DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: MARCH 1, 2002

The Department of Civil and Environmental Engineering is pleased to offer the following research projects for the summer of 2002. 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.

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Project Summary. The Water Quality Biotechnology Program, Department of Civil and Environmental Engineering, University of Cincinnati focuses upon research utilizing techniques from molecular biology to identify, enumerate, and measure the *in situ* growth activity of microorganisms in samples from environments of interest to Environmental Engineers and Scientists. For example, a current project being conducted by one women undergraduate student in the lab examines the effect of bioreactor configuration and operating conditions on the composition of the microbial communities within the bioreactors. In the Summer of 2002, the Water Quality Biotechnology Program will offer two women undergraduate students the opportunity to work on a research project funded in part by a grant from the Ohio State University Research Foundation. The project is entitled, "Preliminary Evaluation of a New Technique for Linking Picoplankton Community Structure with Function in Aquatic Environments." The objectives of this proposal include: acquiring and setting up laboratory infrastructure and demonstrating the effectiveness of bromodeoxyuridine labeling of *de novo* synthesized DNA coupled with whole-cell fluorescence *in situ* hybridizations targeting 16S ribosomal ribonucleic acid (rRNA) genes to measure the growth rate of microorganisms in aquatic environments.

These objectives will be met by completing the following tasks:

- *Task 1* Acquire antibodies, cell cultures, and hybridization equipment to carry out immunostaining of bromodeoxyuridine labeled DNA.
- *Task 2* Train two undergraduate students to conduct whole-cell antibody staining and fluorescence *in situ* hybridizations targeting bromodeoxyuridine and 16S rRNA, respectively.
- *Task 3* Determine the growth rate of microorganisms in samples removed from the Mill Creek, Cincinnati, OH.
- *Task 4* Prepare a summary report documenting the findings of the research.

The two women undergraduate students selected for this project are expected to have some familiarity with general laboratory techniques (e.g., to have previously performed well in lab courses such as general chemistry lab, organic chemistry lab, or microbiology lab). During the project, the progress of the students will be monitored by close contact with the Principal Investigator, Professor Dan Oerther, Department of Civil and Environmental Engineering. It is anticipated that the successful outcome of this work may include establishing a long term working relationship with the Water Quality Biotechnology Program. Thus, preference will be given to women undergraduate students at the Sophomore level with an interest in continuing work on independent projects throughout their academic careers (i.e., to follow up this summer program with supported research during the academic year). For additional information, please contact Professor Dan Oerther, Department of Civil and Environmental Engineering, at Daniel.Oerther@uc.edu or (513) 556-3670. General information on the Water Quality Biotechnology Program can be found at www.wqb.uc.edu.