

Brook Nunn

Title: *The effects of Fe on the size, composition, and bioavailability of dissolved organic carbon from Phaeocystis antarctica*

Abstract:

The investigator will study the effects of the supply of iron in the Southern Ocean on the size, composition, and bioavailability of dissolved organic carbon from *Phaeocystis antarctica*, a widely distributed species of colonial phytoplankton. *P. antarctica* is quite efficient in drawing down carbon dioxide from the atmosphere, because its biomass is not recycled by grazers back to carbon dioxide, and its biomass is observed to sink rapidly. These characteristics make *P. antarctica* blooms an interesting natural mechanism for removing carbon dioxide from the atmosphere for long term burial and preservation. In the Ross Sea, iron has been identified as the limiting nutrient for *P. antarctica* production, but the mechanisms phytoplankton employ to collect and utilize iron remain unknown. This investigation will attempt to determine if *P. antarctica* release organic matter that complexes iron to catalyze the cellular transfer of iron to either themselves or heterotrophic bacteria, that is, the processes that help phytoplankton and bacterioplankton overcome their growth limiting factors - respectively iron and dissolved organic carbon. This will be accomplished through a collaborative approach by characterizing dissolved organic matter produced by the phytoplankters in the laboratory and in the field using combined metals and organic mass spectral techniques.