Woods Hole Oceanographic Institution

Biology Department Seminar

Thursday, October 5, 2023 – 12:00 Noon

A Eukaryotic Heist: Scalable and Automated Approaches for The Study of Eukaryotic Genomes

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Protists, or eukaryotic microbes, are key players in marine ecosystems, encompassing primary producers, mixotrophs, and heterotrophs. Similar to their prokaryotic microbial counterparts, many protists have evaded cultivation, making the direct study of their biology in the lab challenging. Molecular and genomic approaches, particularly those applied to whole, mixed communities (e.g. metagenomics, metatranscriptomics), have shed light on the ecological roles, evolutionary histories, and physiological capabilities of these organisms. Here I present, EukHeist, a scalable and reproducible pipeline to facilitate the retrieval, taxonomic assignment, and annotation of eukaryotic metagenome assembled genomes (MAGs) from mixed community metagenomes. We applied this pipeline to metagenomic data from the Tara expedition protist-size fractions (0.8–2000 um; encompassing more than 20Tb of raw sequence data). We recovered a set of genomes we refer to as the TOPAZ MAGs, which consisted of >900 environmentally-relevant eukaryotic MAGs and >4,000 bacterial and archaeal MAGs. Complementary and expanded databases of MAGs, such as are provided through scalable pipelines like EukHeist, stand to advance our understanding of eukaryotic diversity through increased coverage of genomic representatives across the tree of life.

HYBRID! **In person**: Redfield Auditorium **Zoom:** https://whoi-edu.zoom.us/j/99365831840 Meeting ID: 993 6583 1840 **By phone**: Find your local number: https://whoi-edu.zoom.us/u/adt9cU5CER