2022 ECCA 'Microbial & Metabolic Diversity Under Antarctic Ice Shelves'

The ECCA supported two weeks of in-person work with Dr. Jeff Bowman's lab at Scripps Institution of Oceanography in San Diego, CA. The goal of the work was to develop a bioinformatics pipeline for DNA sequences of microbial communities beneath Antarctic sea ice and ice shelves, several of which are from environments that had never been sampled before. We leveraged Dr. Bowman's PAPRICA (PAthway PRediction by phylogenetIC plAcement) tool for determining microbial taxa. Dr. Avishek Dutta, Benjamin Klempay, Natalia Erazo, and Matt Herron also aided in using and troubleshooting various software packages.

We identified potentially novel sub-ice shelf microbial taxa, and have developed new hypotheses for interactions between nutrients, microbes, and gasses sourced from glacial ice with marine communities in oligotrophic subglacial environments. The results of this ECCA work were presented at AbSciCon 2022 (Poster 439-042; J. D. Lawrence et al., 'The Influence of Ice and Ocean Interactions on Microbial Communities under Ice Shelves'). To continue this work, we have shipped remaining DNA extract from the samples analyzed here to Dr Bowman's lab for additional metagenome analysis, and have plans to collaborate on the extraction, sequencing, and analysis of additional samples from unique subglacial environments. We expect that this collaboration will continue to yield insight into connections between the subglacial and marine ecosystems below Antarctica's ice shelves, and how these ecosystem dynamics can inform our understanding of the potential for life within or below ice elsewhere in our solar system.