



# Overview

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Project Director

**Expanding Options for Women and Girls in Science, Technology, Engineering and Math**

National Alliance for Partnerships in Equity Education Foundation



# National Science Foundation

- Research on Gender in Science and Engineering Program
- Extension Services Grant
- Awarded to the National Alliance for Partnerships in Equity Education Foundation
- 5 years
- Approximately \$500,000/year

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# NSF Extension Services Grants

- Unified program of change
- Consulting services within a certain
  - geographic region
  - community of practice
- Adapt exemplary projects, research-based learning tools, pedagogical approaches, and service or support programs

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# NSF Extension Services Grants

- facilitate the interpretation of research knowledge into practice
- Inform NSF's research agenda

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# WHY?

- In 2003, there were 1,300,000 engineering and engineering technology jobs available in the U.S. without trained people to fill them.
- Between 1980-2000 the number of nonacademic science and engineering jobs increased by 159%.
- The total number of retirees among science and engineering degree workers will increase dramatically over the next 20 years because the 40-44 age group is nearly 4 times as large as the 60-64 age group.

Source: PLTW Website (NSF 2004 Study)

# WHY?

- As a consequence of a lack of diversity [in engineering] we pay an opportunity cost, a cost in designs not thought of, in solutions not produced.

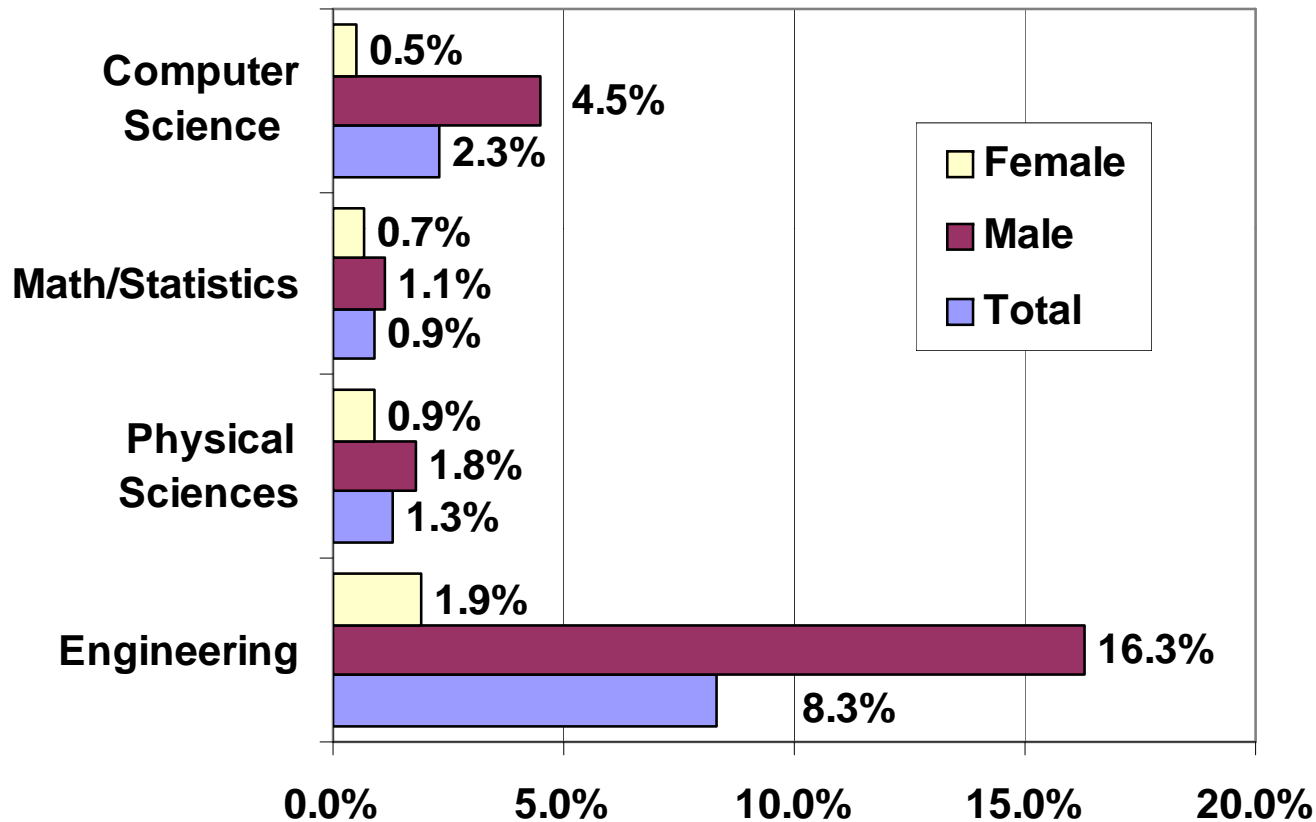
Source: Dr. Bill Wulf, Past President, National Academy of Engineering

- If we do not engage women and minorities in the engineering enterprise, we are ignoring more than 50% of America's intellectual talent.
- By the year 2050, 85% of the entrants into the workforce will be people of color and women.

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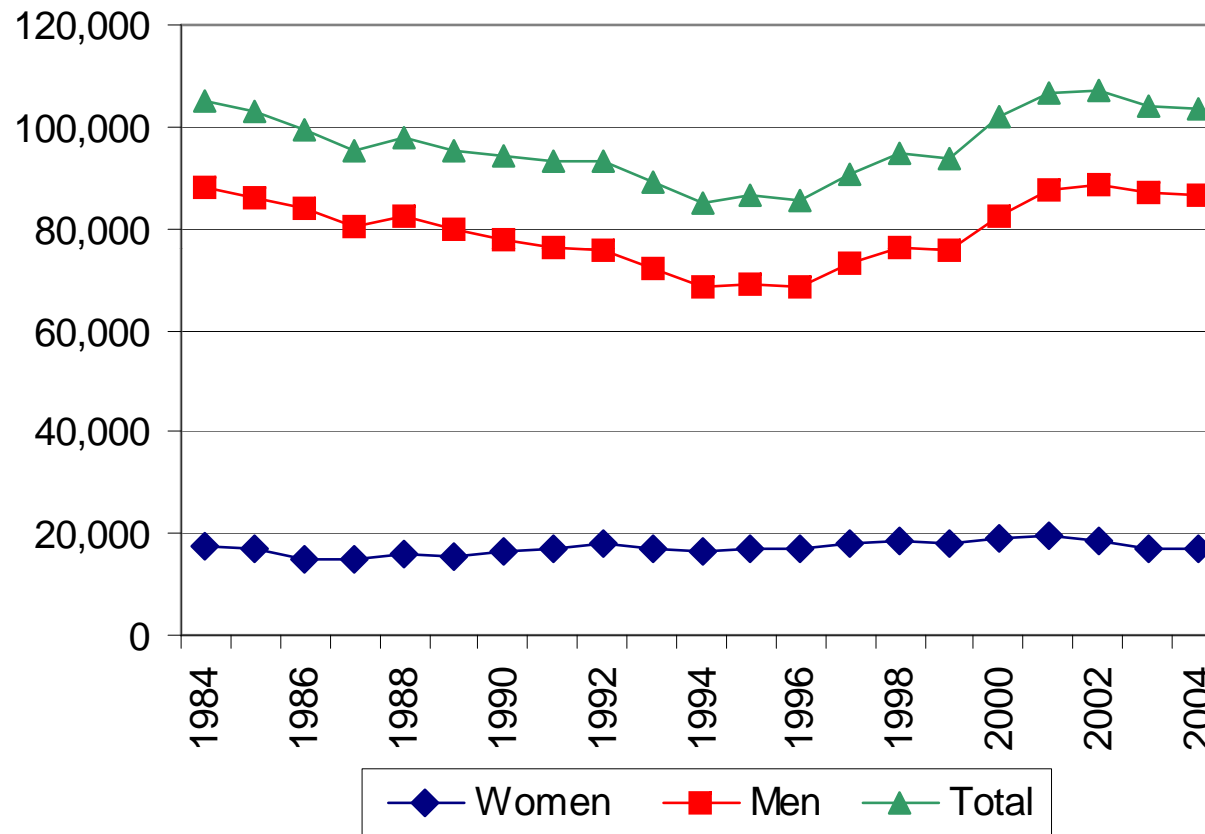
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# Intended College Major of High School Juniors



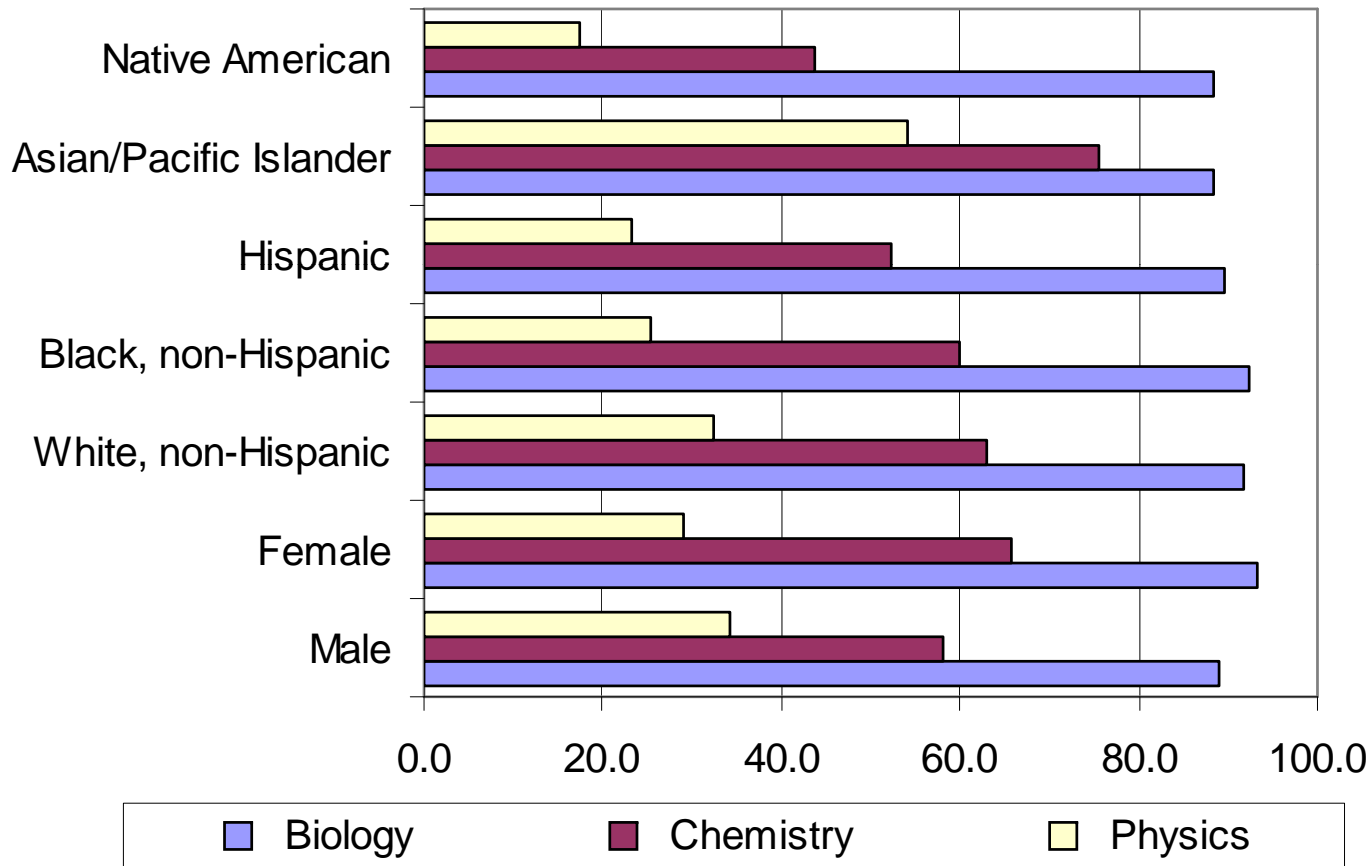
Source: CPST, data derived from the College Board

# Freshmen Engineering Enrollments: No Progress for Women



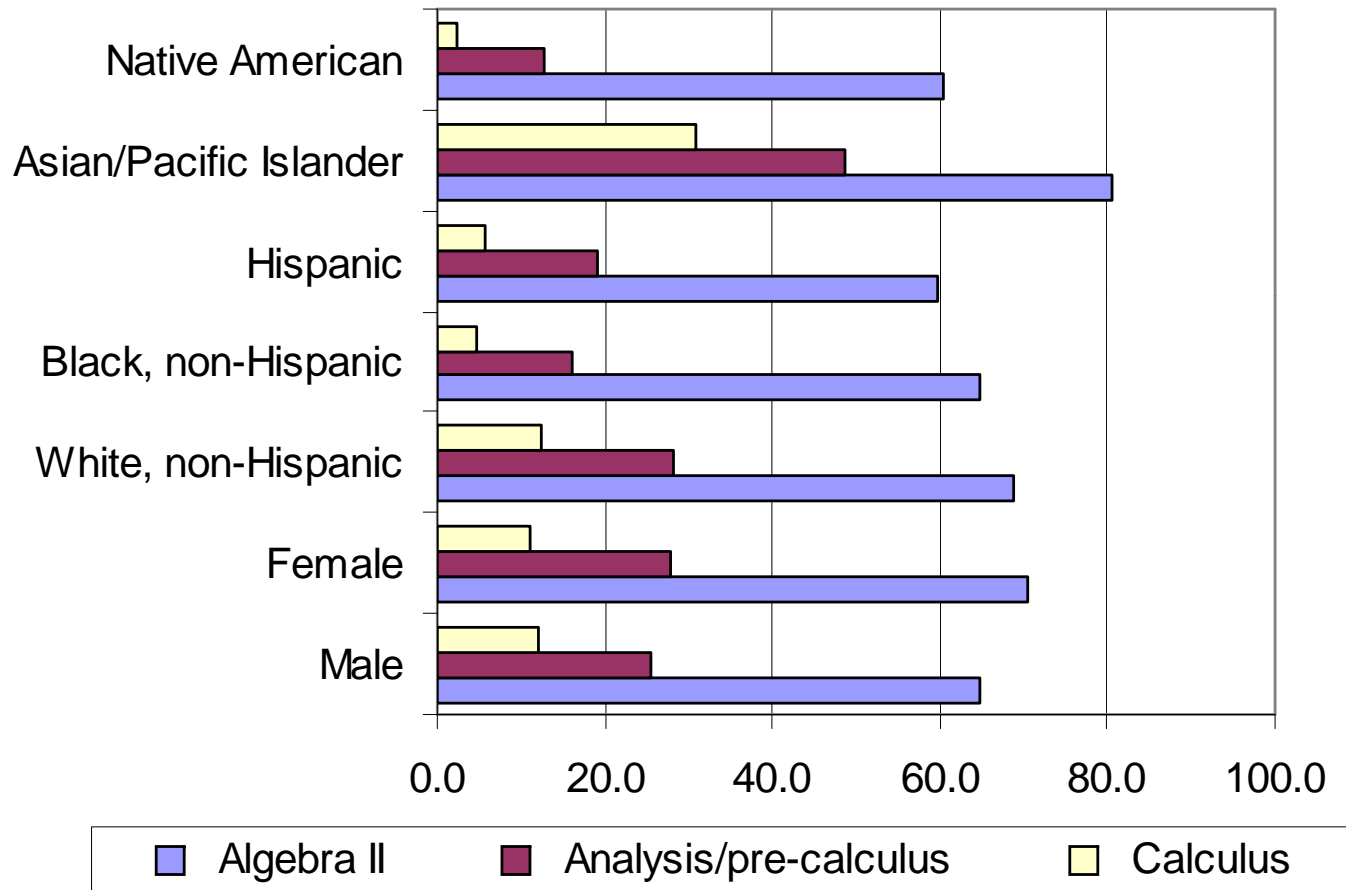
Source: CPST, data derived from Engineering Workforce Commission

# What Science Courses Are U.S. High School Students Taking?



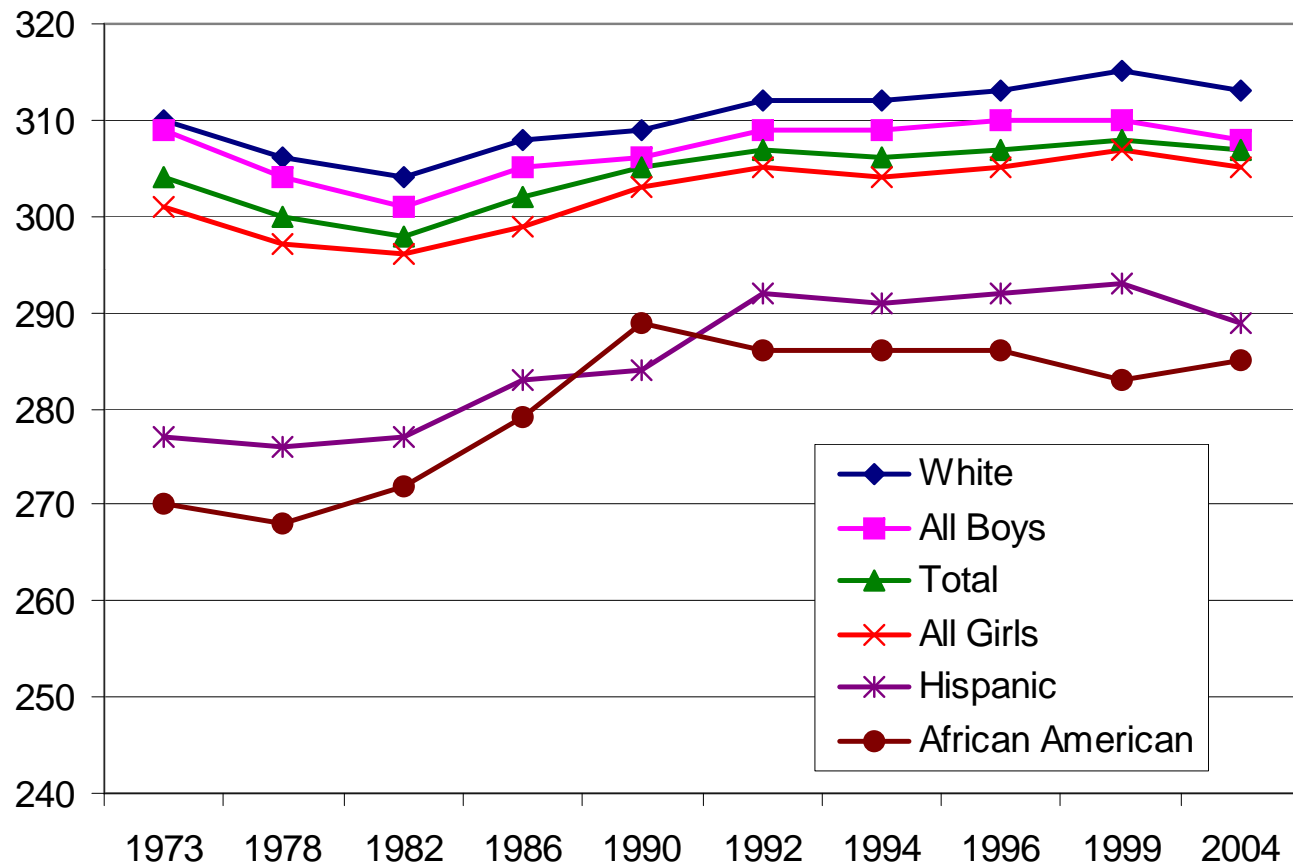
Source: CPST, data derived from National Center for Education Statistics

# What Mathematics Courses Are U.S. High School Students Taking?



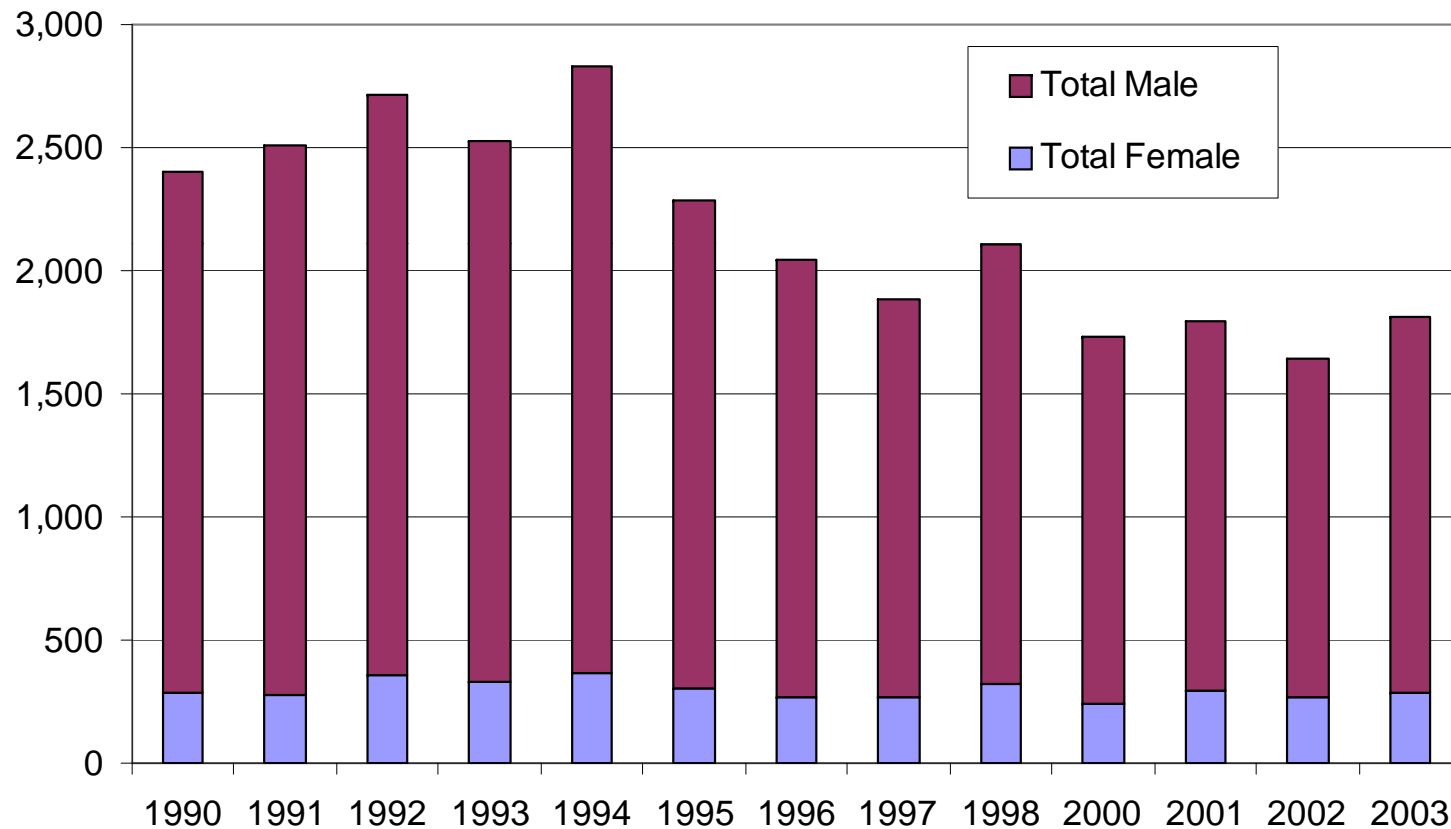
Source: CPST, data derived from National Center for Education Statistics

# Trends in NAEP Math Scores by Sex and Race/Ethnicity, Age 17, 1973-2004



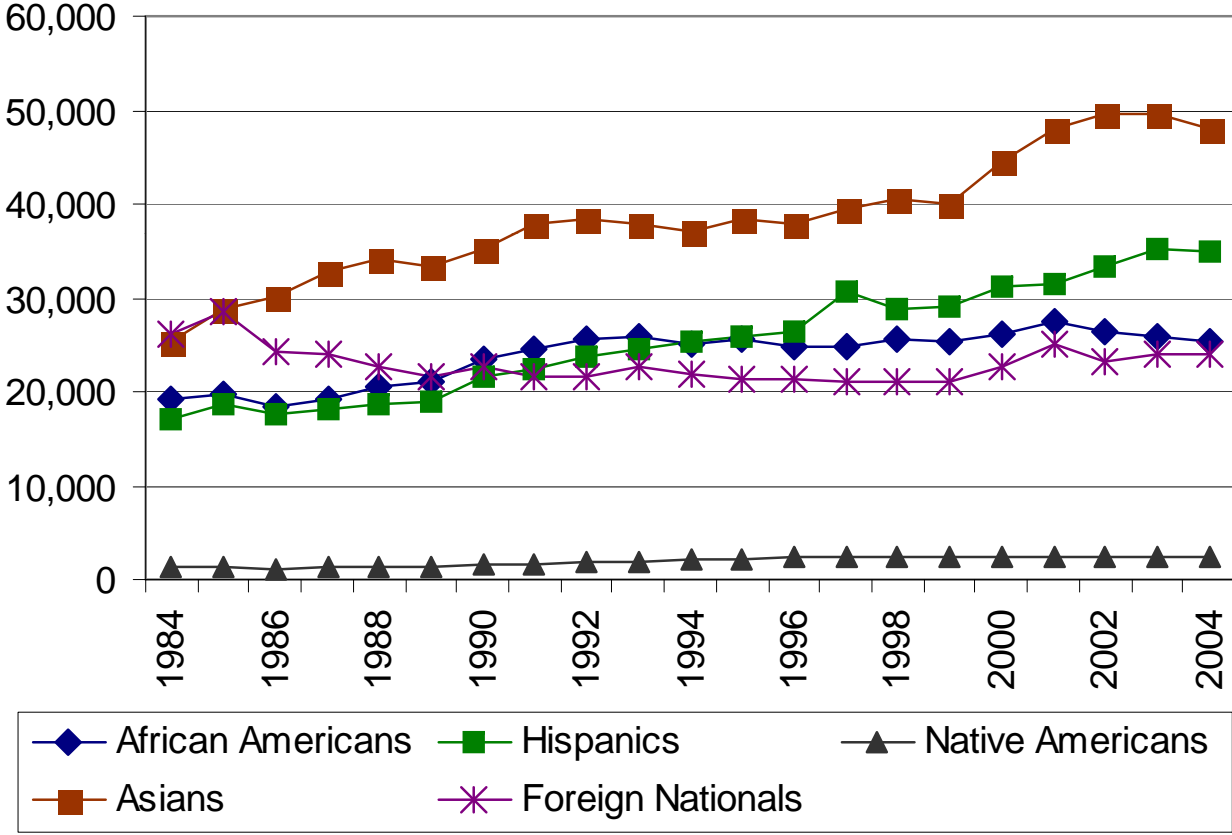
Source: CPST, data derived from National Center for Education Statistics

# Women in Engineering at the 2-Year Level



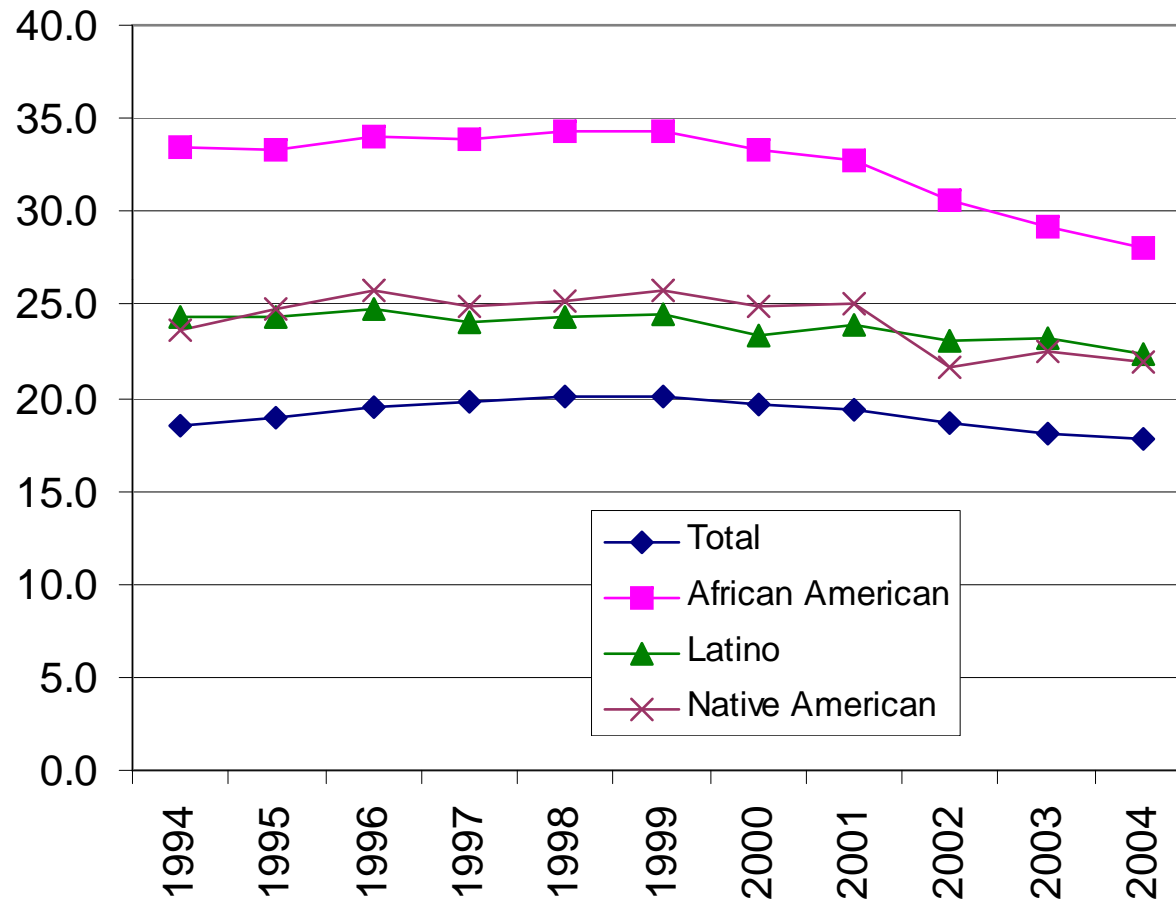
Source: CPST, data derived from National Center for Education Statistics

# Progress Slows for Underrepresented Minority Freshmen in Engineering



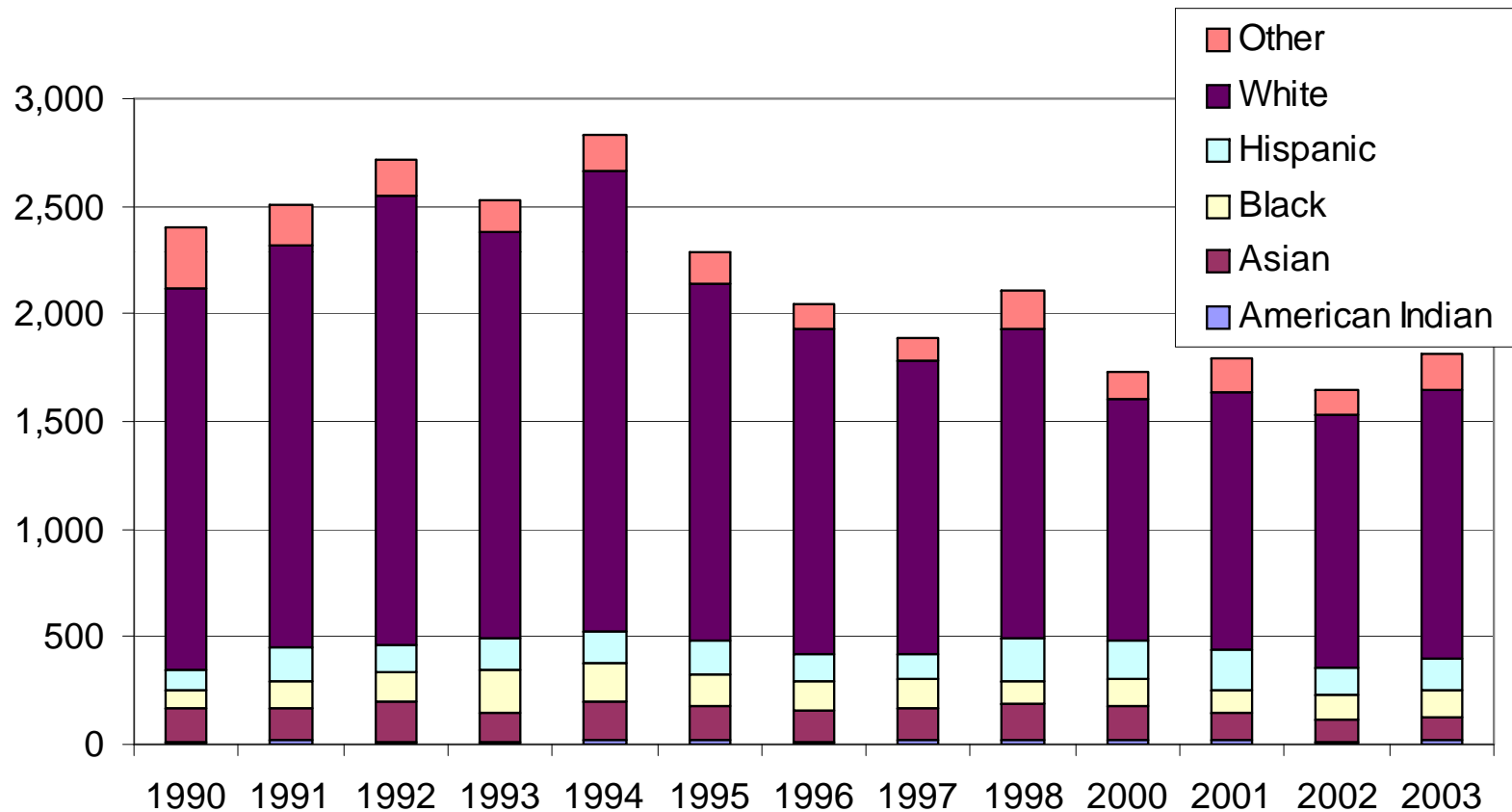
Source: CPST, data derived from Engineering Workforce Commission

# The Decline of Women in Engineering Evident for all Races/Ethnicities



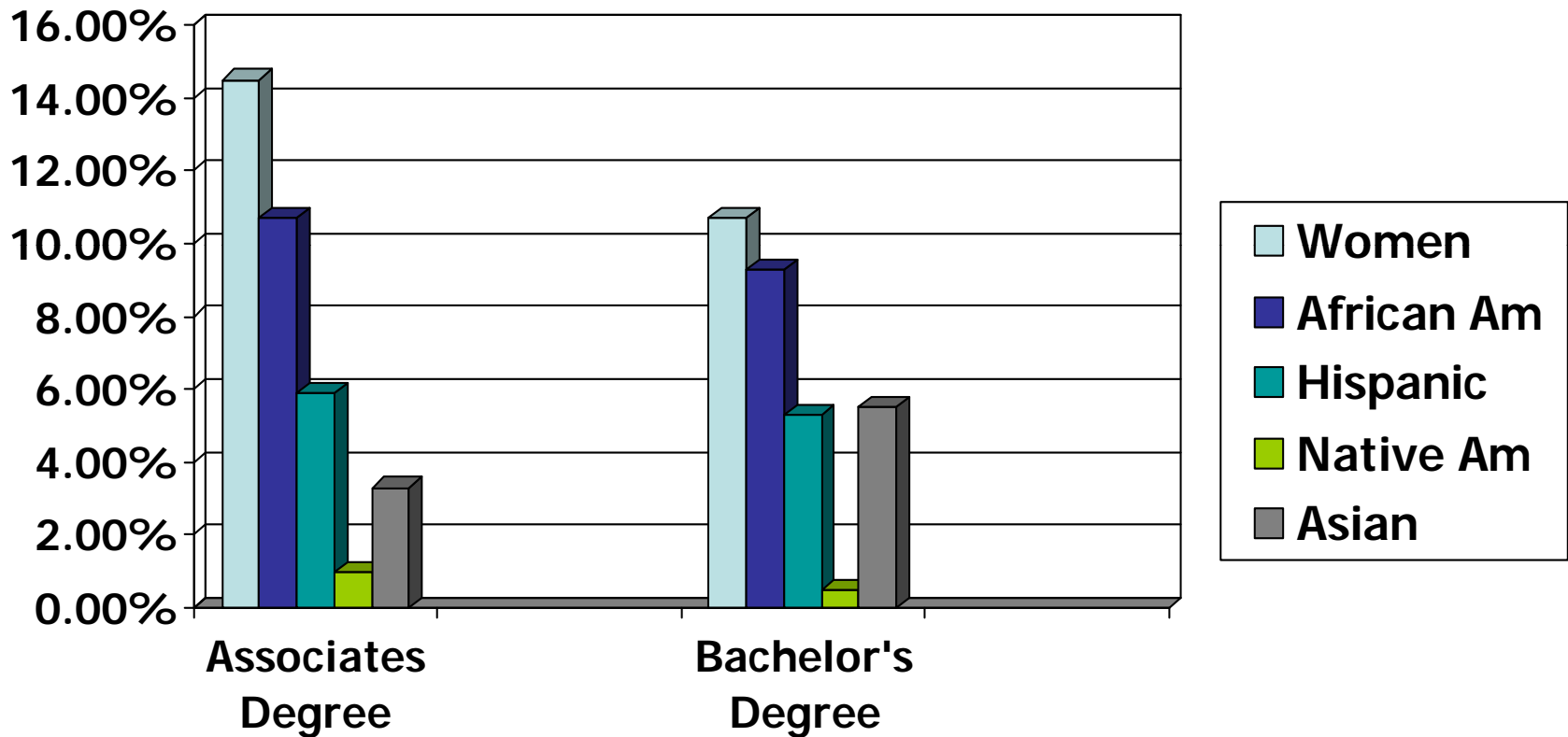
Source: CPST, data derived from Engineering Workforce Commission

# Minorities in Engineering at the 2-Year Level



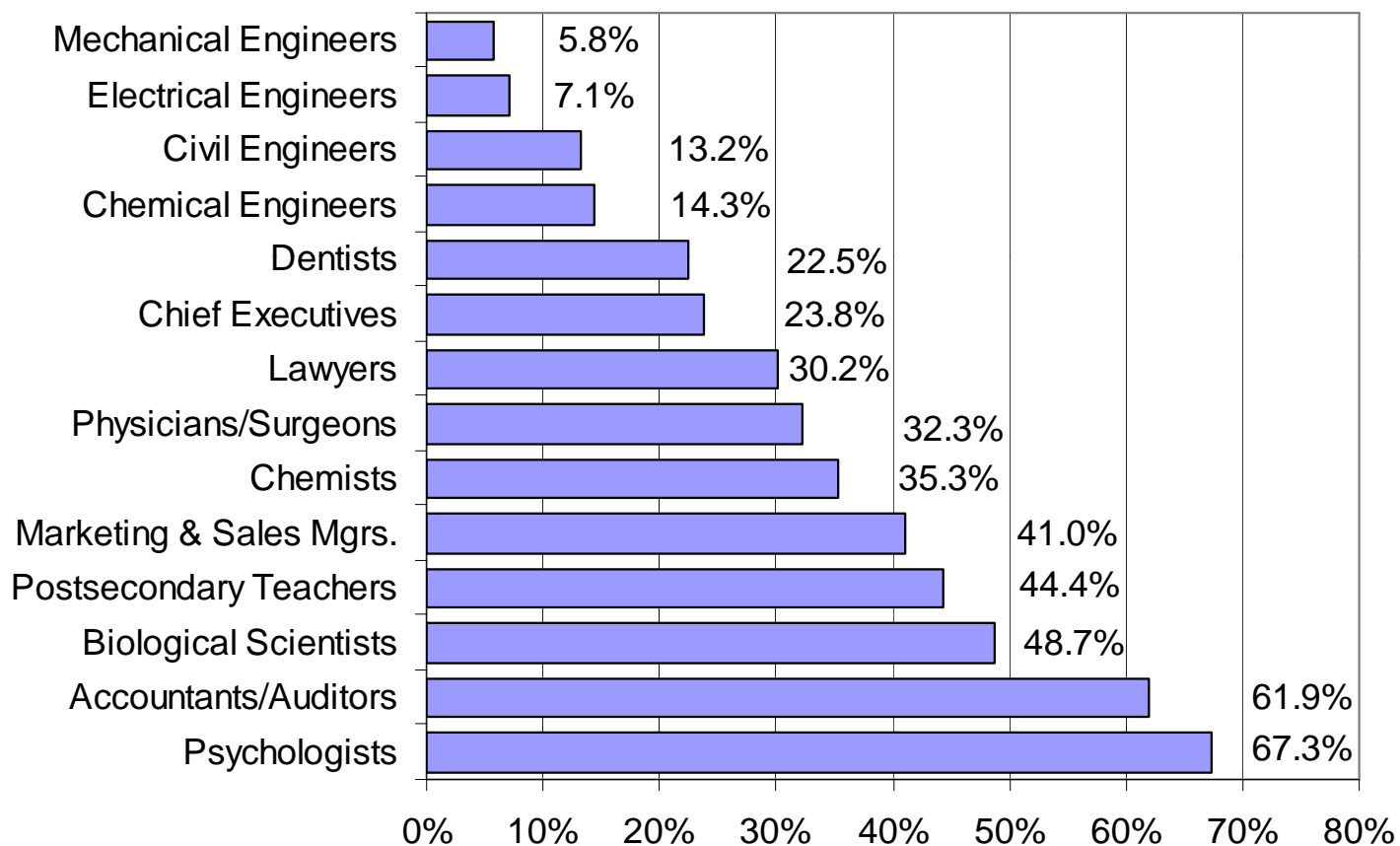
Source: CPST, data derived from National Center for Education Statistics

# Engineering Technology Degrees Granted 2005



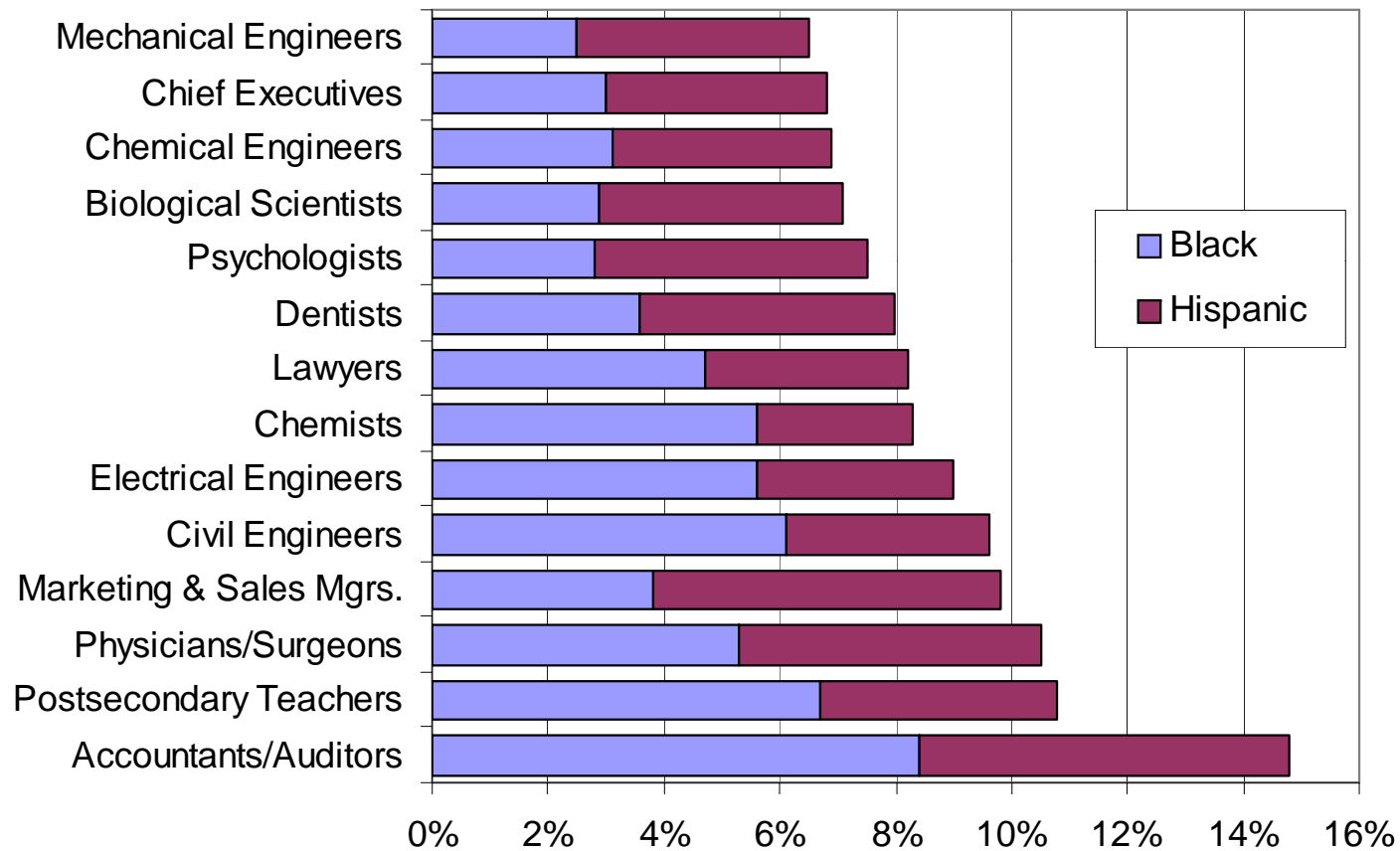
Source: Commission on Professionals in Science and Technology

# Women as a Percentage of Selected Occupations in 2005



Source: CPST, data derived from Bureau of Labor Statistics

# Minorities as a Percentage of Selected Occupations in 2005



Source: CPST, data derived from Bureau of Labor Statistics



# Goals

- Build the capacity of the formal education community
- Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
- Broaden the commitment to gender equity in STEM education

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# Defining STEM

- US Dept. of Ed., Office of Vocational and Adult Education
- STEM Transitions Project
  - [www.stemtransitions.org](http://www.stemtransitions.org)
- 16 Career Clusters – 6 Clusters

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# Defining STEM

- Science, Technology, Engineering and Math
- Agriculture, Food and Natural Resources
- Health Science
- Information Technology
- Manufacturing
- Transportation, Distribution and Logistics

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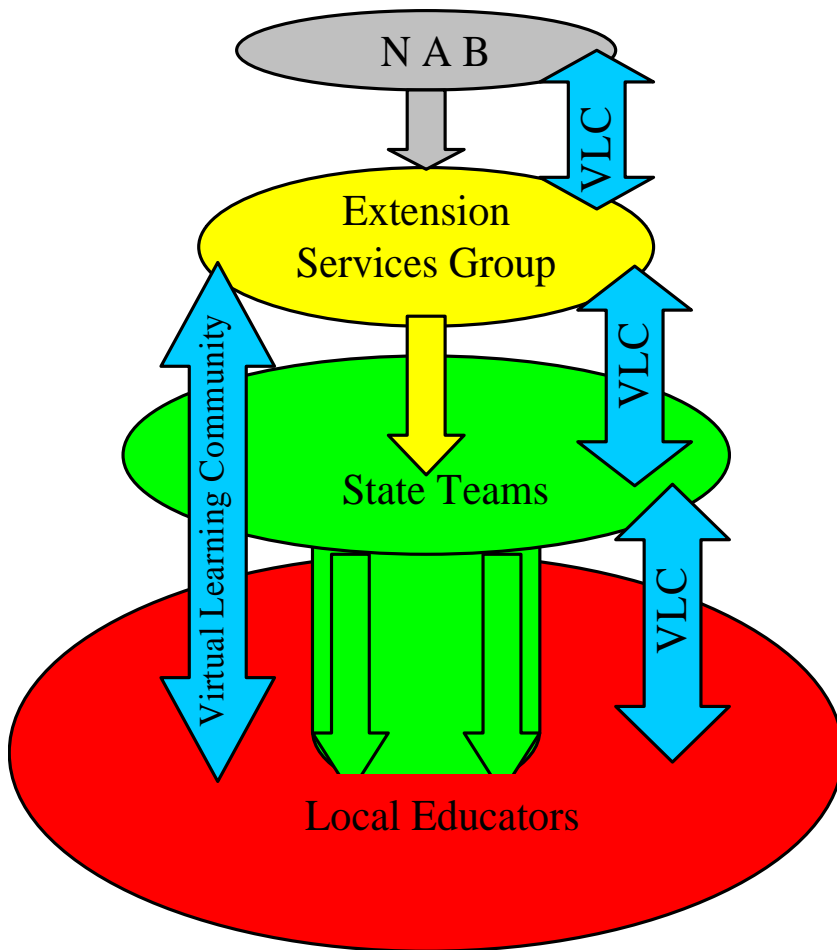
# STEM Equity Pipeline Project Methods

- Professional Development
- Teacher Training
- Consulting and Technical Assistance
- Virtual Web-based Professional Learning Community
- Best Practices Handbook

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# Model



## National Advisory Board

Advice and Resources  
Dissemination

## Extension Services Group

Professional Development,  
Technical Assistance  
Consulting Services  
Best Practices Handbook

## State Teams

Professional Development  
Technical Assistance

## Virtual Learning Community

Evaluation and Customer Service Feedback  
Online Courses, Webcasts, Website,  
Listserv, Resource Materials, Links

## Local Educators

Process Improvement  
Best Practices Implementation



# Extension Services Group (ESG)

- State Facilitator
- Cadre of national recognized experts
- Focused technical assistance and professional development with State Teams

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# State Teams

- 5 states in year one
  - California
  - Missouri
  - Illinois
  - Oklahoma
  - Wisconsin
- Secondary/Postsecondary collaboration
- Led by the agencies that administer career and technical education in the state

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# State Teams

- 2 states added in year 2
- 3 states added in year 3
- 3 states added in year 4
- 13 states over the life of the grant

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# State Teams – Who?

- Personal Passion
- Professional or Volunteer Commitment
- Provide Professional Development
  - middle school
  - high school
  - community colleges

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# State Leadership Team

- Develop Implementation Plan
- Data Collection for Evaluation
- Host Facilitator On-Site Visits (up to 4/yr)
- 5 Step Program Improvement Process Training
- Attend the STEM Equity Pipeline State Team Leadership Training

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# State Teams

- Participate in Professional Development
- Participate in STEM Equity Pipeline Virtual Learning Community
- Provide summative and formative feedback
- Conduct “Extension Services”

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# Virtual Learning Community

- Public portal for the STEM equity community
  - Listserv
  - Links
  - Articles, Resources, Reports and Research
  - Calendar of Events in STEM
  - Webcasts, Webinars, Video, Podcasts, Power Points
  - Online courses and Tutorials
  - Performance Data on Women & Girls in STEM
  - Evaluations Instruments and Surveys
  - Suggestion Box
  - More!

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# Intellectual Specialization

- Accountability – Using Data to Drive Program Improvement
  - The Five Step Process
- Professional Development - Implementing Effective Extension Services in the Formal Education Community

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# Resources

[www.napequity.org](http://www.napequity.org)

[www.stemequitypipeline.org](http://www.stemequitypipeline.org)

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# Questions?

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