DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING
College of Engineering

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: MARCH 1, 2004

The Department of Chemical and Materials Engineering is pleased to offer the following research project(s) for the summer of 2004. 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.

Optimization of Microfiltration Processes

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Microfiltration is widely used in the biotechnology or pharmaceutical industries for initial clarification. One of the limiting factors governing the performance of these processes is the irreversible alteration of the membrane caused by specific physical and chemical interaction of the membrane with various components in the process. Most of the microfiltration processes are operated at either constant flux or constant trans-membrane pressure conditions. Our results for the constant pressure filtration show rapid decline in filtrate flux initially due to the higher rate of deposition at initial times. Results for constant flux filtration experiments show rapid increase in trans-membrane pressure at long filtration times due to the high compressibility of the deposit. This effect was largely absent for systems with incompressible cake layers, making constant flux operation more attractive for filtration applications in which the particles form an incompressible deposit. The focus of this project would be to use our understandings of fouling mechanism to design and perform the filtration using the complex flux/pressure control strategies for specific applications. For example, one would begin the filtration using constant flux but then switch to constant pressure at long times. This might allow one to obtain the benefits of constant flux operation but avoid the detrimental effects of the dense highly compressed deposit that forms at very high pressures. The undergraduate student involved in this project would be able to learn DLS (dynamic light scattering), various filtration processes, and fundamentals of membrane science and technologies.