

MCMICKEN COLLEGE OF ARTS AND SCIENCES

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2007

The Department of Chemistry is pleased to offer the following research project for the summer of 2007. 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.

Bioinformatics studies of sequence variability among mechanosensitive proteins

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Project Description

My group is developing and applying database mining approaches and other bioinformatics methods to the determination of binding motifs at interfaces between various biological molecules to be used in targeted drug-design. The information obtained through this bioinformatics effort is coupled with computational modeling of biological macromolecules dynamics in order to gain insight into mechanisms of macromolecular assembly with specific applications to amyloid diseases (such as Alzheimer's and the Mad Cow Disease) and mechanosensitivity of the cell.

The goal of this project is to build a repository of sequence variations among mechanosensitive proteins such as cell adhesion proteins, motor proteins and the cell's structural proteins which will crosslink the results of a number of bioinformatic approaches with experimental results from biochemical and biophysical studies taken from the literature. This study is very relevant as mechanosensitive proteins are playing crucial roles in the inflammatory response of our body, in intracellular transport, and are often the targets of anti-cancer or anti-inflammatory drugs. The assembly of the proposed repository is likely to assist scientists in their drug-developing efforts by providing clues to target specificity and possible deleterious effects that some small molecules might have on the function of the target protein. The student will gain experience with analysis of protein databases, will learn to use software applications to extract statistical information from such large databases, and will gain knowledge in searching the scientific literature.