

**Electrical and Computer Engineering & CS
COLLEGE OF ENGINEERING**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2006

The Department of Electrical and Computer Engineering @ CS is pleased to offer the following research project for the summer of 2006. 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.

IONIC-CONDUCTIVITY OF SOLID ELECTROLYTE GLASSES

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Base oxide glasses such as Silica and Germania, often used in optical fibers, form networks that are electrically insulating. When these insulating glassy networks are alloyed with an additive such as an alkali-oxide (Na_2O or K_2O) or a solid electrolyte (such as AgI , Ag_2S , Ag_2Se) the electrical conductivity of the alloyed glass is found to increase as the concentration of the additive is progressively increased. These ionically conducting glasses are used in *batteries*, *as sensors*, *and as memory devices*. Engineers are always striving to develop more efficient materials. A good understanding of how electrical conductivity changes in these materials as their chemistry is altered represent an important pre-requisite.

Interested students would synthesize and characterize the materials. Synthesis would entail reacting oxides with alkali carbonates or appropriate silver salts. The molecular structure of these alloyed glasses will be examined by sophisticated thermal and optical methods. State of the art facilities for performing these experiments are available in the laboratory of the PI. Prospective students would learn these techniques under supervision from faculty and graduate students. The experimental work could lead to a research publication in a journal, and possibly to an oral presentation at National meetings.