

**Department of Physics
COLLEGE OF ARTS & SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2011

The Department of Physics is pleased to offer the following research project for the summer of 2011. 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.

In Vitro Evaluation of the Electrostimulation of Neurite Outgrowth on Carbon Nanotube Threads for Repair of Central Nervous System Trauma

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Project Description

Injury to the nervous system, consisting of loss of either long neuronal processes (neurites) and/or nerve cell bodies, represents a significant cause of chronic and debilitating neurological impairment, with approximately 11,000 new spinal cord injuries being reported each year. Strategies for improving post trauma neural regeneration and function follow two strategies: 1) minimizing the initial consequences of injury and, 2) promoting repair of the damaged tissue, particularly neurites. We are focusing on the latter. This research uses carbon nanotube (CNT) materials and neuronal culture systems to investigate enhancing neurite outgrowth by direct electrical stimulation. The long-term goal is to use novel CNT-based scaffolds to address functional regeneration in both the PNS (Peripheral Nervous System) and the CNS (Central Nervous System). Students will carry out electrical stimulation measurements on neurons in cell cultures via the application of dc and/or ac currents and voltages to the CNT thread materials. Electrical transport models for ionic and electronic conduction will be compared to these current/voltage measurements. Knowledge of working with cell cultures not required, but interested students could be involved with the neuron growth.