually characterize phage Naija. Phage Naija is a phage that infects the bacterium Mycobacterium smegmatis mc2 155. Phage Naija was collected from 38.9223 N, 77.0218 W, in front of the Howard University sign on 2400 Georgia Avenue, Washington D.C 20059. Phage isolation after soil collection revealed the presence of a phage, indicated by the presence of plaques in the spot test protocol. Then, clonal phage population was obtained through several rounds of phage purification. Amplification, extraction of phage Naija DNA, and characterization then followed. The titer of phage Naija was recorded to be 9.75 x 10^9 pfu/mL. After the phage DNA was applied to the nanodrop, phage Naija was revealed to have a concentration of 306.8 ng/ µL and a purity of 1.89. This purity is very close to 2, meaning that phage Naija is highly pure and concentrated. Illumina sequencing revealed that phage Naija is a lytic phage whose genome is 155,256 bp long.

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**Detection and analysis of bacterial DNA from New York African Buriaal Ground soil samples to confirm causes of premature death**

Presenter's Name: Shyan Organ
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

The New York African Burial Ground (NYAGB) collection located within the W. Montague Cobb Research Laboratory contains numerous soil samples containing the remains of African Americans that lived in post-colonial New York City. Studying and researching this extensive collection may be able to provide insight into the conditions that these individuals lived under and how their genomes were affected. Due to the limitation of resources at this time, human DNA proves difficult to detect in these remains. Instead we have set out to detect human associated bacterial genes. The bacterial species that are found in the samples will tell us more about the lifestyle of the individual associated with each of the human remains. The aim of this study is to extract and analyze bacterial DNA from soil samples in the NYABG collection. Genomic DNA was successfully extracted from soil samples 45, a child's remains where meningitis was evident in the bones and burial 47, the remains of a middle-aged male where periostitis was observable in the limbs and cranium. The extraction was performed using a Power Soil DNA isolation kit. After screening the primary sample for any genomic evidence, the DNA will be amplified using PCR and screened for 16s rRNA genes that are bacteria specific. If these genes are found within the samples, identification and analysis of the consequent bacterial species can be used to confirm whether or not these individuals in fact died from the bacterial diseases indicated.

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**The Authenticity of the World's Most Expensive Spice, Crocus sativus (Saffron)**

Presenter's Name: Morinne Osborne
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu

In this study, I examined whether or not the spice saffron (***Crocus sativus***) that I have collected from various online sources were adulterated. Expensive spices and herbal supplements, such as saffron, are often duplicated using cheap additives. Since saffron has been characterized as one of the most expensive spices in the world, I hypothesized that the saffron bought online would also be adulterated. To determine the quality of the samples and identify the true ingredients of each sample, I conducted DNA Barcoding. The two gene regions of rbcL and trnH-psbA were utilized and amplified using PCR. After confirming DNA extraction and ensuring that there was no contamination, the samples were then sent to a lab for sequencing and further analysis using the BLAST database, a program designed by the National Institutes of Health (NIH). It was found that not only were the samples in the genus Crocus, but many of the top results were classified as ***Crocus sativus.***

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**Mycobacterium Smegmatis: The Discovery of Phage Kojo**

Presenter's Name: Adjoa Osei-Ntansah
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

In order to find a bacteriophage that infects the host bacterium, ***Mycobacterium Smegamtis***, a soil sample was extracted from 38.9 degrees latitude, -77.025 degrees longitude, which is in front of Howard University Hospital. The supernatant, which was created from 15mL of the soil sample and 7H9 being vortexed, incubated, and centrifuged, was used to conduct a direct plating. Whereas, the remaining was used to plate an enrichment filtrate. However, it was still not known if there were bacteriophages present in the soil, until it was confirmed by a spot test. A selected plaque was obtained from the spot test, and several rounds of plaque assay for plate purification were performed in order to isolate a phage population. After a single phage population was identified, the plate was flooded, in order to collect the lysate. This lysate produced a titer which was 4.85 * 10^10 pfu/mL. In order to determine the concentration and purity, it was necessary to conduct a DNA extraction. After this procedure, using a spectrophotometer, we were able to deduce that the concentration and purity of the phage particles in this sample was 200 ng/microliter and 1.87 on a 260/280 wavelength respectively. Currently, the annotation of the phage's genomic DNA is being annotated for the purpose of sequencing. With the number of the phages sequenced, they are able to be used as antibiotic resistance and disease diagnosis. If more are discovered, its implications would be widespread.

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**Isolation, Purification, and Characterization of Phage Demon**

Presenter's Name: Abdul-basit Oyefeso
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: Shaunda.young@howard.edu

Coauthors: Kristodea Boadum, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background:** Bacteriophages are viruses that infect bacteria. The objective of this research is to discover new phages that infect the host Mycobacterium smegmatis, which could be used as alternative for antibiotic resistant bacteria. This strain of Mycobacterium has colonies that are tan in color and are a rough, wrinkled texture. The genus Mycobacterium also has species like M. tuberculosis and M. leprae which cause deadly diseases in humans. **Methods:** Phage Demon was collected in an environmental soil sample September 13, 2017 in front of the Howard school of business, 38.9223 N,77.0218W at a depth of 0.1m and temperature of 25°C. Phage Demon was isolated from an enriched filtrate and purified by plaque purification assays. To obtain a high titer lysate, webbed plates were flooded, and lysate collected, and filter sterilized. A spot, and later a full plate titer assay was performed to calculate the titer of the lysate. Phage DNA was isolated and quantified using a spectrophotometer. **Results:** The plaques formed by demon were 1.4mm in diameter and clear with a titer of 3.0 X 10 9 pfu/ml. Isolated DNA had a concentration of 191.8ng/µl with a purity of 1.75 (λ260/280). **Conclusion:** Phage Demon infects the host Mycobacterium smegmatis and has all the standard properties of phages. This phage is currently being tested for its sensitivity to other phage infections. Further research will be done to better

understand the phage's uniqueness and compare it to other existing bacteriophages and discover its possible uses.

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**Modelled structure of human ferroportin refined with restraints from mass spectrometry**

Presenter's Name: Christian Parry
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@howard.edu

Coauthors: Guelaguetza Vazquez-Ortiz , Andrey Ivanov, Xionghao Lin, Namita Kumari, Sergei Nekhai

Iron is required by all forms of life. It is crucial in erythropoiesis, metabolism as well as host defense. Nevertheless, excess iron is toxic. It is therefore important that iron is tightly regulated. The only known exporter of iron in mammals is ferroportin and its expression and function are tightly regulated by the hormone ligand hepcidin. Macrophage in the red pulp of the spleen process and recycle iron from spent red blood cells. Macrophages also free iron from heme through heme-oxygenase-1. Iron that is released is transported back to the plasma. During infection macrophages strategically withhold iron providing an effective host defense mechanism. In spite of its importance little structural information is available on human ferroportin. We have built the structure of ferroportin using hybrid methods with restraints from mass spectrometry. Our model comprises 12 transmembrane helices. The iron binding site matches remarkably with what is seen in crystal structures of distant orthologs. We are using this structure along with functional data to answer outstanding questions about the mechanism of ferroportin and the importance of the Q248H mutation found in African and black American populations with moderately high prevalence.

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**Characterization of Mycobacteriophage Jerusha**

Presenter's Name: Jerusha Perry
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: shaunda.young@howard.edu

Coauthors: Kristodea Boadum, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson

The use of antibiotic has caused many issues in the scientific community. Many bacterial organisms are evolving rapidly and are no longer susceptible to common antibiotics. Thus, the study of phages, bacteriophages or viruses, is very important to modern medicine because it is a necessity to find new ways to deal with bacterial organisms to prevent illnesses and diseases. The Phages Program at Howard University aims to identify and characterize new phages found in the environment that infects the Mycobacterium smegmatis mc²155 (M. smeg) host. On September 14, 2017 at 2400 Georgia Ave, Washington, D.C. 20059 in front of the Howard University sign (38.9223 N, 77.0218 W) a soil sample was collected. The phage (Jerusha) particles were isolated from soil through enriched filtrate. Phage Jerusha was purified through a series of purification assays producing 2 mm in diameter clear plaques. Next, web plates were created using empirical testing, phage particles were collected from flooded webbed plates, filter sterilized using a 0.22m syringe filter with a high titer lysate of 1.0 X PFU/ml. Afterwards, Phage Jerusha's DNA was extracted using the Promega Wizard® DNA clean-up kit. The DNA concentration was 71.4 ng/µL, and purity of 1.81 (λ 260/280). With the availability of funds Phage Jerusha will be sequenced and further characterized to better understand it's uniqueness and probable use in the control of antibiotic resistant strains of bacteria.

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**Evidence of contemporary diffusion of hemoglobin C gene in Ghana arising from regional North-South migration**

Presenter's Name: Melisa Philogene
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Christian Parry
Faculty Advisor's email: christian.parry@howard.edu

Coauthors: Winston Anderson, James Taylor, Sergei Nekhai, Kunle Kassim, Christian Parry

A major goal of the Minority Health and Health Disparities program (MHIRT), sponsored by the NIH is to reduce disparities in our local and global communities. Our broad aim was to study and document the manifestation of infection in subjects with sickle cell disease. Along with laboratory bench studies, we obtained demographic information, subject to institutional approval and consent from patients. The 130 patients we were able to recruit showed diverse but usual phenotypic manifestation of sickle cell disease. A surprising discovery, however, that over 50% of our random subjects possessed the hemoglobin C gene. The major hemoglobin structural variant in Ghana is sickle hemoglobin S. The estimated frequency of hemoglobin S is 25% and of hemoglobin C is 12%. We hypothesize that the massive skew of the genotype of our study subjects toward hemoglobin C variants is owing to the evident flux of migrants from hemoglobin C-rich regions, in northern Ghana and neighbors such as Burkina Faso, Mali and Niger, integral to Ghana's modernization and urbanization. There is a dynamic diffusion and shift in the distribution of hemoglobin variants in Accra attendant to migrant settlements that has consequence for the prevalence of sickle cell disease. It is important to monitor the distribution of hemoglobinopathies in a region where one in every three or four persons carries a variant/abnormal hemoglobin gene. Such data is not only important in basic and clinical research but also for budgeting, resource allocation, health policy, advocacy, education and counseling.

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**Evaluating Factors Associated with Interest in Healthcare or STEM Professions Among Rising 9th and 10th Graders**

Presenter's Name: Jessica Pinchinat
Classification: Professional Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Mary Maneno
Faculty Advisor's email: mary.maneno@howard.edu

Coauthors: Mary Maneno, La'Marcus Wingate, Earl Ettienne, Beverly Mims, Tawanna Terry, Lawander McFarland, Jasmine Lopes, Toyin Tofade, Mary Maneno

**Objective:** To evaluate factors associated with interest in Health Care or Science Technology Engineering and Math (STEM) professions among rising 9th and 10th grade students. **Methods:** A cross-sectional evaluation of data collected from the 2016 and 2017 offerings of the Health Occupation Program (HOP), the STEM Career Intervention Program (SCIP), and the Junior URM Mentoring Program (JUMP) within the Howard University National Workforce Diversity Pipeline program (NWDP). The two outcomes evaluated were interest in STEM professions and interest in Health Care professions. Descriptive statistics of all study participants were conducted as well as chi square tests to determine bivariable associations between the study outcomes and independent variables. Analysis was conducted using SPSS at an alpha of 0.05. **Results:** A total of 76 rising 9th and 10th graders were included in this evaluation. The mean age was 14.3 years and 69.7% were female. Majority of the students rated influence of family members as important/extremely important. Additionally a high proportion of participants reported high income, job security, helping people, and spending time with family as factors they considered important in career selection. Bivariable analysis showed a statistically significant association between gender and interest in STEM professions ($p<0.05$) with male participants having a higher odds of high/extreme interest compared to females. No significant gender differences were found with regards to interest in healthcare professions. **Implications:** This study found family members as key influencers in career selection within the early high school age group. Gender specific differences in interest particularly in STEM professions was also observed.

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**Exercise challenge in Gulf War Illness alters task-related dynamics within the Default Mode Network.**

Presenter's Name: Rakib Rayhan
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Kebreten Manaye
Faculty Advisor's email: kmanaye@howard.edu

Gulf War Illness affects 30% of veterans from the 1991 Gulf War and has no known cause. Symptoms include fatigue, pain, and dyscognition. With the most notable being post-exertional malaise; recognized as an exacerbation of symptoms following a physically/cognitively demanding activity. We previously reported a paradigm that

recapitulated this hallmark symptom by utilizing fMRI scans taken before and after submaximal exercise. We hypothesized that exercise would perturb brain function. Two illness phenotypes were discovered with divergent activation patterns during a two-back working memory task. To identify regions utilized during the two-back (task-related activation), we subtracted activity from a zero-back baseline condition (two-back>zero-back). Observing the reverse condition (zero-back>two-back contrast), permits for the identification of regions that were deactivated during task (task-related deactivation). Here we report that prior to exercise, there was no group differences within the task-related deactivation patterns. In contrast, the two illness phenotypes developed a post-exertional elevation of task-related deactivation within the Default Mode Network not seen in controls. Our novel findings of exercised-induced increases within the Default Mode Network complements our previous reports and strongly supports that Gulf War Illness is a central nervous system disorder.

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**Identifying Sierra the Phage**

Presenter's Name: Sierra Reese
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Adrian Allen, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Leon Dickson, Hemayet Ullah

**Introduction**: Bacteriophages are viruses that infect bacteria, are now being used as a substitute for antibiotics as new strains of antibiotic resistant bacteria are being found. My aim is to identify a unique phage particle that infect Mycobacterium smegmatis and include it to the phage collection that is being characterized by the SEA PHAGES program funded by HHMI. **Methods**: Soil samples was collect in front of the Ernest Just Hall. Phage particles were isolated from enriched soil and purified to obtain a single population of plaques through multiple rounds of plaque purification assays. DNA was extracted from the lysate harvested and subjected to restriction enzyme digestion and agarose gel electrophoresis. Lysogeny testing was performed to identify Sierra phage has properties to undergo lysogenic life cycle. **Results**: The plaque morphology was circular with a diameter of 1mm and the high titer lysate concentration was 9.00 X 109pfu/ mL. The isolated DNA had a concentration of 47.3 ng/µland a purity of 1.79. A "mesa" was obtained from the spot titer assay, dilutions10-1, 10-2, and 10-3, which led us to further investigate its properties. **Conclusion**: Sierra is one of few phages in the class that could undergo lysogenic life cycle and remain as prophage. Sensitivity and immunity assays will be performed to learn more about Sierra' ability to manipulate the bacterial genome.

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**Analysis of Rare Mutations in the Regulatory Regions of DISC1 Pathway Genes**

Presenter's Name: Raina Rhoades
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaolei Teng
Faculty Advisor's email: shaolei.teng@Howard.edu

Coauthors: Elasha Colby, Ryan Drew

The neuropsychiatric disorders are a major public health concern as it is estimated that 16.2 million adults have at least one major depressive episode per year and that schizophrenia effects approximately 1% of the adults in the United States. The etiologies of these disorders remain unclear. Recent genetic studies showed the vast majority of loci associated with a high risk of schizophrenia were within non-coding regions. Understanding the role of mutations which occur in regulatory regions of genes associated with mental disorders may prove to be important in elucidating the cause and treatment of the diseases. The Disrupted in schizophrenia 1 gene (DISC1) is a gene associated with serious psychiatric diseases including schizophrenia and recurrent major depressive disorder. Previous work has demonstrated that rare variants in the coding regions of DISC1 and several interacting proteins are associated with the diagnosis of schizophrenia. In the present study, we utilized the association analysis tools to investigate the common and variants in non-coding regions of 213 DISC1 genes in 654 psychiatric patients and 889 healthy controls. We identified a novel protective association between a common intronic variant rs62140621 in Neurexin 1 (NRXN1) in a combined cohort of cases compared to controls. Burden

analysis of rare variants in regulatory regions were found to be correlated with psychiatric disorders and cognitive measures. This data will elucidate the roles of regulatory DISC1 pathway variants in the etiology of mental illnesses and may help in the diagnoses of psychiatric disorders.

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**The Effects of Video-Based Cooking and Meal Preparation on Self-Efficacy Type II Among African Americans with Diabetes**

Presenter's Name: Briana Robinson
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Felecia Banks
Faculty Advisor's email: fbanks@howard.edu

Coauthors: Serita Pettegrue, Chimene Castor

**Purpose** The purpose of this research is to determine the effects of a video-based cooking and meal preparation education program on the self-efficacy of African Americans with Type II Diabetes. **Design**: This study used a quasi-experimental research design to determine the effect of an educational diabetes nutrition and meal preparation video on the self-efficacy of individuals with type II diabetes. **Method**: 45 African American males and females ages 21 and over affiliated with the Howard University Hospital and urban diabetes clinics in the Washington, DC Metropolitan area will be selected to participate in this study using convenient sampling. Participants will view a half-hour DVD entitled: Tasty Solutions for Diabetes, that includes healthy meal preparation techniques geared towards individuals with type II diabetes. A pre/post-test of the Modified General Self-Efficacy Scale (MGSE) will be distributed to participants to determine their previous level of self-efficacy and their level of self-efficacy after the implementation of intervention. A six (6) week follow-up survey (posttest) will also conducted. **Results**: Preliminary findings from this study have been analyzed using SPSS 22 version to help African Americans with diabetes increase self-efficacy and promote occupational activities of healthy cooking and meal preparation.

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**Reduced Migration of HIV-positive Macrophages Associated with Increased Neutrophil Infiltration**

Presenter's Name: Ornela Rutagarama
Classification: Staff
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Marina Jerebtsova
Faculty Advisor's email: marina.jerebtsova@howard.edu

Coauthors: Marina Jerebtsova

Pulmonary disease remains a primary cause of morbidity and mortality in HIV-positive individuals. It is partly associated with altered function of innate immune system. HIV-1 infects and induces profound functional changes in macrophages, including pro-inflammatory phenotypes, and impaired phagocytosis and migration. We hypothesize that reduced migration of HIV-positive macrophages into organs after stimulation of innate immune system will be associated with an increase in neutrophil infiltration. We used HIV-Tg mouse that express several HIV-1 genes in macrophages. Mice were injected with LPS that mimics bacterial infection and activates innate immune system. Lungs were collected from HIV-transgenic and control mice at 24 hrs after LPS injection, and infiltrating neutrophils and macrophages were isolated. Fluorescence activated cell sorting (FACS) analysis was conducted with anti-F4/80-FITC (macrophages) and anti-Ly-6G-PE (neutrophils) antibodies. Three mice per group were used. We demonstrated significant higher levels of infiltrating lung neutrophils in HIV-Tg mice compared to controls. In contrast, levels of lung macrophages were significantly reduced in HIV-Tg mice. Neutrophil/macrophage ratio was about 10 folds higher in HIV-Tg mice ($N/M=0.37\pm0.13$ for HIV-Tg, $N/M=0.039\pm0.02$ for control, $P>0.05$). In conclusion, neutrophils infiltration in lung of HIV-Tg mice was significantly increased. Increased number of lung neutrophils may induce significant lung damage.

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**Gender Differences in Buccal Telomere Length and Exposure to Violence among African American Young Adults**

Presenter's Name: Forough Saadatmand
Classification: Senior Faculty
School/College: Medicine

*Presentation Type: Poster Presentation*
Faculty Advisor: Joseph Wright
Faculty Advisor's email: joseph.wright@howard.edu

**Background**: Exposure to violence (ETV) as a social stressful event impacts African American's health leading to shorter telomere length. Several studies have investigated the relationship between telomere length and early-life stress, but none have focused on African American young adults. **Objective**: Determine the effect of gender and ETV on telomere length in African American young adults. **Methods**: We examined the relationship between ETV and telomere length in a cross sectional analysis of 50 buccal samples (N=25 males, 25 females) of African American men and women 18-25 years old in Washington DC. Average telomere length was measured by a quantitative PCR assay. This method measures the ratio of the abundance of telomere sequence vs. a single copy gene (beta-globin) compared to a reference standard DNA. Participants were selected if they reported either ETV or no ETV measures of physical violence, threat of violence, witnessing violence, and sexual violence. Mann-Whitney tests identified differences between male and female ETV and telomere length. Correlations were calculated between telomere lengths and violence measures. **Results**: Male participants reporting ETV had shorter (mean=1.62) telomeres than those who did not report ETV (mean=1.80). Females experiencing violence had a longer telomere length (mean=1.87) compared to men (mean=1.62). This difference trended toward significance ($p \leq .054$). A significant correlation existed between male exposure to sexual violence and telomere length ($R=0.575$, $p \leq 0.03$). **Conclusions**: These results link the shortened telomere length to ETV among men. Men who experienced violence have shorter telomere compared to women and the differences trends toward being significant.

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**The trophic position of apple snails (Pomacea spp.) in native and non-native habitats.**

Presenter's Name: Kevin Scriber
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Kenneth Hayes
Faculty Advisor's email: KENNETH.HAYES@howard.edu

Coauthors: Qian Qian Yang, Ellen Strong, Kenneth Hayes

**Background**: Invasive species contribute to biodiversity loss. Among molluscs, Pomacea species are well known for causing serious ecological damage (e.g. eutrophication and loss of ecosystem services). A full understanding of their role as invasives requires knowledge of their trophic ecology. **Methods**: Samples from all flora and fauna were collected in Uruguay and China. Stable isotopes analysis (13C and 15N) was used to characterize the trophic ecology of Pomacea spp. and examine food web structure among sites. **Results**: Significant differences in species diversity were found between disturbed and undisturbed sites (66 vs. 21 UR, 61 vs. 25 China) in native and non-native ranges, with no differences between similar habitats in both ranges. There were also statistical differences in mean 15N ratios for Pomacea spp. between native and non-native habitats, for disturbed ($2.01 \pm 0.82$; $6.08 \pm 2.13$ ppt) and undisturbed sites ($4.06 \pm 1.24$; $4.89 \pm 0.87$). Mean 13C ratios were similar in the native range sites, but statistically different in the invaded range and between lake sites in the native and non-native ranges ($3.29 \pm 1.66$ UR vs. $4.06 \pm 1.23$ China). **Conclusion**s: Differences in isotope signatures among disturbed and undisturbed habitats may indicate trophic changes driven by biodiversity variation, while isotopic differences between the native and non-native sites may result from shifts in the feeding behavior of Pomacea spp. Further analyses using more sophisticated mixed models should provide future insights into mechanisms, and allow for a fuller understanding of ampullariid trophic ecology.

Keywords: Pomacea spp., 13N, 15N, trophic ecology

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**In silico Analysis of Single Nucleotide Polymorphisms in Human 5HT7 Gene that Potentially Implicated in Breast Cancer in African American Women**

Presenter's Name: Afnan Shakoori
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Muneer Abbas
Faculty Advisor's email: m_abbas@howard.edu

Coauthors: Areej Alyahyawi, Abrar Aloufi, Nicole Retland, yasmin Kannan, Georgia Dunston

**Background**: Breast cancer is the most common cancer and the second leading cause of cancer death in African American women. The annual incidence in the United States of Breast cancer is almost 178,480. Genetic variation in serotonin receptors (HTRs) has been widely implicated in a variety of health disparities including cancer. Since 5-HT has been shown to be correlated with tumor progression, loss of androgen dependence, and poor prognosis. Ethnic variations of polymorphisms should be evaluated and incorporated into investigations of susceptibility variants for common diseases. We hypothesize that minor allele frequency (MAF) distributions for 5HT7 SNPs in African are significantly different from those of Caucasian-decent population. **Materials and Methods**: Analysis was performed using 1000 genome project to identified a total of 4129 SNPs. Also, the University of California Santa Cruz (USCS), and National Center for Biotechnology Information (NCBI), were used to narrow down the selection to five SNPs in the 5HT7 gene. The selection was based on significant SNPs allele frequency differences between African and Caucasian -descent populations. **Results & Discussion:** Allele frequency differences were determined in the studied populations with a 20% to 60% difference for the following SNPs: rs4406742, rs34871116, rs7893260, rs12259062, rs11472590, and rs792253. All SNPS are found to be intronic and we believe they are important in alternative splicing of the mRNA which might regulate 5HT7 gene expression. To our knowledge this is the first time that those SNPs have been studied in African American women breast cancer patients.

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**Omics Approach to the Identification of Race-Specific Biomarkers for Cirrhosis and HCC**

Presenter's Name: Zaki Sherif
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Zaki Sherif
Faculty Advisor's email: zaki.sherif@howard.edu

The advent and utility of high-throughput technologies coupled with stringent statistical analyses of the generated data have enabled the adoption of a holistic view of the molecules that make up a cell, tissue or organism. This view extends to the universal detection of genes (genomics), mRNA (transcriptomics), proteins (proteomics) and metabolites (metabolomics) in a normal or abnormal biological sample in a non-targeted and non-biased manner. The "omic" technologies can also be used to study the gut microbiome and epigenome and the altered conditions precipitated by disease state. Systems biology, which is derived from the integration of these various techniques, attempts to understand a complex biological system by examining thoroughly all the components that make it whole. Omics and systems biology experiments are hypothesis-generating holistic approaches which differ from traditional scientific studies. When we utilized metabolomics to investigate disparities in the incidence and survival of hepatocellular carcinoma (HCC) in the blood and tissues of African-Americans (AAs) and European-Americans (EAs), our team first conducted untargeted or semi-targeted metabolomic analysis of hundreds of serum samples to identify metabolites with significant changes in ion intensity levels between HCC cases and cirrhotic controls using liquid chromatography coupled with mass spectrometry (LC-MS). The metabolites selected were then used for targeted quantitation which identified race-specific metabolites that differentiated HCC cases from cirrhotic controls to validate biomarkers that yielded better results than alpha-fetoprotein (AFP), the serological marker widely used for the diagnosis of HCC. This study reveals the biological effect of altered metabolism on a system-wide scale.

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**Discovery of the Bacteriophage Samaymay**

Presenter's Name: Samara Silver
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Michelle Fernando , Adrian Allen, Mary Ayuk, Somirajan Ghosh, Ayele Gugssa, Ph.D., Courtney Robinson, Hemayet Ullah

**Background**: The purpose of this project is to isolate, purify and characterize bacteriophages, which are viruses that only infect bacteria. SEA-PHAGES program is designed for undergraduates to gain research experience while doing active research to contribute to the understanding of bacteriophage diversity on earth.

Samaymay was discovered in the grounds of Howard University and characterized as a cluster B sub cluster B1 phage. **Method**: Soil sample collected yielded plaques after enrichment plating. Several rounds of plaque purification assays performed to get plaques with similar morphology. DNA was extracted from a lysate collected and sent for illumina sequencing for characterization. Lysogeny testing performed to investigate whether Samaymay can exist as a prophage. Its genome is annotated using DNA master and other databases to support DNA master output. **Results**: Samaymay formed clear plaques in a lawn of M. smeg. The titer of the collected lysate was 2.0 x 1010pfu/ml which gave is DNA with a concentration 825.0 ng/µl and 260/280 value of 1.80. After genome sequencing Samaymay was identified as a cluster B, sub cluster B1 phage with a spiroviridae morphotype. **Conclusion**: Samaymay was identified as a purely lytic unique phage and further characterization is underway to understand special features of its genome via annotation.

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**Characterization of JamaicaS Phage**

Presenter's Name: Jamaica Simmons
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourds Michelle Fernando, Adrian Allen, Mary Ayuk, Somirajan Gosh, Ayelle Gugssa, Courtney Robinson, Hemayet Ullah, Leon Dickson

**Background**: Bacteriophages are viruses that infect bacteria and are abundant in nature, yet, we do not know the diversity fully. The need for more data on diversity of bacteriophages is in demand now as an alternative to antibiotic due to the new era of antibiotic resistant bacteria. As a student apart of the Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) course, I aid in the cataloging of bacteriophages which infect Mycobacterium smegmatis mc155. I have isolated, purified, and characterized the JamaicaS phage using numerous molecular and microbiology procedures. **Methods**: Soil samples were collected outside of Carnegie Hall. Isolated mixed population of phages via enrichment plating, purified through several rounds of plaque purification assays. After purification the titer was calculated using full plate titer assays. Fixed for transmission electron microscopy. DNA extracted for restriction enzyme digestion and agarose gel electrophoresis. Lysogeny testing performed to determine presence of lysogen. **Results**: JamaicaS formed circular plaques 3mm in diameter. Titer of the lysate collected yield 8.85 x 109 pfu/mL. DNA concentration was 191.8ng/ul and the purity of DNA 260/280 value is 1.86. After a series of lysogeny experiments, no mesas appeared, concluding that JamaicaS phage is lytic. **Conclusion**: Based on the results thus far, JamaicaS is likely a lytic phage that does not go through the lysogenic life cycle. Further characterization will be done to assess the genome and structure of the JamaicaS phage.

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**Machine learning approaches for post-translational modification site prediction**

Presenter's Name: Adebiyi Sobitan
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaolei Teng
Faculty Advisor's email: shaolei.teng@Howard.edu

Coauthors: Farion Cooper, Kymberlee Hill, Amber ChildsSantos, Sagar Raju

Post-translational modification (PTM) is essential for many eukaryotic processes. Most proteins undergo structural and functional changes after translation. There are numerous common PTMs such as phosphorylation, methylation, ubiquitination and sumoylation. Some PTMs involve small molecules binding with specific sites or sequences on the target proteins. For example, Sumoylation occurs when small ubiquitin-like modifiers (SUMO) covalently and reversibly conjugate to sumoylated lysine residues of target proteins. Sumoylation has been implicated in various human neurodegenerative disorders. The rationale of this research is to develop a computational approach better than previous algorithms to predict sumoylation sites based on protein sequence information. Machine learning explores the study and construction of computer algorithms to detect hidden patterns and make predictions on big data. This study focused on using machine learning algorithms, such

as Support vector machines (SVMs), Random Forests (RF), to predict and accurately distinguish positive sumoylated sites from negative non-sumoylated sites. Our data were experimentally verified sumoylation and non-sumoylation sites collected from research articles. The relevant biological features were used for input vector encoding, and SVMs and RFs were used to construct the accurate classifiers. The approach can be applied to other PTM predictions. We investigated the disease-causing mutations involved in different PTMs. The prediction tools would be made available for the entire scientific community. The tools can be used to characterize the PTM sites and elucidate the roles of PTMs in the development of human diseases.

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**Urinary Oroscomucoid Concentration Correlates with Chronic Kidney Disease in Sickle Cell Disease Patients**

Presenter's Name: Simran Soni
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@howard.edu

Coauthors: Sergei Nekhai, Marina Jerebtsova, Nowah Afangbedji, Xionghao Lin, Santosh Saraf, Victor Gordeuk

Chronic kidney disease (CKD) is a prevalent complication of sickle cell disease (SCD) and associated with early mortality. Discovery and validation of non-invasive biomarkers for early stage renal disease is needed to identify and facilitate CKD treatment in SCD. Here, we performed comparative proteomic analysis of urine samples collected from SCD patients with hemoglobinurea (N=2), hyperfiltration (N=3) and normal (N=3). We observed upregulation of orosomucoid in samples with hemoglobinurea versus control (49.93-fold, p=1.9x10-10). We next validated presence of orosomucoid in urine by ELISA and also expanded the analysis to additional SCD patients with CKD stage ranging from 0 to 5 and in 19 healthy individuals. The urinary level of orosomucoid was significantly higher in all tested SCD patients comparing to healthy controls. Orosomucoid concentrations correlated with CKD disease stage and showed high sensitivity and specificity by ROC analysis. Moreover, orosomucoid concentrations showed strong correlation with urinary free hemoglobin concentrations (R=0.45), an established marker of CKD in SCD. Orosomucoid concentrations also correlated well with ceruloplasmin (R=0.62) that we recently identified as a potential biomarker of CKD in SCD. Orosomucoid is involved in inflammation, and its increased levels were found in urine of type 2 diabetes patients. Orosomucoid is also an independent factor for diabetic microvascular complications. Microvascular complications and vaso-occlusive crises are hallmarks of SCD. Taken together, urinary orosomucoid may represent a non-invasive biomarker for CKD in SCD patients.

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**Alderia willowi Larval Responses to Hormonal Stimuli**

Presenter's Name: Abiel Spencer
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Serena Caplin, Frances Armstrong, Richard Grosberg

Hormones are vital for accurate larval development in many animals, but various larval types obtain their hormones differently. The larvae of many marine invertebrate species are long-lived and acquire their hormones through food, while the larvae of other species are instead shorter lived and non-feeding, producing their own hormones. One species of hermaphroditic sea slug native to the mud flats of the Californian coast, ***Alderia willowi***, is capable of producing egg sacs containing two different larval types: lecithotrophic (non-feeding) and planktotrophic (feeding), where the former matures more quickly than does the latter. The goal of this research is to determine whether the larval food source contributes growth hormones which boost development, or whether the larvae produce enough growth hormone to sustain themselves. We therefore predicted that larvae receiving a combination of food and hormone would tend to be largest and metamorphose soonest, while those receiving a hormone inhibitor would be the most delayed. To test this hypothesis, we collected adult slugs from Central California, and identified and isolated lecithotrophic eggs laid. We maintained all organisms in filtered sea water. We raised larvae in T4 treatments (a type of thyroid hormone), thiourea (hormone inhibitor), Isochrysis spp. (larval food source), and in pairwise combinations of the treatments. Preliminary trials revealed that fed larvae receiving hormone developed best,

but were inconclusive regarding which treatment caused the largest delay and so further trials are necessary. The results of this research will help to provide clearer understanding of the evolution of invertebrate larval development modes.

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**Detection of adenovirus in the midgut and salivary gland microbiota of Anopheles arabiensis**

Presenter's Name: Tara Spencer
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: Adenoviridae is a family of non-enveloped viruses containing a double-stranded DNA genome and an icosahedral nucleocapsid. Capable of infecting human cells, adenoviruses cause symptoms ranging from diarrhea and pneumonia to severe respiratory illness. Viral shedding in feces can continue up to several months following the disappearance of symptoms. As a result, virions can exist in stagnant water contaminated with fecal matter. Adenoviral infections are relatively common in the Eastern African nation of Ethiopia, where ***Anopheles arabiensis*** rampantly transmits Plasmodium, the causative agent of malaria. Scientific literature has never implicated ***A. arabiensis*** in the spread of adenovirus in Ethiopia. However, since these mosquitoes breed in unclean water bodies and interact frequently with the adenovirus, it is probable that they are vectors of adenovirus. We hypothesize that adenovirus can colonise the microbiota of A. arabiensis. **Methodology**: To test this, ***A. arabiensis*** was collected from Ethiopia and the salivary glands and midguts of each sample isolated. DNA was extracted from the samples and was screened for the presence of the hexon gene, unique to adenovirus, using PCR. **Results and Conclusions**: Preliminary data suggest the presence of the hexon gene in a small subset of mosquito samples collected from Ethiopia in 2015. Confirmation of this discovery would suggest a dual vector capacity of ***A. arabiensis*** for Plasmodium and adenoviruses.

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**The trafficking and exocytosis behavior of MMP-9 during PMA-induction in MCF-7 breast cancer cells**

Presenter's Name: Dominique Stephens
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Dinari Harris
Faculty Advisor's email: dinari.harris@howard.edu

Regulation of exocytosis is an important mechanism that controls many diseases including cancer. Defects in exocytosis have been implicated in many cancer cell types and are generally attributed to mutations in cellular transport, trafficking, and assembly of machinery necessary for exocytosis of secretory vesicle (SV) cargo. There are dozens of core proteins, accessory proteins, and a growing number of lipids involved in regulated exocytosis. There are many things that are still unclear about what happens at the fusion sites during exocytosis including its dynamic behavior. This is particularly relevant in cancer because alterations or mutations in exocytic proteins are commonly associated with increased tumorigenesis, invasion, and metastasis. This has been partly attributed to an up-regulation of trafficking and secretion of matrix metalloproteinase-9 (MMP-9), a proteolytic enzyme that responsible for degrading the extracellular matrix (ECM), a necessary step in tumor progression. Here we use total internal reflection fluorescence (TIRF) to screen and identify recombinant proteins associated with SV containing MMP-9, and image the local dynamic behavior of many of these proteins at fusion sites during PMA-induced exocytosis of MMP-9 from MCF-7 breast cancer cells. For each molecule we mapped fluorescence intensity changes to the moment of fusion to determine if and when these components are recruited or lost at individual exocytic sites. Our findings provide insight to the dynamic behavior of key core exocytic proteins, accessory proteins, lipids, and some endocytic proteins at single site of SV fusion in breast cancer cells.

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**Understanding LittleRed**

Presenter's Name: Sydney Stephens
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: There are an estimated 1031 bacteriophage (PHAGEs) in our biosphere that infect bacterial hosts and share properties of viruses, very few have been studied thoroughly. The present study is aimed at identifying and characterizing a specific phage, named "LittleRed". **Materials & Methods**: LittleRed was taken from a sample of dirt outside of the A building from the flowerbed, on Howard University's campus. The enriched soil sample was utilized to locate and get the pure phage. A webbed plate was created and flooded. LittleRed was entered into PhagesDB, lysate was archived. The lysate was collected along with the titer of the bacteria that was found after plating dilutions of lysate.**Results**: After purification, the morphology of the plaques became consistent confirming the presence of single phages. LittleRed is temperate with a circular morphology with a titer of 2.7 x 1010. The plaques have a fuzzy edge and are not clear, hence the LittleRed is not lytic. The DNA of LittleRed was extracted, and the final concentration was 132 ug/ml with a purity of 1.81. **Discussion & Conclusion**: The phage was put on a grid in case it was chosen to be a phage used in this study and needed to be viewed under an electron microscope. After the DNA had been extracted and there was a high enough concentration a gel electrophoresis was run. The DNA of LittleRed will be examined further in depth with the help of DNAMaster detailing the number of base pairs.

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**Screening Bacterial Isolates for Iodine Transformation Abilities**

Presenter's Name: Tamara Sullivan
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Courtney Robinson

The Hanford Site in Washington was the location of both nuclear reactors and chemical reprocessing plants. A current major concern at the Hanford Site is the immobilization the radionuclide iodine-129. This radioisotope of iodine is a carcinogen that accumulates in the human thyroid gland. Iodide (I-) is the main species that is released from nuclear facilities and oxidation of this species to the more stable iodine (I2) is not thermodynamically favored, so an enzymatic catalyst is needed. Additionally, at the Hanford site, 70% of the iodine detected is in the form of iodate. It is known that some microorganisms are capable of catalyzing both iodide oxidation and reduction reactions. The purpose of this characterization is to identify those species that are capable of iodide oxidation and/or reduction, so that their growth may be enriched for at the Hanford site to contribute to bioremediation efforts. The characterization of these isolates thus far has consisted of nitrate reduction (because nitrate reduction has been coupled to iodate reduction) and iodide oxidation assays. Iodide oxidation assay of 28 isolates from a 2016 collection revealed that the majority produced approximately 5μM KIO3 during iodide oxidation. Similarly, the same assay completed for 20 isolates from the 2017 collection also revealed that the majority produced approximately 5 μM KIO3 during iodide oxidation. Using q-PCR, it was determined that four isolates contain genes that encode for nitrate reductases. Currently, isolates are being tested for the presence of genes that code for nitric oxide reductases cNOR and qNOR.

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**A Random Forest Approach for Predicting Protein Stability upon Missense Mutations**

Presenter's Name: Shaolei Teng
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaolei Teng
Faculty Advisor's email: shaolei.teng@howard.edu

Coauthors: Adebiyi Sobitan, Kristodea Boadum, Farion Cooper, Ashley McKoy, Raina Rhnodes

Protein destabilization is a common mechanism by which genetic mutations cause human diseases. The missense mutations change protein sequence and may alter abnormal biological functions. Studies suggested that up to 80% of the disease-causing coding mutations result in protein destabilization. In this study, we developed a machine learning method to predict protein stability changes upon missense mutations. We downloaded the mutations with experimental free energy changes from the ProTherm database and investigate their effects on protein function and mutation pathogenicity. The biological features and mutation damaging scores were used to code each amino acid residue in a data instance. The Random Forests (RF) was used to train the data

and construct the classifiers. Support Vector Machines (SVM) was examined for classifier comparisons. We used a fivefold cross-validation method to evaluate classifier performance. We built a RF classifier using 40 biological features (RF40) and two SVM classifiers using 20 features (SVM20) and 40 features (SVM40). The results showed that SVM40 had relatively low performance compared to SVM20. The possible explanation is that the feature-encoded input vector has a larger number of variables and results in model overfitting. The RF algorithm can handle the problem and perform well. RF40 was also found to outperform SVM models on the same dataset. The results indicate that the predictive performance of classifier can be enhanced by using RF algorithm for model construction. The bioinformatics approach will help elucidate the genetic mechanisms which the mutations change protein stability and cause the diseases.

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**Isolation, Purification and Characterization of Phage Termine**

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

**Background**: Bacteriophages are viruses that infect bacteria. Since they cannot reproduce by themselves, they use a bacterial host's machinery to replicate. The purpose of the experiment is to learn about phages that can aid scientists in creating better antibiotics, especially for highly evolving and resisting bacteria. Mycobacterium smegmatis mc2 155 which is relatively safe towards human beings. It is saprophytic and lives off dead matter. It is very similar to Mycobacterium tuberculosis; which scientists can study through these experiments. Mycobacterium smegmatis is mostly found in soil, water and plants. **Methods**: At Howard University, the phage Stermine was collected from soil on Howard's campus near the Blackburn center at 0.503364 N, 0.010958 E. From there, the phage was isolated and filtered out of the sample soil and enriched with the host bacteria. Phage Termine was purified through several rounds of phage purification assays. The phage lysate was used to prepare transmission electron micrographs. Phage DNA was isolated and utilized for restriction enzyme-digests. **Results and Conclusion**: The plaques were 2mm in diameter. After collection of lysate, the titer was 7.75 x 109 pfu/ml. The concentration of isolated DNA was 234 ng/ml and a purity of 1.86 (λ260/280). The phage is currently being utilized in lysogeny/ sensitivity studies with other phage particles to further characterize phage Termine.

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**Characterization of Prostate-Associated Microseminoprotein (MSMP) in Prostate Cancer**

Presenter's Name: Laurie Thomas
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Anna Allen
Faculty Advisor's email: anna.allen@howard.edu

**Purpose**: Previous studies have shown that omega-3 polyunsaturated fatty acids (PUFAs) directly affect the growth and survival of prostate tumor cells. Omega-3 PUFAs are known for their anti-tumorigenic and anti-inflammatory properties. Our lab has shown that omega-3 PUFAs downregulate microseminoprotein (MSMP). MSMP has not been well studied but is believed to have a role in inflammation through ligand binding to CC chemokine receptor 2B. This study further characterizes the function(s) of MSMP in prostate cancer (PCa). **Methods:** MSMP expression was characterized in PCa tissue and cell lines through immunohistochemistry and western blotting techniques. IHC staining was performed on human prostate and TRAMP mouse tissues. PC3 cells were treated with various concentrations of omega-3 PUFAs and lysates and conditioned media were collected for western blot analysis. Analyses of protein/RNA/DNA databases of human PCa were carried out to characterize MSMP expression and mutations. **Results:** Human prostate tumors showed high MSMP staining but no specific staining was evident in mouse tissues. Through database searches MSMP was found in prostate tumor cells and tissues and suggested that MSMP may be present in more advanced cancers. **Conclusion:** IHC analysis showed that MSMP expression was higher in human prostate tissues than in mouse tissues, but additional characterization is needed. Western blot analysis to determine the effects of omega-3 PUFAs on MSMP are ongoing. Database analyses identified significant increases in MSMP expression with gleason grade. Future studies will aid in characterizing MSMP function and highlight the potential use of MSMP as a biomarker.

**Characterization of the Zacknotzachary Phage**

Presenter's Name: Zack Thomas
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourds Fernando, Adrian Allen, Mary Ayuk, Somiranjan Ghosh, Ayele Gugssa, Ph.D., Courtney Robinson, Hemayet Ullah, Leon Dickson

**Introduction**: The aim of SEA-PHAGES program is to characterize and catalog different phages. Bacteriophages are dynamic and genetically diverse particles that infect at a rate of 1023 infections per second. Modern phage study has arisen given the development of antibiotic-resistant bacteria and advanced looks into phage therapy. We use Mycobacterium smegmatis as a host which is found in environmental samples, including soil and compost to isolate phages. Phage Zacknotzachary was characterized as a temperate phage that formed small plaques.
**Methods**: Following the collection of phage from soil, standard microbiology methods were used including enrichment isolation, direct plating, spot test, full plate titer and purification. Standard molecular biology techniques such as DNA extraction, restriction enzyme digestion and agarose gel electrophoresis will be used characterize Zacknotzachary. Lysogenic studies are conducted to test the ability of Zacknotzachary's ability to remain as a prophage. **Results**: Plaques were successfully obtained from enrichment isolation. After seven rounds of purification, a lysate was obtained that gave small and clear plaques with a diameter of 1mm. Consequently, a titer of the lysate was calculated to be 1.39 x 109 pfu/ml. This phage can remain dormant in the bacteria. **Conclusion**: Zacknotzachary phage is a temperate phage and lysogeny testing confirmed that it can undergo lysogenic life cycle in M.smeg. Future plans involves isolating a lysogen formed by Zacknotzachary.

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**Angioedema: Rare Side Effect of Hydrochlorothiazide and Triamterene Treatment**

Presenter's Name: Sage Timberline
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Muhammad Mohsin
Faculty Advisor's email: mohsin16900@gmail.com
Coauthors: Muhammad Munawar, Hamid Yaqoob, Bria Rice

**Introduction**:Angioedema is localized, noninflammatory, nonpruritic skin swelling, characterized by fluid buildup in interstitial tissue. It is often benign, but can result in asphyxiation when affecting the skin around the larynx. **Case**: A 48-year-old African-American male with hypertension presented to the hospital with swelling of lips, tongue, and hands. He had 9 similar episodes in the last year, which he first noticed after taking a new antihypertensive. He denied any relevant family history, food allergies, or insect bites. Physical exam revealed an edematous tongue, tonsillar swelling, and enlarged lips. The patient was treated with epinephrine, H1/H2 blockers, and steroids. C1 esterase inhibitor and C3/C4 levels were within normal limits, which ruled out hereditary angioedema or angiotensin converting enzyme (ACE) inhibitor-induced angioedema. ESR/CRP levels were also within normal limits. Pharmacy data revealed the patient took amlodipine for 7 years with no adverse symptoms, and recently began hydrochlorothiazide and triamterene (Maxzide) for his hypertension. Maxzide was discontinued and the angioedema stopped. **Discussion**: Angioedema commonly involves lips, eyelids, face, extremities, and genitalia. The underlying mechanism involves release of mediators from mast cells which causes pruritus, or bradykinin-mediated increased permeability. Laryngeal swelling is a rare but life-threatening complication. Angioedema is often caused by medications, most commonly ACE inhibitors. However, it is important to be aware that this can occur with Maxzide, as early recognition and discontinuation of the medication can reduce morbidity. **Conclusion**: This case highlights the importance of a good history to detect rare side effects of certain medications, to decrease morbidity and save healthcare resources.

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**The Journey Of A Phage**

Presenter's Name: Eyrie Toliver
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Hemayat Ullah

Faculty Advisor's email: hullah@howard.edu

Coauthors: Deasia Lamar, Jerome Oliver, Mary Ayuk, PhD., Broderick Eribo, PhD., Ayele Guggsa, PhD., Courtney Robinson, PhD., Somiranjan Ghosh, PhD., Winston Anderson, Leon Dickson, PhD., Hemayet Ullah, PhD.

A phage is a single virus that infects bacteria. Phages can be found in many different environmental locations that is particularly populated by bacterial hosts. One of these locations include soil. In this study, the sample collected was a soil sample from the outside of the Howard University hospital. The bacteriophages obtained from the soil sample were then tested for their ability to infect Mycobacterium smegmatis utilizing the direct and enrichment isolation techniques. A spot assay was performed which confirmed phages were present with the positive result of a plaque. Phage purification isolated the individual phage plaque of a single morphology through serial dilution. One of the webbed plates produced a plate that is 85-95% covered in plaques. This plate was then used for the collection of High Titer Lysate. Lysate was then filtered in order to obtain a solution free of bacteria. This lysate was then used to perform the spot titer. A full plate titer was used to provide a more efficient way of counting plaques and calculating the titer, the number of plaque forming units per milliliter. Serial dilutions are done to provide more webbed plates and these plates are used to create more lysates.

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**On the detection of metabolic disorders in experimental TBI by glucoCEST weighted MRI**

Presenter's Name: Tsang-wei Tu
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Tsang-Wei Tu
Faculty Advisor's email: tut@howard.edu

Coauthors: Jaclyn Witko, Joseph Frank

Delay in glucose hypometabolism has been reported in traumatic brain injury (TBI) patients from weeks to years posing a high risk for neurodegenerative diseases. Recently, MRI based molecular imaging, known as glucose chemical exchange saturation transfer (glucoCEST) has been introduced for detecting glucose without radioisotopes. This study investigated the feasibility of glucoCEST weighted MRI (GWI) to detect the metabolic disorders following TBI. TBI was induced on female 10-week-old rats by a 2m/450g weight drop model. Rats were imaged at baseline, day 1, week 1, 2, 3, 4 using Bruker 9.4T. DTI and GWI were performed and compared with the immunohistochemistry and 2DG autoradiography. After TBI, FA exhibited 12–18% decrease at corpus callosum showing TBI. Compared to the baseline GWI, an immediate increase of MTRasym was seen on day 1. Significant decreases of MTRasym were detected (-32%, $p<0.01$) from week 2 to week 3, and a gradual returned toward the baseline level was seen by week 4. 2DG substantiated the trends demonstrating an immediately increase of glucose uptake at day 1 and reached the lowest at week 2 and then normalized at week 4. Glut3 and Glut1 stainings showed 1 to 3 folds increase on day 1 then normalzed after week 2. The GWI results parallel with 2DG and IHC indicating that the injured brain needed immediate energy to restore the nervous function right after injury and entered a hypometabolism state in week 2. GWI affords the sensitivity to identify the window for treatments to increase neuronal survival in TBI.

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**Sex Determination and Resource Allocation in Dioecious Rumex acetosa and Related Species**

Presenter's Name: Delecia Utley
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Janelle Burke
Faculty Advisor's email: janelle.burke@howard.edu
Coauthors: Janelle Burke

Sex ratios in dioecious plant populations are often close to a 1:1 ratio, or are male biased due to gender-specific differences. Rumex acetosa (Polygonaceae) is a dioecious plant in which females posses XX, and males XY1Y2 sex chromosome system. To resolve functional sex among R. acetosa plants, leaf material was analyzed, using a PCR-based technique involving a male-specific DNA marker, to determine sex of the plants. The observed female bias sex-ratio obtained by molecular work was consistent with the view that Rumex populations show female bias, having 13 female individuals and 7 male individuals. Resource allocation has been an

observed reason for the female bias in R. acetosa. Males allocate more resources during flower production, while females allocate more resources during seed production. To investigate resource allocation among gender, both the female and male population were split into two treatments of high and low nutrients. The above and below ground masses were observed between the different treatments and the sexes within the different treatments. There was statistically significant differences between the weight of individuals in high versus low nutrient treatments. There was no statistically significant difference between the sexes within different treatments. Replication of this experiment with a larger sample size was done but was unsuccessful due to greenhouse conditions. Sex determination is now being observed using other species, closely related to Rumex acetosa: Rumex tuberosus, Rumex thyrsiflorus, Rumex intermedius, and Rumex sagittatus, to test the hypothesis that sex determination can be observed in other Rumex species.

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**Methodology of DNA extraction and quantification of post-colonial New York African Burial Ground soil samples**

Presenter's Name: Nancy Varice
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Howard University is the home of the W. Montague Cobb Research Laboratory which houses New York African Burial Ground (NYABG) remains and soil samples. Discovered during the building of federal offices in 1991, the historical burial site was estimated to contain the remains of at least 15,000 persons of African-descent, both freed and enslaved. Here at Howard University the burial samples are being analyzed for bacterial DNA to help construct a picture of those once buried there. Working with the New York African Burial Ground soil samples, we have successfully extracted DNA from burials 307 and 43. The method used for extraction is the Qiagen DNeasy PowerSoil Kit. Many of the steps were optimized since we are looking for degraded strands of ancient DNA. After extraction, we quantified the DNA using NanoDrop 2000 technology to identify the DNA yield and purity of each sample. The next step in our experiment is to perform an end-point PCR to screen for bacterial DNA. By identifying different species of bacteria, we can learn more about the individual associated within each burial. For example, the microbial signature of burial 43 can potentially confirm the existence of a young girl who's remains showed signs of nutritional stress. With this information we can draw conclusions to shed light to conditions and diseases that all individuals buried in this site. Gaining better insight into the life those buried led, will impact their narrative and how we understand the history of early African Americans in New York.

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**Analysis of transmigrations in and out of the Arabian Peninsula: Impact on genetic diversity of the Arabs**

Presenter's Name: Nina Wallace
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Coauthors: Njlaa Bakhsh

There many theories in regards to early hominid migration routes out of Africa across Asia, Europe, and into the America's. The Arabian Peninsula (AP) marks the first sign of human expansion via the Red Sea to the northwest AP or the Swahili Coast to the southwest AP. While the modern day inhabitants of the AP and the Arab Diaspora share a common heritage and culture, they display a wide variety of phenotypic traits. Several studies have reported how gene flow via transmigration has structured the genetic diversity of the area. Studies used analysis of mtDNA and Y-DNA to identify haplogroups and haplotypes in areas in the Middle East including the AP, Iraq, the Levant, North Africa, and Sudan. These analyses were used to explain geographic differences in similarities of Arab and Middle East populations with those Africa and Europe. Particularly, mtDNA in areas in the northwestern AP, e.g., Lebanon, show strong affinity to Europe while mtDNA in southwest AP, specifically Yemen, display strong association to Egypt and North and East Africa. Y-chromosome analysis shows that Arabs with J1 and J2 have a very strong North African component, in contrast to the patterns observed in the mtDNA. Each Arab population demonstrates its own constellation of connections with expansions to Africa and Europe. However, Arab

populations also exhibit unique mtDNA and Y- haplogroups which characteristically demonstrate a people that have been structured by migrations from and into other populations, creating the Arab Diaspora witnessed today.

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**Generation of a mammalian cell-specific growth-restricted Zika virus: a novel vaccine approach**

Presenter's Name: Shengfeng Wan
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Xiaowu Pang
Faculty Advisor's email: xpang@howard.edu

Zika virus (ZIKV) has emerged as a global threat to human health. Developing a safe, effective, and affordable ZIKV vaccine is thus a top public health priority. To achieve this goal, multiple Zika vaccine platforms are under intense investigation. Historically, live-attenuated vaccines induce long-last immunity but reduced safety, while inactivated vaccines provide a high level of initial safety but exhibit weak long-term immunity. To overcome the tradeoff, here we reported a novel mammal-specific growth-restricted ZIKV as a new approach for ZIKV vaccine development. This artificial insect-specific ZIKV (IS-ZIKV) was generated by introducing mutations to selectively enhance furin cleavage efficiency of viral pre-membrane protein (prM) and disrupted the delicate balance of the viral maturation process in mammalian cells. As a result, the IS-ZIKV cannot produce any progeny virus in mammalian cells. On the other hand, the IS-ZIKV remains of its ability of replicating to high titers in the mosquito derived C6/36 cells. Single dose of IS-ZIKV elicited robust cellular and humoral immune response in mice, and conferred sterilizing immunity against lethal ZIKV challenge from both Asian and African lineages. At same time, the completely defective for productive replication in animals provided a high degree of safety. Our results demonstrated that the IS-ZIKV combine the safety of inactivated vaccines with the immunogenicity and ease-of-production of live-attenuated vaccines. We anticipate that our findings described here can also be useful for the development of a new generation of vaccines for other vector-borne pathogens, such as dengue viruses.

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**GABAergic and Dopaminergic Synaptic Transmission Display Similar Regulation of Mitral Cell Activity in the Olfactory Bulb**

Presenter's Name: Ze-jun Wang
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Thomas Heinbockel
Faculty Advisor's email: theinbockel@howard.edu

Coauthors: John Harvey, Thomas Heinbockel

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 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 receptor 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 will greatly enhance olfactory bulb output to higher order olfactory centers in the brain.

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**A Small-Molecule Compound Modulating Bacterial Biofilm Formation by Vibrio cholerae and Staphylococcus aureus**

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

Phosphoenolpyruvate-carbohydrate phosphotransferase system (PTS) is a multistep chemical process which regulates the intake and use of carbohydrates by bacteria. In addition to controlling sugar uptake by bacteria, the PTS regulates several cellular functions such as chemotaxis, glycogen metabolism, catabolite repression and biofilm formation. Biofilms are multi-layered communities of bacterial cells that grow attached to one another. In this study, V. cholerae MO10 served as the model organism to identify small-molecule compounds that may interfere with biofilm formation through the bacterial PTS. V. cholerae was grown in the absence of chemical compounds as a negative control, while an altered strain lacking PTS activity served as a positive control. Growth kinetics was evaluated in absorbance-based microplate assays, and quantitative biofilm assays were performed in borosilicate glass tubes. All assays were monitored by spectrophotometry. Biofilm induction was confirmed by monitoring the growth of Vibrio cholerae in the presence or absence of chemical compounds. Significant biofilm growth was seen in LB with three specific compounds, and one of the three compounds was further analyzed in Minimal Media Pyruvate. Further assays are underway to see the effect of this candidate compound on Staphylococcus aureus biofilms and evaluate the potential for broad-spectrum activity of the compound.

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**Collecting, Isolating, and Purifying Bacteriophage Myadw**

Presenter's Name: Mya Wells
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacteriophages are viruses that infect and replicate using bacterium as a host cell. This process can occur in two different lifecycles: lytic and lysogenic. In the lytic lifecycle, the phage attaches to the host cell and injects its genetic material, the phage chromosome circularizes, the phage DNA replication occurs, phage head and tail production occurs, new virons assemble, and the host cell is lysed while the virons are released. For temperate phages, after the phage attaches to the host cell and injects its genetic material, the phage chromosome circularizes and it either remains in the host cell as a prophage (a phage genome within the cell) or enters the lytic cycle. Phage myadw was extracted from a soil sample taken outside of Just Hall at Howard University, 38.9218°N 77.0188°W. Myadw was isolated from an enriched filtrate and purified through a series of plaque assays. Through empirical testing, the high titer lysate for phage myadw was characterized as 5x10^9 pfu/ml. Myadw was also characterized by its DNA fragments through Gel Electrophoresis and Restriction Enzyme Digest. The purity of myadw was revealed in Gel Electrophoresis and confirmed through Obtaining DNA from lysate. The purity of 1.9 and concentration of 201.3 ng/ul characterizes myadw as a strong bacteriophage that will readily inject hosts. This research may be important in the future to allow for possible tools in DNA cloning and mutation. Researches could also possibly use phages to kill specific antibiotic resistant bacteria in the ongoing battle against infectious disease.

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**Root Foraging Behavior in Serpentine Plants**

Presenter's Name: Whitney White
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Mary McKenna
Faculty Advisor's email: mmckenna@howard.edu

Coauthors: Mary McKenna

Plants inhabiting stressful soil environments evolve diverse root traits for survival. Serpentine soils are highly stressful with low water availability, toxic metals (Ni, Cr), and low nutrient availability (particularly P). Some serpentine species evolved the ability to hyperaccumulate Ni from soil through their root where it protects their tissues from herbivores. This study explores patterns of root-foraging for Ni and P among

serpentine plants in the genus Alyssum. We compared a Ni-hyperaccumulator (A. corsicum) and a non-accumulator (A. montanum) grown with "soil arenas" designed to compare root "choices" to occupy different soil environments. Soil arenas were constructed by transplanting seedlings into sand in an open-bottomed pot suspended above four possible soil environments: high Ni & high P, high Ni & low P, low Ni & high P, and low Ni & low P. After three months of growth in a greenhouse, roots in each soil treatment were harvested and weighed. Soil preference was determined by recording the treatment containing the highest proportion of total root biomass for each plant. Chi Square tests of association revealed a non-random pattern of root growth in soil arenas for both A. corsicum (Pearson Chi Square = 34.11; p=0.000) and A. montanum (Pearson Chi Square =22.97; p=0.000). Roots of both species most preferred the soil treatment containing high Ni and high P. This result was expected from the Ni-hyperaccumulator since Ni and P provide obvious benefits, but our study indicates that mature plants from both species prefer soil conditions most similar to their serpentine origin.

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**Sequencing Text Analytics Tool (STAT): Big Data Analytical Tool to Recover Genomic Data from Historic African Americans**

Presenter's Name: Jonathan Willard
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Fatimah Jackson
Faculty Advisor's email: fatimah.jackson@howard.edu

Biology and big data have a relatively new relationship that requires the development of novel computational tools. We have developed a big data analytics program to circumvent the bottleneck of slowly processing gigabytes of text data to reduce time spent from hours to seconds. This method was created to categorize the recovered bacterial types from 16S microbial data of four African Americans who were born from 1877-1909 and died 59-87 years ago. However, we have demonstrated the versatility of this method to be tailored for any number of applications where desired information can be extracted and quantified from large text files. This method of coding involved using QIIME as a tool to input files and manipulate them in a way to extract, sort, and classify the bacterial data found in the original blastn files. The files used were cc13P, cc32D, cc32P, cc309D, and cc672P, all containing bacterial data of four African Americans affected by Tuberculosis. A code was developed to extract all other bacteria found in these remains. This four-step code consolidated the large data files, turning 1-3 Gigabyte files containing loads of unnecessary data, into files of 100 Kilobytes or smaller only containing the most relevant data. The resulting extracted data consisted of the most relevant genera, seen most commonly in the original files. These results show the most abundant bacteria that may have affected the individuals who were diagnosed with tuberculosis.

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**In-Situ Spargel Expression**

Presenter's Name: Macey Williams
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Atanu Duttaroy
Faculty Advisor's email: aduttaroy@howard.edu

Coauthors: Adul Basar

Spargel/dPGC-1 is a gene found in Drosophila and has been found to be recognized for its role in energy metabolism through biogenesis of the mitochondria and insulin-TOR signaling. It has also been found to be involved in growth signaling of various pathways. In addition, the downregulation of Spargel during Oogenesis results in deformation of the Drosophila ovaries (Basar and Duttaroy 2017). The development of Drosophila is complex along with the different stages of the Spargel gene. Although the findings from the previous study indicated the role of Spargel in oogenesis, the specific spatial and temporal expression of Spargel was relatively unknown. Using immunohistochemistry, we detected the particular stage and location of the ovary tissue that Spargel is specific to. Genescript manufacturers developed antiserums 56-60 with all serums tested to find the most effective one. Clones of the most favorable serums were created in order to find the most effective clone for recognizing tissue specific to Spargel. The 7A10 Clone was found to recognize the tissue mostly specific to spargel expression.

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**Bacteriophage Characterization of Quib21**

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

Coauthors: Madison Moore, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background**: Bacteriophages, also known as phages, are infectious viruses that require bacteria to reproduce and stay alive. The study of bacteriophages is important as they help to understand the basics of molecular biology and if further researched may have the ability to treat bacterial infections that have become antibiotic resistant. The host bacteria for our experiments is Mycobacterium smegmatis, a member of the genus Mycobacterium and share the same genera with M. leprae, which causes leprosy, and M. Tuberculosis bothh disease causing organisms. **Methodology**: Environnemental sample was collected at the Howard University sign on Georgia Avenue. Phage was isolated and through a series of plaque purification assays the phage was isolated. tests, lysate was collected from flooded webbed plates, titer calculations, and DNA extracted and quantified. Isolated DNA was used for restriction enzyme digests, gel electrophoresis, while the phage from lysate was mounted on transmission electron microscope grids for morphology studies. Currently phage Quib21 is been used in lysogeny sensitivity experiments. **Results**/**Conclusion**: Phage Quib21 was found to have reproduced quickly and almost always produced the necessary results for continued experimentation. Through further experiments it was found that Quib21 had a titer of 1.85 x 1010 pfu/ml, a DNA concentration of 240ng/µl and a purity of 1.93 (260/280) . More work needs to be carried out on Phage Quib21 to understand it's usefulness in the control of antibiotic resistant bacterial infections.

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**Novel Enaminones and their Effects on Neurons in the Brain**

Presenter's Name: Julia Woods
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Thomas Heinbockel
Faculty Advisor's email: theinbockel@howard.edu

Coauthors: Isis Amaye, Winfield Whittington, Ze-Jun Wang, Patrice Jackson-Ayotunde, Thomas Heinbockel

**Purpose**: Epileptic seizures are the result of excessive cortical excitation. Therefore, most anti-seizure medications work by promoting neuronal inhibition. However, currently available treatments are less than ideal and novel drugs with higher efficacy and fewer side effects are being scouted. Some enaminones have been demonstrated to exert potent inhibitory effects on neurons. Potentially, such compounds could be used to treat epilepsy. We previously reported that the enaminone KRS-5ME-4-OCF3 strongly inhibited mouse mitral cells in main olfactory bulb (MOB) slices. **Methods**: To expand our drug discovery efforts, we have synthesized and tested five novel enaminones with similar chemical structures (GSA-62, CMA-90, TTA-35, WWB-33, and WWB-67). We used whole-cell patch-clamp electrophysiology to record from mitral cells in acute brain slices that include the MOB. **Results**: We hypothesized that one or more of the five novel enaminones has a reversible inhibitory effect on mitral cells, similar to the drug effect of KRS-5ME-4-OCF which resulted in a decrease of the firing rate and a more negative membrane potential. The novel enaminones did not demonstrate robust changes in firing rate or membrane potential of the mitral cells. We will continue to modify the chemical structure of enaminones to find potent anti-epileptic candidate drugs. **Discussion**: None of the tested drugs evoked significant electrophysiological responses suggesting that they exert their activity through another mechanism of action not tested in our studies. We will continue with our extensive structure activity relationship studies to chemically modify potential agents for clinically use in the treatment of seizure disorders.

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**Development of Tear Proteomics Method for Analysis of Sickle Cell Retinopathy**

Presenter's Name: Keona Wynne
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Sergei Nekhai

Faculty Advisor's email: snekhai@howard.edu

Sickle cell disease (SCD) is a hereditary disorder where a glutamic acid at position 6 of β-hemoglobin is substituted for valine in Hemoglobin S (HbS) and for lysine in Hemoglobin C (HbC). Proliferative sickle retinopathy (PSR) occurs primarily in HbSC patients (33% incidence in HbSC compared to 3% in HbSS). Sickle cell retinopathy is caused by vaso-occlusion of the ocular microvasculature and can affect both the anterior and posterior portion of the eye. Tear proteomics may serve as a novel way to diagnose and track the progression of sickle cell retinopathy. Tears are complex biological fluids that contain electrolytes, proteins, lipids and around 60 metabolites. In this study, we aimed to identify novel protein biomarkers for PSR using a tandem mass spectrometry assay (LC-MS/MS) using tears collected from patients with HbSC and HbSS. This study was approved by Howard University Institutional Review Committee. To establish the baseline proteomics procedure, samples were stored at four different temperatures (RT, 4oC, -20oC and -80oC) for four weeks. Tears were then eluted into 100 mM ammonium bicarbonate, protein concentration was measured, and the combined samples from three individuals were trypsinized. The peptides were purified on C18-tips and subjected to LC-MS/MS (nano-LC paired with Thermo LTQ-Orbitrap mass spectrometer). Data was analyzed using Thermo Protein Discoverer 1.4 software. Though total protein concentration in the samples didn't change after storage at different temperatures, the MS protein profiles varied significantly depending upon storage temperatures. The protein data is currently being analyzed and will be presented.

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**Prevalence of multi-drug resistance Staphylococci in vegetables and clinical isolates in Gondar, Ethiopia**

Presenter's Name: Cherinet Yigrem
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr.Broderick Eribo
Faculty Advisor's email: beribo@Howard.edu

Infectious diseases of bacterial origin are a major cause of morbidity and mortality in Ethiopia. To minimize such burdens, proper use of antibiotics has played a vital role and saved countless lives. However, use of antimicrobials as therapeutic agents is compromised by the potential development of drug-resistant micro-organisms. Current research indicates a trend towards increasing resistance rates among pathogens such as Staphylococcus spp. to commonly prescribed antibiotics including, ampicillin, amoxicillin penicillin, trimethoprim/sulfamethoxazole and tetracycline. Therefore, this study was conducted to evaluate the prevalence of Staphylococci and their drug resistance nature in humans, in Gondar region, Ethiopia. Staphylococcus organism were isolated from 31 (32%) of the total 100 samples, 71.8% in the vegetables and 28.2% in the clinical samples. The isolated species were S. aureus (n = 10; 13%), S. haemolyticus (n = 4; 6%), S. cohnii (n = 4; 6%), S. epidermidis (n=4; 6%) and coagulase negative Staphylococcus (CNS) (n = 9; 12.4%). Amikacin and kanamycin was effective drug all the isolates (n = 32; 66% and 63% respectively) were susceptible to it. However, the majority of the isolates showed resistance to penicillin-G (99.3%), Nalidixic acid (94%), Methicillin MERSA (99.1%), tetracycline (99.1%) and Erythromycin (99.8%). Of the Staphylococcus SPP. tested for drug susceptibility, 100% of them were phenotypically resistant to vancomycin (VRSA) and Trimethoprim and all of the isolates showed Extreme drug resistance (EDR) to > 5 drugs and multi-drug resistance (MDR) to >2 drugs.

# Business

**Do the District 2012 Income Tax Policy Increase Tax Revenue? Evidence from a Regression Discontinuity Design**

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

This paper assesses the impact of the 2012 Washington, D.C. income tax policy of individuals who earn over $350,000 on tax revenue. Providing direct evidence on total revenue and individuals behavior to income tax change (tax shelter). While many studies use federal level data set to study the income tax policy on the whole country, this paper use direct administrative city level data, and direct indicators such as taxable income and the total tax revenue at the city level. In addition, to the indicators, the Regression Discontinuity Design is used to indicate if there is a discontinuity at the threshold of the taxable income caused by increase in tax rate for the treatment group. Preliminary results show a discontinuity at the threshold indicating a negative relationship between the increase in income tax rate and total revenue. It also shows that individuals shift their income to reduce their tax liabilities.

Key words: Taxable income, total revenue, regression discontinuity, and tax shelter.

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**Would Crude Oil Prices More Significantly Influence the Diffusion Rate of The Renewable Energy Portfolio in The United States?**

Presenter's Name: Hind Alnafisah
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Omari H. Swinton
Faculty Advisor's email: oswinton@howard.edu

The United States economy has changed over the past several decades and led to historically high returns to obtaining new resources of a green economy. Nowadays, green energy became an important component of energy consumption. United States is one of the countries that adopted higher fossil energy resources. Furthermore, it adopted renewable energy resources such as solar, bioenergy, geothermal, hydropower and many more. There is no research that exams the impact of crude oil prices on renewable energy consumption for the United States. Hence, understanding how crude oil prices and the other determinant variables impact the diffusion rate of the renewable energy is an important issue of concern to consumers and policy makers. This paper tackles this issue for a state's panel consisting of 51 states over the period 1970 to 2015 by using a dynamic system-GMM panel model. We find that oil prices increase has a smaller but negative impact on renewable energy consumption. Net energy import, coal prices, and population are the major drivers of renewable energy consumption in the United States. We discussed some policy implications.

Special Acknowledgement: Princess Nourah University (PNU) for support.

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**Cognitive Dissonance and the Job Interview: Helpful or hurtful?**

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

The purpose of this study is to test the predictions of the action-based model of cognitive dissonance in the context

of the job interview. Dissonance is the unpleasant feeling individuals experience when they hold two conflicting cognitions (thoughts, behaviors, or attitudes). According to the action-based model of cognitive dissonance, individuals are motivated to reduce dissonance because it can interfere with effective action. New entrants to the job market are particularly prone to experience dissonance because their desire to find employment upon graduation is likely to outweigh their desire to pursue only the most attractive jobs and organizations. In this study, I examine how these variations in applicant perceptions of organizational attractiveness, along with individual differences, predict applicant responses to the job interview and their attitudes about the organization. Results suggest that effort in the interview impacts post-interview perceptions of the interviewing organization.

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**Dietary Attitude and Criteria for Food Selection Among African-American College Students**

Presenter's Name: Maryam Khan
Classification: Senior Faculty
School/College: Business
*Presentation Type: Oral Presentation*
Email: mkhan@howard.edu

Coauthors: Philemon Oyewole

Obesity has become a major health problem in the United States. College students, especially minorities are at a greater risk for obesity and related health complications. African-Americans have the highest age-adjusted rates of obesity (48.1%) followed by Hispanics (42.5%), Whites (34.5%), and Asians (11.7%). Though there are several studies relating to college students' dietary habits, very few focus on African-Americans, even though minorities are at a higher risk for obesity. Therefore, the objective of this study is to determine the major criteria used by African-American college students in choosing food, and what factors influence those criteria. A 6-part survey instrument was used to sample adult African-American college students at a major university. Findings of this study revealed that Quality/ taste, Hunger level, Convenience, and Price/value ranked as top four criteria used in selecting food. Gender, weight management practice, and knowledge of nutrition labels are among the factors influencing their choice of criteria. This study provides valuable insight into the dietary and weight management attitudes and behaviors of a growing minority college-aged group. In addition, this study will benefit the African-American demographics, and be of special interest to college dining services, food service industry, and other community groups.

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**Have Second-Tier Auditors Impacted Auditor Concentration? Analysis of Changes from 2002 to 2014**

Presenter's Name: Lucy Lim
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Business
*Presentation Type: Poster Presentation*
Faculty Advisor: Lucy Lim
Faculty Advisor's email: lucy.lim@howard.edu

Coauthors: R. Mithu Dey

The Arthur Andersen's demise in 2002 left the audit industry with Big 4 auditors. Coupled with Sarbanes Oxley Act of 2002 that limit services provided by an auditor to its clients, the clients' choices for an auditor are limited. We examine auditor concentration overtime, to see whether non-Big 4 auditors have gained more audit market share. Increased competition will give clients more auditor choices, more competitive audit fees and a healthier audit market where auditors assert their opinion without client's pressure. We extend the Government Accountability Office 2008 study on concentration in the audit market. Data are obtained from Audit Analytics and Accounting Today. We compare market concentrations among 4 client-revenue and 3 auditor-size groups. An auditor's market share is calculated as total audit and audit related fees earned by an auditor divided by the total audit and audit related fees earned by all auditors. Market concentration is measured using Herfindahl-Hirschman index (HHI) = ∑_(i=1) ^N▒s_i^2 , where s is the market share for each auditor and N the number of firms in the sample. Results show that small auditors have gained more in the smaller-client categories, while the mid-tier auditors were more successful in the medium-client categories, while the largest clients are still dominated by Big 4 auditors. While market concentration is easing up in the smaller client categories, the decrease in concentration is getting lower as client sizes are larger. Our results indicate that non-Big 4 auditors still experience difficulty in penetrating the large client market.

**The OJ Effect**: **A case study on the intersection of race, activism and the business of sport**

Presenter's Name: Leelannee Malin
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Communications
*Presentation Type: Poster Presentation*
Faculty Advisor: Leelannee Malin
Faculty Advisor's email: leelannee.malin@howard.edu

Athletes such as Muhammed Ali, Michael Jordan and OJ Simpson have exhibited excellence in their field, while their social stances have been long debated in the popular culture. Each have been both praised and loathed as role models in American culture but have set a standard of success within the business of sport. In the realm of professional sports it is virtually impossible to separate branding, advertising, endorsements and the images of its players. However, with the onset of the Black Lives Matter movement, coupled with Colin Kaepernick's protest, activism has been inserted into the conversation; and with the rise of social media, it in fact can not be excluded. As a business practitioner, it must be argued that the athlete is an active participant and sometimes a driving force in commodifying oneself. The assumption can be made that the athletes' tactics are calculated whether for positive, adverse or intended consequences to their image and brand. With the Super Bowl being one of the biggest advertising opportunities amongst all genres of sport, the study of media and the professional athlete as a product can not be complete without the overarching study of society and sport. This case study seeks to provide understanding into the business model of how and why the brands of controversial athletes become global commodities. Grounded in understanding these issues through the lense of the conflict theoretical model, this case study analyzes the intersection of race, activism and the business of sport.

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**The Future of Energy Production**

Presenter's Name: Abdullah Muhammad
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Nea Maloo
Faculty Advisor's email: nea.maloo@howard.edu
In today's technology-dependent society, one of the most fundamental necessities is energy to power these assets. Across the world, the vast majority of this energy comes from fossil fuels; the United States alone there are over 1,700 natural gas power plants from which cities draw their power, not to mention the number of vehicles that rely on gasoline. However, fossil fuels are a finite resource, and while we'll always need energy, we will very soon run out of fossil fuels that can provide it. Additionally, the carbon dioxide emissions from fossil fuels are a huge contributor to global warming – perhaps the greatest environmental issue civilization has ever faced, which means the sooner we find other energy sources the better. Alternatives such as wind power, solar power, and hydroelectric power have proven useful in small and moderate scales, but have yet to see enough widespread, efficient use to be seriously considered as a universal replacement for natural gas. A final solution may include some combination of these technologies in their current applications, or it may require a completely new approach altogether. How can these technologies can provide the energy of the future, and what strategies can be used to quickly and decisively employ them on a large scale?

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**Paying It Forward: The Reciprocal Effect of Service Quality on Charity at Checkout**

Presenter's Name: Efua Obeng
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Business
*Presentation Type: Poster Presentation*
Faculty Advisor: Efua Obeng
Faculty Advisor's email: efua.obeng@howard.edu

Chinintorn Nakhata, Hsiao-ching Kuo

Although donation requests at checkout have become commonplace, much remains to be learned about the retail-level factors that impact shoppers' donation behaviors. This research, in part, fills this gap by studying the relationship between shoppers' perceptions of retail service quality and their willingness to donate at checkout. Drawing from social contract theory, we hypothesize and show that shoppers who believe that they experienced superior service are grateful to retailers and reciprocate their gratitude by being more willing to donate at checkout than other shoppers. We also show that perceptions of superior service do not always encourage prosocial shopper behaviors. Specifically,

shoppers who doubt the authenticity of superior service respond less positively to charity at checkout than expected. Finally, we identify an important boundary condition by showing that the effect of superior service on willingness to donate is attenuated when shoppers are asked to donate to a cause that is recent.

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**Did Federal Income Tax Laws Promote Segregation in Education? A Historical Review: 1954-1983**

Presenter's Name: Jean Wells
Classification: Senior Faculty
School/College: Business
*Presentation Type: Poster Presentation*
Faculty Advisor: N/A N/A
Faculty Advisor's email: jean.wells@howard.edu

Coauthors: Gwendolyn McFadden

This paper explores the theory that income tax laws were effectively used to circumvent the U.S. Supreme Court's decision in Brown v. Board of Education, the landmark case which mandated the desegregation of public schools in 1954. After Brown, many states responded by closing public schools rather than desegregating. By 1961, the courts had resoundingly declared that these school closures were unconstitutional. Private, segregated schools soon emerged and were routinely granted tax exempt status by both federal and state governments. This tax-exempt status removed any obligation to pay federal income tax on the schools' income. Additionally, other related tax laws provided a charitable contribution deduction to those who supported and contributed to those same segregated private schools. The paper examines the applicable federal income tax laws effectively used by private schools to promote segregation and chronicles the attempts by the federal courts, the Internal Revenue Service, and presidential administrations to curtail this misuse for the period 1954 to 1983. The paper concludes with an analysis of the U.S. Supreme Court's 1983 decision in Bob Jones University v. United States, in which the court held that "[i]t would be wholly incompatible with the concepts underlying tax exemption to grant tax-exempt status to racially discriminatory private educational entities [and that] racial discrimination in education is contrary to public policy."

**African Youth Entrepreneurship: Dividend or Ticking Time Bomb?**

Presenter's Name: Wheeler Winstead
Classification: Staff
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Wheeler Winstead
Faculty Advisor's email: wheeler.r.winstead@howard.edu

Coauthors: Jean Wells

In 2017, African Renewal magazine presented two different potential outcomes of Africa's growing youth population: dividend or ticking time bomb. According to United Nations data, Africa has more people under the age of 18 than on any other continent. This youth population is projected to double by 2050, thereby placing more stress on already strained economic and educational resources. As a result, larger numbers of vulnerable and needy youth become targets for extremist groups who recruit them as tools of war. According to Human Rights Watch, "more than 120,000 children under 18 years of age are being used as soldiers across the continent." These realities support the perspective of a ticking time bomb. However, some researchers and African businessmen have the dividend perspective. They see this crop of African youth as the potential entrepreneurs who will transform the continent and rewrite its future. This paper posits that the recent availability of computers and the internet, coupled with the hunger for change, supportive enabling institutions and the newly stabilized democratic governments give more support to the second perspective. It postulates that this newly supportive environment will unleash an explosion of positive innovation and entrepreneurial activities. The paper will examine this new phenomenon; provide evidence of its potential; attempt to provide an explanation for the occurrences; synthesize the commonalities and offer suggestions for expanding and leveraging this impact throughout the continent.

# Creative Arts & Design

**Co-Living, A solution to the growing housing deficit in the U.S.**

Presenter's Name: Kinshasa Campbell
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Dahlia Ndoum
Faculty Advisor's email: dahlia.nduom@howard.edu

More than forty-three million Americans struggle to find affordable housing. As a result, they are cramped into low income housing complexes which are often over looked when it comes to government spending. It is common for these complexes to be replaced with high-rise condominiums, a process referred to as gentrification. Twenty percent of the major cities in the U.S. have experienced gentrification since 2000 (Gentrification in America, Maciag, 2015). This displaces many of the current residents because developers are only required to reserve a small portion of their units to be deemed affordable for the previous occupants. The purpose of this study is to examine how co-living could be implemented as a housing deficit solution. Co-living housing provides community engagement, safety and security at a lower rate than traditional housing options. Berkeley Cohousing Community in Berkeley, California is an income restricted community where households live within the same neighborhood and assist each other with their day to day responsibilities. Similarly, compound homes in Ghana consist of several structures that create an enclosure with a kitchen, bathroom, living areas, and sleeping rooms around an open courtyard. Several households dwell in these compound homes assisting their neighbors with childcare, food preparation and keeping watch for safety and security reasons. Through thorough analysis of the aforementioned co-living complexes, I will present a proposed model for affordable housing that follows a set of design criteria which can be implemented as a viable solution to the housing deficit here in the United States.

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**An Exploration of the Thoughts and Feelings Associated with Freehand Drawing with Colored Pencils**

Presenter's Name: Ravyn Cotton
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Monique Major
Faculty Advisor's email: moniqueamajor@gmail.com

Creativity is a phenomenon that is the driving force behind innovation. Though creativity can be seen in several forms, psychologist have began to ponder what the creative process individuals use to generate ideas into a body of work. A study done by psychologist Tamar Bar-On (2007), uncovered that individuals use one of three methods when creating. These methods included a planned approach, associative thinking, and a mix between both. The planned approach states that individuals have a clear idea of what they want to create before using creative materials. Associative thinking is a concept in which the individual creates by interacting with the material. Finally, the mixed approach includes individuals fluctuating between planning and associative thinking when creating. Her study was duplicated by Harrell and Major at Howard University in 2015. Their study differed in that they used colored pencils and instructed participants to free draw. In this study, two questionnaires asked participants about their thoughts, actions, clarity/preparedness for the task, anxiety and absorption levels, and questions regarding pleasure and power during the creative process. The questionnaires were administered to participants following the creative task. This current presentation serves as an update to the original results found by Harrell and Major in 2015. Data from 140 more participants has been gathered and analyzed, producing an array of results.

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**Of Zannis and Zip Coons: The Effects of Commedia dell'arte and Minstrelsy on Theatre and Performance**

Presenter's Name: Jasmine Davis
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Raymond Caldwell
Faculty Advisor's email: raymondocaldwell@gmail.com

This paper will put commedia dell'arte, the basis for Western improvisational theatre, in conversation with minstrelsy, the only indigenous American theatre form. Although centuries and continents apart, commedia dell'arte and minstrelsy share various common threads; both make use of stock characters, seek to cater to common audiences, and are thought of as cheapening the craft of theatre and performance. However, despite the occasionally low-brow nature of the forms, they also provided opportunities for actors to branch into the performance industry and gain notoriety for their work. These two genres' legacies have been diminished in the light of "more enlightened" thought, but it is important to acknowledge them as cornerstones for their respective schools or performance whilst also analyzing the consequences of performing typecasts and generalizations.

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**Breaking the Cycle: An Investigation of Drama Therapy as an Intervention on the School to Prison Pipeline and At-Risk Youth**

Presenter's Name: Mary Morris
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Ofosuwa Abiola
Faculty Advisor's email: ofosuwa.abiola@howard.edu

Inner-cities are full of high-risk youth who are living in unstable living environments. Inner-city poverty is more concentrated than other areas, inducing risk factors such as violence and failed educational systems. These risk factors are putting inner-city youth at a high risk of engaging in maladaptive behaviors, the primary being truancy, substance abuse, and continued violence. As a result, these behaviors are funneling students into prisons. Prisons are only temporarily limiting these behaviors, not preventing them or addressing why human development is being impacted. Drama Therapy is the intentional use of theatre and play to achieve therapeutic goals. Various exercises under these dramatic areas should achieve symptom relief, development of relationships, and personal growth. This paper argues that drama therapy can be used to treat the negative psychological trauma from the stressors of risk-factors in at-risk youth. As a result, the juvenile mass incarceration rate should decrease. To prove this argument, methodologies include archival research, case studies, and observational study. A primary method used to collect research were interviews with inmates in the D.C. Jail. Through the research, it was determined that the practice of drama therapy enables artistic expression to replace negative psychological attitudes towards life situations. Performance and therapeutic exercises produced positive problem solving skills, and improved self-image and communal relationships. Drama therapy was also found to additionally reduce recidivism rates.

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**Bound to Post-Black: Examining and Redefining Tenets of the Post-Black Art Movement.**

Presenter's Name: Adanna Paul
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Ofosuwa Abiola
Faculty Advisor's email: ofosuwa.abiola@howard.edu

The term Post-black art posits the illusion of a post-racial society. It suggests that the work of Post-black artists disregards the black experience. The current widely accepted definition of post-black art does not fully comply with the former or the latter; however, it highlights a group of contemporary black artists who create work impacted by their race, but who desire for their art to be received unbound to their race. This definition is often thought of as being exclusive to visual art, as the term Post-black art originated in this field. This paper will explore the origins and current state of the Post-black Art Movement, disband the perception that Post-black art is exclusive to visual art, and postulate that creating art that highlights a new perspective on the black experience and accepting the title of black artist are not mutually exclusive. My research methodology includes the interrogation of primary sources from archives, interviews,

art, live footage, plays, and secondary sources such as scholarly journals, and monographs. The results of this research have led to the conclusion that Post-black art must be redefined and theatre arts must be included. This will open a path for artists and non-artists alike to gain a better understanding of Post-black art, shifting and contributing to the broader societal perception of the Post-black Art Movement as it continues to evolve.

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**Effects of Environmental Racism: The Food Desert Dilemma**

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

The cities that qualify as food deserts have grocery stores more than half a mile away, almost half of the families do not have private transportation, and the average household income is less than the national poverty level for a four-person family. The lack of access to healthy foods contributes to unhealthy dietary habits, a higher risk of obesity, high cholesterol, hyperglycemia (which can lead to type 2 diabetes), and vitamin deficiency. My research will explore the receptiveness to healthy food options and determine how conditioned the inhabitants of former food deserts are to their previous state. I will focus on the communities in Atlanta, GA and Washington DC to examine how the community reacts to legislative change versus community based change. Heart disease, obesity and type 2 diabetes in both the youth population and the adult populations of these areas will be studied. After conducting research, I will design an educational and design program that fosters a solution to the food desert dilemma.

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**The Use of Art and Design to Positively Impact the Perceptions and Environment of Black Neighborhoods**

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

Art and design can be used as a tool of mobilization, unity, and social engagement. It can contribute to a neighborhood's wellbeing, citizens, and mindset. There is a growing interest of revitalization efforts of neighborhoods and communities across the United States. Those efforts include moves such as adding bike lanes to streets and bringing trendy coffee shops and locally owned stores to existing buildings. Additionally, signs of revitalization have been made evident through the use of murals and other forms of public art. The use of the public art serves as a source of pride for new and revitalized communities and welcomes visitors and potential residents. From my own experience in my hometown of Memphis and two and a half years of attending college in Washington D.C., I have noticed that public art as a means of revitalization are rare in communities of majority Black citizens. This study will research the use of art and design in majority Black populated communities and their impact on its residents and environment. Often times there are negative stereotypes associated with such neighborhoods referred to by its residents and nonresidents. Can these perceptions be transformed through the use of intentional art and design in such neighborhoods?

# Education & Outreach

**The Effectiveness of Virtual Classrooms in Professional Occupational Therapy Education and Training at Colleges and Universities in Ghana**

Presenter's Name: Ngozi Agwuenu
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Felecia Banks
Faculty Advisor's email: fbanks@howard.edu

In Africa, an estimated 60-80 million people are living with disabilities with limited access to rehabilitation services, specifically, 10% of Ghana's 20 million citizens. According to the Ghana Federation of the Disabled, those with disabilities are often perceived as unproductive and incapable of contributing positively to society, and seen as an economic burden on the family and the society at large (Ghana Federation of the Disabled [GFD], 2016, p. 1). The unmet need of rehabilitation services in Ghana can be addressed by identifying occupational therapy (OT), physical therapy (PT) and speech therapy (SLP) as major healthcare providers. The challenges facing occupational therapy services in Ghana includes an inadequate number of educational programs, insufficient clinical fieldwork sites, lack of faculty, a limited number of therapists and poor country awareness or appreciation for OT services (Agho, et al, 2017; John, 2017; Frantz, 2007). Effective models of international cooperation and collaboration should be established between universities, professional licensing boards, government agencies and nonprofit organizations for rehabilitation needs in Ghana. The purpose of this research is to examine the effectiveness of a virtual classroom in professional occupational therapy education and training at colleges and universities in Ghana. This study used a quasi-experimental research design to determine the effectiveness of a virtual educational and training classroom on improved student performance at the University of Ghana. Preliminary findings from this study were analyzed using SPSS 22 version, and will be used to advance educational practice, and advocate for OT, PT and SLP services in developing countries.

**Evaluation of Public Oral Health in Islamabad, Pakistan**

Presenter's Name: Rafil Ali
Classification: Professional Student
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Xinbin Gu
Faculty Advisor's email: xgu@howard.edu

Coauthors: Muazzam Farooq

The goal of this study was to determine the dental health disparities in Islamabad, Pakistan, a developing nation, compared to the United States. lslamabad is the capital city of Pakistan located within the Federal Islamabad Capital Territory. It has a population of around 2 million people and is currently the 9th largest city in Pakistan. In the August 2017 Pakistan Dental Mission, our team traveled to the surrounding rural towns of Islamabad and triaged over 2,000 patients based on their dental needs. The dental team consisted of 10 HUCD students, 2 HUCD alumni, 1 dental hygienist, 2 dental assistants, and a team of over 15 faculty and dental students from Riphah University in Pakistan. Due to the high volume of patients, only a small portion of the patients were able to be used in the study. 291 participants were evaluated based on their urgent dental needs. Of the 291 participants, over 69% required scaling and root planning treatments while over 51% required extractions. Of the 51% of patients who needed extractions, 339 teeth were extracted. Our results indicate the presence of large disparities of dental needs in Pakistan as compared to more developed countries like the United States.

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**The Effects of Math Intervention on Student Achievement**

Presenter's Name: Janiah Beazer
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*

Faculty Advisor: Gerunda Hughes
Faculty Advisor's email: ghughes@howard.edu

Eureka Math is a K-12 curriculum which is aligned with the college- and career- readiness standards (e.g, Common Core State Standards (CCSS)) for mathematics and promotes deeper learning, critical thinking, problem-solving, and conceptual understanding of a few, but essential, mathematical concepts. This action research project serves to highlight and help alleviate, through a targeted intervention, some of the challenges a group of third grade students faced as they grappled with their first introduction to Eureka Math. The intervention was designed to help students make connections between mathematics and their world in order to be successful mathematics learners. Results from the iReady math test were used to identify students who had the need as well as the opportunity for exponential growth on content related to the multiplication and division standards in CCSS (e.g., 3.OA.A.1, 3.OA.A.2, 3.OA.A.3, and 3.OA.B.6). Every week, over the course of about 6 weeks, a higher-order skill was introduced and practiced on Monday, applied to real world problems on Tuesday, and assessed on Wednesday. The assessments consisted of 2-3 question exit slips that measured students' mastery of the topic of focus. If mastery (> 80%) was not met, students spent the following week studying the same skill. At the end of the intervention, students showed a 5.7% increase in their performance on the multiplication standards and a 44% increase on the division standards. The results of this research demonstrate that students' performance in challenging mathematics can be improved with the use of effective interventions.

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**Adjusting the Scope: Exploring the use of Periscope in Academic Instruction.**

Presenter's Name: Dwayne Bryant
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Gregory Reed
Faculty Advisor's email: g_reed@howard.edu

The rapid use of technology has impacted various facets of modern society. In the world of academia technology is changing the way we learn, engage students and the way we teach. Many see technology as a nuisance that prevents the delivery of quality academic instruction. This paper seeks to provide an alternative outlook on the use of technology in academia and how it can positively alter the educational experience. Specifically, students who are facing out of school suspension or expulsion, a mobile application called "Periscope" can be used to supplement instruction during the student's absence from the classroom. Periscope is an application that allows users to view live video feeds on any mobile assessable device. These live video streams can be viewed on a variety of platforms which would provide students with the ability to receive instruction outside of the classroom. The purpose of this initiative is to provide educators with alternative means of allowing all students the opportunity to receive a quality education. Using a virtual format can serve dual purposes for educators. While allowing the student to receive instruction, the teacher can also evaluate their lesson plans for content delivery and overall effectiveness. With the increase of online degree and training programs, it is important to explore the use of social technology in academic settings.

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**Prostate cancer screening: All men may not be equal.**

Presenter's Name: Clinton Burnside
Classification: Staff
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Pamela Coleman
Faculty Advisor's email: pamela.coleman@howard.edu

Coauthors: Carla Willaims

**Background:** Prostate cancer (PCa) remains a commonly diagnosed cancer for men. Studies demonstrate increased incident rates, emphasizing family history (Lim, et.al, 2008), age (Lim, et.al, 2008), and being African American (Lim, et. al, 2008 & Ogunsanya, et.al, 2017). Black men have greater incidence and mortality rates than other men. PCa screening efficacy is debatable so health organizations suggest somewhat different screening guidelines, but fail to adequately address ethnic differences. Limited data is available to support specific PCa screening guidelines for black men. **Aim:** To review HUCC's "Men Take Ten" program data to identify PCa symptoms in participating men. **Methods:** We analyzed a prospectively maintained institutional screening database. Social and demographic characteristics as well as PCa symptoms of 2,565 men

are described. **Results:** Table 1 includes participant demographics. 74.4% had a body mass index (BMI) > 25. Table 2 depicts PCa symptoms. Black men more often reported a family history of PCa (29.7%), and more likely to have a prostate specific antigen (PSA) > 4.0 ng/mL of blood (4.9%). They also reported more difficulty postponing urination (11.6%) and pushing/straining to begin urine flow (5.6%). Overall, black men reported prostate symptoms more often than other men. **Conclusion:** National health organizations (ACS, USPSTF and AUA) support PCa screening for men based on age. However, each group falls short of suggesting specific screening guidelines for black men. Our data shows that prostate symptoms are identified more in black men. As additional data is collected, health organizations should consider PCa screening

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**Culturally Responsive Assessment Practices for Underrepresented Gifted Populations**

Presenter's Name: Sarah Cooke
Classification: Graduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Celests Malone, PhD
Faculty Advisor's email: celeste.malone@howard.edu

One of the tasks of the education system is to encourage academic success and provide multiple opportunities for culturally diverse students to reach their full potential. One way to do so is to increase the number of culturally diverse students enrolled in gifted education programs. Black and Latino populations are referred to gifted programs at significantly lower rates than their White counterparts. Without proper assessment and identification, it is difficult to provide this population of gifted learners with the quality education that he/she deserves. Providing equity education for students requires providing services and education that meet their educational needs. There is a growing necessity to identify more gifted students without using traditional practices based solely on intelligence testing. School psychologists can play a great role in helping to identify more students from culturally and linguistically diverse backgrounds by using culturally responsive assessment method**s** such as universal screening for giftedness, multi-faceted assessments, and using measures that are valid and reliable for the population. Previous research argues that the gifted identification process can help to decrease underrepresentation of cultures in gifted education. The purpose of this literature review poster is to provide an overview of culturally responsive assessment practices for school psychologists to help diversify gifted education and make it more inclusive. Such practices will also assist school psychologists in providing more equitable services and meeting the needs of traditionally underrepresented students.

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**An Exploratory Study: Teachers' Decision Making Process to Apply Sensory-Based Interventions in Mainstream Classrooms**

Presenter's Name: Aisha Crowley-Hall
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jessica Alden
Faculty Advisor's email: jessica.alden@howard.edu

Coauthors: Tiana Nguyen, Joylynne Wills

**Background**: Usually, when people think of a child with Autism Spectrum Disorder (ASD) in terms of education, they typically think of specialized schools or classrooms. However, within the last few years, inclusion programs where autistic children are placed in mainstream classrooms have become more prevalent. According to the U.S. Department of Education, 538,000 students with ASD were in the U.S. school system in the 2013-2014 school year. Sensory-based interventions (SBIs) are used by mainstream teachers with varying success to meet the needs of students with autism and ADHD. There is a lack of evidence describing how teachers learn about SBIs and how they decide to implement them in the classroom. **Purpose/Aim**: Therefore, the purpose of this study is to describe how mainstream teachers make decisions to implement SBIs in the classroom. **Methods:** The chosen research design of this study is exploratory mixed methods with the use of quantitative and qualitative data. Quantitative data will be collected via site observation and teachers' results of the sensory profile. Qualitative data will be collected through semi-structured interviews as well as the site observations. **Results**: An in-depth qualitative analysis will be conducted with semi-structured interviews and site observations. A quantitative analysis will be conducted for the site observation and sensory profile. The interviews will

be transcribed, coded and reviewed for themes. Results of site observations will also be quantified, tabulating use of SBIs by category. The data will be triangulated by checking patterns found in interview and observations.

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**Contextualizing Achievement Goal Theory: A Narrative Review of the Interrelationships among Microaggressions, Competence Perceptions, and Goal Orientations for African Americans in Undergraduate STEM Programs**

Presenter's Name: Kendra Delaine
Classification: Graduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Kimberley Freeman
Faculty Advisor's email: kefreeman@howard.edu

Coauthors: Kimberley Freeman

To understand the significance of race in educational psychology research, Wood and Graham (2010) argued a need to broaden the conceptual frameworks of traditional theories, while DeCuir-Gunby and Schutz (2014) proposed an inclusion of race-focused and race-reimaged constructs to address race-related issues in education. Since achievement goal theory of motivation has been criticized for the treatment of psychological processes as culture free (Zusho & Clayton, 2011), the purpose of this narrative literature review is to identify ways in which achievement goal theory can be expanded to reflect a more culture-dependent model that takes into account the significance of race and the role of contextual factors in the motivational processes of African Americans. In the narrative literature review, I will integrate bodies of literature in the areas of achievement goals, perceptions of academic competence, racial identity, experiences of microaggressions, and the achievement of African American undergraduates in STEM fields. I focus on experiences and achievement in STEM because to diversify the STEM pipeline, attention should be given to contextual and race-related factors affecting the retention and persistence of students of color in STEM programs. The research questions guiding this review include: a) what are the interrelations among achievement goals, perceptions of academic competence, racial identity, microaggressions, and achievement for African American undergraduates?; b) to what extent do racial microaggressions experienced in a learning context affect the academic outcomes of African Americans?; and c) to what extent are the ability perceptions of African Americans influenced by messages transmitted through their social environments?

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**An Investigation of Speech-Language Pathologists' Use of Telepractice with Culturally Diverse Populations**

Presenter's Name: Lesley Edwards-Gaither
Classification: Graduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Shameka Johnson
Faculty Advisor's email: Shameka.n.johnson@howard.edu

There is a critical shortage of speech-language pathologists (SLPs) in the United States to treat students diagnosed with communication disorders (American Association for Employment in Education, 2017). Telepractice is the online delivery of speech-language pathology services by a remote speech-language pathologist (SLP) and has been proposed as a solution to ensure underserved students receive much-needed services. However, SLPs have reported decreased confidence in their ability to treat culturally diverse populations due to lack of training and exposure to students of diverse backgrounds (Guiberson and Atkins 2012; Kimble, 2013). As a result, the cultural competence of SLPs has never been more fundamentally important to successfully treating communication disorders in the online setting. There is a paucity of research that addresses the clinical experiences of SLPs treating culturally diverse students via telepractice. This study will explore the clinical knowledge, skills, concerns, and preparation process of SLPs providing treatment to culturally diverse students via telepractice.

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**The Impact of Dual Language Pedagogy on Student Learning in Mathematics**

Presenter's Name: Gabrielle Emilien
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Gerunda Hughes

Faculty Advisor's email: ghughes@howard.edu

This study will examine the impact that dual language pedagogy has on student learning in mathematics. The study will be conducted in a French Emersion Kindergarten class in a public school located in Washington, DC. To conduct the study, students who are fluent in both French and English will be randomly assigned to one of two groups. One group will receive dual language mathematics instruction in French and English (experimental group A); while the other group will receive mathematics instruction in English only (experimental group B). Each week, both groups will be taught the same mathematics content; however, one group is taught in the two languages in which they are fluent; whereas, the other group is taught in only one language in which they are fluent. The students will be assessed throughout the study to monitor and document their progress and achievement. At the end of the study, the students from both groups will be administered the same mathematics assessment in English to evaluate their status and growth. Additionally, the results of the assessments will be used to test the hypothesis that students who are offered dual language pedagogy will form a deeper and broader understanding of mathematics concepts than students who are offered the single language pedagogy because the former students are able to deconstruct and process information and concepts in two different ways for the same topic.

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**Is the French or Spanish language more effective in developing early English literacy skills in Kindergarten Students?**

Presenter's Name: Sajela Harlow
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Gerunda Hughes
Faculty Advisor's email: ghughes@howard.edu

In this study, the early literacy skills of Kindergarten students enrolled in an immersion program were tested. The program offered two different languages for students to learn in throughout the course of their elementary education experience: Spanish or French. The purpose of the study was to investigate which language helped students more in developing early English literacy skills –Spanish or French. The study took place over a course of two months. Students were given a pre-assessment which measured their ability to identify 25 sight words at the beginning of the year, then were re-tested using those same words two months later. Results were recorded for both the group learning in Spanish as well as French, and the means, ranges and standard deviations were calculated to determine the average growth and variability in number of sight words students were able to identify. The data show that students learning in the Spanish language have a greater range of growth in sight word recognition than the students learning in the French language.

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**Exploring Pedagogical Possibilities for Transformative Approaches to Academic Literacies in Undergraduate Mathematics through Semantic Profiling: A South African Case Study**

Presenter's Name: Trey Hawkins
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Honjiswa Conana
Faculty Advisor's email: cconana@uwc.ac.za

How can research on academic literacies in regards to mathematics education and mathematical competency help in the modern pursuit to make undergraduate science education more accessible? Framed by the imperative to widen epistemological access to undergraduate science education, this study explores the possibilities of what an academic literacies approach might mean in the context of undergraduate mathematics. Using Maton's Legitimation Code Theory (LCT) (Maton, 2014), a concept from the sociology of knowledge, as a theoretical framework (in particular, his dimension of semantics: semantic gravity and semantic density), this case study aims to characterize the pedagogical practices and student learning in mathematics courses and their links with student success in undergraduate Science, Technology, Engineering and Mathematics (STEM) disciplines. Data was collected through classroom observations, student surveying, observations of students working on Advanced Calculus/Linear Algebra mathematics tasks, and interviews with students. With focus particularly on the disciplinary practice of problem-solving and how mathematics problem tasks are dealt with, the study

suggested that the lecturers' pedagogical practices in dealing with mathematics tasks influenced the way in which the students tackled these tasks. The study shows that students faced challenges in mathematical coursework due to issues of being able to navigate between various mathematical representations. The study found that the course typified a more normative approach to academic literacy, i.e., inducting into the disciplinary norms of the discipline. The study thus has important implications for how reform in curriculum and pedagogy practices might better support epistemological access to undergraduate science studies.

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**Building neurons and the brain: Explaining the structure and function of nerve cells and the brain to elementary school children at St Paul's School**

Presenter's Name: Thomas Heinbockel
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Thomas Heinbockel
Faculty Advisor's email: theinbockel@howard.edu

Coauthors: Vonnie Shields, Nancy Dimitriades

Understanding the structure and function of neurons and the brain is fundamental in gaining an appreciation of how we think and how the brain works. Students from the lower school (K-4) had the opportunity to attend and participate in a STEM-based science fair led by science teacher, Ms. Dimitriades. Students were given the opportunity to visit numerous expositions and were presented with many different hands-on activities in all areas of the STEM disciplines. The children participated typically in small groups consisting of 4-10 participants. Each activity lasted a total of 5-10 minutes. Two of the booths, led by Drs. Shields and Heinbockel, were entitled "Building Models of Neurons Using Edible Items" and "How Does it Feel to Hold a Human Brain in Your Hands?" The first exposition engaged the children by exposing them to build neurons using food items, such as cookies, M & M's, licorice strips, and icing. The presence of plastic neuron models helped to reinforce concepts and to assist the children in learning appropriate neuronal terminology and function. At the second exposition, children handled plastinated human brains, as well as life size brain models and learned the names of the different brain lobes, as well as general functions housed in these areas. Following both presentations, the children were asked general questions about the material to assess their level of comprehension. These expositions are two-way streets for communicating and learning about neuroscience. Neuroscience professionals, who participate in these activities, change their perception of how to teach children about neuroscience and to communicate science more effectively to the general public, thereby improving neuroscience education and general science literacy for children using fun activities.

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**'Teacher-proofing' the Classroom: A Mediation Model Towards Increased Math Performance Through Student Control Techniques**

Presenter's Name: Nikeshia Holt
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: A. Wade Boykin
Faculty Advisor's email: aboykin@howard.edu

The most recent reports of our nation's achievement level for fourth grade students in mathematics reveals that less than half of our students are performing at or above a proficient level (NAEP, 2015). It is imperative that we develop solid methods of increasing the math achievement of our students, especially African-American children. Over the past two decades, research has supported self-regulated learning as a classroom component that will allow students to gain control of their learning experience (Zimmerman, 2008). This proposed study seeks to apply mehods of self-regulated learning through a class intervention; this manipulation will attempt to examine the influence of self-regulated learning on math achievement. According to the theoretical model presented by Boykin and Noguera (2011), self-regulated learning (which falls under guided function in the model) influences engagement, which in turn influences achievement (performance). Other research has found that positive possible selves (Oyserman, 2008), and autonomy-support (Legault & Inzlicht, 2013) are aligned with self-regulation as well. This proposed research will examine how or why autonomy, possible selves, and engagement may intervene on the relationship between self-regulation and math achievement. Furthermore, tests will be run to look

for possible correlations between the three mediators. Research questions for this proposed study asks: 1) is there a direct effect of self-regulated learning on math achievement, 2) does autonomy, possible selves, or task engagement mediate the effect of self-regulated learning on math achievement, and 3) are there correlations between any of the three mediating variables?

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**Synergistic Effects of Traditional and Simulation Methods to Enhance Clinical Skills Acquisition of Medical Students at Howard University**

Presenter's Name: Churchill Ihentuge
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Heinbockel
Faculty Advisor's email: theinbockel@howard.edu

Coauthors: Elizabeth Ricks, Kamla Deonauth

Simulation is a training method that utilizes realistic situations and phenomena to replicate the actual clinical setting in order to familiarize trainees in a controlled environment. It is gradually replacing the traditional method of skill acquisition because of the lack of patients willing to be examined by medical students which made it difficult for medical students to develop the right clinical techniques.A total of 50 first year medical students participated in the study aimed at evaluating the effect of simulation on clinical skill acquisition. The participants were randomly selected and divided into two groups, experimental and control groups (25 each). The control group was taught using the traditional methods while the experimental group was exposed to both the traditional and simulation training methods. A questionnaire consisting of demographic data and a likert scale to assess the students' perception of preclinical simulation sessions were administered. Pre and post simulation tests were also given to assess the impact of simulation on clinical skills acquisition. Results showed that participants generally had a positive perception and usefulness of simulation towards skill acquisition (mean 4.4±0.06).Pretest evaluation of baseline knowledge demonstrated no statistical difference between control and experimental groups (72% and 76%). Average performances of the experimental and control groups in post simulation assessment were 84±8.32 and 44±19.73 respectively, which differs significantly at $p<0.05$. The data provides evidentiary support that coupling of simulation with traditional teaching practices greatly enhanced clinical skills acquisition for medical students and adoption of this dual method approach merits further consideration.

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**Social-Emotional Learning in Racial and Ethnic Minority Youth**

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

Social-emotional learning (SEL) is the process through which children acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions. Unfortunately, children lack social-emotional competencies and this affects their academic performance, behavior, and health. In this literature review, I explored SEL as social and emotional skills play an important role in determining how well-equipped children are able to meet the demands of the classroom and reviewed how SEL is a current challenge for schools serving racial/ethnic minority youth (REM) with varied abilities and motivations for learning. Journal articles were reviewed related to the five interrelated sets of cognitive, affective, and behavioral competencies outlined from The Collaborative for Academic, Social, and Emotional Learning (CASEL). Because effective SEL programming begins in preschool and continues throughout high school, the primary focus for CASEL involves a national Collaborating District Initiative to establish SEL programming in schools throughout the United States. Although many worthwhile programs are currently available, not all of them have been carefully evaluated to determine their quality and impact. Since CASEL first published its review of SEL programs more than 10 years ago, there have been many advances in SEL research, practice and policy. With this new knowledge, it is time to review school-based SEL programming on children's behavior and academic performance and understand the implications of SEL programming on REM youth.

**A Qualitative Study of College Millennials' Career Preparedness to the Workforce: They Say They Are Ready**

Presenter's Name: Joanna Jenkins
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Wei Sun
Faculty Advisor's email: wei.sun@howard.edu

Numerous studies report that Millennial employees encounter challenges in corporate environments. Recruiters and managers all complain that colleges and universities do not provide skills necessary to prepare graduates for the workforce. Universities and colleges have been seeking ways to motivate their students to acquire adequate career skill developing and training. Such endeavors include setting up career center workshops and encouraging students to attend job fairs and apply for internships.The research will use a qualitative research method which will include in-depth interviews with 25-30 college students. The participants will be recruited from a U.S. college. The students' ages range between 18 to 24 (Upon IRB approval). The study will get a deeper understanding of college Millennials' level of career preparedness for the workplace. The findings will help educators and organizational managers tailor mentoring strategies to best help Millennials college graduates to prepare and transition smoothly into the workforce.In this qualitative study, researchers are interested in bridging the gap between Millennial college students' level of career preparedness with the expectations of the current workforce. The research questions are:

- RQ1:What do college Millennials understand career preparedness to be?
- RQ2: How do college Millennials perceive their readiness for workforce?
- RQ3: How do Millennials feel about the stereotypes cast on their generation? And how do they deal with the misunderstanding?

The theoretical framework for this study will be Social Identity Theory. Grounded theory will be used to analyze the data.

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**Importance of leadership skills among pharmacy students; a review of the PILs Program**

Presenter's Name: Youness Karodeh
Classification: Senior Faculty
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: youness karodeh
Faculty Advisor's email: ykarodeh@howard.edu

Coauthors: Muhammad Habib, Imbe Drame, La'Marcus Wingate

The purpose of this study is to evaluate and determine the importance of leadership skills among pharmacy students through a peer-mediated mentorship program. A cross-sectional study design was utilized in evaluating student attitudes towards a Pharmacy Initiative Leaders (PILs) program and to evaluate the impact of PILs on participation in student organizations. First and second year students were asked to complete a survey eliciting information on involvement in student organizations and attitudes towards PILs. Over 115 students completed the survey for a response rate of over 80%. Students mentored through the PILs program participated in 2.2 student organizations during pharmacy school, which was significantly more than the 1.3 student organizations participated in among students not participating in PILs ($p=0.005$). Approximately 54% of PILs participants agreed or strongly agreed that PILs helps to establish a culture of leaders, and over 75% of those mentored through PILs said they would recommend that future students participate in the program. Based upon the results of this study, students who participated in a tailored professional development and leadership program for pharmacists called PILs, were significantly more likely to participate in student organizations than those not participating. The vast majority were also likely to recommend that future students participate in the PILS program, demonstrating high favorability of PILs amongst first and second-year pharmacy students. Further study may be warranted to determine impact of PILs on matriculation rates.

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**A Role for Gene-Environment Interaction in Health Disparities**

Presenter's Name: Bernard Kwabi-addo
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Oral Presentation*
Email: bkwabi-addo@howard.edu

African-Americans (AA) and other USA minorities are disproportionately affected by high infant mortality, cardiovascular diseases, cancer, obesity and other conditions. Social determinants are well known root causes of health disparities: factors such as low socioeconomic status, psychosocial stressors, and racial discrimination causes poor health. Genetic factors also contribute to virtually every human disease by way of increased susceptibility or altered resistance that affects the severity or progression of disease. Genetic studies, in particularly, GWAS (genome-wide association studies), that examine genetic variants in different individuals has identified common and rare variants in different populations that affect disease risk, the choices of therapeutics, and drug sensitivity/resistance profiles and can also help explain why AA disproportionally suffer from some diseases compared to other racial groups. In addition to genetic factor, epigenetic phenomenon (chromatin modification, DNA methylation, and noncoding RNA) results in diversity of gene expression. At least some heritable epigenetic marks are responsive to social determinants, such as diet, psychosocial stress, or exposure to environmental toxins including drugs of abuse. Thus epigenetics has kindled excitement because nutrition, psychosocial stress, and environmental toxicant exposure can alter epigenetic marks linking environment and gene expression to physical health. In some instances, exposure effects may persist across the life course and may be transmitted to offspring via epigenetic inheritance. An emerging phenomenon posits that environmental exposures affect gene expression by modulating epigenetic changes-the so-called "gene-environment" interaction and promises vast potential for developing new multidisciplinary frontiers in shrinking health disparities and personalizing care.

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**The Benefits of Music on Second Language Acquisition**

Presenter's Name: Erika Ladd
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Gerunda Hughes
Faculty Advisor's email: ghughes@howard.edu

As the world becomes more globalized, it is important that the next generation is properly prepared for this era of massive globalization. While the teaching of science, technology, engineering, and mathematics (STEM) has held a very high priority in education circles, one way to become a global citizen is to immerse oneself in another culture which means being exposed to language and the arts, including music. Schools are the places where the majority of students will receive this kind of cultural exposure. Fortunately, there are forward thinking policy makers and educators who are demonstrating a growing interest in preparing students to develop convergent or analytical skills (STEM) as well as divergent or creative skills in the Arts – thereby transforming education curricula priorities from STEM to STEAM. To assist students in becoming more culturally competent, some dual-language schools implement the use of music in their daily instruction of second language vocabulary, literacy and speech. The present research examines the existing research literature on the impact of music on brain functioning and language acquisition. Interviews were conducted with kindergarten teachers in a dual language school who use music in their classrooms daily. Additionally, direct classroom observations were conducted to capture and document classroom life in a dual-language (French and English) kindergarten classroom over the course of nearly 6 weeks. Analyses of the interview and classroom observation data revealed that music benefits second language acquisition by enhancing kindergarten students' engagement, memorization strategies, and opportunities to practice grammatical structures and pronunciation.

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**Impact of Embedding Professional Political Engagement Activities and Service Learning in Curriculum on Student Knowledge and Attitudes**

Presenter's Name: Katherine Lloyd
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jessica Alden
Faculty Advisor's email: jessica.alden@howard.edu

Coauthors: Lynda Hill

**Purpose:** Investigate the impact of professional engagement and service learning educational modules on occupational therapy students' knowledge, attitude, and engagement in professional advocacy. **Background**: Occupational therapists (OT) make up a relatively small portion of

healthcare providers with only 150,000 in practice nationally. Additionally, membership in the national organization is less than 50%, and even fewer OTs engage in advocacy at the local, state, and national levels. It is essential to the advancement of the profession that more OTs become professionally and civically engaged in order to influence decision makers and promote policy that supports OTs and occupational therapy clients. While extensive studies have explored the role of political and professional engagement in professions such as nursing, there is very little information about educating occupational therapists in professional engagement. **Design:** This study uses a design based research theoretical framework. This is the third cycle of the project. In each cycle, a cohort of entry level occupational therapy students are recruited in their first year. Students are asked to 1) complete two pre-surveys, 2) participate in professional engagement modules, and 3) complete the same 2 surveys again after intervention. Professional engagement modules include instruction on engaging with national organization, state organization and state and federal policymakers. Due to findings from the second cycle, a service learning component was added to intervention in the third cycle. **Analysis**: Statistical analysis of survey results is completed in SPSS. Informal content analysis of open-ended responses and student feedback completed by researchers.

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**The Increased Social & Educational Effect of the Internet & Social Media on the Modern College Freshman**

Presenter's Name: Adrienne Perkins
Classification: Undergraduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Kehbuma Langmia
Faculty Advisor's email: klangmia@howard.edu

According to a past Pew Research Center report, 87% of 12 to 17-year-olds are now online and using the Internet in their everyday lives. This translates into an over 20% increase from 2000 and the number continues to grow. The purpose of this research is to examine the effect of this increase in Internet and social media usage both inside and outside of the classroom. Grade point averages, professor classroom culture, and in-person interactions are all examined in the study. The researcher collected data from 100 male and female freshmen students at Howard University. The students could then choose to be a part of an in-depth focus group to help the researcher gain a deeper understanding. Results show that students overwhelmingly use social media in the classroom, even though these same students admit that social media is distracting. The Internet and social media are both here to stay. This research provides valuable insight into how this will affect both classroom practices and in-person interactions.

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**Health Communication, Diabetes, and African American Women**: **A Systematic Review**

Presenter's Name: Serita Poindexter Pettegrue
Classification: Graduate Student
School/College: Communications
*Presentation Type: Poster Presentation*
Faculty Advisor: Carolyn Stroman
Faculty Advisor's email: Cstroman@howard.edu

Coauthors: Chimene Castor, Serita Poindexter Pettegrue

In 2017, 84 million Americans age 20 and older had pre-diabetes, and 90 percent of those with pre-diabetes are not aware of their risk. Without intervention, pre-diabetes is likely to become type 2 diabetes. Research indicates that African Americans are particularly vulnerable to uncontrolled diabetes and diabetes-related morbidity and mortality; thus, researchers have focused attention on African Americans, especially African American women, among whom the prevalence is almost twice that of non-Hispanic whites (Dodani & Fields, 2010; Henderson, et al., 2013; Krishnan, Rosenberg, & Palmer, 2008). Healthcare providers play vital roles in providing health communication regarding how to avoid diabetes and guidance on diabetes self-management. Health communication has been recognized as one source that provides strategies to healthcare providers. Thus, the goal of this research is to identify health communication interventions that have been successful in treating diabetes among African American women. **Methodology:** This project analyzes diabetes prevention articles published in Health Communication, the Journal of Health Communication, Journal of the American Diabetes Association (ADA), and other public health journals for the past 10 years (2008 - 2017). Its purpose is to determine the strategies and treatments communicated to African American women about diabetes management and pre-diabetes intervention. **Preliminary Results:** During the

past 10 years, diabetes prevention has been focused on in a wide-range of health journals. To this point, our findings provide information for the development of culturally-tailored, interactive web-based programs that may be successful in health campaigns geared toward reducing diabetes among African American women.

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**The Perspective of Post Secondary Education Transition Planning and Occupational Therapy Among Persons Diagnosed with Several Disabilities**

Presenter's Name: Marchelle Putney
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Marchelle Putney
Faculty Advisor's email: marchelle.putney@howard.edu

Transition services for high school students are designated under the Individuals with Disabilities Education Act of 1997(IDEA)(PL 105-17) and the more recent Individuals with Disabilities Education Improvement Act of 2001(PL 105-170). These laws aim to facilitate the student's movement from school to post school activities, including post-secondary education, vocational education, integrated employment adult education, adult services, independent living or community participation. Transition services assist the student with disabilities to prepare for post secondary life by defining long term goals for an adult life and making a plan to achieve these goals. Transition services may include; instruction, related services, community experience, development of employment skills, and when necessary, evaluation of functional vocational skills and daily living skills. Occupational therapists have the professional skills to help students in transition evaluate and address areas of independent living skills, community participation and vocational skills. Yet, there is a sparse research on how post-secondary transitional services is understood from a student's perception. The purpose of this research study was to determine the student's understanding of the post-secondary transition planning process. A questionnaire survey was administered to 10 high school special education students who had diagnoses in several disability categories by a school based occupational therapist. **Results:** Participants stated that they understood the purpose of the transition process. They were also able to express the need for further support for training to enter work environments. Findings from this study identified several areas that need further research.

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**Using the Results of Cognitive Labs to Improve Students' Performance in Mathematics**

Presenter's Name: Imari Red-Bingley
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Gerunda Hughes
Faculty Advisor's email: ghughes@howard.edu

In their seminal article, "Psychology's Role in Mathematics and Science Education", Newcombe, Ambady, et. al., (2009) show how advances in psychological research in fields such as cognitive psychology, developmental psychology, cognitive science, and emerging learning sciences offer opportunities to improve teaching and learning in mathematics and science in four areas: (1) early understanding of mathematics; (2) understanding science; (3) social and motivational issues related to learning and engagement in mathematics and science; and (4) assessment that informs learning in mathematics and science. The present study will borrow from the fields of cognitive and developmental psychology to examine fifth grade students' understanding of mathematical concepts while problem-solving problems in a cognitive lab setting. Pearson Assessments defines cognitive labs as a methodology for studying the mental processes one uses when completing a task. Students will be assigned to one of two groups based on their performance on a mathematics test – above average performance or below average performance. The researcher will work with each student individually, observing and listening intently as they explain their problem-solving strategies step-by-step. The strategies used by students in the "above average" group will then be used to supplement the teaching strategies of the classroom teacher when teaching the targeted mathematical content to the "below average" group. All students will be assessed a second time to test the hypothesis that, after the intervention, there is no difference in the mathematics performance between the two originally-formed groups of students.

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**Benefits of Implementing Engineering in Math**

Presenter's Name: Zakiyah Riddick
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Gerunda Hughes
Faculty Advisor's email: ghughes@howard.edu

In the early grades, pre-kindergarten to fifth grade, students are often introduced to mathematical concepts using concrete engineering-designed tools such as blocks and manipulatives when learning how to count, add, and subtract. As the curriculum becomes more abstract, these tools are used less often, requiring students to use more cognitive skills to understand concepts and solve problems. But what if students were consistently taught mathematical content using engineering designs? Some researchers posit that the continuous use of engineering-designed teaching methodologies in all grades will improve students' mathematics skills, allow their learning processes and problem solving skills to become more multifaceted, and expand their knowledge of and interest in the field of engineering. These methodologies are also hypothesized to produce higher engagement in learning and improved test scores. To test this hypothesis, the researcher will use subjects in a kindergarten class who are exposed to mathematical concepts using engineering designs (or not) over a 5-week period and who are divided into two groups. One group will be taught grade appropriate mathematics topics using engineering design methodologies (experimental group), while the other group will be taught the same material without implementing engineering design methodologies (control group). Mathematics assessments will be administered to collect baseline data on students' prior knowledge and to assist in measuring growth at the end of the intervention. Students' performances on the assessments will be used to test the hypothesis that there is no difference in the performances the two groups at the end of the intervention.

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**The Use of Training Modules to Increase Culture Competency for Assessment and Treatment of Speech and Language Disorders**

Presenter's Name: Alexis Silva
Classification: Graduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Ovetta Harris
Faculty Advisor's email: oharris@Howard.edu

Coauthors: Sulare Telford

True professional competence can only be attained if multicultural variations, language exposure, and acquisition are considered (ASHA, 2017). Without cultural and linguistically, appropriate assessment and intervention procedures are unattainable. Many Speech-Language Clinicians feel incompetent when assessing and treating people of other cultural and linguistic backgrounds (Campbell & Taylor, 1992). This is of particular concern as the United States is morphing into a more culturally and linguistically heterogeneous population. Therefore it is imperative to not only promote cultural awareness and sensitivity within the field of communication sciences and disorders but to educate and provide training to the practitioners. To address the increasing need within the area, the current study evaluates the effectiveness of a training module that aims to increase the cultural competence of Speech-Language Pathologists working with Guyanese-Creole speaking populations. Specifically, the module the training module provided clinicians with a background and overview of Guyanese language and cultural practices. It also provides Speech Language Pathologists with strategies for appropriate assessment and treatment of children from this population that may also be appropriate for addressing clients from other Caribbean Creole-speaking population. The study will evaluate pre-and post-training competence and perceptions of ability for SLPs working with the Guyanese-Creole speaking populations.

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**A Survey of Students' Opinion of Job and Residency Opportunities Upon Graduation**

Presenter's Name: Ronald Smith
Classification: Professional Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Bisrat Hailemeskel
Faculty Advisor's email: bhailemeskel@howard.edu

Coauthors: Dr. Bisrat Hailemeskel, Dr. Leo Eyombo

Pharmacy student's worriedness of post-graduation opportunities has received limited attention in the literature. Assessing student confidence on post-graduation employment or the pursuing of a residency could provide insight in to the level of students concerns. The result may lead to potential curriculum changes to develop career development programs. The goal of this survey is to obtain students' opinion of their concerns of getting employed or residency training opportunities upon graduation. The survey consisted of 26 questions and all responses were based on a 5-level Likert scale (strongly disagree, disagree, neutral, agree, strongly agree). The questionnaire was administered to third-year professional pharmacy students as a part of one of the required therapeutic courses in our school. Various statistical methods were conducted using SPSS software. Preliminary data analysis shows that there was 84% response rate and students are highly concerned of not getting employment or residency training upon graduation. This finding was true when stratified across the various demographic measures such as age, gender, work experience, and education.

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**Preliminary Results of a Survey Assessing Food Insecurity Among Students at a HBCU**

Presenter's Name: Linda Thompson
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Graduate Student: Rajae Gayle
Faculty Advisor: Linda Thompson
Faculty Advisor's email: linda.thompson@howard.edu

Food security in the U.S. is defined as the access by all people, at all times, to a safe and adequate diet for an active and healthy life. The study measured food insecurity among students attending Howard University (HU) within the last 12 months. **Design:** A cross-sectional, 20 question online survey using the web-based survey tool Qualtrics. **Methods:** A sample of 10,300 students (HU undergraduate & graduate population) were invited to complete the survey February-March 2018. **Preliminary Results:** 570 students responded. Seventy four percent of students reported the food they bought did not last and they did not have money to buy more (frequency: 23.9 % often, 50.29% sometimes). Thirty four percent of students reported that ***often*** they could not afford to eat balanced with meals, with 42.6% reporting ***sometimes***. Students (59.84%) also reported they had been hungry, but did not eat due to lack of money.

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**A New Orientation toward Howard University's Research Mission: George Washington Williams and W.E.B. Du Bis on Undergraduate Research**

Presenter's Name: Charles Verharen
Classification: Senior Faculty
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: N/A
Faculty Advisor's email: cverharen@howard.edu

**Background**: This essay models student orientation grounded in Howard's ethical foundations. The orientation fosters student commitment to undergraduate research. One inspiration is George Washington Williams, the African American Civil War veteran who believed that Howard students have a moral obligation to pay back those who died to make Howard possible. A second is W.E.B. Du Bois who wrote extensively on the ethical missions of HBCUs. **Method**: The paper proposes a two-phased orientation for matriculating Howard undergraduates. The first phase includes: a mandatory summer reading of Williams' A History of the Negro Troops in the War of the Rebellion: 1861-1865, and Du Bois' The Education of Black People: Ten Critiques, 1906-1960; reviews of Howard's history of solving problems; and a visit to the African American Civil War Museum and Monument. The second phase is the inauguration of Freshmen Research Seminars that explore research topics and methods geared to student career choices. The seminars foster student commitment to senior theses and projects. A striking model is Princeton student Wendy Kopp's senior thesis that led to the Teach for America program. **Results**: A successful orientation and freshmen seminar will help motivate students to produce publishable research papers in undergraduate student journals. In the best case students will successfully collaborate with faculty researchers who will include their names on professional refereed publications. **Conclusion**: The proposed orientation program and freshmen seminar will strengthen Howard's historical commitment to solving problems whose solutions justify the continuing existence of HBCUs.

**Doing Right by Our Black Girls: How can pre-service teacher training programs challenge white feminism and promote Black womanist critical literacy?**

Presenter's Name: Imani Wiltshire
Classification: Professional Student
School/College: Education
*Presentation Type: Oral Presentation*
Faculty Advisor: Ivory Toldson
Faculty Advisor's email: itoldson@howard.edu

The American teaching force is comprised of 82% White teachers, 7% Black teachers and 16% Black girls. Despite nationwide diversity initiatives to increase the recruitment of teachers from underrepresented racial groups, many pre-service teaching curriculums fail to prepare white educators to teach in urban schools that educate predominately students of color. For example, research posits that the lack of anti-racist curriculums employed in urban classrooms contributes to the inequitable racial disparities in school expulsion rates of Black girls. Arming teachers and administrators with the pedagogical tools to identify, examine and resist the systemic educational policies imbued with structural racism require explicit instruction in critical literacy pedagogy. However, self-reflection and an examination of one's own racial socialization is a prerequisite for pre-service teachers' instruction in critical literacy. Currently, pre-service teacher training programs neglect to mandate coursework in anti-bias and anti-racism curriculum development, even though many schools promote social justice oriented missions that prepare teachers to serve vulnerable populations. This lack of explicit instruction in racial socialization results in the perpetuation of implicit bias and stereotypes of marginalized groups—particularly Black girls. As a result, this study intends to examine the relationship between White feminine identity development comparatively to Black Womanist identity development to examine the discrepancies in Black femininity versus White femininity and its relationship to Black girls' educational experiences. By juxtaposing the Downing and Roush's five stages of feminist identity development against the Helms Womanist identity development, educators are provided with a baseline to compare white feminine identity to black womanism.

**The Benefits of Telepsychology in School Consultations and Interventions**

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

The nationwide shortage of school psychologists negatively impacts students' access to mental health services, especially in rural areas. The use of telepsychology for consultations and interventions could be beneficial to increase access to mental health services. Telepsychology is the use of psychological services using technologies such as interactive videoconferencing, email, chat, text, and Internet. Though school psychologist already use technology to communicate with students and parents, there is little research in school psychology on using technology to provide consultative and intervention services in schools. The National Association of School Psychologists (NASP) states that the benefits include the ability to provide services to remote or understaffed districts, including interventions, consultation, and assessment, as well as the ability to provide mentoring and support to interns or early career school psychologists. However, there are many concerns with privacy and confidentiality, impersonal service provision, inadequate training of support personnel, reliability and validity of assessment results, test integrity, and effectiveness of services. In addition, there are concerns related to the increased use of social media as a professional consultation platform. These concerns need to be addressed before school psychologist begin using telepsychology in practice. Telepsychology can be in line with best practices of school psychologists. The purpose of this literature review is to discuss how School Psychologist can benefit from using telepsychology in consultations and interventions.

# Ethics, Law & Religion

**Transferring the Techniques of Transpersonal Psychology to Sustainability to End Environmental Degredation**

Presenter's Name: Ayana Albertini-fleurant
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Charles Verharen
Faculty Advisor's email: cverharen@howard.edu

This paper seeks to explore the potential that the techniques of transpersonal psychology hold for sustainability. The modern human lifestyle has had devastating consequences on the environment. Some of the most pressing concerns include climate change, deforestation, and pollution. Not only are humans doing mother nature a disfavor, humans being are simultaneously sabotaging the continuation of our species on planet Earth. Unfortunately, it doesn't seem we ever developed an evolutionary adaptation to maintain a human-ecosystem equilibrium that is necessary for our collective survival. Despite the impending environmental crisis, why do some people still show apathy towards environmental concerns or their impact on the environment itself? Why does sustainability fail to take precedence in our major lifestyle, political and cultural decisions? Part of this inaction is due to an incomplete understanding of our sense of "Self". A wider understanding of "Self", as taught in transpersonal psychology must be extended to sustainability and applied in our everyday lives. Broadening your sense of "self" leads to a more expansive, compassionate view of the world. Not only are nonhuman entities valuable in their own right, they are a part of us. This paper will use a combination of observational, correlational and experimental methods to test the effect of transpersonal psychology techniques on sustainability in practice.

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**Islami Prophetic Models of Public Service for Community Building**

Presenter's Name: David Belton II
Classification: Graduate Student
School/College: Divinity
*Presentation Type: Oral Presentation*
Faculty Advisor: Zainab Alwani
Faculty Advisor's email: zainab.alwani@howard.edu

Coauthors: Niciah Petrovic, Zainab Alwani

**Background:** Public service is defined as "something that is done to help people rather than to make a profit (Merriam-Webster)." Zakat (charity), one of the Five pillars of Islam, is foundational to the belief of a Muslim. Zakat must also be "redistributed within the [community], and not transferred to another [community] (Bonner (as cited in Sallam, 2002, p.588)." Ummah (community), social work, and service for humanity, essential components of the Islamic faith, greatly contribute to creation of a harmonious, interreligious, community benefitting all. **Methods:** The Constitution of Medina and Hilf al-Fudul illustrate prophetic models of public service for community building that "[provide] an inclusive framework of pluralist, consensual, community-oriented governance (Perennial, n.d.)." Through analysis of Barry Farm, a neighborhood/community in Southeast Washington D.C. currently being gentrified under the guise of the term redevelopment, one sees the demand for such a model. The lack of a strong spiritual, let alone Islamic presence within this community, indicates a need for community growth and prosperity. Establishments such as America's Islamic Heritage Museum located on Martin Luther King Jr. Ave., a major street in this community, churches within the area, and the notoriety of the Goodman League in the Barry Farm Recreation and Aquatics Center can work together to revitalize this community. **Conclusion**s: The Islamic prophetic model for community building can stir up a unified spiritual awareness cultivating great change throughout Barry Farm and other Washington D.C. communities.

**Where Do We Go from Here: Existence or Extinction? Exploring College & University Black Chaplaincy in the 21st Century**

Presenter's Name: Cecil Duffie
Classification: Staff
School/College: Other
*Presentation Type: Oral Presentation*
Faculty Advisor: Bernard Richardson
Faculty Advisor's email: brichardson@howard.edu

There has been extensive research on College & University Chaplaincy especially in the areas of "examining experiences and perspectives that arise at the intersection of religious practice, distinct campus culture, student counseling and the secular context of the modern academic institution" as compiled by Lucy A. Forster-Smith. Very little has been gathered on the role and pertinency of black chaplaincy in the 21st century. While the national debate on the relevance of historically black colleges and universities exist, a distinctive augment should be the spiritual and ethical formation that takes place at such institutions. Where Do We Go from Here: Existence or Extinction? Exploring College & University Black Chaplaincy in the 21st Century addresses: where College & University Black Chaplaincy stand, the threats that remain; and its potential especially in the era of millennials. This work takes a qualitative approach and utilizes purposive sampling of: participant and direct observations; interviews; review of records; and collections of writing samples.

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**Mental Privacy Today**

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

The evolution of Neurotechnology is dangerously advancing toward the implementation of mental invasion. Companies are heavily investing in the research and development of neurological tools which will interpret an individual's thoughts and desires through neural tracking of brain activity. The extent of data collected is unknown as well as its long term effects on mental health. I aim to expose current businesses, review relevant licenses, and discuss individual's privacy. The detection and analysis of neuronal transmissions is not a new concept. Early millennials were captivated by the technology that rendered a generation emotionally reserved and apathetic to current affairs globally. Major companies such as Facebook, Google, and Verizon not only collect personal data from individual browser accounts, but they also distribute this information to partnering and funded franchises. Medical institutions use brain-computer interfaces such as an electroencephalogram which uses electrophysiological signals to interpret the neural activity of comatose patients. Regardless of the practice, an individual has the right to be informed of the uses and degree of external interference of technological advancements not after, but during the process of development. In my research, I found issues concerning evasion of informed consent, failure to protect data, and a lack of risk assessments when introducing invasive technologies to the general public. Citizens deserve to be included in conversations and policies which ultimately affect the individual style of life, especially when it involves external innovations, without experiencing condemnation or exclusion from technological advancements.

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**A Phenomenological Pedagogy of the Black Church Experience**

Presenter's Name: Brandon Greene
Classification: Professional Student
School/College: Divinity
*Presentation Type: Oral Presentation*
Faculty Advisor: Barbara Fears
Faculty Advisor's email: bafears@howard.edu

The Black Church has never been "just church as usual" the Black church is quartered in and built on the literal blood, sweat, tears and the sufferings of our enslaved ancestors. Ancestors that didn't care if they praised God in the field or not, because they were not allowed in a sanctuary anyway. Ancestors that heard "good-news" that was "good-news" to only the folks that did not look like them. Our trailblazing ancestors took what was preached to them and ran with it. Literally ran! They were able to take and give life and cultural meaning to what was meant to kill and destroy their souls. And as a result, they turned it into something that is still preached in thousands of pulpits to this day. Today, the

Black Church is a testament to a phenomenal, liberating, educating, but most of all freeing sanctuary that not only welcomes but affirms what blackness is and how blackness worships the Divine. In much of my research, I essentially break down what I call the essence of the Black Church, I look at how the Black Church would not be what it is without our hermeneutics, liturgy, our culture and the Black family. Theologian James Cone writes, "Black churches are a very powerful force in the African American community and always have been because religion is that one place where you have an imagination that no one can control. Because of this ingenuity, the Black Church is what it is today: phenomenal.

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**The First Amendment Freedom of Assembly as a Racial Project**

Presenter's Name: Justin Hansford
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Law
*Presentation Type: Oral Presentation*
Faculty Advisor: Justin Hansford
Faculty Advisor's email: justin.hansford@law.howard.edu

Beginning with the author's own experience of being arrested as a legal observer during a 2014 protest in Ferguson, Missouri, this Essay explores the fragile protection provided by the freedom of assembly for those who fight for racial justice. The Essay rejects free speech proponents' reliance on the First Amendment's ostensibly instrumental role during the civil rights movement to protect hate speech today. Instead, it demonstrates how authorities have always chilled civil rights speech more than white supremacist speech, contextualizing cases from the civil rights era as examples of occasional exceptions made during short intervals of interest convergence. The Essay then goes on to examine the contemporary administration of freedom of assembly norms, asserting that law enforcement continues to undermine the rights of racial justice protesters on the street and through surveillance, in contrast to its response to white nationalist speech and movements. The Essay calls for a more nuanced approach to freedom of assembly issues that both moves beyond interest convergence and considers human rights standards that affirm both the First and Fourteenth Amendment values of human dignity, public safety, and freedom of expression.

**A Pleas to Federal Judges: Combatting Prosecutorial Misconduct in the Cliven Bundy Era**

Presenter's Name: Quiana Harris
Classification: Professional Student
School/College: Law
*Presentation Type: Oral Presentation*
Faculty Advisor: Sarah Vanwye
Faculty Advisor's email: svanwye@law.howard.edu

Recent statistics provided by the New England Center for Investigative Reporting and the National Registry of Exonerations prove that prosecutorial misconduct plagues the United States' criminal justice system, resulting in volumes of unlawful prosecutions and wrongful convictions. Sadly, the Supreme Court and state bar associations are of little help in addressing the issue because they refuse to reprimand unethical prosecutors. The Court has historically relied on legal doctrines such as harmless error and separation of powers to avoid addressing misconduct, and the majority of state bar associations are reluctant to properly sanction prosecutors found guilty of misconduct. This inadequate response to misconduct has empowered unethical prosecutors to abuse their discretion because they know they will "get away with it." Without reforming the current approach to prosecutorial misconduct, the criminal justice system will continue to harbor a playground for miscarriages of justice. I offer, however, a practical solution: federal judges. Even in the face of an unmoved Supreme Court and lackadaisical bar associations, judges have the power to stop prosecutorial misconduct by refusing to tolerate unethical behavior by the attorneys in their courtrooms. I propose that judges issue standing court orders requiring disclosures of exculpatory evidence—-finding attorneys in contempt when they do not comply, dismiss with prejudice cases where flagrant misconduct is exposed, and publicly reprimand attorneys when they partake in unethical practices. If judges adopt my recommendations and to take a stand against prosecutorial misconduct, we may be entering an era where prosecutors are no longer shielded from accountability.

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**Telemedicine and the Internet: Why Broadband Access is Key for Improving Healthcare in Rural Communities**

Presenter's Name: Johanna Hollingsworth
Classification: Professional Student

School/College: Law
*Presentation Type: Oral Presentation*
Faculty Advisor: Myrisha Lewis
Faculty Advisor's email: myrisha.lewis@law.howard.edu

Eighteen million Americans live in rural areas with a shortage of primary care physicians. People living in rural areas are often older, make less money than those in urban areas, lack reliable transportation, and suffer from chronic diseases that require monitoring. These factors, coupled with physician shortages, mean rural patients often do not get the physician oversight needed to manage their chronic illnesses. Telemedicine provides access to low-cost, quality healthcare by using video, computers, and other telecommunications technologies to deliver direct, patient care at a distance, often without an in-person office visit. This means telemedicine can improve rural patient health outcomes without requiring an in-person, face-to-face visit with a physician. To fully realize the benefits of telemedicine, however, it too much be accessible. Because telemedicine today is delivered mainly by videoconferencing over the internet, to access its benefits, rural communities must also have access to reliable, low-cost broadband. The Health Information Technology for Economic and Clinical Health Act, and the Telecommunications Act of 1996 have requirements for telemedicine and telecommunications in rural communities, but there is no specific requirement for rural broadband. This paper argues that an effective telemedicine rural health program must include requirements for broadband expansion in rural areas. Specifically, it recommends (1) revising the HITECH Act to require rural broadband expansion, and (2) increasing federal funding for telecommunications for rural health programs to cover the expansion. In this way, telemedicine can improve access to quality, affordable healthcare for America's rural population.

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**From the Doctor's Office to the Palm of Your Hands: Data Privacy and Safety Issues Facing Mobile Health and Medical Apps**

Presenter's Name: Fleur Oke
Classification: Professional Student
School/College: Law
*Presentation Type: Oral Presentation*
Faculty Advisor: Olivia Farrar
Faculty Advisor's email: omfarrar@gmail.com

As technology becomes more integrated in our everyday lives, it seeks to revolutionize the way we view healthcare. Whereas traditional healthcare required us to go to the doctor's office for a diagnosis, such a diagnosis may be easily accessible through the mobile devices that we use on a daily basis. Because of this, health and medical apps empower their users to be an active participant in the management of the health. The mobile health app world, however, is subject to little regulation. The U.S. Food and Drug Administration chooses to only regulate those apps that meet the definition of a medical device and that pose a high risk to consumer safety when used improperly. This rather narrow regulatory scope leaves consumers unprotected from many apps on the market. Moreover, these apps have the capacity to store, collect, and share large amounts of consumer health data. This lack of regulation creates multiple privacy and security concerns as healthcare data becomes the fastest growing target for cyber-attacks. This research suggests that the FDA can effectively regulate the fast-paced mobile health app world by creating an office within the FDA that would strictly analyze and approve medical apps for the market. Moreover, to protect user personal health data from unauthorized use, this research also suggests expanding the current health data privacy regulation to include mobile health apps as protected entities in order to effectively protect the user health information that is constantly collected and stored.

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**The Philosophy of Akhenaten: Precursor of the Ubermensch**

Presenter's Name: Ogechi Onwuemenyi
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Charles Verharen
Faculty Advisor's email: cverharen@howard.edu

I make a strong argument for Akhenaten as being one of the earliest (3300 years ago) to practice the ethical evaluation system of Nietzsche, before Nietzsche's birth. I also contend that Akhenaten is one of the first to destroy an old ethical system – only to replace it with a more progressive and reason based philosophy – which puts him in the category of the Übermensch. The Übermensch is a concept presented by Nietzsche, in which he would define as the "guarantor of the future." Essentially, the Übermensch supposedly are

supermen and women who destroy and create new values in an effort to push humanity forward. Although Akhenaten's philosophy manifested itself in a counterreligion that did not survive past his reign as pharaoh, Akhenaten began a theological reformation that introduced the world to monotheism, and eventually led to the popularization of redemptive monotheistic religions. In my research, I extrapolate Akhenaten's case as a forerunner to the Übermensch, by inferring Akhenaten's role in monotheism and just how far his influence extends, arguing that Aten's religion laid the groundwork for these monotheisms to thrive, as well as presented a gateway into the next era in theology – culturally relative redemptive religions.

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**Ethical Considerations in the Use of Social Media for Clinical Trail Recruitment**

Presenter's Name: Assya Pascalev
Classification: Senior Faculty
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Assya Pascalev
Faculty Advisor's email: apascalev@howard.edu

The purpose of this project is to identify the ethical issues arising from the use of social media to recruit participants for clinical studies and to outline specific steps for the ethical use of social media in recruitment while respecting the principle of justice, and the privacy and confidentiality of research participants and their data. The project seeks to answer three questions: 1) are the existing guidelines for traditional recruitment adequate for social medial recruitment; 2) what is the relation between a platform's terms of service and the requirements for ethical recruitment and 3) how should social media recruitment proceed in order to ascertain informed consent and equal access to research. "Social media" refers to internet-based applications that allow users to build a public or semi-public profile and to create a list of other users with whom they may interact and share content. In the context of recruitment for clinical studies, social media could be used to identify potential participants, to contact suitable individuals, to achieve broader outreach and, thus, to expand participation of minority populations. The federal guidelines on human subject research do not address explicitly the use of social media although online resources by OHRP, SACHRP and FDA offer indirect guidance for researchers. From the perspective of the user, recruitment via social media raises important ethical issues concerning privacy, informed consent, and equal access to research. Researchers using social media to recruit for clinical trials should take special care to ascertain informed consent and equal access to research.

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**The Vitalizing Role of Education in Islam's Prophetic Model**

Presenter's Name: Niciah Petrovic
Classification: Graduate Student
School/College: Divinity
*Presentation Type: Oral Presentation*
Faculty Advisor: Zainab Alwani
Faculty Advisor's email: zainab.alwani@howard.edu

Coauthors: Zainab Alwani, David Belton II

The prophetic model of ministry insists that religious institutions engage as agents and stakeholders in the formation of a God-ordained community. It is not enough for the religion to deal only in the salvation of souls; they must also strive for the creation of a just society. This is done through community engagement, institution-building, and social justice work. The kind of social support system provided by the church or mosque under the prophetic model fosters the creation of a just, human-dignity asserting, loving community. This paper's focus is on the community- vitalizing potential of a mosque's prophetic focus on education and schooling. Research presented in this paper asserts 2 things. First, the creation of a God-ordained community, must be sought by the local mosque's undertaking of the prophetic model. There are some scholars and theologians who would argue that the "priestly model" of saving souls is a sufficient mission for a religious body; however, the research makes clear that prophetic ministry through community building contributes to lower crime, sin, and suffering. Second, the research indicates that prioritizing schooling and education may be the best course of action in seeking community reform. This assertion rests on findings that increased parental involvement in school leads to civic engagement; poor education leads to increase in crime; that proper socialization in school fosters life-long responsible citizenship. Further, a proper Islamic education is indispensable in the creation of a sound, thriving

Islamic community. As a case model, I examine the Clara Muhammad schools impact on the community

**Saving What Never Was: Legal Frameworks for Protecting Indigenous Land in the Chittagong Hill Tracts from Further Appropriation**

Presenter's Name: Anupam Roy
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: John Cotman
Faculty Advisor's email: jcotman@howard.edu

The indigenous people in the Chittagong Hill Tracts of Bangladesh have been subjected to decades of land dispossession by various state and non-state actors. The motives behind such actions have often financial, political and even military. The indigenous peoples' claims to land is under attack from Bengali settlers, state agencies such as the Forest Department of the Government of Bangladesh, and non-state actors such as private national and multinational companies which have found interest in appropriating land for development projects. In this paper, I look into steps that can be taken to contain this dispossession by granting the indigenous people legal rights to their land through collective land titling based on customary law. While the titling procedure is underway, I argue, it is important to institute a robust requirement of consultation with the indigenous people through the Free, Prior and Informed Consent (FPIC) framework before any development projects can be undertaken in the region.

Keywords: Free-Prior informed consent, Indigenous peoples, Land rights, Land Titling, Customary Law.

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**Women in Islam Reclaiming Their Religion**

Presenter's Name: Fatoumata Sankare
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Josephine Dawuni
Faculty Advisor's email: josephine.dawuni@howard.edu

When you google Islam, there are many topics that come up. It is ironic how one of those topics is Women in Islam, however, we do not see a topic covering Men in Islam. This already exposes the problem that people think Muslim women face. In today's society, there are many perceptions on Muslim women. These perceptions can be based off the roles of women in Islam, the way women dress in Islam, their social interaction, and even patriarchy. Many people go about making conclusions on the status of women in Islam through what they see and hear. The most important aspect of understanding the role of women in Islam is indeed referring to the Quran. This way, there would be a clear approach in understanding how women indeed have many advantages in Muslim societies. The question becomes, are women in Islam oppressed and need saving? I will ask preliminary questions to Muslim females around campus, in the area and even on social media. I will also want non-muslims to participate to see their view on women in Islam. My anticipated results will clarify the misunderstanding of Islam comes from a gap in society. This gap is between the outsiders and the insiders. A non-muslim may look at Islam and see it as a restriction or a social boundary. However, those who are Muslim are able to enjoy the benefits of peace, happiness and freedom that comes with Islam.

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**A Prescription to States for Comprehensive Legislative Solutions to the Opioid Crisis**

Presenter's Name: Vanessa Stephens
Classification: Professional Student
School/College: Law
*Presentation Type: Oral Presentation*
Faculty Advisor: Okianer Dark
Faculty Advisor's email: okianer.c.dark@law.howard.edu

The opioid crisis, a new wave of the heroin epidemic, has re-emerged to affect the majority of Americans, not just the poor, black, disadvantaged communities targeted in the 80's. Many experts in the legislative, medical, and public health communities have introduced minimally effective solutions, due to the issue's complexity. Opioids are available to people in several ways: prescription medications, illegally-manufactured synthetics, and illegal street drugs. However, the availability of each drug source varies in local communities (e.g., prescription drug-monitoring programs cannot address an uptick of heroin usage in a community). Therefore, state and local legislators should enact solutions

to address the specific needs of the community. This conclusion is based on a critical review of federal legislation, specifically the Comprehensive Addiction and Recovery Act (CARA). This article offers comprehensive state legislation by modeling policies from states that have analyzed local opioid sources and patterns in their communities to enact long-term, comprehensive policies. These include: opioid reversal treatment administered by first responders, medication-assisted treatment centers, and, most importantly, drug courts. This legal analysis focuses on drugs courts, as an alternative to criminalization, as a component of a comprehensive legislative solution to the opioid crisis. These courts are localized and connect users with treatment, provide accountability, and defer criminal liability. These alternatives positively impact disadvantaged communities that continue to struggle with high incarceration rates and addiction's lingering effects.

# Humanities

**The Merger That Shook Jamaica**

Presenter's Name: Mark Beckford
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Mark Beckford
Faculty Advisor's email: mark.beckford@howard.edu

On Friday August 5th, 2015, a day before the anniversary of Jamaica's 53rd independence and the long holiday weekend that was going to follow, two of the oldest and largest media companies in Jamaica sent shockwaves throughout the country and the Diaspora when they announced a merger of the two entities. The Jamaica Gleaner, established in 1884, joined forces with the RJR Communications Group, which was founded in 1939. This merger, which was forced by emerging and new technology, convergence, globalization and shrinking economies has had many implications for the country's journalism industry and the practice of journalism itself. Up to the writing of this abstract, there is no literature that examines this seismic merger or what caused it. While there are news articles and an e-book which mention the merger, this is the first academic article that examines the reasons of the merger, by using interviews from the main stakeholders involved and scholarly research that looks at what environments facilitate mergers. Using the Theory of the Firm, specifically Monopolistic Competition, it is clear that the Jamaican media market was ripe for a merger or consolidation. The Jamaican media market has always had several competitors in electronic, print and online media, but the emergence of overseas based telecommunications companies with deep pockets moving into content sped up domestic legacy media companies having to contend with and come up with new ways to stay solvent and provide a service which is valuable to the sustenance of the democratic Jamaican society.

**Beyond the Música: How Brazilian Hip Hop Sparked Change and Uplifted the Afro-Brazilian Voice**

Presenter's Name: Asiah Cauley
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Eliseo Jacob
Faculty Advisor's email: eliseo.jacob@howard.edu

Inspired by American Hip Hop culture, the 1980s imported and introduced a new sound wave into the Brazilian streets of São Paulo and Rio de Janeiro. After 500 years of oppression, Afro- Brazilians were finally inheriting a platform to expose their adversities and to help emancipate themselves from the injustices imposed on them. Brazilian Hip Hop has given many Afro- Brazilians the opportunity to reveal that even in a country with the eighth largest economy in the world, lives a country of people plagued with health disparities, lack of job opportunities and violence. After thorough research, it was found that the foundations of American Hip Hop, such as MCs and graffiti art, enabled Afro-Brazilians to therapeutically share their truths. Many Afro-Brazilian communities are being polluted with drugs, poverty, and violence and their children are being forced into states of malnutrition. Meanwhile, the world has been conveniently and predominantly fed images of the beauties of Carnival, the FIFA World Cup and most recently, the 2016 Olympics, leaving many people, throughout the world, in oblivion to the Afro-Brazilian struggles. MCs and graffiti artists have been ingeniously and unapologetically illustrating their realities, thus prompting national and global awareness and acknowledgement of the Afro-Brazilian experience. Brazilian Hip Hop artists have proved that beyond the aesthetics and the rhythms, Hip Hop can be utilized to not only provide self-healing but to also challenge social inequality and demand change from the government and support from the world.

**The Drug Epidemic in Brazil**

Presenter's Name: Kyrionna Golliday
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Jacob Eliseo
Faculty Advisor's email: eliseo.jacob@howard.edu

The developing country of Brazil is severely plagued by an everlasting drug epidemic. At the center of this epidemic is crack cocaine, with usage rates increasing more and more every year. Drug dealers run rampant throughout the country, while the drug users receive little to no assistance with their addiction. In most cases, the addicts are incarcerated without proper rehabilitation and life changes, thus, establishing a never-ending cycle of addiction and life on the streets. Brazil ranked fourth for having the world's largest imprisoned population (Miraglia 1). It is imperative that Brazilian lawmakers effect change to improve policy and the criminal justice system in order to have a powerful and efficient impact on the epidemic because it is obvious that the system in place is failing horribly. The reality that comes along with the drug epidemic is one of police brutality, racial discrimination, violence, and inevitable poverty. In 2011, Brazil ranked as one of the most violent countries in the world, with a staggering national homicide rate of 27.1 per 100,000 inhabitants (Miraglia 1). These homicides, many of which stem from the drug epidemic, usually claim the lives of the younger generation who live in the country's poverty stricken urban communities/areas like favelas, morros, and periferias. This research will analyze the adverse effects of the drug epidemic on the Brazilian population, paying close attention to large cities like Rio de Janeiro and São Paulo, and examine how rap artists like MV Bill and Criolo address the epidemic.

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**From Cleopatra to Olivia Pope: Your Majesty to Your Mistress**

Presenter's Name: Cyerra Haywood
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Molly Levine
Faculty Advisor's email: myerowitz@gmail.com

This paper examines Cleopatra, the last active ruler of Ptolemaic Egypt, and her connection to the dynamic of women in power in a patriarchal society. The image of Cleopatra is one that has captivated the western world, reflecting the ramifications of what it means to be a woman in power. Through research on Cleopatra's representation in coinage, statues, and literature, I have been able to draw the parallels between the representations of Cleopatra, and the representations of women in power during the modern era. Using the fictional character of Olivia Pope from the show "Scandal" and the 2016 democratic presidential candidate Hillary Clinton, this paper will affirm the commonalities in the way that women in power are viewed, and exactly what it means to be a woman in power.

# Physical Sciences & Engineering

**On the Geometry of Si3(NH)3R6 (R = H, CH3) Clusters**

Presenter's Name: Jaquesta Adams
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Andre Clayborne
Faculty Advisor's email: andre.clayborne@howard.edu

Coauthors: Kyung-Shin Suh, Andre Clayborne

We report on the geometric properties of Si3(NH)3R6 (R = H, CH3 CH2CH3, etc.) and Si3(NH)3X6 (X = F, Cl, Br, NH3) clusters. The ring-like structures can form various geometries such as planar and boat depending upon the substituent and level of theory. Analysis of the highest occupied molecular orbitals (HOMO) and lowest unoccupied molecular orbitals (LUMO) provide insight into the nature of bonding in the molecular systems. Our study provides insight into the role of electronegativity and steric properties play in the structure of Si3(NH)3-based clusters.

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**Is Europa Next?**

Presenter's Name: Gabby Addane
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Catherine Quinlan
Faculty Advisor's email: catherine.quinlan@Howard.edu

Coauthors: Osi Otugo, Traja' White

The age old question about life on other planets will forever be discussed. The basis of this research is to explore the possibility of sustaining life on Jupiter's moon, Europa. Data collection consists of data reports created by scientists on Europa's atmosphere and land composition. The reports are created from data derived from the Galileo spacecraft from NASA. A preliminary look at the research findings show that similar to the Earth, Europa is made of silicate rock, and has an iron core and rocky mantle. In comparison to the Earth, the interior of Europa is rocky while being surrounded by a layer of water and/or ice. According to studies, when Europa orbits closer to Jupiter, the tides beneath the ice rise up higher than normal causing cracks to form on the surface of the moon. Plate Tectonics and water are needed for proper habitation which Scientists and Astrobiologists have discovered exists on Europa. Breaking down water into Hydrogen and Oxygen, it is said that Europa has enough oxygen for life which is similar to the Earth's composition. The availability of water as ice creates an opportunity for the development of instrumentation to convert ice into atmospheric oxygen, hydrogen, and other gases in adequate compositions to sustain life. While Europa seems to be the next feasible planet that organisms can have stable habitation there are many factors that won't permit human beings to stay on the planet any time soon.

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**Group-Query-as-a-Service with Mobile Edge Computing for Opportunistic Radio Frequency Spectrum Access in Wireless Networks**

Presenter's Name: Abdulhamid Adebayo
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Danda Rawat
Faculty Advisor's email: danda.rawat@howard.edu

Coauthors: Danda Rawat

As part of the effort to effectively utilize available radio frequency (RF) spectrum, the US Federal Communications Commission (FCC) mandated the adoption of a database-driven spectrum access for opportunistic communication. Secondary users are expected to query a cloud database for available idle channels based on their reported locations. This approach

has been found to reduce the uncertainties caused when unlicensed secondary users scan the RF spectrum for idle channels, while also reducing the chances of harmful interference with licensed primary users. However, when multiple secondary users query the spectrum database at the same time, it could result in a denial of service attack. Leveraging on spectrum access needs, secondary users form a cluster or grid while a selected percentage aka grid leaders aggregate spectrum access requests of other secondary users within the grid aka grid followers. The grid leader is selected based on the interactive trust measure within the grid to ensure the integrity of information received by grid followers. Nevertheless, the long distance between the secondary user and core cloud database server can result in long communication delay and large error probability in communication. To address this problem, another tier of mobile edge computing (MEC) is introduced, which perform caching functionality for idle channel sensing by dedicated sensors and respond to spectrum access request from grid leaders in a near-real-time fashion. When evaluated with Monte Carlo simulations, the proposed approach shows reduced delay experienced by secondary users for RF spectrum access and reduced bandwidth utilization in the network.

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**Free-Standing LiFePO4/Sorted Single-Walled Carbon Nanotubes Composite Cathode for Lithium-Ion Batteries**

Presenter's Name: Adewale Adepoju
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Quinton Williams
Faculty Advisor's email: quinton.williams@howard.edu

Coauthors: Thomas Searles, Jeffrey Fagan

The recent development in sorting single-walled carbon nanotubes (SWNTs) into metallic (m) and semiconducting (s) type based on their chirality gives an exciting prospect to their application in lithium-ion batteries (LIBS). A comparative study of free-standing LiFePO4/sorted single-walled carbon nanotubes (SWNTs) and conventional LiFePO4 cathode was carried out. The SWNTs are expected to form a three-dimensional conductive network that is expected to enhance the electron mobility through percolation. Our experiments revealed that the specific capacity of the free-standing LiFePO4/sorted SWNTs cathode film having a trace amount (0.0075%) of sorted SWNTs is comparable to that of a conventional LiFePO4 cathode having 10% carbon black and a current collector foil. Both cathode types exhibit good cycling stability performance relative to each other. Moreover, the free-standing cathode exhibits good flexibility and robust mechanical strength which has the potential to be applied to flexible lithium-ion batteries.

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**3-Zebra Trees**

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

Coauthors: Shakuan Frankson, Kanasia Mctyeire

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. A 3-zebra tree is an ordered tree where all edges connected to the root (call this height 1) are tricolored as are all edges at odd height. The edges at even height are all black as usual. In our research we showed that the number of 3-zebra trees with n edges is the number of Schroder paths with bicolored level steps. We also found the average degree of the root for 3-zebra trees using Riordan arrays.

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**Remote observations of the Lunar Sodium Corona**

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

Coauthors: Rosemary Killen, Prabhakar Misra
The Moon's exosphere shares comparable physical properties to the exospheres of other planetary bodies in our solar

system such as Mercury or Jupiter's large moons. By studying the lunar exosphere we expect to be able to make reasonable predictions regarding the physical properties of these other planetary bodies. The information gained from these studies will undoubtedly be vital to future observations and explorations in our solar system. In this project a dense set of observations of the lunar sodium corona were performed with a remotely-operated lunar coronagraph located at the Winer Observatory in Sonoita, Arizona. It was remotely operated from Goddard Space Flight Center. A series of on-band and off-band images were collected each clear night, along with darks and flats and sky and images of the lunar surface necessary to reduce the sodium emission data. Our results reveal that there appears to be north-south asymmetries in the lunar exosphere. Scale heights vary non-constant temperature and may be consistent with psd and impact vaporization.

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**Investigating Wire Rope Isolator for Seismic Protection of Floor-Mounted Equipment in a Low-Rise Hospital Building**

Presenter's Name: Ammar Al jawhar
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Claudia Marin
Faculty Advisor's email: cmarin@howard.edu

The objective of this project is to define seismic protective mechanisms based of wire rope isolators (WRI) for protection of three different equipment mounted in a 6-story hospital building (electrical generator at ground-floor, computer server at 4th-floor, and cooling tower at roof-floor). Even though the equipment sets represent a major part of damage of total building cost in earthquakes, a validated seismic procedures for designing WRI protective system do not exist. The study includes: investigation of floor seismic demands; identification of WRI mechanical properties; design of WRI system, and the validation via time history numerical analysis. On the seismic demands definition, an available methodology is adjusted and implemented to generative spectral absolute floor accelerations, and compared with two code-specifications (ASCE7-10, and AC156-ICC). The dynamic characteristics of the systems are selected to avoid the resonance and define relatively stiff system; further, the system energy-dissipation capacity is assumed for mitigation the seismic effects. The WRI systems are designed in three configurations, namely, regular, partially inclined, and fully inclined. The inclined configuration is implemented to control the equipment rocking by eliminating the eccentricity between system center of stiffness and equipment center of mass. Numerical analysis is conducted to verify the equipment-platform sets behavior under absolute floor accelerations. The study outcomes show that when the fully inclined WRI configuration is implemented 1) the rocking responses are controlled, with reduction up to 90%, 2) significant reduction in equipment deformations is noticed. As a result, using WRI system is highly recommended to keep floor-mounted equipment safe during earthquakes.

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**Translating Gulf Dialectical Arabic to English**

Presenter's Name: Dema Alorini
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Mugizi Robert Rwebangira
Faculty Advisor's email: rweba@scs.howard.edu
This proposal discusses the translation of Dialectical Arabic to English. Most of the work and research done on Machine Translation (MT) is targeting the Modern Standard Arabic (MSA) which is only used in education and Arabic written forms. Native Arabic speakers use Dialectical Arabic (DA) in communication via text and speech online and offline. Today, with the popularity of social networking sites; such as, Twitter and Instagram and the rapid increase in the use of those sites; it's essential to translates DA than MSA. DA dialects are identified into five categories based on their region. Machine translations have failed in translating these dialects to English due to the lack of DA linguistic resources, DA computational resources, and DA researches on both MT and Natural Language Processing (NLP). To solve this problem, first a good source of DA words and texts is needed. Second, mapping DA to MSA instead of translating directly from DA to English to make use of the extensive research done on MSA so far. Lastly, using one of the MT approaches to translate from DA to MSA and then from MSA to English with a high percentage of overall accuracy and less number of errors. The data used in this research is extracted from tweets on Twitter based on Account's location and some

from Linguistic Data Consortium (LDC).

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**Lithium-ion batteries (LIBs)**

Presenter's Name: Yahya Alqahtani
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Williams Quinton
Faculty Advisor's email: quinton.williams@howard.edu

Lithium iron phosphate (LFP) is a promising cathode material for Lithium-ion batteries (LIBs). LFP has many unique properties including great thermal stability, high energy density, and excellent cycle life. However, one disadvantage of LFP is its poor electrical conductivity, which leads to low rate capability (C-rate). To overcome this challenge, we incorporate sorted single-walled carbon nanotubes (SWCNTs) into the cathode LFP batteries. Comparison measurements have shown the LFP with SWCNTs integration into the cathode material have enhanced the (C-rate) of LFP batteries with improved cycle stability.

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**Performance Analysis of Cognitive Radio Enabled Internet-of-Vehicles**

Presenter's Name: Reham Alsabet
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Danda Rawat
Faculty Advisor's email: danda.rawat@howard.edu

Internet of Vehicles (IoV) is regarded as an emerging concept for intelligent transportation cyber- physical systems. Due to the limited number of channels available in IEEE 802.11p DSRC/WAVE standard for vehicular communications in IoV, time-critical emergency messages in IoV could suffer from delays. Thus, cognitive radio enabled IoV has potential to overcome this problem, where vehicles access RF spectrum other than 802.11p spectrum in an opportunistic manner by sensing and identifying the idle channels licensed to primary users without causing any harm to licensed primary users. Existing spectrum sensing algorithms either consider low mobility or stationary (no mobility) of unlicensed vehicular users. In this paper, we analyze and evaluate the combined impact of unlicensed vehicular users' mobility and licensed user activity for cognitive IoV where each vehicle is assumed to be equipped with a wireless device capable of communication and spectrum sensing for wide-band spectrum regime including IEEEE 802.11p. We formally study the performance of the proposed approach for cognitive IoV using mathematical analysis by considering speed of the vehicles, activities of the primacy users and distance between licensed and unlicensed users. Results obtained from simulation of the proposed approach show that the unlicensed vehicular user mobility and primary user activity have higher impact on misdetection probability than that on false alarm probability. Furthermore, communication range, speed, travel direction and distance between unlicensed vehicular users and licensed primary users affect the overlapping time period for spectrum sensing to find idle channels for opportunistic communications.

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**"Distributed Blockchain-based Scheme for Securing Wireless Network Virtualization"**

Presenter's Name: Amani Alshaikhi
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Danda Rawat
Faculty Advisor's email: danda.rawat@howard.edu

Coauthors: Danda Rawat

Wireless network virtualization is regarded as an emerging paradigm to enhance RF spectrum utilization to support exponentially increasing demand caused by emerging Internet-of-Things (IoT) applications. To create virtual wireless networks (VWNs), there are no automated secure approaches for allocating RF spectrum to meet the dynamically changing quality-of-service (QoS) requirements of the users. In wireless networks, RF spectrum is shared among any users and the given RF spectrum could be easily overcrowded because of the over commitment of limited resources by the service providers. There is a direct incentive in terms of revenue to service providers to have more number of users. In this paper, we propose to leverage a distributed Blockchain − also known as a public ledger

− based scheme to create VWNs where primary wireless resource-owners (PWROs) sublease their wireless resources (e.g., slice of RF spectrum, infrastructure) to mobile virtual network operators (MVNOs) using machine-to-machine communication based on the service level agreements (SLAs) between PWROs and MVNOs. The proposed distributed Blockchain-based scheme provides security to participating PWROs and MVNOs as well as prevents PWROs from over committing their resources (that stops double spending) and helps MVNOs to meet the QoS requirements of their users. The US Federal Communications Commission (FCC) or similar regulatory bodies in other countries participate in this framework by providing the guidelines and regulations about maximum power levels, licensing and geographic coverage's, etc. This essentially helps users to meet their desired QoS requirements while complying the government regulations. Performance is evaluated using numerical results.

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**Experimental data analysis for determination of seismic energy dissipation of computer server frames**

Presenter's Name: Alexander Asemota
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Claudia Marin
Faculty Advisor's email: cmarin@howard.edu

Computers are an integral part of modern society. They control financial systems, monitor transportation systems, and facilitate daily productivity. As we become more dependent on computers, their integrity through catastrophes must be assured. In the technology capital of the United States, seismic events are a pressing concern, and to address this concern, computer server frames need to be designed to be withstand extreme seismic events. This project uses experimental data analysis to evaluate some dynamic properties of two different frames, one rigid and one flexible. The data comes from the responses of the frames under simulated shaking and will be analyzed using signal processing tools within MATLAB to determine dynamic properties of the frames. The parameters used in this study include fundamental period, effective damping, and dynamic amplification factors. The frames' capacity to dissipate energy is monitored by the analysis of the quality of the dynamic amplification of the input shaking by the frames, that is related to the term defined the structural codes as response modification factor which measures the ductility of a structure. The determined properties will be compared to the ASCE07 provisions for non-structural elements and will be used to recommend alterations to these provisions. From preliminary analysis, the flexible frame has a fundamental period of ~0.5s, and the rigid frame has a fundamental period of ~0.24s.

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**Extraction of Social Meaning from Natural Language Using Statistical Approaches**

Presenter's Name: Rouzbeh Asghari Shirvani
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Mohamed Chouikha
Faculty Advisor's email: mchouikha@howard.edu

Coauthors: Robert Rwebangira, Mohamed Chouikha

In language, codeswitching occurs when a speaker uses two or more languages in the context of one conversation. Speculation on motivation for switching is multifaceted; it is possible that a person may switch languages to hide certain information from listening native speakers, to better express themselves because certain words cease to exist in a given language, or to accommodate the person with whom they are speaking. In this proposed work, I plan to use theoretical modeling and data analysis techniques to better understand the mechanisms of codeswitching. I am particularly interested in using data mining and machine learning methods to develop algorithms that can predict when codeswitching will take place, and to accurately classify the type of codeswitching trigger. From my preliminary research, it is apparent that very few scholars have investigated prediction methods related to codeswitching. Though it has been proposed that conversation dynamics affect factors of codeswitching, even fewer articles exist on the mathematical quantification of the hypothesized correlations between two individuals' switching frequency. Prior research demonstrates that codeswitching can index power imbalance, affiliation/disaffiliation, change in footing, identity claims, and other important issues in interaction. This project considers other discursive mechanisms, such as discourse markers, speech acts, and contextualization cues,

to achieve a more accurate and nuanced understanding of how people signal and negotiate their relationships, actions, and intentions.

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**Numerical modeling for predicting failure mode in lattice transmission towers using non-linear String of Continuous Beams (SOCB) formulation**

Presenter's Name: Diwash Bajracharya
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Marin Claudia Dr. Preethi Chandran
Faculty Advisor's email: cmarin@howard.edu; preethi.chandran@howard.edu

Coauthors: Ammar Al Jawhar

Collapse of lattice transmission towers (TT) occurs mostly in extreme loading conditions and has major economic setbacks as its repair is very costly. While a better understanding and reliable prediction of the structural response of TT under extreme loading is desired, full-scale testing of TT is prohibitively expensive, and most traditional analytical techniques and modelling assumptions for predicting failure modes of TT are inaccurate as they fail to account for large deformation analyses. A novel non-linear method developed initially in bioengineering realm for semi-flexible biopolymers, named String of Continuous Beams (SOCB) formulation, has been proposed for modelling large deformation analyses of the structural elements in TT at a higher modelling accuracy and significantly reduced cost. The objective of our research is to investigate the applicability and limitations of models of these semi-flexible biological networks for predicting the failure modes of TT. To achieve this objective, our first aim is to evaluate the performance of the SOCB biopolymer model for a simplified structural problem. The compressive force of wire rope isolators, multidirectional vibration/shock isolation devices, was measured experimentally. Wire rope isolators show highly nonlinear behavior with amplitude-dependent stiffness, and the stiffness asymmetry of the isolators are in the vertical direction. The compressive response was simulated with SAP2000, Finite Elements Analysis and by the SOCB approach. Results of SAP modeling and its implications are discussed in this paper. We also present the result of our second aim, which is to import numerical models of TT built in SAP2000 in MATLAB.

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**Effect of Air Gap and Layer Thickness on Dynamic Response of Additively Manufactured Components**

Presenter's Name: Celete Brown
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Grant Warner
Faculty Advisor's email: g_warner@howard.edu

Coauthors: Grant Warner, Moses Owolabi

This study intends to add to the field of knowledge by exploring how fatigue life is affected by 2 print parameters shown to have influence on static load response and direct impact on key mesostructure features governing fatigue: layer resolution and air gap. These impacts are explored through experimental testing using a two factor 2 level full factorial design. The two levels of air gap include a solid infill and high-density infill while levels for the layer thickness are 0.2540mm and 0.3302mm. Preliminary monotonic tensile testing, performed in accordance with ASTM D638, was conducted for each build style. Results indicate that specimens fabricated with solid infill, corresponding to smaller air gaps between filaments, exhibited superior tensile properties than those with the high density infill for both layer resolutions. It was further determined that the build style with the greatest average ultimate tensile strength (UTS) of 33.33MPa combined the 0.254mm layer resolution and solid infill. Specimens built with the 0.2540mm layer resolution and high density infill, however, had the lowest UTS of 28.29MPa. Specimens built with 0.3302mm layer thickness exhibited tensile strengths in between those values with a UTS of 33.21MPa for solid infill and 28.51MPa for high density. It was also noted that specimens with the greater layer thickness, 0.3302mm experienced greater strain than those with smaller filaments, 0.1243mm in high density specimens, and 0.1361 mm in solid. Continuing experimentation involves tensile fatigue testing in accordance with ASTM D-7791 at 50, 60 70, and 80% of established ultimate tensile stresses.

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**Deconvolving single species behavior from correlation data on group dynamics**

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

In Dynamic Light Scattering experiments, the intensity of light scattered by an arrangement of molecules is compared at two times, and the correlation or similarity between those intensities is plotted as a function of the interval between the two times. Correlation data is collected for a logarithmic range of time intervals, spanning from 0.1 microseconds to several hours, and correlation curve is plotted which falls exponentially over time. The behavior of single species stands out as smaller time-decays. This is because, when a molecular species in the arrangement moves, the correlation falls in the time-scale of diffusion of the species. When there are multiple species of different sizes in the arrangement, there are multiple falls in the correlation function, which can be described mathematically as the sum of several exponential functions with different relaxation time. One can then arguably extract the behavior of a single species in solution by deconvolving the summed exponential and finding it constituent relaxation times. However deconvolving a summed exponential is a mathematically challenging problem and current techniques to do it work only when the species are widely separated in properties. In this presentation we describe a new technique developed in my lab which involves a semi-manual serial extraction of relaxation times and which, compared to current techniques, gives a more robust probing of single species behavior from correlation curves of group dynamics.

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**Microbial Reduction of Iodate for Bioremediation at the Hanford Site**

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

Coauthors Deondre Glover, Ayomikun Olarinoye, Patrick Ymele-Leki, Yaolin Fennell, Kimberly Jones

Radioiodine-129 (I129) from leaking nuclear waste storage tanks is one of the major contaminants of groundwater at the Hanford Site in Washington State. Speciation of I129 in the contaminated groundwater is predominantly as iodate, organo-iodide and iodide. A possible bioremediation method is to use microbial dissimilatory reduction of iodate to iodide. Shewanella oneidensis MR-1, a strain of bacteria known to reduce silver, lead and uranium, was investigated in this study for its potential to serve as a bioremediation agent against iodate contaminants. For this purpose, MR1 was grown in minimal media in the presence of iodate under both aerobic and anaerobic conditions for 24 hours. During each experiment, the amount of iodate present in the growth medium was monitored by colorimetric assays with UV Spectrophotometry. Data suggest that, within 24 hours, MR-1 could reduce iodate content in the medium by 33.8% in aerobic conditions, whereas no reduction was observed in anaerobic conditions. Additionally, preliminary iodate reduction experiments using a community of bacteria collected from groundwater at the Hanford Site, named Community 31, suggest that there may be local bacteria capable of reducing iodate. Future work would explore MR-1's reduction capabilities in concert with Community 31 in suspension as well as in biofilm cultures. Findings from these experiments could lead to the development of novel methods for in situ bioremediation of iodate and to the design of novel bioreactors for the bioremediation of soils and sediments.

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**Taking Our Breath Away: The Effects of Social Media Usage and Breathing Quality**

Presenter's Name: Alston Clark
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Gloria Washington
Faculty Advisor's email: gwashington@scs.howard.edu

Coauthors: Caleb Clark

Over the past years social media has become a ubiquitous

presence in almost every area of life. People check facebook in the bathroom, post to instagram at the bus stop, and post pictures of their meals to their snapchat stories. What are the effects of this exponential increase in social media and overall electronic usage? Our team of researchers seek to study the effects of social media consumption, curation, and passive usage on the breath quality of users. Based on personal experimentation and reflection, we have noticed that we take shorter breaths when using electronic devices. Whatsmore, after turning off our devices after extended periods of social media usage, a deep breath is inhaled. Various scientific studies show the detrimental effects of taking shallow breaths, essentially breathing recycled air. By using breathing monitors we seek to discover if social media contribute to bad breathing habits. After collecting data, we will perform mathematical analysis to delineate trends that would show a correlation between breathing quality and social media usage. Our research will be useful in the domain of Human-Computer Interaction. Such information will provide value to developers who are creating the next generation of smart devices. After all, what's the good of new technology if the user forgets to breathe.

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**Understanding Nanoscale Materials using Computational Methods**

Presenter's Name: Andre Clayborne
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: N/A
Faculty Advisor's email: andre.clayborne@howard.edu

Computational Modelling plays an increasing role in the design of nanoscale materials. Here, I will present some of my group's research that employs using various computational methods to understand the properties of nanoscale materials. One area of important research is in organometallic nanoparticles. Using a series of computational methods, my group has illustrated the importance of the metallic core and organic/organometallic ligand for understanding the electronic and optical properties of these materials. Next, I will discuss the importance of understanding atomistic steps for electrochemical reactions on surfaces and nanoparticle. In particular, my group has been involved in using multiple computational methods to understand nitric oxide electrochemical reduction. Finally, I will discuss the outlook for using multiple computational techniques to not only understand, but also to develop new materials for electrochemical technologies, photochemistries, and biological sensor development.

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**Detecting Heart Rate from Microscopic Movements Abstract**

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

With the technology that is available today, we are now able to see life through a different lens by analyzing the minute details of the world around us. By analyzing video clips of the body, we can detect someone's heart rate from microscopic movements of their head, chest, or wrist. Our research will specialize in the detection of a patient's Heart Beat Rate (HBR) through their minute head movement within a video clip. The Carotid Artery is one of the major arteries that carry blood from the heart to the brain. With every pulse, blood rushes through the artery, into the brain causing the head to move slightly. To the human eye, this movement is invisible. However, a Microscopic Movement Amplifier Program created by MIT graduates can increase the speed of the head movement within a video clip to determine the patient's HBR. So far this program has proven successful for detecting the HBR for 5 patients. Previous video-based systems that have tried to extract a patient's HBR through Hue detection have failed on people of darker complexions because it is harder for the system to detect the amount of blood that is rushing to their face. We want to also see if the following error will hold true with the head movement HBR detection system. Our hypothesis is that as melanin increases, the Microscopic Head Detection HBR System's accuracy will decrease. We will use a minimum of 30 patients for our research.

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**Magnetic Levitation System to Achieve Ideal Seismic Isolation**

Presenter's Name: Laxman Dahal
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Dr. Claudia Marin
Faculty Advisor's email: cmarin@howard.edu

Coauthors: Sola Famakin

Different types of base isolation devices are used in structures to dissipate seismic-induced forces. However, the commonly available isolation systems cannot provide vertical isolation, which is critical to protecting sensitive equipment. Though an established engineering concept, magnetic levitation has not been researched for earthquake engineering applications. This research focuses to demonstrate its applicability to seismic isolation. The demonstration includes a prototype levitation system and a mass of one pound. The mass achieves uplift through like-pole magnetic repulsion mechanism. Fundamentally, two stationary magnets cannot achieve equilibrium in a static magnetic field, consequently the prototype is based on Lenz's Law. Copper plate, dynamo, and four discs with eight neodymium magnets are arranged in a Halbach Array in each disc. Speedy rotation of the discs creates a mirror image of the applied magnetic field induced by the current in the copper plate. The induced magnetic field opposes the field that of the neodymium magnet, creates an equilibrium state ideal, and facilitates the levitation. Micro controller and motion sensor are used to activate the prototype for any simulated earthquake. When the disturbance signal dies off the levitating mass returns to its initial position. In future, the scaled-up model may be used to achieve ideal isolation of critical equipment.

Keywords: seismic levitation, base isolation, magnetic levitation, vertical isolation, ideal isolation.

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**A Microfluidic Approach for the Analysis of Small-Molecule Compounds Modulating Bacterial Biofilm Formation**

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

Though both static and fluid displacement methods of bacterial analysis have their merits, fluid flow studies have proven to be superior in their ability to reproduce the physiochemical environments to which bacterial biofilms are exposed in nature. This study investigates the antimicrobial properties of a small molecule compound, 7D-136, against biofilms of Staphylococcus aureus, a gram-positive pathogen. Under static conditions, the activity of 7D-136 against this pathogen is investigated in microwell plates and borosilicate glass tubes using spectrophotometric assays. Data suggest that the highest inhibitory effect of 7D-136 against S. aureus is equal or higher than 68% inhibition of biofilm formation. Additionally, this study will use flow cell experiments to investigate the impact of hydrodynamic forces on the antimicrobial properties of 7D-136 against Staphylococcus biofilms. Particularly, the role of shear rate and nutrition will be studied for this model organism. The activity of the compound will be demonstrated by monitoring over time the surface area coverages of bacterial biofilms with videomicroscopy. We hypothesize that biofilm formation and detachment in nature is affected not only by fluid forces but also by the local availability of nutrients and antimicrobials that results from fluid flow. Results of such studies could lead to the elucidation of the mode of action of a novel antimicrobial compound and to the prediction of its efficiency against bacteria prone to biofilm formation in hydrodynamic environments.

Keywords: biofilm, fluid displacement, hydrodynamic forces, antimicrobial agent

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**Control Strategies Optimization for Renewable Energy Sources On A Scale**

Presenter's Name: Mercy Daniel-aguebor
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: James Momoh

Faculty Advisor's email: jmomoh@howard.edu

Solar and wind power plants exhibit changing dynamics, nonlinearities, and uncertainties— challenges that require advanced control strategies to solve effectively, considering the importance that energy supplies must equal demand at any given time of the day. Although there are several factors that are considered in each kind of renewable resource to optimize it. This paper concentrates on Voltage/Var Control, Power Quality Control and Frequency Control(Harmonics). The research seeks to establish the relationship between the renewable energy sources and its optimal output. The proposed optimal state is built on observed patterns by extensive simulation and actual observation of the energy sources. The proposed improvement of renewable energy optimization which occurs on a small scale contributes to a bigger picture of establishing independent microgrid or mini-microgrid systems that prove crucial in solving the energy crisis in developing areas.

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**Physics of Failure for Reliability of Power Electronics - Impedance Spectroscopy**

Presenter's Name: Mercy Daniel-aguebor
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Charles Kim
Faculty Advisor's email: cjim@howard.edu

It is common knowledge that electronics have a relatively short lifespan compared to other structures. It is also certain for electronics to fail at some point in their lifespan. Unlike engineering structures like bridges, electronic components are small, and the details of its operation are on a minute circuit level, they can't be observed and measured independently. Another reason for electronic failure being so prevalent is the many factors which affect the electronics' performance like chemical composition, temperature can't always be noticed and are sometimes unrelated to the circuit operation. However, for this research – Physics of failure for reliability in Power Electronics seeks to establish a model to predict failure, to improve reliability in Power Electronics. One way to create a model is by testing a particular circuit configuration through several data until it fails and record its tests limit, this is known as vulnerability testing. This research focuses on the effect the components of the circuit, impedance specifically has on the failure rate of the circuit. Hence the name Impedance Spectroscopy, which implies a wide range of frequencies tested in a particular circuit concerned with impedance. The ultimate goal is to develop a model to relate impedance with an electronic lifetime

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**Investigating Seismic Energy Harvesting for Mitigation of Seismic Effects on Equipment**

Presenter's Name: Sola Famakin
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Charles Kim
Faculty Advisor's email: ckim@howard.edu

Coauthors: Claudia Marin, Charles Kim

Earthquakes generate the tremendous energy that destroys or structurally fractures and undermines equipment integrity resulting in enormous financial losses. This project explores and proposes that harnessing the seismic energy can serve the dual purpose of seismic effect mitigation on equipment and renewable energy harvesting. The objective is to investigate the feasibility of transforming earthquake shaking energy into electrical energy which may be used to modify the mechanical properties of the base supporting systems of equipment for seismic protection. This presentation discusses an experiment that seeks to demonstrate the feasibility of electrical energy harvesting from seismic shaking. The experimental demonstration reiterates the principle of electromagnetic induction which is the foundational principle behind conventional power generation. Mini-shake table to simulate seismic shaking, a set of neodymium magnets and a solenoid were used in the experiment. The small-scale demonstration yielded about 85 millivolts of time varying voltage whose frequency varies between 2Hz and 8Hz thus confirming the feasibility of electrical energy harvesting from seismic shaking. The prototype is scalable to any level depending on the proposed application. Further research includes modeling the system to predict energy harvesting profile for which vibration amplitude and frequency are needed and conversion of the energy to heat for softening equipment base supporting materials to mitigate earthquake effects. Other possible

applications include powering earthquake alarm and emergency lighting systems and supercapacitor charging.

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**Atomistic insight into corrosion of metals coated with graphene**

Presenter's Name: Hamid Ghasemi
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Hessam Yazdani
Faculty Advisor's email: hessam.yazdani@howard.edu

Coauthor: Hessam Yazdani

The small apertures of graphene allow the infiltration of no molecule through it, making it an ideal oxidation inhibitor for metals. Although such application of graphene seems promising, there are challenges that should be addressed before using it in practice. For instance, corrosive materials can seep through defects and scratches that may appear in graphene and become encapsulated at the metal/graphene interface, thereby expediting hazardous localized corrosion and eventually damaging the coated metals. Addressing such challenge requires a multilateral approach including multiscale numerical modeling and simulations as well as laboratory tests to understand the influence of different factors such as physical and chemical properties of material, initial conditions and the quality of graphene-based coating on corrosion rate. While there are several research laboratory reports on the corrosion barrier characteristics of graphene, no numerical studies have so far been carried out to better understand the corrosion protection mechanism of graphene and investigate scenarios that would have otherwise been arduous/expensive to perform in laboratory. In this study, molecular dynamics simulations are used to understand the corrosion mechanism of crystalline copper coated with graphene. The binding energy of the corroded surface together with the mass loss are monitored to evaluate the efficacy of the graphene coating. Results indicate that graphene-coated copper reaches to equilibrium with 67% less binding energy compared with uncoated copper, implying the adsorption of fewer oxygen atoms to the graphene-coated copper and indicating the potential of graphene to help reduce an estimated $2.5-trillion that is spent annually for corrosion protection.

**Science, Technology, Engineering and Mathematics in the African World: Shared Heritages and Contemporary Lessons**

Presenter's Name: Honesti Gittens
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Alem Hailu
Faculty Advisor's email: alemhailu@att.net

Like all descendants of rich civilizations Africans have rich heritages they can claim and draw inspirations from for mobilizing their youth to aspire to even greater achievements. Popular perceptions often tend to overlook or outright deny the positive contributions of the African World to advances in science, technology, engineering and mathematics. Great achievements in such fields were sources of inspiration and pride for people of African descent leading to motivations for the youth to emulate and build on these historic legacies. However, following slavery and colonialism, the decline in progress together with a diminished public policy focus on allocating resources led to the low valorization of STEM fields among people of African descent. Another major factor added to this tragedy has been the often-overlooked culture of negative perceptions developed by the youth. The study hypothesizes that diminished interest in academic achievement and STEM among young people of African descent is closely associated with the adoption of policies that undervalue academic achievement as well as negative cultural perceptions of the youth. A comparative methodology is employed for tracing historic and contemporary roots underlying the diminished role of science and technology in the African World. The potential contributions of institutions and youth culture to advancing academic progress on STEM education are examined in the context of the formal rules and the hidden messages transmitted by popular media. Insights gained from the study are anticipated to contribute to a needed public discourse.

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**Optimization of EV Battery Thermal Management Stimulations**

Presenter's Name: Damon Gresham-Chisolm
Classification: Graduate Student
School/College: Engineering & Architecture

*Presentation Type: Oral Presentation*
Faculty Advisor: Sonya Smith
Faculty Advisor's email: ssmith@howard.edu

The reliability and cost of electric vehicles (EVs) is directly impacted by the thermal management system employed in the battery pack. Ineffective thermal management systems lead to performance degradation and thermal runaway, among other undesirable effects. This paper presents thermal management system simulations for Lithium ion battery-pack configurations. A previous transient simulation of thermal management systems demonstrated an increase in performance for an unmanned ground vehicle; allowing the maximum temperature of the battery cell at peak power draw, 85 A, after 630 s of usage to decrease 10 ˚C below the maximum operating temperature. This paper presents a redesign of the previous thermal management system resulting in an even greater decrease in the maximum temperature at peak power. Comparisons of the battery-pack thermal management system performance among the two designs in optimum climate conditions are made with different cooling strategies. The resulting process for optimizing new thermal management systems for unmanned vehicle battery packs can be integrated into larger scaled systems and can be used to predict the effect of candidate cooling strategies, such as micro-channels, phase change materials, and convective air cooling. The **Results** of the simulation can assist in the design of thermal management systems that are optimized for best performance in the battery's recommended climate conditions. The results of this study show potential performance degradation due to the maximum temperature being higher than the Lithium ion battery optimum temperature range.

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**Pipelined Joint Crosstalk Aware Burst Error Fault Tolerance Mechanism for Reliable on-Chip Communication**

Presenter's Name: Madiha Gul
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: charles kim
Faculty Advisor's email: ckim@howard.edu

Coauthors: Charles Kim

**Background**: With the scaling down of technology, System on Chip (SoC) integrates a larger number of intellectual property (IP) cores such as processors, communication, and storage elements etc. The higher degree of integration in a single die of SoC requires a powerful on-chip communication system, which can deal with the reliability issues during the aging. In a Nano-scale technology, reliability is one of the main issues for on-chip communication systems. **Methodology**: To make communication system more reliable, Joint Crosstalk Aware Multiple Error Correction with interleaving scheme was proposed for crosstalk errors. This technique was very useful while dealing with burst error. The number of burst errors which can be tolerated by this technique can be adjusted by changing the interleaving distance between adjacent bits of the same module. But this solution has a drawback of "No. of Pins". We solved this solution by introducing the pipelined the stages in the techniques. The no of adjacent burst errors which can be corrected in both these techniques is the same. **Results**: The design is implemented on FPGA to calculate area overhead and delay. The proposed Pipelined JMEC/JMEC-Inter encoder and decoder has less area and I/O's pins by trading off by maximum operating frequencies as compared to the traditional JMEC/JMEC-Inter. **Conclusion**: The proposed technique is designed for crosstalk avoidance, and has high error correction probability with lesser no of I/O's and can correct same no of burst errors as the previous technique JMEC-Inter.

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**Synthesis and Characterization of Bovine Serum Albumin (BSA) Conjugated Silver Phosphate Nanoparticles Encapsulated Hydrogel**

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

Coauthors: Sade Atoyebi, Berhanu Zewde, Dharmaraj Raghavan

Despite the best surgical management, bacterial infection of orthopedic devices remains a major concern for physicians and researchers alike in orthopedic surgery. Traditional non-degradable polymeric implants can experience stress shielding and wear debris, which can lead to infections and

potentially surgical removal, thus negatively impacting clinical outcomes. Cross-linked hydrogels have been studied as an alternative to the aforementioned implants due to its biodegradability, biocompatibility, hydrophilicity, and non-toxicity - making them suitable for medical and pharmaceutical applications. Here, we explore the use of hydrogel as a drug carrier to combat bacterial infection. Silver-based nanoparticles, within a certain concentration range, exhibit strong potency toward microorganisms and limited cytotoxicity toward osteoblast cells. The objective of this experiment was to synthesize and characterize silver phosphate/bovine serum albumin nanoparticles encapsulated hydrogel and to evaluate the ability of the nanoparticles to maintain a sterile environment while promoting osteoblast cell growth in the region of interest. The silver phosphate/bovine serum albumin (Ag3PO4/BSA) nanoparticles were synthesized by reacting silver nitrate (AgNO3) with phosphoric acid (H3PO4) in a BSA solution. The isolated nanoparticles were encapsulated while hydrogel was formed via click reaction of norbornene hyaluronic acid (NorHA) and pegylated functionalized tetrazine TZ-(COO-PEG). Using DLS, the hydrodynamic radius of the isolated nanoparticles was determined to be 120 nm. FTIR results of the isolated nanoparticles showed a strong characteristic peak at 1264.32 cm-1 for the asymmetric stretching double bonded P=O modes. Studies are underway to examine the morphology and composition of nanoparticles and nanoparticles filled hydrogel using multiple nanocharacterization techniques.

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**Study of the Thermoelectric Properties of Cobaltite Systems that contains varius amount of Rare-Earth Element Ions and Transition Metal Ions**

Presenter's Name: Ifeanyi Ifeduba
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Robert Catchings
Faculty Advisor's email: rcatchings@howard.edu

The effect of Magnetic ions (Fe, Dy) substitution on the nanostructure and thermoelectric performance of polycrystalline Ca3Co4O9+δ is being investigated. Ca3FexDyyCo4-yO9+ δ (x = 0, y = 0.5, x = 0.5, y = 0.5, x = 0.5, y = 0.1) pellets was prepared using the sol-gel technique (since it allows for densification at a low temperature compared to other fabrication technique). Five different samples was prepared namely; Ca3Co4O9, Ca3Fe0.5Co3.5O9, Ca3Dy0.5Co3.5O9, Ca3Fe0.5Dy0.5Co3O9, and Ca3Fe0.5Dy0.1Co3.4O9. The resistance of the samples was measured as a function of temperature, from room temperature, to about 423K for all samples, using the LR-400 four wire resistance bridge, while employing the Van dar Pauw four wire measurement technique. The obtained values for the resistance of all sample falls within the range of a semiconductor. The Seebeck coefficient was measured using MMR equipment, near room temperature for each sample. Ca3Fe0.5Dy0.5Co3O9 had the highest value of 228 microvolts/Kelvin at 330K, and they all have positive signs indicating that the majority carrier is the hole in all cases. We plan to make these measurements at a higher temperature.

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**Raman Spectroscopy of Bi2Se3**: **Lineshape Analysis**

Presenter's Name: Kevaughn Johnson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Coauthors: Thomas Searles, Pheona Williams

Bi2Se3 is a well-known topological insulator, whose bulk interior is insulating but whose surface contains conducting free electrons. Raman spectroscopy is a widely used method for studying topological insulators and was the primary method used to examine Bi2Se3 for this project. Raman spectroscopy is a technique used to study phonon modes in a system. These phonon modes are quantum mechanical vibrations in the lattice of a material; at long wavelengths these phonons produce sound. Raman spectroscopy works by measuring the inelastic scattering of photons interacting with the material. Previous Raman studies have been conducted on Bi2Se3 with the additional parameters of variable polarization, temperature, and magnetic field. The main goal was to identify both surface and bulk phonon modes and investigate the quality of Bi2Se3 samples with the use of polarization dependent Raman. The second goal was to code a MatLab program that would assist with the analysis of the Raman spectra. This program was created to both fit the peaks of the Raman spectra as well as identify the line width, peak position and intensity after parallel and

perpendicular polarizations were applied. The difference in intensity of the peaks can be used to approximate the purity of the Bi2Se3 sample being examined.

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**Design, Construction and Analysis of Low Speed Open-Loop Blow-Down Weather Tunnel Optimized for Hover Performance Testing of Nano Quadcopters**

Presenter's Name: Alexis Jones
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Narcrisha Norman
Faculty Advisor's email: NORMANN@erau.edu

Coauthors: Adauago Anyamele, Narcrisha Norman

Nano multi-copters, also known as drones, are rapidly becoming a stable in today's society. Drones are being utilized for activities as complex as vital full-scale military surveillance missions to those as arbitrary as novice user entertainment. In 2016, NASA recognized a lack of data available on the performance of Nano quadcopters. One primary consideration is the hover performance of the quadcopter during changes in weather resulting in variations in wind speed, humidity and rain. The use of large full-scale weather tunnels to test such small systems is overtly costly and time consuming. This research seeks to design, construct and analyze an efficient scaled down version of a low speed open-loop blow-down weather tunnel optimized for testing the hover performance of Nano quadcopters. The open-loop blow-down configuration allows for minimal wind tunnel blade moisture exposure. An attached humidifier controls the amount of humidity in the test section and an in-house developed water dispensing system allows for a predetermined amount/size of simulated raindrops to drop into the test chamber. As the primary concern in this tunnel is hover performance and hover occurs when lift equals the weight of the copter, lift is measured by a magneto-inductive distance sensor. The wind tunnel system as stated provides an inexpensive, efficient analysis of the hover performance of Nano drones in various weather conditions allowing a more reasonable means for researchers to conduct test that promote improved designs.

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**An Analysis of the Correlation between Electron Temperature and Geomagnetic Activity in the Plasma Sheet Associated with the Magnetotail of the Earth's Magnetosphere**

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

Coauthors: Dr. Prabhakar Misra, Dr. Michael Collier

The plasma environment surrounding Earth varies immensely according to magnetic and particle output from the sun. Fast paced solar winds (typically around 450 km/sec) are constantly hitting the Earth's magnetosphere, bending its magnetic field lines and forming a "tail" on the night side of the Earth. This "magnetotail" is comprised of two primary regions, the plasma sheet and the lobes. The focus of this presentation is on the plasma sheet, a particularly dense region of the magnetotail, with a relatively weak magnetic field. The high density of charged particles within the sheet, creates an extremely dynamic environment that has a serious impact on the plasma environment of the Moon (which passes through the magnetotail each month), and any instrumentation and human life present on it. Consequently, it is important that we have an understanding of relationships between geomagnetic activity and particle interaction for future missions. The current assumption is that as geomagnetic activity increases, the temperature and concurrently the kinetic energy of electrons within the plasma sheet will increase. Data from NASA's Acceleration, Reconnection, Turbulence, and Electrodynamics of the Moon's Interaction with the Sun (A.R.T.E.M.I.S.) mission and the Kp index were used in order to fully document shifts in electron temperature as they relate to geomagnetic activity in an attempt to demonstrate the correlation between the two. The preliminary results of said research demonstrates a positive correlation between geomagnetic activity and electron temperature in the sheet as suspected.

Financial support from the NASA MUREP Award #NNX16AC90A is gratefully acknowledged

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**Protein Enrichment of Oat Flour via Dry Electrostatic Separation**

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

Coauthors: Solmaz Tabtabaei

A novel chemical-free tribo-electrostatic separation combined with sieving was employed to fractionate dried oat (avena sativa) flour into protein-rich and carbohydrate-rich fractions. Traditional wet fractionation process involves the use of solvents, concentrated acids and alkali, and harsh conditions such as high temperature or extreme pH resulting in protein denaturation. However, our dry chemical- free fractionation technique is not only environmentally-friendly, but also retains native functionality of the proteins. The concept of electrostatic separation is based on different electrostatic chargeability of proteins and carbohydrates. Proteins can be electrostatically charged to higher levels compared to carbohydrates due to the presence of ionizable functional groups. A lab-scale tribo-electrostatic separator consisting of a fluidized bed, polytetrafluoroethylene (PTFE) tribo-charging tube and a fractionation chamber connected to the high voltage supply was used. Oat flour suspended in air stream passed through the PTFE tribo-charger tube during which particles were charged due to collision. Afterward, charged protein particles were separated from carbohydrate particles in the fractionation chamber under the influence of an external electric field. We have optimized the electrostatic separation in terms process parameters of air flow rate and voltage strength. Using the optimum sieving and electrostatic separation conditions, the protein content of the original oat flour was increased from ~10% to 20% accounting for ~40% of the total protein. This novel chemical-free electrostatic separation approach preserves the bio-functionality of the protein and averts the likelihood of toxic microbial contamination common in currently used wet processes.

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**Probing Allosteric Binding Sites for the Chemokine Receptor Family using Pharmacophoric Conformers**

Presenter's Name: Gulriz Kurban
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Mugizi Robert Rwebangira
Faculty Advisor's email: mugizi@gmail.com

Coauthors: Simon Wang, Robert Rwebangira, Chunmei Liu

Allosteric modulation is the regulation of a receptor protein by binding at a site away from the protein's major active site, i.e. orthosteric site. Thus, such regulation provides alternative opportunities for modern drug discovery. In our earlier work, we had built ligand-based pharmacophore models for allosteric antagonists of human CC chemokine receptor 4 (CCR4). In the current work, we applied our prior pharmacophoric conformers in such a novel way that we "blind-dock" the resulted conformer to the 3-D structural model of CCR4 to identify the allosteric sites. The "blind-dock" means that there is no pre-defined region prior to docking in comparison to conventional docking. The sites found by this way matched closely with the experimental data in the literature. Later, we conducted a large scale of "blind-docking" computations for all known members of the chemokine receptor family to explore the universal pattern of allosteric sites. For CCR2, CCR5, CCR9, CXCR1, and CXCR4 we used solved 3-D structures, for the rest we used structural models obtained from GPCRDB web portal. For each receptor, the computations returned multiple sites ranked with respect to free binding energies. Our results provide a valuable insight into the mechanism of allosteric modulation for the whole chemokine receptor family.

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**Nano Multi-Copter Frame Design for Hover Optimization**

Presenter's Name: Felicia Long
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Narcrisha Norman
Faculty Advisor's email: Narcrishanorman@gmail.com

Coauthors: Anikah Norman, Narcrisha Norman

A Nano multi-copter is a flying drone that typically measures 150 millimeters or less from the center of one rotor to another with a weight of fewer than 125 grams. Drones of this size are designed for a variety of activities some as complex as vital full-scale military surveillance missions, others as simple as novice user entertainment. Society's interest in drone technology has substantially increased and research in this field has exploded. Because characteristics of hover performance change when the devices are scaled down to the Nanoscale, one major concern is the Nano multi-copters aptitude to remain stationary and hover. The copters frame is a significant component of its design and has the capacity to promote hover. Through an advanced analysis of current designs and the creation and testing of new designs this research, focuses on optimizing frame design to promote hover performance. A full-size subsonic wind tunnel is utilized to test eight 3D printed frames that vary in frame design including, smooth and multiple dimpled surfaces that vary in dimple size and curvature. The hover speed, the speed at which the wind flows to induce hover, is compared with respect to each surface variation. Dimpled surface variations made on the belly of the drone promotes lift at lower speeds than the traditional smooth bell surface. Where hover performance is of primary concern, future design advances such as increased allowable drone weight and reduced power requirements can be considered.

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**Characterization of Microchip Packaging Electro-Thermal Material Properties: Quantitative Analysis of Niobium, Copper, Sapphire, and Silicon Nitride using Cyrogenic Cycling**

Presenter's Name: Kirsten Lovelace-Sims
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Sonya Smith
Faculty Advisor's email: ssmith@howard.edu

Important fundamental theory and measurements of low temperature material properties have been analyzed for only a selective group of materials. There is a shortage of accurate electro-thermal property data at cryogenic temperatures of 77K to 4K for newer microchip circuit materials. Accurate thermal property data at cryogenic temperatures are important in material selection and thermal design of engineered systems in the microelectronics industry. Microchip circuitries are often subjected to frequent thermal cycling. This constant exposure of alternating temperatures can create thermo-mechanical stresses amongst the layers of materials, which in turn causes critical fatigue within the device reliability resulting in premature failure. This research experimentally examines the effects of cryogenic temperatures on thermal expansion, thermal conductivity, electrical resistivity, Residual Resistance Ratio (RRR) and superconducting transition temperature for microchip packaging materials. The materials of interest are Niobium, Copper, Silicon Nitride (Si3N4) and Alpha-Alumina/Sapphire (α-Al2O3). Copper (Cu) is used as a reference material in a comparative study of available theoretical models. Thermal conductivity and temperature coefficient of resistance were calculated for Cu to validate methods used to calculate these values for the sample materials. The results indicate that our continuous flow cryostat system, corresponding measurement methods and semi-automated data analysis algorithms provide accurate measurements for the thermal properties of these substrates and sample materials at cryogenic temperatures.

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**Characterization of Graphene Grown by HFCVD on Silicon Carbide**

Presenter's Name: Marina Markous
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Tina Brower-Thomas
Faculty Advisor's email: tina.browerthomas@howard.edu

Coauthors: Tina Brower-Thomas

A monolayer of graphene is one atomic layer of graphite. Due to its lattice, graphene exhibits desirable electronic qualities that could make computing faster. There are several methods that have successfully isolate a monolayer of graphene, the most common being mechanical exfoliation. However, this is a tedious process and not suitable for mass production. The most successful experiments conducted using chemical vapor deposition have grown several layers of graphene on copper. Since silicon carbide is a non-conducting surface,

graphene grown on this substrate is considered "device ready." Graphene has never been grown by Hot Filament Chemical Vapor Deposition (HFCVD). The appeal behind using HFCVD is the variety of parameters we can control; filament temperature, process pressure, as well as the distance between the substrate and the filaments. The goal is to achieve ideal conditions and create a "recipe" for mass producing device ready graphene. We had two approaches to attaining our goal of growing a monolayer of graphene using the HFCVD. The first approach involved the sublimation of the SiC. We think that if we can sublime away several layers of the Si face, the carbon will reform its' bonds into a graphene lattice. We found that the system did not achieve high enough temperatures to successfully sublime silicon. The second approach introduced carbon into the system by flowing methane into the growth chamber.

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**Toroidal Response of Asymmetric Metasurfaces with Multiple High Q-Factor Resonances**

Presenter's Name: Sirak Mekonen
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Coauthors: Riad Yahiaoui, Josh Burrow, Imad Agha, Jay Mathews

Toroidal dipole is a localized electromagnetic excitation that corresponds to current flowing on the surface of a torus along its meridians. Recently, toroidal resonance-based metamaterials (MMs) have been used to demonstrate fascinating THz applications such as optical filters, bio-chemical sensing, etc. Here, we report numerical simulations and experimental investigations of an array of split ring resonators (SRRs) deposited periodically on the top side of high-resistivity silicon substrate. The investigated SRRs include one central split gap and two side split gaps, which exhibits a toroidal dipolar resonance at around 1.6 THz for TM-polarization and 1.5 THz for TE-polarization. Numerical simulations have been performed using a finite element method (FEM) based software to analyze the electromagnetic response of the metasurfaces. .In addition, by breaking the symmetry of the resonators, we achieved a high Q-factor ~43. Afterwards, we employed a pump-probe technique via a high-speed asynchronous sampling terahertz spectroscopy system (HASSP-THz) to experimentally study the toroidal geometry. Our experimental results match our numerical simulations, and we present electric, magnetic and surface current of each high Q factor Fano resonance within the 0.8-2.4 THz frequency range.

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**Raman and surface enhanced raman spectra analysis of 2-amino-3-chloro-1,4-naphtoquinone and derivatives**

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

Naphtoquinones can be used for their cytotoxic affect in prostate cancer research. Naphtoquione derivatives have been synthesized using a two step process with secondary amines to use for Raman Spectroscopy. Raman Spectroscopy and Surface-Enhanced Raman Spectroscopy (SERS) spectra of 2-amino-3-chloro-1,4-naphtoquinone have been collected experimentally and theoretically. Raman Enhanced Spectroscopy was used in order to gain a structural fingerprint by which molecules can be identified. Density Functional Theory calculations were used to study the ground and excited states of 2-amino-3-chloro-1,4-naphtoquimone on silver nanoparticles. SERS has shown to be effective in reducing the signal to noise ratio that can affect the Raman spectra. After the results are analyzed, our future plans are to use the other synthesized napthoquione derivatives to add to our Raman spectral studies.

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**Adaptive Security Through AutomotivePots**

Presenter's Name: Eric Muhati
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Gedare Bloom
Faculty Advisor's email: gedare@scs.howard.edu

Adversaries innovating faster than defenders is a troubling ominous trend, more so for critical cyber-physical systems

like automotive networks. Embedded electronic control units (ECU) serve different important vehicle functions while communicating through controller area network (CAN) standards. Since CAN bus data traffic is not encoded or encrypted, both research and industry findings show alarming successful cyber attacks on automotive systems. Recently intrusion detection systems (IDS) for vehicle's architecture gained high interests offering conventional countermeasures. Even so, traditional IDS techniques are still giving possibilities for analysis and eventual circumvention. While traditional IDS techniques monitor all vehicle traffic and are best suited for preventing attacks, they tend to generate too much data, become resource intensive, and give frequent false positives and false negatives. Not knowing much about the enemy leads to techniques guarding against all conceivable attacks, instead of precise security design. HoneyPots have evolved to play major roles in early unauthorized access detection through decoy or deception based technologies. HoneyPots attract probe from attackers in-order to study their movements and behaviors. Understanding "who is targeting us", "what methods are they using?" and "what systems they are after", then using this intelligence in real-time to fine tune or adapt IDS to focus on imminent attacks will help improve security design. We propose a high-interactive HoneyPot in automotive systems (AutomotivePots) by fully simulating ECU and CAN bus traffic functions within a vehicle. Traffic directed to the AutomotivePots would be unauthorized and any similarities with traffic in the vehicle IDS would signal an attack.

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**Supervised Classification of Cancer Groups**

Presenter's Name: Jason Ogato
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Jiang Li
Faculty Advisor's email: lij@scs.howard.edu

Coauthors: Olufemi Salaam, David Awogbemila, Jason Ogato

This project explores techniques to classify 11 cancer groups with the use of quantified gene expression data. This data is provided by the National Cancer Institute and contains tissue samples from 1811 patients representing the different cancer groups. A total of 60483 genes are used as features when input into a convolutional neural network. The resulting model is then trained and tested using the TensorFlow framework in python. The trained model achieves an overall accuracy of 96.69% using unseen data as the testing set. Further testing reveals that the model classifies the bile duct, bone marrow, pleura, and stomach cancer groups with an almost perfect accuracy. These results indicate that it is possible to diagnose a patient's cancer through the analysis of their quantified gene expression data with a high level of confidence. Further training and testing of the convolutional neural network model can result in more accurate classification when used on a larger cancer group.

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**Strain Effects: Properties of Deep Defects in Hexagonal Boron Nitride**

Presenter's Name: Farinre Olasunbo
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Pratibha Dev
Faculty Advisor's email: pratibha.dev@howard.edu

Coauthors: Pratibha Dev, Evan Folk

The spin states of different point defects and defect-complexes within layered semiconductors, such as hexagonal boron nitride (hBN), are of interest for different quantum applications e.g. quantum computing. Using first principles-based methods, we show that strain can affect the structural, electronic and spin properties of defects such as boron and nitrogen vacancies, as well as anti-site defect within hBN monolayers. The results show that along with the defect-defect interactions, strain changes the spin-states of the defect. In particular, in the case of boron vacancy, where the unstrained structure undergoes Jahn Teller distortion, strain makes the symmetric, undistorted structure metastable. The distorted boron-vacancy defect is a spin-1/2 structure, while the symmetric structure has a net spin of 3/2. These results are promising and show that strain can be an important mechanism in manipulating the electronic and spin properties of defects in layered materials.

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**Understanding bioaerosols in the atmosphere and their effects on human health in northern Ethiopia**

Presenter's Name: Esther Otu
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Vernon Morris
Faculty Advisor's email: vernon.morris@gmail.com

Particulate matter found in the atmosphere is known to transport living microorganisms that range in size from less than a micrometer to more than one hundred micrometers. At the low end of the size spectrum, some of these microorganisms are small enough to be deposited in the bronchi, bronchioles and the alveoli of the human lungs if they are respired and may cause or exacerbate respiratory diseases. In this study, air filters were used to collect ambient particulate matter at the University of Gondar hospital, located in northern Ethiopia in the intensive care unit (ICU) and tuberculosis (TB) wards. More than one hundred size-resolved air filter samples were collected during June and July of 2015 and 2016. This span of two months covers the transition dry season to wet season in northern Ethiopia. The biological materials present on each of the filter were extracted to obtain the DNA concentrations and to identify the specie of microorganism on each filter paper and a function of size and time during the seasonal transition. A portion of each filter paper was also cultured in selective culture media (trypticase soy broth and agar) in order to isolate viable pure colonies of microorganisms. This was done to better understand the distribution and transmission of these microorganisms at the University of Gondar hospital.

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**Is Europa Next?**

Presenter's Name: Ositanachi Otugo
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Catherine Quinlan
Faculty Advisor's email: catherine.quinlan@howard.edu

Coauthors: Gabe Addane, Traja White

The age old question about life on other planets will forever be discussed. The basis of this research is to explore the possibility of sustaining life on Jupiter's moon, Europa. Data collection consists of data reports created by scientists on Europa's atmosphere and land composition. The reports are created from data derived from the Galileo spacecraft from NASA and future reports will come from NASA's mission, Europa Clipper. Findings show that similar to the Earth, Europa is made of silicate rock and has an iron core and rocky mantle. Compared to Earth, the interior of Europa is also rocky and surrounded by a layer of water and/or ice. According to studies, when Europa orbits closer to Jupiter, the tides beneath the ice rise up higher than normal causing cracks to form on the surface of the moon. Plate Tectonics and water are needed for proper habitation which Scientists and Astrobiologists have discovered exists on Europa. Breaking down water into Hydrogen and Oxygen, it is said that Europa has enough oxygen for life. The availability of water as ice creates an opportunity for the development of instrumentation to convert this ice into atmospheric oxygen, hydrogen, and other gases in adequate compositions to sustain life. The findings may be useful when exploring the possibility of life on Europa and on other moons or planets. While Europa seems to be a feasible planet to sustain life, there are many factors that restricts human beings from staying on the planet any time soon.

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**Enhancing energy dissipation capacity of wire rope isolators**

Presenter's Name: Alejandro Pardo-Ramos
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Claudia Marin-Artieda
Faculty Advisor's email: cmarin@howard.edu

Coauthors: Claudia Marin-Artieda

**Background:** Wire rope isolators are multidirectional vibration/shock isolation devices. They consist of a helical-shaped wire rope strand connected by upper and lower attachment plates; the energy dissipation capacity of these devices (related to the internal friction developed in the strands) is relatively low and decreases significantly when

the amplitude of the isolator's deformation increases. **Methods:** In this experimental study were implemented two approaches to increase friction in the strands to improve the performance of the isolator, (1) increasing the friction coefficient of the strand surface by adding paint, rubber coating, and polyurethane-based adhesive, and (2) adding a normal force by wrapping wire of different materials and diameters around the strands. Experimental dynamic Tension-Compression (TC), 45° inclination, shear, and roll tests were performed on the isolators at Howard University using an Axial-Torsion Instron equipment. Force-Displacement relationships were developed for the different setups and compared to the properties of a baseline isolator (unmodified specimen). **Results and** Conclusions: The TC tests showed that the confinement and addition of external materials to the strands increase substantially the damping of the isolators for all the setups defined in this study. Damping increment up to 33% of the baseline value was achieved with polyurethane-based adhesive, although degradation (micro-cracks) of the external materials was observed. Steel wire increased damping up to 16.4% which represents 87% of the baseline. The isolator's stiffness was increased by most configurations, however, this parameter doesn't seem to affect the damping increment if confinement is guaranteed.

Keywords: Wire rope, damping, friction, equipment.

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**Resource Allocation in Virtualized Wireless Network with Mobile Edge Computing**

Presenter's Name: Salik Parwez
Classification: Graduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Danda Rawat
Faculty Advisor's email: danda.rawat@howard.edu

Coauthors: Danda Rawat

Due to ubiquitous presence of wireless connectivity and surge in internet of things (IoT) devices, the next generation wireless network is predicted to face crunch of resources. Wireless virtualization is regarded as a viable approach to enhance resource utilization efficiency by sharing and reusing the physical resources in the form of slices or virtual networks (VNs). Mobile edge computing (MEC), on the other hand, facilitates task offloading as well as fast content delivery by bringing the computation and cache resources to the edge of the network. In this work, we investigate virtualization of physical infrastructure that is embedded with MEC resources. Specifically, this paper presents resource allocation in adaptive virtualized wireless networks with mobile edge computing. First, we investigate how to create VNs through a mobile virtual network operator (MVNO) based upon demand from users. Second, after creating VN, how the MVNO can allocate resources to its users so that the utility (aka revenue) of the MVNO is maximized while satisfying users' quality of service (QoS). For the first problem, we propose an algorithm that incorporates demanded area of the MVNO, demanded spectrum, and computation and cache resources. And for the second problem we present a collaborative resource allocation for maximizing the utility of MVNO while meeting the QoS requirements in terms of rates of the users. The performance is evaluated through numerical results obtained from Monte Carlo simulations. Numerical results show that the proposed approach produces better results in terms of utility and spectrum utilization efficiency.

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**Solubility Increase of Chlorinated Organics Using Cosolvents with Application to Site Remediation**

Presenter's Name: Dhruba Paudel
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Ramesh Chawla
Faculty Advisor's email: rchawla@howard.edu

Coauthors: Timara Benson

Chlorinated hydrocarbons, such as trichloroethylene (TCE) and carbon tetrachloride (CCl4) were heavily used for various industrial applications including use as popular industrial solvents in the case of TCE. Because of their relatively low solubility, they are present as a dense non-aqueous phase liquids (DNAPLs), which makes them long-term sources of dissolved contaminants. Research studies were done to determine effective cosolvents that will assist in increasing solubility of chlorinated hydrocarbons in

water. Two types of household cosolvents: alcohols and detergents were investigated. The three alcohols that were used for these experiments were methanol, ethanol, and isopropanol. Isoprapanol was the best alcohol in increasing the solubility of TCE. Household detergents used were - Arm & Hammer, Wisk, OxiClean and Tide. Among detergents, OxiClean and Tide performed better than other detergents and all detergents performed better than alcohols. For an initial TCE concentration of 10,000 ppm in hexane, 1000 ppm or 10% dissolved in water, 25% dissolved in 20% propanol-water mixture and 75% in 20% Tide-water mixture. Based on encouraging results for Tide, OxiClean was used as an alternate detergent, which performed better than Tide. It was determined that isopropanol and OxiClean were the best alcohol and surfactant cosolvents, respectively. 5,500 PPM of TCE dissolved in 500,000 PPM isopropanol/water mixture and the same amount of TCE was totally dissolved by 9,000 PPM of OxiClean-water mixture. This is compared to TCE solubility in water at about 1,000 PPM. Ternary diagrams for all cosolvents were developed to compare relative equilibrium solubilities.

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**Enhancing the Performance of the Wi-Fi Network of Howard University**

Presenter's Name: Delaney Ramalho
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Oral Presentation*
Faculty Advisor: Jiang Li
Faculty Advisor's email: lij@scs.howard.edu

Coauthors: Kaleshwar Singh, Jiang Li, Danda Rawat, Johan Greene

Wi-Fi networks are part of almost all businesses including universities. They facilitate wireless access to the Internet, which is essential to the success of businesses and their stakeholders. In this paper we investigate and redesign the Wi-Fi network for the Lewis K. Downing (LKD) building of Howard University. Our study shows that the poor Wi-Fi network performance in the LKD building is due to misconfiguration and misplacement of Wi-Fi access points. We present better configuration and positioning of the Wi-Fi access points. Our proposed configurations fall under three tiers of financial consideration: 1) No Budget, 2) Low/Restricted Budget and 3) Sufficient Budget. The proposed configurations will boost the overall performance of the Wi-Fi network and allow students, staff and faculty to experience higher data rates while using the network.

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**On a character sum associated to a curve of the form f(y)=λf(x**

Presenter's Name: Francois Ramaroson
Classification: Senior Faculty
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Francois Ramaroson
Faculty Advisor's email: framaroson@howard.edu

Coauthors: Haleemah Ghazwani

In this work, we study a character sum associated to certain algebraic curves over a finite field. These curves are defined by the equation $f(y)=\lambda f(x)$ where $f(t)$ is a polynomial with coefficients in a finite field K and $\lambda$ is an element of K not equal to 0 or $\pm 1$. Exact values of the character sum are obtained in the case when $f(t)$ is of Jacobsthal type. We call the associated curves, Jacobsthal curves. In the course of the study, we obtain a relationship between the Frobenius eigenvalues of these curves and those of the curve $y^2=f(x)$.

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**Singlet Oxygen Chemistry and the Search for a Low-Cost Pathway to an Anti-Malaria Drug**

Presenter's Name: David Roberts
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Joseph Fortunak
Faculty Advisor's email: jfortunak@howard.edu

Coauthors: Joseph Fortunak

The anti-malaria drug artemisinin, deemed by World Health Organization to be one of the world's Essential Medicines, is a naturally occurring peroxide produced by the Chinese wormwood plant. We turn to chemical synthesis in hopes

of establishing a more stable source of this drug at lower cost and in the quantities needed to treat asymptomatic carriers as well as malaria sufferers, and finally achieve the goal of worldwide eradication of the malaria parasite. Our research focuses on the synthesis of artemisinin from an abundant precursor, dihydroartemisinic acid (DHAA). The first step in this process is the formation of a tertiary allylic hydroperoxide via reaction of DHAA with singlet oxygen--a short-lived, highly reactive form of oxygen. In our research, we produced singlet oxygen from hydrogen peroxide using a molybdate catalyst, although it can also be produced photochemically. We varied the conditions of the reaction to maximize overall yield and to favor tertiary hydroperoxide formation relative to two undesired hydroperoxide by-products. We varied the type of catalyst; amount of catalyst; type of solvent; and reaction volume, holding pH constant. We used thin layer chromatography to monitor the reaction, and NMR spectroscopy to determine the final product ratio. **Results**: After 7 reaction trials, the best product ratio obtained so far was 86.7% desired isomer. The product ratio reported in a literature study was 81.8%. Our best yield was 79% as compared to 86% reported in the previous paper.

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**Dynamic control and switching of electromagnetically induced transparency in ultrathin highly flexible terahertz metasurfaces**

Presenter's Name: Thomas A. Searles
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Electromagnetic induced transparency (EIT) is a laser driven phenomena where an otherwise opaque atomic transition becomes translucent in a three state level system. Recently, metamaterials (MMs) as classical analogues of EIT have led to the promise of new EIT applications in sensing, THz modulators and slow light metadevices for operation at room temperature. The generation of an EIT analogue in MMs is achieved by two different approaches: (i) bright-dark mode coupling and (ii) bright-bright mode coupling. The latter, involving two radiative subresonators, is extremely rare with only a few reported cases in the THz regime. Here, we present experimental verification of two-bright mode coupling for a terahertz EIT-MM in the context of numerical results and theoretical analysis based on a coupled Lorentz oscillator model. The investigated MM is comprised of an array of metallic three-gap split ring resonators deposited periodically on a ~ 50μm highly flexible polymer film. The keys to achieving the EIT-like effect in this system are the frequency detuning and hybridization processes between two bright modes coexisting in the same unit cell as opposed to bright-dark modes. In addition, a hybrid variation of the EIT-MM is proposed and implemented numerically in order to dynamically tune the EIT window and switch from the on-state (EIT mode) to the off-state (dipole mode) by incorporating photosensitive silicon pads in the split gap region of the resonators. The proposed structures are promising for a wide array of applications including active THz modulators, label-free biosensing, etc.

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**Hexavalent Chromium Reduction by Zero Valent Iron in the Presence and Absence of TCE and CCl4**

Presenter's Name: Aadarsh Jung Shah
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Aadarsh Jung Shah
Faculty Advisor's email: rchawla@howard.edu

This research study focused on degradation of hexavalent chromium, Cr(VI) to Cr (III) by zero valent iron Fe(0) in the presence and absence of TCE and CCl4 in batch reactors. It was determined that degradation of Cr(VI) by Fe (0) in the presence and absence of TCE and CCl4 is a complex surface limiting reaction and order of the reaction varies between second order initially (0~ 1 hr) and zeroth order in the long term (~ over 6 hours). The observed pseudo-first order rate constant for TCE and Cr(VI) degradation are 0.8869 hr-1 for TCE and 1.217 hr-1 for Cr(VI), respectively. The relative magnitudes of rate constants indicate that in the presence of excess ZVI, both Cr(VI) and TCE compete for the available ZVI but the degradation of Cr(VI) is much faster than that of TCE. Preliminary experiments on the degradation of CCl4 suggest it is not as readily degradable by ZVI as TCE, due to its non-polar nature. A mixture of ZVI and Fe(II) was used to achieve a suitable degradation pattern for CCl4 in the presence of Cr(VI); 82% degradation of CCl4 was achieved and the rate constant was found to be 0.3113hr-1.

**Development of Shewanella Oneidensis MR-1 Biofilms for Iodate Reduction in Groundwater**

Presenter's Name: Jyothirmai Simhadri
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Patrick Ymele-Leki
Faculty Advisor's email: patrick.ymeleleki@howard.edu

Plutonium production at the U.S. Department of Energy (DOE) Hanford Site has resulted in the generation of Iodine isotopes. The release of radioactive 129I to the subsurface due to leaking tanks and direct disposal has resulted in several plumes in the groundwater. Speciation of Radioiodine has shown that iodate comprises a major percent of iodine. Iodate, which is a +5 oxidation state of iodine is found to be the dominant species due to its thermodynamic stability. One way to reduce iodate to iodide (-1 oxidation state) is by the action of biofilms formed by dissimilatory metal-reducing bacteria such as Shewanella oneidensis MR-1, which can gain energy for growth by coupling the oxidation of various electron donors to the reduction of iodate. The polyionic nature, physical and chemical heterogeneity of biofilm matrices, combined with the reduced susceptibility of bacterial biofilms to toxicity by inorganic and organic pollutants, make them particularly suitable for bioremediation applications. This work develops a protocol for the proliferation of S. oneidensis MR-1 biofilms and investigates the potential of these biofilms to reduce iodate. These studies could lead to novel approaches and techniques for the bioremediation of radioiodine at contaminated sites.

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**Developing an Integrated Materials Design Paradigm using Artificial Intelligence**

Presenter's Name: Sigmund Skinner
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Hessam Yazdani
Faculty Advisor's email: hessam.yazdani@howard.edu

Coauthors: Emilda Gwerengwe and Hessam Yazdani

The overall objective of this research is to design new and improve existing materials using artificial intelligence. The focus of the research is on the electrical and mechanical properties of certain classes of polymer nanocomposites (PNCs). A database of the information available in the literature regarding the composition and properties of the PNCs is compiled. The information includes the type, dispersion state, and concentration of the ingredients as well as the fabrication procedure employed. This information is used to develop a series of machine/deep learning models whose architecture and parameters are tuned using advanced optimization techniques to maximize their accuracies and performances. The models will help researchers understand the structure-property relationships in polymer nanocomposites and reduce the uncertainty between their initial design and final tested properties without following a traditional approach where materials are optimized through a trial-and-error procedure.

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**Analysis of Low SNR Data from LADEE Spacecraft UVS-VIS Spectrometer for Chemical Species in the Lunar Exosphere**

Presenter's Name: Ajani Smith-Washington
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Prabhakar Misra
Faculty Advisor's email: pmisra@howard.edu

Coauthors: Prabhakar Misra, Menelaos Sarantos

Recent observations have indicated that the lunar exosphere is more particle rich than previously believed, with particle densities ~10e6 per cubic centimeter. The Apollo 17 Lunar Atmospheric Composition Experiment detected small amounts of He, Ar, Ne, NH3, CH4, and CO2, while earthbound telescopes have detected Na and K in the moon's atmosphere. Results like these encouraged NASA to launch the LADEE satellite in 2013 equipped with the UVS-VIS Spectrometer to, "characterize the lunar exospheric dust environment and measure any spatial and temporal variability and their effects on the lunar atmosphere, " as well as, "determine the composition of the lunar atmosphere and investigate the processes that control its distribution and variability, including sources, sinks, and surface interactions." The spectrometry data returned by the instrument contains several types of systematic noise, including photon noise, dark current noise, and cosmic rays, as well as a sometimes

low SNR. Accounting for these noise sources makes it possible to read the data for the presence of chemical species in the lunar exosphere. This section of the project attempts to do this for a segment of the data called a dark calibration, used to predict the dark current noise for all of the pixels on the sensor during other measurement activities.

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**Fano-fitting for extraction of Q-factor of Planar Terahertz Metameterials**

Presenter's Name: Viet Tran
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Coauthors: Thomas Searles, Sirak Melaku, Riad Yahiaoui

Fano resonances have generated much interests due to their extensive and valuable applications in biological sensors, optical switches, lasers and nonlinear optics. Generally defined as the resonant scattering features with a characteristic asymmetric profile, they have been observed in a variety of optical systems such as metamaterials. Metamaterials (MMs) are artificial composites that acquire their electromagnetic properties from embedded subwavelength metallic structures. Fano resonance is one of the effective methods to realize the high Q-factor resonance in MMs because the radiation loss is suppressed. Engineering high quality factor (Q-factor) resonant responses is an active topic in the field of MMs. High Q-factor resonators are required to achieve a significant field confinement, thus providing an efficient platform for strong light-matter interactions. Here, we demonstrate a Fano resonances obtained in terahertz metamaterials that are composed of periodic 4-gap square split ring resonators (SRR) by breaking symmetry. Asymmetry was introduced by the shifting the metal braces rather than shifting the position of the capacitive gap. By using a well-defined Fano-fit parameter using MATLAB, we were able to fit the Fano-resonances and report a high Q-factor between the range of 18-20 from the ratio of central resonant frequency ($\omega 0$) and overall damping rate of the resonance ($\gamma$). The goodness of the fit is measured by the coefficient of determination R-square. Fano fitting is chosen to fit the data to test whether Fano resonances are present when asymmetry is introduced to the 4-gap square SRR.

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**Controlled Biomimetic Remineralization for Enamel Repair**

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

Remineralization of enamel is essential to maintain tooth integrity and provide protection against dental caries. This study investigates the effect of fluoride ion (F-) on remineralization and the manipulation of enamel rod size, orientation, and configuration. Fluoride is believed to promote the diffusion of ions into tooth surface for mineralization. Fluoridated hydroxyapatite (FHA) crystals are less water-soluble than hydroxyapatite (HA), and thus more resistant to acid attack. However, too much fluoride can result in fluorosis. Consequently, the goal of this research was to evaluate mineralization at low fluoride concentrations and high calcium (Ca2+) and phosphate (PO43-) ion concentrations. Biomimetic solutions with varied calcium, phosphate, and fluoride concentrations were prepared, and the pH of each solution was adjusted to the physiologic range. An HA disk was added to each sample. After three days, the HA disks were removed, air dried, and analyzed under a scanning electron microscope. Overall, the size and orientation of the hydroxyapatite crystals grown via a biomimetic solution could be controlled. The data suggest that within the fluoride concentration range of enhanced mineralization, a lower concentration of fluoride resulted in more numerous and smaller needles. A decrease in the phosphate concentration also resulted in smaller and more numerous needles.

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**"Complex Impedance-based Reliability Monitoring and Modeling of In-operation GaN Transistors"**

Presenter's Name: Ikemefuna Uba
Classification: Graduate Student
School/College: Engineering & Architecture

*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Charles Kim
Faculty Advisor's email: ckim@howard.edu

Coauthors: Derrick Anang, Dr. Charles Kim

Gallium Nitride (GaN) transistors are plagued by several shortcomings that include, joule-heating and charge trapping under electrical overstress. These affect semiconductor material properties and electrical behavior of the transistors, and consequently cause their progressive degradation and final catastrophic failure, the latter usually manifested in GaN transistors in-operation on a board. In principle, with regards to joule heating and the heterostructure of transistors, Seebeck voltage in the bulk can indicate their health status. Based on this principle, the more practical impedance spectroscopy is investigated as an alternative means to study the internal property change in on-board GaN transistors. To validate the impedance microscopy investigation, combined micro-spectroscopic techniques are incorporated to analyze internal property and structural integrity for the specimens of the same GaN transistors used in the impedance microscopy. This paper reports the initial tests and validations of the approaches. Specifically, impedance loci of burnt and unbiased pristine transistors in a buck (DC-DC) converter are presented along with their surface morphology and Raman spectra. It is observed that the burnt and pristine GaN transistors could be differentiated by comparing the imaginary components of their complex impedance loci.

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**Atomistic insight into mechanical properties of nanocarbon-filled polymer composites**

Presenter's Name: Camille Wallace
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Hessam Yazdani
Faculty Advisor's email: hessam.yazdani@howard.edu

Coauthors: Hessam Yazdani

Molecular dynamics (MD) simulations are carried out to investigate the mechanical properties of low-density polyethylene (LDPE) and high-density polyethylene (HDPE) and their composites filled with carbon nanotubes (CNTs). Different combinations of chain length, number of chains, CNT type and concentration are studied. The Dreiding force field is used to describe the interactions among the polymer chains, while the interactions between carbon atoms in CNTs are defined using the AIREBO potential. The simulations are carried out at two different temperatures of 100 K and 300 K, which are representative temperatures for glassy and rubbery states of the polymers. Results indicate that HDPE models exhibit fairly similar behaviors in their strain-hardening response, while the strain-hardening response of the LDPE models is influenced by chain length where the longer-chain models show higher strain-hardening moduli. Results also show that the tensile strength of CNT-filled LDPE and HDPE increases linearly with CNT concentration.

Keywords: Carbon nanotubes, molecular dynamics, polyethylene

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**Evaluating Usafiri Dar Es Salaam Rapid Transit**

Presenter's Name: Willis Walter
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Stacie LeSure
Faculty Advisor's email: stacie.lesure@Howard.edu

In the history of public transit, there have been two separate entities competing against each other, government owned and privately owned public transit systems. An example of this competition in the United States and other developed countries can be seen with the expanding popularity of Uber or in Dar es Salaam, Tanzania with the implementation of a new government owned bus rapid transit system competing with the "Dala Dala" private system that began in the early 1980s. The objective of this study was to compare and evaluate the privately owned public transit system and the newly developing government owned public transit system. The UDA-RT has only been operating for fourteen (14) months, and the rationale for this study was to see if the government of Tanzania should continue to invest in bus rapid transit, considering it is expensive to build and requires additional roadway space to operate effectively. This study compared a privately-owned transportation system and the government owned public transit system used in Dar es

Salaam using literature reviews, observations made, and data collected by riding both transit systems. In order to provide recommendations for improvement, comparisons were made with transit systems in other nations from literature reviews.

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**The Science of Curl Detection**

Presenter's Name: Alanna Walton
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Gloria Washington
Faculty Advisor's email: gwashington@scs.howard.edu

The most important thing you can do with your curls is to understand them. Determining your curl pattern is a starting point to finding the right products and styles for your hair. Your curl type will help you map out a styling strategy that works for you, taking into account your texture, curl pattern, and porosity. Curl pattern is determined by how evenly the two halves of a hair strand grow. When fiber grows faster on one side and not another, a spiral is formed along the cuticle of the hair strand. Depending on genetics, this can be straight, wavy (C-shaped), curly (S-shaped), or kinky/extremely curly (very tight S shape or Z shape). There is an easy alphanumeric system to identify your type of curl. The numbers 1 through 4 represent the amount of turns formed by hair strands. Number 1 is straight; 4 is extremely curly/kinky. The lowercase letters a through c determine the texture and sub-group of each curl type. The letter a denotes a finer hair texture; b is medium; c, thick. Computer vision researchers use image processing techniques to recognize physical characteristics unique to humans. This project will identify through computer vision techniques, the curl types of curly or coarse textures. Such physical characteristics will be captured through images taken of an individual and pictures of their hair. The purpose of this research is to examine if computer vision can be used to produce customized hair care cosmetics.

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**Artificial Intelligence to Improve Scoring Functions for Structure-based Drug Discovery**

Presenter's Name: Simon Wang
Classification: Senior Faculty
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Simon Wang
Faculty Advisor's email: x.simon.wang@gmail.com

Artificial Intelligence (AI) has experienced resurgence in recent years with concurrent advances in computer power, large amounts of data, and theoretical understanding. It helped solve many challenging problems in computer science, thus we expect it can improve current scoring functions to accurately predict binding affinity. The scoring functions can make mistake not only on score but also the rank of pose decoys/native-like poses as well as the differentiation of binding decoys/true binders, which result in their limited ligand enrichment (i.e. screening power). To improve hit rate in real-world compound screening, it is necessary to integrate powerful AI techniques to boost the accuracy of current scoring functions, in particular the power of enriching ligands of diverse scaffolds at the top of the rank-ordered list. Previously, we developed binary pose filters (PFs) using knowledge derived from the protein-ligand interface of single X-ray structure of specific target. This novel approach had been validated as an effective way to improve ligand enrichment. The add-on of PFs has consistently improved ligand enrichment of force field-based scoring functions. This type of knowledge-based PFs had also been evaluated during CSAR 2013/2014 benchmark exercise and it succeeded in native-like pose identification. Continuing from it, we incorporated protein flexibility from multiple crystal structures of the same target to build PF ensemble (PFE) with the aid of ensemble machine learning. Our results so far proved that the incorporation of knowledge from diverse protein-ligand interfaces by ensemble learning is able to enhance the screening competence of SBVS scoring functions.

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**Safe Space: Using Gamification to Provide Medical Recommendations for Sickle Cell Patients in Preadolescence**

Presenter's Name: Candace Williams
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Gloria Washington

Faculty Advisor's email: gwashington@scs.howard.edu

This study investigates implicit data collection through gamification to provide tailored recommendations for a preadolescence Sickle Cell treatment plan. Explicit data collection through formal data entry, such as search queries or polls, limit the amount of personalization in user experiences online and in mobile applications. The goal of the study is to use nonverbal communication through games to teach the Safe Space application a patient's habits and determine needs without explicitly asking. The experiment is to track trends from preadolescentes to determine adjustments to the application in the categories of: game effectiveness, recommendation accuracy, and design inclusiveness. Although this study is in its early stages, the discussion between the software developing team, Safe Space application artists, the Affective Biometrics Lab at Howard University, and the Sickle Cell patients at the Children's National Medical Center has increased the effectiveness of application design and reception. A major trend in inclusive applications such as this is the need for normality. The goal of this application is to not create emotional isolation for those who have chronic illness. An application that is more explicit can make a child, specifically in preadolescence feel inadequate, different, or shame for having an illness. By using gamification, there is an increased incentive to continue to use the Safe Space mobile application while providing normalcy, because the application is perceived as just a game. In conclusion, gamification is proving to be an excellent method of Human Computer Interaction to increase the learning of computers and develop more inclusive applications.

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**Datamining Uncomfortable Conversations on Social Media: Investigation of Microaggressions in Tweets**

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

Communications between humans are not always positive; sometimes humans intentionally and unintentionally speak microaggressions. Microaggressions are hostile, negative, derogatory slights that commonly occur in human interactions. Examples include "you're very articulate", "no where are you really from", "you're a credit to your race", and "you're pretty for a dark-skin person". Today's global society allows humans to show what they believe is socially acceptable; even if it is racist, misogynistic, or offensive. Social media platforms like Facebook, Twitter, and Instagram allow microaggressions commonly experienced in one-off situations to linger and sometimes "go viral". Studies performed by NYU and the Center for Health Journalism show that common exposure to microaggressions can have a negative impact on mental health. This research analyzes the occurrence and prevalence of microaggressions found in twitter conversations, statuses, and updates. Activities performed on this research include 1) creation of data mining software to create a tweet dataset and 2) analysis of microaggressions in tweet data. This research tests if tweets containing negative language and slights are increasing or decreasing according to popular events or activities that occur in U.S. society (i.e. Black History Month, Women's History Month.) The Twitter Application Programming Interface was used to search thousands of tweets for common microaggression phases and for downloading the tweets. Tweet data was collected for February each day and for half of March. Results from this work show that microaggressions occur frequently in tweet data. Future use of this work includes helping to identify cyberbullying.

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**Temperature-dependent Raman Spectroscopy of Doped and Undoped Topological Insulators**

Presenter's Name: Pheona Williams
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Topological insulators, materials whose bulk interior is insulating but have an unusual two-dimensional electronic state at the surface, represent a new class of quantum materials now being intensively investigated. The objective of this work was to study how the **i**ntroduction of magnetic dopants affect the Raman response of topological insulator thin films in terms of spectral peak position and linewidth. We performed temperature dependent Raman spectroscopy

on 8nm thick doped and undoped samples of capped Bi2Te3 thin films grown by molecular beam epitaxy. The dopants used were Cr and V at 2% and 4% replacement of Bi. We describe the effect of this doping on the position, and full width at half maximum of the observed thin film spectra. From the analysis of the temperature dependent Raman response, we suggest that this behavior can be understood in terms of doping-induced strain. This study revealed information about the lattice dynamical properties of Bi2Te3; in particular, how these properties evolve with the manipulation of metallic and transition metallic atoms in the topological insulator lattice.

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**The comparable effects of anti-gravity in resistance training to gravity bound resistance training**

Presenter's Name: Tia Williams
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Catherine Quinlan
Faculty Advisor's email: catherine.quinlan@howard.edu

The goal of this research is to address effects of exercise equipment accessible to crew members of the International Space Station (ISS) on muscle health in comparison to the effects of those same elements on Earth to encourage facilitators of exercise facilities to consider more effective equipment. What are the comparable effects of muscle health of crew members of the ISS to the findings of those elements operated on Earth? Is gravity the defining factor for equipment performance and efficiency? Data collection consists of using secondary data to examine the findings in bed rest studies that simulate antigravity conditions and secondary data that report the results of exercise studies in microgravity conditions on the ISS. Preliminary findings show that effects of exercise equipment accessible to crew members of the International Space Station (ISS) can produce results suggesting anti-gravity forces are more effective operated in conjunction with an established routine of resistance training and can result in a greater increase in muscle volume and muscle strength than standard equipment in gravity bound settings. Astronauts and those who are working and living in space are put through rigorous endurance tests to ensure they can withstand anti-gravity conditions. Studies suggest resistance training is most effective in space due to the long terms of confinement and stringent schedule required to be maintained by those aboard. The results of documented tests and trials advocate a need to review the products used at the ISS for exercise and physical health for consideration in gravity bound facilities.

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**Tunable optical activity in ultrathin and highly flexible terahertz metasurfaces**

Presenter's Name: Riad Yahiaoui
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Other
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Searles
Faculty Advisor's email: thomas.searles@howard.edu

Coauthors: Sirak Mekonen, Thomas Searles

Manipulating the polarization of light is an important tool for the realization of new photonic devices required to meet today's high demands for faster and higher bandwidth optical communications. In this work, we investigated a single layer, ultrathin and highly flexible metamaterial (MM) structure that exhibits a giant and broadband cross-polarized transmission in the terahertz (THz) frequency regime. The MM is comprised of an array of 2D metallic two gap adjacent split ring resonators (SRRs) deposited periodically on the top side of a 50-μm-thick polymer film. The amplitude and bandwidth of the cross-polarized transmission window can be tuned by judiciously adjusting the structural geometry of the designed metamolecules. In addition, the optimized structure allows for a huge optical activity and a bidirectional nearly pure circular polarizer functionality. Beyond its low-cost and simplicity of fabrication, our proposed MM offers substantial advantages over previous works due to the use of a simple topology that strongly relaxes the constraints set by MMs in the visible domain. Our study is an important step forward in developing novel compact, passive and active conformal and integrated THz meta-devices for polarization control applications.

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**A study of the energy capacity of lithium iron phosphate batteries versus the addition of varied weight percentages of graphene oxide**

Presenter's Name: Sharah Yasharahla
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Quinton Williams
Faculty Advisor's email: quinton.williams@howard.edu

Research has shown that adding graphene(G) to Lithium Iron Phosphate(LFP) batteries can improve performance. This improvement has been demonstrated with LFP/G composites delivering an initial discharge capacity of 160mAhg-1 at 0.2C, which is comparable to pristine LFP capacity of 170 mAhg-1. Our research is focused on exploring the addition of low weight percentages (0.25 - 5wt%) of graphene to LFP cathodes. Initial results show slightly larger specific capacity in batteries where 2wt% of graphene is added to LFP cathode material. In contrast, batteries with 0.25 wt% and 0.5 wt% of graphene added to the LFP cathode material had similar specific capacities in comparison with batteries made with pristine cathode material. Currently, our experimental investigations are focused on LFP battery specific capacity versus the addition of low wt% of graphene oxide within the range of 2 - 5wt%.

# Social Sciences

**A Brief Mindfulness Induction May Reduce Impersonal Moral Judgment Extremity Through Moral Decision Seriousness**

Presenter's Name: Imer Arnautovic
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Lloyd Sloan
Faculty Advisor's email: lsloan@howard.edu

Coauthors: Lloyd Sloan

**Background:** Dual-process morality suggests that individuals endorse utilitarian action more in impersonal moral dilemmas that involve low (versus high) automatic/affective and cognitive conflict (Greene et al., 2004, 2001). The mindfulness literature suggests that brief mindful breathing inductions may reduce negative cognitions (Kiken & Shook, 2014), negative affect (Arch & Craske, 2006), and behavior that is habitual (Wenk-Sormaz, 2005) and driven by negative emotions (Long & Christian, 2015). Other work suggests a negative association between judgment extremity and complex mental representations (Linville, 1982). Considering mindful breathing's apparent emotional and cognitive advantages, would a brief mindful breathing induction differentially affect impersonal and personal moral judgment extremity? Whether the seriousness with which individuals make moral decisions was explored as a potential mediator of this effect. **Methods:** 134 undergraduates were randomized to a mindful breathing induction (versus mind-wandering) and made either impersonal or personal moral judgments. **Results:** Compared to mind-wandering participants who showed no differences in dilemma type on extremity, mindful breathing participants were more and less extreme in their personal and impersonal dilemma judgments, respectively. Mindful breathing participants appear to have been less extreme in their impersonal dilemma judgments because they were less serious in their decisions. **Conclusion:** The impact of mindful breathing inductions' impersonal moral judgment extremity may be driven by the seriousness with which moral decisions are made. In addition to previously proposed cognitive (e.g., Hafenbrack et al., 2014) and affective (Arch & Craske, 2006) mindfulness mediators, decision seriousness may serve as a mechanism in the domain of impersonal morality judgment particularly.

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**Help Me! What Black College Students Do When Having Academic Difficulties**

Presenter's Name: Megan Barnes
Classification: Undergraduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Veronica Thomas
Faculty Advisor's email: vthomas@howard.edu

Academic help seeking research is based on a learning and motivational theoretical framework. Studies demonstrate that help seeking is a positive adaptive learning mechanism for students often contributing to college success. However, many students do not seek academic help when needed. Since there is a paucity of research in this important area focusing on Black students attending HBCUs, the present study investigated help seeking behaviors among this population. Participants included 147 juniors and seniors (84% female) attending three HBCUs. Most (81%) reported a G.P.A. of 2.51 and above and their major field of studies varied (45.1% social and behavioral sciences; 37.5% STEM; 17.4% arts and humanities). Students either "agreed for the most part" or "agreed entirely" that professors (a) are helpful when students ask for help (95.1%); (b) treat students with respect when they ask for help (94.4%), and (c) are fair (88.8%). Almost one-third (32.1%) of students indicated that they almost always try do to the work on their own without help from anyone even if they have trouble learning the material in class. Further, most students "strongly agreed" that they are likely to approach the professor for help if he or she seems approachable (66.4%) and appears knowledgeable

about the course content (70.8%). The professor's gender, race/ethnicity, or age was not a major factor in determining whether students would approach the professor for help. Differences by gender, academic discipline, GPA and other characteristics will be discussed.

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**Gender, Power, Intimate Partner Violence and the Faith-Based Community (A Theoretical Analysis of the Social Construction of Gender as it relates to Women Reporting Domestic Intimate Partner Violence to the Black Church) GENDER, POWER, INTIMATE PARTNER VI**

Presenter's Name: Anjerrika Bean
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Terri Adams-Fuller
Faculty Advisor's email: tadams-fuller@howard.edu

The purpose of this study is to examine the response of faith-based communities to intimate partner violence committed against women. The issue of intimate partner violence (IPV) within faith-based communities will be examined through the social construction of gender and power domain framework. This investigation supposes that the social construction of gender framework provides a novel understanding of the phenomenon under examination and offers unique insights into (a) how the incidences of intimate partner violence can be lessened within the faith-based community and; (b) how to better conceptualize the issue so that the faith-based community can adequately address obstacles and barriers in terms of power encountered by Black women who report these incidents to the church. The results indicate that the church plays a vital role in the reporting procedures of intimate partner violence of women. Specifically, for Black women who report IPV to the church because of the historical lack of trust between Black women, the African American community, and authorities, such as; police and social services. Furthermore, because Black women are stratified with lower social class than their white counterparts based on their race, gender, and socio-economic status their experiences with IPV lead to higher lethality rate. Lastly, gender dynamics coupled with power is creating external and internal barriers within the church that are hindering Black women from receiving adequate services needed to address the violence committed against them.

**Aesthetic Orthodontic Treatment Directly Influences Employment Judgments**

Presenter's Name: Milan Benn
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jamie Barden
Faculty Advisor's email: jbarden@howard.edu

Coauthors: Warren B. Scott, Robert K. Mensah, Sana P. Augustus

Numerous articles show that teeth whitening influences a person's perceived attractiveness (Kershaw et al., 2008), and that attractiveness increases hireability (Marlowe et al., 1996), suggesting that aesthetic orthodontic treatment likely does the same. Public health findings indicate that Black children are less likely to receive orthodontic treatment than White children, even when controlling for socioeconomic status (Okunseri et al., 2007). This investigation seeks to establish that unaesthetic malocclusions can decrease hireability for Black job candidates. An orthodontic resident rated a pre-test of 18 Black faces on a clinical scale used to determine eligibility for Medicaid, the IOTN-AC. Clinically unaesthetic teeth decreased the hireability likelihood of the individuals pictured, and also decreased Likert scale ratings of attractiveness and goodness of teeth. An experimental study used real pre- and post-treatment photos of 10 patients to manipulate aesthetic alignment holding facial attractiveness constant. Participants (N=88) provided ratings according to perceived salary, job type, likelihood to interview and hire. Post-treatment teeth showed increased hiring and willingness to interview. Participants were also asked to assign an occupation to each face. Faces with post-treatment teeth were judged to have jobs that paid $7,313 more, according to labor statistics. Future research will explore whether this observed influence of orthodontic treatment on hireability remains consistent across other races of faces.

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**The Mediating Effect of Depression on the Relationship between Trauma and Oppositional Defiant Disorder**

Presenter's Name: Brianna Brower
Classification: Graduate Student
School/College: Arts & Sciences

*Presentation Type: Poster Presentation*
Faculty Advisor: Hope Hill
Faculty Advisor's email: drhopemhillphd@gmail.com

Comparative studies have consistently found that African American youth are overrepresented in economically disadvantaged neighborhoods, which elevates their risk of exposure to adverse community variables that may leave them susceptible to internalizing symptomatology, and poor externalizing behavior (Sanchez, Lambert, Cooley-Strickland, 2012). This study examined the mediating effect of depressive symptomology on the association between exposure to trauma and oppositional defiance in the pathway to offending behavior. Method: This study used an archival data set obtained from The Child Guidance Clinic at the Superior Court of the District of Columbia. 1,481 African American adolescents arrested in the District of Columbia between 2010 and 2014 were administered the Conners CBRS to assess for the presence of emotions, behavior problems and academic disorders in children between six to eighteen years of age. A simple mediation analysis was conducted using techniques based on Hayes (2013) process model in SPSS. **Results**: The results indicated that (i) there was a significant interaction between exposure to trauma and oppositional defiance, and (ii) depressive symptomology significantly plays an intermediary role in the relationship between trauma exposure and oppositional defiant disorder.

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**Support & Optimism in Relation to Depressive Symptoms**

Presenter's Name: Claudia Byer-Tyre
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jules Harrell
Faculty Advisor's email: jharrell@howard.edu

Coauthors: Christian Mallett, Jules Harrell, Alfonso Campbell, Clive Callendar

A study of 86 patients with end stage renal disease (ESRD) found that social support was associated with reduced depression and increased optimism (Symister & Friend, 2003). In a sample of 149 Italian middle school students, optimism was a significant predictor of parental support (Sumer, Giannotti, & Settanni, 2009).These authors also reported that parental support and optimism were negative predictors of depression. The present study examined the relationship between optimism, support, and depression in 54 African American adults. Though none of the participants were suffering ESRD, many of the participants were at risk of developing this disease. Three dimensions of support were assessed: support appraisal, support self-esteem, and tangible support. Depressive symptoms were collected through the NEO-PI measure of the Five-factor personality model. Correlational analyses revealed significant negative relationships between depression and support appraisal (r= -.287), support self-esteem (r= -.397), and tangible support (r= -.417). There was also a significant negative relationship between depression and optimism (r= -.459). These correlations were significant at a 0.01 level. They suggest that social support and optimism are negative predictors of depression in African American adults. Our findings contrast with those reported in the study of adolescents, in that the present study found no significant correlation between optimism and support appraisal (r= .045), support self-esteem (r= .190) or tangible support (r=.202). The next research step will be to perform an ordinary least squares regression mediational analysis to determine if in the present data, optimism acts as a mediator between social support and depression.

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**"Like animals, they lock us in cages!": Portrayals of the Criminal Justice System in Southern Gangsta Rap**

Presenter's Name: Akiv Dawson
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Vernetta Young
Faculty Advisor's email: vyoung@howard.edu

Rap/ Hip-Hop is widely-received as a form of Black cultural expression. In the last twenty years, the academy has shown a growing interest in studying the genre. The limited research that exists on Southern hip-hop has focused on the totality of Southern rap music, rather than the distinctions between different types of rap that characterized the region. Understanding that rap is spatially unique, I contend that Southern gangsta rap offers a different perspective of being Black in the South. I consider how historic, cultural, structural, and material conditions of Southern Black people in America have given rise to language that normalizes

negative encounters with the criminal justice system.This paper is a mixed-methodology content analysis of Southern gangsta rap. The data collection was based on a probability sample of 730 songs from 14 Southern artists and 98 albums. The time span for the music was 1991-2016. The primary analysis used hierarchical linear regression to examine the relationship between the independent variables "part of the hood experience", "code of the streets", an artist's felony status, time frame, and state and if these variables contribute to negative portrayals of the criminal justice system. The secondary analysis used qualitative thematic analysis to explore the criminal justice themes in lyrics from 246 songs that contained a criminal justice variable. The findings, themes, and limitations are discussed.

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**Faith and the Future of Sustainable Peace in Nigeria**

Presenter's Name: Canice Enyiaka
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Alem Hailu
Faculty Advisor's email: alemhailu@att.net

The problem of conflict and violence has bedeviled Nigeria for decades. The research explores the role of faith in advancing sustainable peace in Nigeria. Shortly after independence in 1960, the country was confronted by bloody conflicts which culminated in a civil war that caused more than one million deaths. Since then, deadly conflicts have continued to punctuate the history of the nation. Violence perpetuated by communal or extremist groups as the Boko Haram has exacted not just a heavy economic toll but also inflicted great damage on the moral and social fabric of society. Such movements claiming religious authority have tried to prosecute their agendas of war and terror. An in-depth scrutiny of their claims and practices clearly reveals larger truths and realities; however. An alternate conceptual framework of faith based on traditions of tolerance as a basis for sustainable peace was hypothesized as offering a better explanation. Accordingly, qualitative research involving surveys, interviews and field work engagements confirmed the thesis that faith and spiritual values that have served communities for centuries still hold promises for conflict transformation and the institution of sustainable peace. Conclusions drawn from the wisdom and experiences of faith leaders, constituencies involved in finding answers to this challenge and documented insights on how the forces of spiritualism and humane traditions of tolerance and interdependence can be harnessed for durable peace are vital for the future of Nigeria. The study has significance for Nigeria and the world.

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**Guardian Willingness to Access Child and Adolescent Care in Ibadan, Nigeria**

Presenter's Name: Haley Ferguson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ezer Kang
Faculty Advisor's email: ezer.kang@howard.edu

Understanding the utilization of child and adolescent mental health care (CAMH) in lower-middle income countries, such as Nigeria, necessitates examining the motivation and willingness of guardians to engage their children in accessible mental health services as needed. To address this, a research team from the University of Ibadan (UI) and Howard University developed the CAMH Help Seeking Model for guardians in Nigeria, which is a conceptual framework that examines how socio-cultural and individual factors interact to influence guardians' willingness to use accessible CAMH services for their children. This model was drawn from CAMH studies in Nigeria and the collective clinical expertise of Nigerian psychiatrists on the research team. In addition, several focus group discussions were conducted with families who live within 5 km from a Child-Adolescent MH clinic at the UI. Individual interviews were also conducted to assess the validity of the quantitative surveys used to test the CAMH Help Seeking Model. Findings indicated cultural beliefs about the etiology of CAMH problems, which included spiritual forces and poverty-related stressors. A preference was found for seeking MH treatment from traditional healers, but participants were receptive to consulting with mental health care providers if medical treatment was required. Overall understanding of the factors that influence guardians' recognition of possible MH problems in their children and their willingness to utilize accessible services will provide critical direction for the development of theoretically driven and locally based interventions that optimize CAMH care in regions where MH services remain underutilized.

**Examining Stressful Life Events, Socioeconomic Status, and Anxiety Among Urban Adolescents**

Presenter's Name: Kelly Garrett
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: GiShawn Mance
Faculty Advisor's email: gishawn.mance@howard.edu

Coauthors: GiShawn Mance

**Background**: Stressful life events are often studied as predictors in the development of anxiety in children and adolescents. Although past research has established connections between stressful life events and anxiety, there remains much to be learned about the influence of socioeconomic status on adolescents' exposure to stressful life experiences in an urban environment. The current study addresses this gap through the following aims: 1) to determine the extent to which stressful life experiences are associated with anxiety in ethnically diverse urban adolescents; and 2) to explore the extent to which the association between stressful life events and anxiety is moderated by socioeconomic status. **Methods**: Participants included 267 ethnically and socioeconomically diverse adolescents who were part of a larger multiple-cohort study. Aspects of stressful life events were assessed by the Urban Adolescent Life Experiences Scale (UALES; Allison et al., 1999) and anxiety was measured by the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2; C. R. Reynolds & B. O. Richmond, 2008). Family socioeconomic status was assessed by self-report questionnaires completed by adolescents and parents. **Results**: This study uses correlations to examine relationships between stressful life events and anxiety in urban adolescents. Linear regressions are also used to investigate the moderating effects of socioeconomic status on the relationship between stressful life experiences and anxiety. **Conclusions:** Findings from this study have implications for the conceptualization of stressful life events and socioeconomic status as predictors of anxiety in urban youth.

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**Doing their jobs: The persistence of women journalists in the face of danger**

Presenter's Name: Jasmin Goodman
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Carolyn Byerly
Faculty Advisor's email: cbyerly@howard.edu

Coauthors: Carolyn Byerly

Violence against women journalists is a pervasive problem across the world that has yet to be quantified, analyzed or theorized in a systematic way. Although organizations committed to freedom of expression, including human rights groups, are actively tracking violent encounters by reporters, gender is rarely a variable systematically explored. Using a critical feminist framework, this study sought to quantify the instances of gendered violence against journalists, as well as how those victimized responded to threats and attacks. The study relies on published reports, academic databases such as LexisNexis, and data available from watch grups, such as the Committee to Protect Journalists. This paper presents a summary of what has been learned to date from an ongoing inquiry into both well-known and lesser-known cases of violence against women journalists who are victimized while doing their jobs as reporters. Preliminary findings provide insight into 108 instances of women journalists attacked or murdered from 1992 to present.

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**Investigating the Impact of W.E.B Du Bois' Initial Expectations for the Talented Tenth Among Black Millennials**

Presenter's Name: Kenya Goods
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Marie Jipguep-Akhtar
Faculty Advisor's email: mjipguep-akhtar@howard.edu

In American society, success is typically measured by one's ability to improve their socioeconomic status, material conditions, and class positioning. While it is assumed by many and further propagated through the ideology of the American Dream that anyone can be successful in America, the historical processes that comprise the black American experience provide evidence to the contrary. Recognizing such, W.E.B. Du Bois placed a call to action for those who had the opportunity to become educated – a key factor

for social mobility – stating that they should share their knowledge and skills with the mass black population. Implementing a qualitative approach, this study aims to investigate whether or not Du Bois' call to action for the Talented Tenth is adhered to in modern times, specifically among college-educated Black Millennials. Preliminary findings suggest that the call to action still holds relevance in today's society, is perhaps romanticized, and impacts how the individual perceives theirs and others' philanthropic or service contributions to marginalized communities.

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**The New Studio**: **The Application of a Field Studio in a Disadvantaged Community**

Presenter's Name: Natasha Graves
Classification: Undergraduate Student
School/College: Engineering & Architecture
*Presentation Type: Poster Presentation*
Faculty Advisor: Nea Maloo
Faculty Advisor's email: neamaloo@gmail.com

This thesis is an investigation on an in need community in Dallas, Texas and the role that a University field studio can play in order to balance the inequality present in the local secondary education facility. Education in Dallas is representative of the depressing achievement gap present between the disadvantaged and the privileged, often times only being divided by intangible city zoning districts. Those negatively affected are subjected to lower quality education in conjunction with poor infrastructure and predisposed to negative social environments. While there are an abundance of design-build studios, there lacks a project that functions on a successive basis for these in need areas. My studies will look to understand and develop how University Architecture students have the opportunity to improve the physical experience of students, but also how the connection can foster a place for further development of the adjacent community. This project will discover opportunities to utilize architecture in a way that will facilitate an expansion in the local economy of this impoverished region through the creation of necessary additions to the existing fabric. Creating a space dedicated for architecture students to learn and build in their immediate environment will serve as a catalyst for the secondary students to immerse themselves within the world of architecture - which includes creative as well as technical outlets for self-expressionism - in the hopes of it acting as a deterrent for other outside social influences.

**Globalization of South Africa's Economy**

Presenter's Name: Kiyana Grimes
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Mika Kato
Faculty Advisor's email: mkato@howard.edu

South Africa joined Brazil, Russia, India, and China as one of the world's major emerging national economies. The purpose of this study is to explore the transformation of South Africa's foreign economic policy from a historical, political framework. Although South Africa and European countries like Britain and Holland are linked because of their historical links, South Africa has building relationships with other economies like the United States, Japan, and China. Because South Africa has also become a recipient of foreign direct investment and negotiated various bilateral trade agreements, the paper will study the economic impact of these policies on South Africans. The paper will also include a case study that evaluates the effectiveness of bilateral trade agreements between South Africa and China.

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**Inter-Media Agenda Setting Effects: The Case of #BlackLivesMatter, Black-ish and Network TV News**

Presenter's Name: Natalie Hopkinson
Classification: Senior Faculty
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Natalie Hopkinson
Faculty Advisor's email: natalie.hopkinson@howard.edu

Coauthors: Sharifa Simon-Roberts
The research explores ways in which topics discussed in entertainment media transfer to television news coverage and conversations on Twitter. Looking at "Hope" -- the episode of Black-ish that aired on February 24, 2016 -- the research examines the manner in which the episode handled issues such as Black Lives Matter and police brutality. There appears to be limited research on entertainment programming setting the agenda for traditional and social media. To determine the influence of the episode on television news coverage, the research looks at February 21, 2016 to February 27, 2016 -- three days before, the day of,

and three days after the broadcast of "Hope." The researchers also observed one nightly news broadcast on each of the four commercial broadcast networks for the seven-day period to undercover how they addressed stories tied to Black Lives Matter and police brutality. Similar to the method used to understand television news coverage, the researchers focused on tweets created between February 21, 2016 and February 27, 2016, which included the hashtags #BlackLivesMatter or #BLM. The researchers also examined viewers' reactions to "Hope" by looking at tweets created three hours before and after the broadcast of "Hope" and which used the hashtag #Blackish or # BlackishABC. The findings suggest that inter-media agenda setting was present. It is a phenomenon worthy of further investigation and a topic about which media scholars are learning more. In this study, it can be traced through the datasets.

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**Managing Migration in the Age of Globalization**

Presenter's Name: Marcy Jagdeo
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: William Spriggs
Faculty Advisor's email: wspriggs@howard.edu

According to the United Nations Department of Economic and Social Affairs (2013), emigration rates to OECD countries are higher than ever before. A number of Caribbean countries are listed amongst those with the highest emigration rates in the world with mass exodus of professionals, particularly skilled women in health and education. Such loss of human capital has adverse effects on the economies of developing countries. Many studies have focused on the impact of immigration on developed economies and policies, which have been used to reduced or attract immigrants. The purpose of this study is to examine policies of developing countries, which may be used to manage emigration rates. The study will measure the impact the Caribbean Single Market and Economy (CSME) Free Labor Movement policy and its effect on skilled emigration rates to the United States. To estimate its impact, the study uses data from the Department of Homeland Security and U.S. Census Bureau. The results of the study indicate the policy is ineffective in retaining human capital in the region. Although, the policy provides opportunities for intra-regional migration, the movement of labor to the United States has remained constant and increasing in some cases. The results of the study suggest that policy may be more attractive to less skilled workers.

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**"Sister, Remember Your Name:" Male-female Relationships, Social Institutions, and Black Women in Alice Walker's The Color Purple**

Presenter's Name: Arelia Johnson
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Marie Jipguep- Akhtar
Faculty Advisor's email: mjipguep-akhtar@howard.edu

This study examines the dynamics of social institutions and their impacts on male-female relationships of black women in Alice Walker's The Color Purple. Historically, black sexuality has been distinguished from white (human) sexuality despite sexual actors encompassing similar acts, thoughts, desires, fantasies, and responses. This research required a triangulated theoretical approach to fully analyze the data, to articulate the subject matter, and uses a qualitative thematic analysis. Three themes emerged from twenty-one emergent codes: I can't even trust God, Love is freedom, and Fucking is not for me.

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**Afrofuturism in Reality?: Capitalism, Globalism, and the Future of Technological Advancements in Africa**

Presenter's Name: Denise Johnson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Alem Hailu
Faculty Advisor's email: ahailu@howard.edu

Often, Africa is excluded from the narrative of the development of scientific technological advancements, and discredited for its contributions to the modern world. Though it's the birthplace of humanity, a good portion of Africa doesn't have access to drinking water, and many perish from curable diseases eradicated in West. A large percent of African nations are categorized as "third-world,"

accepting humanitarian aid. Also referred to as "developing" nations, many African nations such as the Congo are far less advanced in terms of technological advancements like infrastructure, life-saving medical technology, and energy production in comparison to countries like the United States. Still, the natural wealth of the continent sustains capitalism. Positively, the Industrial Revolution of the eighteenth and nineteenth centuries would have been impossible without African resources. In turn, capitalism impoverishes these nations. How can Africa elevate itself using the abundance of scientific thinkers and natural resources and rewrite its narrative? Is it possible that Africa could in the future become a self-sustaining model for the rest of the world? The goal of this research is to examine the factors (both internal and external) that have hindered Africa's scientific progress and to identify and investigate current threats to the continent's growth. This research projects aims to highlight ways that Africa supports the global technological economy and ways the continent is gradually overcoming "third-world" status to realize its scientific wealth. From there, it may be possible to begin to imagine a future where Africa leads the world in technology.

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**Relationship between Adverse Childhood Experiences and Environmental Mastery**

Presenter's Name: Omri Johnson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jules Harrell
Faculty Advisor's email: jharrell@howard.edu

Coauthors: Christian Mallett

Previous studies have established a relationship between adverse childhood experiences (ACEs) and well-being. Balistreri and Alvira-Hammond (2016) found adolescents with higher ACE scores had worse well-being scores than adolescents with fewer ACEs. Corcoran and McNulty (2018) found that the ACE score correlated positively with psychological distress, but negatively with subjective well-being. The present study seeks to establish the relationship between adverse childhood experiences and environmental mastery. Seventy-three Howard University undergraduates, ranging in age from 18 to 25 years old (M = 19.27, SD = 1.47), participated in the study. Sixty-three percent of the sample identified as female. Participants completed consent forms, the Adverse Childhood Experiences Scale (M = 2.10, SD = 1.88), and the Ryff Scales of Well-Being - Environmental Mastery subscale (M = 37.64, SD = 7.47, $\alpha$ = .76). A Pearson's R correlation analysis found a significant inverse correlation between adverse childhood experience prevalence and environmental mastery, $r(71) = -0.33$, $p < 0.01$. These findings suggest that the more adverse childhood events one experiences, the more likely they are to have less mastery over their environment.

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**Quality of Life, Patient Satisfaction, and Psychological Distress in Women with Hormone Receptor Positive (HR+) Breast Cancer**

Presenter's Name: Arshdeep Kaur
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Teletia Taylor
Faculty Advisor's email: t_r_taylor@Howard.edu

Coauthors: Teletia Taylor, Vanessa Sheppard, Alejandra Hurtado de Mendoza

**Background**: Hormone-Receptor-Positive Breast Cancer (HRPBC) is a form of cancer in which receptors for cancer cells receive signals from estrogen or progesterone that promote their growth. After receiving primary therapy, patients receive adjuvant endocrine therapy to help prevent return of cancer by lowering the amount of estrogen and/or progesterone in the body or blocking the hormones from attaching to cancer cells. However, these therapies have side effects that can affect patient-rated quality of life (QoL). Patients who report optimal treatment satisfaction from their patient/physician relationships may exhibit greater QoL. A potential mechanism explaining the relationship between patient satisfaction and QoL is psychological distress. That is, optimal patient satisfaction could foster less psychological distress and therefore promote optimal QoL. The relationship between patient satisfaction and QoL and the mediating effect of psychological distress has not been explored in HRPBC patients. **Purpose:** This study aimed to examine QoL in HRPBC patients, the impact of patient satisfaction on QoL, and psychological distress as mediating

the patient satisfaction and QoL relationship. **Method**: Data analysis recently concluded. Eligible participants were women with HRP invasive breast cancer, > 21 years of age, fluent in English, initiated adjuvant hormonal therapy within 12 months of diagnosis and had non-metastatic cancer. An online and in-person survey study was conducted to assess QoL, patient satisfaction and psychological distress. **Expected Results**: It is expected that increased levels of patient satisfaction will be related to higher levels of QoL.

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**Psychosocial Differences in College Experiences: HBCU vs. PWI**

Presenter's Name: Stacia King
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Debra Roberts
Faculty Advisor's email: ddroberts@howard.edu

A recent Gallup poll from Purdue University suggests that Black students who attended Historically Black Colleges or Universities (HBCUs) were more likely to feel supported while in college and reported being more engaged in work after graduation compared to their peers who attended Predominantly White Institutions (PWIs). However, much conversation is had in the academic and non-academic world questioning the necessity, importance, and significance of Historically Black Colleges or Universities. Therefore, this study seeks to identify the potential differences in psychosocial variables among students currently attending PWIs versus those at HBCUs. Differences in cultural, racial, and ethnic identity, as well as self-esteem and self-efficacy between the two groups will be explored. Participants include approximately 75 students who self-identify as Black (of African descent) and currently attend a PWI or HBCU. Based on preliminary results it is expected that students will differ in scores on measures of cultural, racial and ethnic identity. It is also hypothesized that the relationship between these variables, self-esteem and self-efficacy will differ by type of institution. Results will add to the sparse literature that aims to enhance our understanding of the perceived environmental value of attending a HBCU compared to a PWI, and the impact of that experience on developmental outcomes such as self-esteem and self-efficacy.

**Predictors of Attitudes Toward Legal Authorities and Satisfaction with Outcome of Their Case Among Juvenile Offenders in Residential Settings**

Presenter's Name: Karen Kolivoski
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Social Work
*Presentation Type: Oral Presentation*
Faculty Advisor: Karen Kolivoski
Faculty Advisor's email: karen.kolivoski@howard.edu

Coauthors: Jeffrey Shook, Sara Goodkind

**Background and Purpose:** How youths view fairness of treatment from authorities during legal proceedings (i.e., procedural justice) and outcomes of their delinquency cases are important factors for how one develops beliefs in the law/legal system (i.e., legal socialization). A youth's perceptions of treatment from the legal system may vary between the legal actors that one encounters (e.g., police, judge, and lawyer). However, few studies consider both process-related variables and outcome-related variables related to a youth's court case. Thus, this study's purpose was to examine predictors of legal socialization and case outcome satisfaction when considering procedural justice and individual legal actors among youth with deep-end juvenile justice involvement. **Methods**: The sample included 14–19-year-old youth (N = 253) in two private, non-profit long-term residential facilities for juvenile offenders. Data collection occurred through structured one-on-one interviews using Computer-Assisted Survey Interview (CASI) techniques. Regression analyses examined predictors of case satisfaction and legal socialization when considering procedural justice. **Results**: Procedural justice significantly predicted case satisfaction and legal socialization. Youths' perceptions of experiences with a judge ($p < .001$) and their lawyer ($p < .01$) were significant for case satisfaction, but not police. Police ($p < .01$) and lawyer were significant ($p < .001$) for legal socialization. **Conclusions and Implications:** Results indicate that both case process and outcome are important to juveniles. Also, differences exist between perceptions of interactions with different legal authorities. This supports that the components of procedural justice (e.g., neutrality, helpfulness, respect) remain important even when accounting for case outcome satisfaction.

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**Evaluating the Effects of Race and Class in Law Enforcement Policy Change in Ferguson, Missouri**

Presenter's Name: Elton Levingston
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Keneshia Grant
Faculty Advisor's email: keneshia.grant@Howard.edu

Several scholars have documented the need for policy change to occur in concert with demographic change; however, this was not the case in Ferguson, Missouri when law enforcement policy changed. In 1970, the city's population was 99% white, 1% Black, and mostly middle-class. The demographics shifted to a working-class population that was 67% Black and 29% white by 2010. While Ferguson's residential population became predominantly Black working class, its white middle-class city bureaucracy and elected leaders remained. This study aims to examine the impact that race and class differences between residents and policy decision-makers have on policy changes in law enforcement. More specifically, this research investigates whether punctuated equilibrium theory (PET), as it is affected by bounded rationality, policy networks, and disproportionate information processing, can explain policy changes that have resulted in overly aggressive police practices among working-class Black residents in Ferguson. This study will utilize census data, voting records, labor statistics, and government reports to examine whether race and class differences between decision-makers and the residents they serve result in changes to police practices that adversely impact working-class Black residents. The goal of this study is to demonstrate the important implications of race and class in policy change by applying them as critical factors to PET in dynamic ways not yet explored in the existing policy change literature.

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**Mask On, Mask Off: Performance of American Beauty Standards among Second-Generation West African Women**

Presenter's Name: Deja Logan
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Ralph Gomes
Faculty Advisor's email: rgomes@howard.edu

West African women have long been left out of academic conversation regarding beauty and assimilation in the United States. Often, immigrants and their offspring adjust their appearance-based cultural practices to integrate into the normative American society. Physical appearance and attractiveness is a form of privilege that provides upward mobility through better employment options and marital choice. Furthermore, Goffman's theory of presentation of self states that appearance is a mechanism used to present ourselves to others and manipulate their impressions of us. As a result, I believe the beauty practice and body work that women of African descent undergo is an act of performance in efforts to increase their racial and beauty capital. This paper explores how second-generation West African women ages 18-25 engage with American beauty standards and practices, specifically focusing on what beauty means to them, what factors influence their perception of beauty, and how they reconcile American standards with their ethnic standards. Ultimately, I aim to see if and how their beauty standards and choice in practices affect their romantic lives and social mobility. Through semi-structured interviews conducted with second-generation West African female students in New York City, I found that there are detrimental effects on their romantic lives and employment opportunities if they do not perform to the American beauty standard.

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**A Tale of Two Malcolm X Parks: How Gentrification is Shaping Green Spaces in Washington, DC**

Presenter's Name: Judy Lubin
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Judy Lubin
Faculty Advisor's email: judy.m.lubin@howard.edu

While gentrification in Washington, DC has been widely studied, little is known about how neighborhood change is reshaping the cultural and historical significance of parks around the city and activities occurring within them. Through a cooperative agreement with the National Park Service, the Howard University Department of Sociology and Criminology is conducting stakeholder and intercept

interviews, focus groups and a PhotoVoice project, to explore the civil rights histories and issues pertaining to gentrification, crime, environmental justice and the role of socioeconomic factors in shaping park usage patterns at Meridian Hill in Columbia Heights and Parklands/ Shepherd Park in Congress Heights. Both parks are known as "Malcolm X Park" by long-time residents and are in communities in a state of cultural and economic flux that is shaping the expectations of visitors and non-visitors as well as community perception of the significance of the parks. During this presentation, the research team will highlight the strengths and challenges of using community-based participatory research methods and emerging themes from both parks. Preliminary findings suggest that the pressures of gentrification, including a desire among authorities to respond to the demands of stakeholders who may have less attachment to the parks or perceive the presence of marginalized communities such as homeless populations and communities of color with greater suspicion, can lead to divergent perspectives about who and what is allowed to occur in neighborhood parks.

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**Modifying Juvenile and Criminal Justice Programs to the Unique Needs**

Presenter's Name: Courtney Lynch
Classification: Graduate Student
School/College: Social Work
*Presentation Type: Poster Presentation*
Faculty Advisor: Karen Kolivoski
Faculty Advisor's email: karen.kolivoski@howard.edu

Coauthors: Karen Kolivoski

Emerging adulthood, ages 18-25, comprises a distinct developmental period (Arnett, 2000) that is receiving increasing attention in social science research, and is increasingly being applied to criminal justice. Adults in this age range are a vulnerable population because though they make up only 10 percent of the U.S. population, but they account for 29 percent of arrests and 21 percent of admitted adult prisoners (Perker & Chester, 2017). Of all prisoners who engaged in recidivism over a 6 month to 5 year span, those released at age 24 years or younger were the age group with the highest rates of recidivism no matter the amount of time from release to first arrest. For instance, 3 years post release 76 percent of 24 year olds or younger were rearrested, compared to that of 68 percent of all released prisoners (Durose, Cooper, & Snyder, 2014). The contributing factors to emerging adults' extremely high recidivism rates are their lack of fully matured brain development and insufficient social supports tailored to their unique developmental needs. This poster presentation will summarize published literature on current programs and interventions aimed to reduce recidivism specifically for emerging adults. In doing so, the presenters will also examine the most effective and promising juvenile and adult criminal justice programs on reducing recidivism and then make recommendations on how to modify those program designs to better fit emerging adults' needs.

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**Environmental stress and socioeconomic status: Does parent and adolescent stress influence executive functioning in urban youth?**

Presenter's Name: Gishawn A. Mance
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: GiShawn A. Mance
Faculty Advisor's email: gishawn.mance@howard.edu

This study examined whether parental and adolescent stress act as mediators between socio-economic status (SES) and adolescent executive functioning in urban youth. Two hundred and sixty-seven 6th – 11th grade students (ages 11 – 16, 55.4% female; 49.1% Black/African American) attending racially and socioeconomically diverse schools in Chicago, Illinois, completed self-report measures on urban stress and executive functioning. Parents of adolescents completed measures on parental chronic stress and demographic information on the family's socioeconomic status. Results indicated that parent stress was directly related to adolescent stress while adolescent stress was directly related to executive functioning. More specifically, behavior components of executive functioning (i.e., emotion control, set shifting, and inhibition) were assessed. Although parental stress was related to adolescent's ability to shift from one task to another, no relationship was found with adolescent's ability to modulate mood or delay impulsive behaviors. Implications for socio-ecological mental health interventions for youth residing in urban environments are discussed.

**Help-Seeking and Self-Efficacy in Black Female Students at Historically Black Colleges and Universities**

Presenter's Name: Chloe Martin
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Veronica Thomas
Faculty Advisor's email: vthomas@howard.edu

Coauthors: Faun Rockcliffe, Veronica Thomas

**Background**: Students of color are less likely to persist in education in comparison to their White counterparts. Fortunately, Historically Black Colleges and Universities (HBCUs) provide an environment for Black female students that is conducive to academic achievement. Students' behaviors, perceptions, and beliefs contribute to their success in the HBCU environment. Academic help-seeking behaviors and self-efficacy beliefs are personal factors demonstrated to be associated with high academic performance in college students. Further, studies of ethnic majority populations indicate that academic help seeking behavior is influenced by the perceived threat to one's self-esteem or ego orientation. Understanding academic help seeking and other factors influencing academic achievement in Black female college students attending HBCUs could be particularly useful. **Purpose**: The purpose of this study was to determine if self-efficacy serves as a moderator in the relationship between academic help-seeking and academic performance in Black female students attending HBCUs. **Method:** This study employed a cross-sectional survey research design. One hundred eighteen (N=118) Black female junior and senior college students enrolled at HBCUs in the mid-Atlantic and northeastern regions of the US were asked to complete an online questionnaire assessing academic self-efficacy beliefs, academic help-seeking, and academic performance through Survey Monkey. **Results**: Academic help-seeking is a predictor of high academic performance ($\beta$= .4850, p= .0139), and self-efficacy serves as a moderator in this relationship ($\beta$= -.0774, p= .0400). **Conclusion**: These results suggest that academic help-seeking can lead to greater academic performance for Black female students who have a low sense of self-efficacy.

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**Chronological versus Cognitive Age: How it Impacts Criminal Justice System's Decision to Trial Low-SES Youth of Color as Adults**

Presenter's Name: Danielle Mondesir
Classification: Undergraduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Shameka Stanford
Faculty Advisor's email: shameka.n.johnson@howard.edu

In the United States, there are over 8,300 young adults within the criminal justice system serving a sentence of life with the possibility of parole after a minimum of 40 years (American Civil Liberties Union Foundation, 2006). Conversely, in Tennessee, individuals serving a sentence of life are required to serve a minimum of 25 full calendar years before being eligible for parole. These requirements across the United States are enforced and upheld despite the current or at the time of the crime communicative and cognitive abilities of the individual. This primarily affects juvenile African-Americans from Low-SES backgrounds who do not have readily access to communication disorders treatment and intervention. Forty-three percent of young African-Americans are currently serving life without parole sentences, in comparison to twenty-three percent of like age peers who identify as white (Rovner, J., 2014). For example, Cyntoia Brown, an African American female, at the age of sixteen was sentenced to serve life without eligibility for parole until the age of 67 in the state of Tennessee. However, analysis of her history has demonstrated the presence of communicative and cognitive disorders not taken into account during her trial. Therefore, the purpose of this presentation is to present and discuss how the effects of Communicative and Cognitive Disorders may impact the criminal justice system's decision to trial children as adults. Arguing that chronological and cognitive age differences are important to take into account via a Case Study analyzing the Cyntoia Brown Case (2004).

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**Policing Inside Out**: **Experiential Learning and Transformation Among Law Enforcement and Black Student Citizens at Howard University**

Presenter's Name: Bahiyyah Muhammad
Classification: Junior Faculty/ Lecturer/ Instructor

School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Bahiyyah Muhammad
Faculty Advisor's email: bahiyyah.muhammad@howard.edu

This research study provides background information about the Policing Inside Out program at Howard University. This study will identify course components, process and outcomes. Study findings highlight major and minor transformations among students and officers, longitudinally across three semesters, beginning Fall 2016 and commencing Spring 2018. explore emergent themes among three cohorts of students. The course structure is flexible and has the ability to meet in various locations, including, IACP, Howard University, local police stations, and in community settings. Students are encouraged to participate in ride-along with law enforcement to add to course discussions. In addition, participants are encouraged to attend field trips to the following locations: (1) National Law Enforcement Museum and (2) National Museum of African American History and Culture. This course seeks partnership with IACP Institute for Community-Police Relations because the institute is uniquely positioned to:

- Pilot innovative approaches to build community-police trust.
- Facilitate citizen-police dialogue to improve trust.

The proposed course has the potential to advance the dialogue and practices around 21st century policing and change the rhetoric surrounding the community-police relations. Study findings show short term and long term transformation among both students and officers.

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**Etymology in Nomenclature: Call Me By My Name**

Presenter's Name: Judayah Murray
Classification: Undergraduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Kehbuma Langmia
Faculty Advisor's email: klangmia@howard.edu

As a result of reported instances of discrimination in the workplace, specifically in the United States of America, the researcher has chosen to open a study examining the probability that perceived ethnicity based upon names plays a role in whether a job application will get a callback or not. This research was conducted as a quantitative study in which 20-question surveys were filled out by a random sample of 133 people between the ages of 18-24 and 35-50. Based on the results of the study, the researcher concluded that while discrimination does indeed occur in the workplace, and sometimes by name, the phenomenon is more of a assumed or perceived issue. 94.7% of participants believe that people with names that insinuate their ethnicity have a difficult time getting hired, but only 42.1% of participants said that this type of discrimination has ever happen to them. It can be inferred, then, that perhaps people assume this issue occurs more often in society than it actually does. So could a name cost a person the opportunity of a job, yes, but not nearly at the rate that we might think.

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**The Vehicles of Communication: To What Extent Do They Affect Comprehension**

Presenter's Name: Ibrahim Onafeko
Classification: Undergraduate Student
School/College: Communications
*Presentation Type: Oral Presentation*
Faculty Advisor: Kehbuma Langmia
Faculty Advisor's email: klangmia@howard.edu

It has been claimed that the media through which information is consumed have some impact on the comprehension of the consumers. This study examines the effect of traditional media on comprehension while varying the factors influencing comprehension, opportunity for the message, motivation for the message, and characteristics of the message. College students ranging from freshman to senior were presented a short news story in the form of radio, television, and newspaper. Using a 3-way between participants factorial design, students were randomly assigned to three different conditions and each condition was exposed to one medium respectively. Following the students' processing of the information, a bank of comprehension test was administered to them. The principle result is that across the different media, time was not significantly correlated; however, the students comprehend poorly. The second important finding is that students' prior knowledge about the subject matter of the information interferes with their comprehension of the message. Hypothesis are discussed to explain why there was no correlation in time across the three media. In the study, 75 students participants were recruited and participated, with 25 students in each condition. The instruments used were an ABC television news story of 3 minutes long for the TV treatment;

the same news story converted into MP3 was adapted for the radio treatment; and ABC web version of the news story was adopted for the newspaper treatment respectively.

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**Bridging the gap between Western and Modern Medicine: An examination of the health benefits of integrated medicine in Zanzibar, Tanzania**

Presenter's Name: Natazah O'Neil
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Alem Hailu
Faculty Advisor's email: alemhailu@att.net

Tanzania, a nation blessed with vast natural resources is ranked as one of one of the mega-biodiversity rich countries in the world. Its extensive diversity of species is illustrated by the extraordinary statistic of at least 14,500 known and confirmed species in the country. The wide variety of plants and spices have been the nation's foundation for its food and medicinal needs over the millennia. The highly developed health structure grounded in the traditional healing system is underscored by the dependence of the huge sector of the population on non-modern medicine. In Africa, the World Health Organization indicates that up to 80% of the population is served by traditional medicine. In Zanzibar, traditional healers known as "Waganga", following this template have been at the forefront of the healthcare system. These healers, possessing the knowledge system of medicinal plants are the repositories of the community's knowledge accumulated and transmitted through the times. This study hypothesizes that an integration of traditional and modern approaches to health can yield benefits for Tanzania and the broader body of global knowledge on health and wellbeing. A qualitative methodology is employed to examine theories and practices of medicine in the context of blending the two hitherto divergent traditions. The study is significant in terms of the growing global need to develop new drugs and approaches in different cultures.

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**Redlining and Low Birthweight in Black Infants: A Systematic Review of Maternal Exposure to Residential Segregation**

Presenter's Name: Marie Plaisime
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Marie-Claude Jipguep-Akhtar
Faculty Advisor's email: mjipguep-akhtar@howard.edu

Coauthors: Marie-Claude Jipguep-Akhtar

In the United States, African-American infants have significantly higher rates of low birth weight (LBW) when compared to White infants. Studies have indicated an association between social location and health disparities in birth outcomes, however, the exact source of this disparity remains elusive. This study investigated the influence of current and historical housing policies on birth outcomes in Black women. Building on prior research, we sought to look beyond traditional risk factors for LBW and examine how residential segregation and redlining impacts birth outcomes of Black women. A literature review was conducted using PubMed, JSTOR, and ProQuest. We examined articles for relevance based on their titles, abstracts, and overall full-text. Search terms included racial segregation, residential segregation, redlining, neighborhood racial composition, low birthweight, LBW, birth outcomes, mortgage, and African Americans. Thirty- nine articles were examined to explore the associations between segregation and LBW among Black and White mothers. Similar to previous findings, we found that associations between segregation and adverse birth outcomes differ by race. Given the history of racial injustice within the housing industry, we conclude that it is imperative to develop a comprehensive model that challenges current policy and practice. Future research should focus on the findings and challenges in the neighborhood-effects literature and test conceptual frameworks to understand this relationship. Without such a complete understanding, we risk passively supporting policies that fail to account for the current state of racial disparities.

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**Burnout and Emotional Communication in the Practice of Law**

Presenter's Name: Samantha Powers
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Communications
*Presentation Type: Poster Presentation*
Email: samantha.powers@howard.edu

Work stress is responsible for at least 120,000 deaths per year (Goh, Pfeffer, & Zenios, 2016); possibly posing greater risk to those in the high-stress profession of practicing law. Compared to the general population, lawyers are more than twice as likely to be dependent on drugs or alcohol (Krill, Johnson, and Albert, 2016; SAMHSA, 2016) and, compared to other professionals, they are three times more likely to suffer from depression (Eaton, Anthony, Mandel, & Garrison, 1990). After cancer and heart disease, suicide is the third leading cause of death among lawyers (CDC, 2011; Hill, 2006), with alcohol abuse and depression the two top risk factors (Borges, Walters, & Kessler, 2000; Parks, Johnson, McDaniel, & Gladden, 2014; Tondo, Baldessarini, Hennen, et al., 1999). The current study surveyed 2067 attorneys to investigate work-related emotional communication (i.e., emotional labor and emotional work) as a stressor contributing to lawyer burnout. As the first study to use structural equation modeling to test direct effects of emotional labor and emotional work on burnout, results revealed the most understudied type of emotional labor (automatic regulation) to have a negative direct effect on burnout (as opposed to the positive direct effects of other forms of emotional labor), providing important insights for reducing or preventing burnout. Additionally, the finding of no gender differences in the fit of the model has important implications for scholarship on the socialization of emotion through education and on-the-job-training. Finally, the study results provided clarity on the operationalization of certain theoretical constructs in communication research.

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**Adaptive Combinations of Academic Self-Beliefs and Approaches for Academic Success for Black Undergraduate Women**

Presenter's Name: Faun Rockcliffe
Classification: Graduate Student
School/College: Education
*Presentation Type: Oral Presentation*
Faculty Advisor: Veronica Thomas
Faculty Advisor's email: vthomas@howard.edu

Coauthors: Chloe Martin, Veronica Thomas

The positive relationships between academic self-efficacy beliefs, academic help-seeking behaviors, academic achievement, and other outcomes for college students have been supported in the higher education literature. For example, researchers have found that adaptive help-seeking approaches positively predict homework satisfaction, final course grade, students' self-efficacy beliefs, and intrinsic motivation, whereas the avoidance type of help-seeking in college students is negatively associated with their final course grades. While these contributions are important, there remains a void in knowledge about how help-seeking behaviors and attitudes may be similar or different for diverse groups of college students. This exploratory study attempts to add to the literature by investigating differences academic achievement for different profiles of academic self-efficacy and academic help-seeking in Black undergraduate women at HBCUs. The sample, gathered from a cross-sectional online survey research study, consists of 118 juniors and seniors in social and behavioral science, science, technology, engineering, and mathematics (STEM), and arts and humanities academic fields. A cluster analysis was performed to explore how participants' responses to academic self-efficacy (SE) and help-seeking (HS) questions were grouped into profiles. The analysis revealed three profiles: (1) High SE/Low HS; (2) Moderate SE/Moderate HS; and (3) High SE/High HS. Results of a subsequent one-way analysis of variance (ANOVA) revealed significant differences in college GPA between the profiles (Welch's $F(3, 20.879) = 3.934$, $p = .023$), with profiles 2 and 3 demonstrating higher GPAs. Implications for Black undergraduate women and higher education institutions will be discussed.

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**More than Looks: Corrected Teeth indicate Competence which translates to increased job salary**

Presenter's Name: Warren Scott
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Jamie Barden
Faculty Advisor's email: jbarden@howard.edu

Coauthors: Robert Mensah, Jamie Barden, Sana Augustus

Black children are less likely to receive orthodontic treatment than White children, even controlling for income and education (Okunseri et al., 2007). Pithon et al. (2014) explored the impact of misaligned teeth on hireability, but provided no

mechanism for the underlying process. The current research experimentally manipulated malocclusion to identify the impact of orthodontia on future outcomes. Pre-testing indicated dental malocclusion was significantly correlated with competence and hireability. In the current study, Black participants (N = 88) evaluated 10 photos of Black individuals (5 female, 5 male) on traits and future outcomes. Counterbalancing was used to determine which faces appeared pre or post orthodontic treatment. Further, to unconfound age, Photoshop was used to pair post-treatment faces with pre-treatment teeth and vice versa. Mixed effects modeling indicated that target face age and sex did not have an impact on hiring ratings (all $p>0.6$). Uncorrected teeth significantly decreased hireability (Mdiff = .56), perceived current salary (Mdiff =$6,200), and judgments of warmth (Mdiff = .23), competence (Mdiff = .58), and attractiveness (Mdiff = 1.09) ($p < .01$). Warmth, competence and attractiveness were parallel simultaneous mediators of the impact of teeth treatment on hiring. Competence produced a reliable indirect effect (.32, 95% CI [.07, .58]), as did attractiveness (.23, 95% CI [.05, .41]), however warmth did not. This study suggests those lacking orthodontic treatment are at a disadvantage in the job market due to lower levels of perceived competence. The disparity in orthodontic treatment in the Black community may translate into economic disparity.

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**Personality Assessment for College Students Path to Company Fit and Satisfaction**

Presenter's Name: Jeva Stfort
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Jules Harrell
Faculty Advisor's email: jharrell@howard.edu

This study employed a newly-developed model based on four categories that determine the best optimal work fit within a company analyzing a person's temperament. This personality assessment for path-to-company fit explore one's evaluations of work settings that are categorized along lines described in the Competing Values Framework (Cameron & Quinn,1983). Participants indicated the extent to which they would like to work, in competitive, collaborative, creative and hierarchical job settings. The nonverbal assessment presented in what appeared to be in random order. However, the items favored by the participants indicated how they perceived themselves in the work force. Upon completion of the 80 item nonverbal survey participants were provided a summary indicating what kind of settings they preferred. While the survey will provide a summary of preferred settings, participants were made aware that this instrument was in its early developmental stages. Therefore, it was premature for participants to draw conclusions about their fit to various work settings based on our findings.

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**Stigma and Women Living with HIV/AIDS in Bangladesh**: **A Double Burden of Disease and Disparity**

Presenter's Name: Shirin Sultana
Classification: Graduate Student
School/College: Social Work
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Fariyal Ross-Sheriff
Faculty Advisor's email: fross-sheriff@howard.edu

Globally, HIV/AIDS-related stigma makes women living with HIV/AIDS (WLWHA) vulnerable to severe mental health problems. Under patriarchal norms and values, women in Bangladesh, especially those in the lower strata, encounter endless obstructions to their lives including limited or no access to education, healthcare, and livelihood. Due to limited literature, we hardly know how gender status affects women's HIV status and experience of stigma. This paper will present empirical evidences of HIV/AIDS related stigma and its deleterious impact on WLWHA in Bangladesh. This cross-sectional research study was conducted among WLWHA (N=200) in Bangladesh. Demographics and outcome data were collected through a survey among participants receiving treatments in health clinics. The main outcome variable was HIV/AIDS related stigma. The preliminary findings show that the majority of the participants were housewives (91. 5%) having an education of 10th grade or less, (60%). Most participants did not have any income (60.8%), and lived in rural areas (76%). The mean HIV sigma score (i.e. vicarious and internalized stigma) among participants were 59.33 that indicates WLWHA experience higher level of stigma. This will be a three-part presentation. First, I will frame the problem within the theory of gender and power perspective. Then, I will engage the audience to explore the social context of WLWHA in contemporary society with specific focus on Bangladesh,

and finally, explaining the findings, the implications for social work education and practice will be explored through the lens of gender-responsive policies and services.

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**Narrative and Interactional Analysis on GoFundme's Breast Cancer Campaign: The Effectiveness and the Power of Social Media Crowdfunding**

Presenter's Name: Wei Sun
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Communications
*Presentation Type: Poster Presentation*
Faculty Advisor: Wei Sun
Faculty Advisor's email: wei.sun@howard.edu

Studies have shown that more and more people use social media for health-related issues. Social media create a public sphere for individuals and communities to communicate and share social support and find meaning in the medical challenges they face. Health professionals, health care institutions, and patients use social media as platforms to network, promote health messages, and to seek help.The purpose of this study is to analyze individuals' GoFundMe.com breast cancer campaigns to find out the impact of their health narratives in persuading individuals to donate towards their medical care and bills. The research will explore the following questions:

- RQ1: Which aspects of breast cancer narratives are most effective in persuading people to donate to an individual? What persuasive strategies are most effective? (Analysis of the narratives).
- RQ2: How does social media sharing of the original stories impact the crowdfunding donors' awareness of breast cancer campaigns on GoFundMe pages?
- RQ3: What role does the crowdfunding community play in helping women with breast cancer create a collective identity?
- RQ4: What factors impact donors' motivations and willingness to donate?
- RQ5: Are there racial and cultural factors which impact the campaign?

The research employs qualitative mixed methods, more specifically, health narrative analysis and interactional analysis. The preliminary results include: First, crowdfunding donors tend to donate when a good story is told. Second, crowdfunding donors tend to donate to those who are "deserving." Third, the campaigns with more social media shares tend to reach or exceed campaign goals. Fourth, health disparities exist in breast cancer crowdfunding.

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**Innovative Approach to Improving Diabetes Self Management among Black Patients**

Presenter's Name: Tamea Williams
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Deliya Wesley
Faculty Advisor's email: Deliya.B.Wesley@medstar.net

Coauthors: Deliya Wesley

Poor self management of diabetes leads to devastating secondary complications and mortality. Black patients display poorer self management behaviors compared with patients of other races. Social support (SS) and social networks (SN) are important determinants of health outcomes. SS refers to the supportive actions of others that promote coping or buffer stress. SN refer to linkages between people that may or may not provide SS and can serve other functions like companionship. We hypothesize that effective diabetes self management (DSM) among black patients with diabetes may be related to specific SN attributes and nuanced SS dynamics which have yet to be well characterized. The Colored Eco-Genetic Relationship Map (CEGRM) is a psychosocial assessment tool used to obtain detailed information about social exchanges within a patient's network. We aim to adapt and apply a diabetes-specific CEGRM and pilot an innovative digital version to evaluate DSM among black patients. Participant recruitment is actively underway and will be complete for presentation by the time of the symposium. It is critical we develop a means to identify patients in need of intervention by understanding the nuanced DSM behaviors that may drive unfavorable outcomes. This pilot study will establish feasibility of an optimized D-CEGRM to map and identify such nuanced relationship dynamics. The final tool has potential applications to other health domains.

**Sentencing Disparities Among African American Juvenile Delinquents**

Presenter's Name: Royyanna Young

Classification: Graduate Student
School/College: Education
*Presentation Type: Poster Presentation*
Faculty Advisor: Shareefah AlUqdah
Faculty Advisor's email: shareefah.aluqdah@howard.edu

African American youth are overrepresented in the juvenile justice system based on their percentages in the general population (Chesney-Lind & Shelden, 2013). In a study of 4,182 African American and White juvenile offenders, African American juveniles were disproportionately placed in secure facilities compared with White juvenile offenders who were referred to diversion programs or received lenient outcomes (Lieber & Johnson, 2008). There are several factors that contribute to the sentencing disparity among African American juvenile offenders. Specifically, mental health diagnoses have been shown to influence juvenile court decisions (Murrie, Boccaccini, McCoy & Cornell, 2007). Researchers have found that judgments made by the juvenile courts tend to impose serious consequences such as enhanced punishment and limited therapeutic options among juveniles with diagnostic labels such as conduct disorder and attention deficit disorder (Murrie, Boccaccini, McCoy & Cornell, 2007). In order to obtain diagnoses such as those aforementioned, psychological assessments have become a part of the intake process within juvenile courts (Aretllo et al., 2015). However, there is an inadequate amount of evidence-based research that examines the reliability and validity of these assessments when administered to African American juvenile offenders. Due to the increased use of psychological assessments in the juvenile court system, it is imperative to discern if these assessments are capable of obtaining accurate mental health diagnoses for African American juvenile offenders. This study seeks to examine what factors contribute to sentencing disparities among African American juveniles and seeks to develop a model that will assist in making informed adjudicated decisions.

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**Exploring an African-centered intervention's impact on American African high school student Africana Attainment Heritage Culture (AAHC), racial identity, and academic engagement**

Presenter's Name: Kweli Zukeri
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: A. Wade Boykin
Faculty Advisor's email: aboykin@howard.edu

Coauthors: A. Wade Boykin

A striking academic "achievement gap" between Black and White Americans students has persisted for decades. The workings of this gap are extremely complex and numerous theories speculate about its cause. There are many K-12 intervention programs for Black students whose purpose is to improve student academic achievement; some of them use an "African-Centered" (AC) approach and have successfully improved academic outcomes for Black students. However, few empirical studies have sought to determine the extent to which the impact can be attributed to AC orientation in pedagogy/curriculum. This longitudinal study assesses the direct and indirect impact on outcomes related to academic success of an AC program in California high schools. Additionally, this study pilots a new construct: "Africana Attainment Heritage Culture" (AAHC), which is an "empowered personal orientation characterized by inclination for excellence, combined with feelings of connection to and an awareness of Africana heritage marked by intellectual intelligence and capacity, agency, and knowledge production and application." MANOVA analysis determined the program had a positive impact on participant awareness of Africana heritage, as well as participant pride in being Black (or "of African descent"), and correlational analysis found that these factors were positively related to participant cumulative GPA. This suggests that Black student academic performance is related to possession of a positive cultural and racial identity. Additionally, it was found that the program negatively impacted participant general academic engagement. The researchers theorize this was due to a simultaneous increase in heritage awareness and realization that this heritage is ignored in schools.

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# Translational & Clinical Sciences

**The Effect of Process and Formulation Variables on the Synthesis of Nanoparticles Suitable for Combination Chemotherapy**

Presenter's Name: Yvonne Abbey
Classification: Graduate Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Emmanuel O. Akala
Faculty Advisor's email: eakala@Howard.edu

National Cancer Institute indicates that the mortality rate of breast cancer in the United States is about 21 deaths per 100,000 women annually. Hence breast cancer diagnosis no longer equates to a death sentence. However, it does equate to life of pain and suffering. Combination chemotherapy, which involves the simultaneous administration of two or more chemotherapeutic agents, has been found to be more effective than single drug treatment but is still associated with high toxicity. Systemic chemotherapeutic agents affect cancer cells as well as healthy during treatment resulting in adverse side effects. The use of nanoparticles as drug delivery systems, not only effectively reduces systemic toxicity by facilitating synchronous targeted drug delivery of the bioactive agents, it also reduces drug resistance. The benefits presented by nanoparticles greatly improve the quality of life for patients undergoing treatment. However, it is essential to appropriately optimize the nanoparticle formulation in a way that allows it to perform its function efficiently. To optimize the synthesis of nanoparticles capable of simultaneous targeted delivery of two anticancer drugs (Paclitaxel and 17-AAG) we designed different formulations in which the macromonomer and stabilizer concentrations were kept constant; while the crosslinker and poly-ethylene glycol(PEG) concentrations were varied. Also, one process variable (stirring speed) was varied. These variations were made to determine their effects on nanoparticle size, drug loading, yield, and drug release. The nanoparticles data will help in the optimization of the nanoparticles.

**Assessing Nutrition Risk and Utilization of the Nutrition Care Process in Patients with Obesity**

Presenter's Name: Oluwakemi Adeola
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Katherine Manuel
Faculty Advisor's email: kmmanuel@howard.edu

Coauthors: Katherine Manuel, Sapna Batheja, Danyah Alhano, Kaysha Jones

**Background**: Obesity continues to be a public health concern with more than one-third of the US population having the disease. Obesity is associated with over thirty comorbidities and is responsible for 147 billion dollars annually in medical costs. The latter is explained largely in part by the increased number of hospitalizations, longer hospital stays, increased readmission rates, and associated complications in individuals with obesity. In the acute care setting, it is important that appropriate steps be taken to identify nutrition risk in obese patients and provide appropriate treatment in a timely manner**. Objectives:** This work presents guidelines for developing nutrition diagnoses and interventions in individuals with obesity, examines tools for assessing nutrition risk, and explores the association between obesity and readmission rates. **Methods**: A review of relevant guidelines were employed. A case report utilizing the Nutrition Care Process was used to determine the usefulness of these guidelines in the acute care setting. A systematic review was performed to determine the association between obesity and readmission rates. **Results**: NRS-2002 is a highly recommended validated screening tool for identification of nutrition risk, but was not found to be useful for identifying nutrition risk in obese patients in the acute care setting. Preliminary data revealed obesity as a predictor of hospital readmission. **Conclusion**: Screening tools to identify nutrition risk in obese patients should be updated or developed to reflect current evidence of the exitance of malnutrition concurrent with obesity.

Additional focus is needed on research that examines obesity complications and readmission rates.

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**Identification and Documentation of Adult Malnutrition in Patients with HIV/AIDS**

Presenter's Name: Olaoluwa Adeoye
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Katherin Manuel
Faculty Advisor's email: kmmanuel@howard.edu

Coauthors: Wafaa Abusudah, Banafsheh Dehdashtizadeh, Katherin Manuel, Sapna Batheja

**Background**: HIV/AIDS remains a priority public health concern for the Centers for Disease Control and Prevention (CDC). Significant complications associated with HIV/AIDS result from increased risk and presence of malnutrition. These complications affect overall quality of life and influence prognosis of patients with HIV/AIDS. The current study presents a review of guidelines for identification and documentation of malnutrition in adult patients and the applicability of these guidelines in assessing and treating patients with HIV/AIDS in an acute care setting. **Methods**: A comprehensive review of the literature was undertaken, inclusive of the Consensus Statement: Academy of Nutrition and Dietetics and Society for Parenteral and Enteral Nutrition, and based on predetermined review criteria. A case report was employed to determine whether these recommendations are applicable in patients with HIV/AIDS in an acute care setting. **Results**: Ten studies met the systematic review criteria. Findings emphasized the importance of malnutrition screening for patients with HIV/AIDS and confirmed that malnutrition further reduces the capacity of the body to fight infection. Food insecurity was found to be associated with poor clinical outcomes and increased mortality especially among at-risk populations. Overall, the guidelines reviewed were applicable and effective for identification and documentation of malnutrition in patients with HIV/AIDS in the acute care setting. **Conclusion**: The negative interactive effects of malnutrition, inadequate food consumption, and HIV infection demand special focused efforts aimed at accurate identification and documentation of malnutrition to ensure improved quality of life and better survival in patients infected with HIV.

**Statistical Experimental Design and Computer Optimization in Pharmaceutical Dosage form Design: Experience with Biodagradable Nanoparticle Fabrication for Cancer Chemotherapy**

Presenter's Name: Emmanuel Akala
Classification: Senior Faculty
School/College: Pharmacy
*Presentation Type: Oral Presentation*
Faculty Advisor: Emmanuel Akala
Faculty Advisor's email: eakala@howard.edu

Quality by design (QbD) in the pharmaceutical industry involves designing and developing drug formulations and manufacturing processes which ensure predefined drug product specifications. QbD helps to understand how process and formulation variables affect product characteristics and subsequent optimization of these variables vis-à-vis final specifications. Statistical design of experiments (DoE) is a technique for identifying important parameters in a pharmaceutical dosage form design and for optimizing the parameters with respect to certain specifications. DoE establishes in mathematical form the relationships between critical process parameters together with critical material attributes (CMAs) and critical quality attributes (CQAs). We present here our efforts on the fabrication of stealth biodegradable nanoparticles by dispersion polymerization for cancer treatment. Aided by a statistical software, D-optimal mixture design was used to vary the components (crosslinker, initiator, stabilizer and macromonomers) to obtain twenty or thirty nanoparticle formulations for PLLA and poly-ε-caprolactone nanoparticles respectively. Simultaneous numerical and graphical optimizations were carried out on the response variables Optimal solutions were returned from simultaneous optimization of the response variables: to minimize nanoparticle size (small nanoparticles are internalized into disease organs easily, avoid reticuloendothelial clearance and lung filtration); to minimize the surface negative zeta potential, and to maximize percent yield. We have just implemented a central composite face-centered statistical experimental design and computer optimization for the fabrication of drug combination nanoparticles.

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**Formulation and Evaluation of Brinzolamide Nanoparticles - in situ Gelling System containing a combination of Efflux Transporter Modulators.**

Presenter's Name: Ann-marie Ako-adounvo
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Pradeep Karla
Faculty Advisor's email: pkarla@howard.edu

**Background**: The topical route to ocular drug delivery is by far the most convenient and patient compliant. As a result, over 90% of marketed ophthalmic formulations are in the form of eye drops. However, topically applied ocular formulations are prone to drainage, tear dilution, and poor permeation through corneal epithelia tight junctions, thereby resulting in reduced pre-corneal concentrations and decreased corneal absorption. Drug efflux transporters have also been associated with poor bioavailability. A plethora of efflux transporters have been identified in various ocular tissues including the cornea epithelium, which is the primary barrier to topical administration. **Method**: To overcome some of these challenges, brinzolamide-PLGA nanoparticles thermosensitive in situ gelling system containing efflux transporter inhibitors, was formulated and evaluated. The nanoparticle component of the formulation was characterized for particle size distribution, polydispersity index and zeta potential determined by DLS. SEM was employed to confirm nanoparticle formation and morphology. Drug-polymer compatibility was assessed by FT-IT. The release of brinzolamide from drug-loaded nanoparticles was quantified by HPLC. The Poloxamer 407 thermoreversible in situ gelling system was characterized for sol-gel transition, gel degradation profile and viscosity. **Results**: The complete formulation of brinzolamide-PLGA nanoparticles in thermoreversible gel containing efflux inhibitors for topical application was found to be non-toxic, showed good release profile, efflux inhibition and drug transport across SV40-HCEC cell monolayer. **Conclusion**: This formulation has potential to decrease pre-corneal drug loss, increase residence time on cornea surface and decrease ocular drug efflux.

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**Assessing the Correlation Between Point of Care and Laboratory INR Results**

Presenter's Name: Derrick Anderson
Classification: Professional Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Yolanda McKoy-Beach
Faculty Advisor's email: ymckoy@howard.edu

Coauthors: Yolanda McKoy-Beach, La'Marcus Wingate, Peter Sealy

**Background**: The prothrombin time (PT) and international normalized ratio (INR) are used to monitor the effectiveness of the anticoagulant warfarin. Warfarin is prescribed on a short or long-term basis to people who have experienced a variety of hemostatic imbalances that could potentially lead to inappropriate blood clotting. The goal of warfarin therapy is to maintain a balance between preventing clots and causing excessive bleeding and requires careful monitoring. Point of care (POC) devices allow for results within minutes but there has been questionable accuracy with using these devices.1 This pilot study will be to see the degree of variation between the readings from POC device and area laboratories. **Methods**: A retrospective chart review was conducted to compare the INR/PT readings produced with the POC device and lab INR methodologies. Inclusion criteria included patients ages 50 to 89 a POC device reading lower than 1.5 or higher than 3.5, and a visit to the Anticoagulation Management Services clinic from July 1, 2017 to September 30, 2017. Patients were excluded if they did not have a valid lab INR reading. Descriptive statistics were performed to summarize the demographic and clinical characteristics of the population and a Wilcoxon Signed Rank test was utilized to determine if there was a statistically significant difference in the readings produced by the POC device and lab INR methods. **Results**: A total of 17 patients were included in the study. The mean age was 74.2 and 43.8% of the patients were females.

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**Sleep-Disordered Breathing and Posttraumatic Stress Disorder**

Presenter's Name: Maxwell Anderson
Classification: Graduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Thomas Mellman
Faculty Advisor's email: tmellman@howard.edu

Coauthors: Joseph Lavela

Sleep complaints are a central symptom of PTSD. Fragmented or reduced rapid eye movement sleep (REMS), has been observed early during the course of PTSD. There is accumulating evidence supporting a role for REM sleep in adaptive emotional processing. Sleep-disordered breathing (SDB) has been observed to be common with PTSD. SDB could both contribute to, as well as be a consequence of, disrupted sleep, particularly REMS in PTSD. The purpose of this study was to investigate associations between specific types of SDB events and sleep stages with PTSD. 51 African American participants (ages 18-35) were selected from a larger study based on adequate sleep evaluation and matching the study groups: current PTSD (n = 17), trauma positive (met criteria for a criterion A trauma but not for full PTSD diagnosis, n = 17), and no previous trauma (n = 17). PTSD criteria were evaluated by the Clinician Administered PTSD Scale and severity was additionally measured with PTSD Checklist (PCL). Each participant had overnight polysomnography (PSG) recordings. We found a significant correlation between PTSD symptom severity and overall SDB events ($r=.29$, $p<.05$). Poisson regression of count data for specific breathing events revealed fewer hypopneas for the trauma positive group compared to the current PTSD group ($\exp(\beta)=.816$, $p=.016$). In the PTSD group, fewer arousals with apneas featured oxygen desaturation throughout the night and in REM, compared to the trauma negative group ($\exp(\beta)=2.64$, $p=.005$; $\exp(\beta)=13.30$, $p=.012$, respectively). These findings raise the possibility that factors in addition to respiration contribute to apnea/arousals in PTSD.

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**Accessibility and Funding for Dental Care for Autism Spectrum Disorder Patients in the DMV Area - A Caregiver's Perspective.**

Presenter's Name: Francis Badejoko
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Melanie Thwaites
Faculty Advisor's email: mthwaites@howard.edu

**Introduction**: The main purpose of this research is to ascertain if the autistic population is getting adequate dental care and identify any discrepancy in accessibility in the DMV area. **Material and Method.** The research will be done by completion of questionnaires by caregivers visiting Howard Pediatric Dentistry Clinic, Pediatric Clinic Howard University Hospital, and Dr Cherryl Lee's Dental office to have about 500 caregivers complete the questionnaires. **Literature Review.** ASD refers to a range of condition characterized with varying degree of problems with social interaction, communication challenges and a tendency to engage in repetitive behaviors. Associated medical conditions include seizures, intellectual disability, ETC. Condition is life long and early behavioral intervention/therapies can reduce symptoms, improve social and communicative skills and abilities. Review of scientific literature revealed very little about the caregiver's perspective in getting dental care. **Epidemiology**: One in sixth-eight U.S. children are being diagnosed with ASD, up from 1 in 150 in 2000. Dental disease and caries affects 60-90% of children and a lot of adults. This statistics also applies to autistic patient and with possibly higher incidence due to inadequate OH. Cost and finding a properly trained provider are major barriers to getting treatment. The increasing number of children and adults with ASD highlights the need to provide a full range of services, including dental care and the goal of this survey is to help improve access to dental care in the long-term by offering suggestions that can be made to improve the current system. **Results**. Statistical analysis of results is currently being done.

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**Maternal deprivation stress induces gender-dependent alterations in resilience to chronic restraint stress in adult rats**

Presenter's Name: Rosemary Bassey
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Medicine
*Presentation Type: Poster Presentation*

Faculty Advisor: Marjorie Gondre-Lewis
Faculty Advisor's email: rosemary.bassey@howard.edu

Coauthors: Olubukola Kalejaiye, Brittain Waller, Ifeoluwa Bamidele, Marjorie Gondre-Lewis

Early life stress adversely influences neurodevelopment and has profound long-term effects on brain function and behavior. Here we measure endogenous stress hormone and determine behavior of rats exposed to a 2-hit model of maternal deprivation stress (MDS) in infancy followed by acute (ARS) and chronic restraint stress (CRS) paradigms during adolescence/adulthood to determine resiliency or susceptibility to the second stress exposure. Overall, our data showed higher baseline corticosterone levels in adolescent compared to adult rats. In adolescents, MDS alone did not significantly alter corticosterone whereas the 2-hit of MDS followed by CRS exposure significantly increased corticosterone levels. In adults, females seemed to exhibit more resilience to the effects of MDS on corticosterone compared to males. When tested for anxiety-like behavior on an elevated maze, acute (not chronic) stress interacted with MDS to induce anxiety-like behavior. Test of open field activity revealed significantly decreased locomotion in controls exposed to either ACS or CRS, and earlier exposure to MDS seemed to confer protection to the effects of the secondary stressor. The hypolocomotion observed was more profound in control females. Finally, compared to controls, MDS rats lever-pressed significantly more for 10% ethanol on an operant apparatus, and the operant response was further elevated on exposure to ARS. However, with chronic stress males and females diverged: males significantly lever pressed more for alcohol while females did not. This study illustrates that maternal deprivation stress may confer gender-dependent resilience to subsequent exposure to stress.

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**Deep Phenotyping of Patients With Trichothiodystrophy or Xeroderma Pigmentosum**

Presenter's Name: Raina Bembry
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Kenneth Kraemer
Faculty Advisor's email: kraemerk@mail.nih.gov

Trichothiodystrophy (TTD) and xeroderma pigmentosum (XP) are two rare, autosomal recessive disorders with defects in genes involved in transcription and in DNA nucleotide excision repair. TTD patients have a wide spectrum of developmental abnormalities without increased risk of skin cancer. TTD patients exhibit tiger tail banding under polarized microscopy. In contrast, XP patients have a 10,000-fold increased skin cancer risk. XP/TTD patients have characteristics that overlap both TTD and XP. Despite mutations in the same gene ERCC2 (XPD) they have markedly different clinical features. We performed deep phenotyping to understand the relationship of the clinical features to the disease processes and molecular defects. Structured history and clinical information from direct NIH evaluation, NIH medical record systems (CRIS), outside medical records and results of DNA sequencing of candidate genes were entered into a 350 item database. We are employing hierarchical clustering to pinpoint key features associated with these diseases. We are initially analyzing TTD, XP/TTD and XP patients with mutations in the ERCC2 (XPD) gene. Molecular analysis in conjunction with deep phenotyping of clinical data may help identify distinct phenotypes that can guide therapy, inform prognosis, and provide insights into the pathological mechanisms of these diseases.

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**Personality traits related to exercise**

Presenter's Name: Danielle Brown
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jules Harrell
Faculty Advisor's email: jharrell@howard.edu

Coauthors: Danielle Brown, Jules P. Harrell, Ph.D. Alfonso Campbell, Ph.D. and Clive O. Callender, M.D.

This study explores the extent to which personality traits relate to exercise and how people use their leisure time. **Objective:** Personality and physical activity interact to produce crucial life results. The present study focused on engagement in sport and daily walking behavior in an adult population. The study was based on a middle- and older-aged group and their self-reports of exercise walking and

participation in some organized sporting activity. **Method:** As part of a larger study of renal health, survey data was collected from African Americans in an urban mid Atlantic community. Items included questions related to engaging in sports and walking as a physical activity. Personality traits were assessed using the NEO-PI. This questionnaire measured the Big Five traits commonly assessed in studies of personality. One hundred and thirty African Americans (mean age 44 years) completed the scales. Half of the respondents were women. **Results**: Correlational analyses revealed that higher levels of Conscientiousness, Extraversion, and Openness were associated the tendency to report playing a sport during one's leisure time. Agreeableness and more Conscientiousness correlated with reports of choosing to walk leisurely for exercise. **Conclusion**: These findings indicate that personality traits may impact what adults chooses to do for exercise, and whether that is playing a sport or simply walking.

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**Clinicians' perspectives on barriers to employment for clients enrolled in a supported employment program**

Presenter's Name: Imani Brown
Classification: Staff
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Tanya Alim
Faculty Advisor's email: talim@howard.edu

Couathors: Steven Tulin , Loretta Peterson , Tanya Alim, Elizabeth Carpenter-Song

**Objective:** Dually diagnosed patients with opioid use disorder have barriers to recovery including employment. Generally, employment is less than 15% within this population. This study aimed to capture the clinical team's perspectives on barriers to employment for clients enrolled in a supported employment program. **Methods**: Dually diagnosed patients were recruited through the Howard University Mental Health Center. A clinical team used consensus ratings to determine which, if any, of 15 barriers applied to each of the 40 study participants. **Results**: The primary barriers to obtaining employment were substance use (75%), mental illness (60%), and family problems (53%). Other barriers to obtaining employment noted were disengagement from the supported employment program (45%) and problems with the criminal justice system (43%). **Conclusions**: The commonest barriers to obtaining employment as assessed by the clinical team were symptoms of (1) substance use disorder and (2) mental illness. Efforts to improve treatment strategies in these two areas may augment employment rates in patients with dual diagnosis.

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**Two Tumors, Three Decades Apart: A Rare Case of Wilms Tumor (Nephroblastoma) and Bladder Paraganglioma**

Presenter's Name: Marius Chukwurah
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Pamela Coleman
Faculty Advisor's email: pamela.coleman@howard.edu

Coauthors: Muhammad Hassan, Rhonda Burch-Smith, Pamela Coleman

Paragangliomas are rare tumors arising from neural crest tissue that develops into sympathetic and parasympathetic paraganglia throughout the body. Paragangliomas of the urinary bladder are even rarer, accounting for less than 0.1% of all bladder tumors and about 0.06% of all recorded paragangliomas. Vascular invasion, a deeply invasive growth pattern and recurrence are all associated with poor prognosis, but the development of metastases, which occur in up to 15% of these tumors, is the only reliable indicator of malignancy. In our tertiary center, we present a rare case of paraganglioma of the urinary bladder in a 32-year-old female, with past medical history of Wilms Tumor, diagnosed at age 2, treated with surgical resection, radiation and chemotherapy. She initially presented with gross hematuria and right sided abdominal pain. Patient underwent partial cystectomy. The tumor was completely excised. The specimen revealed papillary projecting mass on the mucosal surface. Histopathology showed presence of round to polygonal cells arranged in small nests or zellballen pattern, separated by vascularized fibrous septa. Individual cells had vesicular chromatin with fine granular cytoplasm with no invasion into detrusor layer. Immunostains showed the tumor cells were positive for synaptophysin and chromogranin, while an S-100 stain elucidated the surrounding sustentacular cells. A pancytokeratin stain was negative, but highlighted the

urothelial mucosa and a Ki-67 showed low proliferative index. These findings supported the diagnosis of paraganglioma.

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**Momordica charantia Linn: Safety and Efficacy during Pregnancy and Lactation**

Presenter's Name: Nkechi Enwerem
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Nursing & Allied Health Sciences
*Presentation Type: Oral Presentation*

Coauthors: Priscilla Okunji

**Background**: In Nigeria decoctions and aqueous extract of the leaves of Momordica charantia Linn (MC), are commonly used in the treatment of diabetes. 90% of the populations of developing countries use traditional medicine for their primary health care needs. In the developed countries dietary supplement is considered to be potentially harmless. **Objectives**: There is a paucity of data on the effects of consumption of MC during pregnancy and lactation. **Methodology**: AHMED, CINAHL, Cochrane CENTRAL, Cochrane Library, Medline, Internet journals, Natural Medicines comprehensive database, and Natural standard were reviewed from inception to 2018 for information on Momordica charantia Linn, as it relates to its use on "pregnancy", "lactation", and "breastfeeding". Data were compiled based on the grade and evidence found. **Results**: There were no evidence- based scientific data to support the use of MC during pregnancy and lactation in humans. In mice, treated with metoclopramide (2 mg/100 g BW), and MC fruit juice (400 and 600 mg/100 g BW) orally, the drug and the fruit juice significantly increased blood prolactin levels in lactating mice. Seed extracts given to female Albino rats at 25 mg/100 g body weight for 30 days have antiovulatory activities. In Sprague Dawley female rats water extract from the unripe fruit of MC was found to be teratogenic. In rats, MC extracts demonstrated significant reductions in daily sperm production.

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**Rare Cases of Solitary Axillary Lymph Nodule**

Presenter's Name: Otega Esegine
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Estelle Cooke-Sampson
Faculty Advisor's email: estelle.cookesampson@gmail.com

Coauthors: Andre Duerinckx, Babak Shokrani

**Background:** Mammography is best known for its important role in breast cancer screening. However, mammography plays an equally important role in clinical investigation of a suspicious solitary axillary lymph node (SALN). A unilateral and enlarged SALN might be indicative of an underlying primary malignancy, a metastatic disease or an infection. Clinicians use the combined findings of ultrasound guided fine needle aspiration (UG-FNA) and mammography of a SALN to establish a diagnosis. **Methods**: A world literature review was performed to determine what disease processes present clinically as a unilateral and enlarged SALN. A case series consisting of disease processes that can have the same clinical presentation but rarely do, was then established. Characteristic findings on UG-FNA and mammography were determined for all members of the series. **Results:** Result**s** from the literature review showed that leukemia, lymphoma and common infectious processes clinically present as unilateral and enlarged axillary lymph node. These results led to the creation of a case series consisting of occult breast carcinoma, metastatic ovarian carcinoma, and invasive filariasis. The characteristic findings on UG-FNA and mammography for each case in the series were unique when compared to the corresponding findings of a normal SALN. **Conclusion**s: Most of the time, a SALN found on routine mammogram is associated with positive findings of malignancy in breast tissue. However, in some rare instances, a SALN will be detected in the absence of breast tissue malignancy on mammography. This requires clinicians to include disease processes which are not of breast origin in their differential.

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**Incisal Buttons Deterred the Deleterious Effects of Nail Biting**

Presenter's Name: Tamara Evans
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Shohreh Sharif
Faculty Advisor's email: shohrehsharif@gmail.com

**Purpose**: The purpose of this case study is an attempt to develop an effective method to deter the habitual process of nail biting and to develop nomenclature for measuring its traumatic effects on the nails bed and surrounding tissue. **Results**: Currently, there isn't one proven method that can or has been implemented to deter or treat nail biting. Many have tried various psychological techniques such as decoupling, punishment, hypnosis and aversion behavior technique, that have been found to only work on a small percentage of the population. What happens to the other percentage of patients that are still without a clear means to an end of their nail biting habit? This case report uses one 7 year old male child who started a pattern of chronic nail biting while experiencing a difficult time in the 1st grade. Antiquated techniques such as nail biting polish, positive and negative reinforcement were tried, all of which were not effective. Realizing that there were many functional appliances used for oral habits such as thumb sucking and tongue thrusting, why not one for nail biting. Therefore, I seek to develop a technique to mechanically interfere with the nail biting behavior. The first technique involves the adaptation of incisal composite stops/buttons on the anterior central incisors, which completely inhibited the nail biting habit of our 7 year old subject. The second possible method would entail constructing a Nance appliance with anterior bars that extend forward and around the incisal-facial surface.

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**Acute Sigmoid Diverticulitis: Overview of Imaging, Classifications and Controversies**

Presenter's Name: Naveen Ghuman
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Bonnie Davis
Faculty Advisor's email: bdavis@huhosp.org

Coauthors: Britney Scott, Nehah Harinarayan, Gabrielle Fonteneaux, Shazzanne Pennant, Amara L. Davidson, Brenda Iriele, Kimberly Peoples, Joanna Akinlosotu, Mustafa Alam, Philise Williams, Andre Duerinckx, Terrence Fullum, Bonnie Davis

**Background**: Acute diverticulitis (AD), a common disease entity occurring from complications of diverticulosis, manifest with mild to severe inflammation. Regarded as a disease of western countries, the risk factors are well-known. CT imaging is the modality of choice for diagnosis, as it also provides prognostic information that helps to guide treatment as reflected in the various classifications of diverticular disease. Our goal is to review the imaging features and classification systems of acute sigmoid diverticulitis that highlight the controversies surrounding diagnosis and management decisions. **Methods**: We examined over 30 clinical cases from our radiology teaching file to illustrate uncomplicated and complicated imaging features of AD. We also performed a systematic literature review of the original Hinchey classification and other modified systems to outline clinical controversies including the role of antibiotics in non-operative treatment, recommendations for elective colonic resection, and the need to undergo post treatment colonoscopy. **Results**: Controversies in AD span from diagnosis to management. CT imaging studies provide significant detail compared to ultrasound and MRI. The modified Hinchey classifications, which incorporate imaging findings, are a useful tool in clinical decision making. **Conclusion**: AD carries a potential risk of morbidity and mortality. As such, the role of CT imaging is critical in diagnosing this disease and providing the backdrop upon which the newer classification systems, for treatment planning, have been created.

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**Screening for lysosomal storage disorders in African-Americans shows higher incidence rates – A possible link to ancestry-specific genetic variations**

Presenter's Name: Marjorie Gondré-lewis
Classification: Senior Faculty
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Marjorie Gondre-Lewis
Faculty Advisor's email: mgondre-lewis@howard.edu

Coauthors: Renuka Pudi Limgala, Erk Changsila, Floyd Wilks, Marie N. Fidelia-Lambert, and Ozlem Goker-Alpan

Variations in genomics and biochemical cascades contribute to health and disease and can be ancestry-specific. Here, we investigate the incidence of four lysosomal storage disorders (LSDs) in a cohort of urban-dwelling African Americans (AAs). LSDs are inherited genetic disorders caused by the functional absence of lysosomal enzymes and result in varied clinical symptoms. To date, studies of LSDs in AAs are few

or non-existent with ambiguous clinical manifestations, that cause diagnostic challenges. We initiated a large scale screening for 'treatable forms' of LSDs in 5000 patients: 85% African American, 10% Hispanic, and 5% Caucasian or other. Under IRB approved protocols (NCT02120235 and HUIRB-14-MED-09), dried blood spots were prepared from peripheral blood samples and fluorometric enzyme assays performed using 4-methylumbelliferyl (4-MU) substrates specific for b-glucosidase (Gaucher disease), α-galactosidase (Fabry disease), α-glucosidase (Pompe disease), and b-galactosidase (MPS IV B) enzymes. After two rounds of screening, we confirmed undetectable activity for b-glucosidase in 1 subject; α-galactosidase in 3 subjects and α-glucosidase in 1 subject. Approximately 0.05-0.1% showed significantly reduced enzyme activity, likely indicating carrier status. NextGen Sequencing of b-glucosidase in subjects with low activity revealed a heterozygous c.1342G>C (D448H) and a homozygous missense mutation c.476G>A, R119Q(R159Q). Interestingly, a significant cohort had enzymatic activities several-fold higher than the reference. These findings highlight higher incidence rates for abnormal enzyme levels in this population and shows the importance of such large-scale screenings in minority groups traditionally not associated with a high incidence of LSDs, but who may have ancestry-based genotype variations that confer risk or resilience.

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**Anticancer property of Salvianolic acid B in triple negative breast cancer cells via promoting ceramide-mediated apoptosis**

Presenter's Name: Xinbin Gu
Classification: Senior Faculty
School/College: Dentistry
*Presentation Type: Oral Presentation*
Faculty Advisor: Xinbin Gu
Faculty Advisor's email: xgu@howard.edu

Coauthors: Wei Sha, Zhiqiang Ling, Yanfei Zhou, Paul Wang

Triple negative breast cancer patients often respond poorly to chemotherapeutic agents, hence an urgent need to develop new pharmaceuticals to treat this disease. Salvinolic acid B (Sal-B) is one of the leading bioactive components of Salvia miltiorrhiza Bge treating chronic inflammatory diseases without appreciable adverse effects. In this study, we evaluated the anticancer property of Sal-B in triple negative breast cancer cells. Human triple negative MDA-MB-231 breast cancer cell line as a test model and the human estrogen receptor α positive MCF-7 breast cancer cell line as a control group, the anticancer effects of Sal-B in cultured triple negative breast cancer cells and tumor xenografts were elucidated. Significant decreased cell viabilities ($p<0.05$) were observed in Sal-B treated both triple negative and positive breast cancer cell lines. Cell cycle-related protein expression, such as cyclin A and B proteins, were also decreased in Sal-B treated groups, compared to the untreated control group. The MDA-MB-231 tumor xenografts were significantly smaller in the Sal-B treated group than in the untreated group and doxorubicin treated group. Interestingly, Sal-B treatment decreased the level of glucosylceramide synthase, a key ceramide glycosylation enzyme, resulting in accumulation of ceramide and suppression of anti-apoptotic proteins (Bcl-xL and survivin), which promoted ceramide–mediated apoptosis. In **Conclusion**: Sal-B can effectively inhibit the growth of triple negative breast cancer, in part by suppressing cell growth and inducing ceramide-mediated apoptosis. Thus, Sal-B has high potential to be a new therapeutic strategy to improve triple negative breast cancer treatment.

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**Targeting HIV-associated inflammation with small molecules**

Presenter's Name: Dilbi Hussein
Classification: Graduate Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Amol Kulkarni
Faculty Advisor's email: amol.kulkarni@Howard.edu

Coauthors: Sajith Meleveetil, Joseph Gendy, Maimun Alam, Nathanael Warner, Jason Daniels, Mimi Ghosh, J. Phillip Bowen, Keily Molina, Amol Kulkarni

HIV-associated inflammation is primarily mediated by a multiprotein assembly known as the NACHT, LRR, and PYD domains-containing protein 3 (NLRP3) inflammasome. In HIV-infected women, inflammation of the genitourinary tract is well-correlated with high risk of HIV acquisition. Persistent low-grade neuroinflammation is linked with HIV-associated nerological disorders. Inhibiting these inflammatory pathways represents a novel mechanism to

minimize the viral load during initial viremia and also leads to beneficial therapeutic outcomes in HIV-comorbidities. There is a great deal of interest in developing small molecule inhibitors of the NLRP3 inflammasome. Efforts leading to the rational drug discovery of NLRP3 inhibitors are limited due to the lack of structural details and/or its component proteins. In the absence of this critical structural information, our initial efforts were focused on computational studies to develop a pharmacophore model based on the previously reported small molecule NLRP3 inhibitors. These studies led to the design of novel tertiary sulfonylurea scaffolds with potent NLRP3 inhibitory activity. The scaffolds were synthesized, characterized, and screened for their NLRP3 inhibitory activity. Interleukin-1b (IL-1b) and interleukin-6 (IL-6) were used as the biomarkers in the in vitro screening of the inhibitors using THP-1 cells. One of the analogs was shown to display a dose-dependent reduction in the levels of both IL-1b and IL-6 and exhibited low toxicity. Our current research efforts are targeted towards refining the structure of our lead molecule and studying the effect of these compounds in HIV-infected microenvironments.

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**MDR Efflux Transporters - New Drug Targets for HIV Drug Delivery**

Presenter's Name: Pradeep Karla
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Pharmacy
*Presentation Type: Oral Presentation*
Faculty Advisor: Pradeep Karla
Faculty Advisor's email: pkarla@howard.edu

**Background**: HIV is now considered a global pandemic affecting millions of people. Sexual transmission is the major mode of HIV infection in healthy humans. None of the vaginal microbicides and/or oral therapies has yet resulted in a complete protection from sexual transmission of HIV. Attachment of HIV to the human CD4+ T-cells, incorporation of viral enzymes and genetic material constitute the first steps of HIV sexual transmission. The purpose of the study is to screen the CD4+ T-cells and vaginal epithelial cells (VK2) for the presence of drug efflux transporters. **Methods**: Molecular screening was performed by RT-PCR. Functional screening was performed by 3H-Tenofovir uptake in the presence of specific MRP inhibitor (MK571), P-gp inhibitor (Pgp-4008) and BCRP inhibitor (Fumitrimorgin-C). Intracellular radio labeled drug concentrations were analyzed by scintillation counter. **Results**: Specific PCR gene products corresponding to GAPDH, MRPs1-7, MRP9, BCRP and P-gp were observed in primary human T cells. Single distinct bands for MRPs 1-9, BCRP and Pgp were observed in VK2 cells. Relative % drug uptake of tenofovir in primary human T cells in the presence of 50 μM MK571 was 173.9±5.8%), 100 μM MK571 (205.7±10.6%), 50μM Pgp4008 (215.4±9.2%) and 50 μM Fumitrimorgin (192.1±18.38%) compared to control (100±6.65%). **Conclusion**s: The results for the first time demonstrated the molecular and functional expression of multiple drug efflux transporters in primary human T cells. Further, functional uptake studies revealed that the prominent drug efflux pumps (MRPs, Pgp and BCRP) are functionally active in unactivated human T-cells leading to decreased intracellular tenofovir concentrations.

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**Design, Synthesis and Biological Screening of NOX4 Inhibitors**

Presenter's Name: Amol Kulkarni
Classification: Junior Faculty/ Lecturer/ Instructor
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: Amol Kulkarni
Faculty Advisor's email: amol.kulkarni@howard.edu

Coauthors: Dilbi Hussein, Sajith Meleveetil, Joseph Gendy, Maimun Alam, J. Phillip Bowen, Qian Xu, Kathy Griendling, Bernard Lasegue, E Blake Watkins, Osman Gunner

NADPH oxidase (NOX) enzymes catalyze NADPH-dependent generation of reactive oxygen species and play a pivotal role in various physiological and pathological processes. Recent literature strongly suggests that NOX4 isoform plays a significant role in many disease states, such as fibrosis, cancers, and atherosclerosis. Thus, selective and potent inhibitors of NOX4 have the potential to be employed for the clinical management of a wide spectrum of disease states. Through a multi-institutional drug discovery collaboration, our pharmacophore modeling and computational chemistry studies led ultimately to the identification of novel sulfonylurea scaffold with promising NOX4-selective inhibition. The most potent analogs have displayed nanomolar IC50. The synthesis of the sulfonylurea

compounds and their in vitro screening will be highlighted during the presentation. Application of our compounds in inflammation-associated disease states will also be presented.

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**What is the impact of cephalad venous drainage on complications in neonatal venovenous ECMO?**

Presenter's Name: Ilan Layman
Classification: Professional Student
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Gezzer Ortega
Faculty Advisor's email: gezzer.ortega@howard.edu

Coauthors: Gezzer Ortega, Amit Vij, Jose Salazar, Gean Gilot, Alana Beres, Peter Rycus, Ronald Hirschl, Faisal Qureshi

**Purpose:** Extracorporeal Membrane Oxygenation (ECMO) can be a lifesaving mechanism in newborns with reversible pulmonary failure. Two main ECMO modalities exist, venoarterial and venovenous (VV). VV ECMO can be initiated with a double lumen catheter in the internal jugular vein draining from and infusing into the heart (VVDL). It is sometimes supplemented with a catheter directed cephalad into the internal jugular vein providing additional drainage (VVDL+V) with the possibility of higher flows and reduced neurologic complications. The objective of this study was to evaluate and compare outcomes of VVDL+V versus VVDL use in neonates. **Methods**: The Extracorporeal Life Support Organization (ELSO) registry was used to identify neonates undergoing non-cardiac venovenous ECMO from 1990-2013. Demographic data, ECMO mode, and ECMO variables were collected. Outcomes included survival and ELSO categorized complications and used multivariate analysis. **Results**: Of 1,086 neonates, 54.4% underwent VVDL and 45.6% VVDL+V. The most common conditions requiring ECMO were meconium aspiration and pulmonary hypertension (53.3%), followed by diaphragmatic hernia (23.5%), and sepsis (9.3%). On adjusted analysis there was a decreased likelihood of mechanical (OR: 0.63 95%CI: 0.44-0.89) and metabolic (OR: 0.51 95% CI: 0.27-0.98) complications with VVDL+V. There was an increased likelihood of cardiovascular (OR: 2.84 95% CI: 1.98- 4.07) complications on VVDL+V. **Conclusions**: The results of this study suggest that VVDL+V had less mechanical and metabolic but more cardiovascular complications when compared to VVDL. There was no difference in neurologic outcomes or mortality. Further investigation into the benefit of VVDL+V is needed before recommending its use.

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**STAG2 as a Prognostic Biomarker in Papillary Non-Muscle Invasive Urothelial Carcinoma**

Presenter's Name: Alana Lelo
Classification: Graduate Student
School/College: Other
*Presentation Type: Oral Presentation*
Faculty Advisor: Todd Waldman
Faculty Advisor's email: waldmant@georgetown.edu

Bladder cancer is the sixth most common human cancer. Most cases are early stage tumors known as papillary non-muscle invasive bladder cancer (NMIBC). After resection, 60-70% of NMIBCs recur locally, and ~15% progress to muscle invasion and metastasis. There is an unmet need for a biomarker to stratify tumors on their likelihood of recurrence. We recently identified STAG2 as among the most commonly mutated genes in NMIBC and provided initial evidence that STAG2 mutant tumors may recur less frequently than STAG2 wild-type tumors. Here we report a STAG2 biomarker study using an independent cohort of 82 clinically-annotated papillary NMIBC tumors from the Lombardi Comprehensive Cancer Center. STAG2 immunohistochemistry was correlated with time to recurrence. 52% of NMIBC tumors with STAG2 expression recurred, whereas only 25% of NMIBC tumors with loss of STAG2 expression recurred (p=0.017). Multivariate analysis identified STAG2 as the only significant independent predictor of recurrence (p=0.050). The relative risk of recurrence for patients with STAG2-expressing tumors was 2.408 times the risk for patients with STAG2 negative tumors. Here we demonstrate that a simple, robust assay for identifying STAG2-mutant tumors stratifies patients into two groups: (i) patients with retention of STAG2 expression (wild-type), ~52% of which will recur; and (ii) patients with loss of STAG2 expression, of which only ~25% will recur. Of note, STAG2 expression status, unlike pathological grade-the current standard, was a significant predictor of recurrence. In conclusion, STAG2 is a simple, powerful, and potentially useful biomarker for prediction of recurrence in papillary NMIBC.

**Mapping Potential Binding Sites of Ebola Inhibitory Small Molecule 1E7-07 on Protein Phosphatase 1 with Protein Painting**

Presenter's Name: Xionghao Lin
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Sergei Nekhai
Faculty Advisor's email: snekhai@howard.edu

Coauthors: Tatiana Ammosova, Colette A. Pietzsch, Namita Kumari, Marina Jerebtsova, Andrey Ivanov, Xiaomei Niu, Alexander Bukreyev, Sergei Nekhai

Ebola virus (EBOV) replication is regulated by dephosphorylation of VP30 protein by host protein phosphatase-1 (PP1). PP1 switches EBOV transcription to replication and PP1 inhibition leads to block of EBOV transcription and prevention of viral replication. We previously showed that PP1-targeting small molecule 1E7-03 efficiently blocks EBOV replication in culture cells but undergoes quick degradation in mice. The major obstacle for improvement of 1E7-03 is lack of information on its binding to PP1. Here, we optimized the structure of a PP1-targeting EBOV inhibitor 1E7-03 and derived a new analog, 1E7-07, that potently inhibited EBOV replication and displays better metabolic stability than 1E7-03. We analyzed the effect of 1E7-07 on cellular proteomics and found increased phosphorylation levels of several proteins including ASPP1, B-Raf, MRCKα. 1E7-07 also decreased expression level of PP1-regulatory proteins such as Sds22. We mapped potential binding sites of 1E7-07 on PP1 using novel protein painting approach which was combined with molecular docking. 1E7-07 was found to bind to RvXF and PP1 C-terminal groove (PP1CG) binding sites which were further validated in Biacore binding and competition assays. Taken together, our study reveals the PP1 binding sites for 1E7-07, a novel EBOV inhibitor, thus opening an opportunity for developing of novel viral inhibitors.

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**Impact of the HITECH Act's Incentive Program on the Adoption of Drug-Drug Interaction Alerts and Electronic Prescribing in the Ambulatory Care Setting**

Presenter's Name: Mohammed Malhani
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Mary Maneno
Faculty Advisor's email: mary.maneno@howard.edu

Coauthors: Mary Maneno, Earl Ettienne, La'Marcus Wingate

**BACKGROUND**: The Health Information Technology for Economic and Clinical Health (HITECH) Act has allocated billions of dollars as incentives to promote the meaningful use of electronic health record (EHR) systems nationwide. The ultimate aim of the meaningful use program is to reduce medication errors and improve patient outcomes. This study examined the extent to which the HITECH Act's incentive program enhanced the adoption of drug-drug interaction (DDI) alerts, electronic prescribing (eRx), and computerized physician order entry (CPOE) medication ordering system that are integrated into EHR systems. **METHODS**: A cross-sectional analysis of the 2006-2015 National Ambulatory Medical Care Survey (NAMCS). The data were analyzed using weighted analyses. Descriptive statistics for all study variables were calculated. Chi-square test for trend was used to assess the adoption trends. Chi-square test was used for comparison of the adoption proportions before and after initiating the HITECH Act's incentive program. All analyses were performed using SAS 9.3 at alpha of 0.05. **RESULTS**: In 2015, 77% of ambulatory care practices had a CPOE medication ordering system that provide DDI alerts and send prescriptions electronically, increasing by 27% since 2011. The period after initiating the HITECH Act's incentive program (2012-2015), showed significant increase in the proportion of the adoption of CPOE medication ordering system (P<.0001) with combined use of DDI alerts and eRx functions (P<.0001), compared to prior period (2006-2011). **CONCLUSIONS**: The adoption of CPOE medication ordering systems that provide DDI alerts and send prescriptions electronically have significantly increased after initiating the HITECH Act's incentive program.

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**Adverse Childhood Experiences and Decreased Self-Acceptance**

Presenter's Name: Eva Mayanja
Classification: Undergraduate Student

School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Jules Harrell
Faculty Advisor's email: jharrell@Howard.edu
Coauthors: Christian Mallett

According to Bronfenbrenner's Ecological Theory, the microsystem, which includes family members, caregivers, peers, and teachers, is the primary level of society in which the child develops. Attachment Theory purports that the quality of caregivers' attention and affection toward the developing child impacts the individual's self-esteem and ability to form secure attachments. The present study hypothesized that the adverse experiences within one's household influence self-acceptance. Sixty-six undergraduate students at Howard University took part in the study by signing consent forms and completing the Adverse Childhood Experiences Scale ($M = 2.10$, $SD = 1.88$) and Ryff Scales of Well-Being–Self Acceptance subscale ($M = 41.47$, $SD = 8.04$, $\alpha = .81$). A Pearson's r correlation analysis found a significant inverse correlation between adverse childhood experience prevalence and ratings of self-acceptance, $r(64) = -0.33$, $p < 0.01$. These findings suggest that individuals with more adverse childhood experiences are more likely to endorse lower ratings of self-acceptance.

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**Nutrition-related Knowledge Deficit in Patients with Chronic Kidney Disease**

Presenter's Name: Giovani Mowatt
Classification: Graduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Katherin Manuel
Faculty Advisor's email: Kmmanuel@howard.edu

Coauthors: Nasheba Alexander, Abdulrahman Alsayegh, Giovani Mowatt, Kathrin Manuel, Sapna Batheja

**Background**: Chronic kidney disease (CKD) is a widespread public health problem associated with premature morbidity and mortality. The disease as well as its progression to end stage renal disease (ESRD) disproportionately affects minority populations. CKD is estimated to affect 10% of the population worldwide, 15 % of the US population and 2.7% of individuals living in Washington, DC. African Americans are 3.6 times more likely than Whites to have kidney failure. Given the complexity of the disease, several dietary modifications have been recommended to promote desirable clinical outcomes. The purpose of this review is to determine nutrition-related knowledge of patients with CKD, as well as potential strategies for improving nutrition-related knowledge. **Methods**: A comprehensive review of the literature was conducted. Further, the Nutrition Care Process was employed via case report to determine nutrition knowledge of patients with CKD in the acute care setting. **Results**: Data on nutrition knowledge among patients with CKD are limited. Findings revealed that nutrition knowledge deficit existed among patients with CKD globally, specifically, for individual nutrients of concern as well as overall healthful eating habits. Intervention strategies such as education programs (20 to 60 minutes in duration) were significantly associated with the improvement in nutrition knowledge, biochemical profiles, and dietary habits of patients with CKD. **Conclusion**: Studies involving nutrition knowledge and successful intervention strategies to increase nutrition awareness among patients with CKD are limited globally, especially in the US which has a high prevalence of CKD. Focused research is urgently needed to address this critical issue.

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**Determining characteristics of patients influenced by direct-to-consumer-advertising (DTCA)**

Presenter's Name: Mary Nwokedi
Classification: Professional Student
School/College: Pharmacy
*Presentation Type: Poster Presentation*
Faculty Advisor: La'Marcus Wingate
Faculty Advisor's email: lamarcus.wingate@howard.edu

**Background**: Billions of dollars are spent on direct-to-consumer-advertising (DTCA). The influence of the advertisements may depend on many factors ranging from patient characteristics to availability of advertisements. The purpose of this study was to determine the patient characteristics of those who are influenced by DTCA. **Methods**: The 2015 National Consumer Survey on the Medication Experience and Pharmacist Role was distributed to 25,000 adults within the United States via Qualtrics. Independent variables evaluated from the survey include race, age, gender, medication adherence and use of herbals

and over-the-counter (OTC) medications. Multivariate logistic regression analysis was conducted to identify patient characteristics that predicted if respondents had asked a physician for a medication they had seen through DTCA. **Results**: Approximately one fifth (21.4%) of respondents reported asking a physician for a medication they had seen through DTCA. Nonwhites were significantly more likely to ask for these medications (OR=1.13) after adjusting for other factors, and individuals with lower medication adherence were significantly more likely to ask for these medications as well (OR=1.54). Additionally, use of herbals and OTC medications and experience talking with pharmacists about medications were significantly associated with asking physicians for medications seen in DTCA. **Conclusions**: Potentially vulnerable populations such as minorities and those exhibiting low levels of medication adherence have a greater propensity for asking physicians about drugs seen in DTCA. Additionally, a tendency to seek medical therapy such as OTC drugs and herbals is associated with asking physicians for medications seen in DTCA.

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**Clinical Pharmacogenomics Testing in Opioid Use Disorder Management: A Retrospective Cohort Study**

Presenter's Name: Adaku Ofoegbu
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Oral Presentation*
Faculty Advisor: Earl Ettienne
Faculty Advisor's email: earl.ettienne@howard.edu

Coauthors: Jayla Briggs, Ginika Ezeude, Casey Walker, Simisola Williams, Mary Maneno, Earl Ettienne, Edwin Chapman

**Background**: Opioid use disorder (OUD) constitutes a significant public health burden in the United States. In 2014, 61% of the 47,055 drug overdose deaths that occurred in the United States were attributable to prescription opioid and heroin use. OUD management consists of behavioral modification therapy and medication-assisted treatment (MAT). Buprenorphine is a partial mu-opioid agonist and a MAT option for OUD management. Buprenorphine is metabolized via the cytochrome P450 (CYP) 3A4 enzyme. The CYP3A4*1B allele confers a higher rate of metabolism than the CYP3A4*1 allele, and the CYP3A4*1B allele frequency is higher in African diasporic populations than in people of European descent. Our aim is to determine associations between CYP3A4 genotype, rate of relapse to unauthorized substances, and presence of withdrawal symptoms in African American patients being managed on buprenorphine. **Methods**: A retrospective chart review was conducted on patients from an OUD management clinic in Washington D.C. Demographic data, medication history, and social history were collected for each patient. Pharmacogenomic test reports were reviewed to determine CYP3A4 genotype information. **Preliminary Results**: The majority of the patients exhibited at least one copy of the CYP3A4*1B allele, which appears to confer an accelerated rate of metabolism compared to patients exhibiting two copies of the CYP3A4*1 allele in our cohort. **Discussion**: Clinical pharmacogenomic testing may help to improve OUD management outcomes for patients being managed on buprenorphine.

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**Rare Case of Prostate Abcess in a Patient After Brachytherapy**

Presenter's Name: Desmond Ohiowele
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Pamela Coleman
Faculty Advisor's email: pamela.coleman@howard.edu

Brachytherapy is a form of localized radiation treatment that has been successfully used to treat Prostate cancer, Breast cancer, Cervical cancer and Skin cancer. It involves short range placement of radiation sources at the site of the tumor which are delivered in protective capsules or seeds preventing the radio-isotopes from gaining access to body fluids, yet allowing their ionizing radiation to locally kill tumor cells. The permanent radio-active seed implantation is commonly used to treat localized prostate cancer with favorable prognosis. Among the numerous complications of Brachytherapy including acute urinary retention, urinary incontinence, proctitis, seed migration, and recto-vesical fistula, there is paucity of literature to suggest prostate abscess as a complication of this procedure. Prostate abscess is an uncommon urologic condition in the antibiotic era which may result in sepsis and high mortality rate when not recognized early or adequately treated. In our case

report, we discuss a rare case of prostate abscess in a 58 yr old diabetic male, 6 months after seed implantation. He spent about 2 weeks in the hospital and was treated with intravenous antibiotics and operative drainage of the abscess.

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**Exposure to Interventional Radiology Techniques at a University Clinical Simulation Center**

Presenter's Name: Olumide Olulade
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Roger Lin
Faculty Advisor's email: rlin@huhosp.org

Coauthors: Alexander Song, Hamza Haider, Shannon Sullivan, Andre Duerinckx, Bonnie Davis

**BACKGROUND**: Interventional Radiology (IR) is a well-established medical specialty that includes the performance of a wide range of minimally invasive procedures. Exposure to these procedures during undergraduate medical education could yield increased interest in this field, and motivate medical students to pick IR as a career of choice. It could also improve preparedness of medical students for residency. We aimed to develop a curriculum that provides medical students with early exposure to IR using existing teaching infrastructures. **METHOD**: We explored several educational platforms including classroom instruction, clinical rotations, and supervised non-clinical simulations. Criteria used to assess teaching platforms included: overall added costs, availability of simulation infrastructure, ease of implementation, and impact on providing new skills while not compromising patient safety. **RESULTS**: We chose a curriculum that utilizes an existing surgical simulation center. Equipment at our University Simulation Center allows exposure to three IR procedures: ultrasound-guided central venous catheter placement, vascular stent placement, and foreign object retrieval. Medical students will be trained by an Interventional Radiologist (and other radiologists) on the technical aspects of these procedures, while also gaining hands-on experience. **CONCLUSION**: We developed a curriculum that will provide medical students with hands-on experience with IR procedures. Students will be polled to gauge their level of competency before and after the training sessions as well as changes in their level of interest to pursue IR as a specialty of choice. Future work includes exploring the feasibility of including the aforementioned simulations into the medical school's curriculum.

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**Malaligned Teeth Affect on Hiring Prospects and Higher Education Admissions**

Presenter's Name: Adrienne Perry, DDS
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Dentistry
*Presentation Type: Poster Presentation*
Faculty Advisor: Sana Augustus, DDS
Faculty Advisor's email: sana.augustus@howard.edu

Coauthors: Jamie Barden, PhD, Warren Scott

The aim of this study was to relate access to orthodontics and positive socioeconomic mobility in African Americans through higher education admissions and employment. Although major problems in malocclusion are present in blacks, minority groups are less likely to have orthodontic treatment than their white counterparts. Because orthodontics is widely viewed as a cosmetic luxury, lack of access to orthodontics and its consequences are widely overlooked. In this study, participants judged 8 black faces with mild to severe malocclusions based on a 7 point Likert scale for hireabilty and a 9 point scale for admissions. Lower esthetic ratings were associated with lower hireablility (r=-.51) and a decreased chance of admission into paid internships and master's programs (r=-.57). This data indicates that the criteria for insurance coverage should be reformed to increase availability of orthodontic care for underrepresented groups. Esthetics must be considered as coverage criteria in addition to functional disharmony.

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**Patient Related Limitations of Computed Tomography Angiography for Pulmonary Embolism Diagnosis**

Presenter's Name: Hamza Raja
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Andre Duerinckx

Faculty Advisor's email: aduerinckx@huhosp.org

Coauthors: Hamza Raja, Ibrahim Khaleel, Nia Feaster, Rasheed Nawaz, Saran Hall, Damion Simpson, Bonnie Davis, Andre Duerinckx

**Introduction**: CT Angiography (CTA) currently serves as the gold standard for pulmonary embolism (PE) diagnosis. However, few recent studies have evaluated the frequency of uninterpretable studies and their contributing factors, which is the aim of this study. **Methods**: After obtaining IRB approval, we retrospectively analyzed all CTA studies performed at one institution in the first three months of 2017. Studies without any mention of image quality were grouped as "interpretable"; studies classified as poor quality were grouped as "questionable". A Board Certified Cardiothoracic Radiologist blindly assigned a Quality Score (QS) of 1-5, with 1 being the worst quality and 5 being excellent quality for each of the studies. We analyzed the results and certain patient variables such as Body Mass Index (BMI) and pulmonary artery (PA) size to assess for any correlation with the QS. **Results**: Out of 162 total studies, 31/162 (19%) were of "questionable" quality. These 31 "questionable" studies, named Group A were compared with the first 31 "interpretable" studies, named Group B. Parameters in Group A included BMI = 38 ± 13, main PA size = 28 ± 5 mm; and QS = 2.84 ± 1.18. In Group B the same parameters were: BMI = 27 ± 9, main PA size = 27 ± 4 mm; and QS = 4.18 ± 1.00. Statistically significant differences were found ($P < 0.002$). **Conclusion**: Despite being the gold standard for PE diagnosis, CTA has its limitations as seen by the high frequency of "questionable" studies. Patient BMI and PA size may be contributing factors.

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**Human 5HTR-2A gene implicated in Breast Cancer: An In silico Analysis of Genetic Variation**

Presenter's Name: Nicole Retland Moreland
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Muneer Abbas
Faculty Advisor's email: m_abbas@howard.edu

Coauthors: Georgia Dunston, Yasmin Kanaan, Areej Alyahyawi, Afnan Shakori, Abrar Aloufi

In the United States, African American women are the most disproportionately impacted by cancer; they experience the highest death rates when diagnosed with breast cancer. Studies have demonstrated the expression of serotonin receptors (5HTRs) on breast cancer cells and reported their role in tumor progression. Single nucleotide polymorphisms (SNPs) have been implicated in cancer risk. To characterize the role of SNPs, bioinformatic tools have been helpful. This observed health disparity in cancer, employs us to investigate the contribution of genetic variation within the 5-Hydroxytryptamine receptor 2A (5HTR-2A) gene. We postulated that there would be a statistically significant minor allele frequency (MAF) differences of SNPs in the 5HTR-2A among a population of African Americans and Caucasians. An in silico analysis was performed to identify SNPs in 5HTR-2A. MAF differences were used to determine SNPs of interest. Within the 1000 Genome Project, 2,291 SNPs were identified. Targeting MAF between 0.10 and 0.30, the number of SNPs was reduced to fifty. Subsequently, the functionality of these SNPs was determined via the USCS database. 80% (40) were intronic; 6% (3) in the untranslated region (UTR); and 14% (7) whose function was undetermined. Five SNPs of interest were identified: rs58145637, rs79591795, rs2246127, rs4942578, rs6310. Intronic and UTR SNPs may have a role in alternative splicing or gene expression. However, the relationship of introns to cancer must continue to be explored.

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**A Cross Sectional Study of the Factors that Affect Therapy Adherence in Children with Attention Deficit Disorder/ Attention Deficit/ Hyperactivity Disorder**

Presenter's Name: Noor Saeed
Classification: Graduate Student
School/College: Graduate School
*Presentation Type: Poster Presentation*
Faculty Advisor: Mary Maneno
Faculty Advisor's email: mary.maneno@howard.edu

Coauthors: Sean D. Cleary, Mary Maneno

**OBJECTIVES**: To examine the psychosocial factors that may impact therapy adherence as defined by parental-reported history of medication use among children with ADD/ADHD. **METHODS**: A cross-sectional study with data drawn from the 2011-2012 National Survey

of Children's Health (NSCH) was conducted. Inclusion criteria for the study were U.S. children or adolescents, age 2-17 years, and a parental-reported history of ADD/ADHD. **RESULTS**: Of the 95,677 participants, 29.3% were females, about 75.6%, 13.6%, and 10.8% were White, Black, and Other race, respectively. The mean age of participants was 8.60±0.04 years. Significant predictors of ADD/ADHD therapy adherence were Black race (OR=0.51, 95% CI: 0.36 - 0.73), Other race (OR=0.57, 95% CI: 0.40 - 0.81), always had received provider communication (OR= 2.26, 95% CI: 1.40 - 3.64) or usually had received provider communication (OR= 1.92, 95% CI: 1.15 - 3.20), income between 100-199% FPL (OR= 1.53, 95% CI: 1.06 - 2.22) , income 400% or more FPL (OR= 1.90, 95% CI: 1.19-3.02), and having public insurance (OR= 2.04, 95% CI: 1.12 -3.71). **CONCLUSION**S: Findings suggest that more efforts are needed to address adherence among children of Black and Other race. Also, it shows the positive impact healthcare providers' communication has on improving ADD/ADHD therapy adherence.

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**Efficacy of Ledispavir-Sofosbuvir and other direct-acting antiviral therapies (DAAs) in the treatment of Chronic HCV: A retrospective study in African Americans**

Presenter's Name: Gbeminiyi Samuel
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Charles Howell
Faculty Advisor's email: charles.howell@Howard.edu

Coauthors: Samina Afreen, John Kwagyan, Charles Howell

**Background:** Chronic Hepatitis C virus (HCV) infection is the leading cause of cirrhosis in the United States, with African American (AA) men having the highest prevalence rates. The advent of newer generations of Direct-acting antivirals (DAA) has revolutionized HCV treatment. However, there has been an under-representation of AAs in clinical trials. **Methods:** We conducted a retrospective study assessing 100 consecutive patients with HCV who received treatment with Ledipasvir-Sofosbuvir(LDV/SOF) and other DAAs from January 1, 2015 to June 1, 2017 in Howard University Hospital. **Results:** Most patients were male (62%) and majority of the patients had genotype 1a hepatitis C virus (64%). The mean age was 63 years and 35 (35%) patients were 65 years or older. 76 patients had a documented Fibrosure score, out of which 31 had cirrhosis (F3-F4 & F4). Of the 31 patients with cirrhosis, 27 (87%) achieved SVR, while 42 out of 45 patients (93%) without cirrhosis achieved SVR. SVR was achieved in 92 (92%) patients. Most patients were treatment naïve (83%). 43% endorsed a history of Intravenous drug use, 55% reported past or current alcohol abuse, and 17% had a history of blood transfusion before 1992. Comorbidities profile revealed majority had hypertension, while 5 patients were co-infected with HIV. Of the 70 patients treated with LDV/SOF ± Ribavirin, 64 (91%) achieved SVR, and 28 of 30 (93%) patients treated with other DAAs achieved SVR. **Conclusion:** The response rates of AAs were consistent with those reported in pooled clinical trials regardless of multiple comorbidities and cirrhosis.

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**The Impact of Clinical Pharmacogenomics on Diabetes Management Outcomes in Accra, Ghana: A Cohort Study**

Presenter's Name: Kwame Sarpong
Classification: Professional Student
School/College: Pharmacy
*Presentation Type: Oral Presentation*
Faculty Advisor: Earl Ettienne
Faculty Advisor's email: earl.ettienne@howard.edu

Coauthors: Maimouna Corpening-Traore, Melisa Philogene, Adoma Yeboah, Adaku Ofoegbu, Earl Ettienne, Mary Maneno, Gail Nunlee-Bland, Winston Anderson, Georgia Dunston, Arthur Sackeyfio, Albert Amoah

**Background:** Uncontrolled diabetes can lead to complications, such as cardiovascular disease, ocular complications, renal disease, and increased mortality. Ghana has a diabetes prevalence of 4.8% and a prevalence of elevated fasting blood glucose of 6.4%. Pharmacogenomic testing as a component of clinical decision support may help to improve treatment outcomes. We embarked on a research project at the National Diabetes Management and Research Centre (NDMRC) of the Korle Bu Teaching Hospital in Accra, Ghana to determine which genetic polymorphisms identified via pharmacogenomic testing are predictive of diabetic treatment failure. **Methods**: Participants were recruited from the NDMRC and provided informed consent prior to involvement in the study. Demographic information, medication history, and HbA1c levels were collected

from each participant. A buccal swab was performed to collect genetic material for pharmacogenomic analysis. Pharmacogenomic testing and individual reports were provided by a reference laboratory. Regression analyses were conducted to determine genetic polymorphisms that are predictive of treatment failure, indicated by a glycated hemoglobin A1c (HbA1c) value greater than or equal to 7%. **Results**: A total of 156 participants were included in the study cohort. Mean HbA1c was 8.6% (SD = 2.3%). The cytochrome P450 (CYP) enzymes 2C9, 2D6, and 3A4, the dopamine receptor D2, and the serotonin receptor HTR2C had at least one variant that was predictive of the HbA1c level. **Conclusion**: Pharmacogenomic testing in diabetic patients may help improve treatment outcomes. Further research is needed to determine additional genes of interest that impact diabetes management.

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**Improved Outcomes of Patients with Gastroschisis: Advances in Surgery and Critical Care**

Presenter's Name: Connor Smith
Classification: Professional Student
School/College: Medicine
*Presentation Type: Oral Presentation*
Faculty Advisor: Gezzer Ortega
Faculty Advisor's email: gezzer8@gmail.com

Coauthorsl Jose H Salazar, Gezzer Ortega, Sowmya Swamy, Yiyi Zhang, Ricardo Castillo-Galvan, Jamir Arlikar, Dominic Papandria, Fizan Abdullah

**Background**: The mortality of gastroschisis has been declining for the last 100 years. It has changed from a disease that was nearly always fatal to a treatable condition. **Objective:** To retrospectively compare the contributions of specific technological advances with reductions in mortality of patients with gastroschisis. **Methods**: The English literature was reviewed and due to limitations in patient numbers, articles included were those containing ≥ 8 patients before 1975 and ≥25 patients with gastroschisis after 1975. Statistical analysis was done calculating p values for differences in mortality over 5-year and 10-year periods. **Results**: A total of 67 publications were analyzed including data from 15,782 patients over the last 40 years. Mortality rates ranged from 75 to 0 percent. A statistically significant decrease in mortality was seen between each 5-year period from 1960 to 1990 (all p values ≤ 0.01), with the exception of 1975-1979 to 1980-1984 (p value 0.61). No statistically significant decrease in gastroschisis mortality has been noted for the last 15 years when comparing each 5-year period to the next. **Conclusion**: Advances in critical care and surgery decreased the mortality of gastroschisis to the point that death is infrequent. The most precipitous decrease in mortality was seen during the introduction of total parenteral nutrition and the neonatal mechanical ventilator. Although surgery with bowel reduction is the cornerstone treatment of gastroschisis, changes in technique do not seem to be the main defining factor on patient survival. In the last 15 years, efforts have centered on decreasing the morbidity of survivors.

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**Characteristic Findings on Transvaginal Ultrasound in Different Presentations of Ectopic Pregnancy**

Presenter's Name: Eduardo Somoza
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Andre Duerinckx
Faculty Advisor's email: aduerinckx@huhosp.org

Coauthors: Latonia Miller , Matthew Tang , Imazul Qadir, Anika Hall, Stephanie Davis , Ezana Lulseged, Bonnie Davis

**Background**: The textbook clinical presentation of an ectopic pregnancy (EP) is a woman of reproductive age presenting with vaginal bleeding and/or abdominal pain. However, a systemic review concerning diagnosis of EP, showed that only 15 percent of patients with confirmed EP showed this presentation(1). The same review showed a high likelihood ratio of an EP when an adnexal mass is detected in the absence of an intrauterine pregnancy via transvaginal ultrasound (TVU), thus showing the clinical importance of TVU. **Methods**: A systemic review of peer-reviewed articles that reported characteristic TVU findings helping to confirm possible EP was performed. Thereafter, a case series consisting of EPs which occurred at Howard University Hospital (HUH) were collected and used to demonstrate findings from the systemic review. **Results**: Systemic review yielded 26 high quality articles based on relevant content. Review of articles led to the determination of characteristic TVU findings for different presentations of

EP. Supportive EP cases to demonstrate findings were tubal (most common), heterotopic (highest mortality rate) and cervical (often misdiagnosed) presentations. **Conclusion**: EP has the highest mortality rate in woman of reproductive age. TVU remains the single most reliable diagnostic tool to confirm an EP(1). The findings on TVU support a prompt diagnosis of EP before it manifests into a life-threatening medical emergency, even in a setting where the patient doesn't exhibit the textbook clinical presentation of an EP.

**References:** 1.Crochet et al Does This Woman Have an Ectopic Pregnancy? The Rational Clinical Examination Systemic Review JAMA, 2013: 309 (16)

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**Biomedical Technology and Design: Educating Medical Students**

Presenter's Name: Alexander Song
Classification: Professional Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Roger Lin
Faculty Advisor's email: rlin@huhosp.org

Coauthors: Olumide Olulade, Shannon Sullivan, Hamza Haider

**Background**: Design and innovation are key factors affecting the rapidly changing climate of medicine. Many medical schools do not provide students with exposure to biodesign. Biodesign refers to the integration of design and biological systems. Incorporating such education allows future physicians to help advance medical science. We evaluated how such education could be incorporated into curriculums by conducting a pilot study with a few dedicated students. **Methods**: A group of medical students interested in interventional radiology (IR) modeled their biodesign process on the Stanford Biodesign program (Ref), which includes four phases: Clinical observation: prospectively identify clinical situations where mishaps occurred or procedures were performed sub-optimally with a potential biodesign solution. Need identification: create a "needs statement" for our chosen observation. Need screening: look for already-established solutions for our "need" to avoid duplication of existing technology. Brainstorming of solutions: generate ideas and constraints for a product addressing the need. **Results**: Twelve clinical observations were recognized, with four of these sharing a need for needle stability during biopsy. A specification sheet was generated to guide discussion of designs to address this need. Eight potential designs were created, one was chosen. **Conclusions**: Students identified several clinical problems encountered by physicians at our institution and produced eight unique solutions that could resolve a need found in IR and other specialties. From this study, we hope to identify ways to provide broader exposure to biodesign for medical students.

**Reference:** Sista et al. Applying a structured innovation process to interventional radiology: a single-center experience. JVIR 2012;23(4):488-94.

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**The Impact of Age on Septic Shock and Multiple Organ Failure**

Presenter's Name: Delaram Taghipour
Classification: Post Doc/Resident/Fellow/Research Associate
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Norma Smalls
Faculty Advisor's email: drnormasmalls@gmail.com

**Introduction**: The incidence of sepsis and the percentage of elderly managed for sepsis is increasing. Age and severity of disease play an important role in these patient outcomes. We aim to compare mortality outcomes for patients by stratifying them by pre- and post-Medicare eligibility and by severity: septic shock versus septic shock and multiple organ failure. **Methods**: Retrospective review of the National Inpatient Sample database from 2005-2014 was performed on 501,365 patients 40 to 85 years-old with septic shock alone or septic shock with multiple organ failure (respiratory and kidney failure). Patients were stratified into two age groups, 40-65 years-old and 66-85 years-old. **Results**: By severity of disease, the addition of organ failure to septic shock conferred a 2.5-fold (OR 2.54, 95%CI 2.48-2.61) increased risk for death in the young group and a 2.4-fold (OR 2.36, 95%CI 2.31-2.41) increased mortality in the older group. Analysis by age showed that older patients with septic shock alone had a 49% (OR 1.49, 95%CI 1.46-1.52) increased mortality risk and a 40% (OR 1.40, 95%CI 1.36-1.44) increased mortality risk with multiple organ failure

than their younger counterparts. **Conclusion**s: While age significantly increased mortality risk in septic shock with organ failure, the severity of disease played a larger role. Given the limitation of healthcare resources, allocation of care is important in the establishing long-term strategies for optimal care in the United States.

**Determination of a miRNA Signature in Triple Negative Breast Cancer African American Women from Howard University Hospital in Comparison to Non-Hispanic White Triple Negative Breast Cancer Patients**

Presenter's Name: Safaa Turkistani
Classification: Graduate Student
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Yasmeen Kanaan
Faculty Advisor's email: ymkanaan@howard.edu

**Background**: Triple negative breast cancer (TNBC) of African American (AA) women exhibits aggressive clinical behaviors as demonstrated by poor prognosis, resistance to therapies and rapid progression to metastatic disease, resulting in a disproportionate elevated number of cancer deaths when compared to other TNBC patients. **Methods**: A total of 50 (formalin fixed paraffin embedded tissues) FFPE breast tissues of AA women diagnosed with TNBC in Howard University Hospital will be processed for RNA isolation, qPCR, microarray and further analysis. **Expected Results:** miRNAs will be differentially expressed in the AAW with breast cancer in comparison with NHW patients. **Conclusion:** A group of miRNAs expression will be a unique signature for AA women with TNBC.

# Bacteriophages

**Finding Razza: The Journey**

Presenter's Name: Opeoluwa Abiona
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: shaunda.young@howard.edu

Coauthors: Somiranjan Ghosh, Michael Smith, Courtney Robinson, Adrian Allen

**Background**: The current research on the PHAGES program aims at finding new phages to be used in future against antibiotic-resistant bacteria. Here, a series of experiments was performed to verify the hypothesis that there are new, unique phages on the Howard campus. Ultimately, a new phage-Razza-was discovered after the purification of the phage population that was present in the sample. **Materials & Methods**: In September, some soil sample was collected from the Howard university campus. The phage population in that sample was isolated using enrichment technique, after which dilutions were performed for purification. Mycobacterium Smegmatis mc2 155, the bacterial host, was constantly infected with phages, so that, by the action of phages on bacterial cell, through infection, plaques would be seen in the agar plates that were used in the culture. After purification, Razza eventually emerged as the new phage. Razza is being tested for Lysogens presently. **Results and Discussion**: Razza has a diameter of 1.00cm, a clear and circular morphology, and a titer value of 1.1 x 10^13pfu/ml. 3 rounds of plating, each with over 48 hours of incubation, without any development of Mesas suggests the absence of lysogens. Razza seems to be a purely Lytic phage because of it's inability to form Mesas. Further investigation, viz., Restriction Enzyme Digest, Electron Microscopy, and DNA extraction will be undertaken to visualize and analyze microbes in detail in order to understand Razza better.

**The Isolation and Purification of Phage Babatunde using Mycobacterium smegmatis**

Presenter's Name: Ashley Achonye
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Thomas Heslop, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh

**Background**: The Science Education Alliance: Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program at Howard University is funded by the Howard Hughes Medical Institution to conduct research on bacteriophages. Bacteriophages are viruses that infect bacteria. Bacteriophages can infect their hosts either through the lytic cycle or the lysogenic life cycle. When the host bacterium is infected with bacteriophages, clearings called plaques form. Bacteriophages can be easily manipulated and therefore they have potential uses in biotechnology, research, and therapeutics. **Methodology**: A soil sample was collected outside of the Ernest Just Hall Building at Howard University at 38.921589 N, 77.019728 W. The soil sample was subjected to an enrichment protocol to increase mycobacteriophage population sizes. Phages were then purified via serial dilution in order to generate a single phage population. Putative lysogens were obtained through extended incubation of phage infected plates. **Results**: The pure phage sample was named Babatunde, which means Father Has Returned in Yoruba. The lysate of phage Babatunde had a titer of 3.0 x 108 pfu/mL which was determined through a plaque assay. Three putative lysogens have been isolated. **Conclusion**s: The initial observation of clear plaques suggested that Babatunde was a lytic phage. However, in recent experiments, Babatunde has shown evidence of lysogeny. Ongoing research will determine

whether Babatunde is in fact a temperate phage. Future research will establish superinfection resistance profiles for the Babatunde lysogen and the ability of Babatunde phage to infect other lysogens.

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**Isolation and Purification of Actinobacteriophage Kenji8**

Presenter's Name: Comfort Adegboye
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

The objective of this current study is to find a unique bacteriophage, Kenji8 towards isolation, its action on host bacteria Mycobacterium smegmatis, and final sequencing. The bacteriophage was collected from an environmental sample taken from Howard University's campus. In this study, direct isolation, enrichment protocol, spot test, 10-fold serial dilutions, plaque assay, and full plate titer were utilized to do obtain, amplify, and isolate a bacteriophage. The phage isolated was named Kenji8. Kenji8 is a lytic phage with a tiny, circular and clear morphology. The titer of Kenji8 from a 10-4 dilution was calculated, and the value obtained was 1.5 x 108 pfu/ml. The low titer value may be due to the scarcity of plaques in the successive dilutions. After archiving and regeneration, a new titer was calculated from a 10-5 dilution and the value of 1.06 x 109 pfu/ml was obtained. A lysogen was obtained and streaked from a high titer spot, specifically the 10-3 spot. The potential lysogens were then tested and verified through a technique of patch assay which was repeated to increase the chances of getting a purified lysogen. The further objective of this research is to contribute to the bacteriophage population through the discovery of a new virus, genome annotation, and comparative genomics. If Kenji8 produces a high titer, a lysogen that can prevent superinfection can be obtained, and it could potentially be used to kill antibiotic-resistant bacteria and treat various infections.

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**Isolation and Characterization of Phage Ifeoluwakiisi**

Presenter's Name: Ifeoluwakiisi Adejoorin
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: The present investigation under the SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) research program seeks to explore the Bacteriophages, commonly called phages that are obligate intracellular parasites that infect a bacterial host and bacteria are free living prokaryotes. In addition to contributing to the phages database, this research aims at isolating phages that can kill antibiotic resistant bacteria using the enrichment and direct plating methods. **Materials and Methods**: The current study uses the bacterial host called Mycobacterium smegmatis (MC2 155). The soil samples used in this series of experiments was gotten from the Howard University Hospital. These bacteriophages are very diverse and unique and so there is a possibility of finding a very unique phage considering the rich vegetation of Howard University as well as the variety of soil samples that can be found on the campus. The bacteriophage found on the campus were then isolated using the following Methods: Sample Collection, Direct Isolation, Plaque Assay, Enrichment Protocol, Spot Assay, Plaque Picking, Phage Purification, Lysate Collection, DNA Extraction, Nanodrop Spectrophotometer, Gel Electrophoresis, Transmission Electron Microscopy, treaking, Patch Assay, and Insensitivity Testing. **Results and Discussion**: The phages, as found under the current research, are very promising, as they can be used to treat a variety of illness using phage therapy.

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**The Discovery of Bacteriophage Bell07**

Presenter's Name: Beloved Adenuga
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Young Shaunda
Faculty Advisor's email: Shaunda.young@howard.edu

Coauthors: Ghosh Somiranjan , Courtney Robinson, Michael Smith

**Background**: Bacteriophages, are organisms that solely infect bacterial cells. They bear the characteristics of viruses and function only in living cells by taking over the cellular mechanism of their host and using it to their advantage to replicate. Present investigation research is aimed at discovering a new phage that could affect the host, ***Mycobacterium smegmatis*** mc2 155. Materials & **Methods**: Phage Bell07 was found in a soil sample collected from the bed in front of the A-building at Howard University main campus. Among other phages present in the soil sample, Bell07 was isolated and purified. After three rounds of purification, a webbed plate was obtained, which was used to obtain a lysate used in the calculation of the phage's titer. Using the lysate, preparations for Transmission Electron Microscopy (TEM) were carried out by mounting phage sample on a grid. Also, the phage's nucleic acid (DNA) which was extracted was used for restriction enzyme digestion and gel electrophoresis. **Results** & Discussion: Bell07 forms clear plaques about 1mm in size. The phages titer calculated was 1.82x1010pfu/ml. The DNA concentration and purity were 283.4µg/ml and 1.88 respectively. **Conclusion**: Bell07 is lytic and can infect Mycobacterium smegmatis mc2 155. Currently, the phage is being tested for lysogeny.This would help understand the host range and the degree of sensitivity of Bell07 to a confirmed lysogen. For further characterization, Bell07 would be viewed under the electron microscope and have its genome sequenced.

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**The Characterization of Phage Adigun**

Presenter's Name: Alexandria Adigun
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

A bacteriophage is a virus with a vast community and is able to infect a specific bacterial cell. They are cells that are critical in the development of antibodies, as they can be used to target specific bacterial cells that are resistant to antibodies. Through the isolation and purification of phages and the constant discovery of new phages along with their properties, these entities are used to develop more efficient drugs that will be able to combat against resistant strains of bacteria. The lysate collected containing phage Adigun was used to extract DNA, prepare a grid for TEM viewing and archive the phage. The DNA of phage Adigun was then used to run a gel that could be used to better understand the sequence of this phage's genome. In addition, the plaques presented by this phage were used to streak across and agar plate in order to create an identify lysogen. Phage Adigun is a lytic phage that ranges from 1mm to 3mm, as it has two morphologies, and contains a titer of 1.81 x 109. Phage Adigun's DNA average concentration of 25.85 with average purity of 1.67 ng/ l. Phage Adigun is also able to present well isolated colonies of lysogen when streaked. It is feasible that with a thorough characterization of phage Adigun and additional testing, the phage will demonstrate properties that can be used to further medical advances as it relates to antibiotics.

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**Understanding The BabyBlue Phage**

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

**Background**: Bacteriophages are viruses that are essential in the infection and destruction of bacteria. The purpose of SEA-PHAGES is to expand scientific knowledge of bacteriophages. **Materials & Methods**: A sample was initially collected from a flower bed at the Howard University Health Science Library. The collected sample showed no growth or infection of the host Mycobacterium smegmatis MC 2 155. This prompted another new collection, and was collected from the valley at Howard University, just outside the E. E. Just Hall, Biology building at Howard University main campus. Soon after collection, **Methods** viz., direct isolation, plaque assay, enrichment isolation, spot test, lysate collection, full plate titer, and spot titer completed in order to isolate and purify the phage. **Results**: After purifying and isolating the phage, the titer was calculated and came out to be 7.8 x 10^9 pfu/ml. The phage was then viewed by a transmission electron microscopy and stained with uranyl acetate, extracted, and underwent gel electrophoresis. During gel electrophoresis, the DNA was lit up by the fluorescent dye.The abundance and location of the DNA was able to be seen. **Discussion**: Now the phage is being tested and verified

for potential lysogens. The phage genome needs to be integrated into the bacterial genome for it to be picked from a spot. To continue on to the next stage, the lysogen must be picked and streaked across the plate. This is important because it will show the life cycle of the phage.

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**Isolating and Characterizing Aluko1021**

Presenter's Name: Tosin Aluko
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: Bacteriophages, commonly known as phages, are viruses that infect bacterial hosts and, they share the same properties as other viruses. They can be used for targeting and killing antibiotic resistant bacteria, which is needed most at this hour. We use the bacterial host Mycobacterium smegmatis mc^2 155 and was utilized all throughout this present investigation to isolate and determine a phage genome. **Materials & Methods**: The phage was collected near the Howard University welcome sign. Direct Isolation and Enriched Isolation were used in order to isolate the phage after its collection. After the phage was isolated a spot test was performed, so that, multiple samples of a phage could be seen on one plate. A Plaque Assay was followed to visualize the phage particles in a sample. Once the Plaque Assay was completed, the sample undergoes several rounds of the purification process. to make sure that the sample has only one phage. **Results**: After the sample is purified, the titer was found. The titer was 1.62 x 10^10 PFu/ml, and this number was found by the number of plaques on the purified plate. The phage was very lytic due to the fact that it had the ability to almost lyse plates completely. **Conclusion**: This is a very lytic phage, and it can be used to combat antibiotic resistance.

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**Isolation and Characterization of Bacteriophage KillBill**

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

Coauthors: Hemayet Ullah

Bacteriophages are viruses of a vast, old, and diverse population, fairly new to scientists, that infect bacterial hosts to reproduce and thrive. This was a study of bacteriophage KillBill, collected and isolated in 2017 on Howard University's campus. This research aimed to characterize the genome and properties of bacteriophage KillBill through several experiments. Bacteriophage KillBill was collected in front of Howard University's administration building then directly isolated. A plaque was picked from the direct isolation plate and purified three times before achieving webbed plates. Webbed plates were formed on dilutions 10-3 and 10-4 and flooded with 8ml of phage buffer for two hours. KillBill's calculated titer was 2.9 x 1010. A sample was then archived for long-term storage and shipped to the University of Pittsburgh. The DNA of the phage was then extracted by removing the host bacterial DNA and RNA from the lysate using nuclease enzymes. The nanodrop then determines the concentration of the phage. KillBill has a concentration of 168.5 and a purity of 1.895. The researcher conducted gel electrophoresis to separate the DNA fragments of the bacteriophage; when exposed to an electric current, the DNA molecules migrate through the gel because of DNA's negative charge. The voltage was set at 100V and ran for about an hour before photographing the gel. Overall, bacteriophage KillBill has had consistent morphology and continues to break barriers. The phage will be further annotated and characterized using the DNA master program.

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**Bacteriophage Research as an Undergraduate Student: Finding Ammo the Phage**

Presenter's Name: Danielle Britt
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacteriophages are a type a virus that infect bacteria. Bacteriophages were discovered in 1915 by Frederick

William Twort. This was confirmed by Felix d'Heerelle in 1917. Bacteriophages are parasitic since they need their host to survive and live. After a phage injects genetic material into the cell it can follow the lytic cycle or the lysogenic cycle. In the lytic cycle, the phage completely destroys the cell by lysing it. In the lysogenic cycle, the phage integrates into the genome of the bacteria and replicates with it without destroying the cell. In certain circumstances a lysogenic phage can go into the lytic cycle. For the PHAGES Lab, we use a collection of soil to try to isolate a phage from it. To do this we utilize different methods like serial dilutions, direct and enrichment plating, filtration, and aseptic technique. After phage purification, we isolate the phage DNA, perform electrophoresis, sequencing, and annotating. The phage that I isolated is Ammo. The verified titer of Ammo is 7.8 x 107 pfu/ml The experiments that we do in PHAGES we do are important because we can potentially discover a new bacteriophage that can be added to the gene bank and used for phage therapy or vaccinations.

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**Jordyn1999 Bacteriophage Research**

Presenter's Name: Jordyn Britton
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Coauthors: Jordyn Britton, MSC, Abebe Animut, Ph.D., and Ayele Gugssa, Ph.D.

The objective of my bacteriophage research was to isolate a single bacteriophage. A bacteriophage is a virus that invades a bacterial host. In order to begin our experiment we needed to retrieve an environmental sample. Using a ruler we measured 3.3 centimeters deep into the soil at Howard University Hospital (38.9177 N, 77.012 W) when it was 22 degrees Celsius outside. We used our spoon to scoop about 15 mL of soil into a plastic bag and created a soil filtrate which contained bacteriophage and viruses. This filtrate would become the most important part of my experiment. Once I retrieved the filtrate we were able to split off into individual people and infect Mycobacterium Smegmatis. After many trials with no infection, my bacteriophage finally infected the bacteria. I quickly began the process of phage purification which did not take very long to retrieve a purified phage. Once I had a purified phage we began phage isolation. This resulted in the flooding of my webbed plates in order to retrieve a lysate. Then we filtered our lysate and eventually began the process of bacteriophage DNA isolation. Once I retrieved my phage DNA, I calculated my phage titer which was 4.6 X 10^11 pfu/ml. The journey was long, but I successfully retrieved the DNA of the jordyn1999 phage.

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**Bacteriophages**

Presenter's Name: Cynymon Colebrook
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Coauthors: Cynymon Colebrook, Rajon Scott, Sobitan Adebiyi, Ayele Gugssa, Ph.D.

Bacteriophages were discovered by two people: the English bacteriologist Frederick Twort in 1915 and the French-Canadian microbiologist Felix d'Herelle in 1917. A bacteriophage is a virus that infects and replicates within a bacterium. They are microscopic, single-celled organisms that act as parasites when infecting a bacterium-host. Bacteriophages are composed of proteins that encapsulate a DNA or RNA genome. Furthermore, phages can be used for the advancement of molecular biology, therapeutics, and to treat pathogenic bacterial infections. This semester, we are focusing on sequencing the DNA of JustHall, a bacteriophage that was discovered near Just Hall at Howard University. Using Mycobacterium smegmatis, Just Hall was isolated and is now undergoing further experimentation to investigate its biodiversity. DNA sequencing is a method used to determine the order of nucleotides in a strand of DNA. After characterizing and sequencing the bacteriophage, the information will be entered into the database of the GenBank so that it can benefit other scientists around the world. Collecting this information is important because it helps with the discovery of new bacteriophages that may be needed in the production of antibacterial vaccines thereby relieving the overdependence on antibiotics for treatments of bacterial infections.

**The Characterization of Bacteriophage Elusiva to Infect Bacterial Host Mycobacterium Smegmatis**

Presenter's Name: Aniya Crocker
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourd Michelle Fernando, Mary Ayuk, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Leon Dickson

As part of the SEAPhages Course, students identified a single bacteriophage capable of infecting the bacterial host Mycobacterium smegmatis. M.smeg is non-pathogenic, easy to handle, and can be doubled in number at a faster rate, making it an appropriate bacterial host for the program. The course used standard microbiology techniques such as inoculating agar plates and serial dilution, as well as standard molecular biology techniques such as gel electrophoresis. During the first semester, the researcher obtained a soil sample and performed direct plating to validate any generated plaques. Enrichment plating, which involved submerging the soil in enrichment broth, produced plaques of various morphologies. A spot test was performed to determine the concentration at which plaques would be produced. After these methods of isolation, eight rounds of serial dilution generated purified, isolated plaques. The plaques were then flooded to produce a highly concentrated phage lysate. A spot titer and full plate titer were used to obtain the concentration of phages within the lysate and verify the plaque population, which would determine the titer of the lysate. The purpose of these experiments was to generate a purified phage population. The phage yielded had a titer of 3.5x10^7 pfu/mL, which was not high enough to perform DNA Extraction. Whether the phage was lytic or lysogenic was undetermined. This semester, students are annotating and further characterizing lysogenic studies, which include performing a spot titer to obtain mesas and streaking that bacteria sample to obtain isolated colonies.

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**Bacteriophage Discovery**

Presenter's Name: Chance Davenport-Mills
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: Gugssaa@gmail.com

Coauthors: Adaora Ekwunife, Desiree Duncan, Cynymon Colebrook, Rajon Scott, Sobitan Adebiyi, Ayele Gugssa, Ph.D.

The discovery of bacteriophages dates back about 100 years ago. The most notable contributors to the discovery of bacteriophages are Frederick Twort and Felix D'Herrelle. A bacteriophage is simply a virus that infects a bacterial host. Seeing that the bacteriophage population is vast, antique, highly dynamic, and genetically diverse, they make up the majority of all biological entities in the biosphere. By participating in the SEA-PHAGES program, one is aiding in the genome characterization of the 10^31 phage particles in the biosphere that have yet to be discovered. DavenportM17 was collected in an environmental soil sample in front of Ernest Just Hall, of Howard University, 38.5519 N, 77.17 W. Through the processes of isolation, purification, amplification with the help of mycobacterium smegmatis, paired with electron microscopy and DNA isolation and analysis, I was able to determine the SEA lysate titer - 1.74 x 10 ^10 pfu/ml. In continuation of DavenportM17's discovery, I am following up with the bioinformatics dissection of DavenportM17's genome by using the computational program "DNA Master" in order to identify genes, regulatory elements, and other genomic features of the newly found bacteriophage. Once I finish the computational section of my phage discovery I will have fulfilled the characterization and discovery of DavenportM17.

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**Isolating and Extracting the DNA of Bacteriophages**

Presenter's Name: Arielle Downes
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: ayele.gugssa@howard.edu
The PHAGES Program is a microbiological program that utilizes the information obtained from new phages to aid further research for gene therapy, disease prevention or cure, among other things. The study performed by the investigator

involved (a) isolating, purifying, and amplifying a phage to (b) extract the DNA in order to (c) study and annotate the phage's genome. A soil sample was collected from the Howard University Hospital (approximately 38.9177 N and 77.0212 W). This sample was centrifuged in order to gather lysate from the supernatant. The phage was isolated with a host, Mycobacterium Smegmatis mc2 155 using both direct and enrichment plating. The plaques that formed were used for further purification from a medium titer lysate to a high titer lysate using empirical tests. The phage, named ArielleDownes, was found to have a titer of 1.98 x 1012 pfu/ml and a plaque diameter of 2.0mm. The phage DNA was extracted and observed using a nanodrop photoextrometer and gel electrophoresis. The results of the 'Nanodrop' classified the phage as having a concentration of 0.0459 µg/µl and a 260:280 purity of 1.55 (pure). This information was sent to the PHAGES database for further studies. At the moment, the investigator is learning and engaging in the process of DNA annotation using DNA Master, a program that allows one to observe the specific sequence of the phage DNA.

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**Bacteriophage Research**

Presenter's Name: Desiree Duncan
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

A bacteriophage, also known as phage, is a parasitic virus that infects bacteria, replicates inside of it, and then eventually lyses the cell wall thus killing the bacterium. In our research, we collected a soil sample from outside of Just Hall at Howard University (38.55 degrees North, 77.17 degrees West) and isolated our own bacteriophages that infect ***Mycobacterium smegmatis***. My bacteriophage Desaninn was isolated through a tedious process known as phage purification in which we used serial dilution as a technique to aid us in isolation. Soon, me and my peers were able to notice that different bacteriophages have different characteristics, such as various morphologies and sizes of the plaques that these phages create. Following purification, medium titer lysates (MTL) of our phages were obtained and filtered in order to obtain a high titer lysate (HTL) of our sample through empirical testing. DNA was then extracted from our HTL and purified. Restriction digest enzymes were then used to cut DNA in order to allow us to visualize it through gel electrophoresis and electron microscopy. Many phages were identified using the techniques talked about. Morphology, size, and genomic evidence were all characteristics that allowed us to differentiate our bacteriophages which will be used for further research at the University of Pittsburgh.

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**Just Ha;**

Presenter's Name: Adaora Ekwunife
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Adaora Ekwunife, Lourds Michelle Fernando; Adrian Allen; Mary Ayuk; Broderick Eribo; Ayele Gugssa, Ph.D.; Courtney Robinson; Somiranjan Ghosh ; Leon Dickson

**Introduction**: Bacteriophages are viruses that infect bacteria. My phage was isolated from the environment using Mycobacterium Smegmatis MC2155**. Materials and Methods**: Methods include aseptic technique, serial dilution, direct and enrichment plating, spot test, phage purification, DNA isolation, lysate plating, and gel electrophoresis. **Results**: Mycobacteriophage JustHall made .75 mm clear plaques. I obtained a lysate with a titer 7 x 106 pfu/ml. DNA extracted had a concentration of 0.0843 µg/µl and agarose gel electrophoresis showed that DNA was pure and intact. Presence of mesa confirmed that it can go through the lysogenic life cycle. **Conclusion**: JustHall is one of the few temperate phages in this course and further investigations are on its way to characterize this Mycobacteriophage.

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**Observing Falana**

Presenter's Name: Abimbola Falana
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson

Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: A bacteriophage, commonly known as a phage, is a virus that lives in bacteria. Phages can be found in every ecosystem that can have a significant impact. The purpose of isolating phages from Mycobacterium smegmatis bacterial soil samples was to test their presence and characterize them to be used in medical settings. **Materials & Methods**: A soil sample was collected in 15 ml conical tube in front of the Howard University sign. Direct isolation extracted phages from the sample. Plaque assay detected the presence of the bacteriophage. Enriched Isolation amplified the phages, followed by a spot assay to test the presence of the phage in various dilutions. To create a liquid sample, a well isolated plaque was picked. After flooding a webbed plate, a liquid sample was made. Two levels of dilutions from the lysate were plated for a full plate titer. After purifying the phage and getting a high titer lysate, DNA was extracted. The concentration and purity was found using a nanodrop. A spot titer determined the concentration of phage Falana after a month long break. Streaking was done to create a lysogen with Falana. A patch assay was performed to further identify lysogens. **Results and Discussion**: Future work will be directed towards phage, Falana. This phage was found from the sample, creating 0.2 cm in diameter plaques on average. Falana's titer was 6.3* 10^10 pfu/ml. The next steps are to test the sensitivity of Falana to see how it reacts in different environments.

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**The Isolation and Purification of Christophori with the Host Bacteria of Mycobacterium Smegmatis**

Presenter's Name: Torian Guillory
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Couathors: Courtney Robinson, Adrian Allen, Somiranjan Ghosh, Leon Dickson, Ayele Gugssa, Ph.D., Swagota Roy, Mary Ayuk

**Background**: Science Education Alliance- Phage Hunters Advancing Genomics and Evolutionary Sciences (SEA-PHAGES) program, is funded by the Howard Hughes Medical Institution to expand research centering on bacteriophages. A bacteriophage is a virus that infects a specific bacterium by injecting its DNA into its host allowing it to use the cell to reproduce itself. This research is important because the host bacterium for this study, ***Mycobacterium smegmatis***, is a relative of ***Mycobacterium tuberculosis*** and the results could one day be used to develop new treatments for tuberculosis. **Methodology**: The soil sample for this experiment was collected 9.5 centimeters below the topsoil from the Howard sign, located near 4th and Bryant Streets near the Bethune Annex, and was described as brown and slightly moist. After enriching and filtering, the sample was inoculated with Mycobacterium smegmatis. Phage infections formed clear areas called plaques on the petri dishes. Isolation and purification of a phage was done using plaque assays and was performed to generate a single morphology. After these protocols, DNA was extracted. To determine whether the phage could enter the lysogenic life cycle, lysogeny experiments were conducted. **Results and Conclusions**: Phage Christophori was isolated and yielded a high titer lysate of 3.7 x 10-11pfu/ml. DNA isolation was not successful. The consistent observation of clear plaques on the assays suggested that Christophori, was a lytic phage. Further experiments, however, are currently underway to determine the capability of phage Christophori being a temperate phage.

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**Animal Research in the Modern Era: Productive or Pointless?**

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

In the age of advanced medicine and technology, is Animal Research ethical? With the advancements of medicine and technology, we must begin to question the ethical nature of animal testing. When scientists were still compiling information concerning the human anatomy and finding cures of viral diseases, animal research was viable and reasonable (as the benefits morally outweighed the harm caused to the animals that underwent experimentation). However, animal research is still used for medical and cosmetic purposes. In this presentation, I will present bioethical concerns that

remain prevalent in animal research/experimentation. In order to accurately present this animal research argument, this presentation will present and assess the politics behind animal research/experimentation. This presentation will analyze the ethics around animal research/experimentation through Mill's utilitarian perspective and Degrazia's equal/unequal consideration philosophical theories.

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**Characterizing Patterns of Phaze the Phage from Howard University, with host bacterium: Mycobacterium smegmatis mc2 155**

Presenter's Name: Thomas Heslop
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Ashley Achonye, Ayele Gugssa, Ph.D., Leon Dickson, Mary Ayuk, Somiranjan Ghosh, Adrian Allen, Roy Swagota

**Background**: The goal of this research is to further research on bacteriophages, which are bacteria-infecting virus that can be found where bacteria are. These viruses infiltrate specific bacterial cells and either go through a lytic cycle, that involves immediate lysis or a lysogeny, in which the bacteriophage replicates with the host. Bacteriophages were inoculated with the host bacterium, Mycobacterium smegmatis mc2 155. M. smegmatis was chosen, because this research can be used to fight infections of other harmful, common Mycobacterium species (e.g. M. tuberculosis, M. leprae). **Methodology**: A soil sample was collected from in front of EE Just Hall (38.921589 N, 77.019729 W). A high spot titer was created for mesas. Mesa were used to streak putative lysogens onto an agar plate. After incubating for several days, visible colonies were identified. In the patch assay, individual colonies were streaked onto an agar plate and bacterial lawn; verifying putative lysogens based on clearings on the experimental plates. **Results**: Phaze demonstrated to possess putative lysogens; based on turbid, plaque clearings, of about 1.5 mm in diameter, with colonies. **Conclusion**: Experimentation has supported the idea that Phaze is lysogenic, and that there is a temperate phage population at Howard University. Further experimentation will take place in the future for lysogen candidacy characteristics; such as immunity and exclusions.

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**The Process of the bacteriophage TryAgain**

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

Coauthors: Lourds Michelle Fernando, Mary Ayu, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Leon Dickson

This study explores the isolation, purification, extraction, amplification and characterization of the bacteriophages DNA within the SEA-PHAGES program. On a global scale, the phage population is very large and genetically diverse and is estimated at over 10^31 particles. Bacteriophage particles can be identified in several different ways, however most phages are tailed viruses containing double-stranded DNA genomes. This study covers the lengthy process that my phage named TryAgain has completed throughout the past several months. The study was conducted using aseptic techniques and strictly followed the protocols listed in the Phage Discovery Guide attempting to limit the amount of errors throughout the lab. The bacteriophage, regarding the location of collection of environmental samples, was found and collected from a patch of grass 1.7 centimeters in the soil of the Harriet Tubman Quadrangle at the coordinates 38*55' 14" N, 77*1'17" W at 22*. In my case, I was able to successfully calculate a titer, despite the several setbacks that my lab partner and I endured throughout the semester mainly including the production of very small plaques. The plaques in our full titer were counted and we calculated the titer of the lysate. Unfortunately, I will never have vigorous plaques as even my titer of the lysate was very small compared to others. After performing the full plate, I counted the plaques in the 10^-2 and 10^-3 plate and counted 22 plaques in the 10^-3 plate. From this I calculated the titer of the lysate to be 1.1 x 10^5 pfu/ml.

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**The Extraction, Isolation, and Purification of phage Firefly12 with the Host Bacteria of Mycobacterium smegmatis**

Presenter's Name: Lauren Jackson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Cristen Hall, Nina Brown, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mary Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney J. Robinson

**Background**: A virus is a small organism that relies on host cells to survive and reproduce. Bacteriophages, or phages, are a specific type of virus that selectively target bacteria as their host cells. Plaques are regions formed in a lawn of cells due to cell lysis by the bacteriophage. Phages that undergo the lytic cycle in which the cells are completely lysed immediately after infection, yielding clear plaques, are known as lytic phages. Phages that undergo the lysogenic cycle in which the DNA of the phage is integrated into the host cell DNA and generate turbid plaques because not all of the cells lyse are known as temperate phages. **Methodology**: Direct plating was performed to isolate phage directly from a soil sample on Howard University's campus without amplification. Through serial dilutions, a single plaque morphology was isolated and purified. Upon achieving a pure population, DNA was extracted. To determine whether the phage was temperate or lytic, extended incubation times and patch assays were conducted. **Results and Conclusions**: Phage Firefly12, created clear plaques with a diameter of 0.3mm and a titer of 5.2 x 1010 plaque forming units per milliliter, with an average concentration of 79 ng/µL of DNA. No lysogens were generated after extended incubations, indicating that Phage Firefly12 is a lytic phage.

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**Investigation of Bacteriophage Populations on the Campus of Howard University**

Presenter's Name: Jalen Jean-Baptiste
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Ehab Elhag, Swagota Roy, Courtney Robinson

**Background**: The purpose of this experiment is to discover and investigate new populations of bacteriophages. A bacteriophage is a bacteria-infecting virus that has two major types: lytic and temperate. Lytic phages infect the bacterial cell and immediately make copies of its self. It then lyses the cell, releasing the new phages. A temperate phage does not immediately make new viruses. Its genetic material incorporates into the bacterial genome and replicates with the bacterial genome. In this experiment the host used for infection is Mycobacterium smegmatis MC2 155. The hypothesis of this experiment is that there are diverse mycobacteriophage populations on the campus of Howard University. **Methodology**: The procedures of this experiment are as follows: sample collection, direct plating and enrichment, purification, DNA extraction, DNA sequencing, and electron microscopy. Additionally, restriction enzyme digest, gel electrophoresis and creating and testing of lysogens were performed. **Results** and **Conclusion**s: The phage isolated was named Fludd. It created two plaques of different diameters: < 1.0 mm and ~3.0 mm. Both plaques were circular in shape. The titer was found to be 4.0 x 101 pfu/ml. The initial plaques were clear, which indicated that the phage was lytic. Extended incubation periods have failed to produce lysogens, which supports this initial **Conclusion**. Fludd belongs to phage cluster C1 and its genome is 154, 456 bp in length. Further characterization of Fludd will include genome annotation, comparison to other C1 phage genomes and infection profile studies.

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**Analyzing of Bacteriophages KodakB at Howard University in Washington D.C**

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

Coauthors: Basit Oyefeso, Jerome Oliver, Mary Ayuk, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan

Ghosh, Winston Anderson, Leon Dickson, Jr., Hemayet Ullah The soil sample was obtained near the Burr Gymnasium at Howard University 38.9264° N, 77.0221° W). The soil sample was brought back to the laboratory and aseptic conditions were used for the continuation of the experiment. Phages were amplified using enrichment broth and then were subsequently isolated using 10-fold serial dilution until a single phage of the same morphology was found. For the experiment, Mycobacterium smegmatis was used as the bacterial host, D29 was used as the positive control, and phage buffer was the negative control. For the plating, complete top agar was used by combining 7H9, 2X top agar and using C1V1=C2V2 to find the appropriate amount of CaCl2 to add the combination. On the webbed plate used to calculate the Phage titer 134 plaques were counted which falls into the appropriate perimeter to calculate for titer which concluded to be a high titer at 6.07x1010 pfu/ml. Restriction enzyme digest was performed on the phage's DNA genome and multiple fragments were shown on electrophoreses. DNA isolation procedure was performed to purify of the phage's DNA and measured with Thermo Fisher NanoDrop spectrophotometer which was 203.2ng/ml.

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**The Isolation and Characterization of Chimchim Phage**

Presenter's Name: Jenita Joe
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourds Michelle Fernando, Adrian Allen, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Leon Dickson

**Introduction**: Bacteriophages are viruses that infects and replicates within a bacterium. Many discoveries have been made related to phages such as isolating therapeutic phages which aid in fighting bacterial infections. The importance of research on phages for the progression of medicine has grown. My project aims to isolate a phage that infects M. smegmatis mc2155 and I isolated and purified Mycobacteriophage Chimchim from soil. **Materials/Methods**: A soil sample was taken from the environment. The phage particles were amplified through enrichment to isolate mixed population of phages and purified through plaque purification assays. After harvesting a lysate fixed for TEM and extracted DNA to perform restriction enzyme digestion and agarose gel electrophoresis. Lysogeny testing performed using spot titer assay to obtain a "mesa". **Results**: Chimchim was identified as phage that form circular, clear 1.25mm diameter plaques. Obtained lysate that yield 6.7 x 1010 pfu/ml. DNA extracted was 393.1 ng/µl and has a purity 260/280 value 1.89. From the lysogenic spot test, no mesas were observed so the phage is a lytic phage. **Conclusion**: Since the phage was determined to be lytic further lysogenic testing cannot be conducted. For the next phase of the experiment, the Chimchim phage will be sent to be viewed using TEM and a micrograph will be analyzed. The extracted DNA will be used for restriction enzyme digestion and gel electrophoresis.

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**Isolating, Purifying and Characterizing of Phage Amadi**

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

Coauthors: Madison Moore, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background**: Bacteriophages are viruses that infect bacteria. The objective of this research is to discover new phages that infect the host ***Mycobacterium smegmatis,*** which could be used as alternative for antibiotic resistant bacteria. This strain of Mycobacterium has colonies that are tan in color and are a rough, wrinkled texture. The genus Mycobacterium also has species like M. tuberculosis and M. leprae which cause deadly diseases in humans. **Methods**: Phage Amadi, was isolated from a soil sample collected in front of Blackburn Center on Howard University's campus September 7, 2017. Plaques of uniform morphology were obtained after a series of plaque purification assays were done. Once a single morphology was reached webbed plates were made to obtain concentrated lysate for further characterization experiments. The titer of lysate was calculated. To further characterize Amadi, DNA was extracted. Lysate was used in the preparation of transmission electron micrograph

grids were prepared. Isolated DNA was used in restriction enzymes experiments. **Results**: Phage Amadi had a diameter of 2mm with a lysate titer of 1.1 x 1010 pfu/ml. Isolated DNA had a concentration of 136.75 ng/µl with a purity 1.97. **Conclusion**: Pending the sequencing of phage Amadi its lysate is being used for lysogeny work. With more work to be done it will be interesting to find out if Amadi possessed unique characteristics that could be utilized in alternate therapies.

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**Isolation, Purification and characterization of Phage Rayel**

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

Coauthors: Madison Moore, Leon Dickson, Broderick Eribu, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Mary Ayuk

**Background:** ***Mycobacterium laprae***, and ***Mycobacterium tuberculosis*** are both deadly bacteria that cause infection. Many times, antibiotics are ineffective for theses bacteria due to increased bacterial resistance. Bacteriophages that are able to infect a similar bacteria (Mycobacterium smegmatis) are researched as an alternative. The goal of this experiment is to collect, isolate, purify, and characterize a bacteriophage. This research is important because it brings us closer to finding a phage able to infect dangerous bacteria similar to M. laprae and M. tuberculosis. **Methods**: Bacteriophage Rayel was isolated from a soil sample that was collected in front of the main entrance of Howard University on Georgia Avenue and Howard St. Through direct isolation and enrichment filtration phage Rayel was isolated and a lysate was generated from a webbed plate containing plaques of uniform morphology. To better characterize the phage a restriction digest was carried out and sample was prepared to be visualized on a transmission electron microscope. **Results:** Rayel's lysate. yielded a titer of 2.9 x 1010 pfu/ml. Each plaque was 1 mm with an average of 58 plaques on a webbed plate.Phage Rayel's DNA was isolated with a concentration of 132.6ng/ L and purity of1.96 (260/280). **Conclusion:** DNA annotations will occur for Caml, a phage that is presumed to be genetically similar to Rayel. Also, Rayel will be tested for its lysogeny, or its ability to superinfect prophages. Rayel's phage characterization and lysogenic properties will help us to better understand bacteriophages as a whole.

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**Extraction and Characterization of Phages**

Presenter's Name: Chioma Madu
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: shaunda.young@howard.edu

CoauthorsL Chioma Madu, Janella Maloney, Jerome Oliver, Mary Ayuk, PhD, Broderick Eribo, PhD, Ayele Gugssa, PhD, Winston Anderson, PhD., Leon Dickson, PhD, Hemayet Ullah, PhD.

A bacteriophage is a virus that infects bacteria. It is estimated that there are about 1031 bacteriophages in the biosphere but only less than 3000 have been characterized. In a lytic cycle, the tail latches onto its bacteria injecting its DNA into the bacteria.Lysis then releases hundreds of new phages. In the lysogenic cycle the phage acts as it does in the lytic cycle but instead it does not kill its host, integrating its DNA with the chromosome. M.smeg is used as the host bacteria in these experiments. These experiments can help researchers in the future because phages can cure diseases. Soil was collected in front of the Howard University sign at the corner of 4th and Bryant Street(38°55'18"N 77°1'9"W). In direct isolation, enrichment broth was added to the environmental sample. The sample was mixed vigorously in a shaker for 1-2 hours. Following this was a phage purification process. This was to ensure that the plaques forming had a consistent morphology. After forming a webbed plate, the lysate was then collected. The lysate had a titer of 6.7 x 108. It is important to collect a high titer lysate in order to have a sufficient amount of DNA for sequencing. The phage is currently being characterized to find more information.

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**Analyzing Of Bacteriophages PrincessA at Howard University in Washington, D.C**

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

Coauthors: Jerome Oliver, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, : Leon Dickson, Jr.

On September 11th, 2017 soil was collected. The phage sample was extracted from the corner of Fourth Street and Bryant Street underneath the Howard sign (38.55.18" N, 77.1'. 9" W). The soil was taken from a depth of 7.5cm and it was 21.7 degrees Celsius outside. Aseptic techniques were used while using Mycobacterium Smegmatis for our bacterial host. D29 was a positive control and phage buffer was the negative control. To purify the phage resulting in having the same morphology and size, a series of 10-fold serial dilutions were performed. Top agar was used for plating, which consists of 2xTa, 7H9, and CaCl2. To figure out the specific amounts the equation C1V1=C2V2 was used. Many steps of purification were taken to purify Princess A. On the webbed plate that was used to calculate PrincessA's titer there was 158 of plaques. This resulted in a titer of 7.9x10^6.

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**Phage Isolation and Purification**

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

Coauthors: Mischael Saint-Sume

Viruses that infect bacteria are called bacteriophages (also known as phages). These phages infect bacterium and replicate within them [1]. Bacteriophages have proven to be a great threat to the survival of bacteria. Bacteriophages are parasitic due to their inability to reproduce without a host and this results in the infection of bacterial hosts. Bacteriophages show an extraordinary amount of genetic diversity; however, many have been found and isolated [2]. Bacteriophages have been discovered to be very useful in the treatment of bacterial diseases. Environmental mycobacteria, including ***Mycobacterium avium, Mycobacterium tuberculosis,*** and ***Mycobacterium terrae*** have been implicated in diseases such as pneumonitis and tuberculosis [3]. Phage therapy could be a future alternative to antibiotic treatment of bacterial infections [4]. Phages are now acknowledged as the most abundant microorganisms on the planet and are also possibly the most diversified [5]. This means that the research of this microorganism is extremely important. In the SEA-Phages laboratory, Mycobacterium smegmatis (more commonly known as M. smeg) and the phages that infect it are studied. A phage is isolated, incubated, and plated on an agar plate with M. smeg in an attempt to infect it and create a plaque. A plaque is a clearing on a bacterial lawn that indicates the phage successfully infected and destroyed M. smeg cells [6]. The goal is to discover a bacteriophage that infects M. smeg and isolate it through several processes such as Collecting Environmental Samples, Direct Isolation, Enriched Isolation, Spot Test, Plaque Assay for Purification, and Phage Purification.

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**Bacteriophage Research: Isolation, Amplification, Genome Sequencing and Gene Identification**

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

Coauthors: Jerome Oliver, Mary Ayuk, Ayele Gugssa, Ph.D., Courtney Robinson, Leon Dickson, Kayla Moody

The purpose of the SEA-Phages laboratory at Howard University is to isolate bacteriophages for genomic studies including annotation and gene identification. Bacteriophages, also known as phages, are viruses that infect bacterial hosts and have properties shared by all viruses. The phages used in this lab were collected from an environmental soil sample found at (38.921667 N, 77.019167 W). Through enrichment plating, the phages were amplified for isolation. In the lab, the bacterial host used was ***Mycobacterium smegmatis*** mc2

155, written in shorthand as M. smeg. The tail fiber structure of the phage helped to anchor it and allowed it to insert its DNA to the host bacterium. Once inserted, the phage would either enter the lysogenic life cycle or the lytic cycle. Phages in this lab were lytic and formed clear plaques that varied in size because of the specific phage genome. The processes in the lab followed the central dogma theory of biology. Once isolated, the phage's DNA was extracted and studied by gel electrophoresis. Higher concentrations of phage DNA are better for genome sequencing. The high titer lysate made was then used to produce lysogens, bacteria cells that have a fully integrated phage genome. These lysogens were then plated to create mesas, an overgrowth of bacteria surrounded by a clearing that occurred because the phage infected its host. A streak test was then performed using the mesas to test the ability of the lysogen. Further research is being conducted to fully characterize the phage.

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**Assessment of Bacteriophages, Extraction, and Purification**

Presenter's Name: Alyssa McCall
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: shaunda.young@howard.edu

Coauthors: Jerome Oliver

**Background**: Bacteriophages (phages) are viruses that can infect bacteria. Phages can be lytic, which lyses and causes the bacterial cell to burst, or temperate, which integrates the phage's DNA into the bacterial genome and allows the bacterial cell to continue to live and replicate with the phage's DNA inside of it and its offsprings' genomes. Purpose:The purpose of this lab is discovering, classifying, and characterizing phages that can infect Mycobacterium smegmatis MC2 122 (M. smeg). **Methodology**: This included digging in the soil at the Howard University Hospital (38.92 N, 77.02 W) and using enrichment isolation to find phages, using serial dilutions to purify the phages into one phage, amplifying the phage with serial dilutions, creating a lysate of the bacteriophage, collecting the phage's DNA, and performing a gel electrophoresis. **Results**: This resulted in the discovery of the bacteriophage TRED, which is a temperate phage. After purification, a lysate was made of TRED, from which the DNA with a concentration of 97.8ng/microliter.

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**Effect of Mycobacterium smegmatis on Bacteriophages**

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

**Background:** Bacteriophages (phages) are viruses that infect a bacterial host. Understanding phages and the relationship they have with their bacterial hosts is important for scientists to understand microbial systems (1). Over time, research regarding phages and their mechanisms has vastly increased. This increase in bacteriophage research is useful and helpful to understanding how different types of bacteria can be killed by phages specific to said bacteria. Phages are specific to the bacteria they infect; not all phages are able to infect all bacteria. **Methods:** The research conducted throughout this experiment has thus far yielded very few impactful results due to unknown reasons. The phage was collected from a soil sample on September 11, 2017, from a hole of 3.9 cm depth located behind a sign in front of the Harriet Tubman Quadrangle (38.9222N, 77.0186W). From this soil collection, a number of experiments were conducted. A spot test was conducted and filtrate plates were created, phages were directly isolated, phages were purified through serial dilution, lysate was collected, the titer was collected, the phage was entered into the Actinobacteriophage Database, and DNA was extracted from the phage. **Results and Conclusion:** Plaques that appeared to be lysogenic were used to carry out the creation of webbed plates and later steps. Also, research was set back because the titer calculated was 5.6× (10) ^8, which was one-tenth too low for use. Ultimately, upon DNA extraction, a relatively low DNA concentration was yielded. However, currently, phages with a higher DNA concentration are being actively used to finish.

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**Phages Abstract**

Presenter's Name: Kyle Mells
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Bacteriophages are viruses that infect bacterial hosts; they require a host to reproduce and thrive. Bacteriophages are fairly new to science, but are a vast, old, and diverse population. Some bacteriophages are either lytic, lysogenic, or both; if it is both then it is a temperate phage which means that it can integrate with the bacteria DNA in order to replicate itself but then lyse the cell due to the corporatization of the host cell or other environmental impacts on the cell. This sample has been collected from the soil at Howard University, directly isolated, enriched and isolated, plated, and purified four times while maintaining a uniform morphology throughout the experimentation. The titer was calculated; lysate was collected; webbed plates were made. The phage sample was archived for later research, TEM viewing, DNA extraction, restriction enzyme digests, and gel electrophoresis. Now that the phage has been purified and collected it is now being tested to see if it is lysogenic/a temperate phage. Tested by using the spot test and serial dilution. By using the spot test we can determine, by the plaque, if the phage is lysogenic because the plaque will have a dot in the middle of a clear circle. Then the technique streaking is used in order to get a proper culture of the phage. This is important, and contributes to science because it can be used to create vaccines and further more research in this field of study.

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**Isolation, Purification, Amplification, Analysis, and Characterization of Bacteriophage Jamaina**

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

Mary Ayuk, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Jerome Oliver, Ebonee Major, Briana Louis, Jhevanae Langley, Michelle Fernando

The SEA-PHAGES (Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science) program is a one-year program that enables selected students carry out research on a group of viral organisms called bacteriophages. These organisms are more commonly referred to as phages. Bacteriophages (phages) infect bacteria, in this research, we would be dealing with bacteria that infect Mycobacterium smegmatis mc2155, rod shaped bacterial species (bacillus). Phages from soil samples were experimented upon during the entire research process. The soil samples were first collected from different areas around the Howard University campus, the phage particles collected were expected to vary per soil sample since phages are very ubiquitous organisms. These samples were taken to the lab and isolated. After isolating the phage particles, they were purified, amplified and used in obtaining lysate, a liquid sample with a high concentration of the phage particles. This lysate was then used to extract and analyze the DNA of the isolated phage using specific methods. Transmission electron microscopy is used in viewing the phage particles to determine their size, morphology, and appearance in general. Phage research is very important in science and modern medicine, phages infect and destroy bacteria, and this may include disease-causing bacteria such as Vibrio Cholerae. Also, phage therapy is used for various treatment methods and techniques. While a lot of phages have been discovered, many lay hidden waiting to be discovered.

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**Isolation, Purification, and Genome Sequencing of Bacteriophages**

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

Coauthors: Jerome Oliver, Courtney Robinson, Hemayet Ullah, Ayele Gugssa, Ph.D., Mary Ayuk

The purpose of the research being conducted in PHAGES is to isolate and purify a bacteriophage of our own. This was accomplished by performing certain experiments, such as direct and enrichment isolations and serial dilutions. The bacteriophage that is being isolated will infect the host bacterium, which is Mycobacterium smegmatis. Serial dilutions manipulate the number of phages in a sample. In PHAGES, serial dilutions were used to purify our phage. After the researcher completed serial dilutions and webbing, the titer was calculated. This meant that the researcher could move on to mounting phage DNA samples for TEM, DNA extraction, and gel electrophoresis. The purpose of mounting phage DNA samples is to prepare our phage for viewing with a TEM (transmission electron microscope. DNA extraction is used to isolate DNA from the phage. Through DNA extraction, the researcher figured out their purity and concentration using a Nanodrop. Gel electrophoresis is used to separate DNA fragments. Recently, the researcher has been starting new experiments like streaking and making more lysate. The researcher will continue to further analyze their phage using new mechanisms.

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**Chewing Gum and Mouth Temperature**

Presenter's Name: Sarai Mosby
Classification: Staff
School/College: Medicine
*Presentation Type: Poster Presentation*
Faculty Advisor: Georgia Dunston
Faculty Advisor's email: gdunston@howard.edu

My experiment was to determine if chewing mint or cinnamon flavored gum changes the temperature of a person's mouth? Four people participated in this experiment. Each participant's temperature was taken after chewing the mint flavored gum and then after chewing the cinnamon flavored gum, the results were recorded. The process was repeated ten times. My hypothesis stated that I think mint and cinnamon flavored gum can change the temperature of a person's mouth, because cinnamon gum is spicy and mint gum is cool.

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**Bacteriophage Research an Undergraduate Student: SEA-Phages: Casca**

Presenter's Name: Desiree Nwanze
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Shaunda Young
Faculty Advisor's email: shaunda.young@howard.edu

A bacteriophage is one of the most abundant microorganisms in the world and is a virus that depends on its host to survive in its environment. With that being said, objective of the research is to convey the central dogma of molecular biology: the flow of biological information through DNA, RNA, and proteins and to characterize the phage as well. The soil sample that contained the phage named, Casca, was collected at 38.9N and -77.025W, and from that, direct isolation was done and proved the presence of phages in the sample. Thus, the number of phages present were amplified in enriched isolation. 10-fold serial dilutions and plaque assays were used in order to conduct two rounds of plaque assay for purification and as a result, there was a clear, single morphology seen in each of the plates. Likewise, from that information, webbed plates were created to produce a tube of lysate. The lysate was aseptically filtered and a successful spot titer was done. From that, a full plate titer was conducted and the titer was found to be 3.6 x 1010 pfu/mL. Once the phage's DNA was carefully extracted, a spectrophotometry process was done and the purity was found to be 1.86. In the high titer spot test, lysogens were isolated and in streaking, colonies were made. In the end, these results produced a plethora of information to characterize the phage and displayed the central dogma theory. All in all, further genome sequencing will aid in continuing the research's objective.

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**Bacteriophage Research of DeepSoil15**

Presenter's Name: Chidera Nwamaka Nwude-Jacobs
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Dr. Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

The objective of the present work aligns with the isolation,

purification and amplification of a bacteriophage sample in order to determine its genome and traits "to widen the availability of these phages for the destruction of antibiotic-resistant bacteria" under the SEA-PHAGES program. Beginning with the phage collected outside of the Howard University Hospital at approximately 38.9177° north, 77.0212° south, the direct isolation with a plaque assay, enriched isolation with the spot test, and purification processes were performed. Subsequently, the collection of plate lysates, full plate titer, phage DNA extraction, mounting phage samples for TEM and staining with uranyl acetate, and archiving the phage sample were practiced. Lastly, the preparation and electrophoresis of DNA, setting up restriction enzyme digests, casting agarose gels, gel electrophoresis of restriction enzyme digests, creating lysogens by streaking from high-titer spots, and verification of potential lysogens via the patch assay were performed. The purification and amplification processes showed the phage DeepSoil15 characterized as lytic, sphere-shaped and small in width. The remaining processes concluded that DeepSoil15 retained a DNA concentration of 119 μg/mL and purity level of 1.79. Also, the final gel electrophoresis of the restriction enzymes showed DeepSoil15's DNA was cut by the restriction enzymes ClaI, BamHI, EcoRI, and HaeIII. Conclusively, lysogen formation was confirmed through the verification tests. In the application of DeepSoil15 to other broader phenomena, the viruses retain the potential to ward off cancerous bacterial cells and treat infectious diseases that remain threatening to physical functions.

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**Evolutionary of Phages**

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

Coauthors: Cleyuna Parrish, Riham Abbaj, Jerome Oliver, Mary Ayuk, PhD., Broderick Eribo, PhD., Ayele Gugssa, Ph.D., PhD., Courtney Robinson, PhD., Somiranjan Ghosh, PhD., Winston Anderson, Ph.D., Leon Dickson, PhD., Hemayet Ullah, PhD.

In September, some soil sample was collected from the Howard University campus in front of the biology building. From the beginning, a series of experiments were done to prove or disprove that there are unique phages presented on Howard campus. The bacterial host, ***Mycobacterium smegmatis*** mc 2 155 is a saprophyte. Therefore, areas that have decaying matter are everywhere. Certain procedures are noticed and several experiments are done when trying to get a new phage. These experiments include isolation, amplification, purification, and DNA extraction. The goal of the experiment is to discover a new phage and to distinguish the phage. The goal of the purification is to get one phage from the numerous phages present in the sample by the method of phage dilutions. The phage is purified when one has phages of constant morphologies. After that, a webbed plate is generated so that a lysate can be collected. The aim of the PHAGES program is to explore the bacteriophage population, and use the knowledge to understand more on the natural processes like evolution, mutation, and disease along with microbial importance and its potential benefits.

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**The Discovery and Characterization of Lilileeputain**

Presenter's Name: Kimberly Pierre
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@Howard.edu

Coauthors: Adrian Allen, Mary Ayuk, Somirajan Gosh, Ayelle Gugssa, Courtney Robinson, Hemayet Ullah, Leon Dickson, Lourds Fernando

**Background**: Bacteriophages continue to be one of the most abundant life forms discovered today. Through research programs, such as SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science), researchers are given the opportunity to discover phages that has not been characterized before. I have successfully isolated and purified the phage Lilileeputain using the host Micobacterium smegmatis. **Methods**: Lilileeputian was collected from a sample of soil outside of Earnest Just hall. Two isolation methods were performed, direct plating and enrichment. Uniform plaque population was obtained through plaque purification assays. Lysate was collected and lysogeny testing was performed.

**Results**: Lilileepitian was collected from the enrichment method and then isolated through eight rounds of plaque purification, before obtaining one plaque morphology. The titer calculation was 9.08x10^-2 pfu/mL. This calculation was used to obtain a webbed plate, which was then flooded to collect a lysate, and a full plate titer. It was able to produce a "mesa" which confirms its ability to become a prophage. **Conclusion**: Lilileeputain is a temperate phage and has the potential to produce lysogens when infected with M. smeg. Further characterization through transmission electron microscopy (TEM) and DNA analysis is needed to confirm the uniqueness of Lilileeputain.

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**Exploration of Sabrina Phage Genome Collected from a Soil Sample on Howard University's Campus**

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

Coauthors: Sabrina Pierre; SeighViance Givens; Mya Wells; Vishal Nathan; Lourds Michelle Fernando; Mary Ayuk; Broderick Eribo; Ayele Gugssa, Ph.D.; Courtney Robinson; Somiranjan Ghosh; Winston Anderson; Leon Dickson

Bacteriophages are viruses, making up 90% of biological entities. They infect bacterial hosts, and require these host cells to replicate. They are significantly smaller than bacteria, highly genetically divers (they have several morphologies), and are not susceptible to antibiotics. Bacteriophages only infect certain bacteria and so, their ability to infect a specific host is defined by their host range. What makes bacteriophages an important course of study is that they have the ability to destroy bacteria that threaten humans, and thus can act as antibiotics. They can be vital in understanding bacterial pathogenesis, and basic molecular biology. The purpose for this study was to identify a phage of one specific morphology originating from a soil sample on Howard University's campus (2440 6th St NW, Washington D.C., 20059, 38.9218 N, 77.0188 W), through isolation and purification methods, with the intentions of identifying its host range, properties, and DNA sequence. Phages were incubated at 37 °C for 48 to 120 hours with host bacteria Mycobacterium smegmatis mc2 155 and 1X Top Agar. The plaques of the purified phage Sabrina had a diameter of 3mm, resulting in a titer of 4.0*109pfu/mL, pfu webmax of 802.889, and a lysate of 20.8*10-1. DNA isolation procedures allowed for the calculation of Sabrina's phage concentration, which is 115.3 ng/uL.

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**The discovery of bacteriophage 'Ford'**

Presenter's Name: Erin Pruitt
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

For centuries, humans have been developing treatment methods. The use of antibiotics as a treatment method is relatively recent. They have proven very effective as a treatment method since their invention in the twentieth century. However, their effectiveness has led to overuse, which has lessened their effectiveness. The bacteria that antibiotics were made to fight against have developed immunity to the treatment method, leaving people vulnerable to newer versions of the infection. As a result, it is very important to find alternative options for fighting bacteria. One option is phage therapy, which uses phages to treat the source of the infection. This experiment was done to collect phages from its natural environment, isolate the phage, and then recover its DNA to analyze it. Samples were collected from various areas around Howard University. The sample containing the phage known as Ford was collected in front of the Armour J. Blackburne University Center (0.503364 °N, 0.010958 °W). Phages were extracted from the sample and students were required to determine if any of the phages extracted from sample could infect mycobacterium smegmatis. The phage was isolated from one of the samples collected using multiple rounds of purification via plaque assay. Then DNA was extracted from Ford's lysate. Afterwards tests were begun to see if it can infect a host that will become a lysogen.

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**Isolating and analysing Twish - abstract**

Presenter's Name: Twishi Puri
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Mycobacteriophages, or phages, are viruses that attack bacterial hosts, such as ***Mycobacterium smegmatis*** mc2155 (the host used in the lab). The main objective of the lab that is being conducted is to find a phage that has the properties of killing harmful bacteria and possibly becoming the cure of some bacterial diseases. The phage, Twish, isolated in this lab was collected from the soil sample located under the Howard University welcome sign. From there many methods like direct isolation, enrichment isolation, and multiple purifications were performed in order to isolate the phage from the sample collected. Twish has a titer of 3.5 x1010 which was high enough to proceed forward with future experiments. Also, it has the characteristics of a lytic phage, i.e. it has the ability to completely lyse the bacterial host. This phage could be an important component in curing diseases like tuberculosis, similar to the bacterial host Mycobacterium smegmatis. It could also be used as a reference to classify or compare other phages.

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**The Journey of Discovering Bacteriophage Disappointment**

Presenter's Name: Cary Robinson Jr.
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Leon Dickson
Faculty Advisor's email: ldickson@howard.edu

Coauthors: Lourds Fernando, Adrian Allen, Mary Ayuk, Courtney Robinson, Somiranjan Ghosh, Ayele Gugssa, Ph.D., Hemayet Ullah, Leon Dickson

**Background**: Bacteria are the most abundant living organisms on the planet, with an estimated population of 1030. Bacteriophages, viruses that infect bacteria with an estimated population of 1031.Organizations such as SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) continue the search and identification of new phages to assist the ever-growing fight against antibiotic-resistant bacteria. Here, we have isolated and purified the bacteriophage Disappointment and it been characterized. **Methods**: The sample was collected from a flower bed located in the yard of Howard University, isolated mix population of phage particles by enrichment, purified a single population of phages using plaque purification assays and obtained a lysate. Lysogeny testing was carried out to identify whether my purified phage can undergo lysogenic life cycle. Fixed for Transmission Electron Microscopy (TEM). **Results**: The plaque morphology is clear and circular with a diameter of 3mm. The titer of the lysate purified is 3.35x10^10 pfu/ml. Following 48 hours of incubation no mesas were not present, suggesting there were no lysogens present. **Conclusion**: Based on results Disappointment is a purely lytic phage. Visualization of the page via transmission electron microscopy and analyzing its genomic DNA will provide more information on this phage's unique characteristics.

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**Assessment, Isolation, and Purification of Bacteriophage Politics**

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

Coauthors: Allana Matthews, Mary Ayuk, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Leon Dickson, Hemayet Ullah, Jerome Oliver

Bacteriophages (phages) are individual viruses that only infect bacteria—single celled organisms— and are in need of them for survival and replication; also bacteriophages are the most abundant organisms on Earth. With the numerous amount of bacteriophages present within the biosphere, scientist have devoted a study towards bacteriophages and understanding their capabilities in influencing disease, plants, or other organic and inorganic matter. Within this study, the focus was geared towards the finding of a bacteriophage that

was capable of infecting the host bacterium, Mycobacterium smegmatis mc^2 155. (M. smeg). The researcher obtained a phage sample collected the collected at 21.7 °C, 38.921667N and being 77.019167W. The researcher performed a spot test. Plaques were identified, the researcher picked a plaque and performed serial dilutions as a phage purification method to gain a pure colony of phage. Webbed plates were created to create a lysate to create a webbed plate from said lysate. Upon achieving this newly webbed plate, the titer concentration was determined to extract DNA that would then be archived. The Phage Politics will go through the process of streaking to see if the Phage switches to a lysogenic state to collect the phage's immunity to bacteria.

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**Queen P's Isolation, Purification, Amplification, Microscopy, Extraction and Characterization Abridge**

Presenter's Name: Kambria Sanders
Classification: Undergraduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Hemayet Ullah
Faculty Advisor's email: hullah@howard.edu

Coauthors: Jerome Oliver, Leon Dickson, Broderick Eribo, Ayele Gugssa, Ph.D., Courtney Robinson, Somiranjan Ghosh, Winston Anderson, Hemayet Ullah, Joy Howard

Bacteriophage, also known as a phage, is a virus that infects and replicates within a bacterial host cell. Bacteriophages ability to infect and kill their hosts have provided crucial knowledge on the understanding of bacteria. This infection can occur in two processes: the lytic or lysogenic cycle. In this experiment, a homogenous population of bacteriophages known as Queen P, that infect the bacterium Mycobacterium Smegmatis mc2155, were isolated and identified. This was accomplished through four main protocols: isolation, purification, amplification and microscopy. Through phage isolation, a plaque assay, enrichment plating and spot tests were conducted. In the phage purification procedure, serial dilutions, lysate, and a full plate titer were adminstered and obtained. The conduction of several successful webbed plates then completed the amplification protocol. Phage samples were then mounted for TEM and stained with uranyl acetate as part of the microscopy procedure. Through many trials and errors where contamination occurred, a lysate and a full plate titer of 2.8 x 108 was obtained during the phage purification protocol. Also, after many result errors with receiving low titer webbed plates, successful webbed plates were eventually obscured on the 10-4, 10-5, and 10-6plates. Currently the phage characterization protocol is being carried out by the researcher through methods and materials such as gel electrophoresis and analyzing restriction enzyme gels.

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**Phage Abstract**

Presenter's Name: Mykal Savage
Classification: Undergraduate Student
School/College: Nursing & Allied Health Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Coauthors: Mykal Savage, Sobitan Adebiyi, Ayele Gugssa, Ph.D.

The discovery of bacteriophages happened in 1915 by Frederick William Twort. A Bacteriophage, informally known as a phage, is a virus that infects and replicates a host bacteria. Bacteriophages are made up of numerous proteins that encapsulate a DNA or RNA genome. They are extremely common but also very complex. In this PHAGES course, the bacteria we use is Mycobacterium smegmatis and it involves collecting a soil sample, phage isolation, and the extraction of the phage DNA for characterization and sequencing. A bacteriophage can either be lytic, lysogenic, or both; if both then the phage is considered temperate. To detect the purity of a phage you must maintain the same population, morphology, and size throughout the course of the purification process. The purpose of this lab is to successfully isolate DNA of a phage and enter it into a GenBank to be archived forever. This will be accessible to scientists in order for discovery of new phages that may be needed in the production of vaccines and treatment. The discoveries we make in the laboratory could possibly change the world.

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**The Isolation, Purification, and Characterization of Bacteriophage RazzleDazzle**

Presenter's Name: Rajon Scott
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@howard.edu

Bacteriophages, otherwise known as phages, are viruses that have the ability to infect bacterial hosts. Like all viruses, bacteriophages cannot metabolize or reproduce without a host cell. Therefore bacteriophages depend on the cell machinery of bacteria for survival purposes such as replication. In this experiment, a bacteriophage was isolated and purified. Using an enriched soil sample from the environment, a solution was filtered and collected. Next, the phage was purified through multiple rounds of phage purification which looks for consistent morphology, size, and population of phage plaques. The phage isolated, RazzleDazzle, was named after the researcher. A titer assay was performed to get an accurate titer calculation. The titer of a bacteriophage is the calculated amount of bacteriophage particles that performs a complete lysis of a plate. The ending titer calculation for phage RazzleDazzle was 7108pfu/mL. The second half of the experiment included DNA isolation, gel electrophoresis, sequencing and annotating. Isolation of DNA allows researchers to examine it in various ways such as DNA sequencing. Gel electrophoresis allows the researcher to observe the length and molecular weights of the DNA fragments. Once the DNA has been sequence the DNA sequence can be annotated. The purpose of annotating is to categorize the genes of the phage for later analyzation of the phage. The most common use of bacteriophages is phage therapy, but other uses can include antibiotics and as delivery vehicles for protein and DNA vaccines.

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**Discovering Phinx**

Presenter's Name: Maya Senior
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Oral Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

**Background**: Bacteriophage Phinx, was collected in the lower quadrangle of Howard University, in front of the biology building (38.9218N-Latitude and 77.0193W-Longitude), was found approximately 5.62 cm below the surface at an ambient temperature of approximately 26 degrees Celsius. **Materials & Methods**: When the spot test came back positive for viable phages, a spot titer was then conducted to dilute/ purify until there were homogenous phages of the same morphology. After rounds of purification the plaques are counted and the titer, pfu (max web), and volume needed to create a webbed plate is calculated. Webbed plates were flooded with phage buffer to create a lysate. A full plate titer was conducted to verify these viable phages left in this lysate, after a month-long winter break. Once confirmed a spot titer was then conducted to purify the phage and a homogenous plaque was picked from there for streaking. Once isolated colonies of phages were formed, a patch assay is then conducted to confirm lysogeny. **Results** & Discussion: Based on the plates observed during each of the **Methods**, plates with circular homogenous plaques were found. Purified and isolated, Phinx the phage can be described as lysogenic. **Conclusion**: Phinx the bacteriophage is lysogenic which means it is replicated along-side of its hosts DNA instead of completely eradicating the bacteria's DNA all together through completely lysing it.

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**Exploring the Life Journey of Phage Peyton3000**

Presenter's Name: Charise Simpson
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

Coauthors: Adebiyi Sobitan, Ayele Gugssa, Ph.D.

**Background**: Bacteriophages are viruses which have the ability to infect a specific bacterial host which they required in order to reproduce as they are unable to replicate without it. Bacteriophages, along with their bacterial hosts, are most abundant and genetically diverse groups on Planet Earth, with more than an estimated presence of 1031. However, less than 3000 of these phage particles have been discovered, classified, and characterized genomically. To study and understand phages' diversity in the lab, the bacterium

Mycobacterium smegmatis(mc-155) is utilized to infect. **Method:** The collected phage was obtained from a flower bed soil sample in front of Burr Gymnasium (38.9264 N, 77.0221 W) at Howard University. M.smegmatis was added to the soil sample to increase the number of phage through the Direct Plating, Enrichment Isolation, Spot Test, Plaque Picking, Plaque Purification (to obtain a single population phage) experiments. The titer was calculated, and lysate collected which was used to extract the DNA from Phage Peyton3000. This was followed by streaking Petri dishes to test if the phage population can be temperate through the lysogenic cycle. **Results/Conclusion**: Phage Peyton3000 present in the sample complete the lytic cycle as it created clear spots in the allocated areas with an average diameter of 3mm. The titer of the phage is 4.0*106pfu/mL and The DNA Concentration was 67.7ng/microliters and the 260/280 number was 1.76. Some of the lysate, which was spot tested, contained immune bacteria. This was and continues to be manipulated by streak testing and will be followed with annotation.

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**Characterization of Unnetta128 Bacteriophage**

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

Coauthors: Jerome Oliver, Michelle Fernando, Leon Dickson, Broderick Eribo, Aleye Gugssa, Courtney Robinson, Mary Ayuk, Winston Anderson, Hermayet Ullah

Bacteriophages also known as phages are one of the oldest and most profuse organisms on earth with an approximated (10) ^31particles current around the world. These viruses are characterized by their ability to infect various bacterial entities, genetically diversified backgrounds that expanded over billions of years as well as their inability to reproduce without the assistance of an entire host. Bacteriophages have complex processes in the way in which they can infect their host and reproduce exponentially. The two processes that bacteriophages use in during the replication infection and replication processes include the lytic and lysogenic cycles. The host-bacterium Mycobacterium smegmatis c2 155 is the choice of bacteria used in the PHAGES experiments throughout this discovery. The collection of the phage was pulled from a soil sample that was chosen in the Howard University Hospital from a depth of approximately 6.35 centimeters near the bushes and sign of the Hospital closest to Georgia Avenue (38.553 N, -77.118 W). There was slight moisture throughout the dirt possibly due to the recent rainfall or the automatic sprinklers of the hospital. Many procedures such as direct/enrichment isolation was used as a method of enhancing the bacteriophage's chances of infecting the host bacterium. Other research methods included multiple procedures of isolation to produce a phage that was unique in size, shape and morphology. The bacteriophage Unnetta128 was produced as at a titer of 5.023×10^12 pfu/ml.

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**The Isolation and Purification of Mycobacteriophage Steppo**

Presenter's Name: Idalis Sosa
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Courtney Robinson
Faculty Advisor's email: courtney.robinson@howard.edu

Coauthors: Vishal Nathan, Swagota Roy, Leon Dickson, Ayele Gugssa, Ph.D., Mark Ayuk, Adrian Allen, Somiranjan Ghosh, Courtney Robinson

**Background**: This research is a bacteriophage discovery project funded by the Howard Hughes Medical Institute. Bacteriophages are bacterial viruses that can be found in soil and anywhere else that bacteria are found . When phages attacks, they attach to the host bacteria which are infected. When the bacteria die, clearings known as plaques form. Bacteriophages have proven to be useful for research in the scientific and medical fields. **Methodology**: The phage Steppo was isolated from soil collected from the Howard University campus, under the Howard sign at 4th and Bryant Streets at 38.9° N 77° W. After the soil sample was collected, direct isolation and enrichment protocols were followed in order to isolate the phage on the host bacterium Mycobacterium smegmatis. For direct isolation a plaque assay was completed to detect the presence of phage in the soil. Enriched isolation was completed to amplify phages present in the sample. After a single phage population was obtained, after rounds of serial dilution,

phage DNA was extracted. Lysogeny experiments were completed by incubating infection plates for four to seven days. **Results**: Steppo created one plaque morphology and three putative lysogens were isolated. **Conclusion**s: The plaques that the phage Steppo yielded initially indicated that Steppo was a lytic phage, but lysogeny studies indicate that it is temperate. Experiments will be conducted to determine whether phage Steppo can infect other lysogens and the superinfection resistance of the Steppo lysogens to other phages.

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**Bacteriophage Research as an Undergraduate Student**

Presenter's Name: Najah Walker
Classification: Undergraduate Student
School/College: Arts & Sciences
*Presentation Type: Poster Presentation*
Faculty Advisor: Ayele Gugssa, Ph.D.
Faculty Advisor's email: gugssaa@gmail.com

SEA-PHAGES is a program to explore the bacteriophage population in which will be used to discover mechanisms that gives growth to a diverse cluster of viruses. The bacteriophage procedures consist of isolation, purification, and amplification techniques. The next set of procedures causes one to use an online program to annotate the genes further and find more identities concerning bacteriophages. My phage name is BossP17 gathered from the exterior of John H. Burr Gymnasium in the flowerbed at the position of 38 °55'32" N and 77 °1'17" W. Throughout my procedures, the necessary materials and methods were important to sustaining a proper phage. The main materials were the M. smegmatis, correct serological pipettes and tubes used to measure solutions, and the incubator and refrigerator. Each material has a certain job used for the beneficially of the phage. In order to use these materials wisely, it's important to always keep an aseptic area to create consistent and precise results. Other essential methods are to carefully handle the bacteria accordingly because the same bacteria are used frequently throughout the experimental procedure. Lastly, you want to have a colony of one type of plaque that will eventually need to be transformed to become a lysate and later isolated again in order to create a lysogen with the phage. The last results received should be patching putative lysogens onto the host cells to discover a clearing in the lawn caused by lysis.

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OFFICE OF THE PROVOST
2400 Sixth Street, NW | Washington, DC 20059
202.806.2550
www.howard.edu