FROSTBURG STATE UNIVERSITY

College of Liberal Arts and Sciences
Frostburg State University
Frostburg, Maryland 21532

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Annual Dean's Student Colloquium

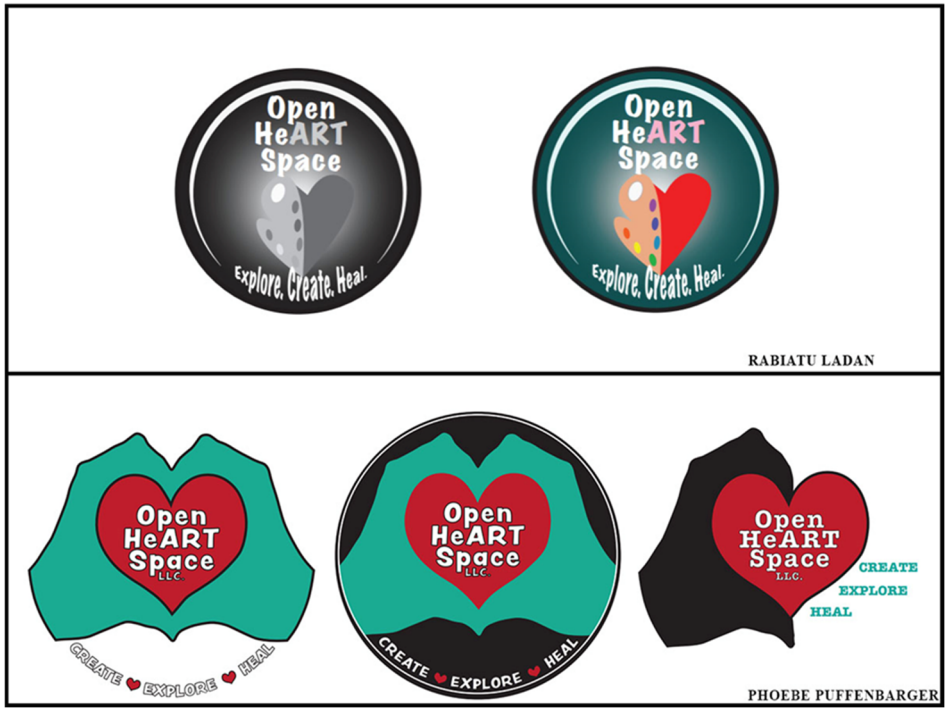
April 17, 2023

Bisrat Demissie (Biology)
Molecular Characterization of Soil Bacteria Collected From Western Maryland

Microorganisms within the soil hold an important role in the global cycling of elements and the nutrient content available to support the ecosystems. The biological fertility of soil is a highly complex and dynamic component of soil fertility and is the least well-understood component of soil fertility. There are vast counts of soil microorganisms in a single gram of soil and a better understanding of these microorganisms is essential for human health as well as agricultural production. The main objective of this research was to identify the bacterial and fungal communities in the soils of Western Maryland and to participate in the global effort of identifying soil microbial communities. Next generation DNA sequencing is the most powerful tool to identify the diverse groups of soil microbial communities than regular biochemical reactions that have been used for the identification of microorganisms. The soil samples were collected from various environments in the Western Maryland area such as mature forest, wetland, grassland, Frostburg State University arboretum, and the campus lawns. For each sampling site, twenty soil samples were collected using the soil probe and were mixed to make two replicates per each sampling site. Collected soil samples were transported to the microbiology laboratory at FSU and stored at 4°C until DNA extractions were performed. The XRF and nitrate ion selective electrodes were used to detect the elemental composition of the soil. The extraction of DNA in bacteria was performed using earth microbiome 16s Illumina sequencing protocol. Bacterial DNA was extracted using the Qiagen soil extraction kit with a 15,000g centrifuge at 4°C. Amplification of the DNA samples were performed using PCR with the nucleotide oligoes such as 806R reverse primer and 515s barcode primers for soil bacteria. According to the XRF reading, Fe, Cr, K, S, and Ca are the most common elements present in the soil samples whereas nitrate levels in mature forest, grass lawn, forest swamp, meadow and shrub were 87,121,48,127, and 88 ppm respectively. The soil sample will then be sent to the Azenta next gene sequencing laboratory in identifying the sequences of the bacterial genes from each soil sample.

Rabiatu Ladan and Phoebe Puffenbarger (Visual Arts)
Logo and Corporate Identity for an Art Therapy Company Based in Cumberland, MD

The Graphic Design program at FSU was approached by a new firm based in Cumberland which was in need of a brand identity for its start up endeavors. The company is an art therapy company, and its owner is a recently licensed and certified art therapist. This project was an opportunity to experience a commissioned graphic design brand identity project from start to finish: client meetings, conceptual discussions, thumbnail sketches, finished art, pdf presentations to the client, changes and revisions, print production, etc. Both Ms. Ladan and Ms. Puffenbarger took the opportunity to bring this project into a creative, original and compelling presentation. Artwork shown below.



Dominique Little (Theatre and Dance)
Navigating the Theatrical Space From Stage To Stage Manager

Senior Theatre major Dominique Little has been performing on stage and backstage since her arrival AT FSU. A member of the Acting track and Musical Theatre minor, she performed featured roles as #00 in *The Wolves*, Debbie in *Social Media Massacre*, and as an understudy for Olive and Mitch in *The 25th Annual Putnam County Spelling Bee,* and Martha in November's *Spring Awakening*. She also served as Stage Manager for *Seven Keys to Baldpate* and *Alice in Wonderland*.

During this spring and senior semester, Dominique continued to navigate the space between stage performance and stage management over the course of two shows. She performed the lead role of Girl in Finnegan Kruckemeyer's play *Where Words Once Were*. Set in a dystopian time when people were limited to just 1,000 words, Dominique's character, silenced for her rebellion of this rule, wove in and out of the action as a catalyst for change. Simultaneously, Dominique took on a behind the scenes role as Stage Manager of Keenan Scott II's *Thoughts of a Colored Man*. Written and produced in 2009 when Scott was a student, the show went on to open the new Broadway season in 2021. For this major leadership role, Dominique carries the responsibility of all production communications with over twenty artists, including Scott and six guest artists, running auditions, weekly production meetings, nightly rehearsals, tech week, and calling performances before the live audience.

Dakota Donaldson (Chemistry)
Transport Mechanics of Microplastic Fibers in a Porous Media Model

Microplastic Fibers (MPF) are considered emerging contaminants due to potential harmful impacts on humans and the environment. The presence of microplastics in diverse settings around the world has been confirmed and it has been shown that the largest fraction of microplastics by volume are MPFs, but questions of how they got there and where they are going has yet to be addressed. It is expected that soils are the largest sinks for MPFs, but the specific mechanisms of MPF transport through the terrestrial environment are largely unknown. Our research focuses on developing an understanding of the dynamics of MPF movement/transport in porous media. An intermediate scale (50cm by 20cm) "meso-model" of a periodic porous media was used to conduct laboratory experiments of MPF transport. MPF were added to a steady-state flow through a flow cell and their trajectories were captured using a GoPro hero black 7 camera. The videos were pre-processed (image enhancement) in MATLAB, analyzed using Fiji (ImageJ) software, and MATLAB scripts allowing a dataset of their trajectories to be created. Fibers of 5mm length, the minimum pore throat size in our domain, were evaluated independently under a discharge of 3.5 mL/s. The fibers traveled as a rigid straight fiber that would tumble/roll during transport. The findings offer unique insights into the transport mechanisms and features of MPF migration that are expected to be used to help develop accurate models of MPF transport in the environment, which could better inform environmental policy and regulation of MPF discharges.

Matthew Watkins (Communication)
Student Editor for "Sweet Appalachia: The Story of Delfest"

Through MCOM499: Directed Study, Matthew Watkins has worked rigorously on editing "Sweet Appalachia: The Story of Delfest" with producer and professor, Annie Danzi. Matt worked as a volunteer, filming Delfest 2022, and then as a Directed Study Student editing the film in Fall 2022 and Spring 2023. Matt's investment in storytelling, advanced editing techniques, and dedication to the project have been commendable. He has worked for hundreds of hours on this production. He will receive film credits in this feature length documentary in both camera, field producing, and editing, This experience has greatly strengthened his resume.

Brooke Liller (Social Work)
Constructing Change: Exploring the Community of Cumberland, MD

Like many rural cities across the country, Cumberland has been grappling with the effects of the Opioid Crisis over the last several years. Unfortunately, this community has not been immune to the growing number of individuals experiencing homelessness in general as well as those who are also struggling with mental health and/or substance abuse issues. Currently, the only shelter in Cumberland is the Union Rescue Mission, which is not accessible for individuals with physical disabilities. Individuals experiencing homeless, regardless of the contributing factors, are overlooked and stigmatized by the community. Moreover, there is a lack of complete, adequate, and appropriate resources to assist them, including, but not limited to, adequate housing, safe harm reduction services, and general support. To begin to address these issues, it is recommended that Cumberland adopt and implement a program based on the Housing First approach which is an evidenced-based practice that aims to provide permanent housing to individuals first before offering clinical support (Henwood et al., 2010). The Housing First approach views housing as a basic human right and places emphasis on self-determination. An individual's sobriety and/or treatment services are not used as prerequisites, allowing for immediate access to housing while following a recovery-oriented service philosophy that offers ongoing support (Pathways Housing First, n.d.). Implementing Housing First involves a project-level dimension that includes screening practices promoting the acceptance of individuals despite if they are actively using substances, unemployed, or have no income. Within the community-level dimension, Housing First is implemented by getting individuals into housing as quickly as possible with minimal intermediate steps (United States Interagency Council on Homelessness & Substance Abuse and Mental Health Services Administration [USICH, SAMHSA], 2014). The Housing First model has demonstrated effectiveness in ending homelessness for individuals. For example, when compared to Treatment First programs, Housing First approaches decreased homelessness by 88% (Peng et al., 2020) while positively impacting both the individual's quality of life and that of the overall community (Gulcur et al., 2003). The Housing First model has also been shown to be cost-effective such that it has led to a reduction in the overuse of public services such as hospital stays and retention in the criminal justice system (Larimer et al., 2009). However, due to Housing First being a cost-forward model, lack of funding is one primary challenge to implementation (USICH, SAMHSA, 2014). Along with funding, community bureaucratic processes may create barriers along with communities who may not be educated on mental health and addiction. Nonetheless, the implementation of Housing First in Cumberland would be beneficial as the community has suffered immensely both economically and socially by the devastating effects of the Opioid Crisis. When looking at Cumberland's infrastructure, there are many blighted buildings that that could be utilized to execute a Housing First program. For those on the path to sobriety, both individual and community support are crucial to their success. Providing housing first gives these individuals the platform needed to pursue their personal goals while offering a sense of community and support.