Increasing the Diversity of the STEM Workforce

Strategies for Counselors

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Why Do We Need to Encourage Students to Study Science & Engineering?

- **In the last 50 years, more than half of America's sustained economic growth was fueled by engineers, scientists and advanced-degree technologists, a mere 5% of America's 132 million-person workforce. (1)**

- **Twenty-five percent of our scientists and engineers will reach retirement age by 2010. (1)**

- **By the year 2050, 85% of the entrants into the workforce will be people of color and women. (2) In 2003, women were 26.1% of all STEM occupations. In 2004, African Americans and Hispanics were 6.2% and 5.3% of all STEM occupations respectively. (3)**

- **The National Bureau of Labor Statistics projects that our greatest needs will be in computer-related fields that propel innovation across the economy. (1) Female bachelors degree recipients dropped from 37% in 1985 to 27% in 2003. (2)**

Source: See Notes Page

Why Do We Care if Women and Minorities Become Engineers and Scientists?

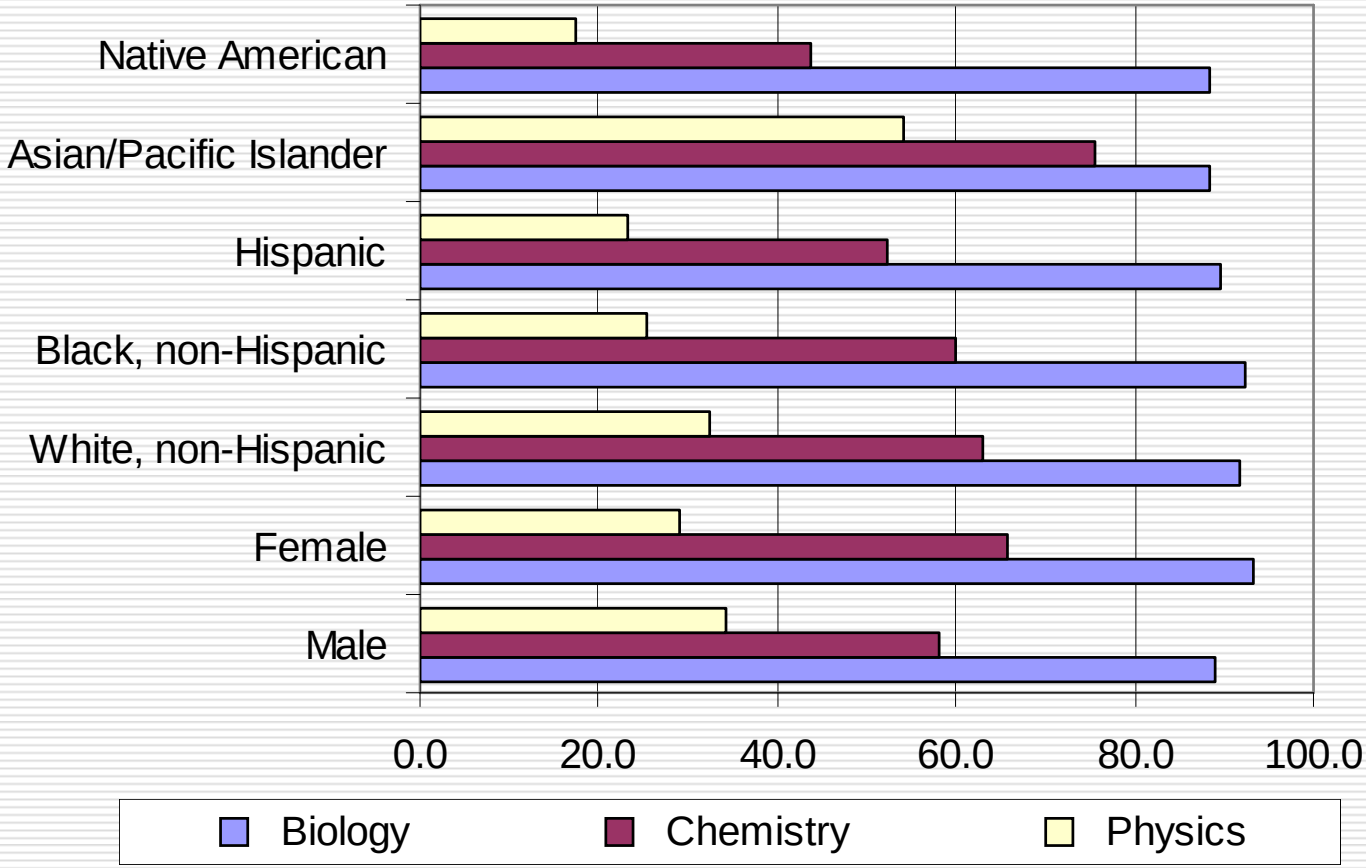
- **As a consequence of a lack of diversity we pay an opportunity cost, a cost in designs not thought of, in solutions not produced.**

  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.**

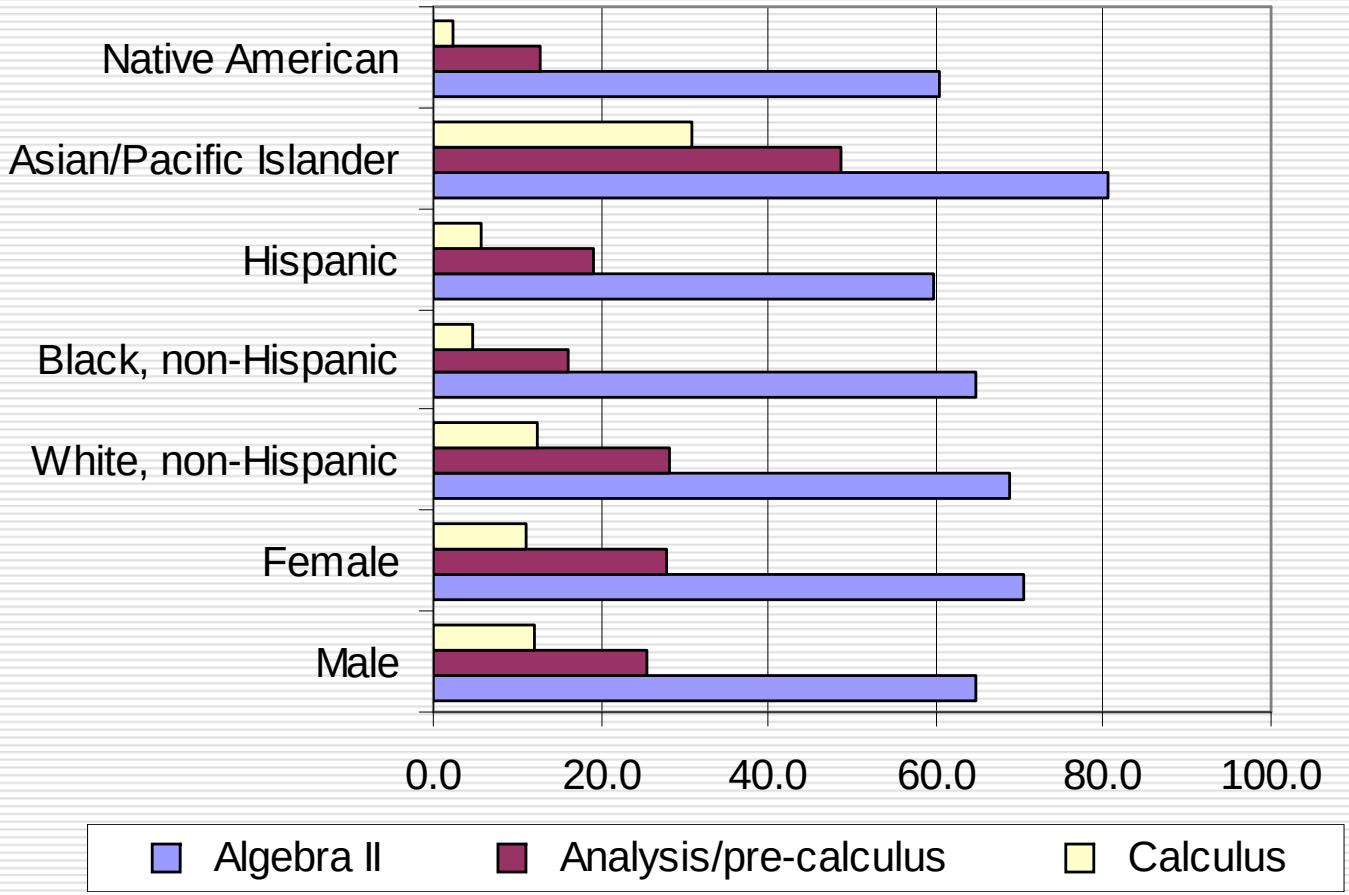
Source: Bostonworks.com

What Science Courses Are U.S. High School Students Taking? 2004



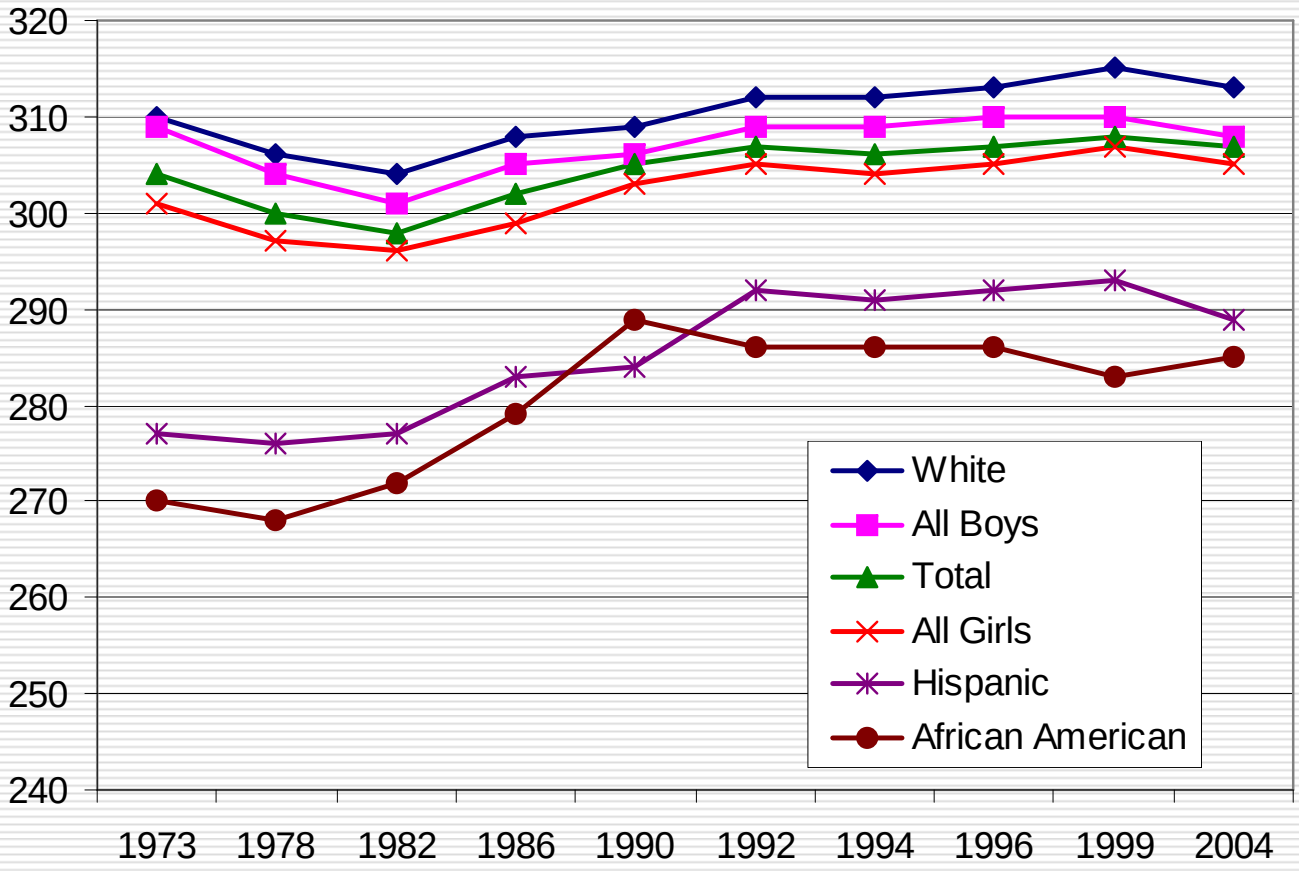
Source: CPST, data derived from National Center for Education Statistics

What Mathematics Courses Are U.S. High School Students Taking? 2004



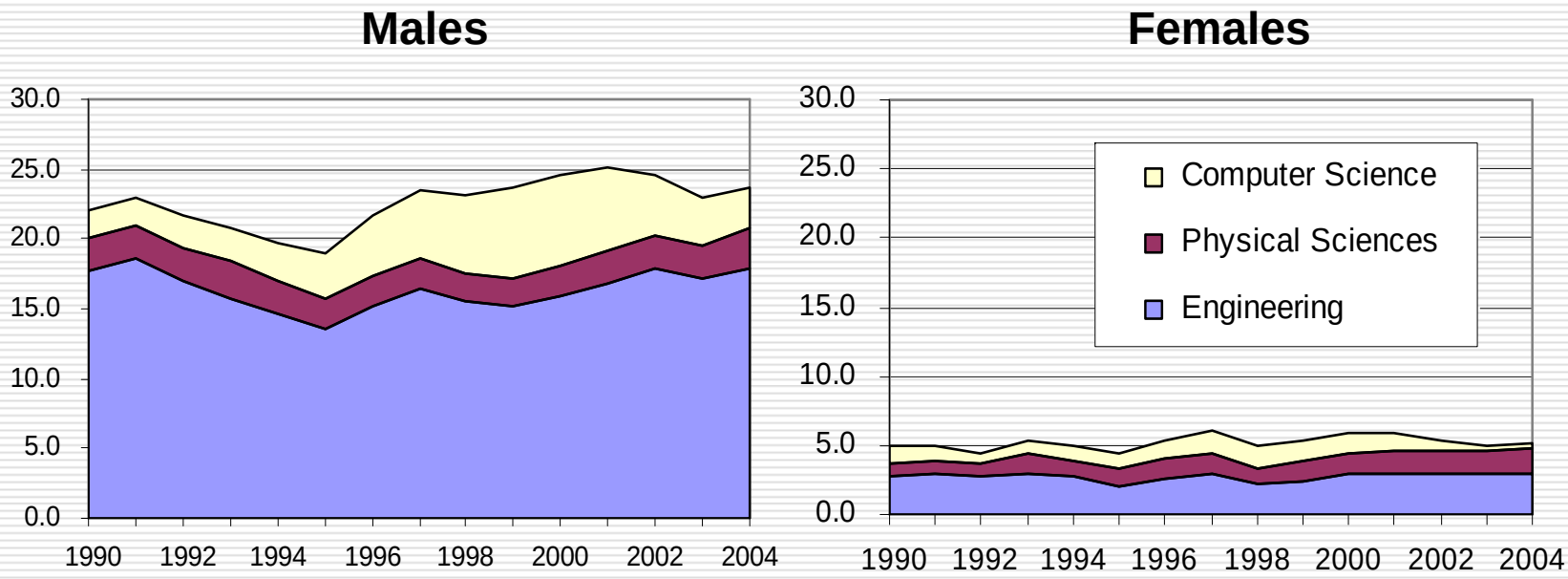
Source: CPST, data derived from National Center for Education Statistics

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



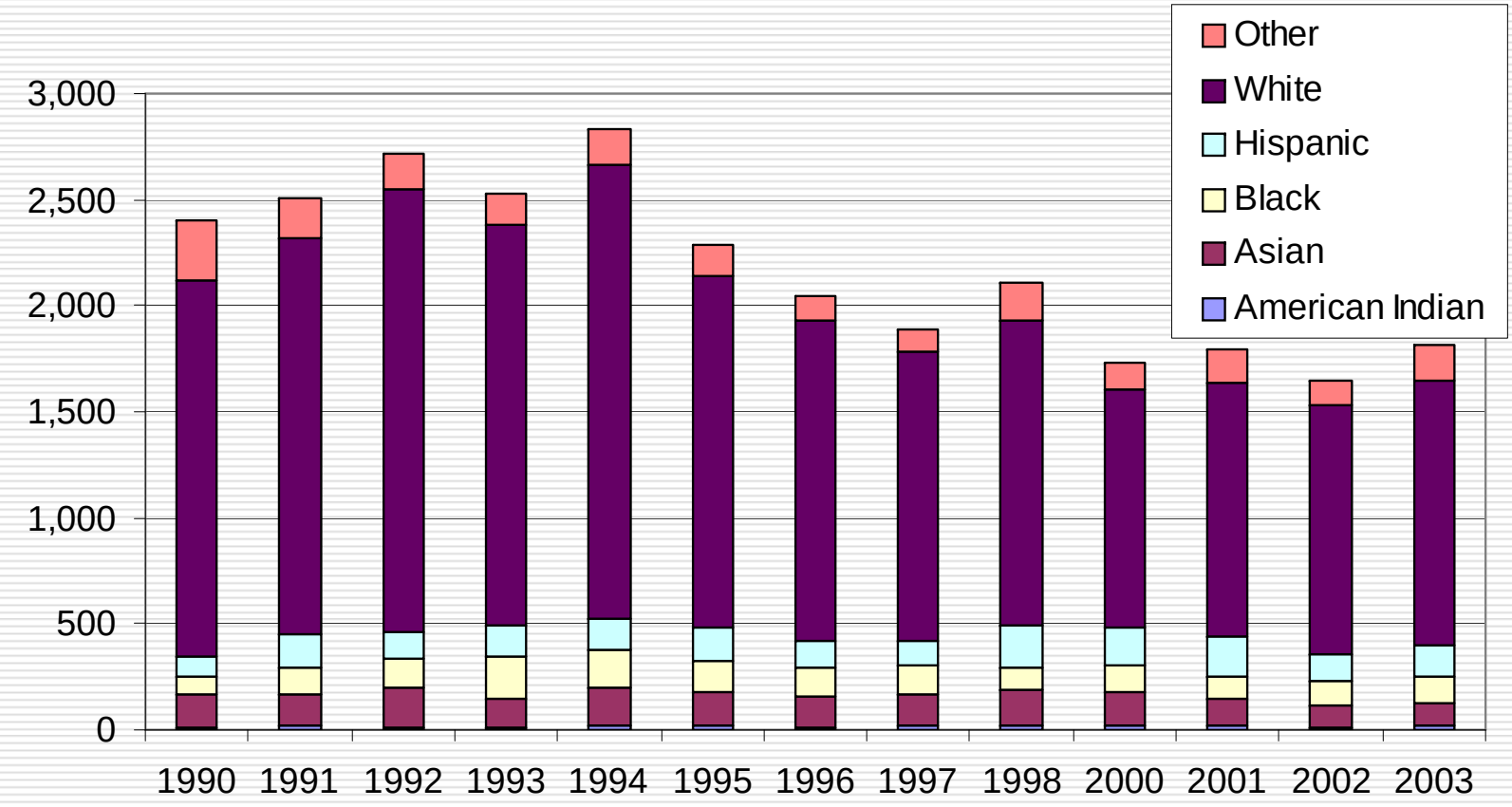
Source: CPST, data derived from National Center for Education Statistics

Males Far More Likely to Plan to Major in Technical Fields Than Are Females



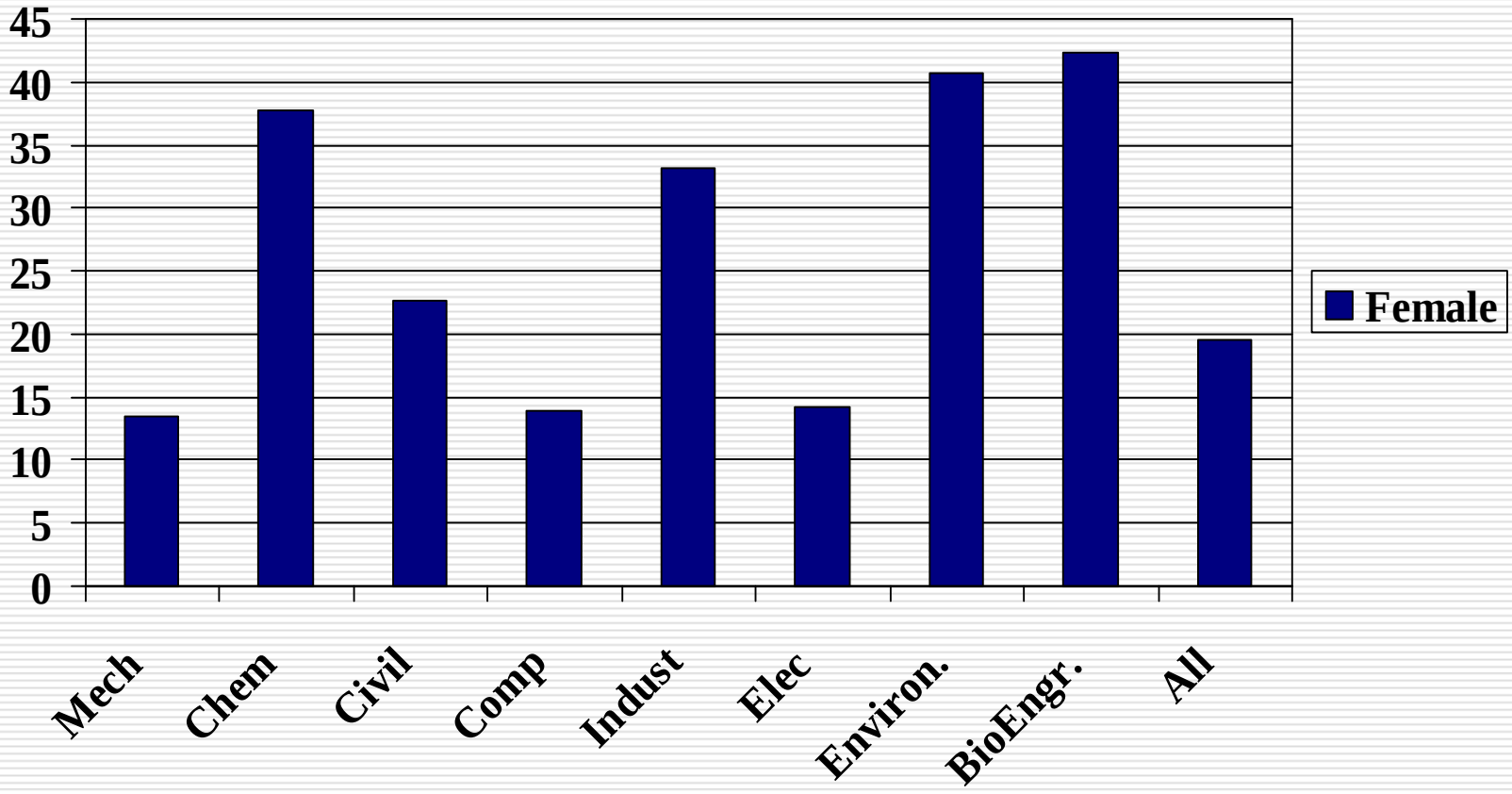
Source: CPST, data derived from Higher Education Research Institute

Minorities in Engineering at the 2-Year Level: Degrees Granted



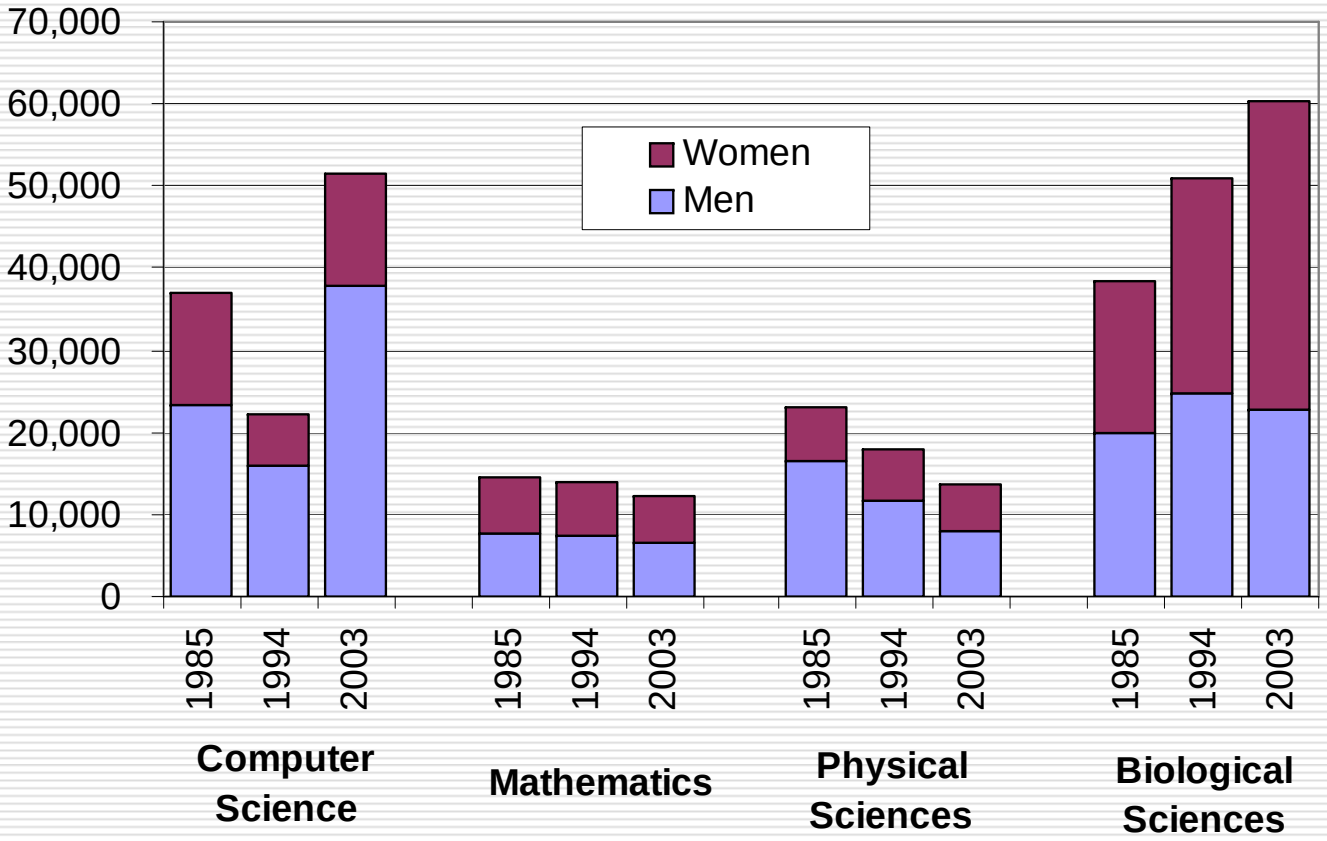
Source: CPST, data derived from National Center for Education Statistics

Bachelor's Degrees Granted by Engineering Discipline 2005



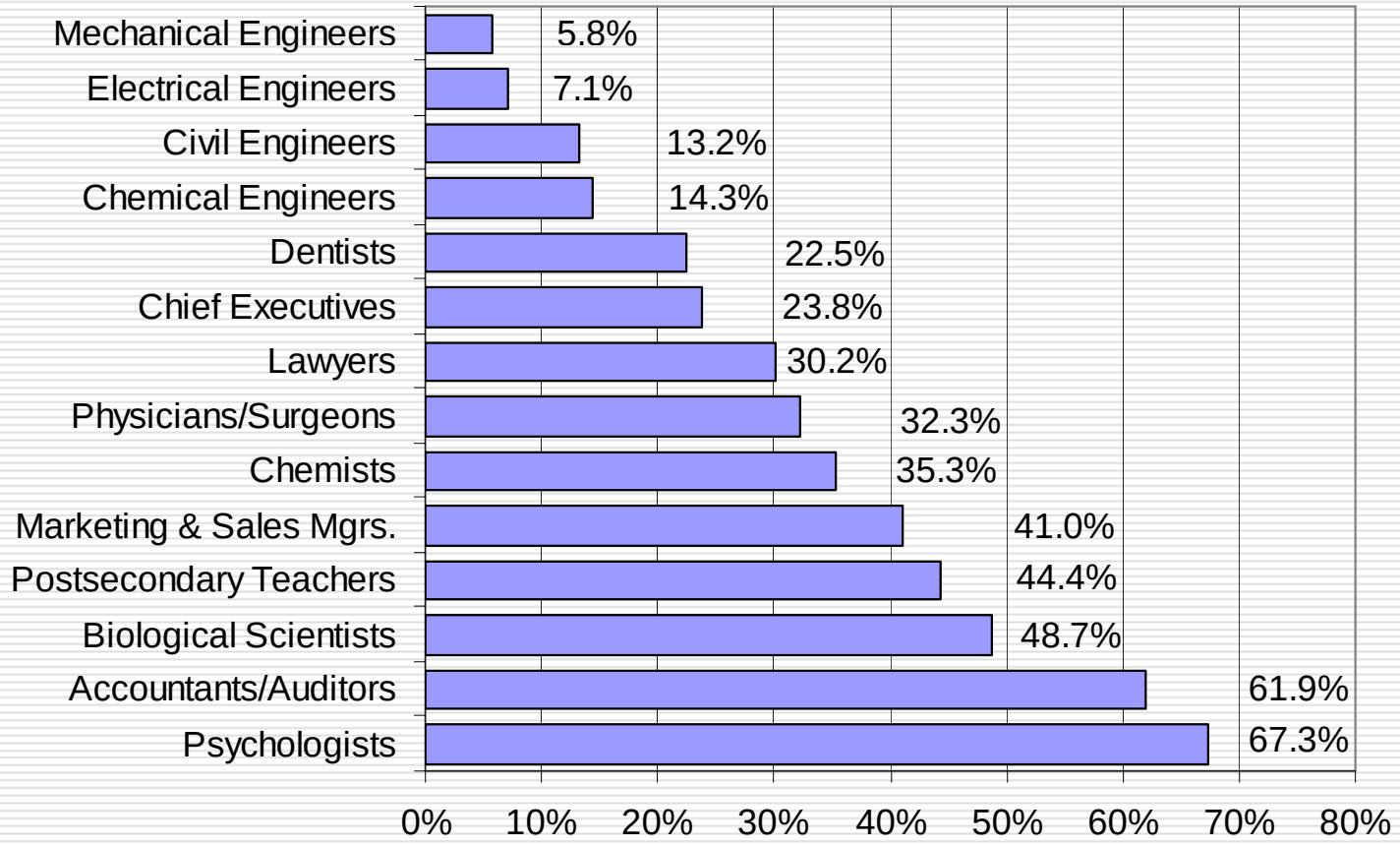
Source: CPST, data derived from Engineering Workforce Commission.

Women Increasing Their Share of Some STEM Bachelor's Degree Fields



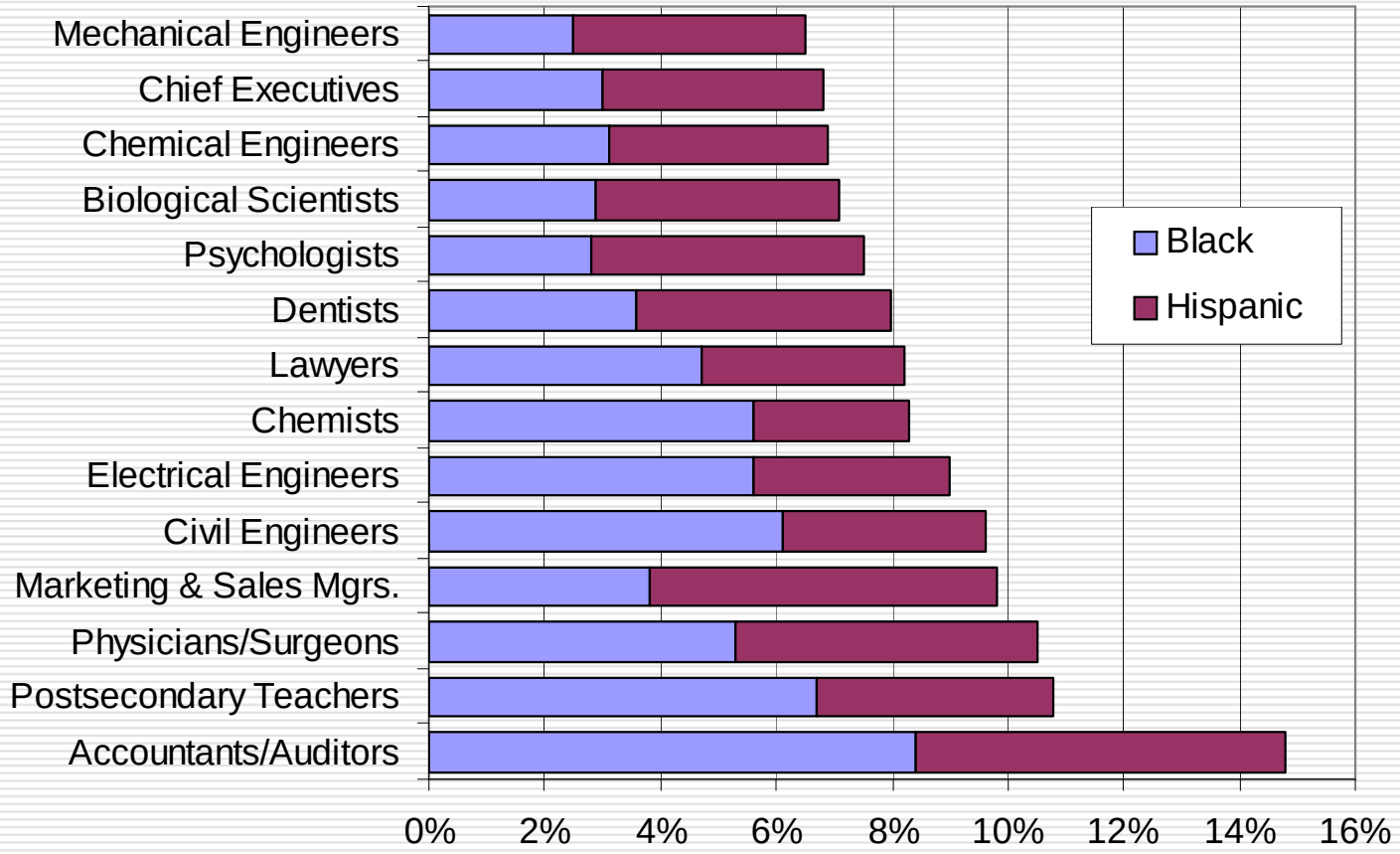
Source: CPST, data derived from NSF and NCES

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

Median Annual Salaries of Full-Time Engineers and Scientists 2005

- **Engineers: $63,500 (Range: $60,500 – $73,000)**
- **Engineering Technicians: $41,000**
- **Mathematical & Computer Scientists: $59,000**
- **Medical Scientists: $48,500**
- **Biological & Life Sciences: $46,500**
- **Science (Chemical) Technicians: $36,500**

Source: CPST

Why Nontraditional?

Societal Issues that Led to the Implementation of Public Policy

Nontraditional Fields

Occupations or fields of work, including careers in computer science, technology, and other current and emerging high skill occupations, for which individuals from one gender comprise less than 25 percent of the individuals employed in each such occupation or field of work.

Early 1970's

- Children's Defense Fund report on children in poverty
- Increasing single parent households headed by women on public assistance
- Women entering the workforce at a faster rate than any other population
- Women hold majority of low paying jobs
- Pay gap and pay equity

Solution

Access for women in poverty to education and job training for occupations providing wages leading to economic self-sufficiency

=

Nontraditional occupations

Why Continue the Policy?

- Children in poverty continue to be living in single parent households headed by women
- Workforce competitiveness, especially in STEM fields, does not allow us to ignore more than 50% of the potential workforce pool
- Making slow progress on increasing the participation and completion of women and men in nontraditional fields.

Why Continue the Policy?

- Pay gap and pay discrimination continues to be an issue
- Women still clustered in the lowest paying occupations
- Nontraditional careers a path to economic self-sufficiency for women
- Career satisfaction more important to today's workforce participants

Perkins Accountability Measures

Core indicator

- Participation in CTE programs preparing students for nontraditional fields

- Completion of CTE programs preparing students for nontraditional fields

Startling Statements

- Conduct your own poll
- Survey three other people in the room
- Average their answers
- Be prepared to report out your polling results

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Barrier Busters

What can counselors do to support student's exploration of nontraditional careers

Career Guidance Materials and Practices

- More than just brochures and posters
- Get beyond the images
- Beware of subtle messages
- Be careful about how you use interest inventories
- Design career exploration in all clusters without self-selection

Career Guidance Materials and Practices

- Create opportunities to spark student interest
  - Pre-enrollment exploration programs
  - Tours that include hands-on activities
  - Nontraditional program exploration days (ex. Diva Tech Day)
  - Targeted recruitment activities
  - Send a personal invitation (ex. Focus on Your Future event)

Early Exposure

- Most students pursuing a nontraditional career have had a friend or family member influence them
- Spark an interest that would otherwise not be evident
- Informal experiences supported by formal experiences
- The earlier the better

Parental Support

- Parents are the #1 influence of student college major and career choice
- Negative messages from people with emotional influence difficult to overcome
- Educate parents
  - Newsletter articles
  - Website information
  - Parent night program
  - Open House demonstrations
  - Student award programs

Nontraditional Role Models

- Strongest evidence in the research
- Need to see someone that looks like them in the career
- Family members are significant
- Teachers
- Mentors

Nontraditional Role Models

- Career speakers
- Job shadowing
- Field trips
- Mentoring
- Online career exploration
- Print images
- Video selection

I am an Engineer

Cisco Systems Inc.

Available at
www.stemequitypipeline.org

Access to and Participation in STEM

- Shrinking gender gap in performance on national assessments in math and science between boys and girls
- Still significant gaps when looking at gender AND race/ethnicity or socio-economic status
- Girls not translating their academic success in STEM to careers in STEM

Self-efficacy

- Attribution Theory
  - Girls more likely to attribute success to external factors and failure to internal factors
- Stereotype Threat
  - Stereotype that girls are not as capable as boys in math affects their performance
- Locus of Control
  - When students feel they are in control of their lives and their futures they are more likely to select nontraditional options

Student Attitudes/Peer Influence

- Encourage valuing diversity
- Acceptance of differences
- Dispel bias and stereotypes
- Stop peer harassment
- Create peer support groups
- www.tolerance.org

School Climate

- Nontraditional faculty and staff
- Acceptable behavior in hallways, cafeteria, school events, busses, etc.
- Administration and staff support and encouragement
- Extracurricular activities
  - Clubs, After School Program
  - Competitions
  - Summer Camp

Student Isolation

- Cohort of underrepresented students in a program are more likely to complete than a single individual
- Individuals more likely to
  - Have trouble integrating effectively in to social structure
  - Suffer decreased performance
  - Drop out
- Schedule students in cohorts when possible

Support Services

- Tutoring
- Child care
- Transportation
- Financial Aid
- Books, Equipment, Tools, Clothing
- Tuition
- Modification of Curriculum, Equipment
- Student/Teacher Aides
- More

Resources

- www.napequity.org
- www.stemequitypipeline.org

Questions?