Department of Biomedical, Chemical, and Environmental Engineering
COLLEGE OF ENGINEERING AND APPLIED SCIENCE

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 1, 2016

The Department of Biomedical, Chemical, and Environmental Engineering (BCEE) is pleased to offer the following research project for the summer of 2016. 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.

PROJECT TITLE: Synthesis of Novel Ion Separation Membranes for Electrical Storage Batteries

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Project Description

This summer research project is part of our ongoing research program sponsored by the NSF (grants CBET-1263860). The overall goal of this NSF research program is to develop the next generation of inorganic-based ion-exchange membranes (IEMs) that will lead to the establishment of new redox flow batteries (RFBs). The inorganic-based RFBs will have higher energy efficiency and unprecedented temperature-resistance suitable for large scale electrical energy storage in renewable (e.g., solar and wind) power systems. Our research addresses the fundamental issues that are critical to the successful development of such new IEMs, including (1) design, synthesis, and characterization of the IEM materials, and (2) IEM performance test in RFB and understanding of molecular/ionic transport mechanisms.

The main objective of this summer undergraduate research project is to synthesize thin films of a new type of microporous nanocrystal-ionic polymer composite membrane with a unique layered-structure and demonstrate its functionality and advantages in an actual flow battery set. The student working on this summer project will collaborate closely with a number of highly experienced senior Ph.D. students in our laboratory. The undergrad participant will learn and contribute specifically to the material synthesis, characterization and battery performance test.