

**Department of Mechanical Engineering
COLLEGE OF ENGINEERING**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 3, 2008

The Department of Mechanical Engineering is pleased to offer the following research project for the summer of 2008. 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.

**IMPROVING THE MECHANICAL INTEGRITY OF BIOMATERIALS USING
CARBON NANOMATERIALS**

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Project Description

The field of Functional Tissue Engineering (FTE) seeks to engineer artificial tissue by delivering mechanical stimuli to cell-seeded biomaterials in order to promote cell growth and collagen expression. The ideal materials for FTE must therefore be biocompatible and be able to withstand mechanical stimuli. Our main goal in this NSF-supported project is to improve the mechanical integrity of biomaterials such as agarose for functional tissue engineering applications using carbon nanomaterials (CNM). Through a combination of experiments and computational modeling, we are attempting to overcome many of the limitations of current-generation biomaterials.

A variety of factors affect the response of biomaterials reinforced with carbon nanomaterials: shape, size and alignment of the CNM, concentration of the CNM, dispersion of the CNM in the biomaterial, functionalization of the CNM, etc. The goal of the summer project through the WISE program will be to qualitatively and quantitatively study the effects of these factors in a systematic manner. The WISE student will learn to create samples of nano-reinforced biomaterial constructs, conduct mechanical (stress-strain) testing of the samples, and analyze test data to determine the elastic and viscoelastic properties of the samples.