

**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.

PROJECT TITLE: Exploring the cellular behavior of actin homologs

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Project Description

Research in the Dima group focuses on understanding the role of various structural and cellular factors in the mechanical response of biological molecules ranging from small multi-domain proteins to large fibrillar assemblies that play crucial roles in fundamental processes such as the maintenance of the cell shape, cell mobility, synaptic fusion, cell-cell adhesion, blood flow, wound closure, axonal growth, and mitosis. A project for a REWU student is "Exploring the cellular behavior of actin homologs". Actin and actin homologs like Hsp70 play fundamental roles in cell biology. For example, actin itself is the major protein component of skeletal muscle, while Hsp70s help prevent protein aggregation by binding to unfolded proteins during times of cell stress. As protein aggregation is known to cause several neurodegenerative diseases such as Parkinson's and Alzheimer's, understanding their behavior in the cell is extremely relevant to finding treatments. The goal of this project is to study the unfolding behavior of several actin homologs and compare the results to those of actin. The student will gain experience with bioinformatics methods and protein databases, learn to use simulation software to follow protein unfolding under applied forces and gain knowledge of current scientific literature on the subject.