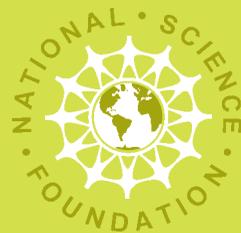


**NEW TOOLS FOR AMERICA'S WORKFORCE**  
**GIRLS IN SCIENCE AND ENGINEERING**





## ORIGINS

One of the National Science Foundation's key strategies is to cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens. Why is it important and timely to deepen the American talent pool in engineering and computer science? There are many reasons:

- After 9/11, the United States finds itself no longer able to depend as much on foreign talent for engineers and technology experts. We need more citizens available for classified work, especially to meet new challenges such as those presented by chemical and biological weapons and weapons of mass destruction.
- Companies are exporting jobs to meet their demands for talent in engineering and computer science.
- Having developed their own competitive educational institutions, other countries are growing their potential to produce more engineers and computer scientists than the United States.
- The diversity profile of faculty in the U.S. colleges and universities has not kept up with the profile of graduates in science, technology, engineering, and math (STEM) fields. Graduates are available but are not entering the academic or corporate workforces, are not choosing to stay, or are not advancing to leadership positions.
- Congress recently directed the General Accountability Office to assess the application of Title IX to higher education, and especially to the issues of equitable access, recruitment, and retention of underrepresented students in science and engineering.
- The National Science Board, the National Academies of Science and Engineering, the American Association for the Advancement of Science, and other leading policy entities continue to voice concerns about the lack of diversity in the science and engineering workforce.
- “Why aren’t women in science?” Former Harvard University president Lawrence Summers, launched a public discussion—including hundreds of pages of press coverage—on the topic. Subsequently, Harvard University invested \$30 million to change those of its policies and practices that contributed to the slow integration and advancement of women in faculty positions in these fields.
- While women’s participation in medicine, law, and business management has increased to parity or near parity, it remains slow in the high-demand fields of science and engineering, especially with regard to workforce participation and advancement.
- Cross-cultural studies show that occupational participation and segregation by gender is cultural. That is, a society can encourage and support different trends, even in a short period of time, that could lead to a more diverse and dynamic workforce.

In 1981 the Equal Opportunities for Women and Minorities in Science and Technology Act acknowledged that it was U.S. policy and in the national interest to encourage all groups to participate in science and engineering. The act mandated that the NSF report statistics on underrepresented groups and initiate programs fostering their more proportionate representation. Among the suite of programs that followed was the Program for Women and Girls, created in fiscal year 1993 and housed in NSF's Division of Human Resource Development, Directorate for Education and Human Resources.

The annual budget has varied from \$7 million to \$10 million. Although relatively small, the NSF program is the largest funding source, public or private, for efforts expressly addressing the need to broaden girls' and women's participation in STEM. To date, more than 350 grants have provided the national STEM education enterprise with new ideas, proven good practices, innovative products, research publications, and a leadership of savvy, experienced educators and education researchers. These grants are relatively small but reach nearly every state in the country.

The program aims to change education policy and practice by supporting research, student and educator programs, dissemination of findings, and technical assistance projects. Program findings and outcomes help us understand, for example, how to

- Maintain girls' interest in science past middle school
- Bring more girls into elective high school math and advanced-placement science courses
- Increase young women's enrollment in STEM undergraduate studies, particularly in engineering and computer sciences (where there is a national need for more experts and more diverse faculty)

A study of its impact from 1993 through 1996 showed that the NSF program has been successful. Yet while much has been accomplished, national statistics reveal that much more remains to be done. Since 1993—even since 2003—the national need for a larger, more diverse, more science- and computer-literate and skilled workforce has steadily grown, as we progress toward an increasingly technological job market, a more scientifically complex society, and more intense global competition in engineering and technology innovation.

## ABOUT THE BOOKS

*New Formulas for America's Workforce: Girls in Science and Engineering* was published in September 2003. Within seven weeks of issue, the initial print run of 7,000 copies was exhausted and the NSF had to order reprints. Copies on CD and online were also in great demand. NSF's publications Web site showed *New Formulas* to be the second most requested print publication during October 2003. There were requests for up to 300 copies of the CD at a time, to be handed out at conferences. All copies (paper and CD) are free. The publication reached teachers, formal and informal educational practitioners, researchers, and even parents and students. Ensuing publicity in every major science publication (and the *Washington Post*) revealed the breadth of public interest.

The first *New Formulas* covered about 220 grants from 1993 through 2001. The publication led to

- New collaborations among education researchers
- New and greater investments in educational programs for female students
- Better understanding of gender differences in career interests and in how students engage in science and mathematics
- Awareness of and better access to widely scattered resources and information
- Deeper comprehension of the educational impacts of NSF's investments
- Faster and easier press access to findings and leading experts in a field of study that crosses many disciplines

In short, the book informed public discourse about the state of gender diversity in science and engineering, the critical role of education in preparing the workforce, and the constraints on national competitiveness that can result from failing to address diversity issues.

*New Formulas 2* updates the first volume by describing the roughly 100 grants made between 2002 and 2005. There are fewer educational demonstration projects in that edition, but more social-science research studies, dissemination activities, and projects that will provide technical assistance for the implementation of best practices.

*New Tools* is the third volume in this series. This publication is a catalog of the products created by the program grant projects from 1993 through 2005. These products include CDs, DVDs, brochures, program guides, special reports, and informational Web sites. The CD-ROM attached to the back cover contains electronic versions of *New Formulas 2* and *New Tools*. Active links are placed throughout the CD-ROM, allowing the user to easily access the many Web resources featured in the publications. The grants covered in these two publications encompass programs conducted at all educational levels, and include both professional development and formal and informal activities.

We expect the same spectrum of groups to be interested in *New Tools* as in the first *New Formulas*: teachers, faculty, counselors, administrators, after-school program providers, researchers, deans, colleges of education, professional associations, foundations, industry, policymakers, the public media, parents, and students. All are interested in better education, better access to education, better student achievement, and more entrants (and more diverse entrants) into science and engineering careers.

## MORE INFORMATION

### About NSF:

<http://www.nsf.gov>

### About the program:

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5475&org=HRD&from=home](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5475&org=HRD&from=home)

Any NSF publication may be retrieved at <http://www.nsf.gov/publications/>. Type in the publication number, e.g., NSF 06-59, or the title.

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