NEW FORMULAS FOR AMERICA'S WORKFORCE 2

GIRLS IN SCIENCE AND ENGINEERING

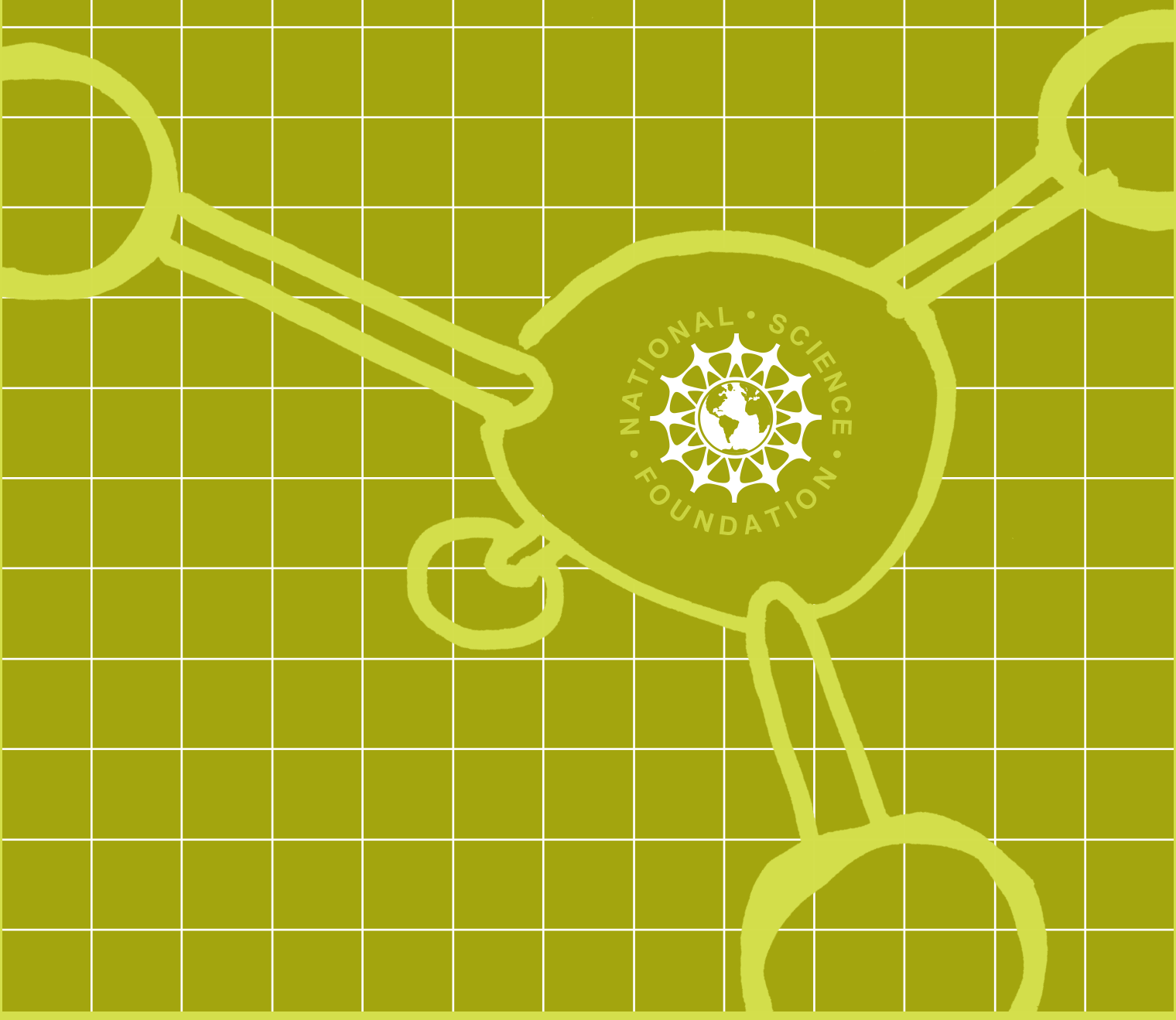

TABLE OF CONTENTS

INTRODUCTION • WHY THIS BOOK?

CHAPTER ONE • CHANGING STEREOTYPES 01
Reaching Parents of Elementary and Middle School Girls 02
Making Teamwork Work for Women 02
Gender Segregation in Engineering and Math/Computer Science 03
Radio Series Tells the Stories About Girls and Women in Science 04
Think Again . . . Girls Can! 05
Challenging Gender Stereotypes With Computer-Based Social Models 05
The Image of Engineering 06
Improving Girls' Self-Efficacy With Virtual Peers 06
Developing a New Scale to Evaluate Students' Attitudes 07
Social Context and Gender Differences in STEM 08
Predicting What Keeps Women in STEM 08
Media Literacy Training for Middle School Students 09

CHAPTER TWO • GIRLS AND THE TECHNOLOGY GAP 11
Computer Science Computing and Mentoring Partnership 12
Can Robotics Keep Girls in Science? 12
Girls Creating Games: Increasing Middle School Girls' Interest in Technology 13
Tech Team 14
Girls as Education Software Designers 15
Computer Programming for Middle School Girls 16
Hear Our Voices and the Computer Clubhouse 16
Girls and IT: A Promotional Video 17
Tech Savvy 18
Programming With a Purpose 19

CHAPTER THREE • FOSTERING EARLY INTEREST IN SCIENCE 21
The Case of Missing Human Potential 22
Science on Patrol 22
Girls in Science 23
Discovery Under the Hood 24
Explanatoids and Click! the Urban Adventure 24
SciGirls From DragonflyTV 25
Bringing Young Girls Into Science With Books and Inquiry 26
Girls' Science Practices in Urban, High-Poverty Communities 27
GO-GIRL 28
4 Schools for Women in Engineering 29
Gender-Based Science Performance Models 30

CHAPTER FOUR • GIRLS AND THE MATH GAP 31
Aiming for Algebra 32
Early Interventions to Improve Later Math Performance 32
Collaboration, Reflection, and Role Models 33
Reducing Gender Differences in 3-D Spatial Skills 34
Understanding Why Girls Have Trouble With Measurement 34
The Role of Gender in Language Used by Children and Parents Working on Mathematical Tasks 35

TABLE OF CONTENTS (CONTINUED)

CHAPTER FIVE • HOLDING INTEREST THROUGH COLLEGE AND COMMUNITY COLLEGE 37
Changing College Freshmen's Attitudes Toward Women in STEM 38
Women at CENS: A Research System 39
Evaluating Living-Learning Programs 39
Producing Women Engineers: A Study of Undergraduate Engineering Programs for Women 40
Gender Differences and Cultural Models in the Computing Sciences 41
Engineering Cultures That Promote Diversity 41
Including the Social Studies of Science in Science Courses for Gender Equity 42
Diversity in Physics: Learning From Women's Colleges 43
Pathway to a STEM Baccalaureate Degree 43
Why Does it Work? A Study of Successful Gender Equity in Industrial Engineering at the University of Oklahoma 44

CHAPTER SIX • CREATING A DIVERSE S&E WORKFORCE 45
Valuing a Diverse Engineering Workforce 46
The Role of Gender in STEM Training and Career Paths 46
Understanding What Keeps People in STEM 47
Women and Students of Color in Doctoral Mathematics 47
Women in Chemical Business and Industry 48

CHAPTER SEVEN • TOOLS FOR EDUCATORS AND RESEARCHERS 49
Intergenerational Working Conference on Women and Science Research 50
Resources for K–12 Service and Experiential Learning in STEM 50
Standards for Online Teacher-Development Courses 51
A Community of Practice of Science: After-School Programs for Girls 51
Collaborative Projects Across the Nation 52
Opportunities for Wisconsin Women 53
Seeing Gender: Tools for Change 53
Bridging the Gap: A Synthesis of Findings From STEM 54
Sisters in Science Dissemination and Outreach Project 54
Disseminating National Science Partnership Kits 55
Engineering Equity Extension Service 55
Widening the Use of Effective Practices to Keep Women in Computing 56
Moving Beyond Anecdote to Informed Discussion 57
Effective Strategies to Diversify Academic STEM 58

APPENDIX

INDEX

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 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 Government 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, 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.
- Lawrence Summers, former president of Harvard University, launched a public discussion—including hundreds of pages of press coverage—on the topic "why aren't women in science?" 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 United States policy and in the national interest to encourage all groups to participate in science and engineering. The act mandated that NSF report statistics on underrepresented groups and initiate programs fostering more proportionate representation. Among the suite of programs that followed was the Program for Women and Girls, created in 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 United States.

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 to 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 increased, as we progress toward an increasingly technological job market, a more scientifically complex society, and more intense global competition in engineering and technology innovation.

WHY THIS BOOK?

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-ROM 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-ROM at a time, to be handed out at conferences. All copies (paper and CD-ROM) 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. *New Formulas 2* updates the first volume by describing the roughly 100 grants made from 2002 through 2005. There are fewer educational demonstration projects but more social science research studies, dissemination activities, and projects that will provide technical assistance for the implementation of best practices. 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.

We expect the same spectrum of groups to be interested in this volume as the first: teachers, faculty, counselors, administrators, after-school program providers, researchers, deans, colleges of education, trainers of teachers, 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: www.nsf.gov
ABOUT THE PROGRAM: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5475&org=HRD&from=home
ORIGINAL PROJECT SUMMARIES IN THE "AWARDS DATABASE" AT NSF:http://www.nsf.gov/awardsearch/index.jsp • GO TO THE TAB ALL FIELDS • IN PROGRAM ELEMENT ENTER "1544" • REMOVE CHECK FOR CURRENT AWARDS ONLY
Any NSF publication may be retrieved at http://www.nsf.gov/publications/. Type in the publication number, e.g., NSF 6-59, or the title.

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ACKNOWLEDGEMENTS—THE PROJECT TEAM

At the National Science Foundation

Victor Santiago, Acting Division Director, Human Resources Development

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At large

The 75 Principal Investigators and their teams who carried out these projects and who responded with additional information, reviews, chapter introductions, and images

A periodic table of contents

1 Rp — Reaching Parents of Elementary and Middle School Girls
1 Tmw — Making Teamwork Work for Women
2 CsP — Computer Science Computing and Mentoring Partnership
2 rBo — Can Robotics Keep Girls in Science?
3 Mhu — The Case of Missing Human Potential
3 Sci — Science on Patrol
3 gSi — Girls in Science
4 Sp — Reducing Gender Differences in 3-D Spatial Skills
4 Rf — Collaboration, Reflection, and Role Models
7 Af — A Community of Practice on Science: After-School Programs for Girls
7 Cln — Collaborative Projects Across the Nation
7 oW2 — Opportunities for Wisconsin Women

1 Seg — Gender Segregation in Engineering and Math
1 Ra — Radio Series Tells the Stories About Girls and Women in Science
2 Gmz — Girls Creating Games
2 Tch+ — Tech Team
3 unH — Discovery Under the Hood
3 Ex uRb — Explanatoids and Click! The Urban Adventure
4 msur — Understanding Why Girls Have Trouble With Measurement
4 mm — The Role of Gender in Language
6 Se — Valuing a Diverse Engineering Workforce
7 tOlz — Seeing Gender: Tools for Change
7 si2 — Sisters in Science Disseminating and Outreach Project
7 kiT — Disseminating National Science Partnership Kits
7 e3 — Engineering Equity Extension Service
7 Brg — Bridging the Gap: A Synthesis of Findings from STEM

1 TnkA — Think Again... Girls Can!
1 Gn — Challenging Gender Stereotypes
2 sDn — Girls as Education Software Designers
2 Prg — Computer Programming for Middle School Girls
3 Dtv — SciGirls From Dragonfly TV
5 Fshm — Changing College Freshmen's Attitudes Toward Women in STEM
5 Wrs — Women at CENS: A Research System
5 eV — Evaluating Living– Learning Programs
6 Pth — The Role of Gender in STEM Training and Career Paths
7 Wdn — Widening the Use of Effective Practices to Keep Women in Computing

1 Ioe — The Image of Engineering
1 Slf — Improving Girl's Self-Efficacy With Virtual Peers
2 Vz — Hear Our Voices and the Computer Clubhouse
2 GITv — Girls and IT: A Promotional Video
3 Bks1 — Bringing Young Girls Into Science With Books and Inquiry
5 wmE — Producing Women Engineers
5 Soc — Including the Social Studies of Science for Gender Equity
6 Kps — Understanding What Keeps People in STEM
6 cBz — Women in Chemical Business and Industry
6 DrM — Women and Students of Color in Doctoral Mathematics
7 InFo — Moving Beyond Anecdote to Informed Discussion

1 NuS — Developing a New Scale to Evaluate Student's Attitudes
1 Cxt — Social Context and Gender Differences in STEM
2 TSv2 — Tech Savvy
2 PrP — Programming With a Purpose
3 Cmm — Girls' Science Practices in Urban, High-Poverty Communities
5 Pth — Pathway to a STEM Baccalaureate Degree
5 D1v — Engineering Cultures That Promote Diversity
5 Cmod — Gender Differences and Cultural Models in Computing Sciences
5 Ie1 — Why Does It Work? A Study of Successful Gender Equity
5 dP — Diversity in Physics: Learning from Women's Colleges
7 aCdm — Effective Strategies to Diversify Academic STEM

1 PreD — Predicting What Keeps Women in STEM
1 M-lit — Media Literacy Training for Middle School Students
3 grL — GO-GIRL
3 wiE — 4 Schools for Women in Engineering
3 mod — Gender-Based Science Performance Models

4 a — Aiming for Algebra
4 int — Early Interventions to Improve Later Math Performance
7 kd — Resources for K-12 Services and Experiential Learning
7 rSRH — Intergenerational Working Conference on Women
7 eTch — Standards for Online Teacher-Development Courses

- Chapter 1: Changing Stereotypes
- Chapter 2: Girls and the Technology Gap
- Chapter 3: Fostering Early Interest in Science
- Chapter 4: Girls and the Math Gap
- Chapter 5: Holding Interest Through College and Community College
- Chapter 6: Creating a Diverse S&E Workforce
- Chapter 7: Tools for Educators and Researchers