

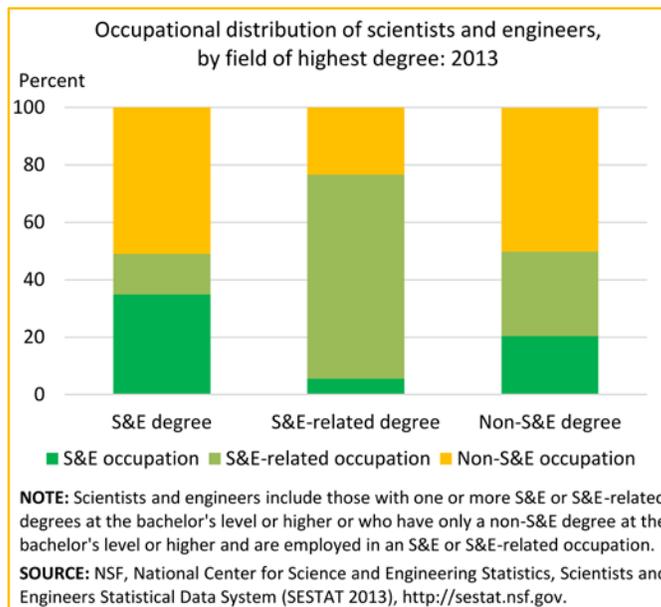
STEM EDUCATION AND THE WORKFORCE

PATHWAYS, NOT PIPELINES

WHAT TYPES OF JOBS DO STEM DEGREE HOLDERS HAVE?

STEM (science, technology, engineering, and math) knowledge and skills enable individuals to follow career paths to many jobs, not just those traditionally defined as STEM or S&E (science and engineering).

- Among college-educated U.S. workers with their highest degree in an S&E field, 49% are employed in an S&E or S&E-related job.
- A majority (51%) of these workers are employed in non-S&E occupations!
- Non-S&E jobs held by S&E degree holders include management, sales, marketing, social services, and teaching in non-STEM fields.

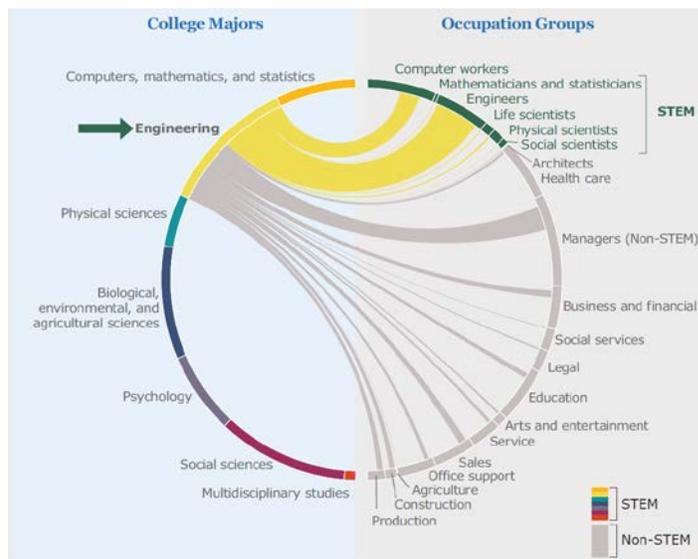


A "PATHWAYS MODEL" OF CAREER PROGRESSION

In our dynamic economy, careers are continually being created, supplanted, and reshaped. Yet the "STEM pipeline" model suggests a straightforward progression from formal STEM education to STEM occupation. This model does not reflect the full range of career opportunities available to STEM degree holders and the many factors that influence career choices over a lifetime.

A "pathways model" better represents the relationship between degree and jobs, in which STEM degree holders follow career paths into STEM and non-STEM jobs, or both, over the course of their working lives. This approach recognizes that employers can create workforce paths to draw on diverse individuals with disparate educational backgrounds and expertise.

An emphasis on career pathways encourages a shift in the focus of questions concerning workforce competitiveness from "how many degrees/workers" do we have to "what kinds of knowledge and skills" should all U.S. workers have.



The career "pathways" for engineering bachelor's degree holders. The circle segments show the proportion of people graduating in a given college major (left) and employed in each occupation group (right). The lines between majors and occupations indicate the share of people in a major who work in a particular occupation.

Source: This image is from a data visualization tool created by the U.S. Census Bureau.
<https://www.census.gov/dataviz/visualizations/stem/stem-html>

Examples of personal factors that influence career choice:

- Education and training
- Availability of opportunities
- Lifestyle preferences
- Work experience

Examples of external factors that influence career choice:

- Scientific and technological change
- Entrepreneurial activities
- Business needs
- Public policy

STEM DEGREES ARE FLEXIBLE AND VALUABLE

The varied career pathways of U.S. S&E degree holders demonstrate the value of S&E degrees and the distinctive features of the U.S. workforce. Compared with other nations, U.S. graduates are less constrained by their field of degree in pursuing career options. U.S. employers are quite fluid, acquiring and using employees' skills in differing ways to yield value. **This flexibility is advantageous for individual workers, businesses, and the Nation.**

Surveys of employees underscore that many individuals with S&E degrees, regardless of where they are employed, believe that their work is related to their degree. Among individuals with their highest degree in S&E who are not employed in an S&E occupation, more than two-thirds say that their job is either closely (35%) or somewhat (33%) related to their S&E degree, **further demonstrating the value of STEM capabilities throughout the economy.**

DEGREE IS NOT DESTINY!

KEY QUESTIONS FOR POLICYMAKERS

Using a pathways model to understand the connection between STEM education and the S&E workforce encourages a shift away from a near-term focus on educating individuals for today's jobs to how to equip them with the generalizable STEM and non-STEM capabilities needed to adapt and thrive in a globally competitive, knowledge- and technology-intensive economy.

To assess, enable, and strengthen STEM pathways for the long term, policymakers should consider:

- What kinds of policies are necessary to ensure that all students and current workers, regardless of demographic characteristics, have the opportunity to embark on these career paths?
- Once on these paths, what types of roadblocks and obstacles do workers encounter? What policies could help mitigate or remove them?
- How can we assess and strengthen the state of career pathways that we believe are especially important to national competitiveness?
- What are the roles of governments, educational institutions, and businesses in enabling pathways and strengthening the workforce for the long term?

A FOCUS ON PATHWAYS HIGHLIGHTS OUR COLLECTIVE CHALLENGE TO ENSURE THAT ALL OUR STUDENTS HAVE ACCESS TO STEM PATHWAYS, AND THAT ROADBLOCKS TO THEIR SUCCESS ARE IDENTIFIED AND REMOVED.

NSB Contact:

Nadine Lymn
NSB Communications Director
nlymn@nsf.gov | 703-292-2490

STEM Workforce Report:

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

