

**National Science Foundation
Gender Diversity in Science, Technology, Engineering and Mathematics Education**

**Women @ CENS: A Research System
Project Summary**

Although we have seen progress over the last few decades, women still lag far behind their male counterparts, especially at the doctoral level, in the fields of engineering, computer science, and physical sciences. In an attempt to explain as well as counteract women's persistent under-representation in the fields of engineering, computer science, and physical science, the pre-college and college experiences of women in science and engineering have been the focus of both intervention and research endeavors. The pre-college and college experiences of women in science and engineering have been the focus of both intervention and research endeavors. These endeavors has provided the science and engineering communities with some information from which to develop new programs, generate new research designs, and implement new interventions. Despite such efforts, there is one crucial educational component of a woman's undergraduate experience that remains somewhat of a mystery: the undergraduate research experience.

This demonstration project proposes, "Women @ CENS: A Research System", proposes to develop a demonstration model of an undergraduate research program that is designed to promote women's longer-term commitment to science and engineering (e.g., pursuit of graduate education in engineering, computer science, and physical sciences). The intent of this project is to go beyond simply offering an undergraduate research experience and documenting the outcomes of such an experience. Our goal is to use the demonstration model we propose in this document as a basis to identify the best practices and strategies inherent in successful undergraduate research programs across the country. From this, we will further refine and develop a model program and implement the program to evaluate the outcomes. CENS has chosen the disciplines of engineering, computer science, and the physical sciences to focus efforts because of the low representation of women in these three doctoral fields.

The expected **outcomes** for our women undergraduate interns include: increased hands-on skill set and research experience; improved teamwork, problem-solving, presentation, and content skills as identified by project; improved self-confidence and increased positive attitudes towards respective disciplines; increased number applying for and participating in undergraduate research experiences; increased retention through graduation in respective disciplines; and increased interest and participation in pursuing graduate study.

To accomplish these outcomes, our project will begin with a baseline model undergraduate research program. We chose to use a **systems approach** that would provide a framework for the three main components of programs currently being implemented at institutions across the country. Our research system model includes these three components:

1. **Environment:** A research environment that offers women undergraduates experiences in forefront research with direct societal implications (e.g., environmental, safety, educational). The connection between the research environment and the societal implications generates a medium through which successful recruitment can occur.
2. **Experience:** A research experience structured so as to promote successful and productive outcomes. The research experience is the process of a woman undergraduate doing science.
3. **Engagement:** A vital support structure to ensure academic and social integration for each student. The model program proposed in this project will allow for a more comprehensive understanding regarding which engagement strategies are most effective for women.

We will conduct a thorough qualitative evaluation of this project and its outcomes. Upon completion of this project, we will **disseminate** the results of our process in addition to the web-based tools, structure guidelines, and process documents developed. All of these items will be available via a Web site. The work conducted with monies from this grant will allow us to provide faculty members and administrators of undergraduate research programs in engineering, physical sciences and computer science with tools for developing successful undergraduate research programs for their women undergraduates.