

**Department of Chemical and Materials Engineering
and Department of Mechanical Engineering
COLLEGE OF ENGINEERING**

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 3, 2008

The Department of Chemical and Materials Engineering and the Department of Mechanical Engineering are 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.

Synthesis of Carbon Nanotube Arrays for Spinning Thread

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PROJECT DESCRIPTION

This project is to synthesize carbon nanotubes that can be spun into thread much like how cotton is spun into thread. Carbon nanotubes are currently synthesized at the Univ. of Cincinnati and are up to 1.5 cm long. Using the long nanotubes, it may be possible to spin thread that is strong, lightweight, and electrically conductive. The project would be performed under the supervision of Vesselin Shanov and Mark Schulz in the NANOWORLD lab, which is a nanotechnology laboratory for research and teaching located in Rhodes Hall Rm. 414 (http://altmine.mie.uc.edu/mschulz/public_html/smartlab/smartlab.html). The thread would have structural applications in advanced composite materials such as aircraft, spacecraft, sporting equipment, and to build a ribbon for a possible future space elevator. The thread might also be used to replace copper wire to reduce the weight and improve the performance of electric motors and aircraft. Another application for nanotube thread is in clothing. It may be possible to make clothes that never wear out, never get wet, and that are bulletproof for military use. One student would be jointly supervised by Shanov and Schulz. The student would be involved in synthesis of nanotubes using a computer controlled nanofurnace. Synthesis involves preparation of a substrate, nanotube growth in the nanofurnace reactor, and characterization of the nanotubes produced using electron microscopy and other techniques. The student would work with other students in the lab including undergraduate and graduate students.

