NATIONAL SCIENCE BOARD
Science & Engineering Indicators

Labor Force

STEM Talent: Education, Training, and Workforce

NSB-2026-1 | February 12, 2026

The National Science Board (Board) is required under the National Science Foundation (NSF) Act, 42 U.S.C. § 1863 (j) (1) to prepare and transmit the biennial *Science and Engineering Indicators* (*Indicators*) report to the President and Congress every even-numbered year. The report is prepared by the National Center for Science and Engineering Statistics (NCSES) within NSF under the guidance of the Board. It is subject to extensive review.

Table Of Contents

Contact Us 94

List of Tables

List of Figures

Executive Summary

U.S. STEM Workforce Scale and Composition

The U.S. science, technology, engineering, and mathematics (STEM) workforce in 2023 represented about a quarter of all workers in the domestic economy and demonstrated distinct patterns of educational attainment and industry concentration.

- In 2023, there were 36 million STEM workers in the United States, accounting for 25% of the total workforce.
- In 2023, science and engineering (S&E) workers (42%) and S&E-related workers (48%) made up 90% of the STEM workforce with a bachelor's or an advanced degree; workers in STEM middle-skill occupations made up the other 10%. Among STEM workers without a bachelor's degree, 63% were employed in STEM middle-skill occupations.
- In 2023, 22% of the U.S. STEM workforce was foreign born. Naturalized U.S. citizens made up 52% of the foreign-born domestic STEM workforce, noncitizens made up 42%, and foreign-born workers who were U.S. citizens by birth (i.e., born abroad to a parent or parents who are U.S. citizens) made up 5%.
- In 2022, over a third (36%, or about 6 million) of the workers in research and development (R&D)-intensive industries were employed in STEM occupations. Under a quarter (24%, or 30 million) of the workers in non–R&D-intensive industries were employed in STEM occupations.
- Based on the American Community Survey 5-Year File, 2023, comparable proportions of workers in rural (25%) and urban (25%) areas were employed in STEM occupations, but the occupational groups varied by geography. The share of workers in STEM middle-skill occupations in rural areas (13%) was higher than the share in urban areas (9%), whereas the share of S&E workers in urban areas (7%) was higher than the share in rural areas (3%).

U.S. STEM Workforce Growth and Economic Impact

Employment in STEM occupations grew at a faster rate than in non-STEM occupations between 2013 and 2023 and provided economic premiums to STEM workers.

- Between 2013 and 2023, the STEM workforce grew by 26%, faster than the 9% growth in the non-STEM workforce.
- Employment in STEM occupations is projected to grow 6% from 2024 to 2034, faster than the projected 2% growth in employment in non-STEM occupations.
- In 2023, full-time, year-round workers in STEM occupations had higher median earnings ($76,000) than workers in non-STEM occupations ($55,000). Within STEM occupations, S&E workers had the highest overall earnings ($100,000), followed by S&E-related workers ($80,000), then by workers in STEM middle-skill occupations ($58,000).
- In 2023, the two largest countries or economies of origin for foreign-born STEM workers in the United States were Mexico (1.3 million) and India (1.0 million), which combined to represent 31% of all foreign-born STEM workers in the United States. Workers from the top 30 countries or economies of origin made up 79% of the foreign-born STEM workers in the United States.

K–12 STEM Education Performance and Challenges

Recent assessments reveal concerning trends in U.S. K–12 STEM education, with incomplete recovery from pandemic-related learning losses and declining international competitiveness, particularly in mathematics. In mathematics assessments, students taught by experienced, credentialed teachers outperformed students taught by less-experienced teachers.

- A 2024 national assessment of fourth and eighth graders' mathematics performance shows some post–COVID-19 pandemic learning recovery since 2022 for higher-performing students but no recovery for lower-performing students. Other than for fourth-grade students scoring at the 75th and 90th percentiles, student scores have not returned to pre-pandemic levels.
- The national mathematics assessment in 2024 shows that students taught by teachers with 6 or more years of experience scored higher than students taught by less-experienced teachers, as did students taught by teachers with traditional certifications rather than teachers with alternative certifications.
- Eighth graders from 18 advanced economies participated in an international assessment in 2023. U.S. students scored in the middle of the group in science and in the bottom third in mathematics.
- Average mathematics scores for U.S. eighth-grade students who participated in international assessments decreased by 27 points, from 515 of 1,000 possible points in a pre-pandemic 2019 assessment to 488 points in a 2023 assessment.
- Students' mathematics achievement in high school is associated with postsecondary STEM degree outcomes. Of students who scored in the highest quintile of a mathematics assessment in grade 11 and declared a postsecondary STEM major in college, 71% completed a STEM degree, compared with 34% of students who scored in the lowest quintile.

Higher Education STEM Pipeline and International Competitiveness

U.S. higher education institutions continue to expand STEM degree production at all levels, with particularly strong growth in S&E fields. In 2023, the United States maintained its position as a leading destination for international students, despite a slight decline in overall share since 2013 and increasing global competition.

- Between 2013 and 2023, the number of S&E degrees awarded by U.S. institutions increased at all levels. At all degree levels, the growth in S&E degree completions during this period was higher than the growth in the college-age population.
- Between 2013 and 2023, computer and information sciences degree awards at the bachelor's and master's levels exhibited strong growth, from about 51,500 to 114,100 and from about 22,800 to 77,200, respectively.
- In 2023, visa holders continue to be highly represented among advanced degree awardees (master's and doctoral levels) in technologically important fields—computer and information sciences, engineering, and mathematics and statistics.
- The United States was the most popular destination for internationally mobile postsecondary students in 2023. However, the number of internationally mobile students enrolled in the United States fell by 3% between 2017 and 2023, while it rose in other countries that are major attractors of this talent.

Introduction

Talent is the bedrock of the nation's science and engineering (S&E) enterprise and a key part of U.S. competitiveness. The science, technology, engineering, and mathematics (STEM) workforce is integral to the United States' ability to meet persistent and emerging global challenges, including national security, health, economic development, and future research challenges. A globally competitive STEM education system equips Americans with the skills and knowledge needed to participate in the STEM workforce. Indicators of the performance of the domestic S&E enterprise—from STEM education and training to employment and attrition—highlight challenges.

The STEM workforce accounts for roughly a quarter of all U.S. workers and includes those who work in traditional S&E occupations and those who work in a wider collection of occupations, including the skilled technical workforce. For all, the path to these occupations starts early and may be complex, with many junctions where an individual may continue to pursue STEM education or employment or choose to follow other paths. However, for those who end up employed in STEM fields, the wage and employment benefits are notable. This report presents available statistics that highlight key persistence and attrition milestones on the path to the STEM workforce.

The STEM workforce comprises individuals born in the United States, as well as those born abroad and educated or trained at U.S. or international institutions. Many types of U.S. institutions foster talent development: K–12 schools, community colleges, colleges and universities, and technical training programs. The availability of STEM training varies across schools, districts, and regions, with differences often linked to socioeconomic and geographic factors. Many variables affect the probability of students moving through their education and training and gaining employment in the STEM workforce. Attrition of individuals from the U.S. S&E ecosystem occurs at various points along the pathway to employment in STEM occupations. A recent national assessment shows some recovery in elementary and secondary student mathematics performance since the COVID-19 pandemic, but only the scores for fourth-grade students at the 75th and 90th percentiles have returned to pre-pandemic levels. This highlights potential gaps in foundational knowledge that domestic students progressing through STEM education and training may have, with potential downstream consequences for the adequacy and robustness of the domestic STEM workforce.

International students play a significant role in the U.S. higher education system, which awards a large percentage of S&E degrees in certain fields to individuals studying in the United States on temporary visas, especially at the doctoral level and in some critical and emerging technological fields. International students who earned their degrees in the United States and stay in this country (on employment visas, as permanent residents, or as naturalized citizens) after graduating contribute to meeting the domestic demand for STEM workers.

STEM Labor

U.S. STEM Workforce: Size, Demographic Characteristics, and Labor Market Outcomes

STEM workers play an important role in the economic vitality, health, and security of the United States. They contribute to cutting-edge research and development (R&D), the application and maintenance of technologies in all sectors of the economy, and the provision of services that contribute to the well-being of every citizen. The United States relies on STEM workers to build its scientific and technical capacity and maintain the global competitiveness of its industries. The STEM workforce is defined as those currently employed in S&E, S&E-related, or STEM middle-skill occupations (see the Glossary section). STEM middle-skill occupations are those occupations that require technical knowledge but are not classified as S&E or S&E-related and do not require a bachelor's degree (Table TAL-1).

Table TAL-1. Workforce, occupational groups, and examples

(Workforce, occupational group, and example)

Workforce	Occupational groups	Examples of occupations
STEM	S&E	Computer support specialists, engineers, industrial engineers, including health and safety, software developers
	S&E-related	Licensed nurses, pharmacy technicians, physicians, registered nurses
	STEM middle skill	Carpenters, electricians, farmers, ranchers and other agricultural managers, industrial production managers
Non-STEM	Non-STEM	Counselors, food preparation workers, police officers, general and operations managers

STEM = science, technology, engineering, and mathematics.

Note(s):
Please see https://ncses.nsf.gov/pubs/nsb20212/ for the expanded definition of STEM occupations; https://ncses.nsf.gov/pubs/nsb20212/table/SLBR-1 for the classification of STEM occupations; and https://ncses.nsf.gov/136/assets/0/files/ncses_workforcestatistics_onepager.pdf for an overview.

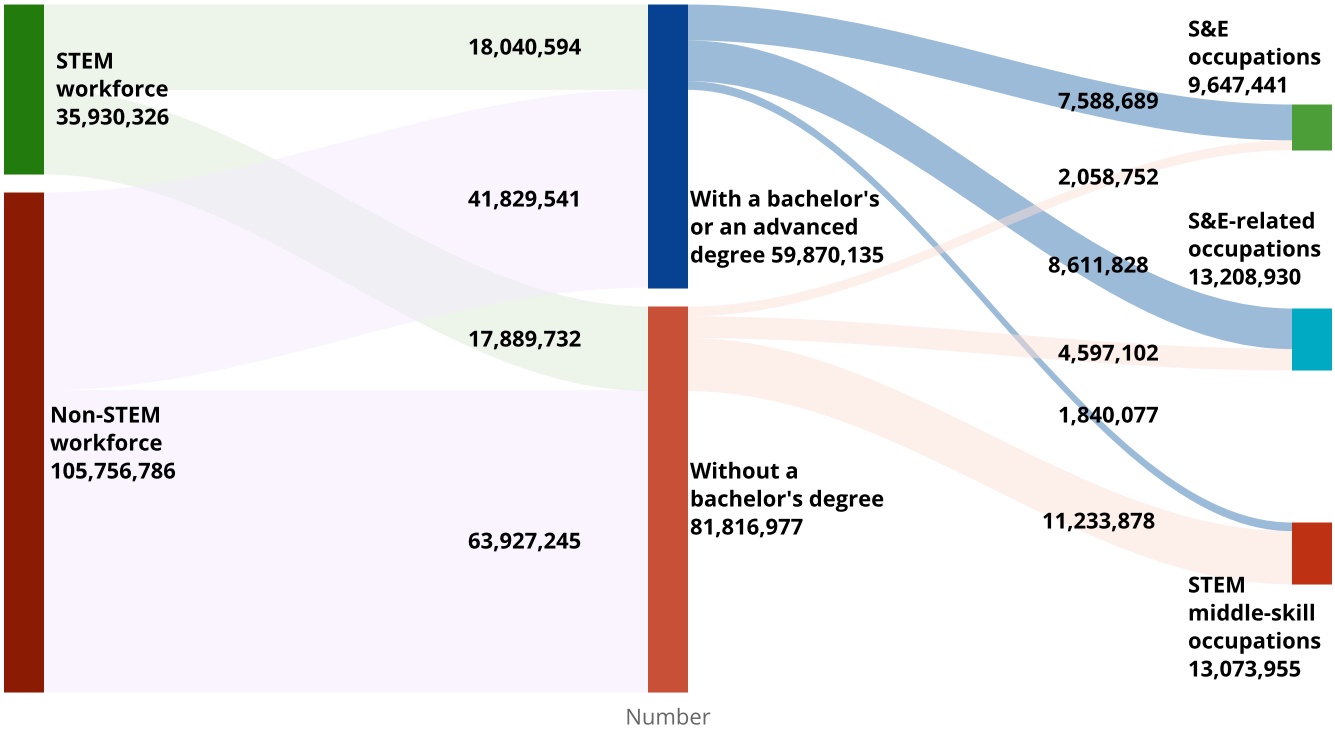
Source(s):
National Science Board, National Science Foundation, 2021, The STEM Labor Force of Today: Scientists, Engineers and Skilled Technical Workers, *Science and Engineering Indicators 2022*, NSB-2021-2, available at https://ncses.nsf.gov/pubs/nsb20212/; National Center for Science and Engineering Statistics, 2022, *Workforce Statistics*, NCSES 2022-203, available at https://ncses.nsf.gov/136/assets/0/files/ncses_workforcestatistics_onepager.pdf.

Science and Engineering Indicators

Size of the STEM Workforce

In 2023, there were 36 million STEM workers in the United States, making up 25% of the total U.S. workforce. Employment and educational attainment patterns varied among S&E, S&E-related, and STEM middle-skill occupations (Figure TAL-1). Among STEM workers, 27% were employed in S&E occupations, 37% in S&E-related occupations, and 36% in STEM middle-skill occupations. Most workers in S&E (79%) and S&E-related (65%) occupations had a bachelor's or an advanced degree, whereas 14% of workers in STEM middle-skill occupations did. Of the STEM workers with a bachelor's or an advanced degree, 42% were employed in S&E occupations, 48% were in S&E-related occupations, and 10% were in STEM middle-skill occupations. About half of the workers in the STEM workforce did not have a bachelor's degree; of these workers, 63% were employed in STEM middle-skill occupations.

Figure TAL-1. Size of the workforce, by occupational group and education level: 2023



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

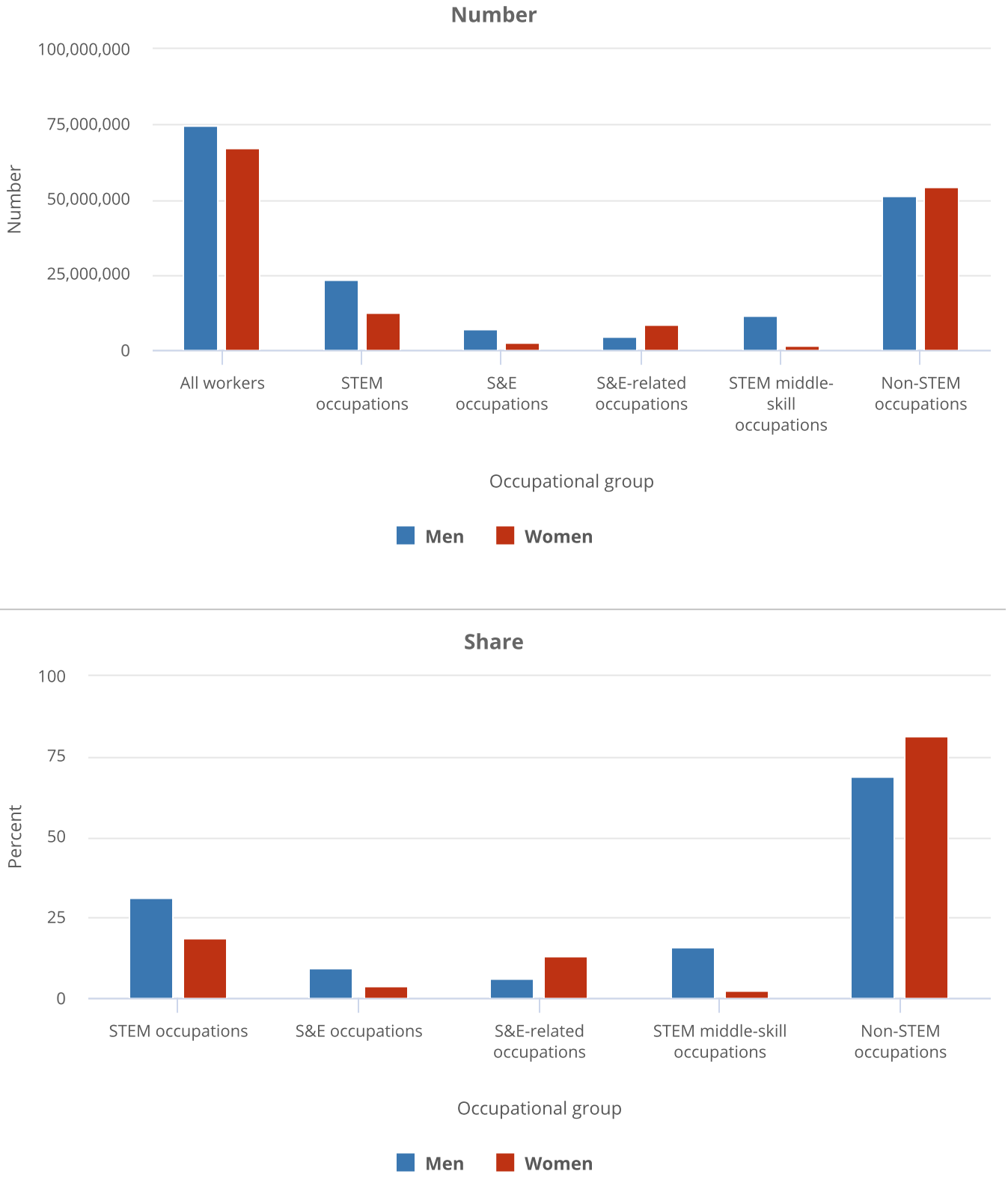
Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Demographic Patterns of the STEM Workforce

The STEM workforce is predominantly male. Of the 36 million workers in the STEM workforce in 2023, 65% were men (Figure TAL-2). Although men accounted for most workers in S&E (73%) and STEM middle-skill (89%) occupations, women accounted for the majority (65%) of workers in S&E-related occupations.

Figure TAL-2. Workforce, by occupational group and sex: 2023



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

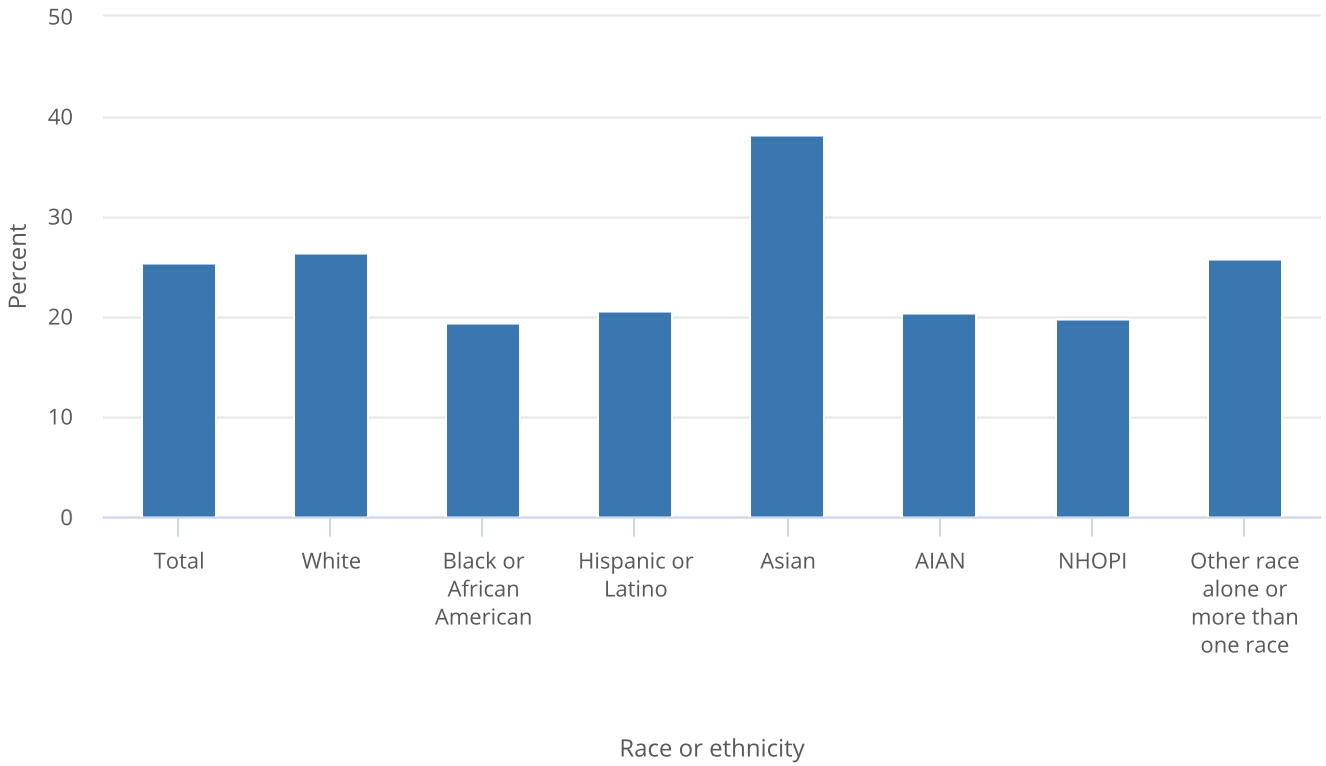
Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

A greater share of the total male workforce of the United States was employed in STEM occupations than their female counterparts in 2023: 31% of the total male workforce was employed in STEM occupations, compared to 19% of the total female workforce (Figure TAL-2). However, a different pattern emerged by STEM occupational group. Greater shares of the total male workforce were employed in S&E (9%) and middle-skill (16%) occupations than their female counterparts (4% and 2%, respectively), whereas a greater share (13%) of the total female workforce was employed in S&E-related occupations than their male counterparts (6%).

Participation in the STEM workforce varied by racial and ethnic group. In 2023, 38% of all Asian workers were employed in STEM occupations, the highest share of any racial or ethnic group, followed by White workers at 27% (Figure TAL-3; Table STAL-1). Roughly 20% of Black or African American (Black), Hispanic or Latino (Hispanic), American Indian or Alaska Native, and Native Hawaiian or Other Pacific Islander workers were employed in STEM occupations.

Figure TAL-3. Share of workers of each racial or ethnic group employed in STEM occupations, by race or ethnicity: 2023



AIAN = American Indian or Alaska Native; NHOPI = Native Hawaiian or Other Pacific Islander; STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. Hispanic or Latino may be any race; race categories exclude Hispanic origin. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

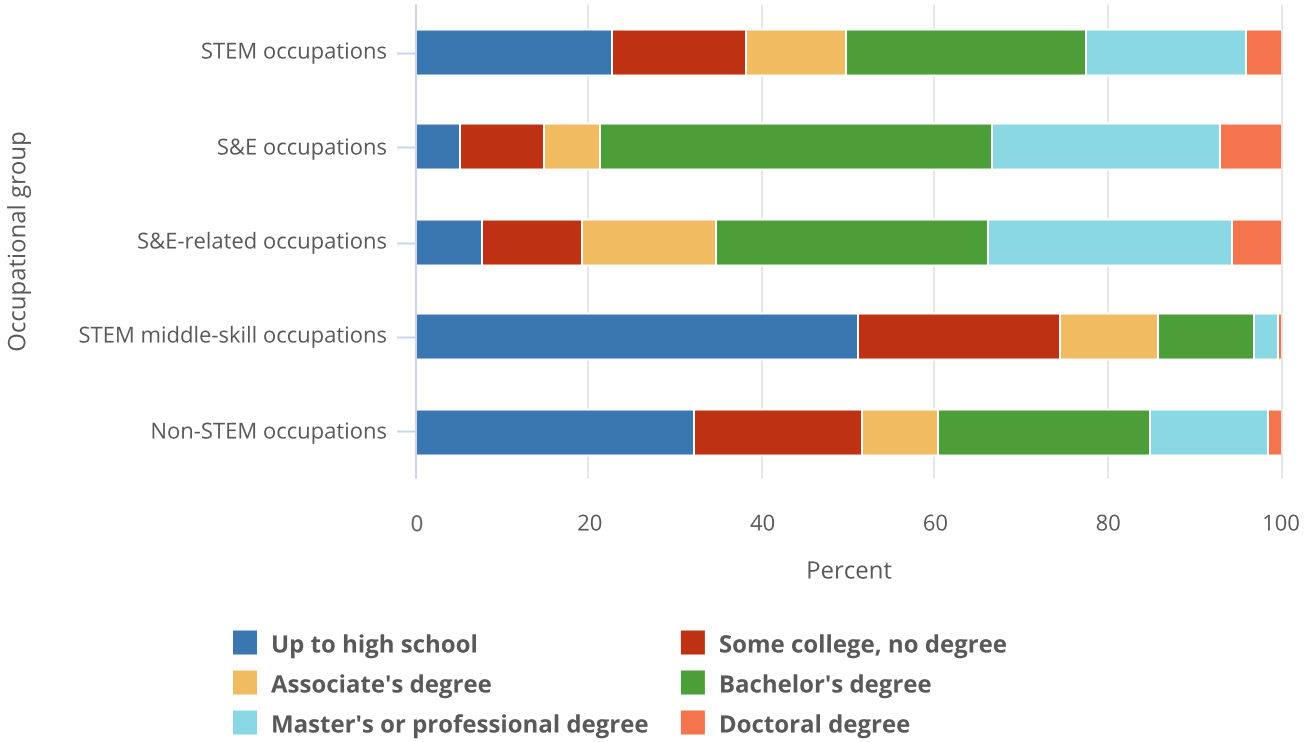
Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Educational Attainment of the STEM Workforce

Postsecondary education is a common educational pathway to STEM occupations. In 2023, 62% of STEM workers had earned a postsecondary degree, with 50% having earned a bachelor's or an advanced degree and another 12% having earned an associate's degree (Figure TAL-4; Table STAL-1). STEM workers had higher shares of each level of postsecondary degree (associate's through doctoral degrees) than non-STEM workers. The majority of workers in S&E occupations had a bachelor's or an advanced degree (79%), higher than the shares of these degrees among workers in S&E-related (65%), STEM middle-skill (14%), and non-STEM (40%) occupations. A bachelor's degree was the most common degree among workers in S&E (45%) and S&E-related (32%) occupations. For workers in STEM middle-skill occupations, 75% did not have a postsecondary degree.

Figure TAL-4. Workforce, by occupational group and educational attainment: 2023



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

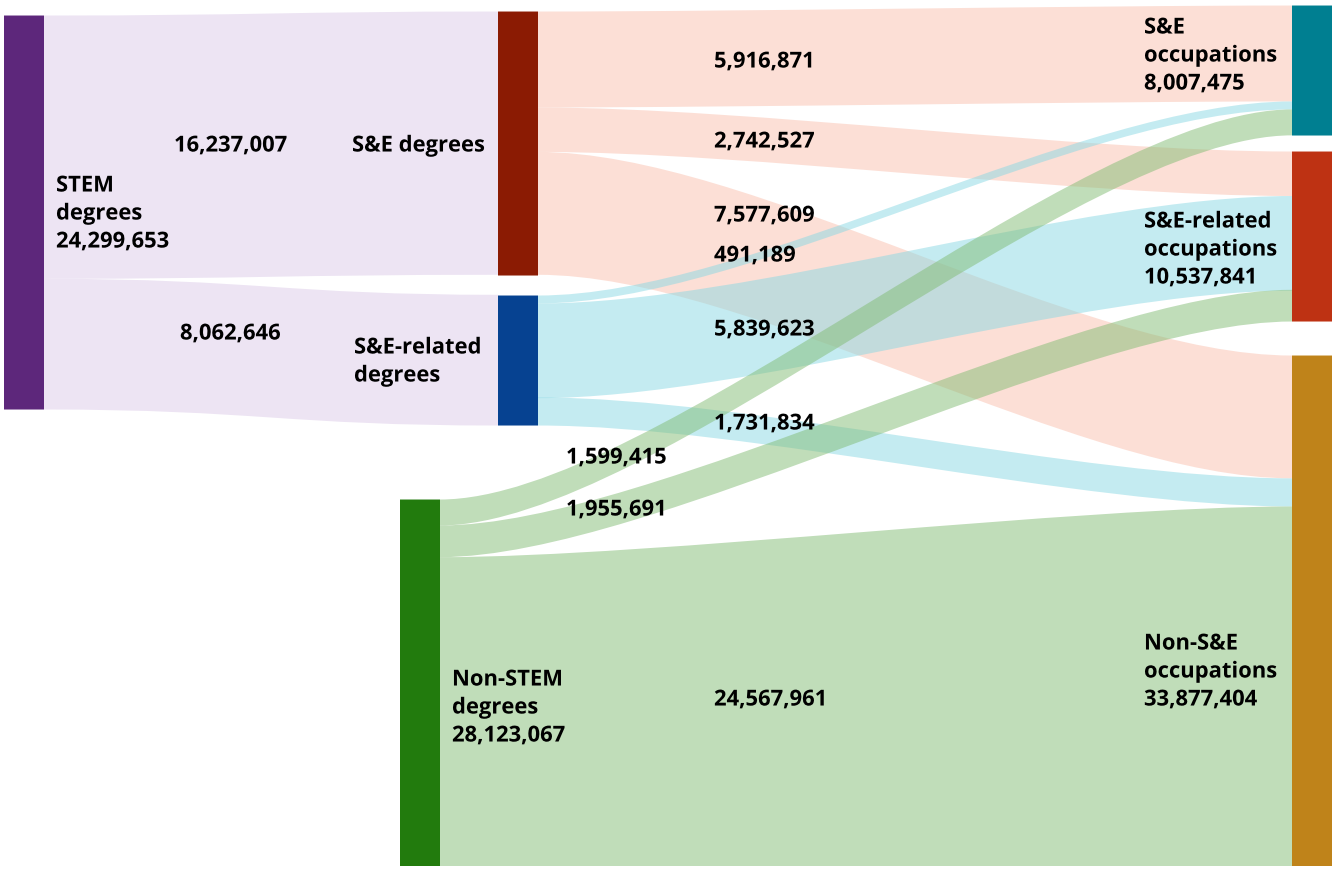
Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Relationship between Field of Study and Occupational Group

Workers in STEM occupations have diverse educational backgrounds, although most earned their degrees in STEM fields.[1] Based on the National Survey of College Graduates (NSCG), 24 million college-educated workers had their highest degree in a STEM field in 2023, comprising 46% of the college-educated workforce (Figure TAL-5).[2] Of those with their highest degree in a STEM field, about two-thirds (16.2 million) received their highest degree in an S&E field, and the other third (8.1 million) received S&E-related degrees. The college-educated workforce had 19 million workers in S&E and S&E-related occupations, with 8 million in S&E and 11 million in S&E-related occupations.[3] Most S&E (80%) and S&E-related (81%) workers received STEM degrees. About a quarter of S&E workers (26%) did not receive their highest degree in an S&E field, and close to half (45%) of S&E-related workers did not receive their highest degree in an S&E-related field.

Figure TAL-5. Field of study of highest degree and occupational group of S&E, S&E-related, and non-STEM workers with a bachelor's or an advanced degree: 2023



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include employed civilians 25–75 years old. Highest degree is derived from first major of highest degree. STEM middle-skill occupations are included in non-S&E occupations for the college-educated workforce in the National Survey of College Graduates (NSCG).

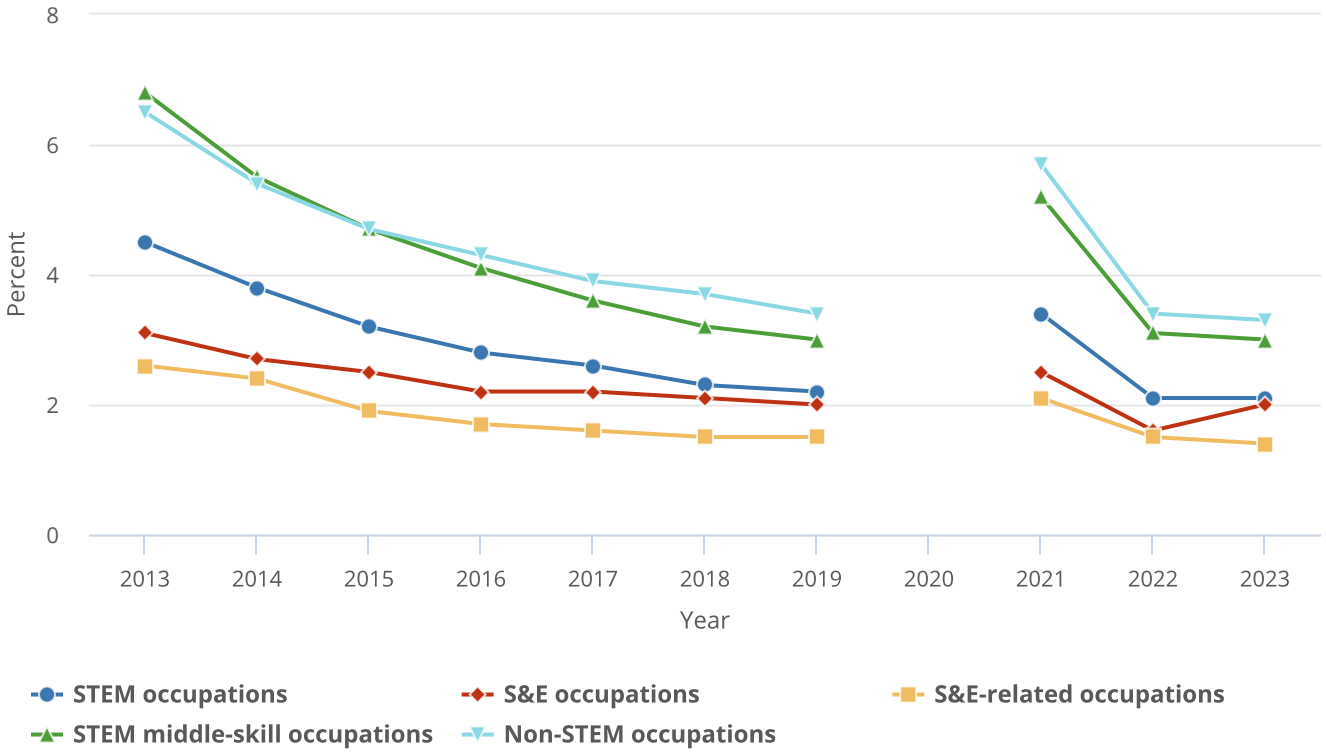
Source(s):
National Center for Science and Engineering Statistics, NSCG, 2023.

Science and Engineering Indicators

Labor Market Outcomes

Indicators of labor market conditions, such as unemployment rates and earnings, provide information on the economic value proposition of STEM occupations. STEM workers fare well in the labor market. Each year from 2013 to 2023, the unemployment rate of STEM workers was lower than that of non-STEM workers (Figure TAL-6; Table STAL-2). However, unemployment rates varied among STEM occupational groups. S&E and S&E-related workers consistently had lower unemployment rates than workers in STEM middle-skill occupations. The unemployment rate of workers in STEM middle-skill occupations was much closer to that of non-STEM workers. Between 2013 and 2016, the unemployment rate of workers in STEM middle-skill occupations was comparable to that of non-STEM workers. Since 2017, the unemployment rate of workers in non-STEM occupations exceeded that of STEM middle-skill workers.

Figure TAL-6. Unemployment rate, by occupational group: 2013–23



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Coding of occupations into STEM categories reflects changes to American Community Survey (ACS) occupation codes following the 2018 update to the Standard Occupational Classification implemented by the Bureau of Labor Statistics. Data from 2013 to 2017 use occupations from the 2010 occupation list, whereas data from 2018 to 2023 use occupations from the 2018 occupation list. Data for 2020 are not available due to the impact of the COVID-19 pandemic on ACS data collection for the survey year. Additional information is available at https://www.census.gov/programs-surveys/acs/data/experimental-data/2020-1-year-pums.html. STEM includes S&E, S&E-related, and STEM middle-skill occupations. Unemployment rate is defined as the number of unemployed individuals as a percentage of the number of individuals in the labor force (employed and unemployed).

Source(s):
Census Bureau, ACS, 2023.

Science and Engineering Indicators

Median Earnings in the Workforce

Overall, full-time, year-round workers in STEM occupations had higher median earnings ($76,000) than workers in non-STEM occupations ($55,000) in 2023 (Table TAL-2). Among STEM workers, S&E workers had the highest overall median earnings ($100,000) and the highest median earnings among all STEM occupational groups at each educational attainment level. STEM workers in STEM middle-skill occupations had the lowest overall earnings ($58,000) among STEM occupations. But at the educational attainment levels of up to a high school degree or equivalent, some college, and associate's degree, their earnings exceeded the earnings of non-STEM workers. The difference in median earnings from associate's to bachelor's degrees was the smallest among workers in STEM middle-skill occupations, suggesting that workers in STEM middle-skill occupations did not see the same earnings premium for bachelor's degrees that other occupational groups received.[4] For all occupational groups, earnings increased with each degree level. The range in median earnings from up to a high school degree or equivalent to a doctoral degree was the greatest for workers in S&E-related occupations ($68,000) and was the smallest for workers in STEM middle-skill occupations ($40,000).

Table TAL-2. Median earnings of full-time, year-round workers, by educational attainment and occupational group: 2023

(Dollars)

Education level	All occupations	STEM occupations	S&E occupations	S&E-related occupations	STEM middle-skill occupations	Non-STEM occupations
All education levels	60,000	76,000	100,000	80,000	58,000	55,000
Without a bachelor's degree	50,000	60,000	78,000	60,000	55,000	45,000
Up to a high school or an equivalent degree	45,000	52,000	75,000	52,000	50,000	41,000
Some college	52,000	62,000	80,000	60,000	60,000	50,000
Associate's degree	56,000	69,000	80,000	68,000	65,000	50,000
With a bachelor's or an advanced degree	85,000	100,000	109,000	99,000	70,000	78,000
Bachelor's degree	78,000	90,000	100,000	85,000	68,000	70,000
Master's or professional degree	96,000	115,000	120,000	115,000	78,000	87,000
Doctoral degree	110,000	125,000	130,000	120,000	90,000	100,000

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Geographic Distribution of STEM Workers

STEM workers are geographically concentrated in a few states. In 2023, the three states with the largest shares of the total working-age population of the Unites States—California, Texas, and Florida—were also the states with the largest shares of STEM workers (Table STAL-3, Table STAL-4).[5] Together, these three states contributed to about a quarter (26%) of the nation's STEM workforce.

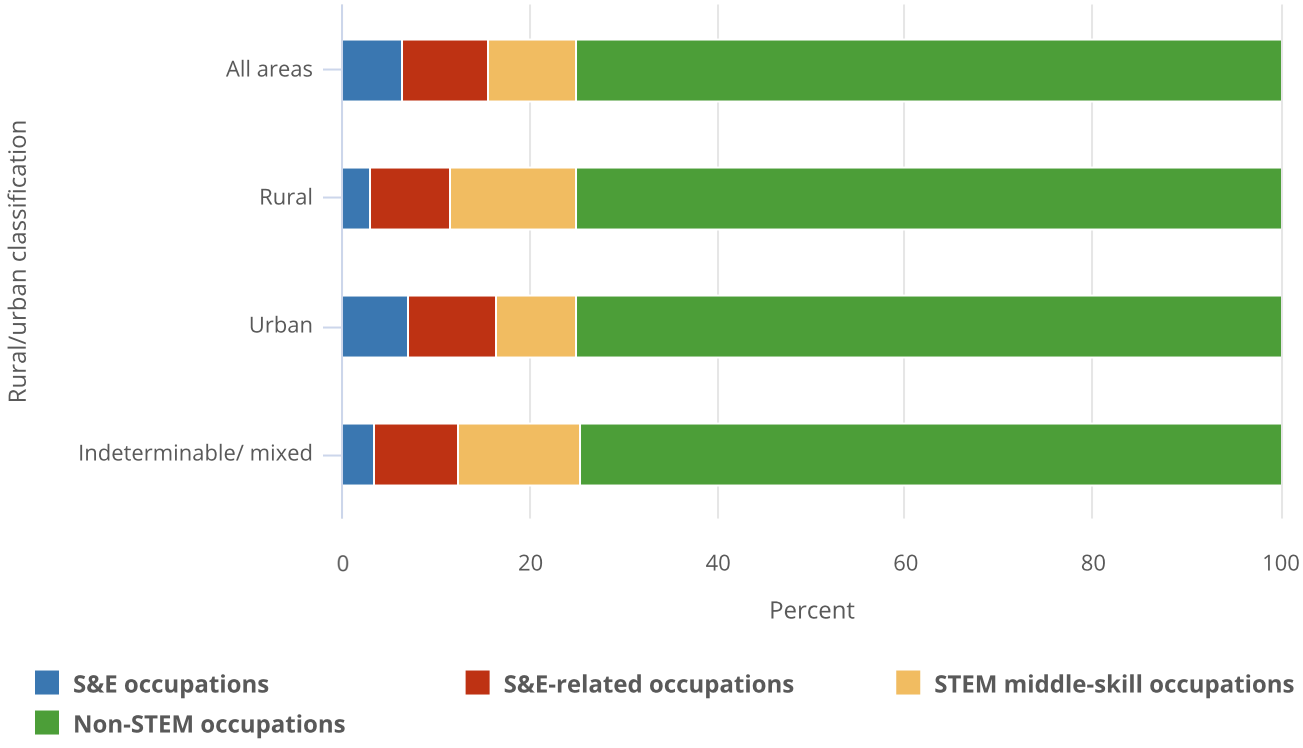
Participation in the STEM workforce varied by state. In 2023, between 20% and 30% of the workforce in each state was employed in STEM occupations. North Dakota and New Hampshire had the highest shares (30% each) of STEM workers in their workforce (Table STAL-4, Table STAL-5); the District of Columbia (23%), New York (22%), and Nevada (20%) had the lowest shares.

Differences in educational attainment for the STEM workforce existed across states. In 34 states, half or more of STEM workers did not have a bachelor's degree (Table STAL-4, Table STAL-6). Mississippi had the largest share of STEM workers without a bachelor's degree (64%). Sixteen states, plus the District of Columbia, had a STEM workforce in which the majority of workers had a bachelor's or an advanced degree. Among these, the District of Columbia had the highest share of STEM workers with a bachelor's or an advanced degree (88%), followed by Massachusetts (64%).

The STEM Workforce by Rural-Urban Classification

Equal proportions of rural and urban workers were employed in STEM occupations (25%), according to the American Community Survey (ACS) 5-Year File, 2023 (Figure TAL-7; Table STAL-7).[6] Although the overall shares of STEM workers were comparable in rural and urban areas, the distribution of STEM occupational groups differed. In rural areas, STEM workers were concentrated in STEM middle-skill occupations (13%). In urban areas, 9% of the workers were in STEM middle-skill occupations. Workers in rural areas were the least prevalent in S&E occupations, comprising 3% of the overall workforce in rural areas, whereas 7% of the workers in urban areas were in S&E occupations.

Figure TAL-7. Workers, by occupational group and rural/urban classification: Five-year sample, 2019–23



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. STEM includes S&E, S&E-related, and STEM middle-skill occupations. For more information on the geographic categories, please see documentation of the METRO variable: https://usa.ipums.org/usa-action/variables/METRO#description_section.

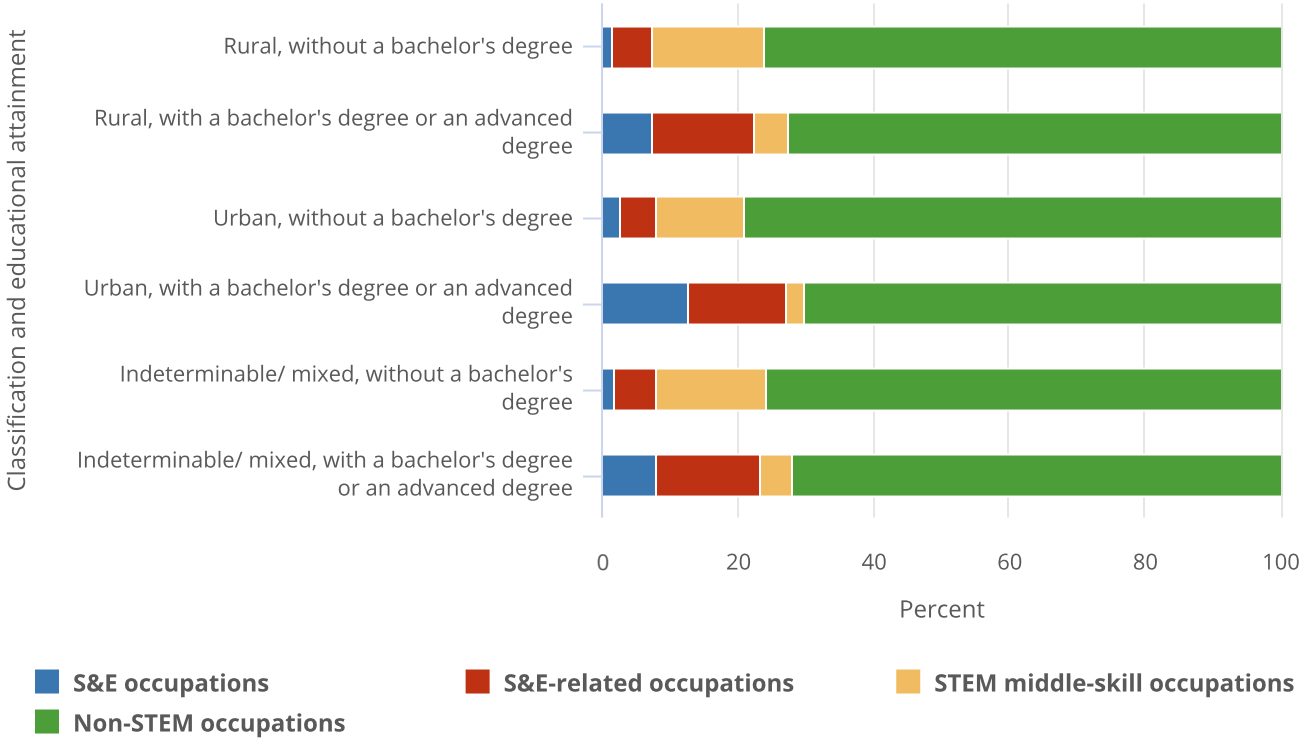
Source(s):
Ruggles S, Flood S, Sobek M, Backman D, Cooper G, Rivera Drew JA, Richards S, Rogers R, Schroeder J, Williams KCW, 2025, *IPUMS USA: Version 16.0 American Community Survey Five-Year File (2023)*, https://doi.org/10.18128/D010.V16.0.

Science and Engineering Indicators

Educational Attainment of STEM Workers in Rural and Urban Areas

The prevalence of rural and urban workers in STEM occupations overall differed by educational attainment. STEM workers without a bachelor's degree were more common in rural areas: 24% of rural workers without a bachelor's degree were in STEM occupations compared to 21% of their counterparts in urban areas. STEM workers with a bachelor's or an advanced degree were more common in urban areas: 30% of urban workers with a bachelor's or an advanced degree were in STEM occupations, compared to 27% of their rural counterparts (Figure TAL-8; Table STAL-7). For each occupational group, however, the pattern between urban and rural areas was consistent across educational attainment groups. The urban workforce had higher shares of S&E workers in each educational attainment group. The pattern was reversed for workers in S&E-related and STEM middle-skill occupations—the rural workforce had higher shares of these workers relative to the urban workforce. Among workers with a bachelor's or an advanced degree, the share of workers in STEM middle-skill occupations in rural areas (5%) was nearly double the urban share (3%).

Figure TAL-8. Workers, by occupational group, rural/urban classification, and educational attainment: Five-year sample, 2019–23



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. STEM includes S&E, S&E-related, and STEM middle-skill occupations. For more information on the geographic categories, please see documentation of the METRO variable: https://usa.ipums.org/usa-action/variables/METRO#description_section.

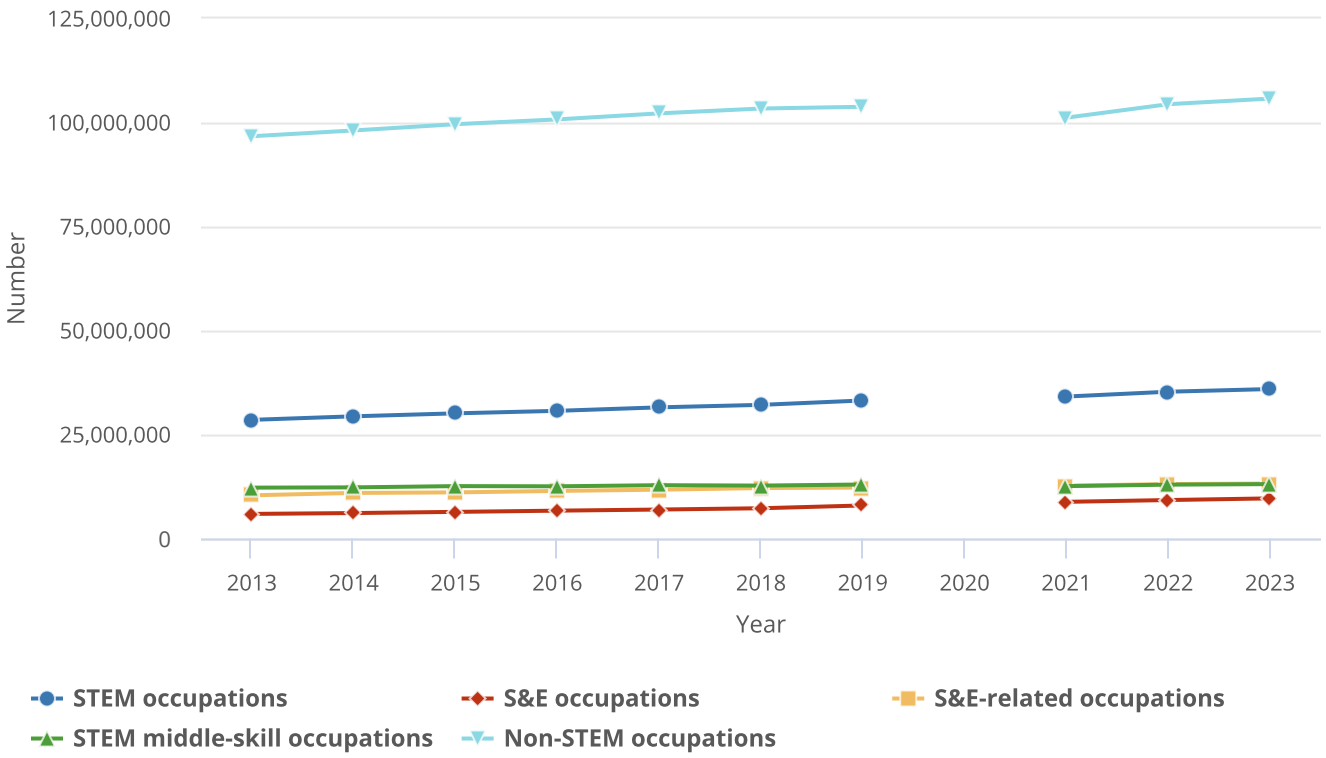
Source(s):
Ruggles S, Flood S, Sobek M, Backman D, Cooper G, Rivera Drew JA, Richards S, Rogers R, Schroeder J, Williams KCW, 2025, *IPUMS USA: Version 16.0 American Community Survey Five-Year File (2023)*, https://doi.org/10.18128/D010.V16.0.

Science and Engineering Indicators

Growth of the STEM Workforce

Between 2013 and 2023, employment in STEM occupations in the United States grew at a faster rate than non-STEM occupations. During this period, the STEM workforce increased by 26%, from 29 million to 36 million workers, whereas the non-STEM workforce increased by 9%, from 97 million to 106 million workers. The STEM workforce also increased as a share of the total workforce between 2013 (23%) and 2023 (25%). Within STEM occupations, the number of workers employed in S&E occupations increased most (63%) during this period, followed by S&E-related occupations (27%) and STEM middle-skill occupations (7%) (Figure TAL-9).

Figure TAL-9. Size of the workforce, by occupational group: 2013–23



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. Coding of occupations into STEM categories reflects changes to American Community Survey (ACS) occupation codes following the 2018 update to the Standard Occupational Classification implemented by the Bureau of Labor Statistics. Data from 2013 to 2017 use occupations from the 2010 occupation list, whereas data from 2018 to 2023 use occupations from the 2018 occupation list. Data for 2020 are not available due to the impact of the COVID-19 pandemic on ACS data collection for the survey year. Additional information is available at https://www.census.gov/programs-surveys/acs/data/experimental-data/2020-1-year-pums.html. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, ACS, 2013–19, 2021–23.

Science and Engineering Indicators

Growth of the STEM Workforce by State

Between 2013 and 2023, the share of the total workforce in each state and the District of Columbia employed in STEM occupations increased but varied widely among jurisdictions. Among states, the largest increases in the share of STEM workers between 2013 and 2023 were in North Dakota and Washington State (about 5 percentage points)—from 25% to 30% in North Dakota and 25% to 29% in Washington State (Table TAL-3; Table STAL-8). The smallest increase in the share of workers in STEM occupations was in Louisiana: 24% of its workforce was employed in STEM occupations in 2013 and 25% in 2023.

Table TAL-3. Share of STEM workforce, by state: 2013–23

(Percent)

State	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Alabama	24.1	23.8	24.6	24.5	24.6	25.1	25.1	NA	26.1	26.3	26.8
Alaska	22.4	24.5	22.8	25.9	23.6	23.7	26.1	NA	25.6	25.7	26.6
Arizona	22.4	22.1	22.1	22.2	21.7	22.6	22.9	NA	24.8	24.3	25.0
Arkansas	23.6	24.3	24.1	22.8	24.1	23.9	23.3	NA	25.3	24.8	24.9
California	21.4	21.6	21.7	22.1	22.3	22.4	23.2	NA	24.6	24.1	24.5
Colorado	23.9	24.5	24.9	24.3	25.1	25.3	26.2	NA	27.0	27.0	27.9
Connecticut	22.8	24.0	23.5	23.9	23.6	24.0	24.1	NA	25.3	25.8	25.9
Delaware	23.7	23.7	24.1	24.6	22.9	23.7	25.3	NA	25.0	25.3	25.7
District of Columbia	18.1	17.7	18.5	18.9	19.4	20.0	20.9	NA	20.6	22.0	22.6
Florida	20.0	20.3	20.6	21.0	21.2	21.5	21.8	NA	22.5	22.8	22.8
Georgia	22.0	22.7	22.6	22.7	22.7	22.9	22.9	NA	24.2	24.7	24.3
Hawaii	19.8	21.1	21.3	20.7	19.7	21.2	21.4	NA	22.4	22.8	23.4
Idaho	22.4	23.8	22.9	24.5	24.0	23.8	24.2	NA	24.9	26.1	24.1
Illinois	22.3	22.5	22.8	22.6	22.7	22.8	24.0	NA	24.6	24.6	24.5
Indiana	24.4	24.0	24.6	24.0	25.8	25.0	25.6	NA	26.9	27.2	27.6
Iowa	24.9	25.2	25.0	25.2	25.7	24.7	25.9	NA	26.1	26.7	27.3
Kansas	25.1	24.8	25.8	25.0	26.3	25.9	26.0	NA	26.6	25.9	26.4
Kentucky	23.3	23.6	24.3	25.0	23.4	24.2	26.0	NA	25.2	25.8	25.6
Louisiana	24.1	23.6	23.8	24.1	23.6	24.8	24.0	NA	25.1	25.1	25.0
Maine	23.4	23.1	24.1	23.9	22.9	24.3	25.5	NA	24.9	26.2	25.4
Maryland	24.9	25.8	25.5	25.6	26.2	25.9	27.1	NA	27.7	27.9	27.6
Massachusetts	24.8	25.6	24.8	25.8	25.7	26.1	26.3	NA	27.2	27.7	27.8
Michigan	24.3	24.7	25.2	25.6	25.7	25.6	26.3	NA	27.2	27.3	27.4
Minnesota	24.7	24.5	25.0	25.2	26.0	25.7	26.8	NA	27.4	27.3	27.8
Mississippi	21.7	23.4	23.4	23.7	24.9	24.5	24.4	NA	24.0	23.8	24.6
Missouri	22.6	23.9	23.6	23.8	24.0	24.1	25.2	NA	25.7	26.0	25.5
Montana	24.8	24.6	25.5	24.1	23.8	24.7	27.6	NA	26.2	26.8	27.2
Nebraska	25.3	25.7	24.7	25.1	25.4	24.8	26.3	NA	28.2	28.1	27.6
Nevada	17.7	17.0	17.5	17.9	17.5	18.1	18.2	NA	21.3	20.1	20.3
New Hampshire	26.7	25.9	27.5	26.4	27.0	28.0	28.6	NA	29.4	27.5	29.9
New Jersey	22.4	22.6	22.4	22.8	23.0	23.5	23.4	NA	24.4	25.0	24.3

Table TAL-3. Share of STEM workforce, by state: 2013–23

(Percent)

State	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
New Mexico	22.9	22.5	22.6	22.8	23.3	23.3	25.9	NA	25.5	25.8	24.7
New York	19.9	20.0	20.4	20.6	20.5	20.7	21.4	NA	22.5	22.3	22.2
North Carolina	23.8	23.7	24.4	24.3	24.4	24.5	24.8	NA	26.4	25.7	26.1
North Dakota	25.0	27.9	27.3	26.4	25.9	26.6	27.1	NA	27.7	26.9	30.1
Ohio	23.7	24.5	24.4	24.6	24.3	24.8	25.5	NA	25.9	26.3	26.8
Oklahoma	23.9	23.8	22.7	23.7	23.9	23.6	24.8	NA	25.1	25.5	25.5
Oregon	23.2	22.3	23.3	23.3	23.9	24.7	24.3	NA	26.2	26.1	26.9
Pennsylvania	23.9	24.1	24.1	24.2	24.7	24.4	25.3	NA	26.0	26.2	26.1
Rhode Island	23.3	23.3	22.5	24.5	23.2	22.8	24.8	NA	25.2	26.3	25.2
South Carolina	22.2	23.3	23.6	23.0	23.7	23.8	24.2	NA	25.5	25.2	24.4
South Dakota	24.8	24.4	24.1	27.7	25.4	25.9	26.1	NA	27.9	27.7	27.6
Tennessee	23.1	24.1	23.9	23.7	23.8	23.8	24.2	NA	24.6	25.6	25.0
Texas	22.9	23.2	23.2	23.0	23.8	23.6	23.2	NA	24.6	24.6	24.6
Utah	24.2	23.8	24.2	24.0	24.5	25.2	25.5	NA	25.6	25.6	26.3
Vermont	23.6	24.4	25.5	24.1	27.1	24.6	23.3	NA	27.7	28.5	26.5
Virginia	24.2	24.7	24.7	25.1	25.7	25.6	26.4	NA	27.1	27.0	26.8
Washington	24.6	24.6	25.1	25.7	26.0	25.7	27.1	NA	28.4	28.7	29.3
West Virginia	23.9	23.3	25.6	23.0	24.9	24.5	25.0	NA	25.4	25.7	26.1
Wisconsin	24.5	24.7	25.4	25.7	25.4	26.1	25.8	NA	26.9	27.6	28.0
Wyoming	24.7	23.7	23.9	25.4	23.5	25.9	25.4	NA	26.7	26.4	27.4

NA = not available.

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. Coding of occupations into STEM categories reflects changes to American Community Survey (ACS) occupation codes following the 2018 update to the Standard Occupational Classification implemented by the Bureau of Labor Statistics. Data from 2013 to 2017 use occupations from the 2010 occupation list, while data from 2018 to 2023 use occupations from the 2018 occupation list. Data for 2020 are not available due to the impact of the COVID-19 pandemic on ACS data collection for the survey year. Additional information is available at https://www.census.gov/programs-surveys/acs/data/experimental-data/2020-1-year-pums.html. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

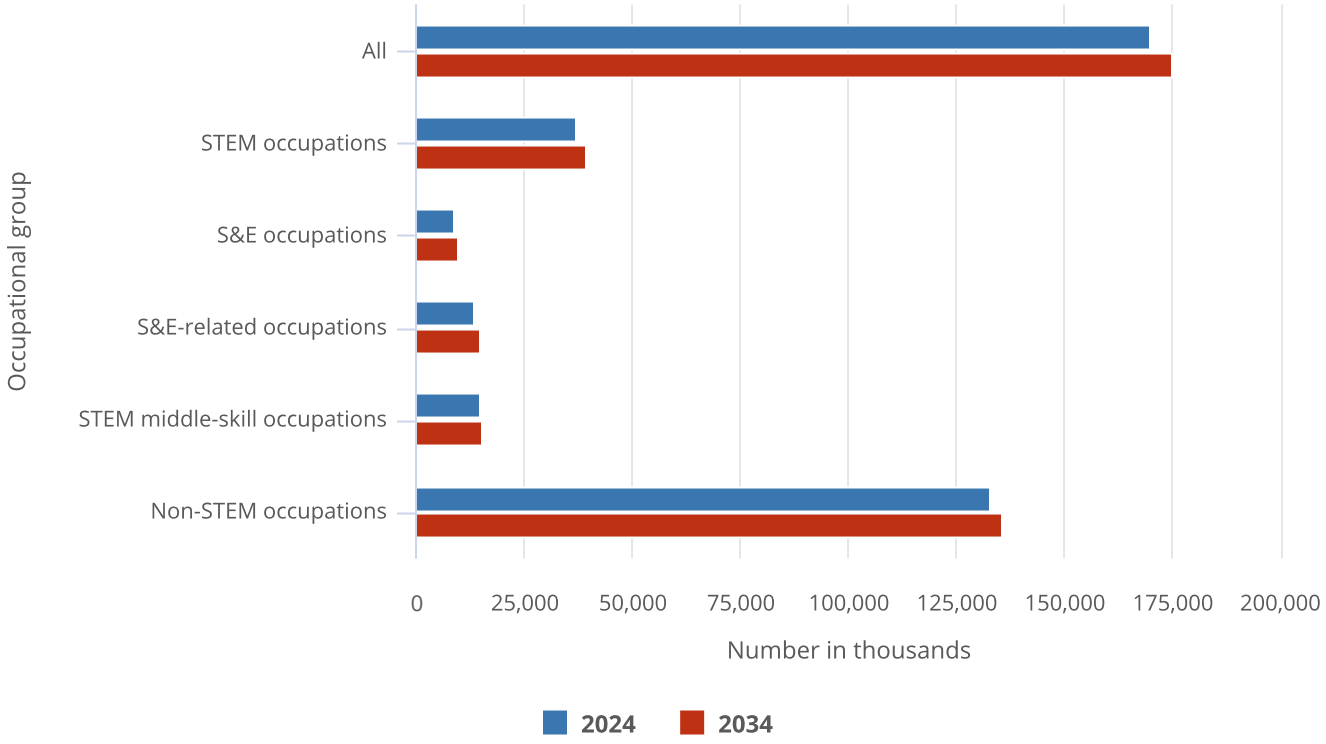
Source(s):
Census Bureau, ACS, 2013–19, 2021–23.

Science and Engineering Indicators

STEM Employment Growth Projections

Employment projections are indicators that provide insight into how the labor market might expand or contract. According to employment projections from the Bureau of Labor Statistics (BLS 2025c), general employment is projected to grow by 5.2 million jobs between 2024 and 2034, or 3%, with employment in STEM occupations projected to grow by 6% (Figure TAL-10).[7] S&E occupations are expected to grow by 9% during this period, the fastest among STEM occupations, followed by S&E-related (8%) and STEM middle-skill occupations (3%).

Figure TAL-10. Projected employment size, by occupational group: 2024 and 2034



STEM = science, technology, engineering, and mathematics.

Note(s):
Estimates of current and projected employment for 2024–34 are from the Bureau of Labor Statistics (BLS) National Employment Matrix; estimates in the matrix are developed using data from the Occupational Employment and Wage Statistics (OEWS) program and the Current Population Survey (CPS). Together, these sources cover paid workers and self-employed workers in all industries, agriculture, and private households. Because data are derived from multiple sources, they can often differ from employment data provided by OEWS, CPS, or other employment surveys alone. BLS does not make projections for S&E occupations as a group, nor does it do so for some of the S&E and S&E-related occupational categories as defined by the National Center for Science and Engineering Statistics (NCSES); numbers in the figure are based on the sum of BLS projections for occupations that NCSES includes in the respective categories. The STEM classifications used here differ slightly from those used in the American Community Survey due to additional occupation detail in the projections tabulations. A crosswalk will be provided upon request.

Source(s):
BLS, special tabulations (2025) of the 2024–34 Employment Projections.

Science and Engineering Indicators

Within S&E occupations, employment in data science is projected to have the highest (34%) growth between 2024 and 2034, followed by information security analysis (29%) and operations research analysts (21%) (Table STAL-9). The numbers of workers employed in network and computer system administration and in survey research are expected to decline the most (4% and 6%, respectively) by 2034. Within S&E-related occupations, the largest growth is expected in the numbers of workers employed as nurse practitioners (40%), medical and health services managers (23%), and actuaries (22%), and the largest decline is expected in the numbers of workers employed as computer programmers (6%), mechanical drafters (7%), all other drafters (7%), and nuclear technicians (8%). Employment is expected to grow the most by 2034 in two STEM middle-skill occupations: wind turbine service technicians and solar photovoltaic installers are projected to grow by 51% and 42%, respectively. However, nearly a third (33 of 104 STEM middle-skill occupations) of the STEM middle-skill occupational categories are projected to have no growth or to decline in employment during this period.

Foreign-Born STEM Workers in the United States

Overall Foreign-Born STEM Workforce

The U.S. STEM economy has become increasingly reliant on foreign-born talent, and these workers are widely considered to be crucial in maintaining the nation's competitiveness in the S&E enterprise (NSB 2020b). Foreign-born workers are defined as those born outside of the United States and its territories, regardless of citizenship status. Foreign-born workers are more highly represented in the U.S. STEM workforce than in the general workforce. In 2023, 29 million of the 142 million workers in the United States were foreign born, accounting for 20% of the general workforce (Table TAL-4; Table STAL-1). Of the 36 million STEM workers in the United States, 8 million were foreign born, accounting for 22% of the STEM workforce. Among foreign-born STEM workers, 34% were employed in S&E occupations, 31% in S&E-related occupations, and 35% in STEM middle-skill occupations. In comparison, 25% of U.S.-born STEM workers were employed in S&E occupations, 38% in S&E-related occupations, and 37% in STEM middle-skill occupations.

Table TAL-4. Workers, by region of birth and occupational group: 2023

(Number and percent)

Region of birth	All occupations	STEM occupations	S&E occupations (%)	S&E-related occupations (%)	STEM middle-skill occupations (%)	Non-STEM occupations
U.S.-born workers	112,664,585	28,144,254	25.0	38.4	36.7	84,520,331
Foreign-born workers	29,022,527	7,786,072	33.6	31.0	35.4	21,236,455
Latin America	14,559,058	2,941,904	13.7	21.1	65.2	11,617,154
Asia	8,788,439	3,259,311	50.4	35.5	14.1	5,529,128
Europe	3,175,896	887,264	39.1	34.6	26.3	2,288,632
Africa	1,821,853	504,521	30.0	49.8	20.3	1,317,332
Northern America	502,988	152,857	38.7	41.7	19.6	350,131
Oceania and at sea	174,293	40,215	34.5	32.6	32.9	134,078

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Region, Country, or Economy of Origin of Foreign-Born Workers

In 2023, the two largest countries or economies of origin for foreign-born STEM workers in the United States were Mexico (1.3 million) and India (1.0 million), which combined to represent 31% of all foreign-born STEM workers in the United States (Table TAL-5).[8] Among S&E workers, 45% of the foreign-born workforce was from three countries: India (727,625), China (309,759), and Mexico (128,863). For the 2.4 million foreign-born S&E-related workers in the United States, the Philippines (315,520), India (272,039), and Mexico (151,931) were the three top countries or economies of origin, accounting for 31% of all foreign-born workers in this category. Workers born in Mexico accounted for 38% of all foreign-born workers employed in STEM middle-skill occupations (1.1 million of 2.8 million total). All other countries or economies of origin each contributed 5% or less of the share of foreign-born workers in STEM middle-skill occupations.

Table TAL-5. Foreign-born workers, by selected region, country, or economy of origin and occupational group: 2023

(Number)

Region, country, or economy of origin	STEM occupations	S&E occupations	S&E-related occupations	STEM middle-skill occupations	Non-STEM occupations
Total	7,786,072	2,617,832	2,410,784	2,757,456	21,236,455
Mexico	1,336,893	128,863	151,931	1,056,099	5,322,200
India	1,041,654	727,625	272,039	41,990	852,600
China (including Hong Kong)	494,617	309,759	108,733	76,125	881,849
Philippines	466,310	82,441	315,520	68,349	816,288
Vietnam	225,850	78,392	79,047	68,411	582,960
El Salvador	180,553	11,829	23,845	144,879	746,132
Korea, not specified	175,861	69,848	75,817	30,196	417,790
Cuba	164,040	24,481	59,110	80,449	588,990
Germany	151,403	56,085	55,998	39,320	433,288
Canada	150,059	58,362	62,412	29,285	344,435
Guatemala	127,365	9,782	10,981	106,602	576,803
Jamaica	117,952	20,005	63,639	34,308	393,364
Colombia	117,177	27,628	39,738	49,811	502,539
Dominican Republic	112,209	16,545	27,818	67,846	593,075
Nigeria	107,220	28,985	66,304	11,931	224,792
Brazil	101,260	31,116	26,834	43,310	329,372
Haiti	99,827	11,849	57,016	30,962	367,315
Honduras	97,799	6,425	11,428	79,946	380,249
Venezuela	93,185	25,403	19,950	47,832	353,200
Iran	91,838	40,869	37,123	13,846	162,234
Taiwan	85,248	50,070	27,619	7,559	142,698
Pakistan	82,776	37,784	34,800	10,192	161,238
Ukraine	80,016	30,517	25,883	23,616	176,274
Japan	78,148	36,901	25,182	16,065	198,026
Russia	71,503	34,233	26,726	10,544	150,231
Poland	68,868	15,838	22,581	30,449	163,455
Peru	65,881	16,770	19,658	29,453	265,542
United Kingdom, not specified	61,577	30,883	22,641	8,053	144,253
England	59,309	23,213	22,063	14,033	169,373
Ecuador	58,995	9,048	12,018	37,929	275,648
All other regions, countries, and economies	1,620,679	566,283	606,330	448,066	4,520,242

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Citizenship Status of STEM Workers

In 2023, most (54%) foreign-born STEM workers from the top 30 countries or economies of origin were U.S. citizens, and most of the foreign-born U.S. citizen STEM workers were naturalized citizens (Table TAL-6). Foreign-born STEM workers from Vietnam, Jamaica, Poland, and the Philippines had the highest shares of naturalized citizens among their foreign-born populations. Mexico and India were the top two countries of origin for foreign-born STEM workers, and the majority of the workers from Mexico (64%) and India (59%) were not U.S. citizens.

Table TAL-6. Citizenship status of foreign-born STEM workers, by selected region, country, or economy of origin: 2023

(Number)

Region, country, or economy of origin	All foreign-born STEM workers	Native-born U.S. citizen	Naturalized U.S. citizen	Not a U.S. citizen
Mexico	1,336,893	32,425	445,056	859,412
India	1,041,654	6,949	418,474	616,231
China (including Hong Kong)	494,617	6,824	249,839	237,954
Philippines	466,310	22,931	352,118	91,261
Vietnam	225,850	4,969	192,673	28,208
El Salvador	180,553	2,098	61,578	116,877
Korea, not specified	175,861	9,823	112,201	53,837
Cuba	164,040	2,729	105,835	55,476
Germany	151,403	93,598	30,804	27,001
Canada	150,059	21,719	64,234	64,106
Guatemala	127,365	3,334	35,124	88,907
Jamaica	117,952	2,877	91,862	23,213
Colombia	117,177	2,618	70,033	44,526
Dominican Republic	112,209	4,068	67,447	40,694
Nigeria	107,220	3,826	77,775	25,619
Brazil	101,260	3,713	36,864	60,683
Haiti	99,827	3,593	72,886	23,348
Honduras	97,799	2,260	22,887	72,652
Venezuela	93,185	5,044	29,003	59,138
Iran	91,838	3,016	64,411	24,411
Taiwan	85,248	3,920	61,512	19,816
Pakistan	82,776	1,938	58,796	22,042
Ukraine	80,016	2,937	59,700	17,379
Japan	78,148	33,698	13,385	31,065
Russia	71,503	2,071	53,748	15,684
Poland	68,868	1,559	53,029	14,280
Peru	65,881	1,910	41,121	22,850
United Kingdom, not specified	61,577	9,289	29,892	22,396
England	59,309	13,890	29,155	16,264
Ecuador	58,995	1,211	27,168	30,616
All other countries and economies	1,620,679	114,364	1,043,585	462,730

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

Pathways to STEM Occupations

Credentialing: Certificates and Licenses

A postsecondary degree in a STEM field is the most common path to employment in a STEM occupation. However, not all STEM occupations require a STEM degree as a condition of employment. Nondegree training, such as career and technical education and apprenticeships that lead to credentialing, is another path to STEM employment. There are three main types of work credentials: educational certificates, professional certifications, and licenses. Educational certificates are typically awarded by an educational institution, such as a community college, and indicate the completion of a program of study. Professional certifications indicate that the worker possesses certain skills, abilities, or specializations and are awarded by

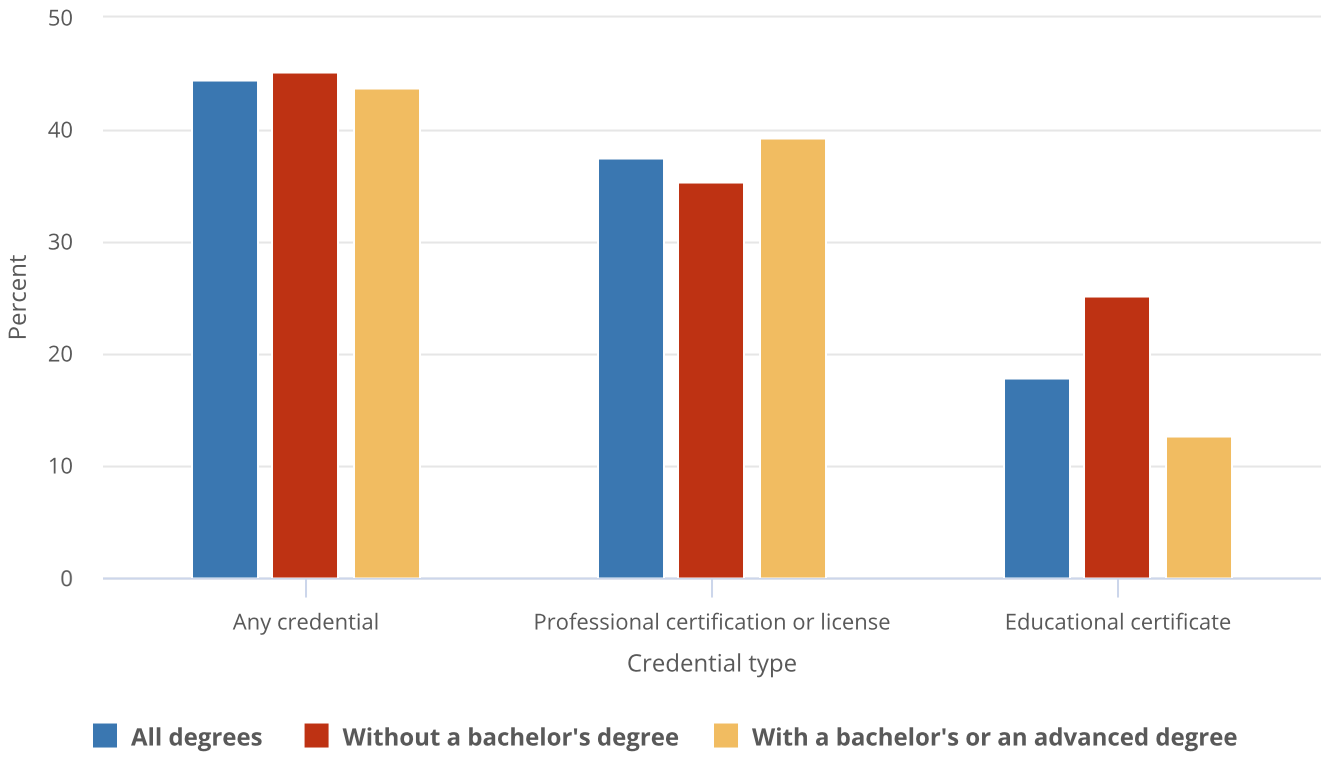
independent organizations that are often associated with a particular industry or profession (BLS n.d.). Some workers who may have professional certifications are project managers, software developers, and financial analysts (BLS 2019). Licenses are issued by a government agency and convey a legal authority to perform an occupation (BLS 2019). Licenses are prevalent in healthcare, legal, and educational occupations.

Many workers who obtain credentials realize economic and employment benefits. In general, workers with credentials enjoy wage premiums and lower rates of unemployment than workers without credentials (BLS 2025a, 2025b). Credentials, such as occupational licenses, may be a job market signal to employers of the worker's readiness for employment, level of technical training, and productivity (BLS 2019, 2023).

Data from the 2024 Census Bureau's Survey of Income and Program Participation (SIPP) was used to analyze the distribution of credentials among STEM workers. The SIPP is a longitudinal survey, and the 2024 survey in general uses 2023 as the reference year for monthly data collection (Census Bureau 2025b).[9] Estimates below are presented from month 12 of the reference year among respondents ages 25–75 years that had at least a high school diploma or GED.

Based on the 2024 SIPP data, 44% (16 million) of workers in the STEM workforce held a credential, with comparable proportions of STEM workers without a bachelor's degree holding a credential (45%) as those with a bachelor's or an advanced degree (44%) (Figure TAL-11; Table STAL-10). When credential type was considered, a slightly higher proportion of STEM workers with a bachelor's or an advanced degree held a professional certification or license (39%) than those without a bachelor's degree (35%). The opposite was true for educational certificates, where a much higher share of STEM workers without a bachelor's degree held an educational certificate than STEM workers with a bachelor's or an advanced degree (25% vs. 13%), and this pattern held across all occupational groups (Table STAL-10). Within STEM occupations, a much higher share of S&E-related workers held any credential (66%) than S&E workers (28%) or workers in STEM middle-skill occupations (38%).

Figure TAL-11. Share of STEM workers with credentials, by credential type and educational attainment: 2024



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 with at least a high school diploma or GED employed in the 12th month of 2023 and exclude those with only military occupations, those missing occupation data or who have not worked in the last 5 years, and those currently enrolled in primary or secondary school. Non-STEM occupations are not shown.

Source(s):
Census Bureau, Survey of Income and Program Participation (SIPP), Public-Use File, 2024.

Science and Engineering Indicators

Degree-Based Estimate of STEM Talent

The STEM workforce in this report is defined by the worker's occupation, which captures only those who are in the labor force. However, not all STEM-trained individuals enter the labor force, and not all members of the STEM-trained workforce work in STEM occupations. This section uses a degree-based definition to provide insight into the number of individuals with S&E and S&E-related training.[10]

In 2023, close to half (46%, 31 million) of the 25- to 75-year-old college-educated population with a bachelor's or an advanced degree had earned their highest degree in a STEM field (Table TAL-7). Of these individuals, about two-thirds (21 million) were in S&E fields and one-third (10 million) in S&E-related fields. Among S&E fields, social and related science was the most prevalent field of study (36%, 7 million), and physical and related sciences the least (5%, 1 million).

Table TAL-7. Measures of population with a bachelor's or an advanced degree, by field of study: 2023

(Number)

Field of study	All college-educated individuals
All highest degrees	67,495,000
Highest degree in a STEM field	30,711,000
Highest degree in an S&E field	20,555,000
Computer and mathematical sciences	4,009,000
Biological, agricultural, and environmental life sciences	3,253,000
Physical and related sciences	1,098,000
Social and related sciences	7,433,000
Engineering	4,762,000
Highest degree in an S&E-related field	10,156,000
Highest degree in a non-STEM field	36,784,000

STEM = science, technology, engineering, and mathematics.

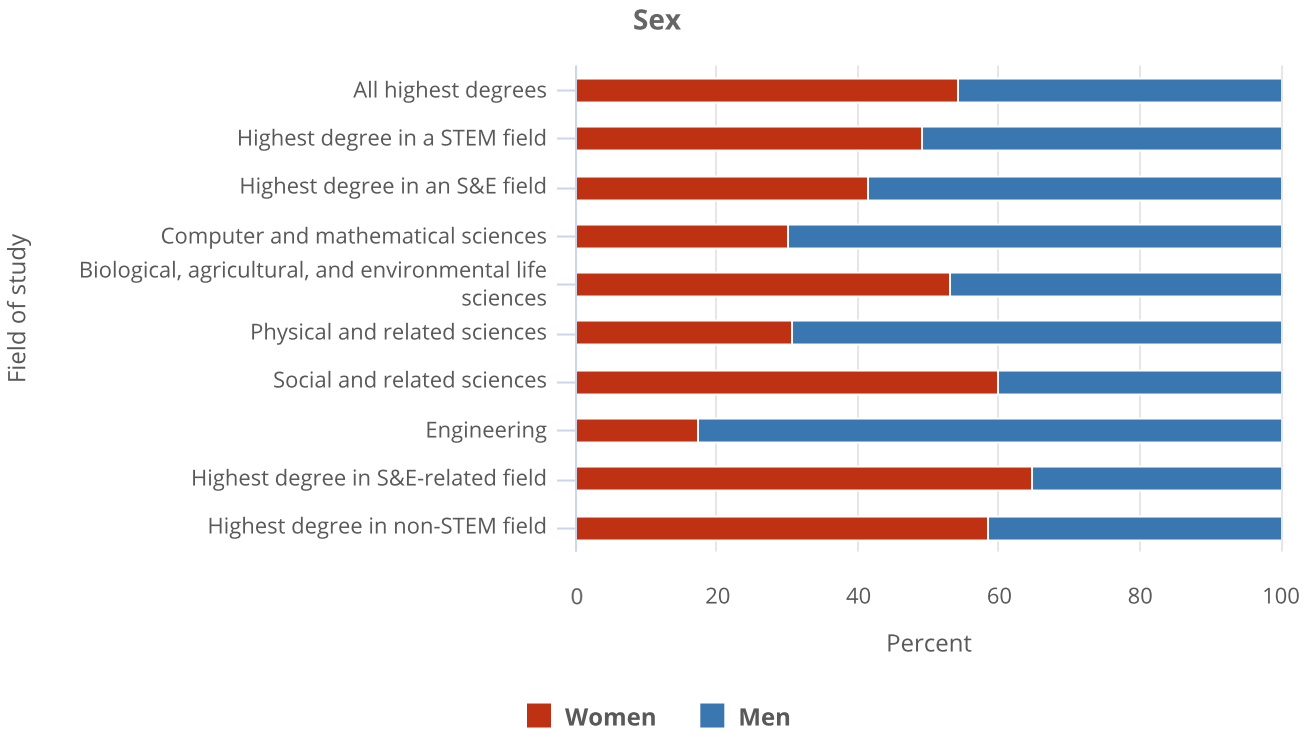
Note(s):
Data include civilians 25–75 years old.

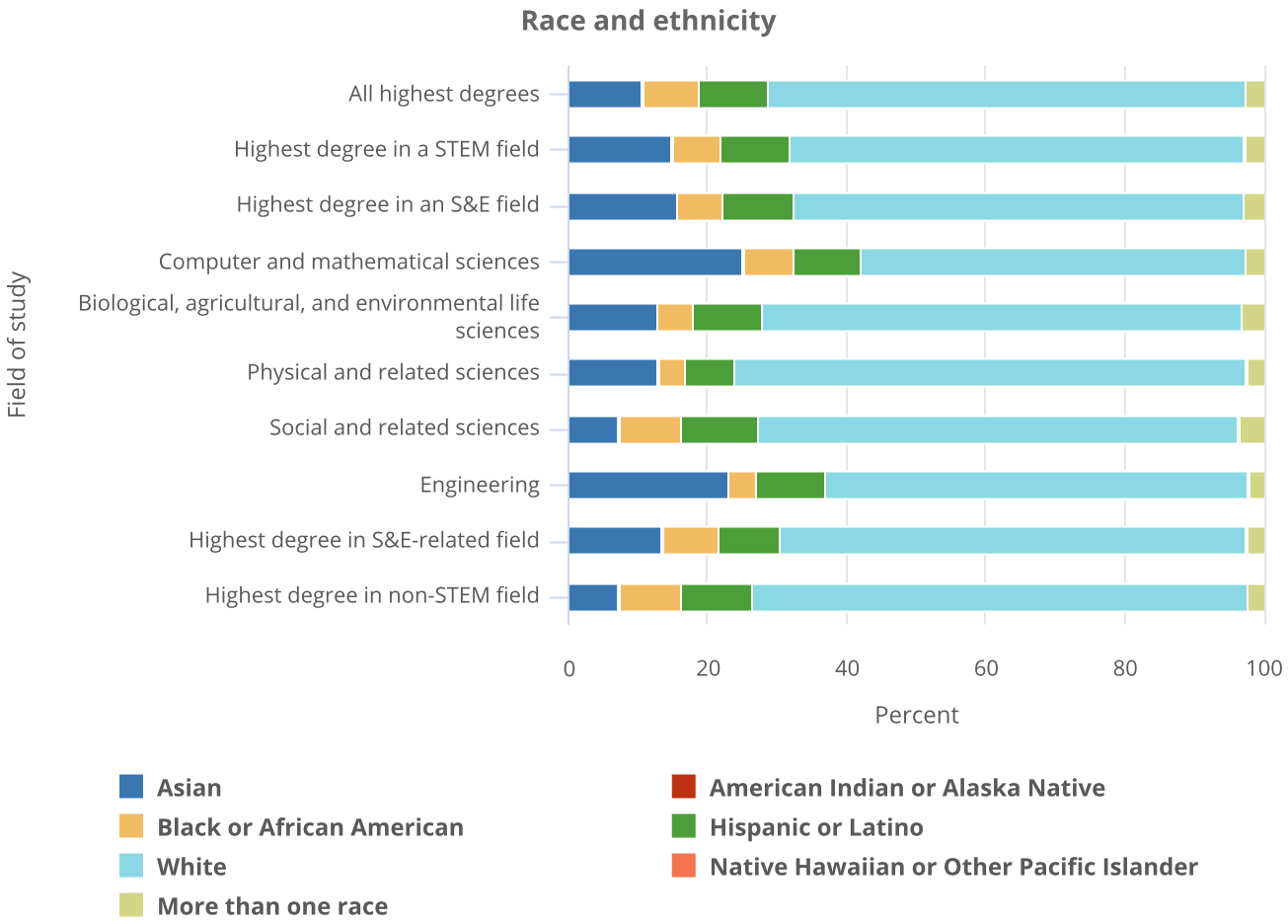
Source(s):
National Center for Science and Engineering Statistics, National Survey of College Graduates (NSCG), 2023.

Science and Engineering Indicators

Slightly more women with a bachelor's or an advanced degree (51%) earned their highest degree in a STEM field than men with a bachelor's or an advanced degree (49%) in 2023 (Figure TAL-12; Table STAL-11). Although men were the majority (58%) of those with highest degrees in S&E fields, women were the majority (65%) of those with highest degrees in S&E-related fields. Within S&E fields, more men than women earned their highest degrees in engineering (83%), computer and mathematical sciences (70%), and physical and related sciences (69%), whereas more women than men earned their highest degrees in social and related sciences (60%) and biological, agricultural, and environmental life sciences (53%). Women with a bachelor's or an advanced degree in 2023 also earned the majority of the highest degrees in non-STEM fields (59%) relative to men (41%).

Figure TAL-12. Measures of population with a bachelor's or an advanced degree, by field of study, sex, and race and ethnicity: 2023





STEM = science, technology, engineering, and mathematics.

Note(s):
Data include civilians 25–75 years old. Hispanic or Latino may be any race; race categories exclude Hispanic origin.

Source(s):
National Center for Science and Engineering Statistics, National Survey of College Graduates (NSCG), 2023.

Science and Engineering Indicators

White college-educated individuals comprised the majority of highest degree awardees in each field in 2023 (Figure TAL-12; Table STAL-11). Among all other demographic groups, composition varied by field. In S&E fields, specifically, Asian college-educated individuals were the second-most prevalent ethnic group after White college-educated individuals in all fields (ranging from 13% in both biological, agricultural, and environmental sciences and physical and related sciences to 25% in computer and mathematical sciences), except in social and related sciences. Within S&E fields, Hispanic (11%) and Black (9%) college-educated individuals were the second- and third-most prevalent demographic group, respectively, in social and related sciences. American Indian and Alaska Native college-educated individuals and Native Hawaiian and Other Pacific Islander college-educated individuals made up between 0.1% and 0.3% of college-educated individuals across all fields. College-educated individuals that reported more than one race represented between 2% and 3% of college-educated individuals across all fields.

STEM Workers in the Economy

All major industrial sectors of the U.S. economy employ STEM talent but at differing rates.[11] In 2023, the health care and social assistance sector (47%) and the utilities sector (46%) employed the highest shares of STEM workers among major industrial sectors (Table TAL-8; Table STAL-1). Major industries differed in the shares of workers in S&E, S&E-related, and STEM middle-skill occupations that they employed. The professional, scientific, and technical services sector and the information sector employed the highest shares of S&E workers, with 26% and 17% of their respective workforce in S&E occupations. The health care and social assistance sector employed the highest share of S&E-related workers, accounting for 43% of its workforce. The construction sector (37%) and the agriculture, forestry, fishing, and hunting sector (35%) employed the highest shares of STEM workers in STEM middle-skill occupations.

Table TAL-8. Workers in major industries, by occupational group: 2023

(Number and percent)

Major industries	All occupations	STEM occupations	STEM occupations (%)	S&E occupations (%)	S&E-related occupations (%)	STEM middle-skill occupations (%)	Non-STEM occupations (%)
All major industries	141,687,112	35,930,326	25.4	6.8	9.3	9.2	74.6
Agriculture, forestry, fishing and hunting	1,666,297	645,141	38.7	2.3	1.6	34.8	61.3
Mining, quarrying, and oil and gas extraction	584,842	242,207	41.4	9.4	4.1	27.9	58.6
Construction	10,134,690	4,049,690	40.0	1.9	1.0	37.0	60.0
Manufacturing	14,746,078	5,669,647	38.4	12.3	4.5	21.6	61.6
Wholesale trade	3,065,471	316,148	10.3	3.4	1.3	5.6	89.7
Retail trade	13,251,840	1,579,014	11.9	2.3	4.2	5.4	88.1
Transportation and warehousing	7,579,153	631,981	8.3	2.1	0.6	5.7	91.7
Utilities	1,336,871	611,096	45.7	13.7	5.3	26.7	54.3
Information	2,745,149	943,936	34.4	17.3	4.6	12.5	65.6
Finance and insurance	7,415,855	1,012,016	13.6	9.4	3.5	0.7	86.4
Real estate and rental and leasing	2,726,849	306,776	11.3	1.8	0.7	8.7	88.7
Professional, scientific, and technical services	12,719,816	4,824,213	37.9	26.1	9.2	2.7	62.1
Management of companies and enterprises	159,490	33,744	21.2	13.3	5.1	2.8	78.8
Administrative and support and waste management services	6,204,219	693,009	11.2	2.7	3.1	5.4	88.8
Educational services	13,668,402	1,258,962	9.2	3.8	4.1	1.3	90.8
Health care and social assistance	20,589,400	9,605,906	46.7	2.9	42.8	0.9	53.3
Arts, entertainment, and recreation	2,647,605	225,196	8.5	2.1	1.2	5.2	91.5
Accommodation and food services	6,525,274	487,343	7.5	0.5	0.3	6.7	92.5
Other services, except public administration	6,709,138	1,007,159	15.0	1.4	1.0	12.6	85.0
Public administration	7,210,673	1,787,142	24.8	10.6	5.5	8.6	75.2

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

Science and Engineering Indicators

The health care and social assistance sector also had the largest STEM workforce (9.6 million workers), accounting for over a quarter (27%) of the total STEM workforce. The top five industrial sectors by size of their workforces employed in STEM occupations—health care and social assistance; manufacturing; professional, scientific, and technical services; construction; and public administration—jointly accounted for 72% of the total STEM workforce in the United States.

Industrial Sectors and the Foreign-Born STEM Workforce

Foreign-born STEM workers are more prevalent in some major industrial sectors than the overall STEM workforce. Of the major industrial sectors where the share of workers employed in STEM occupations was greater than the average across all industries (25%), the professional, scientific, and technical services sector, the construction sector, and the information sector had the highest shares of STEM workers who were foreign born (27%, 27%, and 25%, respectively), and each had high shares of noncitizen STEM workers in the STEM workforce relative to other sectors with higher than average shares of STEM workers (12%, 18%, and 12%, respectively) (Table TAL-8, Table TAL-9; Table STAL-12). The proportions of foreign-born STEM workers in these three industrial sectors who were U.S. citizens (through birth or naturalization) relative to noncitizens differed, with native-born and naturalized U.S. citizens making up 34% of the STEM workers in construction, 51% of the STEM workers in information, and 54% of the STEM workers in professional, scientific, and technical services. Among the two largest major industrial sectors with high shares of STEM workers—health care and social assistance and utilities—foreign-born STEM workers made up 18% and 13%, respectively, of the STEM workforce (Table TAL-8, Table TAL-9). Within the foreign-born population in these industries, 78% were U.S. citizens in health care and social assistance and 65% in utilities. Over 70% of the foreign-born STEM workers in public administration (72%) and in health care and social assistance (71%) were naturalized citizens—the highest across all major industries.

Table TAL-9. STEM workforce and the educational attainment, citizenship status, and country or economy of the foreign-born STEM workforce, by major industry: 2023

(Number and percent)

Major industries	Workers (number)	STEM workers (number)	STEM workers (percent)	Foreign-born STEM workers (number)	Foreign-born STEM workers (percent)	Educational attainment of foreign-born STEM workers (percent)		Citizenship of foreign-born STEM workers (percent)			Top 3 countries or economies of origin of foreign-born STEM workers	Foreign-born STEM workers from top 3 countries or economies of origin (number)
						Without a bachelor's degree	With a bachelor's or an advanced degree	Native-born U.S. citizens	Naturalized U.S. citizens	Noncitizens		
Agriculture, forestry, fishing and hunting	1,666,297	645,141	38.7	75,981	11.8	80.7	19.3	5.1	35.0	59.8	Mexico, Guatemala, Vietnam	49,159
Mining, quarrying, and oil and gas extraction	584,842	242,207	41.4	35,073	14.5	56.1	43.9	7.7	42.0	50.3	Mexica, China, India	17,639
Construction	10,134,690	4,049,690	40.0	1,080,180	26.7	88.5	11.5	3.2	30.9	65.9	Mexico, El Salvador, Guatemala	635,464
Manufacturing	14,746,078	5,669,647	38.4	1,221,584	21.5	50.0	50.0	4.8	52.1	43.0	Mexico, India, China	498,809
Wholesale trade	3,065,471	316,148	10.3	76,762	24.3	60.9	39.1	5.4	43.6	51.0	Mexico, India, China	30,648
Retail trade	13,251,840	1,579,014	11.9	335,471	21.2	45.6	54.4	4.4	51.9	43.6	India, Mexico, China	129,643
Transportation and warehousing	7,579,153	631,981	8.3	138,589	21.9	60.4	39.6	6.0	56.4	37.6	Mexico, India, Philippines	46,657
Utilities	1,336,871	611,096	45.7	80,656	13.2	45.7	54.3	7.4	57.4	35.2	Mexico, India, Vietnam	26,861
Information	2,745,149	943,936	34.4	239,538	25.4	23.4	76.6	5.1	45.8	49.2	India, China, Mexico	102,815
Finance and insurance	7,415,855	1,012,016	13.6	299,198	29.6	12.1	87.9	3.8	55.5	40.7	India, China, Philippines	150,524
Real estate and rental and leasing	2,726,849	306,776	11.3	67,270	21.9	69.3	30.7	6.8	54.8	38.4	Mexico, Cuba, Dominican Republic	25,304
Professional, scientific, and technical services	12,719,816	4,824,213	37.9	1,282,516	26.6	13.3	86.7	5.8	48.0	46.2	India, China, Mexico	577,416
Management of companies and enterprises	159,490	33,744	21.2	8,585	25.4	5.8	94.2	9.0	40.1	50.9	India; China; Korea, not specified	4,091
Administrative and support and waste management services	6,204,219	693,009	11.2	160,294	23.1	53.8	46.2	6.3	45.0	48.7	Mexico, India, Philippines	56,908
Educational services	13,668,402	1,258,962	9.2	248,488	19.7	18.1	81.9	5.8	50.7	43.5	India, China, Mexico	80,023
Health care and social assistance	20,589,400	9,605,906	46.7	1,736,076	18.1	26.1	73.9	7.0	70.6	22.4	Philippines, India, Mexico	525,606
Arts, entertainment, and recreation	2,647,605	225,196	8.5	34,309	15.2	54.7	45.3	10.7	58.7	30.6	Mexico, China, Venezuela	11,306
Accommodation and food services	6,525,274	487,343	7.5	205,948	42.3	83.9	16.1	2.4	42.6	55.0	Mexico, China, Vietnam	89,915
Other services, except public administration	6,709,138	1,007,159	15.0	228,013	22.6	81.6	18.4	4.4	43.0	52.7	Mexico, El Salvador, Cuba	92,670
Public administration	7,210,673	1,787,142	24.8	231,541	13.0	25.8	74.2	10.5	71.8	17.8	Mexico, India, Philippines	58,626

STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations.

Source(s):
Census Bureau, American Community Survey (ACS), 2023.

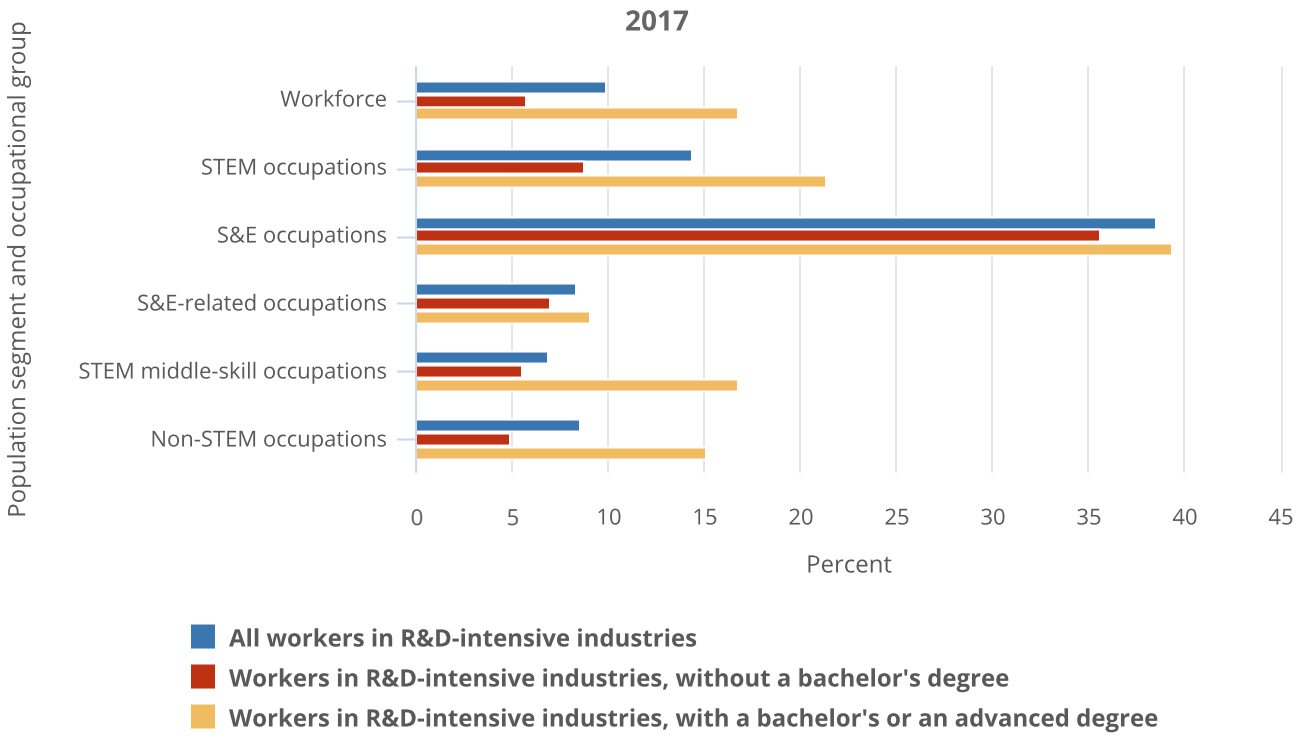
Science and Engineering Indicators

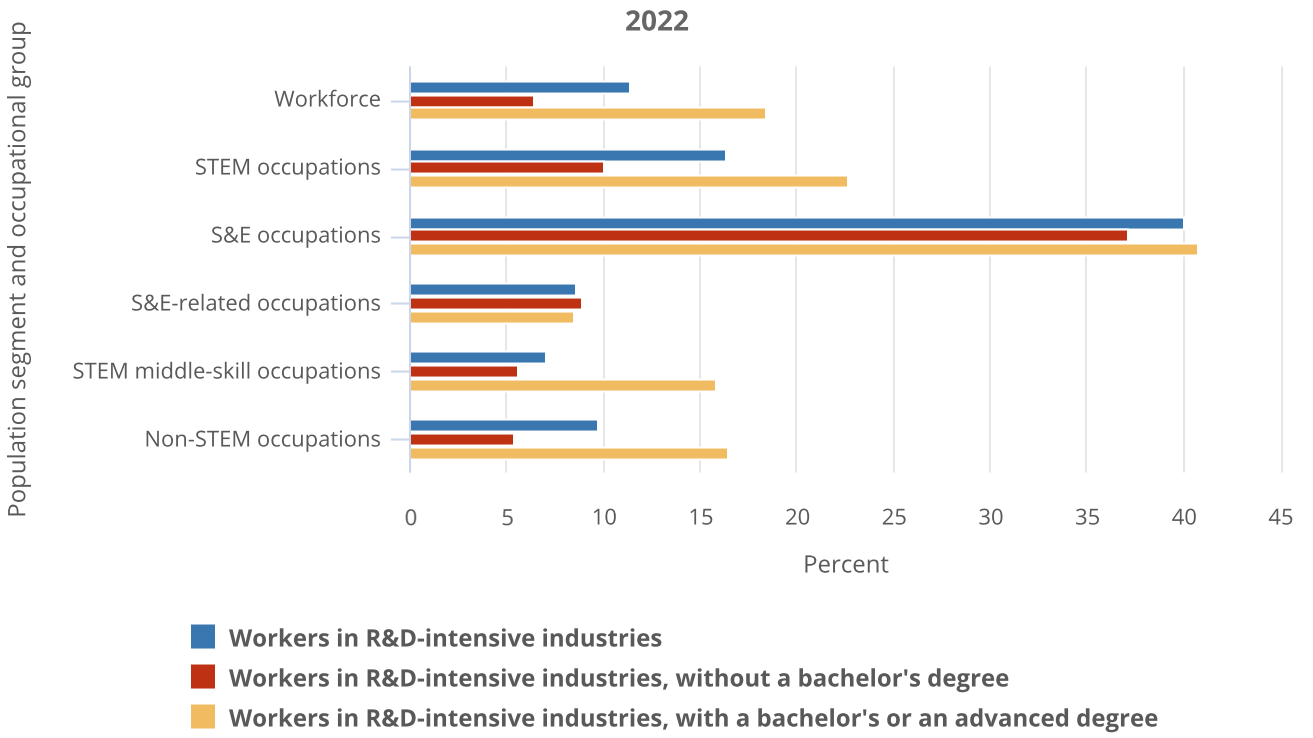
Workers in R&D-Intensive Industries

R&D intensity is a ratio of R&D expenses to sales. In this report, it is defined as the cost of domestic R&D paid for by the company and others outside of the company and performed by the company as a percentage of domestic net sales of companies that performed or funded R&D (NCSES 2024a). Using the Business Enterprise Research and Development (BERD) survey, R&D intensity is derived for selected North American Industry Classification System (NAICS) industries.[12] Industries that have an R&D intensity higher than the average across all listed industries are considered R&D-intensive.[13] These industries are then mapped onto modified NAICS codes in the ACS to identify a set of industries that were R&D-intensive using BERD 2022 data (Table STAL-13).

Using a set of industries identified as R&D-intensive in BERD 2022, 11% of the workers in the total workforce and 16% of the workers in the STEM workforce were employed in R&D-intensive industries in 2022 (Figure TAL-13; Table STAL-14). Using the same set of BERD 2022 R&D-intensive industries, 10% of the general workforce and 14% of the STEM workforce were employed in R&D-intensive industries in 2017 (Figure TAL-13). In 2022, over 40% of the workers in S&E occupations were employed in R&D-intensive industries, compared with 9% of workers in S&E-related and 7% in STEM middle-skill occupations. In 2017, these proportions were 39%, 8%, and 7%, respectively. Higher shares of workers in S&E and STEM middle-skill occupations with a bachelor's or an advanced degree were employed in R&D-intensive industries in 2022 than those without a bachelor's degree. The pattern was reversed for S&E-related workers. In 2017, across all occupational groups, higher shares of workers with a bachelor's or an advanced degree were employed in R&D-intensive industries than their counterparts without a bachelor's degree (Figure TAL-13; Table STAL-14).

Figure TAL-13. Share of workers in R&D-intensive industries, by occupational group: 2017 and 2022





STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the data. See Business Research and Development Survey (BRDS), 2017, Table 17 for the list of industries: https://ncses.nsf.gov/pubs/nsf20311/table/17. Data in the BRDS table withheld to avoid disclosing operations of individual companies are not included in the analysis. For the correspondence of North American Industry Classification System (NAICS) codes to modified NAICS codes (NAICSP), see https://www.census.gov/programs-surveys/acs/microdata/documentation.html. As a result of these conversions, the list of industries used in this report may not be identical to the industries listed in the BRDS table. Data from 2017 use codes from the 2012 version of NAICS industries. Conversion from NAICS to modified NAICS codes may not be a one-to-one match and may include additional components.

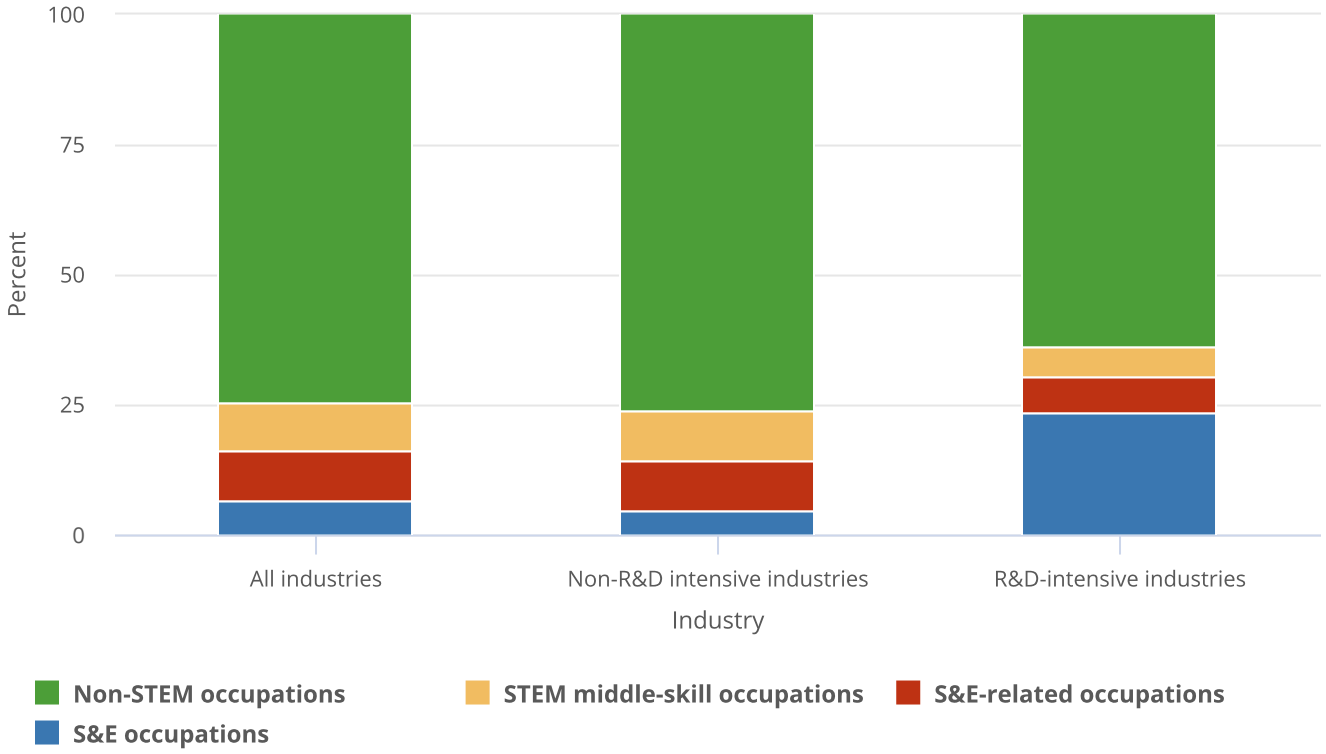
Source(s):
Census Bureau, American Community Survey (ACS), 2017, 2022.

Science and Engineering Indicators

Occupational Composition of R&D-Intensive Industries

STEM workers are highly represented in R&D-intensive industries. In 2022, 36% of workers in R&D-intensive industries (6 million individuals) were in STEM occupations (Figure TAL-14; Table STAL-14). About a quarter (23%) of the workers in R&D-intensive industries were in S&E occupations. The proportion of S&E workers in R&D-intensive industries was close to 6 times higher than that of S&E workers in non–R&D-intensive industries (4%)—the most pronounced difference between industries among all occupational groups.

Figure TAL-14. Share of workers in occupational groups, by R&D intensity: 2022



STEM = science, technology, engineering, and mathematics.

Note(s):
Data include the employed, civilian, noninstitutionalized population ages 25–75 not currently in primary or secondary school. Missing occupations and those who have not worked in the past 5 years or have never worked are not included in the workforce data. STEM includes S&E, S&E-related, and STEM middle-skill occupations. See Business Enterprise Research and Development (BERD), 2022, Table 17 for list of industries: https://ncses.nsf.gov/pubs/nsf24335/table/17. Data in the BERD table withheld to avoid disclosing operations of individual companies are not included the analysis. For the correspondence of NAICS codes to modified NAICS codes (NAICSP), see https://www.census.gov/programs-surveys/acs/microdata/documentation.html. As a result of these conversions, the list of industries used in this report may not be identical to the industries listed in the BERD table. Data from 2022 use codes from the 2017 version of NAICS industries. Conversion from NAICS to modified NAICS codes may not be a one-to-one match and may include additional components.

Source(s):
Census Bureau, American Community Survey (ACS), 2022.

Science and Engineering Indicators

Path to STEM Employment

The path to STEM employment starts early and can be complex, with many junctions where an individual may choose between continuing along the path of STEM education and employment or seeking other options. Indicators highlight numerous factors, including academic performance, teacher quality, and access to advanced courses at the K–12 level, that affect students' STEM experience at the K–12 level and STEM degree attainment, ranging from associate's to doctoral degrees in higher education.

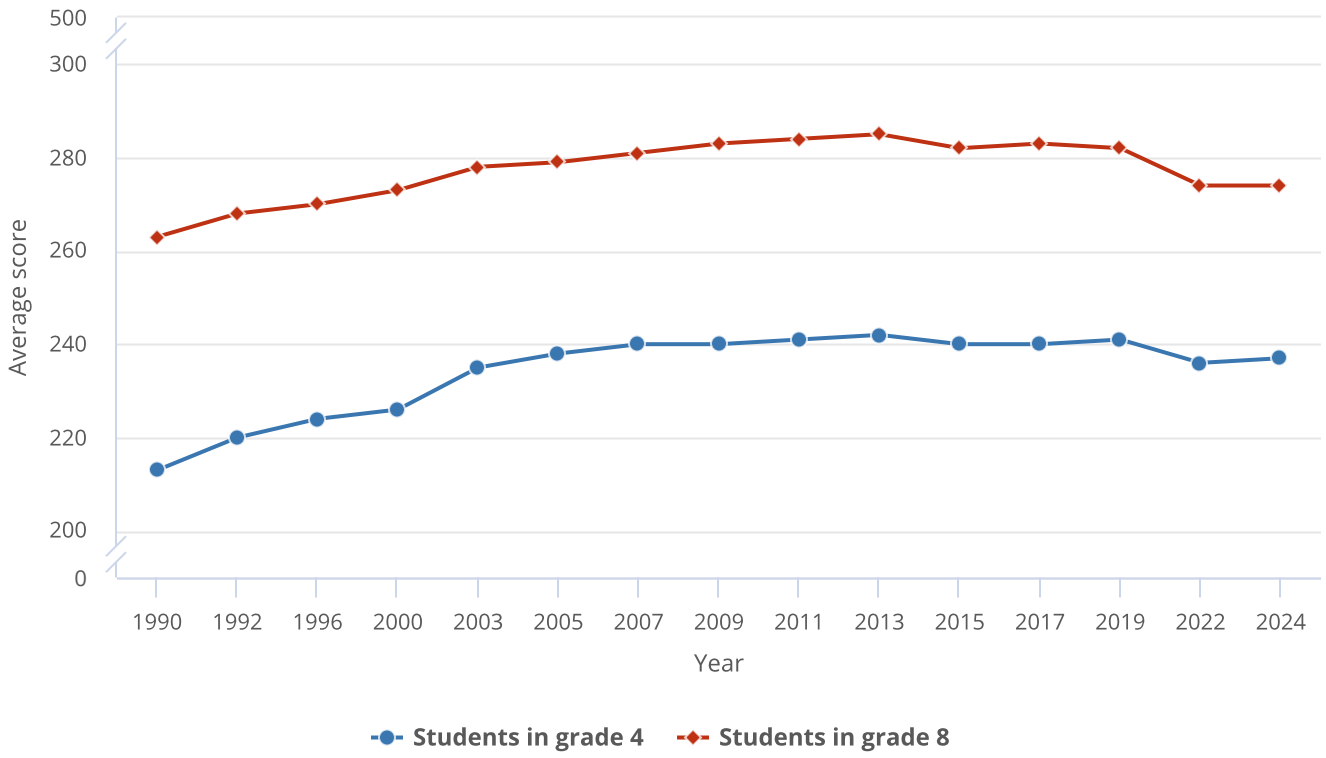
K–12 STEM Education

The National Assessment of Educational Progress (NAEP) mathematics assessment tracks student academic performance over time and is administered every 2 years to nationally representative samples of fourth- and eighth-grade students in the United States and every 4 years to a nationally representative sample of 12th-grade students.[14] This section presents scores for the 2024 assessments and includes comparisons to scores in 2019 and 2022 to understand the impact of the COVID-19 pandemic on student academic performance.

Results for Students in Grades 4 and 8

The 2022 NAEP mathematics assessment revealed a decline in average scores for all fourth- and eighth-grade students compared with pre-pandemic scores in 2019. The NAEP mathematics assessment data gathered in 2024 indicate a slight recovery since 2022 in average mathematics performance among fourth graders, but the decline from the pre-pandemic benchmark of 2019 continues for both grade levels (Figure TAL-15). The 5-point difference in fourth-grade average scores from 2019 to 2022 improved to a 3-point difference from 2019 to 2024, whereas the 8-point difference in eighth-grade average scores from 2019 to 2022 remained unchanged in 2024.

Figure TAL-15. Average scores of students in grades 4 and 8 on the main NAEP mathematics assessment: 1990–2024



NAEP = National Assessment of Educational Progress.

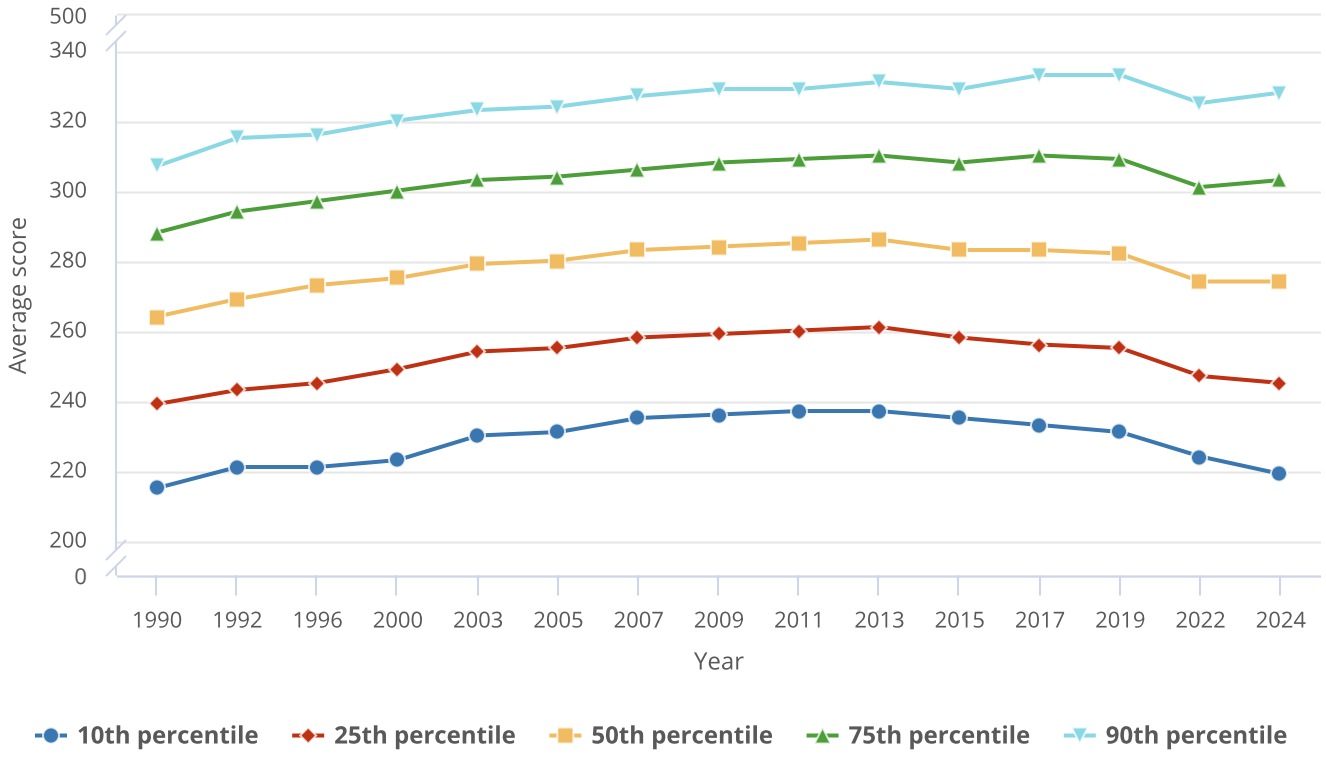
Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grades 4 and 8.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 1990, 1992, 1996, 2000, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2022, and 2024 main NAEP mathematics assessments, National Center for Education Statistics.

Science and Engineering Indicators

For both grade levels, the mathematics scores for students at the 10th percentile showed either declines or no changes between 2022 and 2024, whereas the scores of students at the 90th percentile increased. The gaps between the scores at the 10th and 90th percentiles at both grade levels in 2024 widened to the largest gaps since the NAEP assessment began in 1990 (Figure TAL-16; Table STAL-15, Table STAL-16). These results suggest some learning recovery for higher-performing students between 2022 and 2024 but no recovery for lower-performing students. In 2024, full returns to pre-pandemic performance were observed only at the 75th and 90th percentiles of mathematics scores for fourth-grade students.

Figure TAL-16. Average scores of students in grade 8 on the main NAEP mathematics assessment, by percentile: 1990–2024



NAEP = National Assessment of Educational Progress.

Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grade 8.

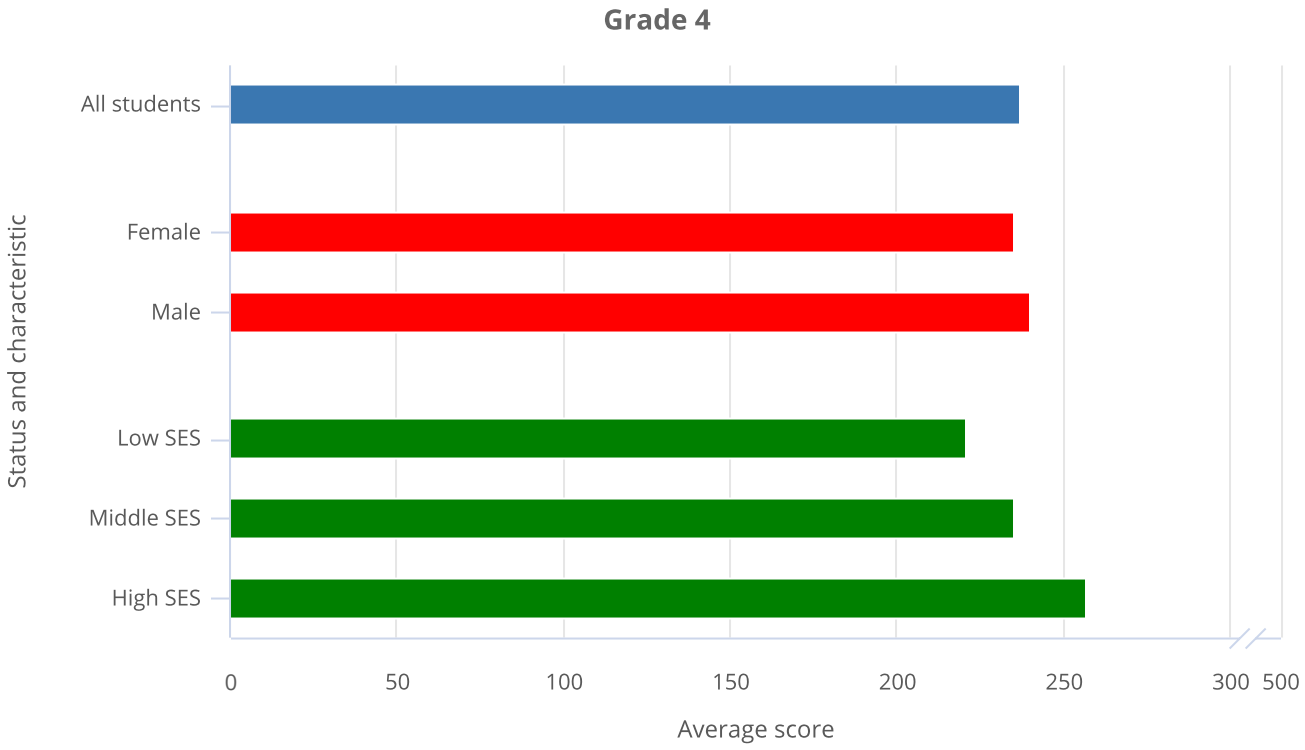
Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 1990, 1992, 1996, 2000, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2022, and 2024 main NAEP mathematics assessments, National Center for Education Statistics.

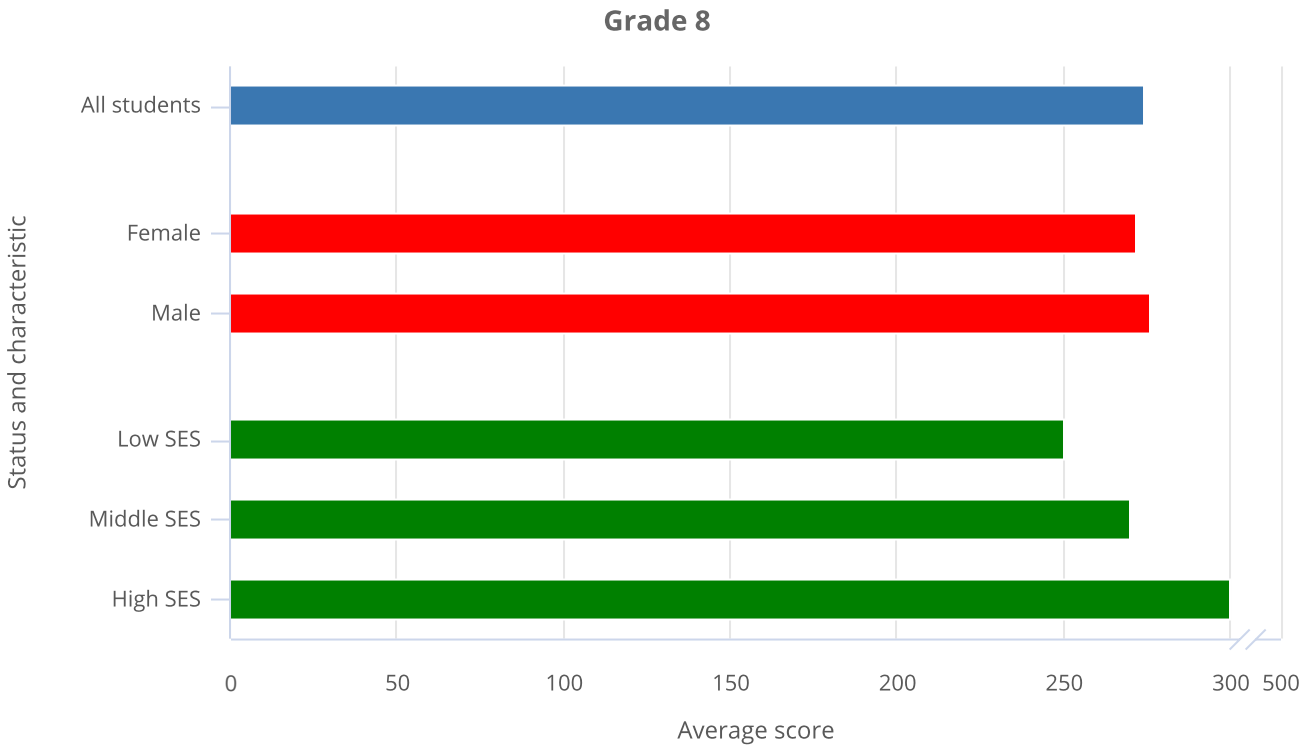
Science and Engineering Indicators

Variations in Scores by Student, Teacher, and School Factors

NAEP mathematics results in 2024 show differences in average student performance associated with student, school, and teacher factors. Male students scored higher than female students at both grade levels, as did high socioeconomic status (SES) students compared with low SES students (Figure TAL-17).[15]

Figure TAL-17. Average scores of students in grades 4 and 8 on the main NAEP mathematics assessment, by sex and socioeconomic status: 2024





NAEP = National Assessment of Educational Progress; SES = socioeconomic status.

Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grade 4 and grade 8. In 2024, NAEP introduced a comprehensive measure of SES, an SES index, comprised of three components: (1) the student's economically disadvantaged status, (2) the percentage of students eligible for the National School Lunch Program at the school the student is attending, and (3) the number of books at the student's home.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 2024 main NAEP mathematics assessments, National Center for Education Statistics.

Science and Engineering Indicators

Asian and White students posted the highest scores at both grade levels (Table TAL-10). Students with more-experienced teachers scored higher than students with less-experienced teachers, as did students taught by teachers with traditional certifications rather than teachers with alternative certifications (Figure TAL-18). Students who attended schools with extracurricular mathematics enrichment activities, including mathematics club competitions, scored higher than students who attended schools without these activities (Table STAL-17).

Table TAL-10. Average scores of students in grades 4, 8, and 12 on the main NAEP mathematics assessment, by race or ethnicity: 2024

(Average score)

Status and characteristic	Grade 4	Grade 8	Grade 12
All students	237	274	147
American Indian or Alaska Native	218	252	131
Asian	259	308	177
Black	220	252	125
Hispanic	227	258	133
Native Hawaiian or Other Pacific Islander	221	258	s
Two or more races	241	278	152
White	247	286	157

s = suppressed for reasons of confidentiality and/or reliability.

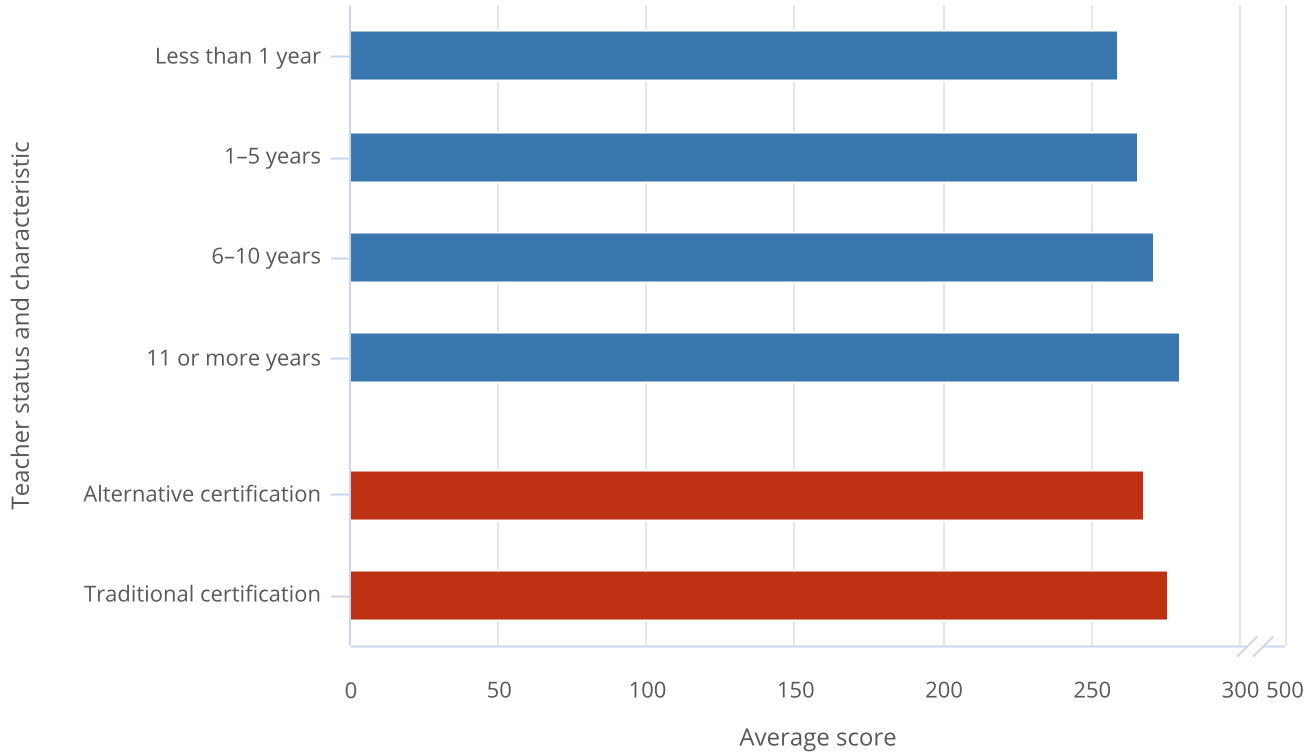
NAEP = National Assessment of Educational Progress.

Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grade 4 and grade 8 and 0–300 for grade 12. Black includes African American. Hispanic includes Latino. Hispanic may be any race; race categories exclude Hispanic origin.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 2024 main NAEP mathematics assessments, National Center for Education Statistics.

Science and Engineering Indicators

Figure TAL-18. Average scores of students in grade 8 on the main NAEP mathematics assessment, by teacher characteristics: 2024



NAEP = National Assessment of Educational Progress.

Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grade 8. Data shown are for students allowed to use testing accommodations.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 2024 NAEP mathematics assessment, National Center for Education Statistics.

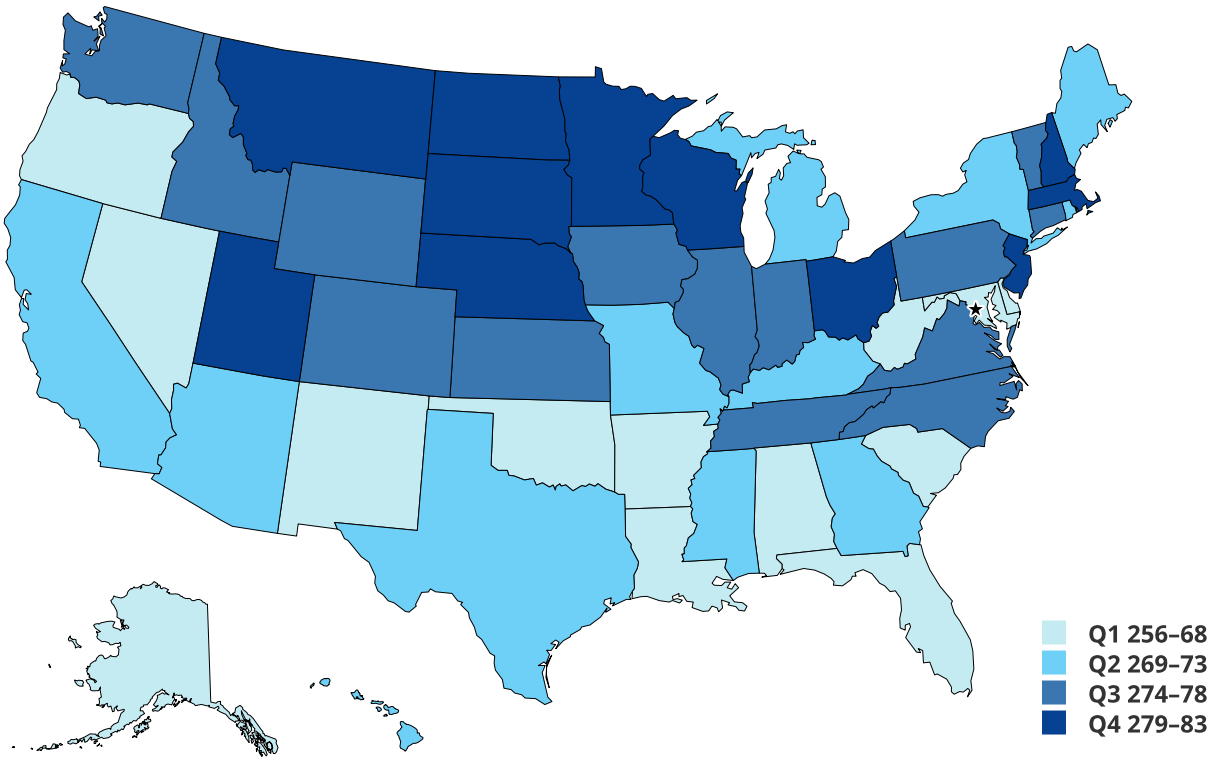
Science and Engineering Indicators

Variations in Scores by Geography

Average student scores in 2024 varied by geographic factors, including school location, census division, and state. Fourth- and eighth-grade students in suburban and rural areas scored higher in 2024 than students in towns and urban areas. Students in both grades who attended suburban schools posted the highest scores (Table STAL-18). In 2024, fourth-grade students in the West scored lower than students in all three other U.S. Census Bureau regions. At the state level, eighth-grade

students in Massachusetts, Wisconsin, Minnesota, New Jersey, and Utah were among the highest-scoring students, whereas students in Alabama, the District of Columbia, West Virginia, and New Mexico were among the lowest (Figure TAL-19). State-level data and other geographic analyses on mathematics and science achievement can be found in Science and Engineering Indicators: State Indicators.

Figure TAL-19. Average scores of students in grade 8 on the main NAEP mathematics assessment, by state: 2024



NAEP = National Assessment of Educational Progress; Q = Quartile.

Note(s):
The scale for NAEP mathematics assessment scores is 0–500 for grade 8.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the 2019, 2022, and 2024 main NAEP mathematics assessment, National Center for Education Statistics.

Science and Engineering Indicators

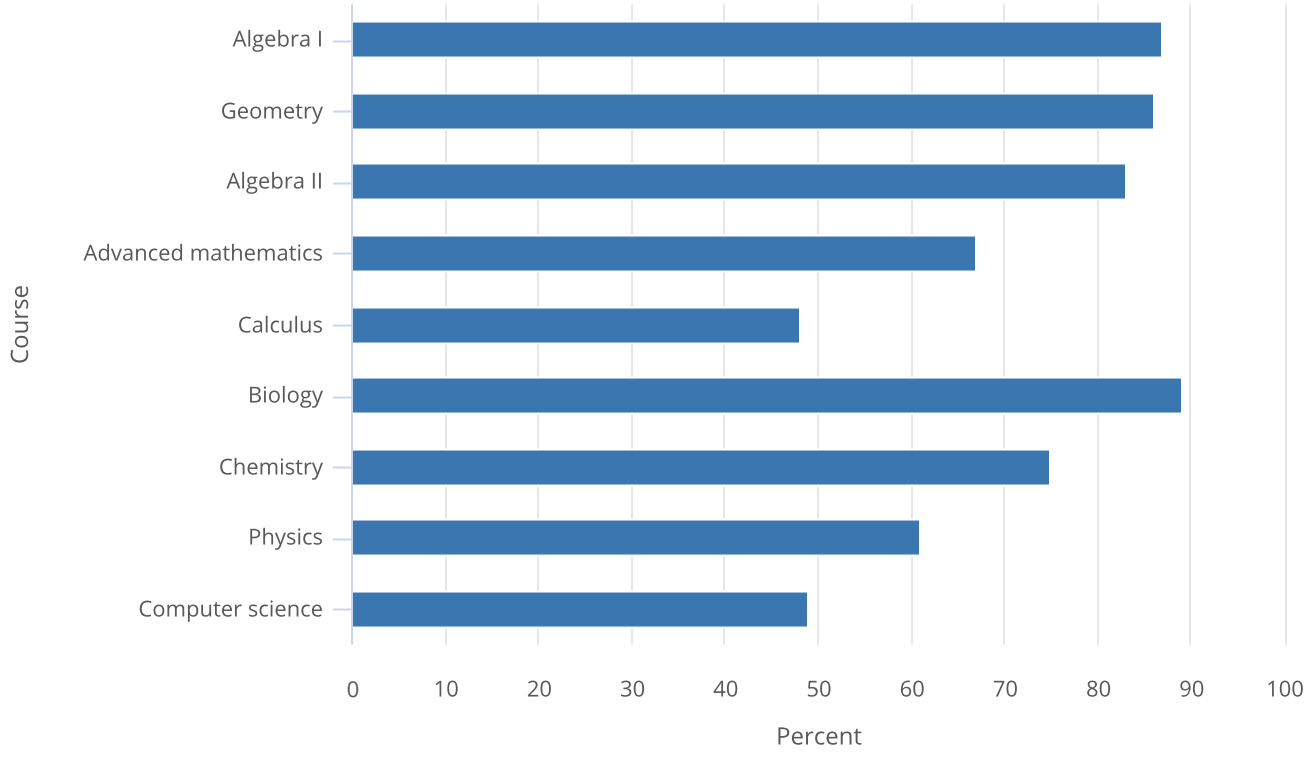
Results for Students in Grade 12

NAEP mathematics assessments results for 12th-grade students show similar patterns to those for fourth- and eighth-grade students. The average score in 2024 for 12th-grade students was 3 points lower than in 2019 and lower than all years since the current mathematics assessment framework was instituted in 2005, suggesting an adverse impact of the COVID-19 pandemic on 12th-grade students' academic performance (Table STAL-19). Students at the 90th percentile scored the same in 2024 as in 2019, whereas students at the 10th percentile scored 4 points lower, resulting in the largest gap between higher- and lower-performing students since the current assessment began in 2005 (Table STAL-16). Score differences among male and female 12th-grade students also reflected patterns observed among fourth- and eighth-grade students; the average score for male students was 5 points higher than the average score for female students.

STEM Course Access and Enrollment

The 2020–21 Civil Rights Data Collection (CRDC) is a survey of all public school districts and schools serving students in preschool through grade 12 in the United States. It provides data about public high school students' access to STEM courses and their enrollment in those courses. Statistics cited here are from the 2020–21 CRDC report (Department of Education 2024), which includes data for the 26,200 public high schools in the United States enrolling approximately 17 million students. During the 2020–21 school year, more than 80% of high schools offered algebra I, algebra II, geometry, and biology; 75% offered chemistry; 67% offered advanced mathematics; and 61% offered physics (Figure TAL-20). Less than 50% of schools offered calculus or computer science. Access to these courses varied by student and school characteristics. At the student level, 69% of Asian students, 55% of White students, 51% of Hispanic students, and 47% of Black students attended high schools that offered a full range of mathematics, science, and computer science courses. At the school level, approximately 35% of schools with high enrollments of Black and Hispanic students (i.e., more than 75% of students) offered calculus, compared with 54% of schools with low enrollments of Black and Hispanic students (i.e., less than 25% of students).

Figure TAL-20. Public high schools offering mathematics, science, and computer science courses: 2020–21



Source(s):
Department of Education, Office for Civil Rights, 2020–21 Civil Rights Data Collection, released November 2023, available at https://civilrightsdata.ed.gov.

Science and Engineering Indicators

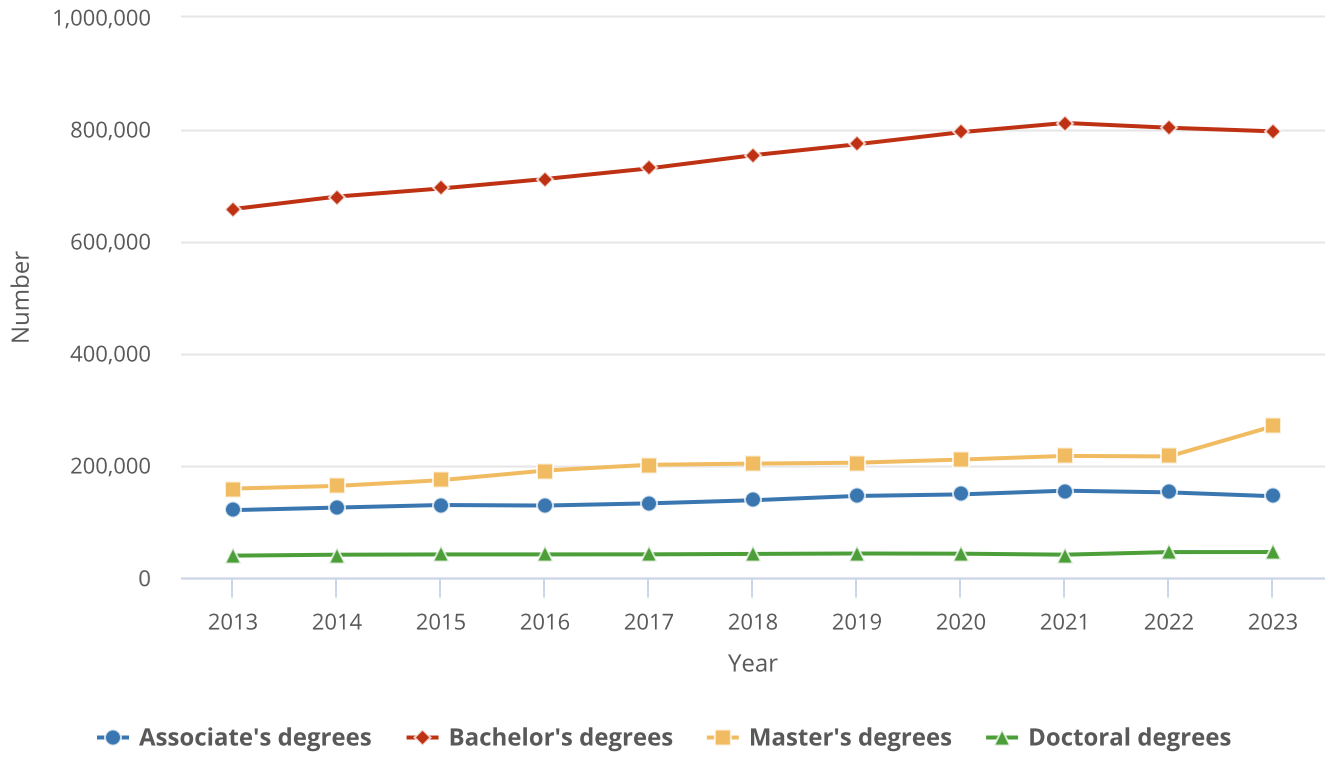
Approximately 2.9 million public high school students across the nation were enrolled in at least one Advanced Placement (AP) course in mathematics, science, or computer science during the 2020–21 school year. Student enrollment in AP STEM courses differed by race or ethnicity. For example, Asian students represented 5% of total high school student enrollment but accounted for 17% of students enrolled in AP science and AP mathematics courses. Black students represented 15% of total high school student enrollment but accounted for 8% of students enrolled in AP science and 6% of students enrolled in AP mathematics courses.

For more information about the CRDC mathematics, science, and computer science course enrollment, see Department of Education (2024).

STEM Degrees

Counts of STEM higher education degrees approximate a potential supply of workers for employment in the STEM workforce.[16] Between 2013 and 2023, the number of S&E awards conferred by U.S. postsecondary institutions increased at all levels (Figure TAL-21). The number of S&E associate's degrees and the number of S&E bachelor's degrees awarded increased by 21% each during this period, the number of S&E master's degrees increased by 70%, and the number of S&E doctoral degrees increased by 17%. At all degree levels, the growth in S&E degree completions between 2013 and 2023 was higher than the growth in the college-age population during the same period.[17]

Figure TAL-21. S&E awards conferred, by award level: 2013–23



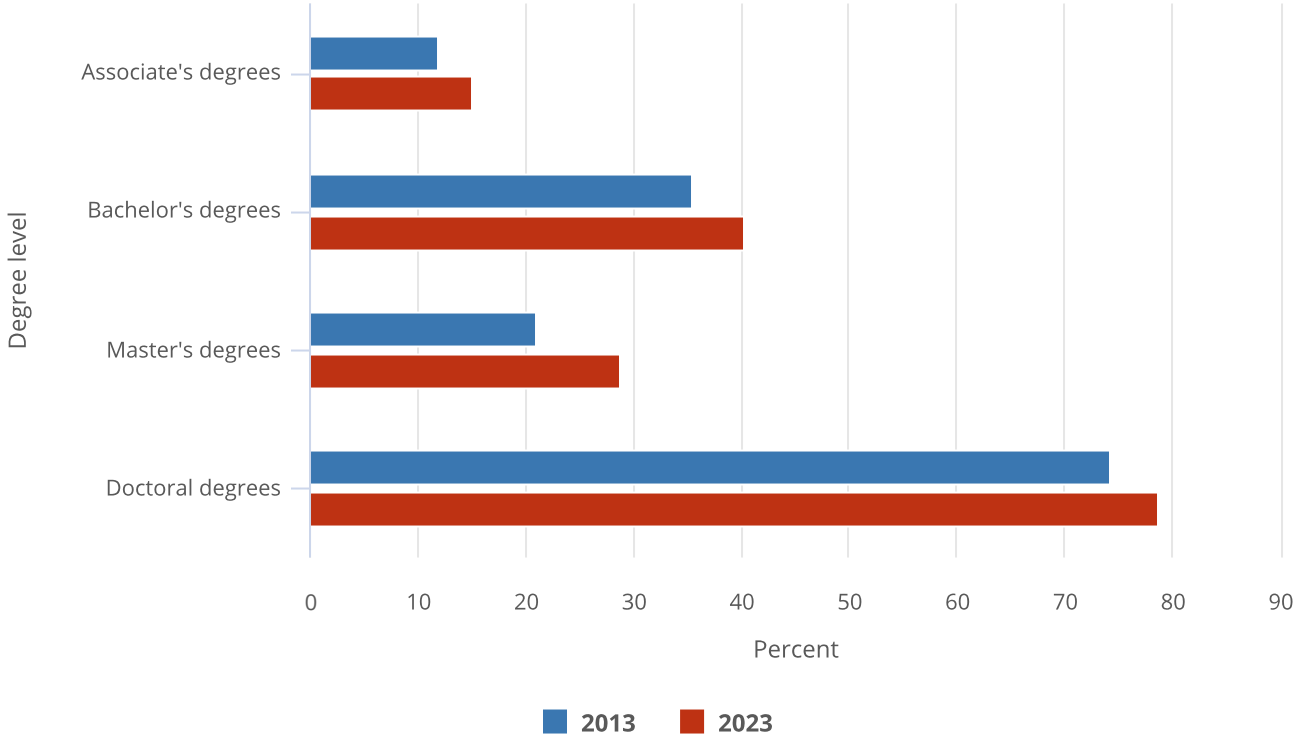
Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels are based on institutions eligible to participate in Title IV federal financial aid programs. Doctoral degree data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The SED survey data collection for field of study changed in 2021, which may affect the data comparability across years. The SED data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the trend field taxonomy that facilitates trend data comparisons with prior years; for more information, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data, and NCSES, SED, 2023.

Science and Engineering Indicators

The increase in the number and share of S&E degree awards reflects a growing population and representation of postsecondary students in S&E fields. The share of S&E master's degrees awarded increased at the highest rate among all award levels, from 21% of all master's degrees awarded in 2013 to 29% in 2023 (Figure TAL-22). The share of awards in S&E fields at the associate's, bachelor's, and doctoral levels also increased but to a lesser degree. Doctoral degrees in S&E fields account for the vast majority (79%) of all doctoral degrees awarded in 2023, whereas S&E degrees do not account for the majority of degrees awarded at any other level.

Figure TAL-22. S&E degrees as a percentage of total degrees awarded: 2013 and 2023



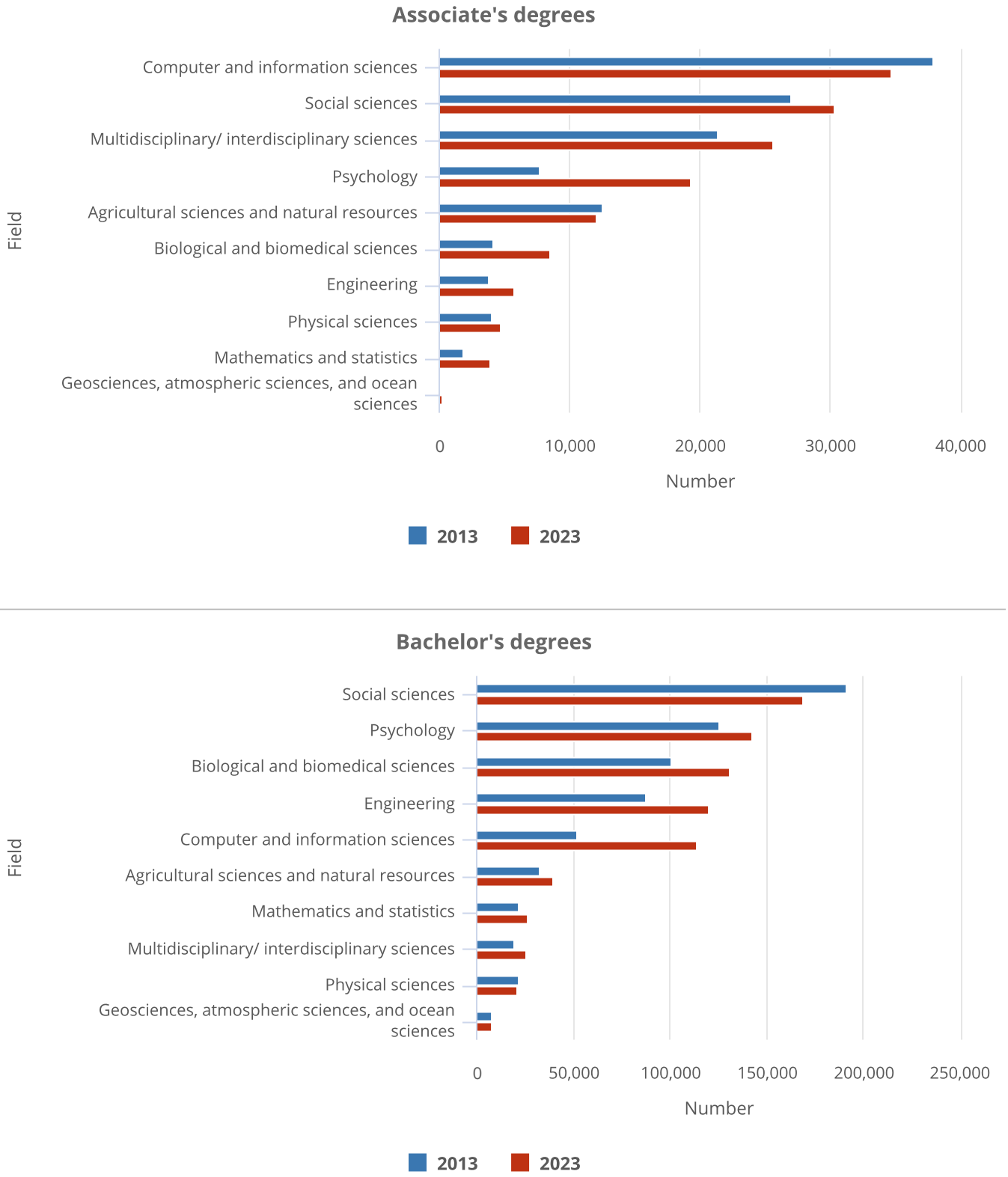
Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels are based on institutions eligible to participate in Title IV federal financial aid programs. Doctoral degree data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The SED data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the trend field taxonomy that facilitates trend data comparisons with prior years; for more information, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data, and NCSES, SED, 2023.

Science and Engineering Indicators

At the associate's level, computer and information sciences, social sciences, and multidisciplinary/interdisciplinary sciences were the most common S&E fields in 2013 and 2023 (Figure TAL-23). Although the number of associate's degrees awarded in computer and information sciences declined during this period, the number in multidisciplinary/interdisciplinary sciences, which includes fields such as computational science and engineering and data analytics, increased.[18] At the bachelor's level, social sciences remained the most popular S&E field in 2023, although the number of awards has decreased since 2013. The number of computer and information sciences bachelor's degrees more than doubled over the decade, from 52,000 to 114,000.

Figure TAL-23. S&E undergraduate degrees awarded, by field: 2013 and 2023



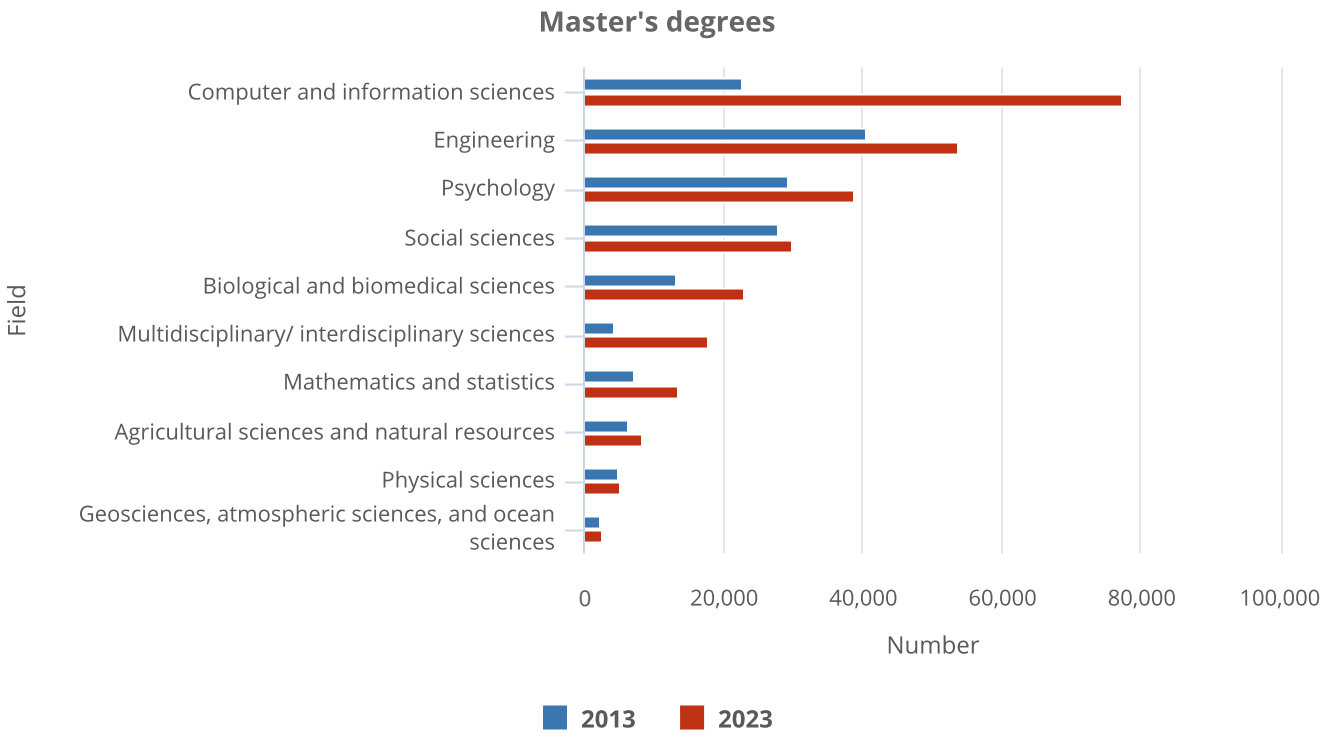
Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

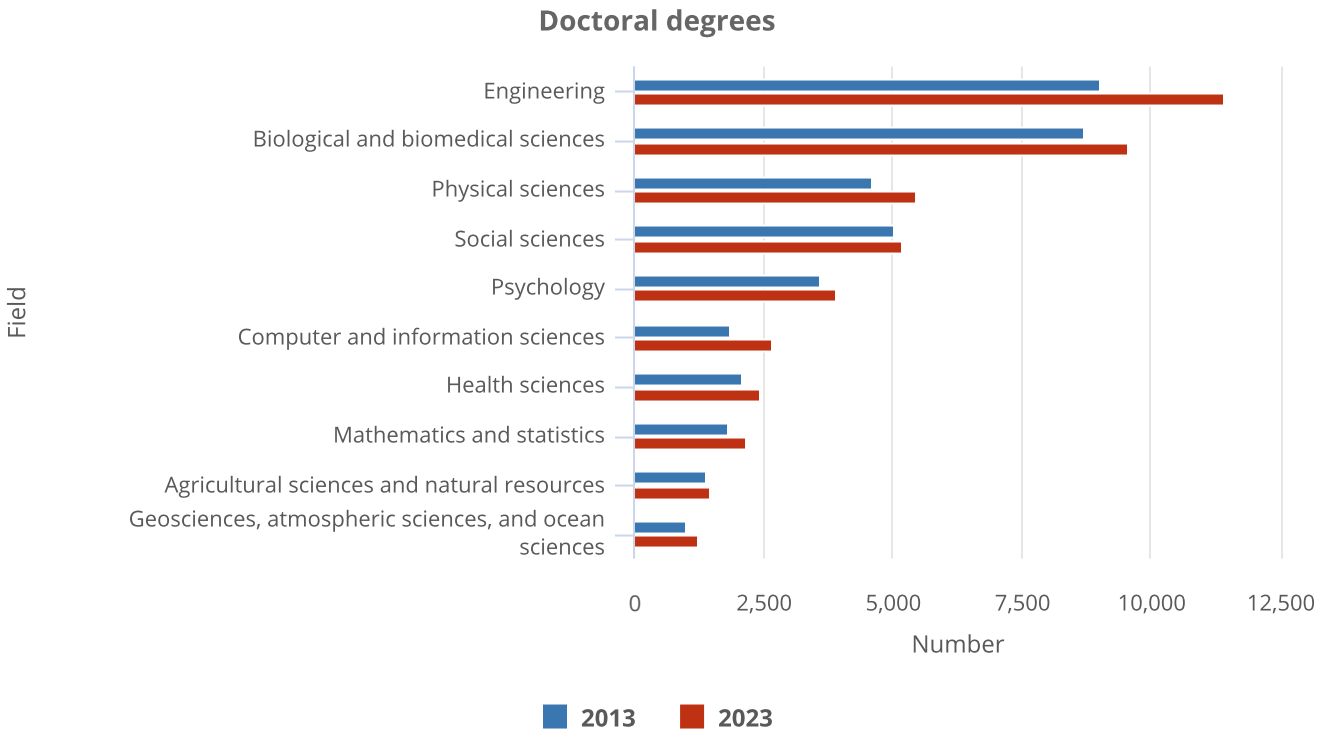
Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

In 2023, computer and information sciences was the most popular S&E field for master's degree recipients, followed by engineering, which had been the most popular field in 2013 (Figure TAL-24). In contrast, at the doctoral level, relatively few research doctoral degree recipients studied computer and information sciences. Instead, the largest number of research doctoral degree recipients in 2023 studied engineering, followed by biological and biomedical sciences, then by physical sciences.

Figure TAL-24. S&E graduate degrees awarded, by field: 2013 and 2023





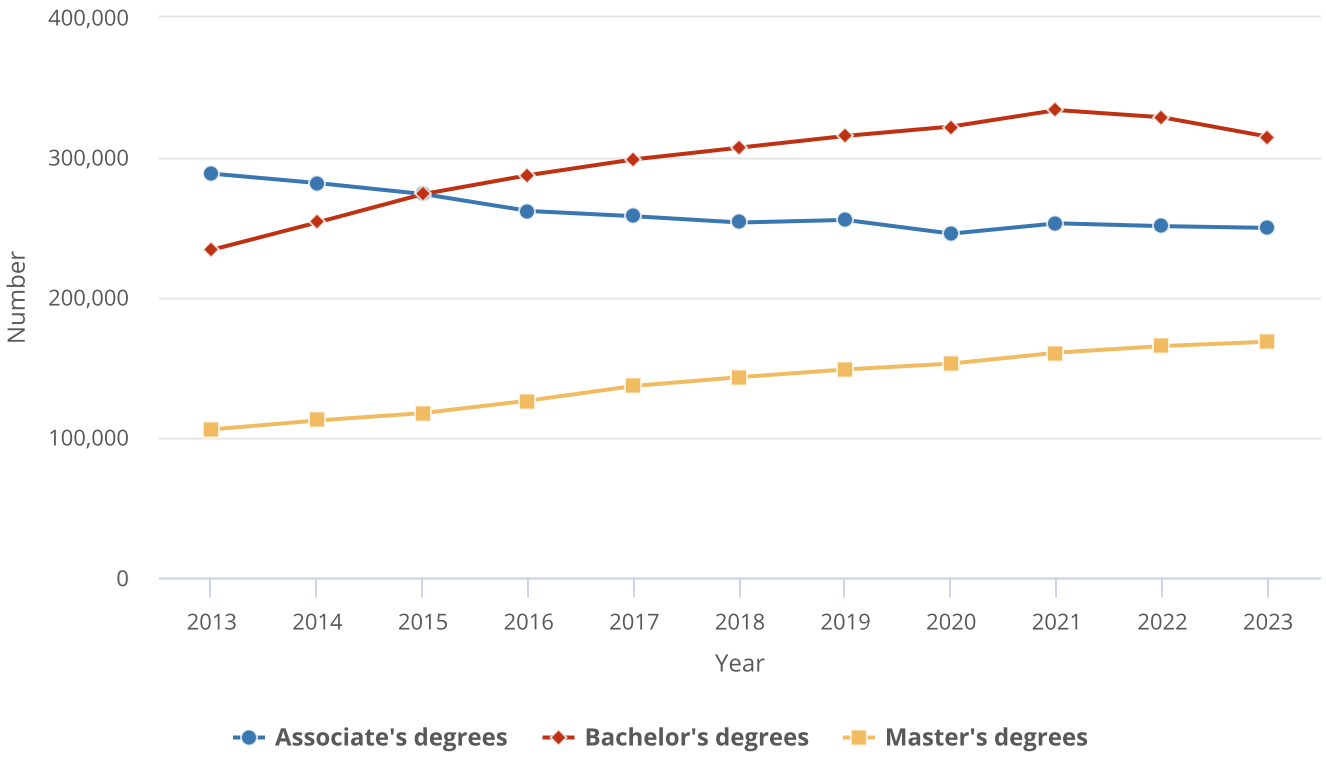
Note(s):
Master's-level data are based on institutions eligible to participate in Title IV federal financial aid programs. Health sciences are classified in S&E only at the doctoral level. Doctoral-level data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The SED data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the trend field taxonomy that facilitates trend data comparisons with prior years; for more information, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data, and NCSES, SED, 2023.

Science and Engineering Indicators

In contrast with the growth in S&E degrees at all levels between 2013 and 2023, the trend in the number of S&E-related awards differed by degree level (Figure TAL-25). During that period, the number of S&E-related associate's degrees awarded decreased, whereas the number of bachelor's and master's degrees increased. The number of S&E bachelor's degrees increased continuously through 2021 but declined in the following 2 years; however, the number awarded is still 35% higher than in 2013. At the associate's, bachelor's, and master's levels, the most popular field of study among S&E-related fields was health professions and related programs (Table TAL-11). The number of degrees in science and mathematics teacher education decreased at these three degree levels, most notably at the bachelor's level. In 2013, the number of bachelor's degrees in science and mathematics teacher education (4,874) was larger than the number of master's degrees (3,990); however, by 2023, the number of master's degrees in this field (3,508) surpassed the number at the bachelor's level (3,306).

Figure TAL-25. S&E-related awards conferred, by award level: 2013–23



Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

Table TAL-11. S&E-related degrees awarded, by degree level and field: 2013 and 2023

(Number and percent change)

Degree level and field	2013	2023	Percent change
Associate's degrees			
Health professions and related programs	213,572	181,562	-15.0
Homeland security and fire protection	5,748	4,487	-21.9
Science and mathematics teacher education	61	33	-45.9
Technology and technical fields	36,139	22,448	-37.9
Other S&E-related fields	32,975	41,208	25.0
Bachelor's degrees			
Health professions and related programs	203,335	280,661	38.0
Homeland security and fire protection	3,387	5,254	55.1
Science and mathematics teacher education	4,874	3,306	-32.2
Technology and technical fields	19,326	22,305	15.4
Other S&E-related fields	3,153	3,326	5.5
Master's degrees			
Health professions and related programs	93,518	152,483	63.1
Homeland security and fire protection	1,830	2,810	53.6
Science and mathematics teacher education	3,990	3,508	-12.1
Technology and technical fields	5,108	9,402	84.1
Other S&E-related fields	1,340	257	-80.8

Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

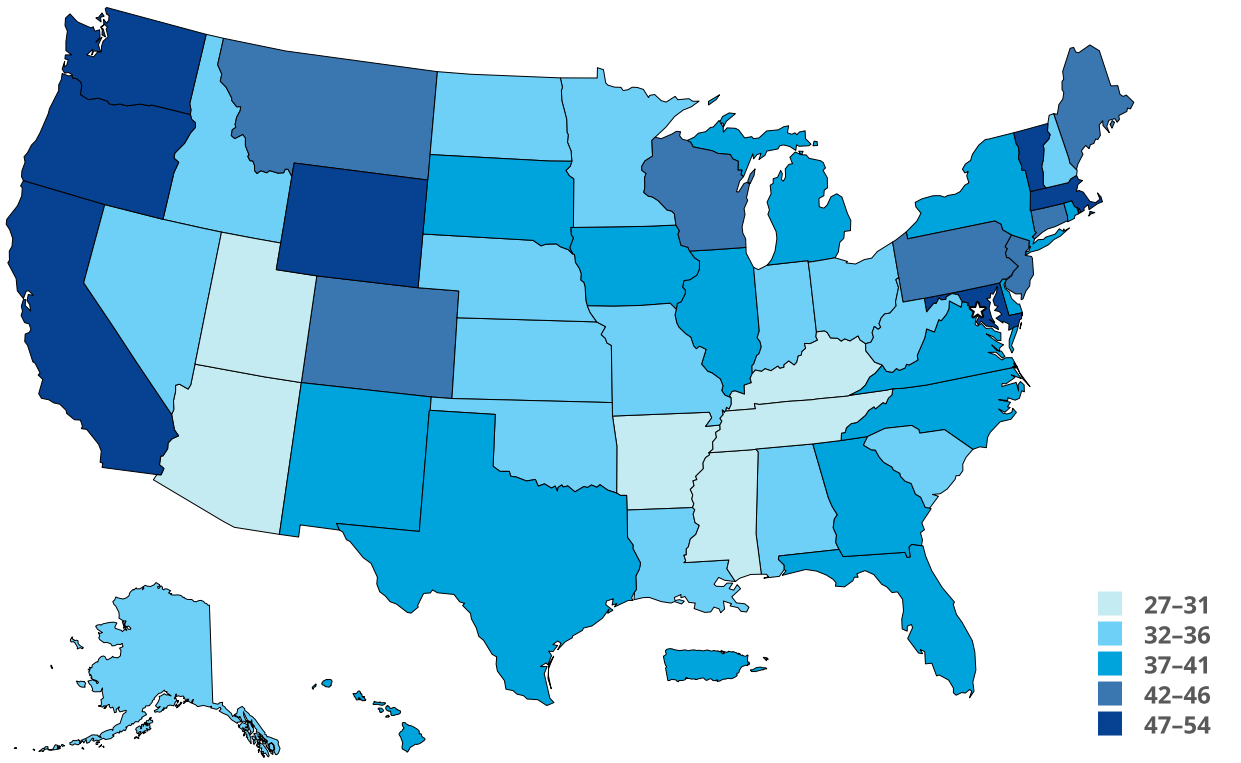
Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

S&E Degrees by State

The availability of S&E training varies by geography. Higher education institutions vary in the percentage of degrees they award in S&E fields, and this variation is apparent at the state level.[19] The share of bachelor's degrees awarded in S&E fields by institutions within their geographic boundaries ranged from 27% in Arizona to 54% in Vermont (Figure TAL-26).

Figure TAL-26. Share of bachelor's degrees awarded in S&E fields, by state: 2023



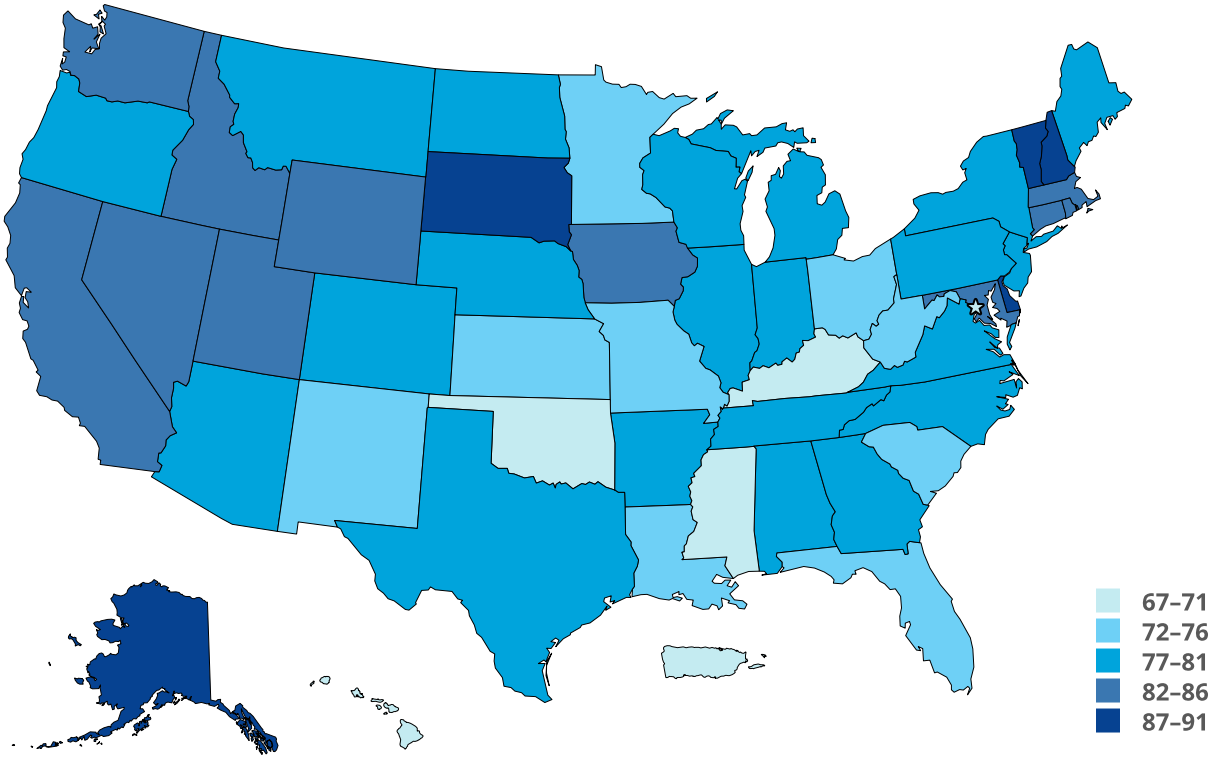
Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

At the doctoral level, institutions in several states produced considerably higher concentrations of S&E degrees than were observed at the bachelor's level. New Hampshire, Alaska, Delaware, and South Dakota had the highest share of doctoral degrees awarded in S&E fields of any state—90% or higher—although they awarded low numbers of doctoral degrees when compared with states like California or Texas (Figure TAL-27) (NCSES 2024b: Table 7-6).[20] In 2023, Mississippi and Hawaii awarded the lowest proportion of doctoral degrees in S&E fields (67% and 68%, respectively).

Figure TAL-27. Share of doctoral degrees awarded in S&E fields, by state: 2023



Note(s):
Data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics, SED, 2023.

Science and Engineering Indicators

STEM Degrees by Demographics

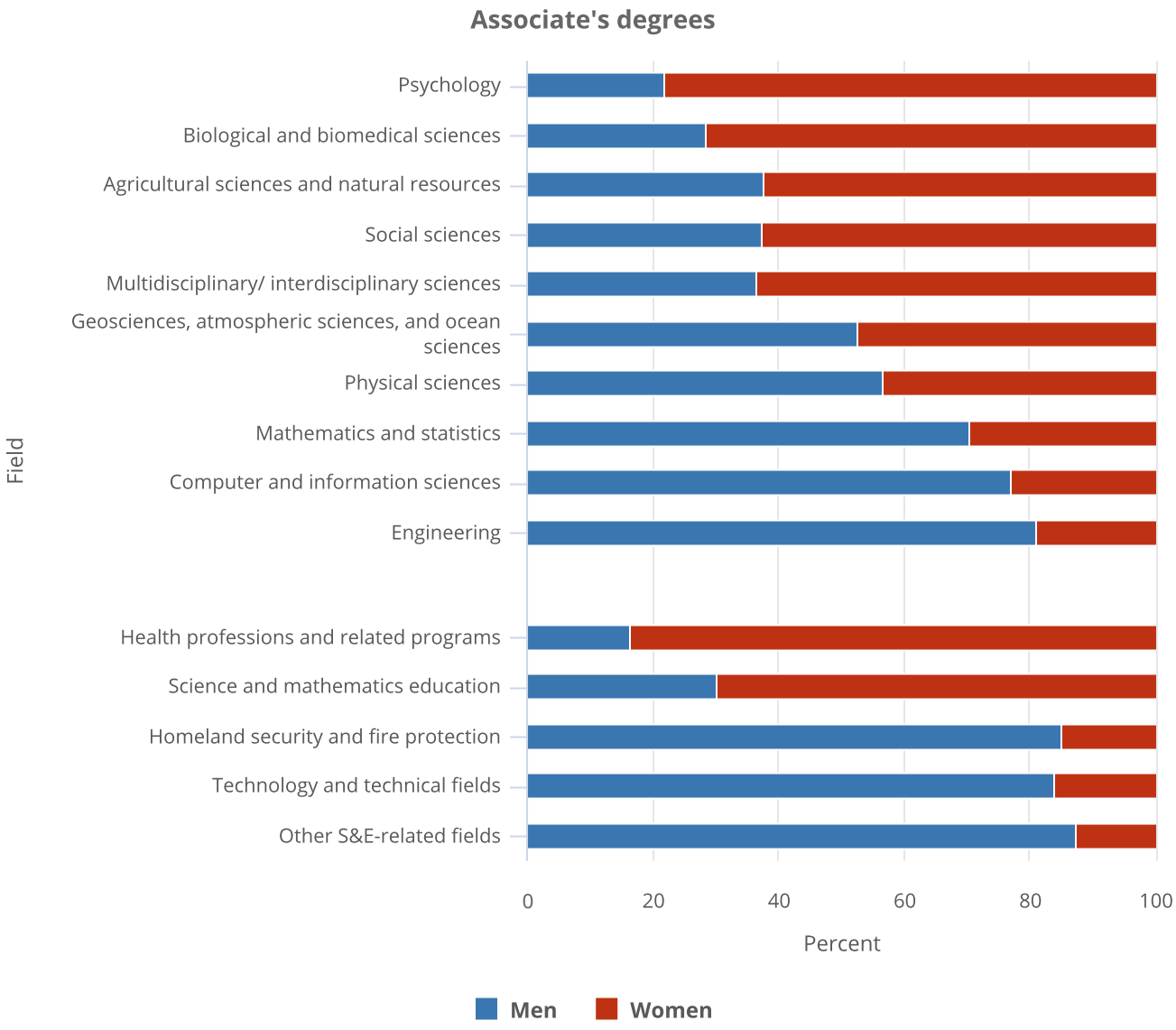
The demographic composition of S&E degree recipients varies by field of study. This section presents data on S&E degrees by sex, race and ethnicity, and citizenship status.

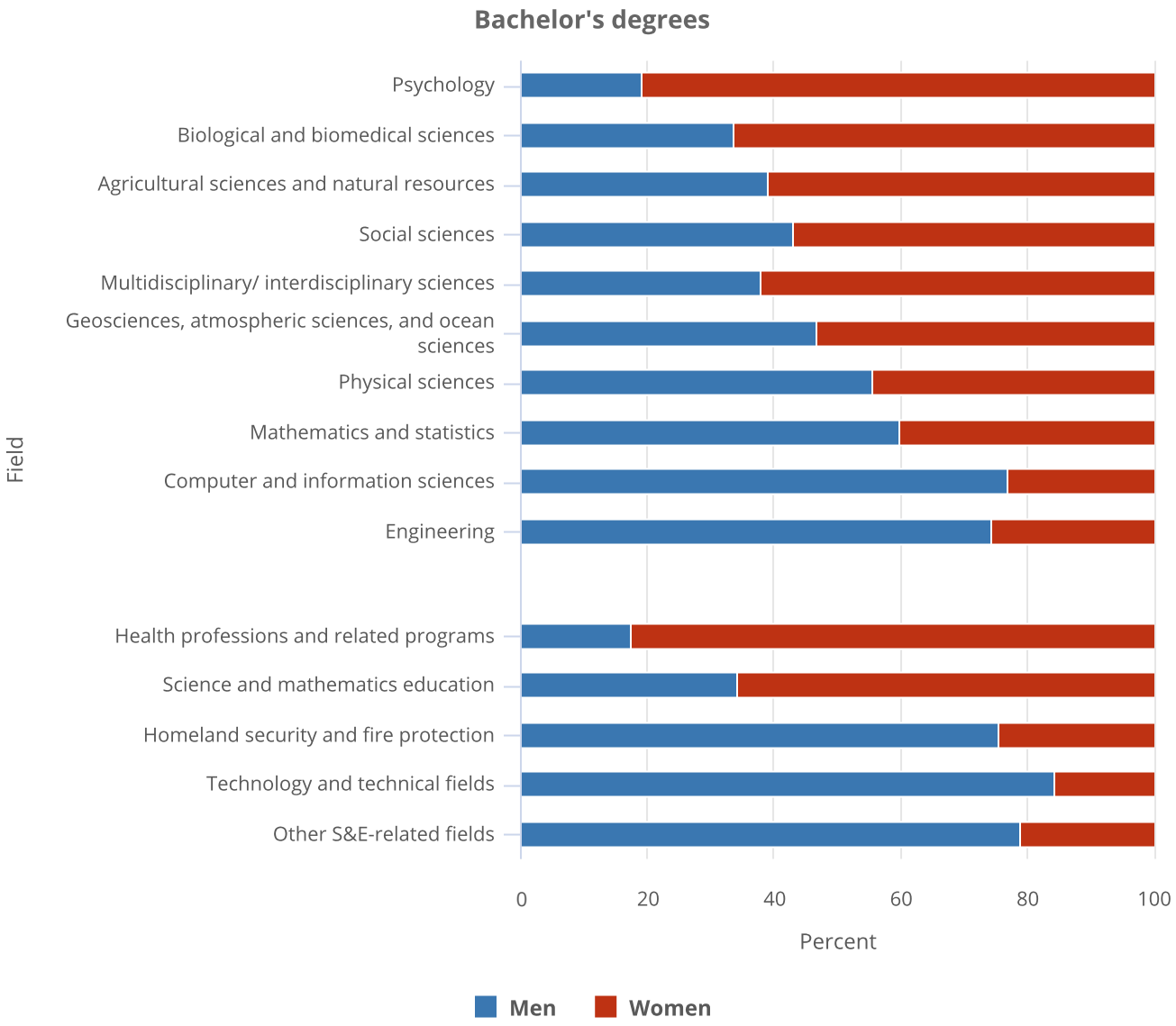
STEM Degrees by Sex

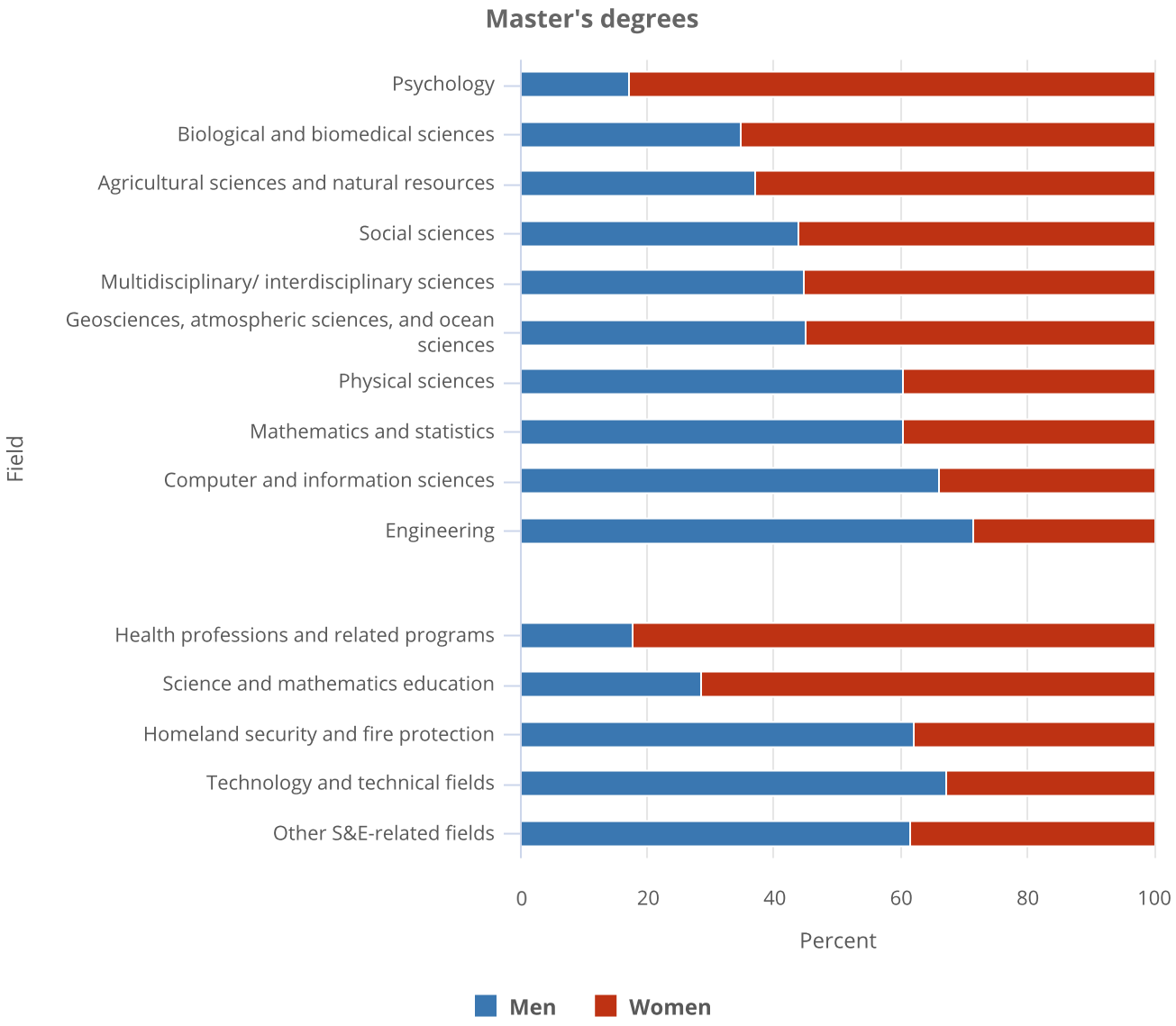
The proportion of S&E degrees that men and women earned in 2023 differed by field and by award level (Figure TAL-28, Figure TAL-29). Across all award levels, men earned larger proportions of degrees than women in engineering, computer and information sciences, mathematics and statistics, and physical sciences. At the associate's, bachelor's, and master's levels, women earned larger proportions of degrees than men in psychology, biological and biomedical sciences, agricultural sciences and natural resources, social sciences, and multidisciplinary/interdisciplinary sciences. In geosciences, atmospheric sciences, and ocean sciences, men earned more than half of the associate's and doctoral degrees, and women earned more than half of the bachelor's and master's degrees. Men earned the highest shares of degrees in engineering, accounting for at least 72% of the degrees at any level, and in computer and information sciences, accounting for at least 66% of the degrees at any level. Women earned the highest shares of degrees in psychology, with at least 77% of the degrees

at any level. In the physical sciences, the proportion of awards that women earned was lower at the master's and doctoral levels than at the undergraduate levels. The proportion of women in mathematics and statistics was highest at the bachelor's and master's levels (about 40% of women in each) and lowest at the associate's and doctoral levels (29% and 28%, respectively).

Figure TAL-28. S&E and S&E-related degrees awarded, by sex, field, and degree level: 2023




Bachelor's degrees
Psychology
Biological and biomedical sciences
Agricultural sciences and natural resources
Social sciences
Multidisciplinary/ interdisciplinary sciences
Geosciences, atmospheric sciences, and ocean sciences
Physical sciences
Mathematics and statistics
Computer and information sciences
Engineering
Health professions and related programs
Science and mathematics education
Homeland security and fire protection
Technology and technical fields
Other S&E-related fields
Field
0
20
40
60
80
100
Percent
Men
Women



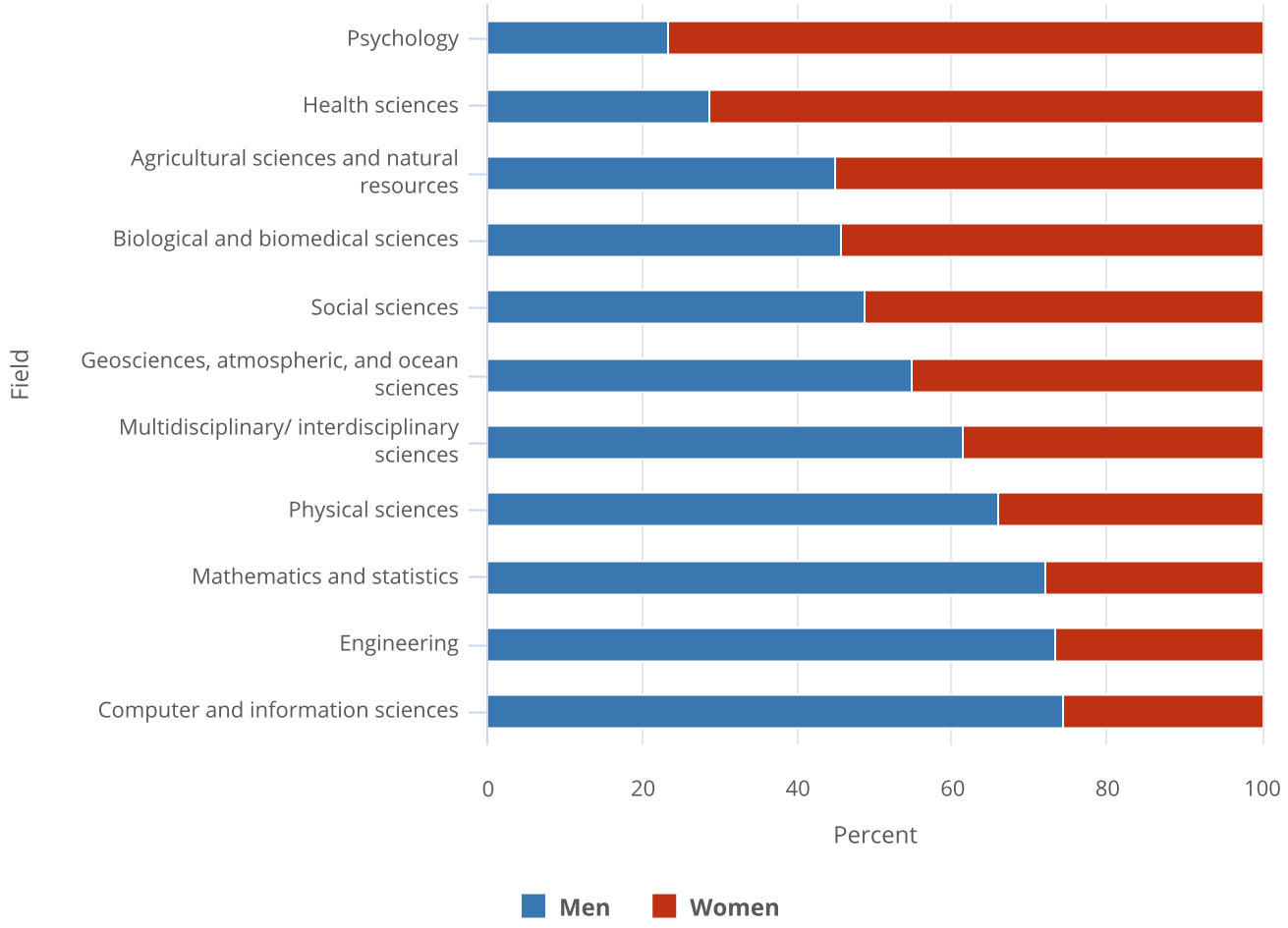
Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels are based on institutions eligible to participate in Title IV federal financial aid programs. S&E degrees include psychology; biological and biomedical sciences; agricultural sciences and natural resources; social sciences; multidisciplinary/interdisciplinary sciences; geosciences, atmospheric sciences, and ocean sciences; physical sciences; mathematics and statistics; computer and information sciences; and engineering. S&E-related degrees include health professions and related programs; science and mathematics education, homeland security and fire protection, technology and technical fields, and other S&E-related fields.

Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2025) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

In 2023, the proportion of S&E-related degrees earned by men and women also differed by field and degree level (Figure TAL-28). Across all award levels, men earned larger proportions of degrees than women in homeland security and fire protection, technology and technical fields, and other S&E-related fields. Women earned larger proportions of degrees than men in the health professions and related programs and in science and mathematics education.

Figure TAL-29. S&E doctoral degrees awarded, by sex and field: 2023



Note(s):
Percentages are based on all respondents, including those who did not report sex. Percentages may not sum to 100% due to rounding. In 2023, 0.1% of geosciences, atmospheric, and ocean sciences degree recipients did not report sex. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Earned Doctorates (SED), 2023.

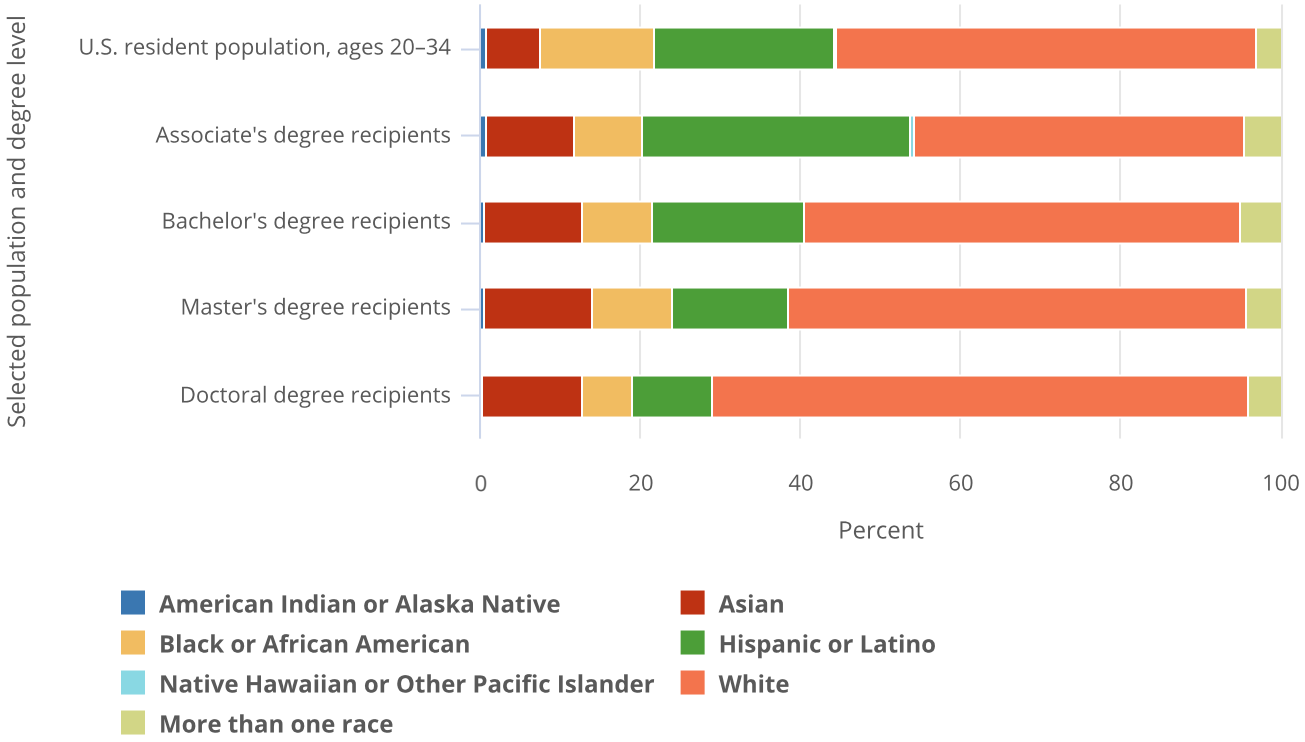
Science and Engineering Indicators

STEM Degrees by Race and Ethnicity

In 2023, relative to their shares of the U.S. population ages 20–34 years, racial and ethnic groups differed in the proportion of S&E degrees awarded at different degree levels (Figure TAL-30). White students earned a lower proportion of S&E associate's degrees (41%) than their share of the 20- to 34-year-old U.S. population (53%). However, White students earned a share of the S&E bachelor's degrees awarded (55%) similar to their proportion of the 20- to 34-year-old U.S. population. Asian students earned larger proportions of S&E degrees at all levels than their share of the U.S. population ages 20–34 years. In contrast, the proportion of S&E degree recipients among American Indian or Alaska Native, Black, and Hispanic students was lower than their respective shares of the U.S. population ages 20–34 years at most degree levels. One notable exception was that Hispanic students earned 34% of the S&E associate's degrees awarded but comprised 23% of the U.S. population ages 20–34 years. Another exception was that American Indian or Alaska Native students earned the same proportion of associate's

degrees as their proportion in this population. Students who reported more than one race earned a higher proportion of S&E-related degrees at all degree levels relative to their shares of the 20- to 34-year-old U.S. population (Figure TAL-30). Native Hawaiian or Other Pacific Islander students earned a higher proportion at the associate's level but a lower proportion at the bachelor's, master's, and doctoral levels relative to their shares of the 20- to 34-year-old U.S. population.[21]

Figure TAL-30. Race and ethnicity of U.S. resident population, ages 20–34, and U.S. citizen and permanent resident S&E award recipients, by degree level: 2023



Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels collected by the Integrated Postsecondary Education Data System (IPEDS) are based on institutions eligible to participate in Title IV federal financial aid programs and the race and ethnicity data represent U.S. citizens and residents only. Doctoral degree data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED), and the race and ethnicity data represent U.S. citizens and residents only. Hispanic or Latino may be any race; race categories exclude Hispanic origin. Award recipients with unknown race and ethnicity are not included. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

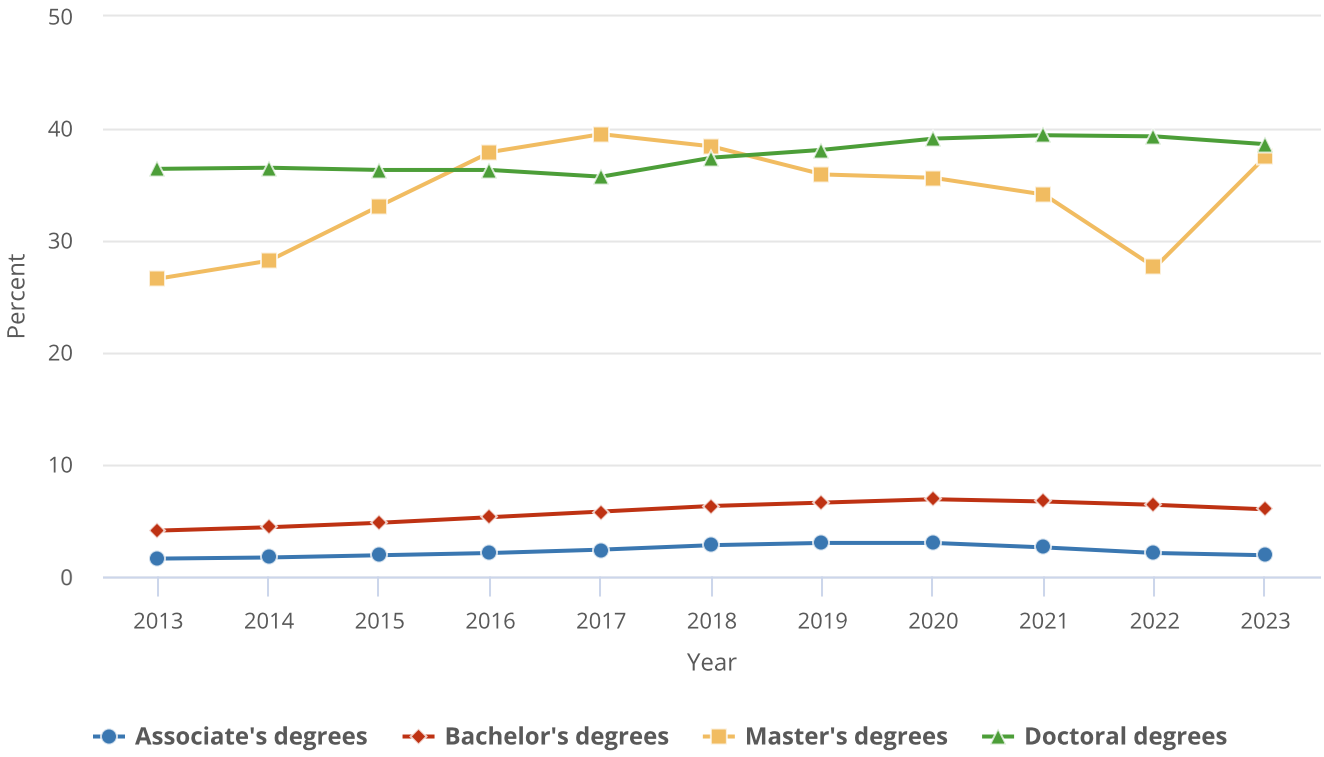
Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2025) of the National Center for Education Statistics, IPEDS, Completions Survey, provisional release data; NCSES, SED, 2023; Census Bureau, Population Division, Annual Estimates of the Resident Population by Sex, Age, Race, and Hispanic Origin for the United States: April 1, 2020, to July 1, 2023 (NC-EST2023-ASR6H).

Science and Engineering Indicators

STEM Degrees by Citizenship Status

International students in the United States earn low shares of S&E postsecondary degrees at the associate's and bachelor's levels but much higher shares of S&E advanced degrees (Figure TAL-31). In 2023, temporary visa holders earned 2% of S&E associate's degrees, 6% of S&E bachelor's degrees, 38% of S&E master's degrees, and 39% of S&E doctoral degrees.[22] The share of S&E master's degrees awarded to temporary visa holders fluctuated between 2013 and 2023; it peaked at 40% in 2017, declined to 28% in 2022, and increased to 38% in 2023. International students earn a low proportion of the associate's, bachelor's, and master's degrees awarded in S&E-related fields (1%, 2%, and 6%, respectively) (Table STAL-20).

Figure TAL-31. Share of S&E degrees awarded to temporary visa holders, by degree level: 2013–23



Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels are based on institutions eligible to participate in Title IV federal financial aid programs. Doctoral degree data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The SED data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the trend field taxonomy that facilitates trend data comparisons with prior years; for more information, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics (NCSES), special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data, and NCSES, SED, 2023.

Science and Engineering Indicators

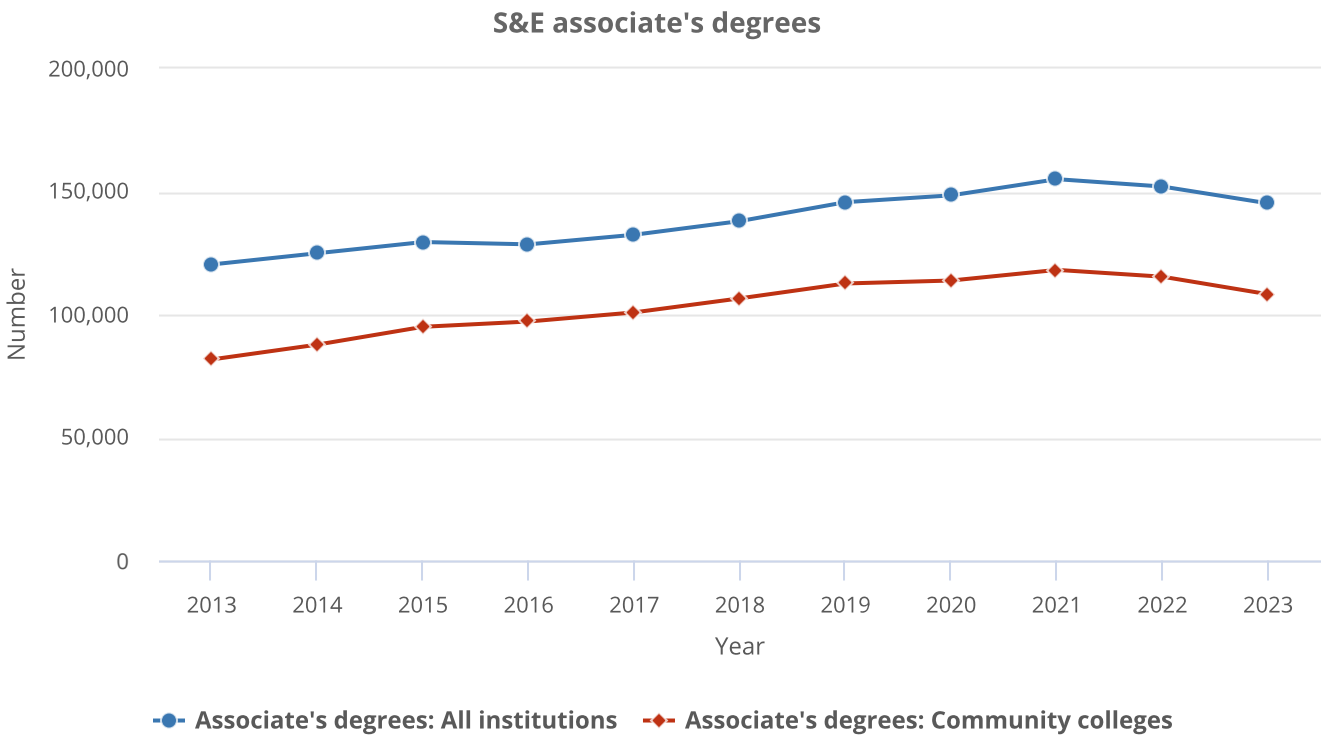
The proportion of temporary visa holders among master's degree and doctoral degree recipients varied greatly by field (Table STAL-20). In 2023, temporary visa holders earned 10% of the doctoral degrees in psychology and 24% of those in the health sciences but received more than half of the doctoral degrees in computer and information sciences (62%), engineering (55%), and mathematics and statistics (53%), fields that are particularly important in critical and emerging technologies. Temporary visa holders also accounted for about half of the master's degrees awarded in each of these three fields. Surveys of S&E research doctorate recipients who were temporary visa holders have shown that most of these individuals intend to and ultimately do remain in the United States after graduation (see the section STEM Doctoral Degrees, Stay Rates, and Internationally Mobile Students).

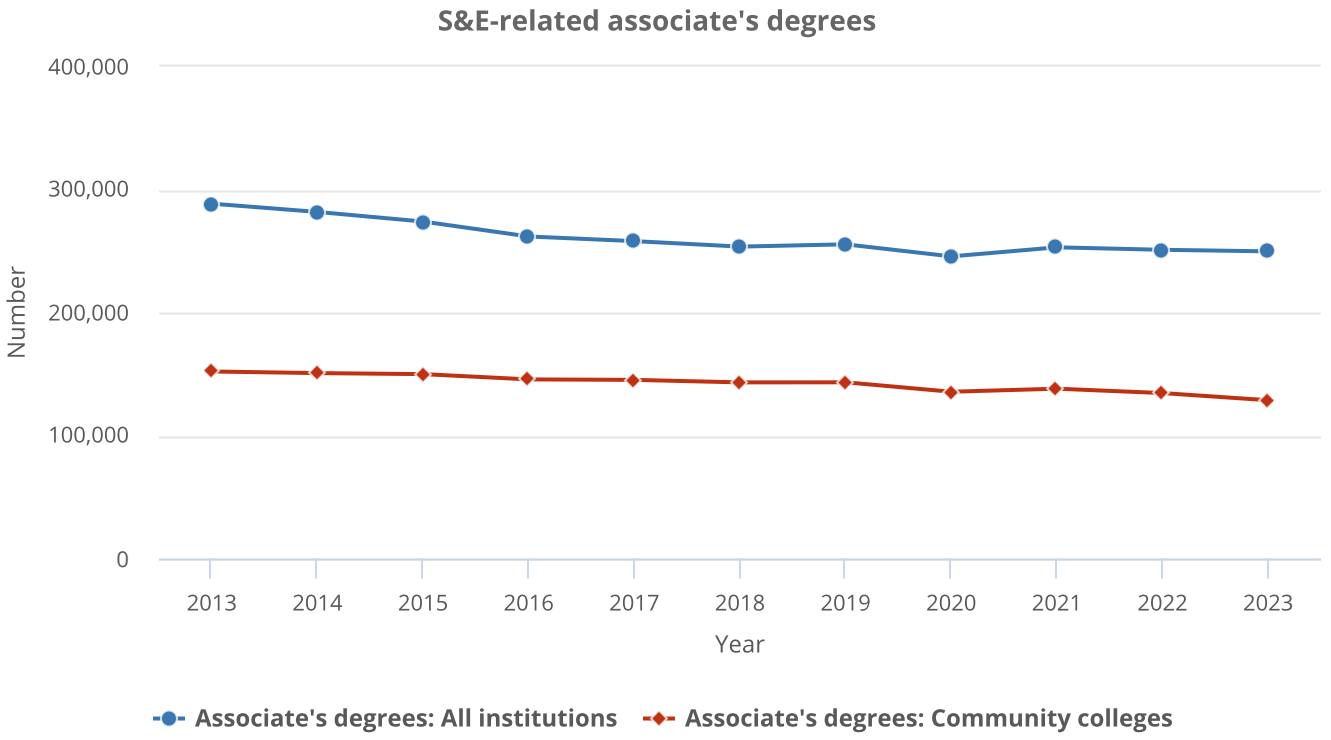
STEM Degrees by Type of Institution

Community Colleges

A variety of institutions provide the education necessary to maintain and enhance the U.S. S&E enterprise. Community colleges are public colleges that offer associate's degree programs that require 2 years or less to complete.[23] They specialize in providing relatively affordable programs of study, including in S&E and S&E-related fields. In 2023, about a third of the associate's degree holders were in STEM occupations (Table STAL-1). Community colleges awarded 75% of the S&E associate's degrees and 52% of the S&E-related associate's degrees conferred in 2023 (Figure TAL-32). Among S&E fields, community colleges awarded the largest number of associate's degrees in social sciences (23%), followed by multidisciplinary/interdisciplinary sciences (20%), then computer and information sciences (20%) (Figure TAL-33); among S&E-related fields, they awarded the largest number of associate's degrees in health professions and related programs (Figure TAL-34).

Figure TAL-32. S&E and S&E-related associate's degrees awarded, by institution type: 2013–23



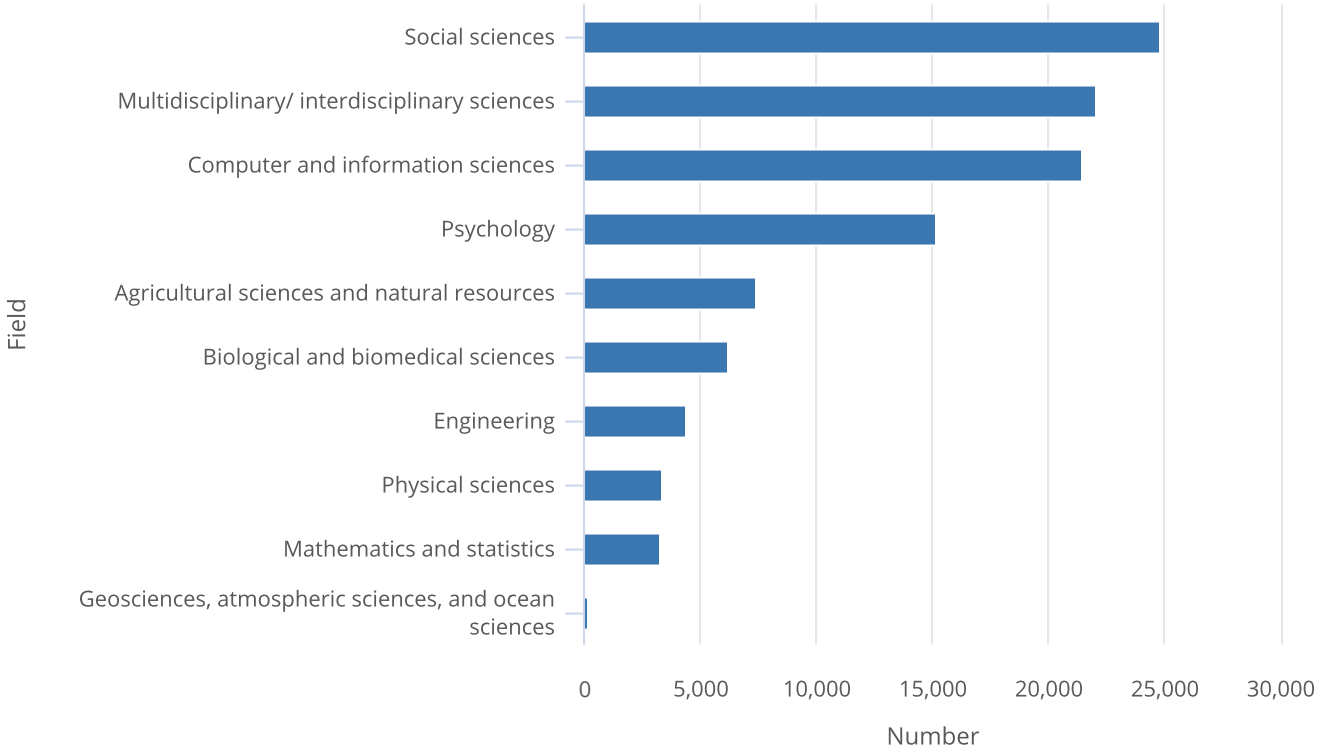


Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

Figure TAL-33. Broad field for S&E associate's degrees awarded by community colleges: 2023

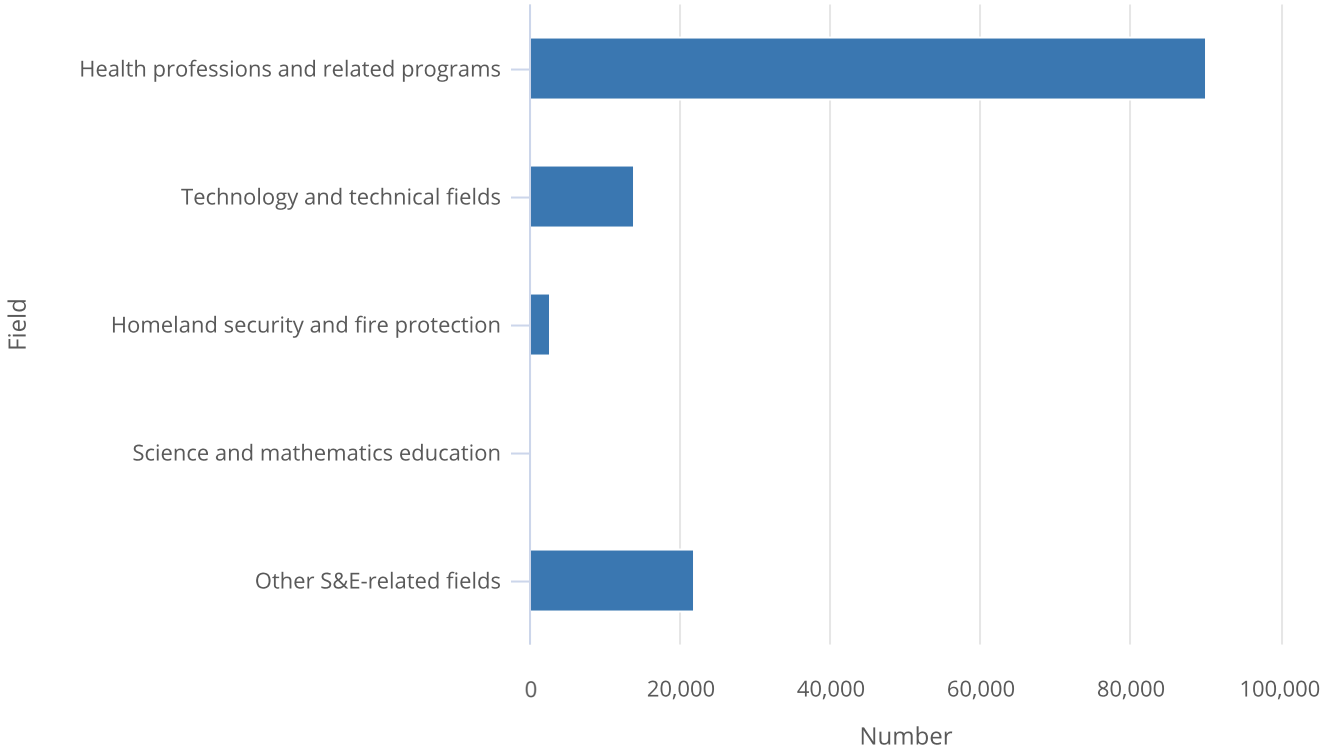


Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

Figure TAL-34. Broad field for S&E-related associate's degrees awarded by community colleges: 2023



Note(s):
Data are based on institutions eligible to participate in Title IV federal financial aid programs.

Source(s):
National Center for Science and Engineering Statistics, special tabulations (2024) of the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions Survey, provisional release data.

Science and Engineering Indicators

In addition to offering certificates and associate's degrees, community colleges can be the first stop on the road to a bachelor's or an advanced degree (Foley, Milan, and Hamrick 2020). According to the 2023 NSCG, about 3.1 million of the 5.6 million college graduates who had earned their first bachelor's degree between 2019 and 2021 (55%) reported attending a community college; this was true for 63% of those who earned degrees in S&E-related fields and 51% of those who earned degrees in S&E fields (Table TAL-12).[24] Among the 1.1 million S&E bachelor's degree recipients who attended community college, about 518,000 (45%) indicated that they took courses after high school and before enrolling in college, 429,000 (37%) while in college and before receiving their first bachelor's degree, and 81,000 (7%) after leaving college without receiving their first bachelor's degree. Among the bachelor's degree recipients with S&E degrees who indicated they had attended community college, 882,000 (77%) reported attending during one of these three periods after high school and before earning their first bachelor's degree.[25] Among the 555,000 bachelor's degree recipients with S&E-related degrees who reported attending community college, about 60% said they attended after high school and before enrolling in college, 44% while in college and before receiving a bachelor's degree, 11% after leaving college without receiving their first bachelor's degree, and 86% any time after high school and before earning their first bachelor's degree.

Table TAL-12. Recent recipients of their first bachelor's degrees who reported attending community college, by timing of attendance and broad field area: 2023

(Number and percent)

Attendance at a community college and timing of attendance	All fields	S&E field	S&E-related field	Non-S&E field
Earned the first bachelor's degree in 2019–21 (number)	5,583,000	2,267,000	880,000	2,437,000
Ever attended a community college	3,068,000	1,149,000	555,000	1,364,000
After high school and before ever enrolling in a college	1,523,000	518,000	332,000	673,000
While enrolled in a college and before receiving the first bachelor's degree	1,198,000	429,000	244,000	524,000
After leaving a college without receiving the first bachelor's degree	324,000	81,000	61,000	182,000
Anytime after high school and before the first bachelor's college	2,482,000	882,000	475,000	1,126,000
Earned the first bachelor's degree in 2019–21 (percent)	100.0	100.0	100.0	100.0
Ever attended a community college[a] (percent)	55.0	50.7	63.1	56.0
Ever attended a community college	100.0	100.0	100.0	100.0
After high school and before ever enrolling in a college[b] (percent)	49.6	45.1	59.8	49.3
While enrolled in a college and before receiving the first bachelor's degree[b] (percent)	39.0	37.3	44.0	38.4
After leaving a college without receiving the first bachelor's degree[b] (percent)	10.6	7.0	11.0	13.3
Anytime after high school and before the first bachelor's college[b] (percent)	80.9	76.8	85.6	82.6

[a] This percentage is based on the number of respondents who earned their first bachelor's degree in 2019-21.

[b] This percentage is based on the number of respondents who earned their first bachelor's degree in 2019-21 and reported attending community college at any point in time.

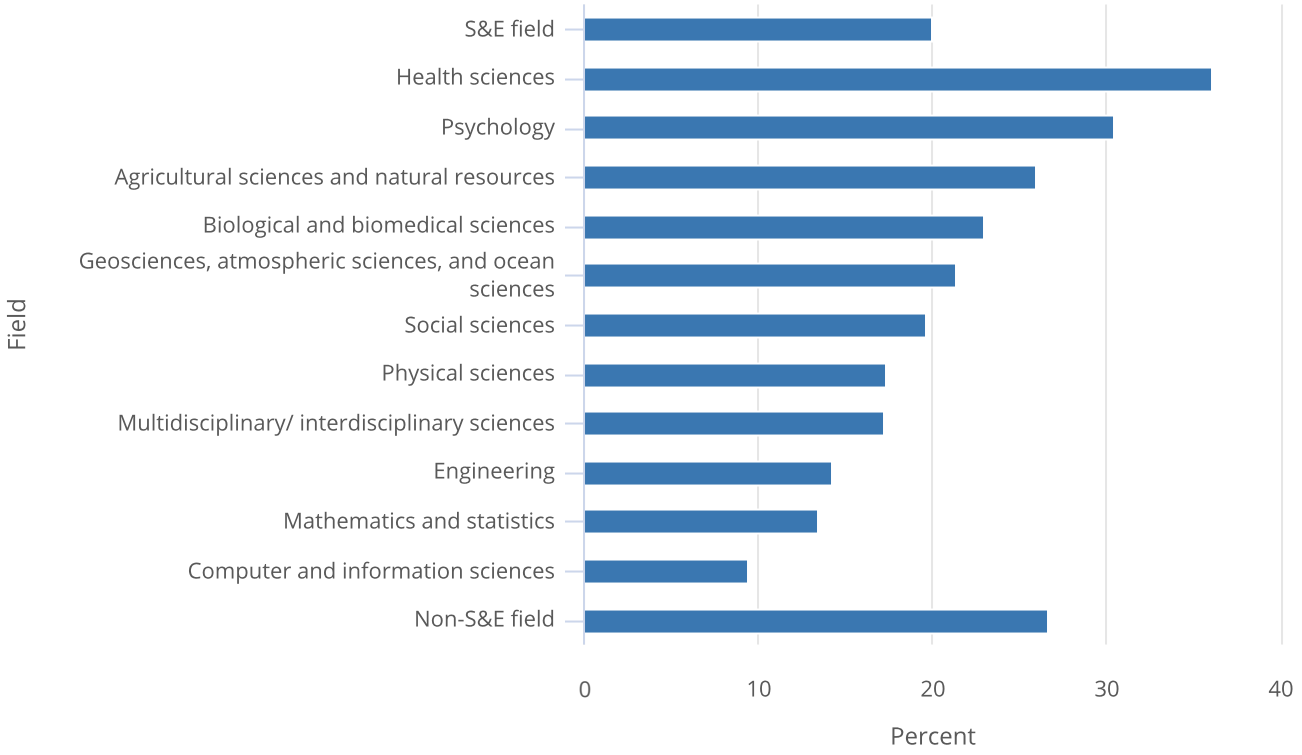
Note(s):
Numbers are rounded to the nearest 1,000. Detail may not add to total because of rounding and because respondents could have attended community college at more than one point in time. Recent recipients are those who earned their bachelor's degrees in 2019–21.

Source(s):
National Center for Science and Engineering Statistics, National Survey of College Graduates (NSCG), 2023.

Science and Engineering Indicators

Education at the associate's level, predominantly offered by community colleges, also plays a role in the preparation of S&E doctorate recipients. In 2023, 20% of S&E doctorate recipients reported that they had earned college credit at a community college.[26] This proportion was highest among those in the health sciences (36%) and psychology (31%) and lowest among those in computer sciences (9%), mathematics and statistics (13%), and engineering (14%) (Figure TAL-35).

Figure TAL-35. Doctorate recipients who earned college credit at a community or 2-year college, by field: 2023



Note(s):
Percentages are based on the total number of doctorate recipients. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Earned Doctorates (SED), 2023.

Science and Engineering Indicators

Tribally Controlled and Historically Black Colleges and Universities

All U.S. institutions of higher education foster talent development. In 2023, there were 35 tribally controlled colleges and universities (TCCUs) and 100 historically Black colleges and universities (HBCUs), as defined by the Higher Education Act of 1965 (P.L. 89-329) based on the populations of students they have served since their founding. These legislatively defined institutions are part of the overall system of degree-granting U.S. institutions of higher education discussed above.[27] HBCUs and TCCUs award a small number of the overall degrees awarded by all institutions in the United States but play an important role, especially at the associate's and bachelor's degree levels, in producing STEM graduates (Table TAL-13). In 2023, 67% of the S&E degrees (267 out of 398) and 80% of the S&E-related degrees (178 out of 222) that TCCUs awarded were associate's degrees. In 2023, 86% of the S&E degrees (12,836 out of 14,868) and 55% of the S&E-related degrees (4,158 out of 7,519) awarded by HBCUs were bachelor's degrees. Although HBCUs awarded fewer than 500 doctoral degrees in 2023, more than two-thirds of these doctoral degrees were in S&E fields.

Table TAL-13. Degrees awarded by HBCUs and TCCUs, by degree level and field area: 2023

(Number)

Degree level and field area	All institutions	HBCUs	TCCUs	All other institutions
All degree levels	3,943,291	45,391	1,961	3,895,939

Table TAL-13. Degrees awarded by HBCUs and TCCUs, by degree level and field area: 2023

(Number)

Degree level and field area	All institutions	HBCUs	TCCUs	All other institutions
S&E field	1,258,065	14,868	398	1,242,799
S&E-related field	744,939	7,519	222	737,198
Non-S&E field	1,940,287	23,004	1,341	1,915,942
Associate's degree	965,384	5,326	1,484	958,574
S&E field	145,187	181	267	144,739
S&E-related field	249,738	1,966	178	247,594
Non-S&E field	570,459	3,179	1,039	566,241
Bachelor's degree	1,981,895	32,322	420	1,949,153
S&E field	796,772	12,836	124	783,812
S&E-related field	314,852	4,158	40	310,654
Non-S&E field	870,271	15,328	256	854,687
Master's degree	938,150	7,272	57	930,821
S&E field	270,133	1,532	7	268,594
S&E-related field	168,460	1,243	4	167,213
Non-S&E field	499,557	4,497	46	495,014
Doctoral degree	57,862	471	na	57,391
S&E field	45,973	319	na	45,654
Non-S&E field	11,889	152	na	11,737

na = not applicable; no research doctorates were awarded.

HBCU = historically Black college or university; TCCU = tribally controlled college or university.

Note(s):
Data at the associate's-, bachelor's-, and master's-degree levels are based on institutions eligible to participate in Title IV federal financial aid programs. Doctoral degree data correspond to research doctorates as collected in the Survey of Earned Doctorates (SED). The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) completions; National Center for Science and Engineering Statistics, SED, 2023.

Science and Engineering Indicators

Persistence and Attrition in STEM Education and Training

Along the trajectory to STEM employment, talent retention influences the eventual makeup of the STEM workforce. From high school through undergraduate and graduate education and the transition to the STEM workforce, understanding where people exit the pipeline can shed light on attrition from STEM education and the workforce.

Postsecondary Enrollment in STEM

The High School Longitudinal Study of 2009 (HSLS:09) follows a nationally representative sample of students who were ninth graders in fall 2009 from high school into postsecondary education and the workforce (NCES 2024a). Part of the HSLS:09 data includes the Postsecondary Education Administrative Records Collection that was conducted in 2021, approximately 8 years after high school graduation for most of the cohort. Together, these data provide information on whether fall 2009 ninth graders enrolled in STEM postsecondary education completed a STEM degree by June 2021. The data also provide information about enrollment characteristics and STEM degree completion for those students.

Declared STEM Majors Who Completed a STEM Degree

Approximately 1.8 million ninth graders in fall 2009 had enrolled in a postsecondary certificate or degree by 2017 (Table STAL-21). Of these students, 38% entered postsecondary education with a declared STEM major. As of 2021, 55% of students who had started as a STEM major had completed a STEM undergraduate certificate or degree, 16% completed a non-STEM degree, and 29% did not complete any degree (Table TAL-14). A higher proportion of women (57%) who started in STEM completed a STEM degree, compared with men (53%). Of Asian students who started in STEM, 70% completed a STEM degree, and 62% of White students did so. Less than half of Hispanic (44%) and Black (40%) students who started in STEM completed a STEM degree. Students' mathematics achievement in high school is also associated with postsecondary STEM degree completion. Of students who scored in the highest quintile of a mathematics assessment in grade 11, 71% completed a STEM degree, compared with 34% of students who scored in the lowest quintile.

Table TAL-14. Among fall 2009 ninth graders who started as a STEM major and completed a postsecondary degree by 2021, percentage who completed a STEM degree, by student characteristics

(Percent)

Student characteristics	Completed a STEM degree	Completed a non-STEM degree	Did not complete a degree
Total	55.3	15.7	29.1
Sex			
Female	57.3	14.9	27.9
Male	52.9	16.6	30.5
Race or ethnicity			
American Indian or Alaska Native	S	S	S
Asian	69.5	14.5	S
Black	40.0	11.4	48.6
Hispanic	43.8	17.0	39.2
Native Hawaiian or Other Pacific Islander	S	S	S
Two or more races	53.9	8.7	37.3
White	61.7	17.1	21.2
Mathematics achievement quintile in grade 11			
Lowest quintile[a]	34.2	14.1	51.7
Middle quintiles	47.5	17.9	34.6
Highest quintile	70.9	13.2	15.9

S = reporting standards not met either because the standard error is greater than 50% of the estimate or because there were too few cases for a reliable estimate.

STEM = science, technology, engineering, and mathematics.

[a] Interpret data with caution. Estimate is unstable because the standard error is between 30% and 50% of the estimate.

Note(s):
Estimates pertain to fall 2009 ninth-grade students who first enrolled in a STEM major at their primary first institution through 2017 and had degree completion information as of spring 2021. In most cases, the primary first postsecondary record is the institution and associated academic year with the earliest start date after high school. Completed a STEM degree includes any undergraduate certificate, associate's degree, and bachelor's degree earned in the fields of science technologies or technicians; psychology and other social science; and health and medicine. Estimates are weighted using the survey weight "W6W5STU." Detail may not sum to totals because of rounding.

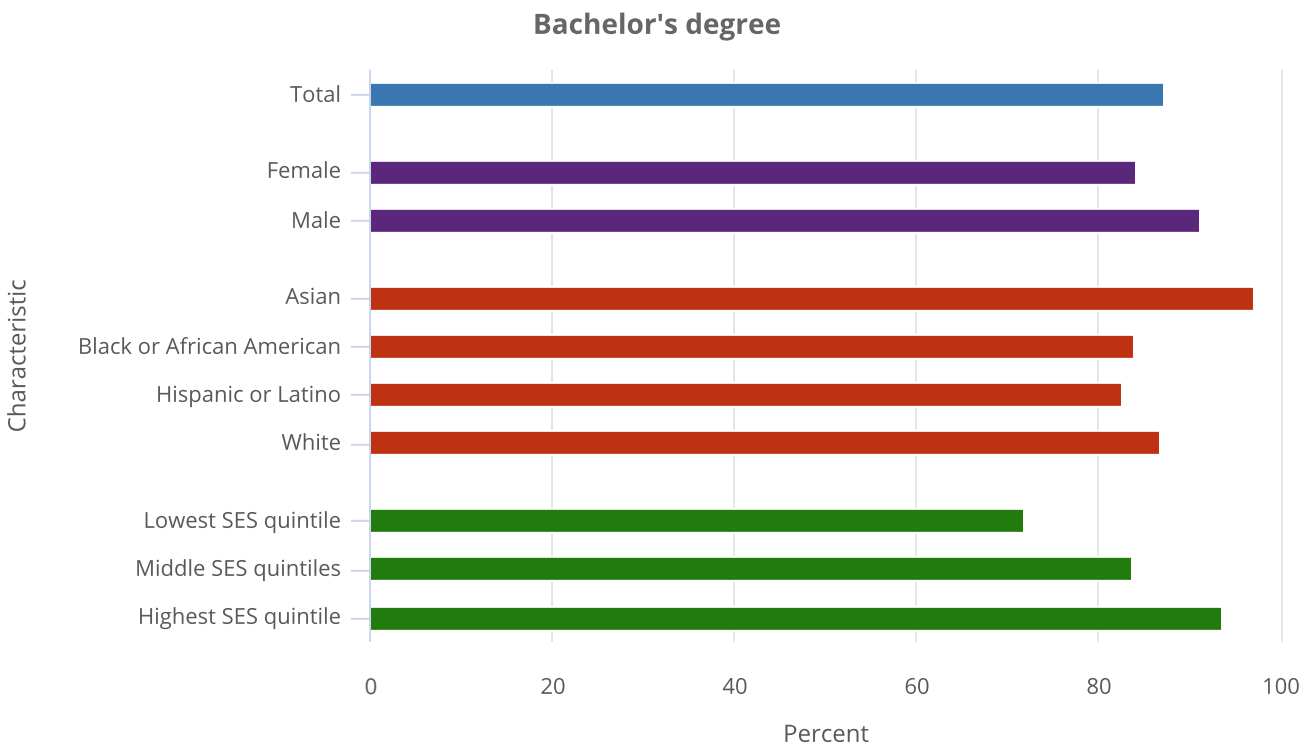
Source(s):
Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09).

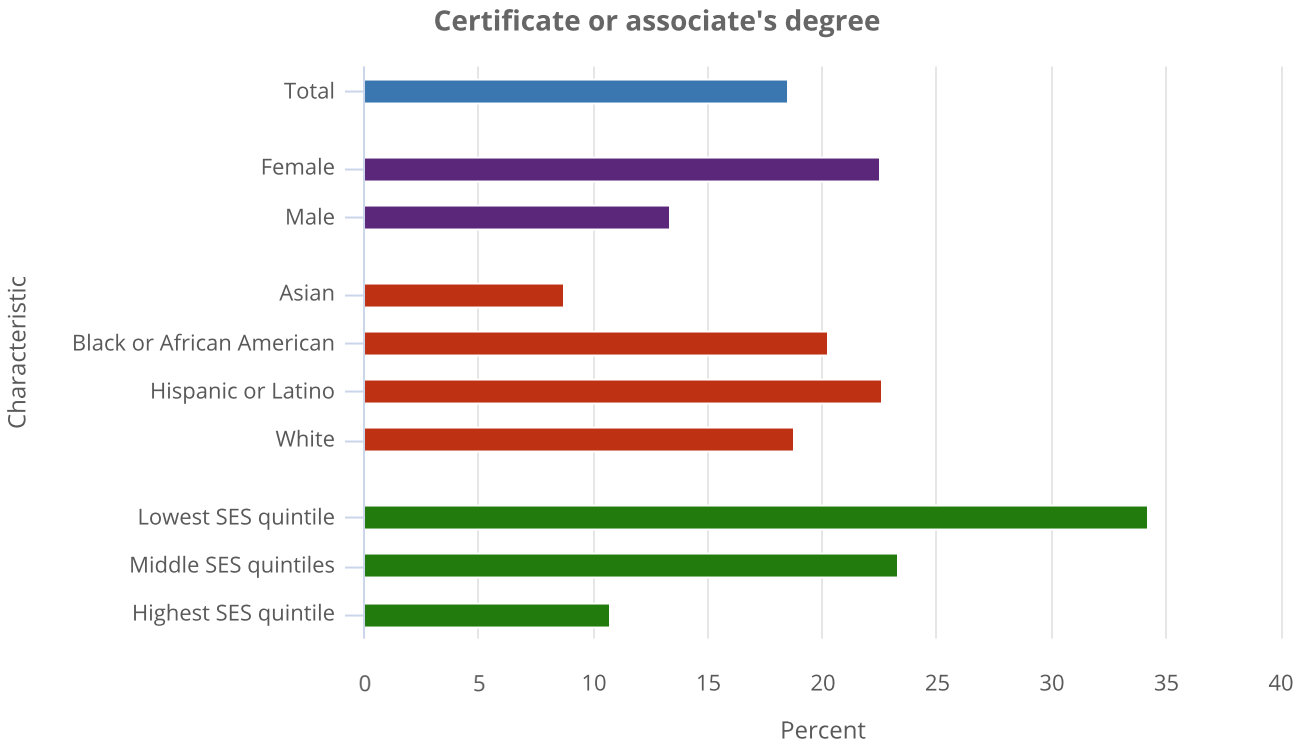
Science and Engineering Indicators

Type of Degree Completed by Students Who Declared a STEM Major

Among those who completed a STEM degree, 87% earned a bachelor's degree and 19% earned a certificate or an associate's degree (Figure TAL-36). The percentage of students completing a bachelor's degree or a certificate or an associate's degree varied by student characteristics. More men than women completed a bachelor's degree, whereas more women than men completed a certificate or an associate's degree. The proportions of Asian students and White students (97% and 87%, respectively) who entered as postsecondary STEM majors and completed a postsecondary STEM bachelor's degree were higher than the proportions of Hispanic and Black students (83% and 84%, respectively) who did so.

Figure TAL-36. Among fall 2009 ninth graders who completed a postsecondary STEM degree by 2021, percentage who completed a bachelor's degree or a certificate or an associate's degree, by select student characteristics





SES = socioeconomic status; STEM = science, technology, engineering, and mathematics.

Note(s):
The racial or ethnic groups of American Indian or Alaska Native and of Native Hawaiian or Other Pacific Islander are not included because reporting standards were not met. The standard error of the excluded racial or ethnic groups was either greater than 50% of the estimate, or there were too few cases for a reliable estimate.

Source(s):
Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSLS:09).

Science and Engineering Indicators

Transition to Employment for Research Doctorate Recipients

In the current global economy, knowledge is an increasingly valuable national asset. When studying abroad, international students broaden their career prospects, and many of them may weigh job opportunities in different countries. This section focuses on research doctorate recipients who studied at U.S. institutions of higher education and had definite employment commitments or postdoctoral study or training positions in the United States at the time of graduation.[28]

In 2023, of the students awarded S&E doctoral degrees, 27,010 recipients were U.S. citizens and permanent residents and 16,807 were temporary visa holders (Table TAL-15) (NCSES 2024b: Table 6-2, Table 6-3). The majority of S&E doctorate recipients in both groups reported having definite postgraduation commitments at the time they responded to the survey, although this proportion was slightly higher among temporary visa holders (72%) than among U.S. citizens and permanent residents (69%). In both groups, most of the employment commitments were in the United States, but this proportion was higher for U.S. citizens and permanent residents (97%) than for temporary visa holders (85%) (Table TAL-15). Among temporary visa holders reporting definite employment commitments, the proportion with a commitment in the United States were highest for those in biological and biomedical sciences (90%), engineering (89%), multidisciplinary sciences (89%), and computer and information sciences (88%); these proportions were lowest for those in health sciences (73%) and social sciences (64%) (Figure TAL-37).

Table TAL-15. S&E doctorate recipients with definite postgraduation commitments, by location of commitments, citizenship status, and field of doctorate: 2023

(Number)

Field of doctorate	U.S. citizen and permanent resident doctorate recipients	Doctorate recipients with definite commitments	Location of definite commitments						
			United States					Abroad	Unknown
			Total	Postdoctoral study	Academic employment	Industry employment[a]	Other[b]		
U.S. citizens and permanent residents									
Science and engineering	27,010	18,532	18,017	7,409	3,121	5,190	2,297	512	3
Biological and biomedical sciences	7,004	4,446	4,334	2,416	495	1,087	336	111	1
Computer and information sciences	820	579	559	93	121	277	68	19	1
Engineering	4,542	3,076	3,008	775	267	1,563	403	67	1
Geosciences, atmospheric sciences, and ocean sciences	773	586	572	343	64	85	80	14	0
Health sciences	1,953	1,343	1,329	345	480	251	253	14	0
Mathematics and statistics	929	671	629	254	149	174	52	42	0
Multidisciplinary/ interdisciplinary sciences	826	562	549	158	122	198	71	13	0
Physical sciences	3,142	2,135	2,038	875	163	848	152	97	0
Psychology	3,178	2,384	2,363	1,418	348	285	312	21	0
Social sciences	3,065	2,221	2,124	559	803	295	467	97	0
Temporary visa holder doctorate recipients reporting postgraduation plans									
Science and engineering	16,807	12,074	10,234	4,358	936	4,598	342	1,830	10
Biological and biomedical sciences	2,352	1,692	1,521	1,001	54	412	54	170	1
Computer and information sciences	1,337	999	882	181	124	551	26	115	2
Engineering	5,646	3,966	3,529	1,190	188	2,055	96	435	2
Geosciences, atmospheric sciences, and ocean sciences	389	283	235	174	14	37	10	47	1
Health sciences	623	446	325	172	39	98	16	121	0
Mathematics and statistics	1,049	777	645	260	65	301	19	131	1
Multidisciplinary/ interdisciplinary sciences	813	629	557	171	74	294	18	72	0
Physical sciences	2,093	1,495	1,289	648	36	590	15	206	0
Psychology	335	227	186	109	47	21	9	41	0
Social sciences	1,716	1,267	810	286	270	180	74	454	3

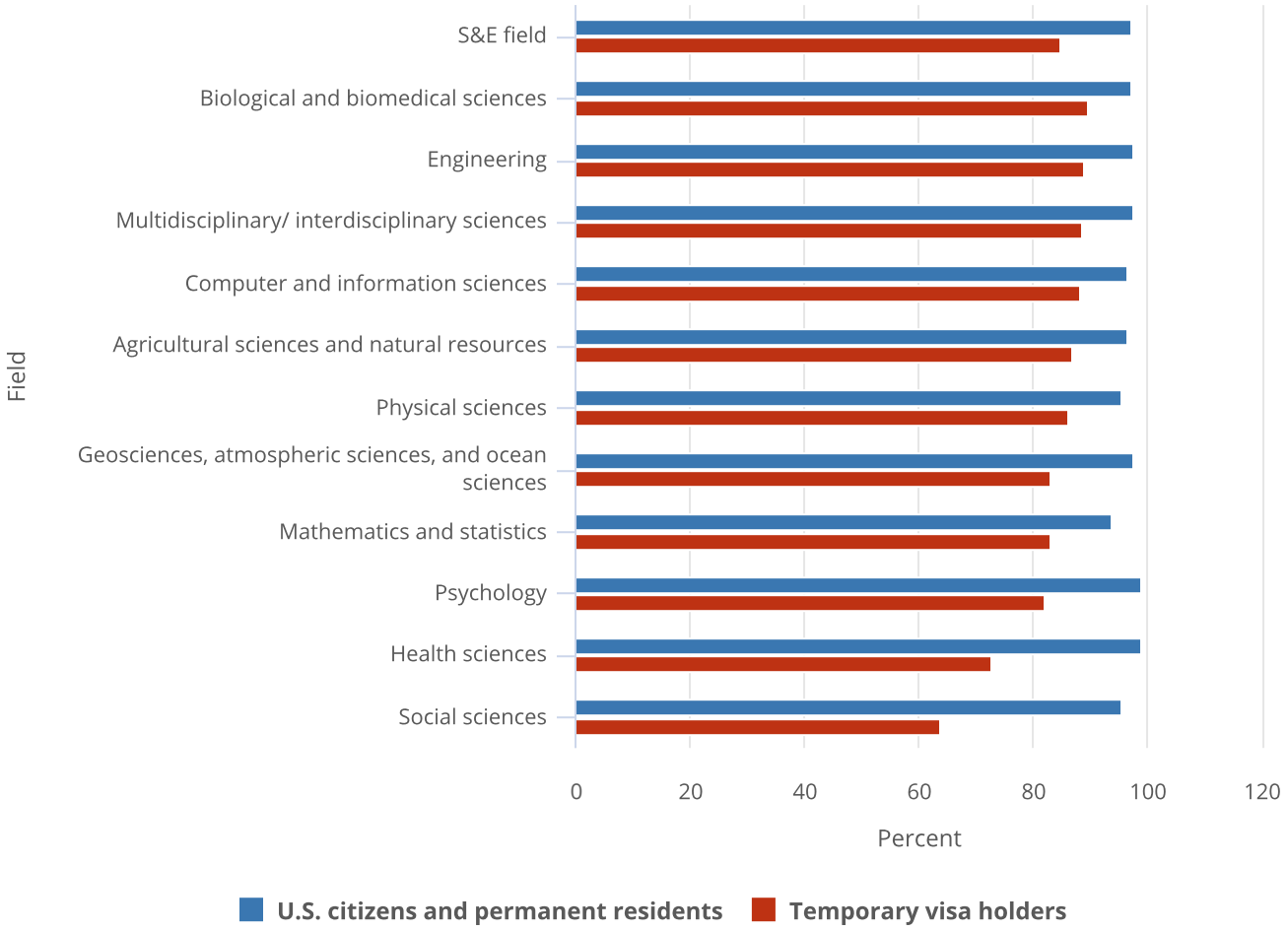
[a] Industry employment includes doctorate recipients reporting self-employment.
[b] Other includes doctorate recipients reporting government, nonprofit, elementary or secondary school, or other employment and those with unknown employment.

Note(s):
A definite postgraduation commitment includes accepting new employment or a postdoctoral study (postdoc) position or returning to predoctoral employment. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Earned Doctorates (SED), 2023.

Science and Engineering Indicators

Figure TAL-37. S&E doctorate recipients with definite postgraduation commitments in the United States, by citizenship status and field of doctorate: 2023



Note(s):
A definite postgraduation commitment includes accepting new employment or a postdoctoral study (postdoc) position or returning to predoctoral employment. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification of Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

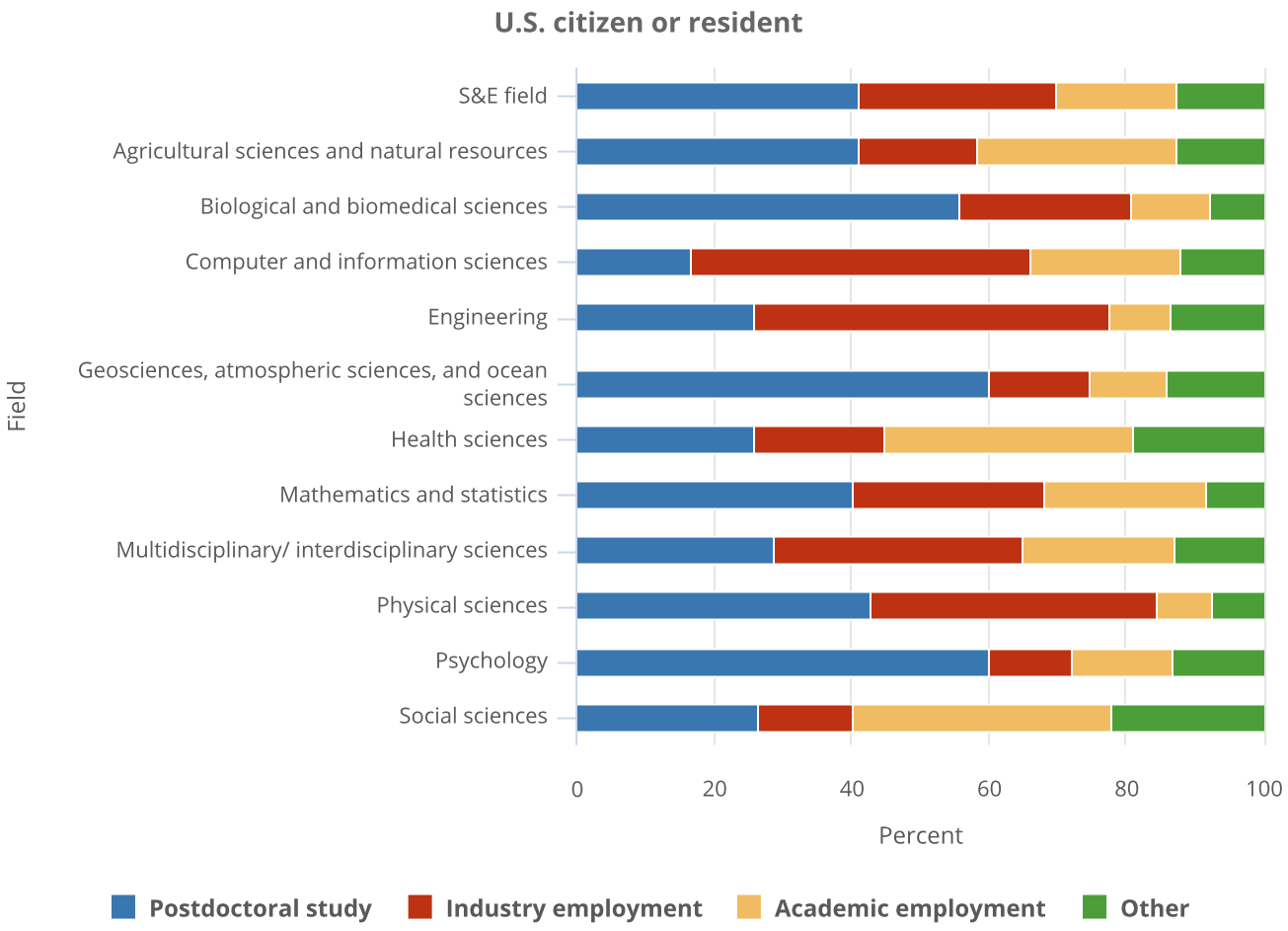
Source(s):
National Center for Science and Engineering Statistics, Survey of Earned Doctorates (SED), 2023.

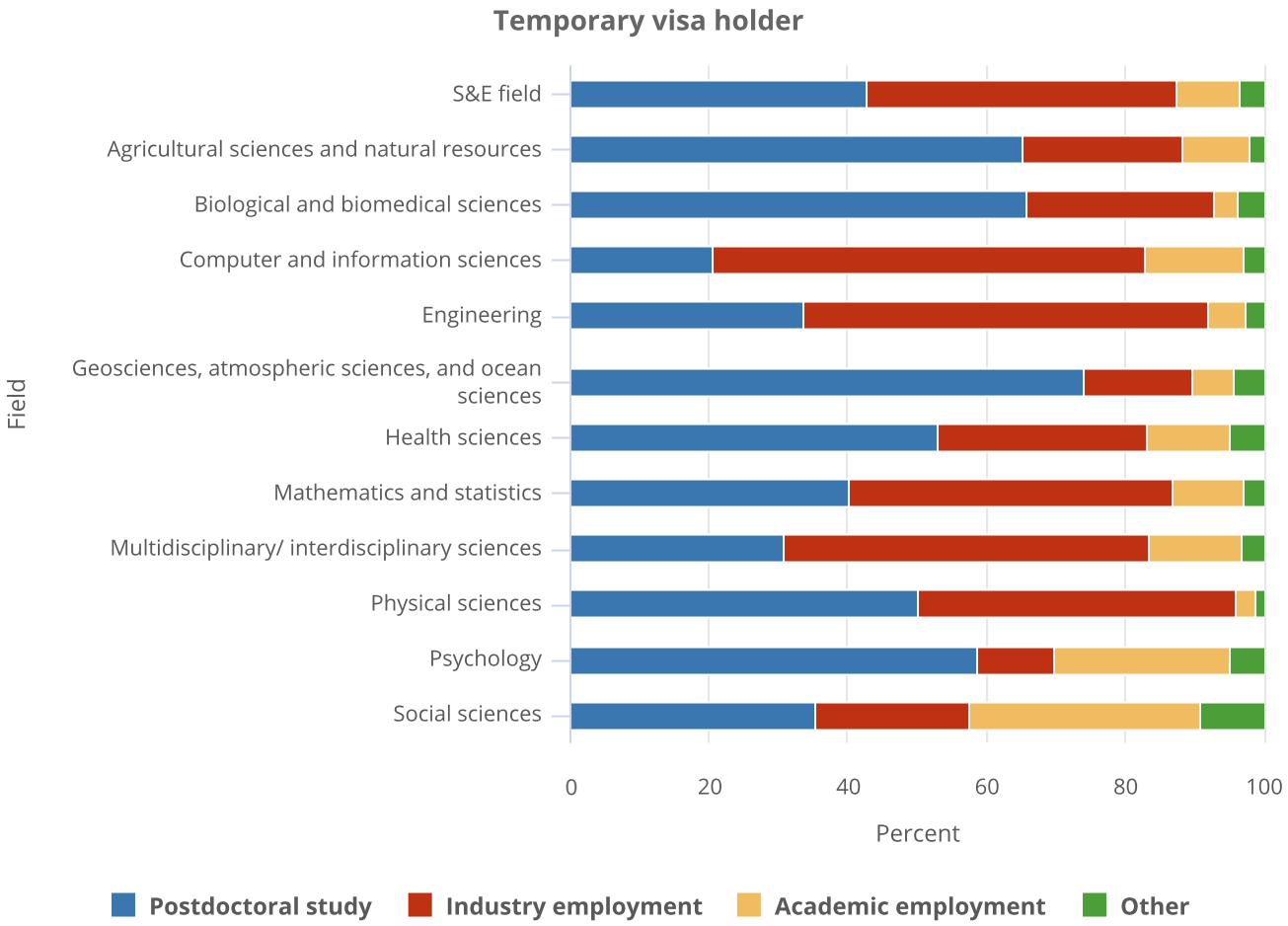
Science and Engineering Indicators

Postdoctoral study or training is a temporary position in which doctorate recipients can gain additional education and training in research, usually awarded in academia, industry, government, or a nonprofit organization.[29] In 2023, among S&E doctorate recipients who reported postgraduation employment in the United States, about 42% reported having secured a postdoctoral training position, regardless of citizenship status. However, larger proportions of temporary visa holders than U.S. citizens reported postdoctoral positions in several S&E fields, particularly health sciences (53% vs. 26%), agricultural sciences and natural resources (65% vs. 41%), and geosciences, atmospheric sciences, and ocean sciences (74% vs. 60%) (Figure TAL-38; Table TAL-15).

Among doctorate recipients with definite postgraduation employment commitments in the United States, a larger proportion of U.S. citizens and permanent residents than temporary visa holders reported academic appointments that were not postdoctoral study (17% vs. 9%), whereas a larger proportion of temporary visa holders (45%) reported an industry position compared with their U.S. citizen and permanent resident counterparts (29%). This pattern can be observed in most fields of study (Figure TAL-38; Table TAL-15).

Figure TAL-38. S&E doctorate recipients with definite postgraduation commitments in the United States, by type of commitment, citizenship status, and major field of doctorate: 2023





Note(s):
A definite postgraduation commitment includes accepting new employment or a postdoctoral study (postdoc) position or returning to predoctoral employment. Industry employment includes doctorate recipients reporting self-employment. Other includes doctorate recipients reporting government, nonprofit, elementary or secondary school, or other employment and those with unknown employment. The survey data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the Classification and Instructional Programs–based field taxonomy, which is used for reporting single-year data from 2021 to the present; the data may not match the data based on the trend field taxonomy. For more information about the 2021 field taxonomy changes, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Earned Doctorates (SED), 2023.

Science and Engineering Indicators

International Comparisons and Global Competitiveness

International comparisons of U.S. STEM talent help illustrate the competitiveness of the U.S. S&E enterprise. Comparative indicators of K–12 STEM education and STEM doctoral degrees, as well as stay rates of international STEM doctoral students in the United States and the enrollment of internationally mobile students in select countries, highlight the current state of U.S. competitiveness on important dimensions of STEM talent.

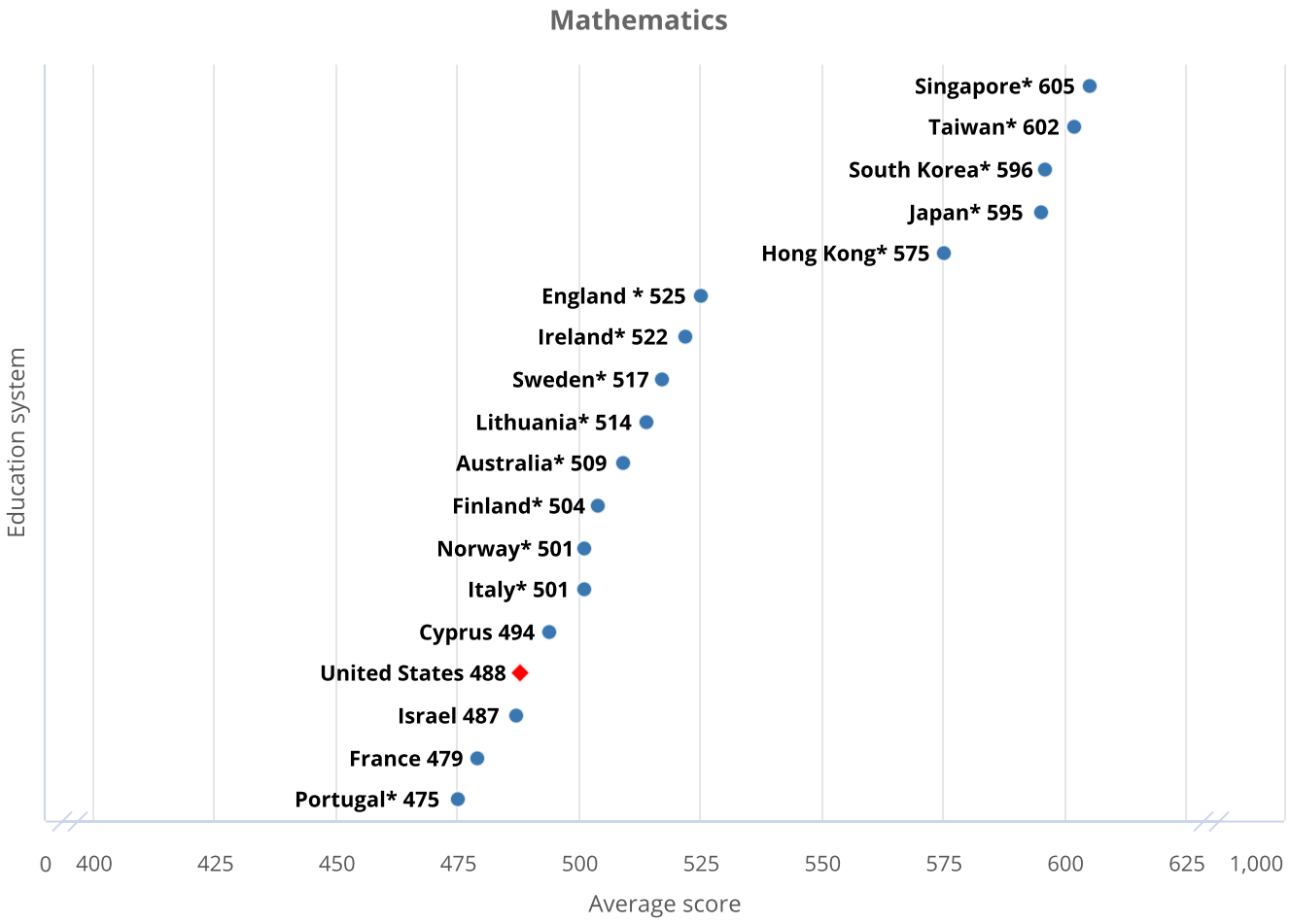
K–12 STEM Education

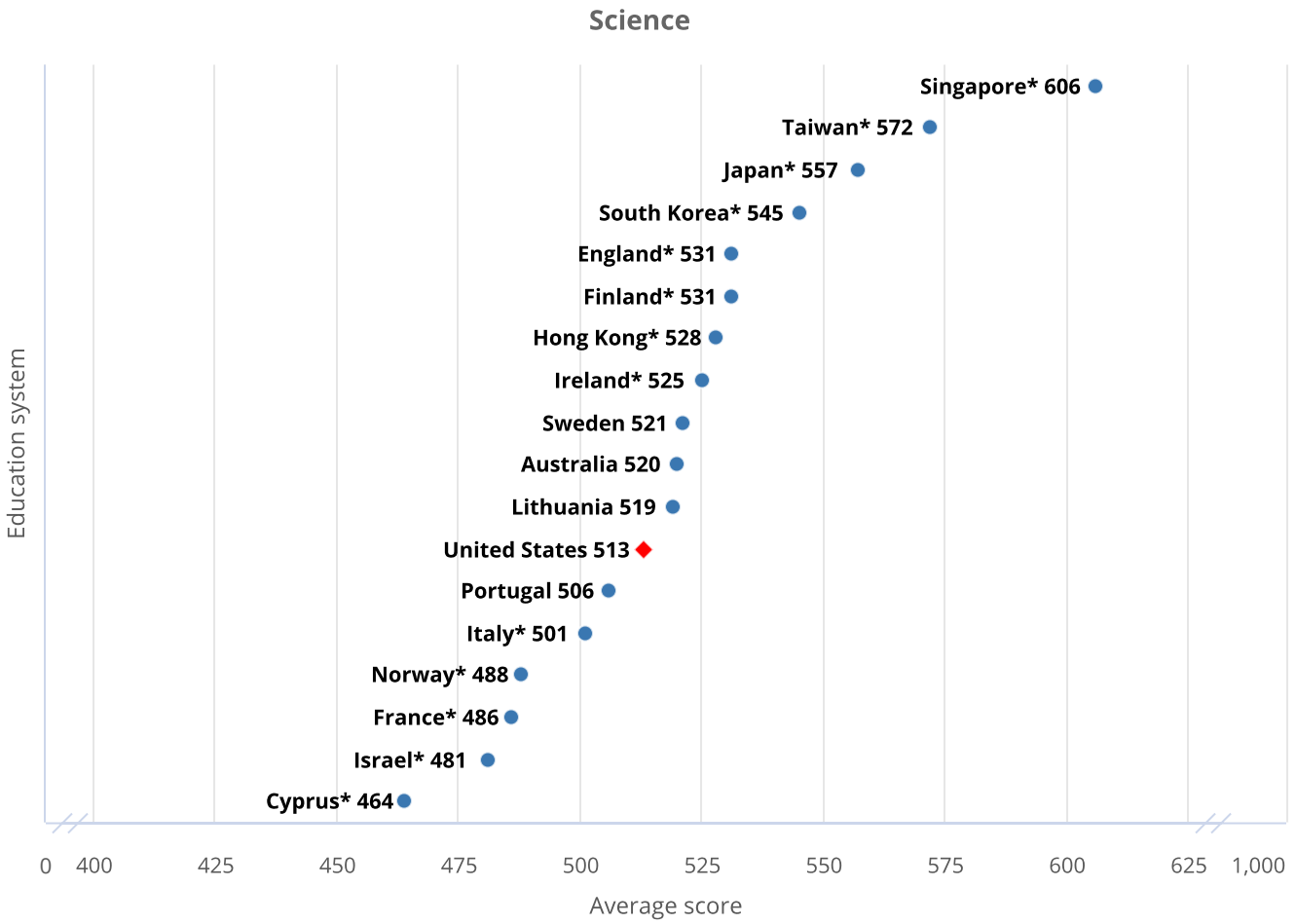
The United States participates in two international assessments that are used to describe how the mathematics and science performance of students in the United States compares with that of students in other nations. The Trends in International Mathematics and Science Study (TIMSS) is administered to fourth- and eighth-grade students every 4 years and focuses on foundational mathematics and science content knowledge (NCES 2024c). The Programme for International Student Assessment (PISA) is administered to 15-year-olds in Organisation for Economic Co-operation and Development (OECD) countries every 3 years and focuses on students' mathematics and science literacy as measured by their ability to apply skills to real-world contexts.

TIMSS and PISA Scores

U.S. scores on the TIMSS 2023 assessment show that U.S. eighth graders perform better in science than they do in mathematics on international assessments (Figure TAL-39). Among the 18 advanced economies that participated in TIMSS 2023 at the eighth-grade level, 13 had average mathematics scores that were higher than the average U.S. score, and 8 had average science scores that were higher than the average U.S. score.[30] Singapore and Taiwan scored highest on both assessments.

Figure TAL-39. Average scores of students in grade 8 on the TIMSS mathematics and science scales among participating advanced economies, by education system: 2023





* $p < 0.05$; significantly different from the U.S. estimate at the 0.05 level of statistical significance.

TIMSS = Trends in International Mathematics and Science Study.

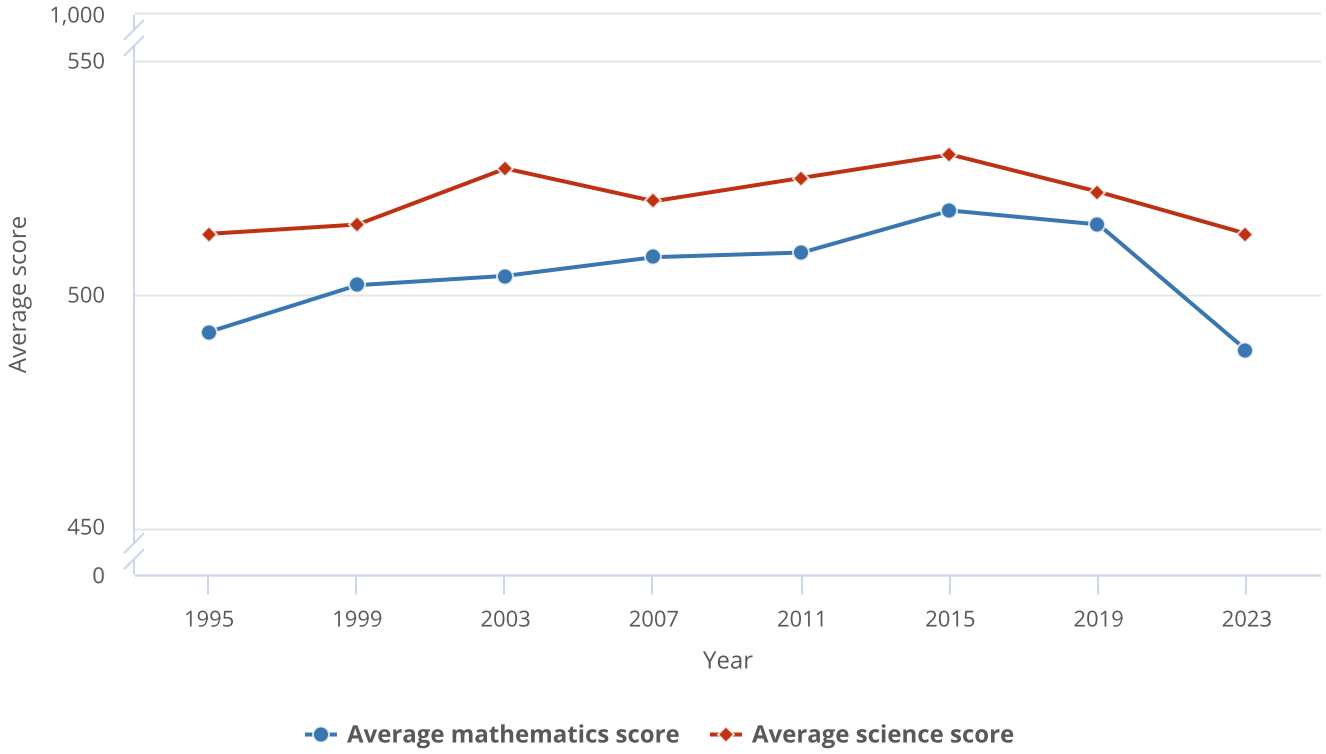
Note(s):
TIMSS participants include countries that are complete, independent political entities and non-national entities (e.g., Hong Kong). Advanced economies are based on the International Monetary Fund (IMF) designation of advanced economies (IMF 2022). Education systems are ordered by average mathematics score.

Source(s):
International Association for the Evaluation of Educational Achievement, TIMSS, 2023.

Science and Engineering Indicators

Between 2019 (before the COVID-19 pandemic) and 2023, the average mathematics scores of eighth-grade U.S. students decreased by 27 points (Figure TAL-40). The average science scores for eighth-grade students in the United States in 2023 did not exhibit a statistically significant difference from the average science scores observed in 2019. As with TIMSS, the 2022 PISA results show that U.S. 15-year-olds performed better in science than in mathematics on international assessments. In 2022, 37 OECD countries participated in PISA. Of those, 21 scored higher than the United States in mathematics, and 6 scored higher than the United States in science. Japan, South Korea, Estonia, and Switzerland were the highest-scoring OECD countries in mathematics in 2022, and Japan and South Korea were the highest scoring in science (Table STAL-22).

Figure TAL-40. Average scores of U.S. students in grade 8 on the TIMSS mathematics and science scales: 1995–2023



TIMSS = Trends in International Mathematics and Science Study.

Note(s):
The scale for mathematics and science scores is 0–1,000.

Source(s):
International Association for the Evaluation of Educational Achievement, TIMSS, 1995, 1999, 2003, 2007, 2011, 2015, 2019, and 2023.

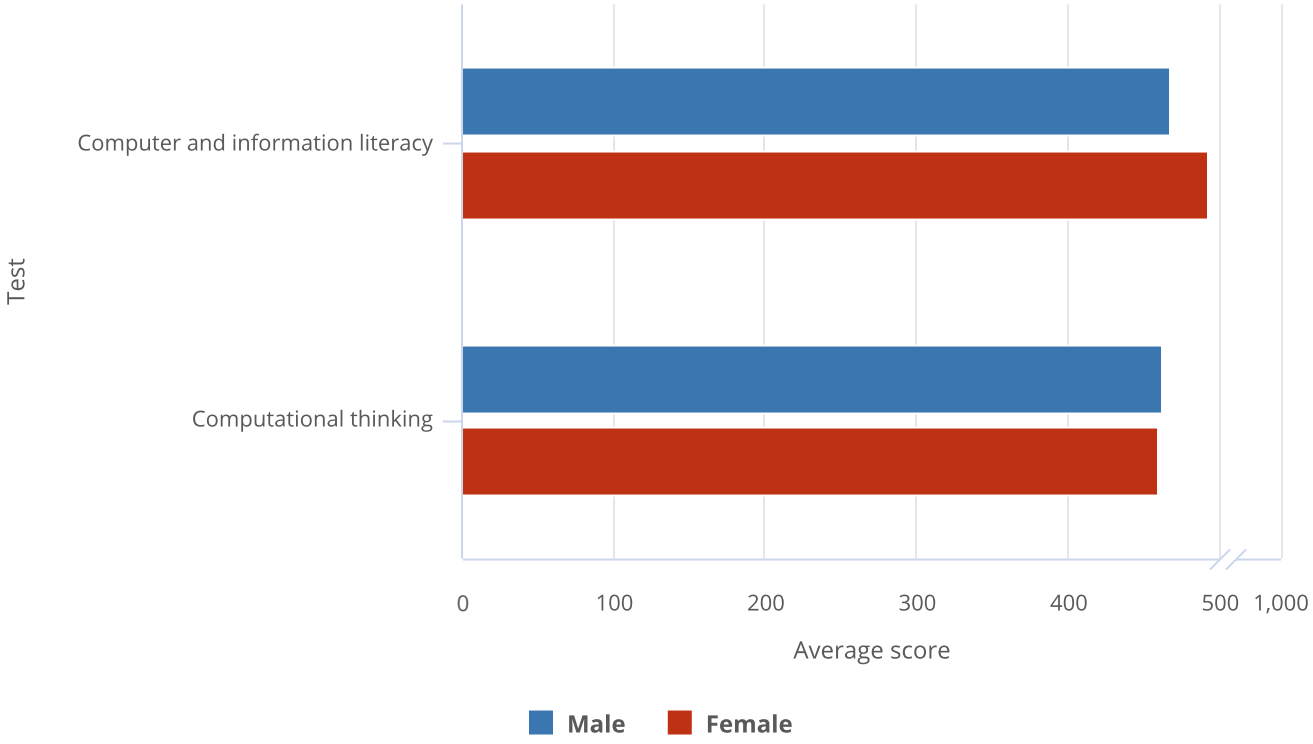
Science and Engineering Indicators

International Comparisons of Computer Science Performance

The International Computer and Information Literacy Study (ICILS) is a computer-based international assessment sponsored by the International Association for the Evaluation of Educational Achievement. It measures eighth-grade student performance in computer and information literacy (the ability to use computers effectively in everyday life at home, work, and school) and in computational thinking (the use of computers to solve problems; this includes such skills as programming). In 2023, 16 of the 33 education systems participating in the computer and information literacy assessment scored higher than the United States, and 14 of the 23 education systems participating in the computational thinking assessment scored higher than the United States. South Korea, Taiwan, and Czechia were among the highest-scoring countries across both assessments (Table STAL-23).

ICILS also provides insight into variations in computer science knowledge and ability among U.S. students by sex, race or ethnicity, and school poverty level. Female students scored higher than male students in computer and information literacy; there was no measurable difference in scores between male students and female students in computational thinking (Figure TAL-41).

Figure TAL-41. Average scores of U.S. students in grade 8 on the ICILS computer science assessment, by sex: 2023



CIL = computer and information literacy; CT = computational thinking; ICILS = International Computer and Information Literacy Study.

Note(s):
The scale for CIL and CT scores is 100–700.

Source(s):
International Association for the Evaluation of Educational Achievement (IEA), ICILS, 2023, https://nces.ed.gov/surveys/icils/icils2023/international.asp.

Science and Engineering Indicators

Asian students had the highest scores in both domains, followed by White, Hispanic, and Black students. U.S. eighth-grade students in schools with less than 25% of students eligible for free or reduced-price lunch outscored students in schools with 75% or more students eligible in both domains (Table TAL-16). For more detailed ICILS data, please refer to National Center for Education Statistics (NCES 2024b).

Table TAL-16. Average CIL and CT scores of U.S. students in grade 8, by race or ethnicity and school poverty level: 2023

(Average score)

Characteristic	Average CIL score	Average CT score
Race or ethnicity		
American Indian or Alaska Native	NA	NA
Asian	555	533
Black	440	407
Hispanic	462	433
Native Hawaiian or Other Pacific Islander	NA	NA
Two or more races	503	483
White	513	495
School poverty level		
75.0% or more	440	417

Table TAL-16. Average CIL and CT scores of U.S. students in grade 8, by race or ethnicity and school poverty level: 2023

(Average score)

Characteristic	Average CIL score	Average CT score
50.0%–74.9%	476	455
25.0%–49.9%	495	484
Less than 25.0%	524	509

NA = not available.

CIL = computer and information literacy; CT = computational thinking.

Note(s):
The scale of CIL and CT scores is 100–700. School poverty level is the percentage of students eligible for free or reduced-price lunch.

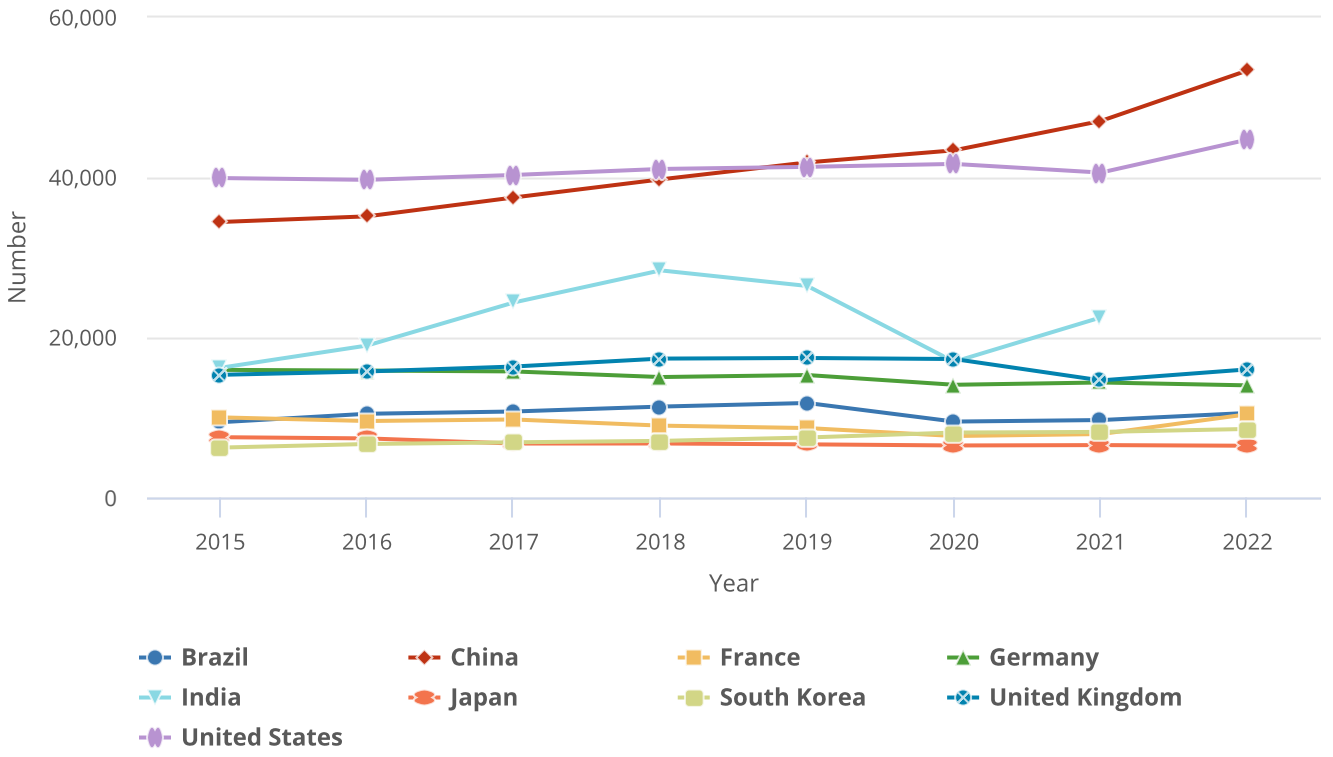
Source(s):
International Association for the Evaluation of Educational Achievement (IEA), International Computer and Information Literacy Study (ICILS), 2023, https://nces.ed.gov/surveys/icils/icils2023/international.asp.

Science and Engineering Indicators

STEM Doctoral Degrees, Stay Rates, and Internationally Mobile Students

Doctoral education trains scientists, engineers, researchers, and scholars, all of whom are critical for countries' innovation capacity and progress. Doctorate recipients create and share new knowledge and new ways of thinking that lead to new products and services. China awarded the highest number of S&E doctoral degrees (53,400) in 2022, followed by the United States (44,700), which China surpassed in 2019 (Figure TAL-42).[31] After experiencing rapid growth in the mid-2010s, the number of S&E doctoral degrees awarded in India dropped to 17,000 in 2020 but increased again to 22,500 in 2021 (the latest data available). In 2022, other top awarders of S&E doctoral degrees included the United Kingdom (16,000), Germany (14,000), Brazil (10,600), France (10,400), South Korea (8,600), and Japan (6,500). Among these countries, in 2022, the proportion of S&E doctoral degrees of all doctoral degrees awarded among the top awarders of S&E degrees ranged from 44% in Japan to 72% in France (Figure TAL-43), but the composition of S&E degrees varied.

Figure TAL-42. S&E doctoral degrees awarded, by selected country: 2015–22

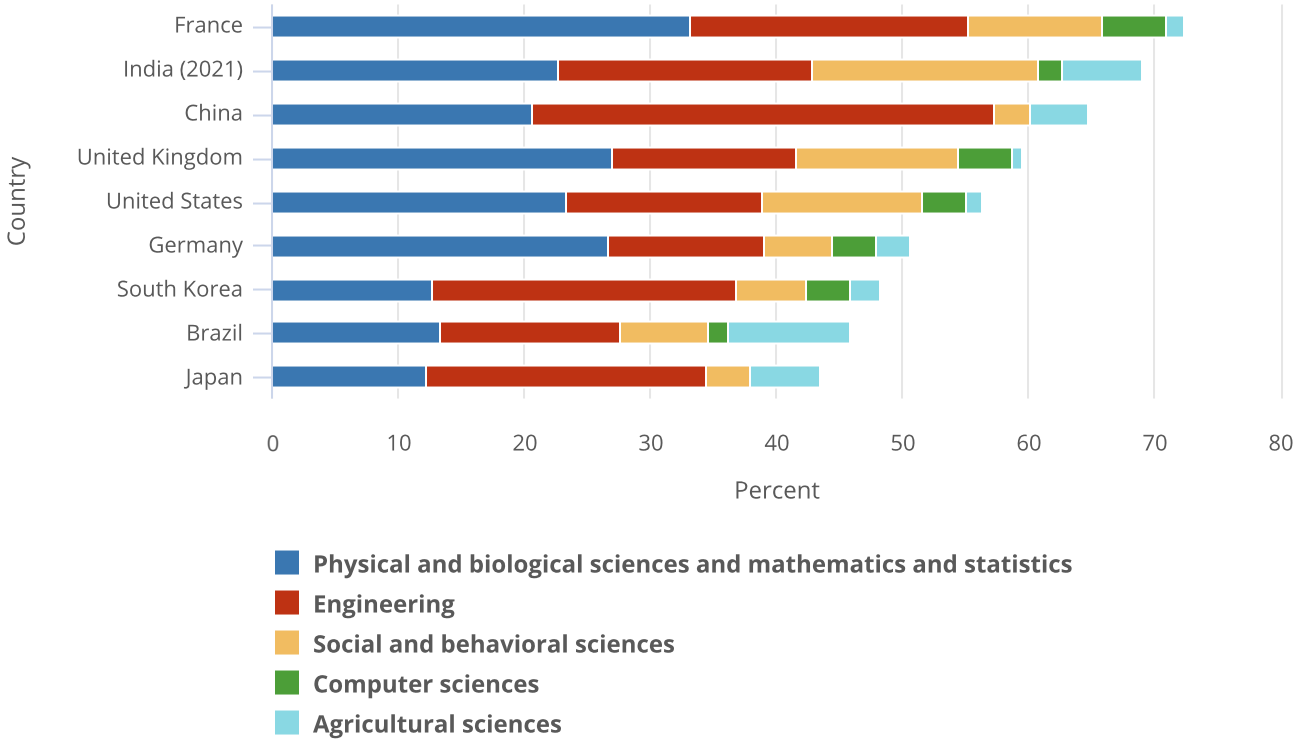


Note(s):
To facilitate international comparison, data for the United States are those reported to the Organisation for Economic Co-operation and Development (OECD), which vary from the National Center for Science and Engineering Statistics classification of fields presented in other sections of the report. Data for India are not available for 2022.

Source(s):
OECD, *Education at a Glance*; National Bureau of Statistics of China, *China Statistical Yearbook*; People's Republic of China, Ministry of Education data; Government of India, Ministry of Education, Department of Higher Education, *All India Survey on Higher Education*.

Science and Engineering Indicators

Figure TAL-43. Doctoral degrees awarded, by S&E field and selected country: 2022



Note(s):
Computer sciences is included under engineering for China and Japan. The latest year of data available for India is 2021. To facilitate international comparison, data for the United States are those reported to the Organisation for Economic Co-operation and Development (OECD), which vary from the National Center for Science and Engineering Statistics classification of fields presented in other sections of the report.

Source(s):
OECD, *Education at a Glance*; People's Republic of China, Ministry of Education data; Government of India, Ministry of Education, Department of Higher Education, *All India Survey on Higher Education*.

Science and Engineering Indicators

Degrees in physical and biological sciences and in mathematics and statistics accounted for the largest share of doctoral degrees in S&E fields in most of these countries. However, engineering degrees were more common in East Asian countries, especially China, where 37% of all doctoral degrees were awarded in engineering in 2022, compared with 21% in physical and biological sciences and in mathematics and statistics. Doctoral degrees in computer sciences and agricultural sciences typically account for the lowest shares of S&E degrees, but agricultural sciences doctoral degrees were comparatively more common in Brazil (10% of all doctoral degrees awarded in 2022) and in India (6% of all doctoral degrees awarded in 2021) than in the other countries.

Stay Rates of U.S.-Trained Scientists and Engineers on Temporary Visas

Stay rates of U.S.-trained scientists and engineers provide insights into whether international students remain in the United States after earning their degrees. The National Science Board's (NSB's) *Vision 2030* report suggested that attracting and retaining global talent are necessary for the United States to remain competitive in S&E fields and that stay rates are critical indicators for understanding how well the United States is retaining global talent (NSB 2020b).

The rate at which S&E doctorate recipients with temporary visas intended to stay in the United States at the time of graduation remained relatively stable between 2012 and 2023 at about 73%–76% (Table TAL-17). Among the most recent S&E doctorate recipients with temporary visas who earned their degree between 2020 and 2023, plans to stay in the United States were highest for those in biological and biomedical sciences (81%), computer and information sciences (81%), engineering (80%), and physical sciences (79%) and lowest for those in the social sciences (57%), health sciences (67%), and psychology (68%). Among S&E doctorate recipients with temporary visas from the four countries with the highest number of recipients between 2020 and 2023 (China, India, South Korea, and Iran), intentions to stay in the United States ranged from 92% (Iran) to 69% (South Korea).

Table TAL-17. Postgraduation plans of U.S. S&E doctorates on temporary resident visas to stay in the United States, by broad field of doctorate and country or economy of origin: 2012–23

(Number and percent)

Field and country or economy of origin	Temporary residents								
	Doctorate recipients (number)			Plans to stay (%)			Definite commitments to stay (%)		
	2012–15	2016–19	2020–23	2012–15	2016–19	2020–23	2012–15	2016–19	2020–23
All S&E fields	53,953	59,440	65,181	73.4	75.0	76.3	44.6	49.5	56.8
Agricultural sciences and natural resources	2,198	2,501	2,426	62.6	62.7	69.5	35.7	37.3	48.3
Biological and biomedical sciences	8,930	8,770	8,788	78.7	81.0	81.3	47.3	52.7	60.2
Computer and information sciences	3,983	4,797	6,046	82.4	82.2	81.1	55.3	60.5	64.9
Engineering	19,183	21,136	23,906	78.0	79.4	80.3	44.8	50.3	58.3
Geosciences, atmospheric sciences, and ocean sciences	1,204	1,543	1,523	69.7	71.2	72.6	48.7	46.1	54.2
Health sciences	1,679	2,165	2,236	68.1	66.4	66.6	39.7	43.3	48.0
Mathematics and statistics	3,234	3,613	4,328	72.5	75.2	73.9	49.4	56.2	59.0
Physical sciences	7,082	7,787	7,987	76.5	77.6	79.0	45.9	50.5	58.7
Psychology	1,045	1,214	1,305	57.5	65.7	67.8	37.4	46.2	53.1
Social sciences	5,415	5,914	6,636	48.4	52.4	57.1	32.8	36.7	43.6
Country or economy of origin									
China[a]	17,973	21,735	23,345	82.7	81.8	78.7	49.4	54.2	60.1
India	8,547	7,802	9,345	86.0	87.8	88.4	51.1	57.3	65.8
South Korea	3,994	3,263	3,050	63.7	67.5	69.3	39.4	46.5	54.0
Iran	1,729	3,143	3,025	88.8	92.3	92.4	54.2	58.4	65.8
Bangladesh	447	945	1,800	85.5	88.6	89.3	44.5	56.4	66.2
Saudi Arabia	268	1,132	1,597	16.0	12.7	14.1	6.7	4.3	4.9
Taiwan	2,229	1,806	1,586	72.7	79.6	80.9	42.4	49.9	59.4
Canada	1,286	1,183	1,204	60.5	65.3	64.5	41.8	50.5	51.7
Turkey	1,490	1,461	1,155	63.4	64.7	72.8	40.3	44.4	55.2
Nepal	560	866	1,081	87.1	90.3	93.7	49.3	52.3	65.7
Brazil	511	640	1,017	49.3	62.3	71.2	32.5	49.2	57.3
Sri Lanka	494	562	770	78.1	82.9	84.7	41.9	47.5	57.8
Nigeria	259	418	750	82.6	85.4	88.0	43.2	45.0	53.7
Mexico	649	655	749	58.2	66.7	76.0	36.7	43.2	55.5
Colombia	617	651	673	61.1	58.5	69.2	40.0	40.6	51.3
Unknown foreign country	307	971	1,368	34.2	45.6	56.5	19.2	30.8	39.9
Other	12,593	12,207	12,666	58.4	61.0	67.8	37.4	41.2	49.8

[a] Includes Hong Kong.

Note(s):
Data include doctorate recipients who are on temporary resident visas. Percentages are based on the total number of S&E doctorate recipients on temporary resident visas, including those who did not report their postgraduate location plans or employment plans. Recipients who plan to stay report intending to locate in the United States; definite commitments include doctorate recipients reporting having a definite commitment for a postdoctoral appointment or employment in the United States. The Survey of Earned Doctorates (SED) data collection for field of study changed in 2021, which may affect the data comparison across years. This figure uses the trend field taxonomy that facilitates trend data comparisons with prior years; for more information, see the "Technical Notes" in https://ncses.nsf.gov/surveys/earned-doctorates/2024. See also Table 3-4, https://ncses.nsf.gov/pubs/nsf25349/table/3-4.

Source(s):
National Center for Science and Engineering Statistics, SED.

Science and Engineering Indicators

The proportion of S&E research doctorate recipients with temporary visas who had definite commitments to stay in the United States at the time of responding to the survey (e.g., those with postdoctoral appointments or employment commitments) was 45% for those who earned their doctorate between 2012 and 2015 and 57% for those who earned their doctorate between 2020 and 2023 (Table TAL-17).[32] For the most recent cohort of doctorate recipients (2020–23), the proportion of doctorate recipients with temporary visas and definite commitments to stay was highest among those in computer and information sciences (65%), biological and biomedical sciences (60%), mathematics and statistics (59%), physical sciences (59%), and engineering (58%). The highest proportions of doctorate recipients with temporary visas and definite commitments to stay in the United States (about two-thirds) were among those from Bangladesh, Iran, India, and Nepal; proportions were lower among those from China (60%), Taiwan (59%), and South Korea (54%).

Long-Term Stay Rates of S&E Doctorate Holders

Although intentions to stay provide insight at the time of degree completion, the short- and long-term stay rates for S&E research doctorate recipients with temporary visas from earlier graduation cohorts show the longer-term retention of doctorate-holding scientists and engineers in the United States.[33] Across the 44,450 temporary visa holders from all countries of citizenship and S&E degree fields who earned their doctorate between academic years 2017 and 2019, the short-term stay rate (approximately 5 years after graduation) was 73% in 2023. Among the 42,250 temporary visa holders from all countries of citizenship and S&E degree fields who earned their doctorate between academic years 2012 and 2014, the long-term stay rate (approximately 10 years after graduation) was 68% (Figure TAL-44; Table TAL-18). Although the short-term stay rate in 2023 (73%) increased slightly from 2021 (71%), there was no statistically significant difference in the long-term stay rate between 2021 and 2023.

Figure TAL-44. Stay rates for U.S. S&E doctoral degree recipients with temporary visas at graduation: 2003–23

Note(s):
Data are available for odd-numbered years only. Short-term stay rates are based on individuals who remain in the United States approximately 5 years after graduation, and long-term stay rates are based on individuals who remain in the United States approximately 10 years after graduation. Data are not available for 2019. Stay rate estimates prior to 2011 may not be comparable to subsequent years due to differences in source data.

Source(s):
Finn M, 2014, *Stay Rates of Foreign Doctoral Recipients from U.S. Universities, 2011,* Oak Ridge Institute for Science and Education (2001–11); National Center for Science and Engineering Statistics, Survey of Doctorate Recipients (SDR), 2013–23.

Science and Engineering Indicators

Table TAL-18. U.S. stay rates for S&E doctorates holding temporary U.S. visas at doctoral graduation, by key characteristics: 2023

(Number and percent)

Key characteristics	Doctorate recipients, academic years 2017–19 (number)[a]	Short-term U.S. stay rate (%)	Doctorate recipients, academic years 2012–14 (number)[b]	Long-term U.S. stay rate (%)
Total	44,450	73.0	42,250	68
Doctoral fields				
Biological, agricultural, and environmental life sciences and health	9,650	75	10,450	70
Computer and mathematical sciences	6,550	75	5,350	76
Physical sciences	6,500	75	6,400	65
Social sciences	5,750	49	5,100	49
Engineering	16,000	80	15,000	71
Citizenship: Select countries				
China (including Hong Kong and Macau)	15,850	83	12,000	85
India	5,750	86	5,850	75
Iran	2,600	97	1,000	96
South Korea	2,550	50	3,950	45

Table TAL-18. U.S. stay rates for S&E doctorates holding temporary U.S. visas at doctoral graduation, by key characteristics: 2023

(Number and percent)

Key characteristics	Doctorate recipients, academic years 2017–19 (number)[a]	Short-term U.S. stay rate (%)	Doctorate recipients, academic years 2012–14 (number)[b]	Long-term U.S. stay rate (%)
Turkey	1,350	53	1,650	50
Taiwan	1,150	68	1,600	66
Canada	950	59	1,150	62
All other countries	14,300	61	15,000	58
Citizenship: World region				
Europe	4,600	63	5,900	57
Asia	33,500	77	30,600	70
North America[c]	1,400	64	1,550	60
South America	1,750	58	1,550	53
Africa	1,800	75	1,750	81
All other regions[d]	1,400	60	850	71

[a] U.S.-trained S&E doctorate recipients holding temporary U.S. visas at graduation, degrees awarded between 1 July 2016 and 30 June 2019.
[b] U.S.-trained S&E doctorate recipients holding temporary U.S. visas at graduation, degrees awarded between 1 July 2011 and 30 June 2014.
[c] North America excludes the United States.
[d] Other regions include the Caribbean, Central America, Oceania, and abroad, region not specified.

Note(s):
The National Center for Science and Engineering Statistics (NCSES) estimates short-term and long-term stay rates. Short-term stay rates are based on individuals who remain in the United States approximately 5 years after graduation, and long-term stay rates are based on individuals who remain in the United States approximately 10 years after graduation. Stay rate is the percentage residing in the United States on 1 February 2023 of U.S.-trained S&E doctorate recipients holding temporary U.S. visas at doctorate graduation. Weighted frequencies are rounded to the nearest 50. Stay rates are rounded to the nearest integer. Due to changes in the NCSES Taxonomy of Disciplines, field of degree numbers and proportions may not be comparable with those from prior years. Detail may not add to total due to rounding.

Source(s):
NCSES, Survey of Doctorate Recipients (SDR), 2023.

Science and Engineering Indicators

Stay rates varied by field of doctoral degree and by country and region of citizenship (Table TAL-18).[34] The short- and long-term stay rates of doctorate recipients with temporary visas were similar in computer and mathematical sciences (about 75%). Yet, for doctorate holders in engineering and in physical sciences, the short-term stay rates were higher than the long-term stay rates. For doctorate holders in engineering, the short-term stay rate was 80%, and the long-term stay rate was 71%; for those in the physical sciences, the short-term stay rate was 75%, and the long-term stay rate was 65%. Doctorate holders with Indian citizenship had greater short-term stay rates (86%) than long-term stay rates (75%).

Internationally Mobile Students Enrolled in Tertiary Education

Global S&E connections and research collaboration, which can be facilitated by the international exchange of students, are areas of substantial interest to the NSB (NSB 2020b). In 2023, the United States was the most popular destination for internationally mobile tertiary (postsecondary) students, enrolling 957,000 of them (see the Glossary section for a definition of internationally mobile students). Other popular destinations for internationally mobile students were the United Kingdom (748,000), Australia (467,000), Germany (423,000), Canada (389,000), and Russia (336,000) (Table TAL-19). From 2017 to 2023, the number of international students in the United States decreased by 3%, whereas it increased in all other top countries of destination between 2017 and 2023 or the latest year of data available.

Table TAL-19. Internationally mobile students enrolled in tertiary education, by selected country of destination: 2017–23

(Number)

Country	2017	2018	2019	2020	2021	2022	2023
United States	984,898	987,314	NA	957,475	833,204	NA	956,923
United Kingdom	435,734	452,079	489,019	550,877	600,589	674,931	748,461

Table TAL-19. Internationally mobile students enrolled in tertiary education, by selected country of destination: 2017–23

(Number)

Country	2017	2018	2019	2020	2021	2022	2023
Australia	381,202	444,514	509,160	458,279	378,439	382,007	467,074
Germany	258,873	311,738	333,233	368,717	376,359	403,473	423,197
Canada	209,979	224,548	279,168	323,157	312,630	336,837	389,181
Russia	250,658	262,416	282,922	NA	321,845	340,326	336,453
France	258,380	229,623	246,378	252,444	252,856	263,459	276,217
Turkey	108,076	125,138	154,505	185,047	224,048	244,027	NA
United Arab Emirates	NA	199,958	204,942	210,030	208,453	225,845	237,034
China	157,108	178,271	201,177	225,100	221,653	210,903	200,892
Japan	164,338	182,748	202,907	222,661	216,241	199,298	181,821
All other countries	1,862,868	1,816,711	1,974,039	2,184,285	2,200,359	2,205,454	2,309,682

NA = not available.

Note(s):
Data include only degree-mobile students who have physically crossed an international border to enroll with the objective of graduating with a degree in the country of destination. Students enrolled in short-term, for-credit programs and exchange programs are excluded.

Source(s):
United Nations Educational, Scientific and Cultural Organization (UNESCO), Institute for Statistics (UIS) database.

Science and Engineering Indicators

Conclusion

As the bedrock of the U.S. S&E enterprise, STEM talent contributes to the competitiveness of U.S. research and U.S. industry globally. This report presents indicators of the STEM workforce, pathways to STEM employment, persistence and attrition in STEM, and international comparisons of U.S. STEM competitiveness. A globally competitive infrastructure through which STEM talent is educated and trained to join the workforce remains a key part of the performance of the domestic S&E enterprise.

In 2023, STEM workers made up 25% of the U.S. workforce. Employment in STEM occupations increased by 26%, from 29 million in 2013 to 36 million in 2023, and contributed to increasing shares of the workforce. From 2013 to 2023, the unemployment rate of STEM workers was lower than that of non-STEM workers each year, and STEM occupations had higher median earnings ($76,000) than non-STEM occupations ($55,000).

Education data showed that U.S. fourth and eighth graders demonstrated some, but not complete, learning recovery after the COVID-19 pandemic for higher-performing students but no improvement for lower-performing students. Further, students taught by teachers with 6 or more years of experience or by credentialed teachers posted higher scores than students taught by less-experienced teachers or teachers with alternative certifications. Between 2021 and 2023, the number of students earning S&E master's degrees and doctoral degrees reached new peaks, whereas the number of students earning associate's and bachelor's degrees declined. At the associate's and master's levels, computer and information sciences was the top field of study. At the bachelor's level, the top field was the social sciences; at the doctoral level, it was engineering.

U.S. K–12 students perform lower on average than students in other countries in mathematics and science assessments. Institutions of higher education in China awarded the highest number of S&E doctoral degrees in 2022 (53,000), followed by the United States (45,000). In 2023, 39% of S&E doctorate recipients who earned their degree at U.S. universities were temporary visa holders; three-quarters of them reported the intention to stay in the United States after completing their degree and more than half had definite commitments to stay at the time they obtained their doctorate. Overall, the United States continues to attract the largest number of internationally mobile students worldwide, although its share of international students has dropped since 2017.

Glossary

Definitions

Full-time, year-round workers: Workers who were employed at least 50 weeks in the preceding year (year-round workers) and worked at least 35 hours per week during that year (full-time workers).

Internationally mobile students: Students who have physically crossed an international border to enroll with the objective of graduating with a degree in the country of destination. Students enrolled in short-term for-credit programs and exchange programs are excluded (UNESCO UIS 2025).

Science and engineering (S&E) degree fields: Under the National Center for Science and Engineering (NCSES) Taxonomy of Disciplines (TOD), S&E fields include agricultural sciences and natural resources; biological and biomedical sciences; computer and information sciences; engineering; geosciences, atmospheric sciences, and ocean sciences; mathematics and statistics; multidisciplinary and interdisciplinary sciences; physical sciences; psychology; and social sciences. The fields taxonomy is guided by the NCSES TOD, and the fields may be aggregated further for analysis and reporting.

Science and engineering (S&E) occupations: Occupations in the following five major categories: (1) computer and mathematical scientists; (2) biological, agricultural, and environmental life scientists; (3) physical scientists; (4) social scientists; and (5) engineers.

Science and engineering (S&E)-related degree fields: Under the National Center for Science and Engineering (NCSES) Taxonomy of Disciplines (TOD), S&E-related fields include health professions and related programs; homeland security and fire protection; science and mathematics teacher education; technology and technical fields; and other science and engineering related fields. The fields taxonomy is guided by the NCSES TOD, and the fields may be aggregated further for analysis and reporting.

Science and engineering (S&E)-related occupations: These occupations require science and technology expertise but are not part of the five major categories of S&E occupations. S&E-related occupations include these four minor occupations: (1) health, (2) S&E managers, (3) S&E precollege teachers, and (4) technologists and technicians.

Science, technology, engineering, and mathematics (STEM) fields: STEM fields include science and engineering (S&E) degree fields and S&E-related degree fields.

Science, technology, engineering, and mathematics (STEM) middle-skill occupations: A range of occupations that require a high level of STEM expertise to perform their core duties, although these occupations do not require a bachelor's degree for entry. STEM middle-skill occupations are primarily in health care; construction; installation, maintenance, and repair; and production.

Science, technology, engineering, and mathematics (STEM) workforce: The STEM workforce is composed of workers in S&E, S&E-related, or STEM middle-skill occupations.

Key to Acronyms and Abbreviations

ACS: American Community Survey

AP: Advanced Placement

BERD: Business Enterprise Research and Development survey

BLS: Bureau of Labor Statistics

BRDIS: Business R&D and Innovation Survey

BRDS: Business Research and Development Survey

CPS: Current Population Survey

CRDC: Civil Rights Data Collection

HBCU: historically Black college or university

HSLS: High School Longitudinal Study

ICILS: International Computer and Information Literacy Study

IPEDS: Integrated Postsecondary Education Data System

K–12: kindergarten through 12th grade

NAEP: National Assessment of Educational Progress

NAICS: North American Industry Classification System

NCSES: National Center for Science and Engineering Statistics

NSB: National Science Board

NSCG: National Survey of College Graduates

NSLP: National School Lunch Program

OECD: Organisation for Economic Co-operation and Development

OEWS: Occupational Employment and Wage Statistics

PISA: Programme for International Student Assessment

PUMA: Public Use Microdata Area

R&D: research and development

S&E: science and engineering

SES: socioeconomic status

SIPP: Survey of Income and Program Participation

SIRD: Survey of Industrial Research and Development

STEM: science, technology, engineering, and mathematics

TCCU: tribally controlled college or university

TIMSS: Trends in International Mathematics and Science Study

References

Bureau of Labor Statistics (BLS). n.d. *Occupational Requirements Survey: Credentials*. Available at https://www.bls.gov/ors/factsheet/credentials.htm. Accessed 8 August 2025.

Bureau of Labor Statistics (BLS). 2019. *Professional Certifications and Occupational Licenses: Evidence from the Current Population Survey*. Available at https://www.bls.gov/opub/mlr/2019/article/pdf/professional-certifications-and-occupational-licenses.pdf. Accessed 9 June 2025.

Bureau of Labor Statistics (BLS). 2023. *Labor Force Statistics from the Current Population Survey*. Available at https://www.bls.gov/cps/certifications-and-licenses.htm. Accessed 9 June 2025.

Bureau of Labor Statistics (BLS). 2025a. *Household Data Annual Averages*. Table 50. Suitland, MD. Available at https://www.bls.gov/cps/cpsaat50.pdf. Accessed 9 June 2025.

Bureau of Labor Statistics (BLS). 2025b. *Household Data Annual Averages*. Table 54. Suitland, MD. Available at https://www.bls.gov/cps/cpsaat54.htm. Accessed 9 June 2025.

Bureau of Labor Statistics (BLS). 2025c. *Occupational Employment Projections Data, Special Tabulations of 2024–34 Employment Projections*. Available at https://www.bls.gov/emp/data/occupational-data.htm. Accessed 25 November 2025.

Census Bureau. 2014–24. *American Community Survey, 1-Year PUMS, 2013–19, 2021–23*. Public Use Microdata Sample. Available at https://www.census.gov/programs-surveys/acs/microdata/access.html. Accessed 5 November 2024.

Census Bureau. 2023. *PUMS Documentation*. Available at https://www.census.gov/programs-surveys/acs/microdata/documentation.html. Accessed 9 June 2025.

Census Bureau. 2024. *Annual Estimates of the Resident Population for Selected Age Groups by Sex for the United States: April 1, 2020 to July 1, 2023 (NC-EST2023-AGESEX).* Available at https://www.census.gov/data/datasets/time-series/demo/popest/2020s-national-detail.html. Accessed 8 January 2026.

Census Bureau. 2025a. *Annual Estimates of the Resident Population by Sex, Age, Race, and Hispanic Origin for the United States: April 1, 2020 to July 1, 2023 (NC-EST2023-ASR6H).* Available at https://www.census.gov/newsroom/press-kits/2024/population-estimates-characteristics.html. Accessed 12 February 2025.

Census Bureau. 2025b. *Survey of Income and Program Participation 2024*. Public Use Microdata Sample. Available at https://www.census.gov/programs-surveys/sipp/data/datasets.html. Accessed 7 August 2025.

Department of Education, Office for Civil Rights. 2024. *2020–21 Civil Rights Data Collection: Student Access to and Enrollment in Mathematics, Science, and Computer Science Courses and Academic Programs in U.S. Public Schools*. Washington, DC. Available at https://www.ed.gov/sites/ed/files/about/offices/list/ocr/docs/crdc-student-access-enrollment.pdf. Accessed 9 June 2025.

Foley D, Milan L, Hamrick K; National Center for Science and Engineering Statistics (NCSES). 2020. *The Increasing Role of Community Colleges among Bachelor's Degree Recipients: Findings from the 2019 National Survey of College Graduates.* NSF 21-309. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf21309/.

Ministry of Education, Government of India. Various years. *All India Survey on Higher Education (AISHE)*. Available at https://aishe.gov.in/aishe-final-report/. Accessed 11 February 2025.

Ministry of Education, People's Republic of China. Various years. Available at http://en.moe.gov.cn/. Accessed 10 February 2025.

National Bureau of Statistics of China. Various years. *China Statistical Yearbook.* Available at https://www.stats.gov.cn/english/Statisticaldata/yearbook/. Accessed 10 February 2025.

National Center for Education Statistics (NCES). 2013–23. *Integrated Postsecondary Education Data System (IPEDS), Completions Survey.* Available at https://nces.ed.gov/ipeds/survey-components/7. Accessed 11 June 2025.

National Center for Education Statistics (NCES). 2024a. *High School Longitudinal Study of 2009 (HSLS:09) Postsecondary Education Administrative Records Collection (PEAR)*. Available at https://nces.ed.gov/surveys/hsls09/. Accessed 31 March 2025.

National Center for Education Statistics (NCES). 2024b. *International Computer and Information Literacy Study (ICILS): ICILS 2023 U.S. Results*. Available at https://nces.ed.gov/surveys/icils/icils2023/international.asp. Accessed 9 June 2025.

National Center for Education Statistics (NCES). 2024c. *TIMSS 2023 U.S. Highlights Web Report*. NCES 2024-184. Washington, DC. Available at https://nces.ed.gov/timss/results23/index.asp. Retrieved 17 January 2025.

National Center for Science and Engineering Statistics (NCSES). 2021. *Survey of Doctorate Recipients, 2019* (*SDR 2019*). NSF 21-320. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf21320/.

National Center for Science and Engineering Statistics (NCSES). 2024a. *Business R&D Performance in the United States Nears $700 Billion in 2022.* NSF 24-334. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf24334.

National Center for Science and Engineering Statistics (NCSES). 2024b. *Doctorate Recipients from U.S. Universities: 2023 Data Tables* (*SED 2023*). NSF 24-336. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/surveys/earned-doctorates.

National Center for Science and Engineering Statistics (NCSES). 2025a. *Nearly Half of 2023 U.S. Doctorate Recipients with Temporary Visas Were from China or India*. NSF 25-336. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf25336.

National Center for Science and Engineering Statistics (NCSES). 2025b. *National Survey of College Graduates: 2023* (*NSCG 2023*). NSF 25-322. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/surveys/national-survey-college-graduates/2023.

National Center for Science and Engineering Statistics (NCSES). 2025c. *Survey of Doctorate Recipients, 2023* (*SDR 2023*). NSF 25-321. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/surveys/doctorate-recipients/2023.

National Science Board (NSB), National Science Foundation. 2019. Science and Engineering Labor Force. *Science and Engineering Indicators 2020* (*Indicators 2020*). NSB-2019-8. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20198/.

National Science Board (NSB), National Science Foundation. 2020a. Research and Development: U.S. Trends and International Comparisons. *Science and Engineering Indicators 2020* (*Indicators 2020*). NSB-2020-3. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20203/.

National Science Board (NSB), National Science Foundation. 2020b. *Vision 2030*. NSB 2020-15. Alexandria, VA. Available at https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf.

National Science Board (NSB), National Science Foundation. 2023. Higher Education in Science and Engineering. *Science and Engineering Indicators 2024* (*Indicators 2024*). NSB-2023-32. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb202332/.

National Science Board (NSB), National Science Foundation. 2024. Production and Trade of Knowledge- and Technology-Intensive Industries. *Science and Engineering Indicators 2024* (*Indicators 2024*). NSB-2024-7. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20247.

Organisation for Economic Co-operation and Development (OECD). 2016. *OECD Taxonomy of Economic Activities Based on R&D Intensity*. Paris: OECD Publishing. Available at https://doi.org/10.1787/5jlv73sqqp8r-en. Accessed 12 June 2025.

Organisation for Economic Co-operation and Development (OECD). 2022. Education at a Glance Database. Available at https://stats.oecd.org/. Accessed 11 June 2025.

Ruggles S, Flood S, Sobek M, Backman D, Cooper G, Rivera Drew JA, Richards S, Rogers R, Schroeder J, Williams KCW. 2025. *IPUMS USA: Version 16.0 American Community Survey Five-Year File (2023)*. Minneapolis, MC: IPUMS. Available at https://doi.org/10.18128/D010.V16.0. Accessed 30 July 2025.

United Nations, Department of Economic and Social Affairs, Population Division. 2024. *World Population Prospects 2024, Online Edition*. Available at https://population.un.org/wpp/. Accessed 1 May 2025.

United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS). 2025. *Glossary: Internationally Mobile Students*. Available at https://uis.unesco.org/node/4789141. Accessed 11 June 2025.

Notes

1 STEM fields include S&E and S&E-related fields.

2 The NSCG is a survey of respondents who earned a bachelor's or an advanced degree. The 2023 NSCG continued a rotating panel design, with a sample selected from multiple American Community Survey (ACS) annual samples (2015, 2017, 2019, and 2021 ACS). As a result, the 2023 NSCG reports the 2023 outcomes of the 2021 U.S. population still eligible for the NSCG. It does not account for people who earned a degree after 2021. In contrast, the 2023 ACS reports the 2023 outcomes of the 2023 U.S. population. Given the coverage and other methodological differences between the two surveys, the size of the STEM workforce derived from each is different. Caution should be used when comparing the estimates presented using the ACS and the NSCG. In the NSCG and the Integrated Postsecondary Education Data (IPEDS), fields of study for STEM degrees are aggregated to S&E and S&E-related fields for all degree levels. In the Survey of Earned Doctorates (SED), all STEM fields of study at the doctoral level are aggregated to S&E fields. Doctoral degrees in health fields are classified as health sciences under S&E for the SED, whereas these fields are classified as health professions and related programs under S&E-related at all degree levels in the IPEDS and NSCG. The STEM degree classification in the IPEDS data in this report was created and recoded by NCSES and is available in the NCSES version of IPEDS through NCSES Data Tools. For more information, see (*NSCG 2023*: Table A-1; *SDR 2023*: Table A-1; *SED 2023*: Table B-2); see also the *Indicators 2024* report "[2024] Higher Education in Science and Engineering": Revisions to Classification of IPEDS Degree Data under the NCSES Taxonomy of Disciplines (NSB 2023). For NCSES Data Tools, see https://ncses.nsf.gov/explore-data.

3 Given the coverage and other methodological differences between the American Community Survey (ACS) and the NSCG, the estimates using the NSCG differ from the estimates using the ACS. The ACS estimates that there were 7.6 million college-educated workers in S&E occupations and 8.6 million college-educated workers in S&E-related occupations in 2023, compared with 8.0 million and 10.5 million college-educated workers in S&E and S&E-related occupations, respectively, using the NSCG (Figure TAL-1, Figure TAL-5).

4 The increase in earnings from the associate's level to the bachelor's level was the smallest for workers in middle-skill occupations (5%). All other occupational fields had at least a 25% increase in earnings.

5 The working-age population consists of noninstitutionalized civilians ages 25–75 years who are currently not in primary or secondary school. The total workforce is defined as the employed working-age population.

6 Rural-urban classification is derived using the METRO variable in IPUMS. The METRO variable indicates whether a respondent resides in a metropolitan area or not in a metropolitan area. In this report, rural areas are defined as nonmetropolitan; urban areas are defined as metropolitan. Metropolitan and nonmetropolitan areas are not directly identified in the American Community Survey. Therefore, IPUMS uses other geographic variables to impute the categorization of the METRO variable. Public Use Microdata Areas (PUMAs) are defined as "nonoverlapping, statistical geographic areas that partition each state or equivalent entity into geographic areas containing no fewer than 100,000 people each." If a PUMA is partially within a metropolitan area, then that PUMA is categorized as "indeterminable." For more information, please see the description of the METRO variable.

7 Estimates of current and projected employment for 2023–33 are from the BLS National Employment Matrix; estimates in the matrix are developed using data from the Occupational Employment and Wage Statistics (OEWS) program and the Current Population Survey (CPS). Together, these sources cover paid workers and self-employed workers in all industries, agriculture, and private households. Because data are derived from multiple sources, they can often differ from employment data provided by OEWS, CPS, or other employment surveys alone. BLS neither makes projections for S&E occupations as a group nor does it do so for some of the S&E and S&E-related occupational categories as defined by the National Center for Science and Engineering Statistics (NCSES); numbers in the figure are based on the sum of BLS projections for occupations

that NCSES includes in the respective categories. The STEM classifications used here differ slightly from those used in the American Community Survey due to additional occupation detail in the projection tabulations. A crosswalk will be provided upon request. For more information on BLS employment projections methods, please see https://www.bls.gov/emp/methods-overview.htm.

8 Origin is defined by place of birth. Respondents born outside of the United States and its territories, regardless of citizenship status, are considered foreign-born.

9 For more information, see https://www.census.gov/programs-surveys/sipp/tech-documentation/info-data-users.html.

10 In the NSCG and the IPEDS, fields of study for STEM degrees are aggregated to S&E and S&E-related fields for all degree levels. In the SED, all STEM fields of study at the doctoral level are aggregated to S&E fields. Doctoral degrees in health fields are classified as health sciences under S&E for the SED, whereas these fields are classified as health professions and related programs under S&E-related at all degree levels in the IPEDS and NSCG. For more information, see (*NSCG 2023*: Table A-1; *SDR 2023*: Table A-1; *SED 2023*: Table B-2); see also the *Indicators 2024* report "[2024] Higher Education in Science and Engineering": Revisions to Classification of IPEDS Degree Data under the NCSES Taxonomy of Disciplines (NSB 2023).

11 The intensity of employment in an occupational field is defined as the proportion of an industry's total employment in that occupational field. See the *Indicators 2020* report "[2020] Science and Engineering Labor Force" (NSB 2019).

12 Predecessors to BERD were the Survey of Industrial Research and Development (SIRD) (1953–2007), the Business R&D and Innovation Survey (BRDIS) (2008–16), and the Business Research and Development Survey (BRDS) (2017–18). Note that SIRD and BRDIS collected statistics for businesses with five or more employees. BRDS produced (and the BERD survey produces) statistics for businesses.

13 For the universe of industries that were considered, see https://ncses.nsf.gov/pubs/nsf20311/table/17 for 2017 and https://ncses.nsf.gov/pubs/nsf24335/table/17 for 2022. American Community Survey years in the analysis correspond to BERD/Business Research and Development Survey years.

14 In 2024, the NAEP mathematics assessment was also conducted for 12th-grade students, and the NAEP science assessment was administered to eighth-grade students. However, the results from both assessments were published too late for a full analysis in this volume of *Indicators.* This volume provides a brief overview of 12th-grade mathematics results. Typically, the 12th-grade assessment would have occurred in 2023, 4 years after the 2019 assessment. Because of the pandemic, the NAEP mathematics assessment shifted by 1 year, with the original 2021 assessment occurring in 2022. NAEP assessments now occur every other even year. The 12th-grade assessment was administered at the same time as the fourth- and eighth-grade assessments in January–March 2024. Analysis of the Grade 8 science results is available in *The State of U.S. Science and Engineering 2026*. A comprehensive analysis of the 2024 NAEP assessments scores is available on the Nation's Report Card website for mathematics and science.

15 SES is indicated by a student's SES index score, which ranges from 0 to 9. Scores are categorized as Low SES (0–2), Middle SES (3–6), and High SES (7–9). Before 2024, a student's eligibility for the National School Lunch Program (NSLP) was used in NAEP assessments as a proxy variable to measure SES. In 2024, NAEP introduced a more comprehensive measure of SES comprising four components: (1) the student's NSLP eligibility status, (2) the percentage of students eligible for NSLP at the school the student is attending, (3) the number of books at the student's home, and (4) the highest level of education of either parent.

16 Starting with the *Indicators 2024* report "[2024] Higher Education in Science and Engineering" (NSB 2023), the degree data from the Integrated Postsecondary Education Data System (IPEDS) are classified into the National Center for Science and Engineering Statistics (NCSES) Taxonomy of Disciplines, which aggregates fields of study into S&E, S&E-related, and non-S&E field areas. The numbers of S&E-related fields vary considerably by degree level, with the greatest differences observed at lower degree levels; for more details, see (NSB 2023: Revisions to Classification of IPEDS Degree Data under the NCSES

Taxonomy of Disciplines). This section starts by presenting data on S&E and S&E-related fields but focuses on S&E fields when looking at differences by state. At the doctoral level, data in this report come from the Survey of Earned Doctorates, a census of all research doctoral degrees awarded in the United States; for the doctoral-level data, S&E-related fields are included under S&E.

17 According to the U.S. Census Bureau, the U.S. population ages 18–24 years declined by 3% between 2013 and 2023, and the population ages 25–34 years increased by 6% during this period (Census Bureau 2024, 2025a).

18 The multidisciplinary/interdisciplinary sciences field includes the following fields of study: interdisciplinary computer science; behavioral and cognitive sciences; computational science and engineering; data analytics; history and philosophy of science, technology, and society; nutrition science; and multidisciplinary fields not elsewhere classified.

19 S&E degrees discussed here are categorized by institution location and include postsecondary degrees awarded to all students, regardless of their residence or where they earned a high school credential.

20 In 2023, a total of 5,703 S&E doctoral degrees were awarded in California, and 3,495 were awarded in Texas. In contrast, 32 S&E doctoral degrees were awarded in Alaska, 104 in South Dakota, 171 in New Hampshire, and 237 in Delaware.

21 The comparisons are based on unrounded percentages. In 2023, the proportion of S&E bachelor's degrees earned by Native Hawaiian or Other Pacific Islanders was 0.183781331830459 when unrounded, and their proportion in the 20- to 34-year-old U.S. population was 0.214033967008794.

22 In 2023, 51% of U.S. S&E doctorate recipients on temporary visas were from China or India (for more details, see NCSES [2025a]).

23 Community colleges are defined here as publicly controlled institutions that confer awards up to at least the 2-year level but less than the 4-year level. Community colleges primarily award associate's degrees and certificates below the bachelor's degree level.

24 All comparative statements derived from sample surveys in this report have undergone statistical testing; unless otherwise noted, all comparisons are statistically significant at the 0.10 significance level.

25 Respondents could have attended community college at more than one point in time.

26 For additional data on doctorate recipients who earned college credit at a community or 2-year college, see (NCSES *SED 2023*: Table 5-1).

27 Examples of other types of institutions whose designation varies from year to year depending on enrollment include Alaska Native and Native Hawaiian–serving institutions, Asian American and Native American or Other Pacific Islander–serving institutions, Hispanic-serving institutions, Native American–serving nontribal institutions, and predominantly Black institutions (see the *Indicators 2024* report "[2024] Higher Education in Science and Engineering" [NSB 2023]; especially see the section Institutions in S&E Higher Education for more details).

28 Research doctorate recipients complete the Survey of Earned Doctorates as they approach graduation toward the end of their program. This statistic provides data on those who had a definite employment commitment at the time they took the survey. Respondents who indicated that they did not have a definite commitment at that time could have ended up having a definite commitment by the time they graduated. In 2023, 26% of doctorate recipients who responded to this question had no definite commitment for employment or postdoctoral training at the time they completed the survey (NCSES *SED 2023*: Table 2-1).

29 Doctorate recipients with definite postgraduation commitments in national laboratories such as, for example, the National Institute of Standards and Technology, the Department of Defense, Federal Funded Research, and Development Centers, etc. may have reported their position under any of the categories in Table TAL-15, depending on the type of position they accepted (postdoctoral study or employment) and on whether the center or institute is affiliated with a university, the government, or a nonprofit.

30 Our analysis focuses on U.S. performance when compared with the advanced economies participating in the assessment because those are the major economic competitors for the United States. A total of 42 countries participated in both assessments (Table STAL-24).

31 Given the proximity of the United States and China on this indicator, see discussion on the comparability of the data in the sidebar Considerations for International Comparisons of S&E Doctoral Degrees in the *Indicators 2024* report "[2024] Higher Education in Science and Engineering" (NSB 2023).

32 The proportion of doctorate recipients who have definite employment commitments to stay in the United States is not strictly comparable over time because doctorate recipients complete the survey at different times as they approach their graduation, and some of them may have obtained an employment commitment after they responded to the survey.

33 Short-term stay rates are based on individuals who remain in the United States approximately 5 years after graduation, and long-term stay rates are based on individuals who remain in the United States approximately 10 years after graduation.

34 Citizenship represents country of citizenship at the time of graduation as reported in the Survey of Earned Doctorates. Noncitizen respondents were asked the country of which they are a citizen. This information is used to produce stay rate estimates by citizenship.

Acknowledgments and Citation

Acknowledgments

The National Science Board extends its appreciation to the staff of the National Center for Science and Engineering Statistics within the National Science Foundation and to the many others, too numerous to list individually, who contributed to the preparation of this report.

The following agencies reviewed this report:

Bureau of Labor Statistics
Census Bureau
Office of Science and Technology Policy (Executive Office of the President)
U.S. National Science Foundation

The Board is especially grateful to the Committee on National Science and Engineering Policy for overseeing preparation of the volume and to the National Science Board Office.

Citation

National Science Board, National Science Foundation. 2026. STEM Talent: Education, Training, and Workforce. *Science and Engineering Indicators 2026.* NSB-2026-1. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20261/.

Contact Us

Contact Us

To report an issue with the website, please e-mail ncsesweb@nsf.gov. For questions about the National Science Foundation (NSF), please visit the NSF help page at https://nsf.gov/help/. To see more from the National Science Board, please visit https://nsf.gov/nsb/.

NCSES

National Center for Science and Engineering Statistics
Directorate for Social, Behavioral and Economic Sciences
National Science Foundation
Randolph Building, 401 Dulany Street
Alexandria, VA 22314
Tel: (703) 292-8780
FIRS: (800) 877-8339
TDD: (800) 281-8749
ncsesweb@nsf.gov