DEPARTMENT OF CHEMISTRY
COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: MARCH 1, 2004

The Department of Chemistry is pleased to offer the following research project(s) for the summer of 2004. 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.

Designing Two-Electron Photo-Reagents: A New Approach to Solar Energy

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This research project is focused on building new molecules for converting energy from the sun to chemical fuel. When a molecule absorbs light, an electron is excited from a low-energy orbital to a high-energy orbital. The resulting excited molecule is very reactive, and it now much more favorable for the excited electron to "jump" to another molecule. This light-induced electron-transfer chemistry is essential if we want to use sunlight energy to drive chemical reactions. One problem is that the excited molecule usually releases only one electron, whereas the kinds of reactions we want to tackle require multiple electrons (e.g., splitting water to make H_2 and O_2). We have developed a strategy for overcoming this problem by designing inorganic molecules (called metal complexes) that are capable of releasing two electrons when excited by light. A student working on this project will get to help design these new two-electron reagents and explore their extraordinary reactivity. She will learn various synthetic and analytical techniques that are useful in chemistry and have the opportunity to take the project in any of a variety of directions, depending on her interests and background. No prior chemistry research experience required.