

**Department of Chemistry
COLLEGE OF ART & SCIENCE**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2014

The Department of Chemistry is pleased to offer the following research project for the summer of 2014. 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: Environmentally Friendly Solid State Reactions

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Project Description

The greatest challenge of the 21st century is developing sustainable energy to maintain the needs of society. One of the major thrust has been to harness solar energy as a clean renewable energy source. Thus, the development of solid state photodevices is vital for developing sustainable energy and it requires advanced understanding of the fundamental solid state photophysics and photochemistry. Specifically, basic knowledge of solid state photophysics and photochemistry of triplet states is needed to develop the next generation of solar cells and emitting diodes.

Due to the limited motions in crystals, solid-state photoreactions have been shown to be generally more regio- and stereo-selective than their solution counterparts. Thus, crystals have been used ingeniously to synthesize natural products from radical intermediates in both high chemical and enantiomeric yields. In addition, solid-state photoreactions make it possible to carry out solvent free synthesis, which are environmentally benign and thus green chemistry.

The WISE student will be elucidating a solid state reaction mechanism using transient spectroscopy. The student will learn to carry out simple organic reactions, characterize the starting materials and the products using IR, NMR and MS spectroscopy. In addition, the student will use transient spectroscopy to elucidate the solid state reaction mechanism. No prior experience in organic chemistry is required as we will train the student. Furthermore, after the summer the student will have gained good insight into organic synthesis and spectroscopy, and have obtained valuable laboratory skills, and thus be better trained for future employment or to attend graduate school.