

FACT SHEET

Foreign-Born STEM Workers in the United States



Workers in STEM fields (science, technology, engineering, and math) play an increasingly important role in the U.S. economy. STEM workers are critical to the country's innovation, responsible for many of the cutting-edge ideas and technologies that create jobs and raise the living standards of U.S. households. Given their importance, workers with STEM training and skills are some of the most sought after in the labor market. Chronic shortages of specialized, high-skilled workers have been making headlines in the United States for more than a decade, even during the depths of the Great Recession.¹

Foreign-born workers make up a growing share of the country's STEM workforce.² Using data from the American Community Survey (ACS), this fact sheet provides an overview of the characteristics and contributions of foreign-born STEM workers in the United States. As of 2019, immigrants made up almost one-fourth, or 23.1 percent, of all STEM workers in the entire country. This is a marked increase from 2000, when just 16.4 percent of the country's STEM workforce was foreign-born. Between 2000 and 2019, the overall number of STEM workers in the United States increased by 44.5 percent, from 7.5 million to more than 10.8 million.

The increasing importance of immigrant workers in STEM occupations can be seen in every state in the country and across different fields within the broader STEM category. The data also shows that foreign-born STEM workers have higher rates of educational attainment than their U.S.-born counterparts. Furthermore, the gender disparity among immigrant STEM workers has decreased since 2000, but immigrant women remain vastly underrepresented in the STEM workforce.

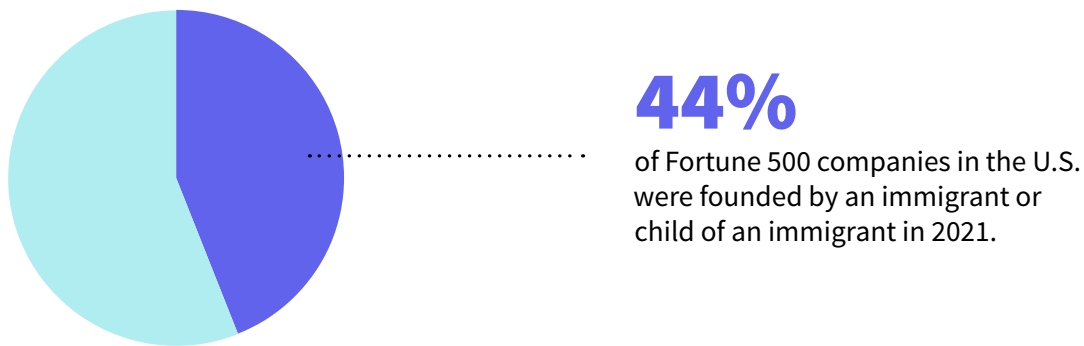
Since 2009, the most robust growth in well-paying jobs in the United States has been in STEM occupations, particularly those that are computer-related.³ As the U.S. economy—and, indeed, the global economy—continues to become more technology dependent, more qualified STEM workers—a group already difficult to find—will be needed. An annual cap on the number of available green cards, H-1B visas, and other skilled talent visas hinders efforts to hire immigrant STEM professionals when no American workers are available. If employers are unable to fill vacancies for skilled STEM workers, the competitiveness of American companies and their ability to innovate may be in danger, with significant negative long-term effects on the U.S.

KEY FINDINGS

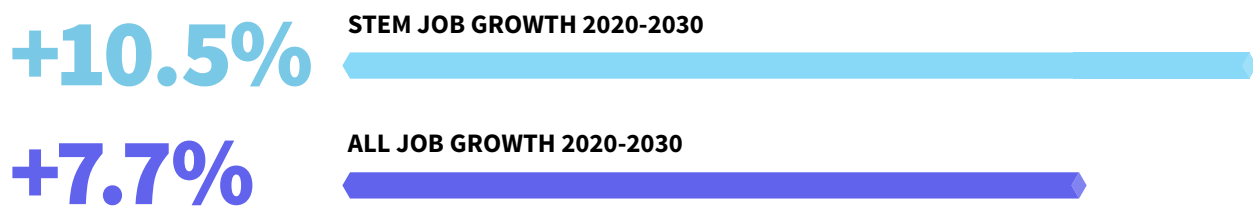
- Immigrants made up almost one-fourth, or 23.1 percent, of all STEM workers in the United States in 2019, a significant increase from just 16.4 percent in 2000.
- While the overall number of STEM workers in the United States increased by 44.5 percent between 2000 and 2019, the number of immigrant STEM workers more than doubled over the same period. By 2019, there were almost 2.5 million immigrant STEM workers, compared to just 1.2 million in 2000.
- Immigrants from India formed the largest country of birth group among immigrant STEM workers, at 28.9 percent of all foreign-born STEM workers in 2019. There were also significant numbers of STEM workers who were born in China (273,000), Mexico (119,000), and Vietnam (100,000).
- The foreign-born share of workers in the largest STEM occupation groups—computer and math, and engineering occupations—has increased since 2000. The largest increase was seen among computer and math occupations, where the immigrant share of the workforce grew from 17.7 percent in 2000 to 26.1 percent in 2019.
- Women remain underrepresented among STEM workers overall as well as among immigrant STEM workers. While the share of STEM workers who are female has increased slightly since 2000, only 26.8 percent of all STEM workers were female as of 2019. Women made up 27.2 percent of all immigrant STEM workers in 2019.
- Even among STEM workers, who are among the most highly educated workers in the United States, foreign-born workers stand out. While 67.3 percent of U.S.-born STEM workers held at least a bachelor's degree in 2019, 86.5 percent of immigrant STEM workers did. Almost half, or 49.3 percent, of immigrant STEM workers held an advanced degree in 2019, compared to only 21.8 percent of U.S.-born STEM workers.

Who Are STEM Workers?

Foreign-born STEM workers have made important contributions to the U.S. economy in terms of productivity and innovation.⁴ Research has found that immigrants are more likely than the U.S.-born to obtain a patent, and immigrants account for rising shares of U.S. patents in computing, electronics, medical devices, and pharmaceuticals.⁵ Immigrants are also more likely to start their own businesses, many of which go on to be major companies. In 2021, 44 percent of Fortune 500 companies in the United States were founded by an immigrant or the child of an immigrant.⁶



As the demand for STEM workers continues to increase, foreign-born STEM workers will likely continue to complement U.S. workers and play a key role in U.S. productivity and innovation. The number of STEM jobs is projected to increase by 10.5 percent (to almost 11.3 million jobs) between 2020 and 2030. This growth rate is greater than the 7.7 percent growth projected for all occupations during the same period.⁷



According to projections made in 2022 by the Bureau of Labor Statistics, the United States will need approximately one million more STEM workers in 2030 than it did in 2020. This does not include the number of STEM workers that will be needed to replace retiring workers or workers who leave the field for other reasons. To meet this growing demand, the United States will need to increase the number of students who receive undergraduate and graduate STEM degrees. But while increasing the number of U.S.-born workers in STEM fields is critical, demographic trends indicate that foreign-born STEM students and workers are likely to be needed if the United States is to be prepared for future labor demands and continue to excel globally.

Defining STEM Occupations

There is no standard definition of a STEM occupation, but most analysts would probably agree that “STEM workers use their knowledge of science, technology, engineering, or math to try to understand how the world works and to solve problems.”⁸ While some occupations—like mathematician or aerospace engineer—are clearly STEM occupations, the inclusion of others is not as straightforward. For example, no consensus exists about including healthcare professionals and social scientists. Research results can vary a great deal depending on which occupations are included in the researcher’s definition of STEM occupations.

This fact sheet uses the 2018 definition of STEM occupations from the U.S. Census Bureau. This is a set of 70 STEM occupations that does not include higher education and health care. For more detailed information on the occupations included in this definition, see the Methodology section.

The total number of STEM workers in the United States has increased by more than **44%** since 2000.

The total number of STEM workers in the United States has increased since 2000 both in absolute numbers and as a share of the total U.S. workforce. As seen in Table 1, the number of STEM workers increased from 7.5 million to 10.8 million between 2000 and 2019. The STEM worker share of the total workforce was 5.7 percent in 2000, dipped to 5.5 percent in 2009, and then increased significantly to 6.8 percent in 2019.

TABLE 1: TOTAL STEM WORKFORCE, 2000-2019

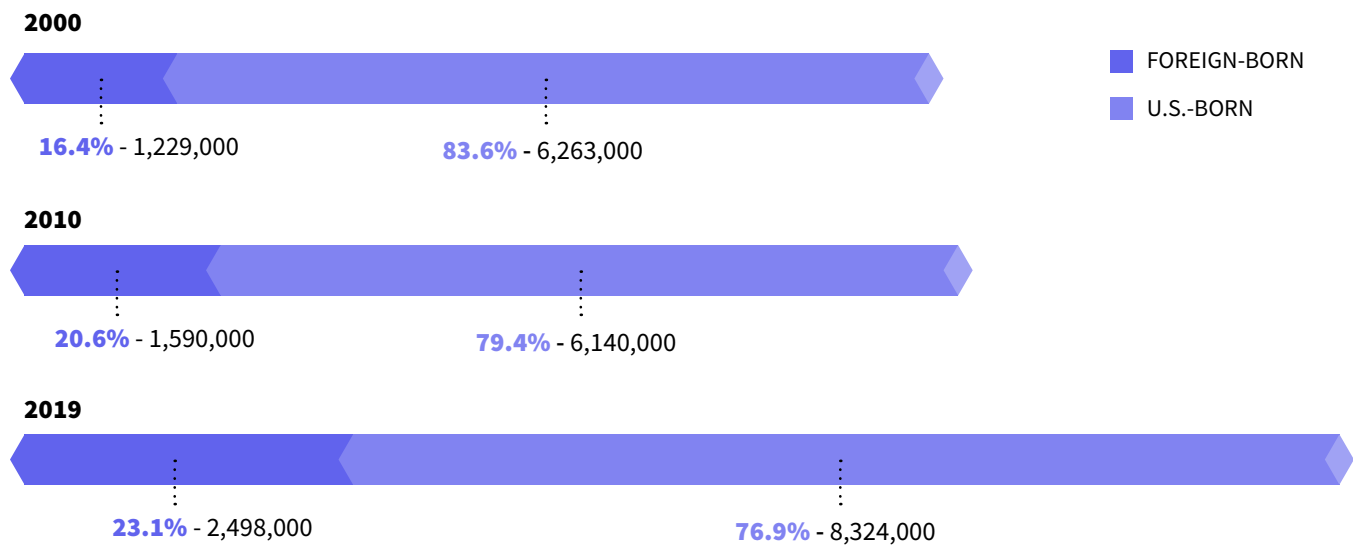


Source: American Immigration Council analysis of microdata from the 2000, 2010, and 2019 American Community Surveys.

Since 2000, the share of foreign-born workers in the STEM workforce has increased by more than **40%**.

The share of foreign-born workers in STEM occupations has grown significantly in recent years. As shown in Table 2, the number of foreign-born STEM workers increased from 1.2 million (16.4 percent of the STEM workforce) in 2000 to 2.5 million (23.1 percent of the STEM workforce) in 2019.

TABLE 2: STEM WORKFORCE BY NATIVITY, 2000-2019



Source: American Immigration Council analysis of microdata from the 2000, 2010, and 2019 American Community Surveys.

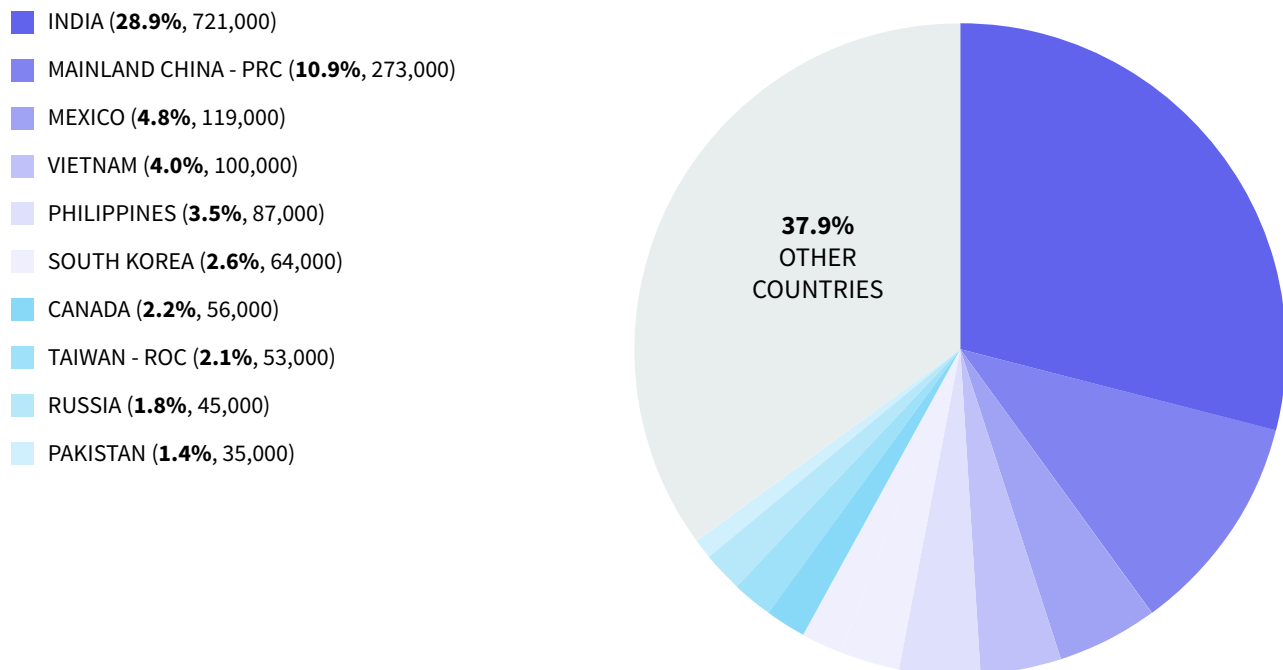
Because immigrant STEM workers tend to possess skills that complement those of their U.S.-born co-workers, the presence of immigrants in the workplace increases the productivity (and therefore the wages) of all workers. Moreover, innovation by immigrant workers increases the revenue of the firms in which they work, which enables employers to hire more workers.⁹ The overall share of workers who are foreign-born and hold advanced degrees from either a U.S. or a foreign university is also associated with higher levels of employment among U.S.-born workers. A 10 percent increase in the share of foreign-born workers with advanced degrees working in STEM occupations boosted the U.S.-born employment rate by 0.03 percent. This means that every additional 100 foreign-born workers with an advanced degree working in a STEM occupation creates roughly 86 jobs for U.S. workers.¹⁰

Indian immigrants make up more than 1 in 4 foreign-born STEM workers in the United States



Among foreign-born STEM workers, there is great diversity in terms of the countries from which they hail. While immigrants from India were the largest country of birth group in 2019 (accounting for 28.9 percent of all foreign-born STEM workers), there were also significant numbers of STEM workers who were born in China (273,000), Mexico (119,000), and Vietnam (100,000).

TABLE 3: COUNTRY OF BIRTH OF IMMIGRANT STEM WORKERS, 2019



Source: American Immigration Council analysis of 2019 American Community Survey data.

Foreign-born workers make up a growing share of the STEM workforce in different occupational groups.

When STEM occupations are broken into different occupational groups, the foreign-born share of the workforce varies significantly (see the Methodology section for a full list of STEM occupations). The foreign-born share of workers has increased since 2000 in the two largest STEM occupational groups: computer and math jobs and engineering jobs. The largest increase was in computer and math fields, with the foreign-born share of workers jumping from 17.7 percent in 2000 to 26.1 percent in 2019. Meanwhile, in the third-largest occupational group among STEM workers—life, physical, and social sciences occupations—the immigrant share of the workforce has remained relatively stable.

TABLE 4: IMMIGRANT STEM WORKERS, BY OCCUPATIONAL GROUP 2000-2019

Occupation Group	2000		2010		2019	
	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers
Computer & Math	570,000	17.7%	776,000	22.6%	1,370,000	26.1%
Engineering	376,000	14.8%	433,000	18.1%	611,000	19.5%
Life, Physical, and Social	222,000	18.1%	268,000	21.8%	342,000	21.5%
Management, Business, and Financial	61,000	12.2%	112,000	17.0%	176,000	20.7%

Source: American Immigration Council analysis of microdata from the 2000, 2010, and 2019 American Community Surveys.

Computer and Math: Among STEM workers in computer and math occupations, software developers were by far the largest single occupation. In 2019, there were 647,000 immigrant software developers, making up 39.2 percent of all software developers (Table 4). In fact, software developers made up 47.3 percent of all foreign-born workers in the computer and math category in 2019. Foreign-born software developers made up almost 6 percent of the total number of STEM workers in the United States, but made up more than 1 in 4 (25.9 percent) of all foreign-born STEM workers.

TABLE 5: IMMIGRANT STEM WORKERS IN COMPUTER AND MATH OCCUPATIONS, 2019

Occupation	Immigrant Workers	Immigrant Share of Workforce
Software Developers	647,000	39.2%
Computer Systems Analysts	137,000	22.1%
Computer Occupations, All Other	136,000	19.3%
Computer Support Specialists	105,000	15.7%
Computer Programmers	90,000	26.7%
Other Mathematical Science Occupations	47,000	25.7%
Database Administrators and Architects	35,000	28.1%
Network And Computer Systems Administrators	34,000	14.8%
Computer Network Architects	27,000	23.5%
Operation Research Analysts	25,000	15.2%
Software Quality Assurance Analysts and Testers	23,000	32.1%
Information Security Analysts	20,000	14.8%
Web Developers	14,000	13.8%
Web And Digital Interface Designers	12,000	15.8%
Computer And Information Research Scientists	11,000	31.9%
Actuaries	6,000	17.0%

Source: American Immigration Council analysis of 2019 American Community Survey data.

Engineering: In the engineering category, foreign-born workers were most prominent in computer hardware engineering. In 2019, almost 4 out of 10 computer hardware engineers (or 24,000) were foreign-born. Immigrants also made up around one-quarter of all electrical and electronic engineers (25.4 percent); petroleum, mining, and geological engineers (23.7 percent); and biomedical and agricultural engineers (24.8 percent). Among all other kinds of engineers not listed separately, immigrants made up 24.0 percent of the workforce (Table 5).

TABLE 6: IMMIGRANT STEM WORKERS IN SELECTED ENGINEERING OCCUPATIONS, 2019

Occupation	Immigrant Workers	Immigrant Share of Workforce
Miscellaneous Engineers	145,000	24.0%
Civil Engineers	80,000	19.0%
Electrical And Electronics Engineers	66,000	25.4%
Mechanical Engineers	63,000	18.8%
Other Engineering Technologists and Technicians, Except Drafters	62,000	15.5%
Industrial Engineers, Including Health and Safety	52,000	20.2%
Computer Hardware Engineers	24,000	39.1%
Aerospace Engineers	21,000	15.6%
Electrical And Electronic Engineering Technologists and Technicians	18,000	16.2%
Chemical Engineers	16,000	20.8%
Other Drafters	14,000	14.6%
Materials Engineers	10,000	20.0%
Petroleum, Mining, And Geological Engineers	9,000	23.7%
Architectural And Civil Drafters	8,000	14.3%
Sales Engineers	6,000	12.7%
Environmental Engineers	5,000	16.2%

Source: American Immigration Council analysis of 2019 American Community Survey data.

Life, physical, and social sciences: In this category, physical scientists and life scientists were the largest occupations for foreign-born workers. In 2019, immigrants made up 32.8 percent of all physical scientists (including chemists and materials scientists, geoscientists and hydrologists, and astronomers and physicists) and 30.0 percent of all life scientists (including biological scientists and agricultural and food scientists). Together, there were 164,000 foreign-born physical scientists and 79,000 immigrant life scientists, making up 71.2 percent of all foreign-born workers in the life, physical, and social sciences category.

TABLE 7: IMMIGRANT STEM WORKERS IN SELECTED LIFE, PHYSICAL, AND SOCIAL SCIENCES OCCUPATIONS, 2019

Occupation	Immigrant Workers	Immigrant Share of Workforce
All Physical Scientists	170,000	30.8%
– Chemists And Materials	27,000	24.1%
– Geoscientists and Hydrologists, Except Geographers	5,000	11.4%
– Astronomers and Physicists	4,000	26.2%
– Physical Scientists, All Other	134,000	35.3%
All Life Scientists	80,000	27.7%
– Biological Scientists	18,000	19.0%
– Agricultural and Food Scientists	5,000	15.3%
– Other Life Scientists	57,000	40.5%
Other Life, Physical, and Social Science Technicians	27,000	12.1%
Other Psychologists	16,000	10.1%
Economists	10,000	32.0%
Chemical Technicians	10,000	14.0%
Other Social Scientists	7,000	12.4%
Agricultural and Food Science Technicians	6,000	13.5%
Biological Technicians	5,000	19.5%

Source: American Immigration Council analysis of 2019 American Community Survey data.

The share of foreign-born STEM workers who are female has increased since 2000, but women (regardless of nativity) are underrepresented in the STEM workforce.

Nationally, foreign-born women are underrepresented in the overall labor force. Women make up slightly more than half of the total foreign-born population, but immigrant women participate in the labor force at a lower rate than either U.S.-born or immigrant men, and at a rate slightly below that of U.S.-born women.

In the STEM fields, women are underrepresented. While the share of STEM workers who are female has increased slightly since 2000, only 26.8 percent of all STEM workers were female as of 2019 (see Table 8). The female share of foreign-born STEM workers is slightly higher than the female share of all STEM workers, with immigrant women making up 27.2 percent of all immigrant STEM workers (See Table 9).

TABLE 8: STEM WORKERS BY SEX, 2000-2019

	2000		2010		2019	
	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers
Male	5,585,000	74.5%	5,731,000	74.1%	7,925,000	73.2%
Female	1,907,000	25.5%	1,999,000	25.9%	2,897,000	26.8%

TABLE 9: FOREIGN-BORN STEM WORKERS BY SEX, 2000-2019

	2000		2010		2019	
	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers	STEM Workers	Share of STEM Workers
Male	920,000	74.8%	1,173,000	73.8%	1,820,000	72.8%
Female	309,000	25.2%	417,000	26.2%	679,000	27.2%

Source: American Immigration Council analysis of microdata from the 2000, 2010, and 2019 American Community Surveys.

Foreign-born STEM workers have high levels of educational attainment.

Not all STEM occupations require a college degree, but many STEM occupations require a high level of training and education, and workers in STEM fields tend to be highly educated. Among STEM workers, those in life, physical, and social sciences had the highest educational attainment as of 2019, with more than 84 percent having at least a bachelor's degree and more than half having an advanced degree.

Even among STEM workers, the foreign-born are among the most educated. While 67.3 percent of U.S.-born STEM workers had at least a bachelor's degree in 2019, 86.5 percent of immigrant STEM workers did. Almost half, or 49.3 percent, of immigrant STEM workers held an advanced degree, compared to only 21.8 percent of U.S.-born STEM workers. Past research has found that, since the mid-2000s, immigrants have made up the majority of STEM workers with doctoral degrees.¹¹ Many of these foreign-born advanced degree holders obtained their degrees in the United States.¹²

TABLE 10: STEM WORKERS BY EDUCATIONAL ATTAINMENT AND NATIVITY, 2019

	2000	2010	2019
U.S.-born Workers	39.5	42.4	41.9
Foreign-born Workers	37.7	40.4	41.5
All STEM Workers	39.2	42.0	41.8
MA or above	1,817,000	21.8%	1,232,000

Source: American Immigration Council analysis of microdata from the 2000, 2010, and 2019 American Community Surveys.

Past research has found that foreign-born STEM workers tend to arrive in the United States at age 21 or older, which is consistent with arriving on a work or student visa as opposed to immigrating through the family-based system.¹³

Foreign-Born STEM Workers by State

Research has shown that areas which attract more high-skilled foreign-born workers see faster rates of growth in labor productivity.¹⁴ Furthermore, college-educated workers, whether U.S.-born or foreign-born, have a positive effect on local economies and boost productivity and wages. College-educated workers may also increase the quality of amenities in a city, such as better schools, medical facilities, and cultural institutions. Therefore, cities that retain their foreign-born college-educated workers are more attractive to both immigrant and U.S.-born workers alike, and areas that fail to attract and retain college-educated workers are less attractive.¹⁵

The number of STEM workers varies widely from state to state. For example, the foreign-born made up more than 42 percent of all STEM workers in New Jersey and almost 40 percent in California as of 2019. In total, there were 15 states in which immigrants made up 20 percent or more of all STEM workers (see Table 12).

Among states with the most immigrant STEM workers, California came out on top with 609,000 immigrant STEM workers, followed by Texas (241,000), New Jersey (150,000), and New York (136,000) (see Table 13).

TABLE 12: TOP 20 STATES BY IMMIGRANT SHARE OF STEM WORKERS, 2019

State	Immigrant Workers	Immigrant Share of Workforce
New Jersey	150,000	42.2%
California	609,000	39.4%
Washington	120,000	31.2%
Massachusetts	107,000	29.1%
Texas	241,000	27.5%
Florida	128,000	25.4%
New York	136,000	25.2%
Illinois	106,000	25.0%
Connecticut	33,000	24.6%
Delaware	8,000	24.0%
Rhode Island	9,000	23.5%
Virginia	100,000	23.0%
Georgia	74,000	22.8%
Maryland	75,000	22.2%
Arizona	46,000	20.5%
North Carolina	58,000	18.3%
Michigan	62,000	18.2%
Oregon	26,000	17.3%
District of Columbia	8,000	15.7%
Kansas	14,000	15.4%

TABLE 13: TOP 20 STATES BY NUMBER OF IMMIGRANT STEM WORKERS, 2019

State	Number of Immigrant STEM Workers	Immigrant Share of All STEM Workers
California	609,000	39.4%
Texas	241,000	27.5%
New Jersey	150,000	42.2%
New York	136,000	25.2%
Florida	128,000	25.4%
Washington	120,000	31.2%
Massachusetts	107,000	29.1%
Illinois	106,000	25.0%
Virginia	100,000	23.0%
Maryland	75,000	22.2%
Georgia	74,000	22.8%
Pennsylvania	65,000	15.4%
Michigan	62,000	18.2%
North Carolina	58,000	18.3%
Arizona	46,000	20.5%
Ohio	45,000	12.9%
Colorado	37,000	13.1%
Minnesota	36,000	14.6%
Connecticut	33,000	24.6%
Oregon	26,000	17.3%

Methodology

To quantify the economic contributions of foreign-born STEM workers in the United States, this report uses data from the American Community Survey (ACS), including the 1-year samples from 2010 and 2019 and the 1% sample from 2000, obtained from the Integrated Public Microdata Series (IPUMS).¹⁶

The report focuses on workers employed in STEM occupations. The definitions of STEM occupations were created using the list of STEM occupations from the U.S. Census Bureau.¹⁷ The Census Bureau utilizes the 2018 Census Code, which was matched to the ACS occupation codes for each respective year involved. Similarly, the occupational groups used in this fact sheet refer to the U.S. Census Bureau's generalized categorization of occupations and are not specific to STEM occupations.

The STEM occupations used in this fact sheet are listed below:

- Computer and information research scientists
- Computer systems analysts
- Information security analysts
- Computer programmers
- Software developers
- Software quality assurance analysts and testers
- Web developers
- Web and digital interface designers
- Computer support specialists
- Database administrators and architects
- Network and computer systems administrators
- Computer network architects
- Computer occupations, all other
- Actuaries
- Mathematicians
- Operations research analysts
- Statisticians
- Other mathematical science occupations
- Surveyors, cartographers, and photogrammetrists
- Aerospace engineers
- Agricultural engineers
- Bioengineers and biomedical engineers
- Chemical engineers
- Civil engineers
- Computer hardware engineers
- Electrical and electronic engineers
- Environmental engineers
- Industrial engineers, including health and safety
- Marine engineers and naval architects
- Materials engineers
- Mechanical engineers
- Mining and geological engineers, including mining safety engineers
- Nuclear engineers

- Petroleum engineers
- Engineers, all other
- Architectural and civil drafters
- Other drafters
- Electrical and electronic engineering technologists and technicians
- Other engineering technologists and technicians, except drafters
- Surveying and mapping technicians
- Sales engineers
- Agricultural and food scientists
- Biological scientists
- Conservation scientists and foresters
- Medical scientists
- Life scientists, all other
- Astronomers and physicists
- Atmospheric and space scientists
- Chemists and materials scientists
- Environmental science specialists, including health
- Geoscientists and hydrologists, except geographers
- Physical scientists, all other
- Economists
- Survey researchers
- Clinical and counseling psychologists
- School psychologists
- Other psychologists
- Sociologists
- Urban and regional planners
- Miscellaneous social scientists and related workers
- Agricultural and food science technicians
- Biological technicians
- Chemical technicians
- Environmental science and geoscience technicians
- Nuclear technicians
- Social science research assistants
- Other life, physical, and social science technicians
- Computer and information systems managers
- Architectural and engineering managers
- Natural sciences manager

ENDNOTES

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2. In this report, immigrants are defined as any individuals residing in the United States who were not born a U.S. citizen. This includes naturalized citizens, legal permanent residents, and temporary residents, as well as those without regular immigration status. We use the terms "foreign-born" and "immigrant" interchangeably in this report.
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