

**Department of Biological Sciences  
COLLEGE OF ARTS AND SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: March 2, 2015**

*The Department of biological sciences is pleased to offer the following research project for the summer of 2015. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.*

**PROJECT TITLE: Trace metal availability under early Earth conditions**

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**Project Description**

Early Earth was oxygen-poor, potentially altering the bioavailability of redox sensitive trace metals that are integral to biology. For instance, iron reacts with H<sub>2</sub>S in sulfide-rich water, forming insoluble sulfides that remove molybdenum from the water column. Throughout much of Earth's history, surface oceans experienced at least localized sulfidic conditions. In contrast, iron is scarce in the modern oxygen-rich ocean whereas molybdenum, present as molybdate, is highly soluble and readily bioavailable.

We are using model microorganisms to determine the bioavailability of metals that are complexed with sulfides and in more complex minerals to examine the links between redox conditions and the evolution of enzymes that incorporate trace metals for activity. This student project will involve culturing of microorganisms, nucleic acid extraction, genetic sequence analyses, and trace metal analyses.