

THE STEM WORKFORCE: NOT ONE, BUT MANY

WHAT IS "THE STEM WORKFORCE"?

Workers who use hold a STEM (Science, Technology, Engineering, and Mathematics) degree, work in a STEM job, or who use significant STEM knowledge and skills in their jobs are part of the STEM workforce. While there is not a consensus definition of "the STEM workforce," it includes

- Scientists and engineers who further scientific and technological progress through research and development (R&D)
- Workers in non-R&D jobs who use STEM knowledge and skills to devise or adopt innovations
- Workers in technically demanding jobs who need STEM capabilities to accomplish occupational tasks.

THE STEM WORKFORCE IS COMPOSED OF MANY DIFFERENT "SUB-WORKFORCES"

Sub-workforces can be categorized by

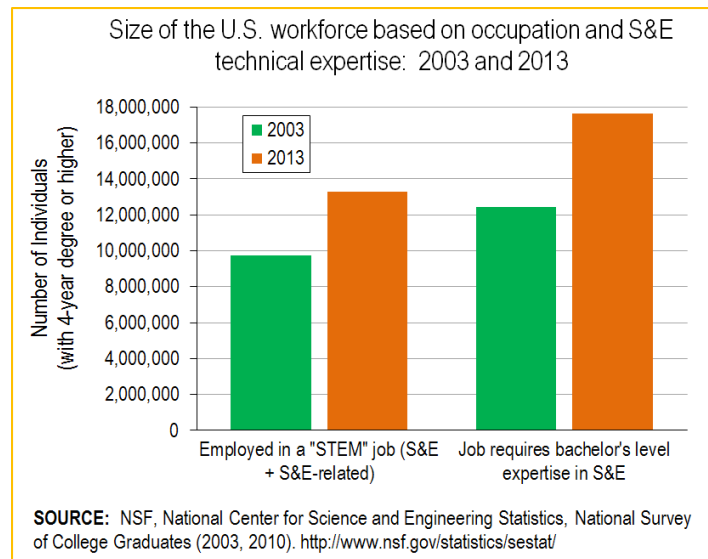
- Field of degree
- Occupational field
- Required educational level
- Some combination of these factors

Demand for, supply of, and career prospects for each sub-workforce can vary significantly by

- Employment sector
- Geographic region
- Career stage

SCIENCE AND TECHNOLOGY ARE PERVASIVE IN THE AMERICAN WORKPLACE

STEM knowledge and skills are used in many more occupations than those traditionally thought of as science and engineering (S&E). In 2013, about 13.27 million U.S. workers were employed in an occupation classified as S&E or S&E-related. **Yet in a survey of individuals with at least a four-year degree, including many working in sales, marketing, and management, an estimated 17.65 million reported that their job required at least a bachelor's degree level of S&E expertise.**



TO REMAIN COMPETITIVE, OUR NATION NEEDS FLEXIBLE STEM-CAPABLE WORKERS AT EVERY EDUCATION LEVEL.

In 2013, the number of non-S&E jobs that require a bachelor's level of S&E skills surpassed the number of traditional S&E jobs for the first time!



STEM JOBS ARE NOT JUST FOR THOSE WITH ADVANCED DEGREES!

Recent reports have drawn attention to a sub-baccalaureate, or “technical STEM workforce,” consisting of workers with high school, two-year technical training, or a certification, who employ significant levels of STEM knowledge in their jobs. These jobs, which combine conventional literacy with technical expertise, are concentrated in information technology (IT), health care, and skilled trades. The National Science Foundation (NSF) estimates that one quarter of all S&E workers have less than a bachelor’s degree. When these “middle-skill” STEM workers are included, there may be as many as **26 million jobs** in the U.S. that require significant STEM knowledge and skill in at least one field. **This represents nearly 20% of all U.S. jobs.**

Earnings and employment rate. Technical STEM jobs are among the best paying and most stable jobs available to individuals with a sub-baccalaureate education. In 2013, the median annual earnings among workers 25 and older without a bachelor’s degree employed in S&E occupations was significantly higher than that of comparable workers in other occupations (\$60,000 for S&E jobs and \$45,000 for S&E-related jobs vs. \$28,000 for non-S&E). The unemployment rate of technical S&E workers was less than half of that in other occupations (4% vs. 9%).

Demographics. Compared to scientists and engineers with advanced degrees, the technical STEM workforce has fewer foreign-born workers, with 89% of technical STEM workers being native born. Blacks and Hispanics are represented in higher proportions in the technical STEM workforce.

Demand for sub-baccalaureate STEM workers is distributed nationwide.

WHAT ARE “STEM CAPABILITIES”?

Anthony Carnevale and colleagues analyzed data from the U.S. Department of Labor’s Occupational Information Network (O*NET) to identify which competencies are highly associated with STEM occupations. They include

- Knowledge of math, chemistry, and other scientific and engineering fields
- STEM skills, such as complex problem solving, technology design, and programming
- STEM abilities, including deductive reasoning, mathematical reasoning, and facility with numbers.

Carnevale, A. et al., 2014, “STEM.” Washington, DC: Georgetown University Center on Education and the Workforce.

A CHALLENGE FOR POLICYMAKERS

The STEM workforce is not a single entity. Therefore when developing policies to address workforce issues, including claims of shortages, surpluses, and “skills gaps” between workers and business needs, policy makers should consider the STEM field, educational level, career stage, geographic region, and employment sector of the workers in question.

WHEN DISCUSSING WORKFORCE ISSUES OR DELIBERATING POLICY INTERVENTIONS, IT IS VITAL TO BE SPECIFIC ABOUT WHICH PART OF THE STEM WORKFORCE IS BEING CONSIDERED.

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STEM Workforce Report:

<http://nsf.gov/nsb/publications/2015/nsb201510.pdf>

