

**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 Carbon Nanocomposites**

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Carbon nanotubes (CNTs), discovered by Iijima in 1991, possess exceptionally high stiffness, strength, resilience, as well as superior electrical and thermal properties, which may become ideal reinforcing materials for an entirely new class of composites. The main goal of this project is to understand the mechanics of carbon nanotube-based nanocomposites by developing modeling and simulation tools. The specific aims of this WISE project include: 1) Develop algorithms for the generation of molecular structures of carbon nanotube-based nanocomposite, with desired geometry, distribution and volume fraction. 2) Develop a molecular dynamics code to model the polymer and composite systems. 3) With the use of this code, study the mechanical properties such as failure strength, stiffness, and interfacial properties of the nanocomposite. Approximately 70% of this project involves the use of a variety of engineering analysis software and programming languages. The rest 30% will be theoretical, with an effort to validating the computational results. Dr. Dong Qian and Dr. Yijun Liu from the College of Engineering will be the primary mentors for this WISE project. The student will have access to the state-of-the-art computational hardware and visualization tools. The student will also be getting assistance from two experienced graduate students.