

Department of Civil and Environmental Engineering

COLLEGE OF ENGINEERING

SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 1, 2007

*The Department of Civil and Environmental Engineering is pleased to offer the following research project for the summer of 2007. 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.*

### **EVALUATION OF BIODIESEL EMISSIONS**

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#### **Project Description**

The WISE student will work with a graduate student to characterize diesel particulate matter (DPM) emissions from biodiesel fuel usage in non-road a diesel generator. Biodiesel is mainly made from vegetable oil and animal fat, which are considered as renewable sources. The chemical structure is mainly fatty acid esters and contains almost no aromatics and sulfur. It is expected that the use of biodiesel can result in less DPM emissions. The goal is to compare the DPM emissions from the use of regular diesel and biodiesel. The student will take samples from a diesel generator at the UC Center Hill Research Facility, and will collect DPM at various engine loads (idle, low, medium and full load). They will learn the sampling techniques, setting up generator loads, filter preparation, conducting gravimetric measurements, and calculate concentrations of the DPM. The graduate student will assist them in analyzing the organic compositions of the DPM samples. Thus, they will better understand air quality issues caused by diesel (truck, busses, and machine) emissions and why the use of biodiesel results in less pollutant emission.

The use of renewable biodiesel will greatly reduce our nation's dependence on imported petroleum; it also reduces green house gas emissions and is environmentally friendly as DPM emission reduction can also be expected.

The student will also receive training in sampling, and the use of state of the art analytical instruments, such as the GC-MS (gas chromatography mass spectroscopy).