



June 2017 ■ NSF 17-319 (revised July 2017)

## The 2015 Survey of Doctorate Recipients Expands Its Population Coverage and Reporting on Field of Study

by Wan-Ying Chang and Daniel Foley<sup>1</sup>

The U.S. federal government devotes considerable resources to train and support the next generation of front-runners in science, technology, engineering, and mathematics to stay competitive in the dynamic, global knowledge-based economy. To better understand the employment outcomes for doctoral recipients, the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF) refreshed and more than doubled the sample size for the Survey of Doctorate Recipients (SDR) in the 2015 cycle. This expanded sample allowed the survey to report employment characteristics at the fine field of study level for the first time. The expansion also allowed for full representation of internationally residing U.S.-trained doctorate holders.

In 2015, an estimated 1,047,900 individuals worldwide held U.S. research doctoral degrees in science, engineering, and health (SEH) fields—an increase of 13% from 2013. The large increase is due in part to a larger number of new doctoral recipients from academic years 2012 and 2013 as well as improved survey coverage of the SEH doctoral population in the United States and abroad. Overall, 920,050 of the SEH

doctorate holders were residing in the United States and 127,800 (12%) in a foreign country.

Among the SEH doctoral degree holders in the United States in 2015, 87% were in the labor force, including 76% working full time and 9% working part time. The unemployment rate of U.S.-residing SEH doctorates in the labor force remains low at 1.8%. Of the non-U.S. residing population, 94% were in the labor force with an unemployment rate of 1.2%. Among employed SEH doctorate holders in the United States, the largest share (47%) were employed in the business/industry sector, with educational institutions as the next largest employer (45%). By contrast, most of the SEH doctorate holders living abroad were employed in the education sector (66%) (table 1).

### Foreign-Born U.S. Doctorate Recipients

Overall, nearly 40% of U.S.-trained SEH doctorates were born in a foreign country, though a majority (73%) remained in the United States after receiving their first SEH doctorate. Foreign-born U.S. doctorate recipients included those who were permanent residents (15%) at the time of their

graduation, those with temporary visas (72%), and those who were U.S. citizens (13%).<sup>2</sup>

The likelihood of SEH doctorate holders residing in the United States in February 2015 varied by citizenship and visa status at the time of degree award.<sup>3</sup> Among SEH doctorate holders who were U.S. citizens at the time of their degree, 2% of those with degrees earned before 1981 were residing abroad in 2015, compared with 5% of those with degrees earned since 2011 (figure 1). In contrast, recent SEH doctorate holders with a temporary visa at the time of graduation were more likely to be residing in the United States than abroad. For temporary visa holders at the time of graduation, 60% of those with degrees earned before 1981 were residing in the United States compared with 75% of those earning their degree since 2011. Among the estimated 183,050 temporary visa holders at the time of degree who were residing in the United States in February 2015, nearly half (49%) had become naturalized U.S. citizens and another 35% had acquired U.S. permanent residency. Of the temporary visa holders at the time of degree residing abroad in February 2015, 77% had returned to their birth country.<sup>4</sup>

TABLE 1. Employment status and sector of employment of U.S.-trained SEH doctorate holders, by residence location and field of doctorate: 2015

Residing location and field of doctorate	Total	Employment status			Employment sector		
		Employed	Unemployed <sup>a</sup>	Not in the labor force <sup>b</sup>	Educational institution	Business/industry	Government
<b>U.S. residing population</b>							
All SEH fields	920,050	787,250	14,300	118,500	351,500	366,450	69,350
Biological, agricultural, and environmental life sciences	228,650	195,100	4,200	29,350	96,700	79,250	19,100
Computer and information sciences	26,350	24,600	500	1,250	9,250	14,400	950
Mathematics and statistics	43,400	35,950	600	6,850	21,850	12,400	1,700
Physical sciences	157,100	131,550	2,750	22,800	52,150	66,400	13,000
Psychology	134,250	114,200	1,500	18,600	45,200	58,400	10,600
Social sciences	115,150	95,650	1,650	17,850	63,500	23,900	8,250
Engineering	171,250	151,900	2,500	16,850	41,650	98,750	11,500
Health	43,900	38,350	600	5,000	21,250	12,950	4,150
<b>Non-U.S. residing population</b>							
All SEH fields	127,800	119,200	1,450	7,150	78,250	29,200	11,800
Biological, agricultural, and environmental life sciences	25,950	24,000	350	1,600	15,050	5,800	3,150
Computer and information sciences	4,450	4,350	D	S	2,950	1,150	250
Mathematics and statistics	8,550	8,050	150	350	6,350	1,250	400
Physical sciences	19,900	18,200	300	1,400	10,700	5,200	2,350
Psychology	5,250	4,800	50	400	3,250	1,150	400
Social sciences	27,400	25,200	250	1,950	17,900	4,850	2,500
Engineering	31,700	30,300	250	1,150	19,150	8,850	2,250
Health	4,600	4,350	D	200	2,900	950	500

D = suppressed to avoid disclosure of confidential information. S = suppressed for reliability; coefficient of variation exceeds publication standards.

SEH = science, engineering, and health.

<sup>a</sup> Unemployed includes individuals who were not working during the survey reference week but had been seeking work in the 4 weeks prior to February 2015 or who were on layoff from their job.

<sup>b</sup> Not in the labor force includes retirees and individuals neither working nor looking for work in the 4 weeks prior to February 2015.

NOTES: Residence location is based on reported living location on 1 February 2015. Educational institution includes 4-year colleges or universities, medical schools (including university-affiliated hospitals or medical centers), university-affiliated research institutes, 2-year colleges, community colleges, technical institutes, precollege institutions, and other educational institutions. Business/industry includes private for-profit, private nonprofit, self-employed or business owners in incorporated or nonincorporated business, and employers not broken out separately. Government includes U.S. federal, state, and local government and non-U.S. government at any level. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2015.

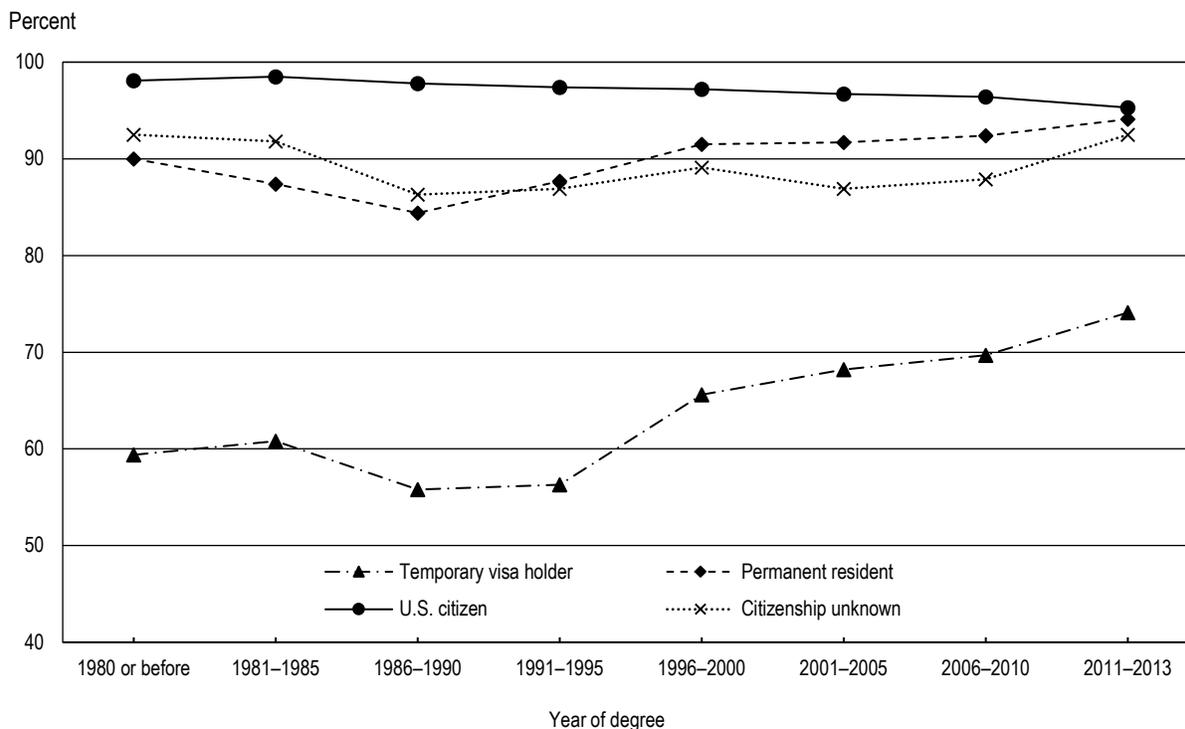
## R&D Activities by Fine Field of Degree

The expanded 2015 SDR sample enabled reliable estimation of doctorates performing Research and Development (R&D) activities within more than 200 fine fields of degree (FFODs).<sup>5</sup> These FFODs can be aggregated into broader field of degree categories to meet various analytical needs. Overall, 41% of the 787,250 U.S.-employed SEH doctorate recipients

were performing R&D as their primary work activity in 2015. When reporting R&D as either a primary or secondary work activity, the rate increased to 63%.<sup>6</sup> The proportion of SEH doctorate holders performing R&D as a primary activity varies considerably across the 8 broad degree fields, from a low of 18% among the doctorates with degrees in psychology to a high of 54% among doctorates with degrees in engineering (figure 2).

R&D intensity also varies significantly among the fine fields of degree (FFODs). For example, among the 63 FFODs under the broad field of biological, agricultural, and environmental life sciences, the R&D rate varied from a low of about 25% among doctorate recipients in the fine field of agricultural animal breeding and anatomy compared to more than 60% among those in the fine fields of structural biology, biometrics & biostatistics, and biotechnology.

FIGURE 1. U.S.-trained SEH doctorate holders residing in the United States, by year of degree and citizenship at time of degree: 2015



SEH = science, engineering, and health.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2015.

## Data Sources, Limitations, and Availability

Data presented here are from the 2015 SDR, which collects data on individuals who earned research doctoral degrees in SEH fields from U.S. institutions. The target population of the SDR consists of all U.S.-trained SEH doctoral graduates who were younger than 76 years of age and not institutionalized or terminally ill on 1 February 2015. The SDR has been conducted since 1973 and is sponsored by NCSES in conjunction with the National Institutes of Health.

The SDR sample size more than doubled for the 2015 survey cycle to 120,000 individuals, from approximately 47,000 individuals in the 2013 cycle. This sample size increase was designed to significantly improve the survey's ability to examine employment characteristics at the fine field of

degree level reported in the Survey of Earned Doctorates (SED).

The estimates in this InfoBrief 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 in this report have undergone statistical testing and are significant at the 95% confidence level. In addition, the estimates presented are rounded to the nearest 50, though calculations are based on unrounded estimates. With the new sample design, NCSES is evaluating its rounding and computation guidelines for the SDR to determine if rounding continues to be necessary. More information on the SDR and its new estimation goals can be found at (<https://www.nsf.gov/statistics/srvydoctoratework/>).

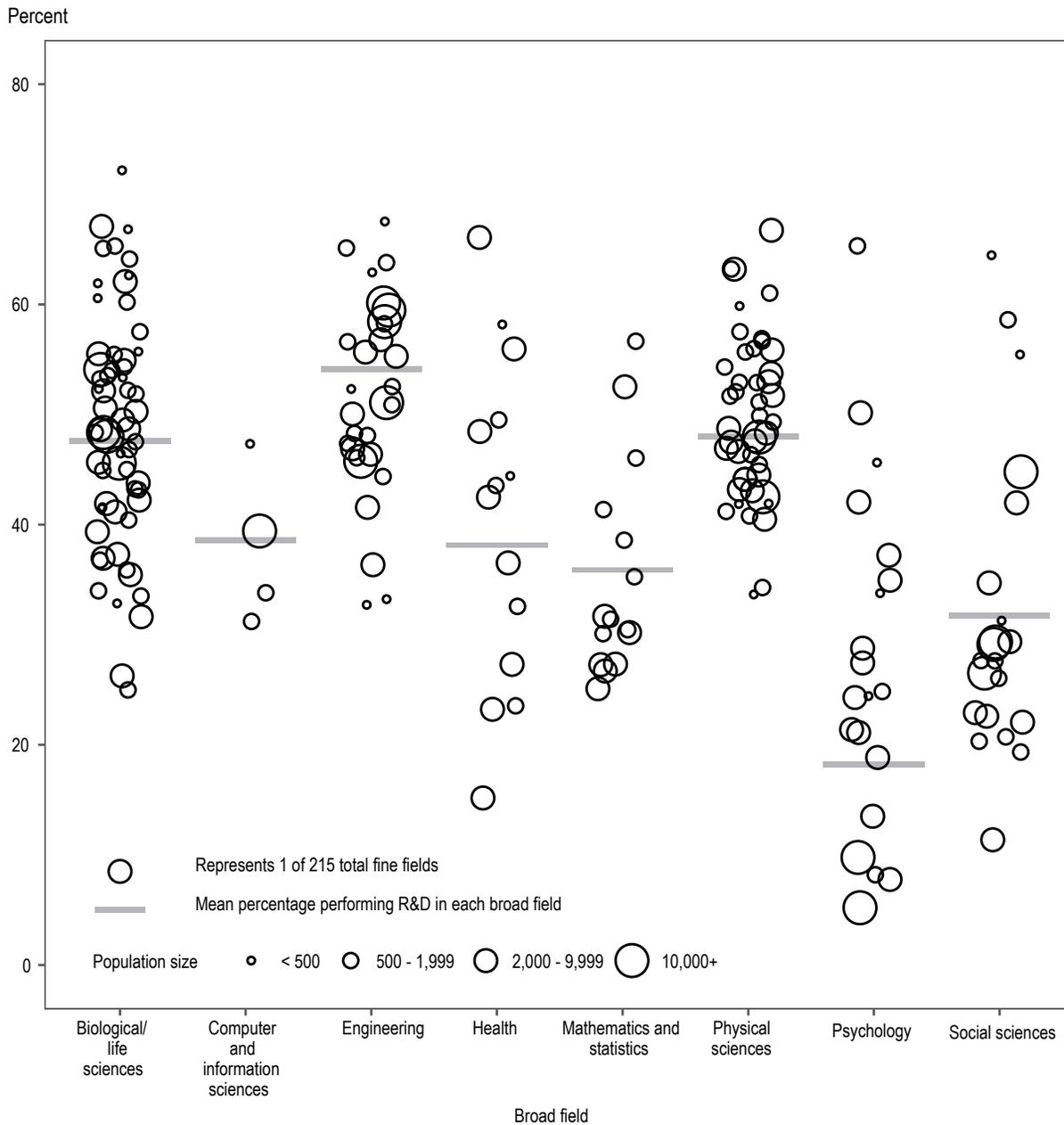
## Notes

1. Wan-Ying Chang (wchang@nsf.gov; 703-292-2310), Office of the Division Director, and Daniel Foley (dfoley@nsf.gov; 703-292-7811), Human Resources Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230.

2. Citizenship and visa status at the time of graduation was unknown among 42,800 (4.1%) of the 1,047,900 SEH doctorates including 20,500 (5.0%) of the foreign-born doctorates and are not included in these percent calculations.

3. Foreign residency, citizenship, and visa status upon graduation also has been shown to be related to employment decisions including sector of

FIGURE 2. U.S.-residing employed SEH doctorate holders with R&D as a primary activity, by field of degree: 2015



SEH = science, engineering, and health.

NOTE: R&D activity refers to the share of workers reporting basic research, applied research, design, or development as a primary activity in their principal job—the activity ranks first in work hours.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2015.

employment, work activities, and postdoctoral appointments (<https://www.nsf.gov/statistics/2015/nsf15302>).

4. The rate of returning to birth countries has varied by country of origin (<https://www.nsf.gov/statistics/infbrief/nsf13300/>).

5. Before the 2015 cycle, SDR data were reported on only 26 minor field of degree categories as a disaggregation of the 8 major field of degree categories shown in figure 2.

6. R&D activity rate is the proportion of employed doctorates who report that

basic research, applied research, design, or development is a primary work activity in that most of their hours are spent on this activity during a typical week. It is a secondary work activity if this is where their second most hours were spent.

Erratum: The National Institutes of Health (NIH) was inadvertently excluded as a co-sponsor of the Survey of Doctorate Recipients. This has been corrected, and NIH is now appropriately credited.

RETURN THIS COVER SHEET TO ROOM P35 IF YOU  
DO NOT WISH TO RECEIVE THIS MATERIAL  OR  
IF CHANGE OF ADDRESS IS NEEDED  INDICATE  
CHANGE INCLUDING ZIP CODE ON THE LABEL (DO  
NOT REMOVE LABEL).

**National Science Foundation**  
ARLINGTON, VA 22230  
OFFICIAL BUSINESS

NSF 17-319