

**COLLEGE OF ENGINEERING  
Mechanical, Industrial and Nuclear Engineering**

**SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: MARCH 1, 2005**

*The Department of Mechanical, Industrial and Nuclear Engineering is pleased to offer the following research project for the summer of 2005. 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.*

**Mechanical Properties of Biomaterials**

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Mechanical deformation of biological cells are known to be important regulators of cell function. Deformations at the sub-cellular length scale play an important role in a variety of transport phenomena (e.g., stretch-sensitive ion channels), cell-to-cell adhesion and receptor-ligand interactions, and play an important role in overall cell structural integrity. Whole-cell length scale deformation play obvious roles in muscular contraction and cell division. So understanding the mechanics of living cells holds a critical place in the study of cell structure and function. The goal of this project is to derive improved models and experimental approaches for cell mechanical property identification. The program employs atomic force microscopy (AFM) for cell (and other biomaterial) interrogation, a variety of software tools for data processing, and computational tools like finite element analysis.

The WISE program would support a detailed computational study, in which material parameters for cells would be extracted from available experimental data. The work involves finite element analysis and data processing. The WISE student will be mentored primarily by Dr. Vemaganti (Mechanical Engineering), and an experienced graduate student.