

**Department of Biological Sciences
McMICKEN 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: Molecular Genetics of Hyperthermophiles

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Project Description

Certain prokaryotic micro-organisms (primarily archaea) colonize acidic hot springs, and the Grogan lab studies their genetic processes. Projects for a 2015 WISE participant apply basic techniques of microbiology or molecular genetics to investigate cellular functions in these very unusual micro-organisms.

The single, circular chromosomes of *Sulfolobus* cells are expected to suffer high rates of spontaneous damage in the organism's natural habitat. The Grogan lab has developed molecular methods to measure the impact of specific lesions on DNA replication, but inactivating the corresponding DNA repair systems would make the analyses more informative. A related project would attempt to develop more versatile techniques for deleting *Sulfolobus* genes. Additional projects could investigate the role of particular RNA modifications on fitness, or cellular mechanisms that defend *Sulfolobus* from killing by lytic viruses. Ultimately, these various projects all address whether thermoacidophilic archaea employ novel molecular mechanisms to carry out basic genetic processes under extreme environmental conditions.