NSF Award from Geosciences

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- **Project:** Collaborative Research: Ocean Oxidation and the Biosphere During Neoproterozoic Glaciation
- **Start Date:** September 1, 2009
- **Total Award Amount:** $219,214

**How the results of this project will benefit society:**
An increase in Earth surface oxygen levels has long been invoked as a driver of biological innovation at the end of the Neoproterozoic Era (1000 to ~541 million years ago), when diverse macroscopic life, including animals, first flourished. Recent work suggests that a pulse in ocean oxygenation ~580 million years ago may have permitted the evolution of animals, but almost no consideration has been paid to the relationship between biology and fluctuating oxygen levels earlier in the Neoproterozoic, in particular spanning the Cryogenian (a.k.a. snowball Earth) glaciations ~720 to 635 million years ago, when Earth may have been entombed in ice.

**The problem the project is trying to solve:**
The aim of this project is two-fold: (1) reconstruct oxygen levels and biology during the Cryogenian glacial interval; and (2) test the hypothesis that fluctuating oxygen levels are linked to changes in the diversity and composition of biological communities observed during this time.

**How this project will work:**
To address these goals, the PIs will undertake micropaleontological, geochemical, and geochronologic analyses of shales collected from successions in Svalbard, an archipelago north of Norway, and in four separate basins in Australia. Collectively, these units span the entire interval of Cryogenian glaciation. Samples from Svalbard already have been collected; samples from Australia will be collected during two field seasons, one in Tasmania, the other on the Australian mainland. All analyses will be performed on the same suite of stratigraphically well-defined samples, allowing records of life and oxygen availability to be unambiguously linked and placed within the context of Neoproterozoic climate change.

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