InfoBrief

NCSES National Center for Science and Engineering Statistics

September 2015 ■ NSF 15-328

Immigrants' Growing Presence in the U.S. Science and Engineering Workforce: Education and Employment Characteristics in 2013

by Flora Lan, Katherine Hale, and Emilda Rivers[1]

From 2003 to 2013, the number of scientists and engineers residing in the United States grew from 21.6 million to 29.0 million (table 1). An important factor in this growth has been immigration: In 2013, 18% (5.2 million) of the scientists and engineers residing in the United States were immigrants, whereas in 2003, 16% (3.4 million) were immigrants. In 2013, the majority of U.S. immigrant scientists and engineers were naturalized U.S. citizens (63%), whereas 22% were permanent residents and 15% were temporary visa holders (table 2). Immi-

TABLE 1. Birthplace of immigrant and U.S. citizen scientists and engineers: 2003 and 2013
(Number)

	2003			2013		
Birthplace	All scientists and engineers	Immigrants[a]	U.S.-born citizens[b]	All scientists and engineers	Immigrants[a]	U.S.-born citizens[b]
Total	21,647,000	3,352,000	18,295,000	28,950,000	5,179,000	23,771,000
United States	18,036,000	0	18,036,000	23,385,000	0	23,385,000
Non-United States	3,611,000	3,341,000	270,000	5,566,000	5,176,000	390,000
Asia	1,947,000	1,873,000	74,000	3,066,000	2,956,000	109,000
India	521,000	515,000	5,000	956,000	950,000	5,000
Philippines	317,000	304,000	13,000	487,000	465,000	22,000
China (including Hong Kong and Macau)	331,000	326,000	5,000	445,000	438,000	7,000
Other Asia	778,000	728,000	50,000	1,178,000	1,103,000	75,000
Europe	756,000	632,000	124,000	1,017,000	851,000	166,000
Africa	172,000	167,000	6,000	333,000	323,000	10,000
South America	188,000	179,000	10,000	333,000	303,000	30,000
Central America	165,000	145,000	21,000	284,000	257,000	27,000
Caribbean	176,000	170,000	6,000	257,000	249,000	8,000
North America (excluding the United States)	178,000	156,000	23,000	237,000	203,000	34,000
Oceania	25,000	18,000	8,000	38,000	32,000	5,000
Abroad, not specified	2,000	2,000	0	2,000	0	1,000

[a] Includes naturalized U.S. citizens, permanent residents, and temporary visa holders.

[b] Includes U.S. citizens born in the United States, Puerto Rico, or another U.S. territory and U.S. citizens born abroad of a U.S. citizen parent.

NOTE: Detail does not add to total due to rounding. The number of U.S.-born immigrants is zero, because it excludes a small number of individuals who were reported to be immigrants but were born in the United States, Puerto Rico, or another U.S. territory.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineers Statistical Data System (SESTAT), 2003 and 2013.

grant scientists and engineers were more likely to earn post-baccalaureate degrees than were U.S. citizens who were born in the United States, Puerto Rico, or another U.S. territory or born abroad of U.S. citizen parents.

This InfoBrief describes selected characteristics of immigrant scientists and engineers from the 2013 Scientists and Engineers Statistical Data System (SESTAT)—including birthplace, education, and employment—and determines whether these characteristics have changed or remained largely stable since 2003. Selected comparisons are made between U.S. immigrant scientists and engineers and their U.S.-born counterparts. In SESTAT, scientists and engineers are individuals who hold a bachelor's degree or higher in an S&E or S&E-related field of study or are employed in an S&E or S&E-related occupation.

Birthplace of Immigrant Scientists and Engineers

In 2013, among all 5.2 million immigrant scientists and engineers in the United States, 57% were born in Asia; 20% were born in North America (excluding the United States), Central America, the Caribbean, or South America; 16% were born in Europe; 6% were born in Africa; and less than 1% were born in Oceania.

Among the Asian countries, India continued to be the top country of birth for immigrant scientist and engineers in the United States. In 2013, a total of 950,000 immigrant scientists and engineers were born in India, representing a nearly 85% increase from 2003 (table 1). Since 2003, the number of scientists and engineers from the Philippines increased 53%, and the number from China (including Hong Kong and Macau) increased 34%.

Educational Attainment

Immigrant scientists and engineers are more likely than their U.S.-born counterparts to have earned a post-baccalaureate degree such as a master's or doctoral degree (table 2). In 2013, 32% of immigrant scientists and engineers reported that their highest degree was a master's degree (compared to 29% of U.S.-born citizens), and 9% reported that their highest degree was a doctorate (compared to 4% of U.S.-born counterparts). In both 2013 and 2003, a higher percentage of immigrant scientists and engineers earned their highest degree in an S&E field compared to their U.S.-born counterparts (62% versus 53% in 2013). In contrast, at both points in time, a higher percentage of U.S.-born scientists and engineers earned their highest degree in a non-S&E field (23% versus 13% in 2013), and the same percentage (24%) of both immigrant and U.S.-born scientists and engineers earned their highest degree in an S&E-related field.

In 2013, the most common S&E broad fields of study among immigrant scientists and engineers were engineering, computer and mathematical sciences, and social and related sciences (table 2). Engineering degrees constituted 20% of all degrees earned by immigrant scientists and engineers (compared to 10% of degrees earned by their U.S.-born counterparts). Degrees in social and related sciences represented 14% of all degrees earned by immigrant scientists and engineer (compared to 24% of degrees earned by their U.S.-born counterparts). Degrees in computer and mathematical sciences represented 15% of all degrees earned by immigrant scientists and engineers (compared to 8% of degrees earned by their U.S.-born counterparts). Within social and related sciences, immigrant scientists and engineers were more likely than their U.S.-born counterparts to earn degrees in economics in both 2003 and 2013. Economics constituted about 30% of immigrants' social sciences degrees in both years and about 13% of social sciences degrees earned by U.S.-born citizens. Another popular field of study in 2013 for both foreign-born and U.S.-born scientists and engineers was psychology, which constituted 30% of the social sciences degrees for immigrants and 40% of the social sciences degrees for U.S.-born citizens.

There were also variations in growth by field over the decade (figure 1). In the field of computer and mathematical sciences, the number of immigrant graduates grew from 421,000 to 767,000, an 82% increase over 10 years. Computer and mathematical sciences has also been a high-growth field for U.S.-born scientists and engineers: from 2003 to 2013, the number of graduates in this field increased by 46%. Other fields showed very different growth rates for immigrants versus U.S.-born scientists and engineers. Between 2003 and 2013, there was a 45% increase in the number of immigrants with engineering degrees, compared to 12% for their U.S.-born counterparts. Similarly, during this time, there was a 27% increase in the number of immigrants with degrees in physical and related sciences but only a 4% increase for U.S.-born scientists and engineers.

Employment Status, Occupation and Median Salary

Over 80% of scientists and engineers residing in the United States were employed in 2013. This share was nearly identical for immigrants (82%) and U.S.-born scientists and engineers (81%). Conversely, 3% of scientists and engineers were unemployed (not working, but looking for work), and 15% were not in the labor force (not working, not looking for work).

In 2013, 34% of immigrant scientists and engineers worked in S&E occupations, compared to 22% of their U.S.-born counterparts (table 2). Among the immigrants in S&E occupations,

TABLE 2. Characteristics of immigrant and U.S.-born citizen scientists and engineers in the United States: 2003 and 2013

Characteristics	2003						2013					
	All scientists and engineers		Immigrants[a]		U.S.-born citizens[b]		All scientists and engineers		Immigrants[a]		U.S.-born citizens[b]	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All scientists and engineers	21,647,000	100.0	3,352,000	100.0	18,295,000	100.0	28,950,000	100.0	5,179,000	100.0	23,771,000	100.0
Citizenship status												
U.S. citizens, native	18,295,000	84.5	ne	ne	18,295,000	100.0	23,771,000	82.1	ne	ne	23,771,000	100.0
U.S. citizens, naturalized	2,132,000	9.9	2,132,000	63.6	ne	ne	3,283,000	11.3	3,283,000	63.4	ne	ne
Non-U.S. citizen, permanent resident	860,000	4.0	860,000	25.6	ne	ne	1,147,000	4.0	1,147,000	22.1	ne	ne
Non-U.S. citizen, temporary resident	361,000	1.7	361,000	10.8	ne	ne	749,000	2.6	749,000	14.5	ne	ne
Highest degree of educational attainment												
Bachelor's	12,782,000	59.0	1,714,000	51.1	11,068,000	60.5	16,650,000	57.5	2,627,000	50.7	14,023,000	59.0
Master's	5,967,000	27.6	1,011,000	30.2	4,956,000	27.1	8,551,000	29.5	1,663,000	32.1	6,888,000	29.0
Doctorate	1,026,000	4.7	315,000	9.4	710,000	3.9	1,360,000	4.7	468,000	9.0	892,000	3.8
Professional	1,873,000	8.7	312,000	9.3	1,561,000	8.5	2,390,000	8.3	422,000	8.2	1,968,000	8.3
Highest degree field												
S&E fields	11,880,000	54.9	2,096,000	62.5	9,784,000	53.4	15,812,000	54.6	3,222,000	62.3	12,590,000	53.0
Computer and mathematical sciences	1,703,000	7.9	421,000	12.6	1,283,000	7.0	2,639,000	9.1	767,000	14.8	1,872,000	7.9
Biological, agricultural, and environmental life sciences	1,851,000	8.6	283,000	8.4	1,568,000	8.6	2,429,000	8.4	433,000	8.4	1,996,000	8.4
Physical and related sciences	876,000	4.0	190,000	5.7	685,000	3.7	956,000	3.3	241,000	4.7	715,000	3.0
Social and related sciences	4,618,000	21.3	477,000	14.2	4,141,000	22.6	6,378,000	22.0	731,000	14.1	5,647,000	23.8
Engineering	2,832,000	13.1	725,000	21.6	2,107,000	11.5	3,410,000	11.8	1,050,000	20.3	2,360,000	9.9
S&E-related fields	5,203,000	24.0	815,000	24.3	4,388,000	24.0	6,994,000	24.2	1,265,000	24.4	5,729,000	24.1
Non-S&E fields	4,564,000	21.1	441,000	13.2	4,123,000	22.5	6,146,000	21.2	693,000	13.4	5,452,000	22.9
Labor force status												
Employed	18,021,000	83.2	2,823,000	84.2	15,198,000	83.1	23,557,000	81.4	4,242,000	81.9	19,316,000	81.3
Unemployed (not working, but looking for work)	595,000	2.7	140,000	4.2	455,000	2.5	930,000	3.2	224,000	4.3	706,000	3.0
Not in labor force (not working, not looking for work)	3,031,000	14.0	389,000	11.6	2,642,000	14.4	4,463,000	15.4	714,000	13.8	3,749,000	15.8
Occupations												
S&E occupations	4,817,000	26.6	1,021,000	36.2	3,795,000	24.9	5,749,000	24.4	1,459,000	34.4	4,291,000	22.2
Computer and mathematical scientists	2,008,000	11.1	487,000	17.3	1,521,000	10.0	2,647,000	11.2	769,000	18.1	1,879,000	9.7
Biological, agricultural, and environmental life sciences	444,000	2.5	102,000	3.6	342,000	2.2	638,000	2.7	179,000	4.2	459,000	2.4
Physical and related scientists	315,000	1.7	64,000	2.3	251,000	1.6	319,000	1.4	81,000	1.9	238,000	1.2
Social and related scientists	495,000	2.7	54,000	1.9	440,000	2.9	581,000	2.5	84,000	2.0	497,000	2.6
Engineers	1,555,000	8.6	314,000	11.1	1,241,000	8.2	1,564,000	6.6	346,000	8.2	1,218,000	6.3
S&E-related occupations	5,331,000	29.6	802,000	28.4	4,529,000	29.8	7,439,000	31.6	1,330,000	31.3	6,110,000	31.6
Non-S&E-related occupations	7,873,000	43.7	998,000	35.4	6,875,000	45.2	10,368,000	44.0	1,453,000	34.2	8,916,000	46.2
Sector of employment												
Business or industry	12,477,000	69.2	2,130,000	0.75	10,348,000	68.1	16,503,000	70.1	3,203,000	75.5	13,300,000	68.9
4-year college or university	1,505,000	8.4	327,000	0.12	1,178,000	7.8	1,868,000	7.9	456,000	10.8	1,411,000	7.3
Other education institution	1,896,000	10.5	131,000	0.05	1,766,000	11.6	2,595,000	11.0	242,000	5.7	2,353,000	12.2
Government	2,142,000	11.9	236,000	0.08	1,906,000	12.5	2,592,000	11.0	340,000	8.0	2,251,000	11.7
Primary or secondary work activity												
Research and development	4,910,000	27.20	1,015,000	36.00	3,895,000	25.6	6,312,000	26.8	1,424,000	33.6	4,888,000	25.3
Teaching	3,072,000	17.00	328,000	11.60	2,744,000	18.1	4,212,000	17.9	536,000	12.6	3,676,000	19.0
Management, sales, administration	10,680,000	59.30	1,424,000	50.50	9,256,000	60.9	13,588,000	57.7	2,086,000	49.2	11,502,000	59.5
Computer application[c]	2,912,000	16.20	643,000	22.80	2,269,000	14.9	2,533,000	10.8	799,000	18.8	1,734,000	9.0
Other	7,006,000	38.90	992,000	35.20	6,014,000	39.6	9,991,000	42.4	1,580,000	37.3	8,411,000	43.5

ne = not eligible.

S&E = science and engineering.

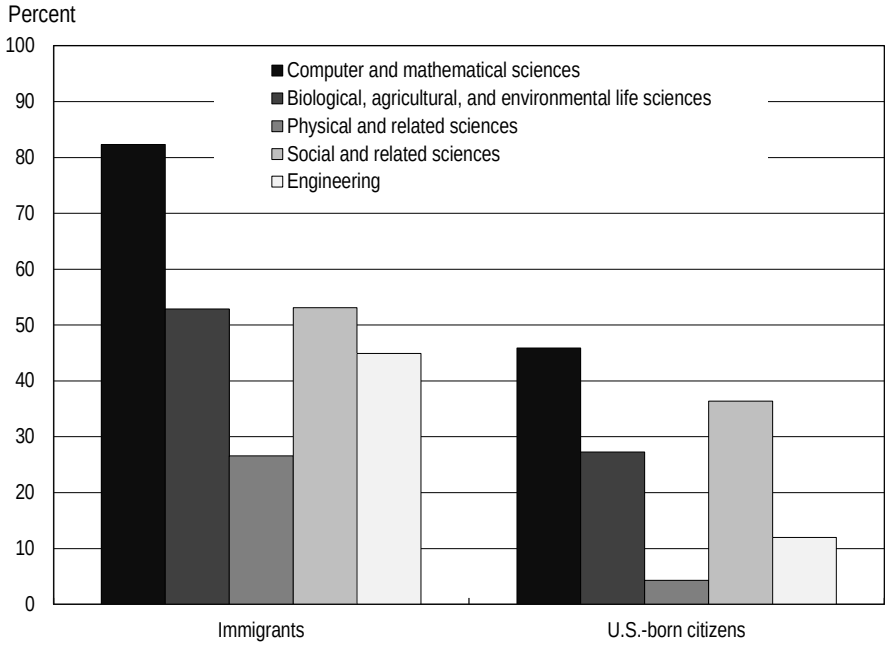
[a] Includes naturalized U.S. citizens, permanent residents, and temporary visa holders.

[b] Includes U.S. citizens born in the United States, Puerto Rico, or another U.S. territory and U.S. citizens born abroad of a U.S. citizen parent.

[c] Includes computer programming, systems, or application development.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineering Statistical Data System (SESTAT), 2003 and 2013.

FIGURE 1. Growth in highest degree field for scientists and engineers, by immigration status: 2003–13



SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineers Statistical Data System (SESTAT), 2013.

the largest share worked as computer and mathematical scientists (18%), compared to 10% of their U.S.-born counterparts. Engineering was the second-largest S&E occupation for both immigrants and U.S.-born employed scientists and engineers, at 8% and 6%, respectively.

Three S&E occupations experienced substantial employment growth among immigrant scientists and engineers from 2003 to 2013: life scientists (75%), computer and mathematical scientists (58%), and social and related scientists (55%). There was less growth over the decade in these occupations for U.S.-born scientists and engineers.

Another story emerges upon examining occupations such as physical and related scientists or engineers. Although there was little change in the total number of physical and related scientists or engineers over the decade, the immigrant share of both occupations increased, and the U.S.-born share of both occupations decreased. The number of immigrant engineers increased by 32,000 (10%), and the number of immigrant physical and related scientists increased by 17,000 (27%) (table 2). Meanwhile, there were decreases in the number of U.S.-born physical and related scientists (5%) and engineers (2%).

Overall, the median annual salary of immigrant scientists and engineers ($72,000) was higher than the median annual salary of their U.S.-born counterparts ($64,000) (figure 2). This pattern of higher median salary for immigrants compared to their U.S.-born counterparts exists in both S&E occupations and S&E-related occupations and may in part reflect the fact that immigrants are more likely than U.S.-born citizens to have earned a post-baccalaureate degree (41% versus 33%, excluding professional degree). Immigrants earned higher median salaries at both the master's and doctoral levels. At the bachelor's level, immigrants and U.S.-born scientists and engineers earned similar median salaries (table 3).

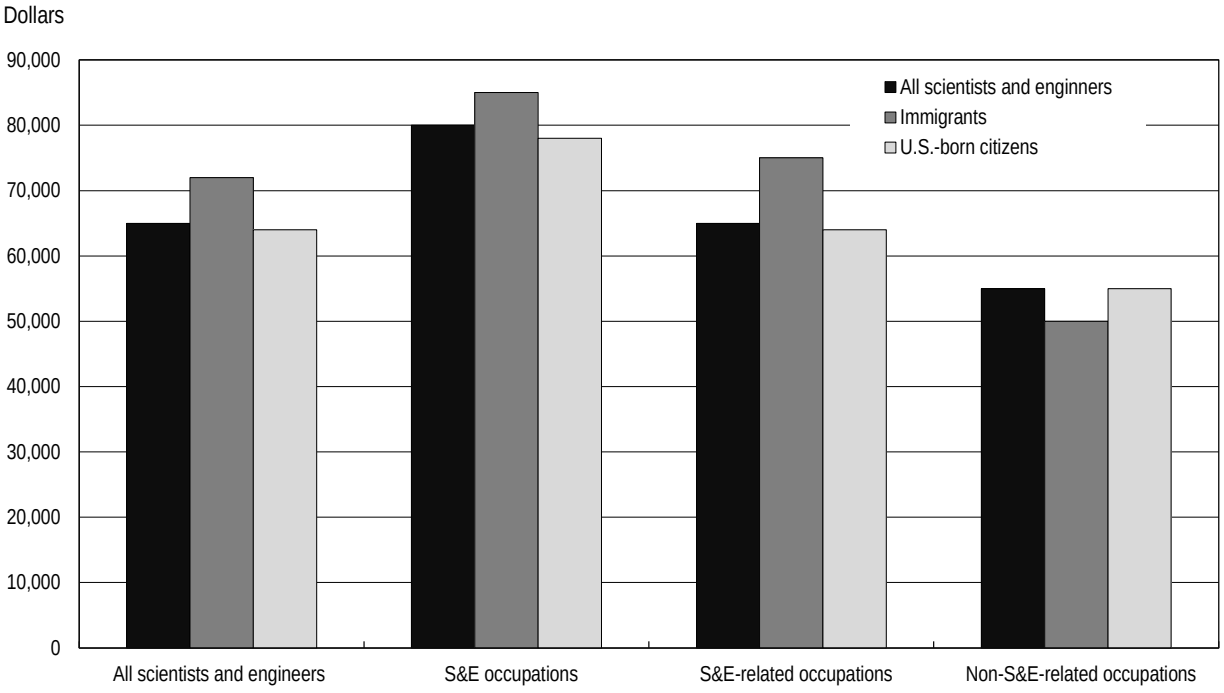
Economic Sector Representation

In 2013, 76% of immigrant scientists and engineers were employed in business or industry, 11% were employed in 4-year colleges or universities, 6% were employed in other educational institutions, and 8% were employed in government (table 2). Compared to immigrant scientists and engineers, slightly smaller shares of U.S.-born scientists and engineers were employed in business or industry (69%) or in 4-year colleges or universities (7%), and larger shares were employed in other educational institutions (12%) and in government (12%). These differences in the shares of immigrant versus U.S.-born scientists and engineers by employment sectors were similar to those in 2003.

Primary or Secondary Work Activity

Overall, 58% of employed scientists and engineers reported management, sales, or administration as their primary or secondary work activity (i.e., the activity on which they spent the most or the second-most hours in a typical work week) (table 2). However, immigrant scientists and engineers were less likely than their U.S.-born counterparts to report management, sales, or administration as their primary or secondary work activity (49% versus 60%). In contrast, immigrant scientists and engineers were more likely than their U.S.-born counterparts to report research and development as their primary or secondary work activity (34% versus 25%). Similarly, immigrant scientists and engineers were more likely than their U.S.-born counterparts to report that their primary or secondary work activity involved computer applications

FIGURE 2. Median salary of scientists and engineers, by citizenship status: 2013



S&E = science and engineering.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineering Statistical Data System (SESTAT), 2013.

(computer programming, systems, or application development) (19% versus 9%). U.S.-born scientists and engineers were more likely than their immigrant counterparts to report teaching as their primary or secondary work activity (19% versus 13%).

Data Sources and Limitations

Data presented here are from the 2013 SESTAT, an integrated data system that provides a comprehensive picture of individuals educated or employed in S&E fields and serves as the official National Science Foundation (NSF) source for estimates of the college-educated S&E workforce. The 2013 data are collected through two biennial surveys: the National Survey of College Graduates (NSCG) and the Survey of Doctorate Recipients (SDR).

The NSCG is the core of SESTAT. It is a representative sample of the entire college graduate population residing in the United States. The NSCG provides information on individuals educated or employed in S&E fields as well as those educated or employed in non-S&E fields. The SDR further supplements SESTAT with the stock and inflow of U.S.-degreed doctoral level scientists and engineers. For further survey information, please visit the SESTAT Web page: www.nsf.gov/statistics/sestat/.

Data presented in this report are now available through the SESTAT data tool at http://sestat.nsf.gov/sestat/sestat.html. The 2013 SESTAT public use data files are available at http://sestat.nsf.gov/datadownload. Data from these sources are also included in reports such as *Science and Engineering Indicators* and *Women, Minorities, and Persons with Disabili-*

TABLE 3. Median salary of immigrant and U.S.-born citizen scientists and engineers in the United States, by degree level: 2013

(Dollars)

Highest degree of educational attainment	All scientists and engineers	Immigrants	U.S.-born citizens
All scientists and engineers	65,000	72,000	64,000
Bachelor's	58,000	60,000	58,000
Master's	70,000	80,000	65,000
Doctorate	90,000	95,000	85,000
Professional	118,000	119,000	118,000

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineering Statistical Data System (SESTAT), 2013.

ties in Science and Engineering, and in data tools, such as Science and Engineering State Profiles.

The estimates in this report (which may be shown in text, figures, and tables) are based on responses from a sample of the population and may differ from actual values because of sampling variability or other factors. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements have undergone statistical testing and are significant at the 10% level unless otherwise noted. In this report, the variances of estimates were constructed based on the survey-specific replicate weights from the SDR and the NSCG.

Note

1. Flora Lan (flan@nsf.gov; 703-292-4758), Katherine Hale (khale@nsf.gov; 703-292-7786), and Emilda Rivers (erivers@nsf.gov; 703-292-7773), National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington VA 22230.

NSF 15-328