



## BIOLOGICAL, SOCIAL, AND ORGANIZATIONAL COMPONENTS OF SUCCESS FOR WOMEN IN ACADEMIC SCIENCE AND ENGINEERING REPORT OF A WORKSHOP (2006)

A nation's ability to utilize all available scientific and engineering talent is vital to achieving technological and economic leadership in an increasingly competitive world. This can be done with a workforce that brings diverse perspectives and priorities to education and research, and by removing barriers that prevent scientists and engineers from successfully contributing their expertise.

Twenty-five years ago Congress passed the Science and Engineering Equal Opportunity Act, which states that men and women have equal opportunity in education, training, and employment in scientific and technical fields in the United States. Major advances have occurred since then in the number of women enrolled in science and engineering classes in high school and college. Women now earn 51 percent of the bachelor's degrees and 37 percent of PhDs. However, academic institutions are not fully tapping into this growing pool of women science and engineering graduates. Women do not hold science and engineering academic faculty positions in proportion to their increasing share of the talent pool. This is particularly true for African American women. Furthermore, women in academia are less likely than men to have tenure-track jobs and those that do lag behind men in salary, professional honors, and positions of authority.

The causes of these discrepancies are controversial, and have been attributed to differences in cognitive abilities based on sex, differences in career interests and preferences, bias and discrimination, gendered institutional policies and practices, and/or broader societal gender roles and assumptions.

A public workshop was held in December 2005 to explore these challenging issues. The workshop featured national experts and was organized into four sessions: biological components of success in science and engineering, social components of success, institutional structures that affect recruitment and retention of women scientists and engineers, and current institutional transformation efforts. Several key themes were highlighted during the workshop discussion:

- Male and female careers in science and engineering generally follow different paths.
- Sex differences in cognitive and intellectual abilities do not account for the different numbers of women and men in faculty positions.
- Women and minorities lack necessary foundations for career success, including mentors, networking opportunities, and social support.

- Pervasive explicit and implicit gender bias has played a major role in limiting women's opportunities and careers.
- Data show that bias is a complex phenomenon that requires multiple solutions, such as examining the effects of bias on evaluation.
- General-neutral policies often disadvantage women scientists, particularly those targeted at women to accommodate family care giving responsibilities, because women who take advantage of such programs are seen as less serious than their male colleagues.
- Women scientists who belong to ethnic and racial minorities face additional issues of stereotyping and isolation.

Workshop panelists proposed a wide range of steps that institutions can take to reduce bias and inequity against women and improve opportunities for them to succeed in academic science careers:

- Using new descriptions to discuss bias, such as calling bias or stereotyping *unexamined*, so that responsibility is placed on the person who holds or acts on the bias or stereotype.
- Educating people to identify unexamined bias in their own and others' actions.
- Establishing flexible-time policies such as family leave, flex time, part-time tenure, and temporary stoppage of the tenure-clock. An atmosphere that allows faculty members to take advantage of these policies without fearing damage to their careers is critical.
- Restructuring hiring and promotion procedures to reduce bias and encourage diversity, particularly the training of search committees, deans, and department chairs to recognize and reduce bias in hiring, evaluation, and promotion.
- Establishing mentoring programs for women and other underrepresented groups.
- Changing the context of test-taking to eliminate stereotype threat.
- Continued or enhanced funding of research into social and institutional structures and field testing of methods to reduce bias and stereotype threat.

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