

**Department of Chemistry
COLLEGE OF ARTS & SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2013

The Department of Chemistry is pleased to offer the following research project for the summer of 2013. 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.

New Materials for the Detection of Volatile Organic Compounds and Aqueous Anions

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Project Description

A significant challenge in achieving sustainable development is measuring the human ecological footprint. Meeting this challenge will require the development of new strategies for sensing chemicals with applications ranging from workplace safety to monitoring watershed contaminants. We have recently discovered a new class of materials that undergo a color change in response to important contaminants in the gas phase and aquifers. These materials have potential practical use in chemical sensing and chemical sequestration applications. One example of these compounds are vapochromic platinum salts whose colors and phosphorescence change when exposed to vapors of simple organic molecules, such as dichloromethane, ethanol and acetonitrile. Another example is hybrid materials containing nanocrystals that respond to aqueous anions. This research project is focused on understanding the mechanism by which these materials respond to analytes by undergoing a color change. Our long-term objective is to learn to tailor these extraordinary behaviors. A student working in this area will determine the stoichiometry of analyte uptake and learn about the mechanisms of the response. In addition, she will screen new materials to determine their analyte selectivity patterns. She will have the opportunity to learn various synthetic and analytical methods that are useful in chemistry, including absorption and emission spectroscopies, thermal gravimetric analysis, X-ray crystallography and NMR spectroscopy. There is flexibility for the student to take the project in any of a variety of directions, depending on her interests and background. No prior research experience is necessary. Interested students are encouraged to meet with Professor Connick to learn more.