DEPARTMENT OF MATHEMATICAL SCIENCES
College of Arts & Sciences

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: MARCH 3, 2003

The Mathematical Sciences Department is pleased to offer the following research project(s) for the summer of 2003. Interested students are urged to contact the faculty member(s) directing the project(s) that most interest 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.

Modeling of Neuronal Networks

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The aim of this project will be to understand the behavior of certain networks of nerve cells using mathematical modeling based on the Nobel Prize winning work of Hodgkin and Huxley, and computer simulations. These neuronal networks typically display various types of oscillatory behavior. The individual nerve cells in these networks are primarily connected by synapses which may become weaker or stronger depending on the type of oscillations. These modifications are thought to be involved in learning and memory.

The student will work with two mathematicians who are currently conducting research as part of a highly interdisciplinary team which also has a biochemist and neurophysiologist. The mathematical models will consist of systems of ordinary differential equations which must be solved using computer approximation techniques.   Noise is also present in these biological systems and will have to be included in the modeling.

The student must have a background in Differential Equations and Computer Programming as well as probability and statistics.