What's in That Crack? Exploring Urban Micro Environments for Novel Amoeboid Diversity Using Next-Gen Sequencing

McConnell, Danielle (School: The Mississippi School for Mathematics and Science)

The vast majority of eukaryotic diversity is made up of protists, diverse groups of unicellular microorganisms found throughout terrestrial and aquatic environments. Amoeboid protists are represented across the Eukaryotic Tree of Life and have diverse morphologies, behaviors, ecologies, and evolutionary histories. Despite the overwhelming diversity of amoeboid protists, there is limited laboratory research dedicated to discovery and characterization of novel species from unique terrestrial and urban environments. This project aims to document the morphology, identify the species, and sequence the 18S rRNA gene of an amoeba isolated from the dirt and biocrust of a sidewalk crack. A clean culture of the environmental isolate was prepared so the organism could be observed without the influence of outside factors. Using a microscope, data regarding the structure and behavior was documented to conduct morphological analysis. Along with descriptive data, extraction and amplification of gene sequences via PCR and Sanger Sequencing were utilized to produce DNA sequences for species identification. Later, mRNA was extracted and amplified to produce transcriptomic data for phylogenetic analysis. Piecing together observational and experimental data, this project sheds light on the unexplored diverse ecology of amoeboid protists and the potential to find novel species in unexpected places.

Awards Won: