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

**SUMMER RESEARCH OPPORTUNITIES**
**FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE:  March 2, 2015**

*The Department of Chemistry is pleased to offer the following research project for the summer of 2015.  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 role of cofactors in the aging of cytoskeleton filaments

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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, cell-cell adhesion, blood flow, wound closure, axonal growth, and mitosis. A project for a REWU student is "Exploring the role of cofactors in the aging of cytoskeleton filaments". Microtubules, the main component of the cell cytoskeleton, play fundamental roles in cellular processes ranging from cellular transport to mitosis. These roles are all intimately connected with microtubules' ability to depolymerize in the presence of cofactors. Recent experimental results strongly suggest that cofactors target primarily microtubules that present aging effects and apply mechanical forces to the lattice. The goal of this project is to study the changes in the mechanical behavior of microtubules with aging defects, such as missing lattice subunits, in the presence of kinesin motors, a main cofactor inducing microtubule depolymerization upon the start of mitosis. The student will gain experience with bioinformatics methods and protein databases, learn to use simulation software to follow protein structure deformation under applied forces, and gain knowledge of current scientific literature on the subject.