CYANOBACTERIAL DIVERSITY WITHIN THE EUTROPHIC LAKE OKEECHOBEE AND THE ST. LUCIE ESTUARY, FLORIDA

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Lake Okeechobee is a large eutrophic subtropical shallow lake in the southern Florida peninsula which frequently experiences *Microcystis* dominated cyanoHABs. These blooms are re-occurring and in 2018 a state of emergency was declared as >90% of the lake's surface was covered by cyanobacterial scum and microcystin levels were detected above WHO guidelines across much of the lake. Therefore, it is imperative to understand the community structure during bloom and non-bloom events to identify potential drivers of these microbial communities. From August 2019 to September 2020, Lake Okeechobee and the connected St. Lucie River and estuary were sampled for 16S rRNA metagenomic analysis and limnological parameters. Results revealed community structure varying spatially and temporally within Lake Okeechobee and the St. Lucie River and estuary. The most abundant cyanobacterial families within Lake Okeechobee over the course of this study included Aphanizomenonaceae, Microcystaceae and Prochlorococcaceae and the most abundant bacterial families included Chitinophagaceae, Pirellulaceae, and Sporichthyaceae. While the majority the cyanobacterial ASVs corresponded to Prochlorococcaceae, several toxigenic genera were detected within the lake, with *Dolichospermum* and *Microcystis* occurring frequently. Additionally, cyanotoxins also varied spatially and temporally, with several different microcystin congeners detected as well as anatoxin-a and nodularin throughout both the lake and river. This study provides insights into drivers of the cyanobacterial and associated microbial communities within Lake Okeechobee, and highlights potential drivers of bloom forming taxa and their toxins

PRESENTER BIO: Forrest Lefler is a PhD student in the School of Natural Resource and Environment. His research is focused on cyanobacteria, including harmful algal blooms, and uses taxonomic, genomic, and metagenomic methods to understand their ecology, diversity, and treatment.