School of Dynamic Systems
COLLEGE OF ENGINEERING AND APPLIED SCIENCES

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 1, 2011

The School of Dynamic Systems 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.

Development of Control System for Electrochemical Micromachining

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Project Description

Electrochemical Micromachining (ECMM) is an emerging nontraditional micromachining process. ECMM requires very precise process control. The inter electrode gap (IEG) needs to be maintained within few microns in order to prevent short-circuiting between the electrodes and achieve accurate machining results. In this research project, a closed loop feedback control system for ECMM will be developed and integrated into the existing ECM set up at the Micro and Nano Manufacturing Laboratory and used in the micromachining of Titanium. The tool to be used in the micro-machining of Titanium will also be manufactured using the same ECM setup. The effectiveness of the control system developed will be explored under various ECMM process parameters like the electrolyte concentration, feed rate, current settings, type of electrolyte and tool sizes. Proposed research work will introduce students to the various aspects of scientific research. The specific learning opportunities for the students include (i) acquiring *hands-on* experience in micromachining, (ii) theoretical modeling of ECMM process and experimental verification, and (iii) learning to use software like labview for control system development.