

SLOAN FOUNDATION INITIATIVES AT CORNELL UNIVERSITY

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Introduction

Cornell University is one of three universities to receive significant three-year grants toward women's programs initiatives, beginning November 1991, from the Alfred P. Sloan Foundation. This paper describes activities that led to the creation of the Women's Programs in Engineering at Cornell and how the Sloan funding is being used to work toward meeting the mission and objectives of the program.

I would like to take this opportunity to thank WEPAN -- the organization and its individual founders and ground-layers -- for the unselfish giving of information and support they have provided, without which we would not have come this far this soon. Since we are a new program, I'd also like to take this opportunity to brag a bit about it by describing its background and activities.

The Birth of Women's Programs in Engineering at Cornell

Background

Throughout the 1980's, Cornell's College of Engineering maintained a relatively high percentage of women in its undergraduate program compared to the national average. During this period, the average freshman class was 23% female, with a high of 27% in 1983 and a low of 17.6% in 1989. As a result of the significant drop in enrollment of women in 1989, as well as the prediction by the National Science Foundation that there would be a serious shortage of engineers by the year 2010, Cornell began looking at its methods of, and its commitment to, recruiting and retaining females in engineering.

Initial efforts in the area of retention began in early 1990 with data collection and analysis of the situation for women in engineering at Cornell, as well as by establishing increased support for women in the college. Efforts included:

- a review of the literature in an attempt to understand the barriers for women in engineering, as students and as professionals (these barriers will not be explained here; they can be found elsewhere in WEPAN literature and resource material),
- an intensive cohort study that tracked the enrollment and graduation of all students who entered engineering at Cornell as freshmen from 1983-1990 (an important first step for anyone considering setting up a women's program),
- support for a visit by Dr. Jane Z. Daniels, Director of Women in Engineering Programs at Purdue, to meet with faculty, staff and administrators,
- a survey of students who had left the college in the previous three years in an effort to gain an understanding of the reasons why they leave, paying particular attention to gender differences,
- an experiment in collaborative learning with a group of 24 female students in second-semester calculus,
- the establishment of a mentoring program, where freshman women were linked with graduate and faculty women,
- greater college support, both financially and administratively, for Cornell's student chapter of the Society of Women Engineers (SWE).

In the area of recruiting, a variety of activities were undertaken to increase the number of accepted and enrolling women candidates. One key appears to be the "personal touch", which was provided in several ways:

- by mailing hand-written personal notes to females identified early as good candidates for our program,
- by responding with personal letters to inquiries,
- by sending letters to targeted females from current female engineering students who are from the same geographic region as the recipients,
- through a letter to accepted candidates from a recent female engineering graduate,
- through telephone contact with both prospective and accepted applicants by members of SWE and the Engineering Ambassadors Association,
- through a weekend on campus, organized by SWE, where 94 accepted candidates were hosted (of which over 80% enrolled at Cornell in the fall).

While it is too early to determine whether retention efforts have been successful, our freshman class in fall 1991 was 31% female.

The variety and intensity of the activities listed above is evidence of a strong commitment to provide an environment where female students are welcomed, supported and feel free to pursue their chosen professions. This commitment is provided from many sources: the Dean of Engineering, the Associate Dean for Undergraduate Programs, faculty members, staff members in the Offices of Admissions and Advising, Engineering

Status of Women Committee members, and student members of the Society of Women Engineers and Engineering Ambassadors. As a result of this commitment, the Women's Programs in Engineering Office was established in July 1991.

Mission

The mission of Women's Programs in Engineering is to recruit, enroll and retain an increasing percentage of women, both in Cornell Engineering programs and the engineering profession, and to establish an educational environment and support structure that enhances the image of women in the engineering professions.

Objectives

There are four primary objectives of the Women's Program in Engineering:

1. To increase the graduation rate of women who enter as freshmen in engineering to equal the graduation rate of males. More specifically, to reduce the attrition rate for women from the College who transfer to other colleges at Cornell.
2. To increase the percentage of women in the incoming freshman class to 35-40% by 1995. Our previous goal of 30%, established in 1989, was met in fall 1991.
3. To increase the interest and number of qualified females in the pre-college portion of the engineering pipeline (middle and senior high school). This is part of a national initiative, supported at the local program level.
4. To increase the number of our undergraduate women continuing into graduate engineering programs who will feed into the faculty and industry pipeline where they can become role models for undergraduate women in engineering.

Projects

Several projects were undertaken in the first year of our program. They include:

- the establishment of a Student Advisory Board, composed of women engineering students, to act in an advisory capacity to tailor programs to fit the needs of women in engineering,
- a "Women in Engineering Career Planning Seminar", for juniors and seniors, which covers career planning, aspects of transition to the engineering profession, graduate study options, and related issues of special interest to women,
- a tutoring program where female junior and senior students tutor freshman and sophomore women in key courses in the engineering curriculum,
- the publication of a monthly newsletter, *Women in Engineering News*, sent to all women students in the college, and
- the development of a video for pre-college girls, entitled *She's the Engineer*. This video shows high school girls already in the math and science track how they can use their talents to pursue an engineering career. Both college and professional life are

discussed in realistic terms in a format that appeals to the age group. Brochures about the video and how they may receive a copy for a nominal fee are sent to high school girls who may be likely candidates to pursue engineering degrees.

Sloan Foundation Proposal

Our proposal to the Sloan Foundation, submitted by Professor Christine Shoemaker and myself, requested funding for salary for a Director of Women's Programs, which was partially funded, and for specific projects that would enhance ongoing activities and work within the infrastructure to improve the climate for women in the College of Engineering. Proposed projects were designed to work toward meeting overall program goals as well as to evoke changes and provide opportunities in a number of areas that have impact on the experiences of female students. The following describes the projects for which funding was requested as well as an update on how these projects are progressing.

Freshman Seminar for Women

Funding was requested for the development of a weekly freshman seminar for females where they would have the opportunity to form social and academic support networks with other participants. By providing a non-threatening environment where women can learn about what engineering has to offer and discuss issues relevant to them, they should become more committed to engineering and be less likely to leave.

This seminar was offered in fall 1991 for 60 women in three sections. Evaluations showed positive reactions toward the seminar, though it is too early to tell if it had an impact on retention.

Course Development

A major reason given by students for why they leave the College of Engineering, particularly women, is that engineering is not what they expected. Given the first two years of the curriculum, which includes foundation courses with little actual engineering, we requested funding that would foster the development of introductory courses that use innovative and exciting ways of teaching engineering and also include examples of the presence and contributions of women in engineering.

For the fall 1992 semester, this funding will support Academic Excellence Workshops in introductory calculus for women (this opportunity is also being provided to male underrepresented minority students). In these weekly workshops, senior and/or graduate engineering students act as facilitators for collaborative learning to foster and develop community while mastering group study skills and academic subject matter. Exciting examples of engineering will be incorporated into the workshop format.

Faculty Awareness

Realizing that many faculty are concerned about the issues for women in engineering, and seeing a need to improve the climate for women, funding was requested to provide faculty with training that will sensitize them to the long-standing cultural biases that subtly undermine the success of women in engineering, and to the ways in which they, as instructors and as faculty advisors, can work more effectively with their female students.

The Cornell Interactive Theatre Ensemble is in the process of designing interactive workshops specifically for engineering faculty, to begin in fall 1992, with a goal of involving all faculty in the college.

SWE Support

Funding was requested to provide increased for the student chapter of the Society of Women Engineers, an important organization that encourages social and professional support and provides leadership opportunities for women.

This year part of the funding was used toward our annual SWE Banquet in April, where Jill Baylor, National SWE President, was keynote speaker and Christine Shoemaker was presented the 1991 SWE Outstanding Educator Award.

Video Support

Funding was provided toward the creation and evaluation of the *She's the Engineer* video described above. The video has been completed and distribution and evaluation is currently under way. To date there has been much positive response to the video. We are currently looking at ways to provide the video to all high schools across the country, preferably through high school math and science teachers.

We are looking forward to continuing these and other activities through the Women's Program in Engineering Office. Individuals wishing more information about our activities may write or call: Michele Fish, Director, Women's Programs in Engineering, 167 Olin Hall, Cornell University, Ithaca, NY, 14853-5201, (607) 255-3658, FAX (607) 255-8929.

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We are very grateful for the generous support provided by the Sloan Foundation, and to Harry T. Weiner, Program Consultant. We appreciate their interest and commitment demonstrated through the funding of our newly-established Women's Programs in Engineering. We hope that through their commitment, and through our own efforts, we can collectively help make positive changes for women in engineering at all levels.

