

## WOMEN ENGINEERS: DOES CONGRESS CARE?

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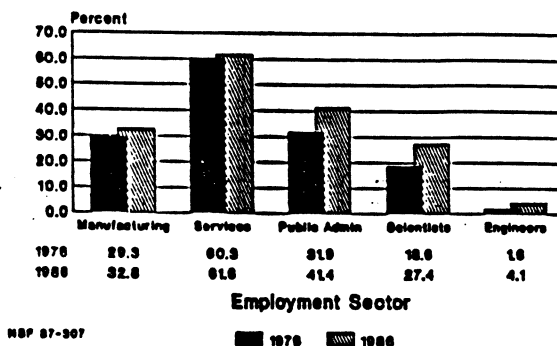
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This past year, as a Congressional Fellow, I did my work with the Congressional Caucus of Women's Issues. The Caucus is co-chaired by Pat Schroeder and Olympia Snowe. Very shortly after I began, it became obvious to me that one of the most blatant inequities for women is in the field of science and math. This inequity, I found, is documented by Congress but was not being addressed in legislation.

The United States is suffering from a severe and worsening shortage of scientists and engineers, one that threatens the nation's ability to develop and advance its traditional industrial base and compete internationally. If present patterns continue, the United States will experience a net shortfall of approximately 750,000 scientists and engineers by the year 2000. (FCCSET)

One major problem is that there is a severe underrepresentation of women in math and science courses and careers. Although women constitute approximately 50% of the total professional workforce, data from 1988 revealed that women comprised 4 percent of the engineering population. Women make-up a vast and important untapped resource. (Clutter)

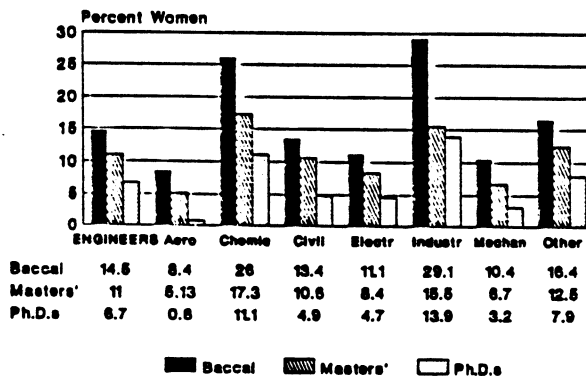
Percent of Workers Female, by Sector



While girls do score, on the average, 45 points lower than boys on the math portion of the SAT exams, this has been attributed more to enrollment in and exposure to math courses and mathematical principles in high school than to ability. (Shakashiri;Pelavin) They are then perceived as having lower abilities than men by their professors, and often ruled out from majoring in engineering or one of the physical sciences. (Oakes)

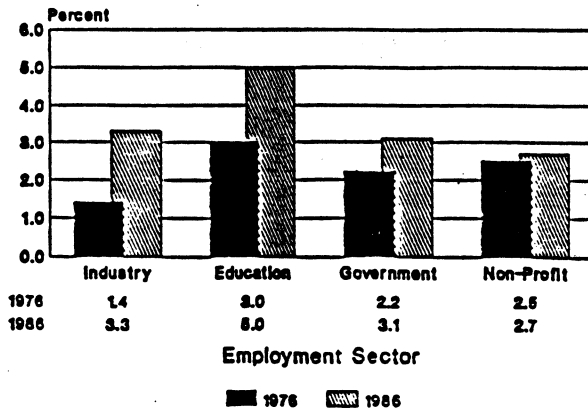
The undergraduate years are especially critical. While 46.1% of the share of Baccalaureate degrees in math are attained by women, these figures drop considerably in the Masters and Ph.D degrees. Data in the field of engineering is dismal even compared to the degrees in pure math. In 1986 only 14.5% of Baccalaureate degrees in engineering were awarded to women, with a drop of a Masters' degree to 11% and Ph.D degree to 6.7%. (Figure 2) The main factor attributed is the institutional climate which is not supportive of female students. (Clutter,Oakes)

Shares of Engineering Baccalaureates,  
Masters, Doctorates to Women (1986)



Women role models are few. In 1987, 2.4% of employed Doctoral Scientists in University or Four-Year Colleges were women. Women engineers working in industry made up 3.3% of the total while the percentage of women engineers in government jobs was only 3.1%. (Figure 3) There is a clear message being sent. What is more, a "cold climate" is often subtly suggested to women when they do fight up the career ladder in engineering, both in academia as well as in the corporate world as the glass ceiling is evident. The women who do pursue, often suffer pay differentials and slower promotional rates. (Vetter)

Percent of Engineers Female, by Sector

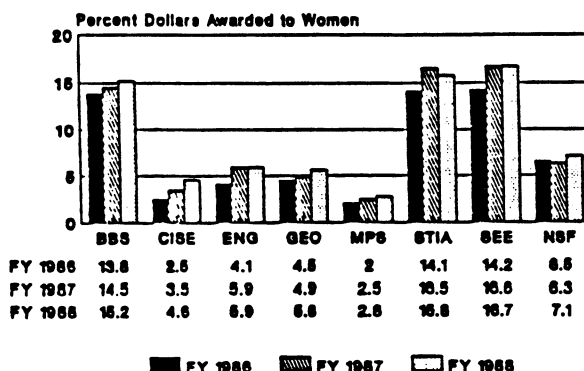


There are ways to encourage women to pursue engineering careers. (Reynolds, Clutter) These include the introduction of role models, the use of intervention programs, sensitizing and familiarizing teachers with the subtle ways by which they discriminate by gender and race, and encouragement of students by creating a classroom climate of high expectations and self-esteem.

The National Science Foundation (NSF), is the agency which is funded by the government to support projects dealing with research, education, development and training activities in the sciences. Congress reauthorizes its authority and budget every few years. In 1980, during the 96th Congress, committee hearings exposed the need for legislation to encourage women to enter the fields of math and science. The Reauthorization of the National Science Foundation for that year provided for a section on "Women In Science" (P.L. 96-516) However, eight years later, in 1988, it became apparent from those testifying at congressional hearings that because of lack of funding, little progress had been made in encouraging women and underrepresented minorities into the math and science pipeline and the problem still existed. (Malcom) A Task Force on Women in Science and Engineering was established to review the existing NSF programs which promote full participation of women. The Task Force also set its goal to determine barriers for women in engineering and science disciplines. The Task Force made many recommendations. (Clutter) Unfortunately, funding for new programs are subservient to budgetary considerations.

It is documented that women graduate students in the fields of mathematics and science are presently less likely than men to have either institutional or Federal support during their graduate studies. Teaching and research assistantships are not afforded equally to women as to men. Women are more likely than men to be self-supporting or to have to borrow money to get through graduate programs in mathematics and science. (Vetter; Cole & Zuckerman) Shares of dollars awarded to women engineers by NSF for research is extremely low. (Figure 4)

Shares of Dollars Awarded to Women  
FY 1986, FY 1987 and FY 1988



During the last hours of the 101st Congress, an "Excellence in Education" Bill was passed. The provisions include grants to institutions to recruit and retain women faculty, a Distinguished Visiting Professors grant, priority of awards to States or State agencies who emphasize women in math and science, provisions to encourage an increase in the number of fellowships going to women, and the recruitment and retention of women on faculties. (PL-101-589) Many of these are not new programs. Funding for these programs still remain an issue.

The process to get a bill passed by both houses and into public law often entails extreme compromise, and then the problem becomes funding of the provisions. Often, much is lost in the process.

This session of Congress, the Reauthorization of the Higher Education Act of 1965 will come before both houses. After a careful reading of the act, it became clear to me that nowhere in any of the several reauthorizations was language included to encourage women and minorities to enter the fields of mathematics and science. I therefore drafted a bill that would include such provisions throughout this very far reaching act. One of the fruits of this labor is HR 2142, which was introduced by Rep. Nita Lowey on May 1, 1991.

Called "The Women and Minorities in Science and Education Act", HR 2142 attempts to ensure that we maximize our ability to train highly skilled scientists and engineers. In order to spur more women and underrepresented minorities to enter the fields of science and mathematics and succeed in these fields, it provides strong support in secondary, postsecondary and graduate educational institutions, including counseling and student aid. In addition, it provides additional training for existing mathematics and science teachers and expands recruitment of women and underrepresented minorities as teachers in these fields.

Another bill I drafted amends the provisions for the Christa McAuliffe Fellowship, reinterpreting the program as a fellowship specifically for a woman teacher dedicated toward the integration of the science and social studies curriculum. This language memorializes the work done by Christa McAuliffe.

A third bill, will establish a position at the National Science Foundation to be known as the Directorate of Women in Science. The Director will be responsible for oversight and assessment of programs that encourage women to enter and remain in the fields of mathematics and science.

There is definitely interest by members of Congress and by the Executive Branch to encourage math and science education in general. The interest in including special provisions for the encouragement of women in mathematics and science is more problematic. It is up to those who realize the vast human potential available as well as those concerned with equity issues for women, to lobby for the specific inclusion of the encouragement of women to enter these fields. Supporting bills specific to this inclusion is of utmost importance.

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