



Unemployment among Doctoral Scientists and Engineers Remained Below the National Average in 2013

by Lance A. Selfa and Steven Proudfoot¹

In 2013, an estimated 837,900 individuals in the United States held research doctoral degrees in science, engineering, and health (SEH) fields, an increase of 4.0% from 2010.² Of these individuals, approximately 735,900 were in the labor force, which includes those employed full time or part time and those actively seeking work (i.e., unemployed). The unemployment rate for SEH doctorate recipients in the labor force was 2.1% in February 2013, down from 2.4% in October 2010 (table 1). Moreover, the 2013 unemployment rate of the SEH doctoral labor force was one-third of the February 2013 unemployment rate for the general population aged 25 years or older (6.3%).³

These and other findings in this InfoBrief are from the 2013 Survey of Doctorate Recipients (SDR), which collects information from individuals who have earned research doctorates in SEH fields from U.S. academic institutions.

Employment Status

Field of Doctoral Study and Years since Doctorate

Of the approximately 735,900 SEH doctoral degree holders in the labor

force in 2013, about one-quarter (25.5%) had earned a doctorate in the biological, agricultural, or environmental life sciences; 18.5% had doctorates in engineering; 17.1% in physical sciences; 14.5% in psychology; 12.3% in social sciences; 4.6% in health; 4.5% in mathematics and statistics; and 3.0% in computer and information sciences (percentages derived from table 1).

Unemployment rates of SEH doctorates in the labor force ranged from 1.2% for those who received doctorates in mathematics and statistics to 2.7% for those who received doctorates in the physical sciences.

Of the total SEH doctoral population in February 2013, 87.8% was in the labor force, with 76.0% working full time and another 10.1% working part time (table 2). An additional 10.4% of the SEH doctoral population was retired in 2013, whereas the rest was not seeking work (1.7%). Across SEH degree fields, full-time employment ranged from 64.5% for psychology doctorates to 90.0% for computer and information sciences doctorates.

Retirement and part-time work status differed by years since doctorate

award. Those who earned their doctorates more than 25 years ago were, as expected, more likely than the younger cohorts to be retired and out of the labor force (32.1% in 2013) and to be working part time (15.9%) (table 2).⁴ In contrast, years since doctorate award had no significant relationship with the unemployment rate.⁵

Demographics

Women continue to represent a growing share of doctorate holders, rising to 32.9% of all SEH doctorate holders in February 2013, from 31.5% in October 2010 and 30.2% in October 2008. In 2013, the labor force participation rate among SEH doctorate holders was 89.1% for women, compared with 87.2% for men (table 3). Female SEH doctorate holders were less likely than their male counterparts to be employed full time in 2013 (72.7% of women, 77.5% of men) and more likely not to be seeking work (3.7% of women, 0.8% of men). Female SEH doctorate holders, who as a group are younger than male SEH doctorate holders, were also less likely than their male counterparts to be retired (7.2% of women, 12.1% of men). In contrast, the proportions of female and male doctorate recipients

TABLE 1. Number in labor force and unemployment rate for scientists and engineers with U.S. doctoral degrees, by field of doctorate: Selected years, 2001–13

Field of doctorate	2001	2003	2006	2008	2010	2013
	Number in labor force					
All SEH fields	582,500	606,300	630,300	670,200	709,700	735,900
Biological, agricultural, and environmental life sciences	142,400	148,800	158,200	167,600	179,600	187,700
Computer and information sciences	10,900	12,300	13,700	16,300	19,400	22,200
Mathematics and statistics	26,300	29,000	29,500	31,200	32,500	33,000
Physical sciences	113,200	115,700	115,800	119,900	124,400	125,600
Psychology	89,600	93,000	97,500	101,000	104,200	106,600
Social sciences	77,200	79,600	81,000	85,100	88,700	90,200
Engineering	101,300	104,400	108,000	119,800	129,100	136,300
Health	21,500	23,600	26,500	29,300	31,800	34,200
	Unemployment rate (percent) ^a					
All SEH fields	1.3	2.1	1.4	1.7	2.4	2.1
Biological, agricultural, and environmental life sciences	1.1	2.0	1.4	1.9	2.2	2.2
Computer and information sciences	0.9	2.4	1.4	1.2	2.1	1.8
Mathematics and statistics	1.5	2.4	1.0	1.0	1.5	1.2
Physical sciences	1.7	2.5	2.1	2.4	3.5	2.7
Psychology	0.8	1.7	0.9	1.3	1.7	1.6
Social sciences	1.3	1.5	1.0	1.3	1.9	1.9
Engineering	1.7	2.7	1.4	1.8	2.8	1.9
Health	0.5	1.3	0.7	1.0	1.9	2.0

SEH = science, engineering, and health.

^a Based on count of doctorate recipients in the labor force.

NOTES: Numbers represent weighted counts, rounded to the nearest 100. Details may not add to totals due to rounding. October was the survey reference month in 2003, 2008, and 2010; April was the survey reference month in 2001 and 2006; February was the survey reference month in 2013. Estimates from 2008 vary from those previously published because a revised sample design was retroactively applied. The revised design integrates the international component of the Survey of Doctorate Recipients. Estimates from 2010 and 2013 also reflect the revised sample design. See Data Sources and Availability for more detail.

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

who reported themselves as unemployed in February 2013 were not significantly different (2.0% of women, 1.7% of men).

A majority of the SEH doctoral population is white (73.0%), with Asians constituting the next largest group (19.0%). Within the SEH doctoral population, Hispanics or Latinos were employed full time at a higher rate than those who are not Hispanic or Latino (81.9% versus 75.7%). Among those who are not Hispanic or Latino, Asian doctorate holders exhibited a higher level of full-time employment (87.6%)

than blacks or African Americans (79.9%), whites (72.4%), and those who reported more than one race (76.3%). Whites were more likely to be retired (12.7%) than were Hispanics or Latinos (4.5%), Asians (4.1%), blacks or African Americans (4.6%), and those reporting more than one race (8.2%) (table 3), reflecting the younger ages of the individuals in the SEH doctoral population who are not white.⁶

In 2013, 3.4% of the SEH doctoral population held temporary visas (derived from table 3). As might be expected based on U.S. visa require-

ments, almost all of these individuals (96.9%) were working full or part time; a small fraction was not in the labor force in February 2013 (1.7%).

Sector

Four-year educational institutions employed 42.2% of all working SEH doctorate recipients in 2013. Private for-profit firms employed the next-largest share of the doctoral workforce at 32.3% of the total (derived from table 4). Most doctorate recipients in the social sciences were employed in 4-year educational institutions (62.7%). Doctorate recipients in the field of

TABLE 2. Employment status of scientists and engineers with U.S. doctoral degrees, by field and years since doctorate: 2013 (Percent)

Field and years since doctorate	Total (number)	In labor force					Not in labor force		
		All	Working for pay or profit			Unemployed ^a	All	Retired	Not working, not seeking work
			All working	Full time	Part time				
All U.S. SEH doctorate holders	837,900	87.8	86.0	76.0	10.1	1.8	12.2	10.4	1.7
Field of doctorate									
Biological, agricultural, and environmental life sciences	211,900	88.6	86.6	79.1	7.5	2.0	11.4	9.2	2.2
Computer and information sciences	23,000	96.5	95.2	90.0	5.2	1.7	3.5	2.6	0.9
Mathematics and statistics	39,200	84.2	83.2	75.5	7.7	1.0	15.8	13.8	2.0
Physical sciences	148,800	84.4	82.1	74.4	7.7	2.3	15.6	13.8	1.7
Psychology	120,200	88.7	87.3	64.5	22.8	1.4	11.3	9.3	2.0
Social sciences	105,900	85.2	83.6	72.1	11.4	1.6	14.8	13.3	1.5
Engineering	150,600	90.5	88.8	82.7	6.1	1.7	9.5	8.4	1.1
Health	38,300	89.3	87.5	76.5	10.7	1.8	10.7	9.1	1.8
Years since doctorate									
2 years or less	60,000	98.0	96.2	89.7	6.5	1.8	2.0	D	1.8
3–5 years	80,400	97.8	95.6	89.7	6.0	2.1	2.4	0.4	2.0
6–10 years	112,300	97.0	95.2	87.3	7.9	1.8	3.0	0.9	2.0
11–15 years	110,900	95.5	94.1	85.1	9.0	1.4	4.5	2.2	2.4
16–20 years	98,100	94.4	92.8	84.1	8.7	1.6	5.6	3.4	2.2
21–25 years	80,900	91.5	89.7	80.2	9.5	1.7	8.7	6.8	1.7
More than 25 years	232,800	67.0	65.2	49.3	15.9	1.8	33.0	32.1	0.9

D = suppressed to avoid disclosure of confidential information.

SEH = science, engineering, and health.

^a Based on count of all doctorate recipients.

NOTES: Numbers represent weighted counts, rounded to the nearest 100. Details may not add to totals due to rounding. Designation of full-time and part-time employment status is based on principal job only, not on all jobs held in labor force. Full-time employed persons are those working at least 35 hours per week at their principal job. Part-time employed persons are those working fewer than 35 hours per week.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2013.

engineering tended to be employed in for-profit firms (58.1%) (derived from table 4).

Data Sources and Availability

Comparative terms in this InfoBrief (e.g., higher, more or less likely, differ, increase) are based on statistical tests for significant differences at the 95% level. Percentage comparisons in this report are based on unrounded estimates and may differ from percentages calculated from the rounded estimates displayed in the tables.

The ethnicity and race categories reported here are mutually exclusive. Hispanic or Latino ethnicity refers to all individuals who reported Hispanic or Latino origin regardless of racial background. The estimates on racial backgrounds refer to individuals who were not of Hispanic or Latino origin and who reported only one racial background. Individuals who reported more than one racial background are shown as a separate group.

Data in this InfoBrief are from the SDR, a biennial longitudinal survey

of individuals who earned doctoral degrees in SEH fields from U.S. institutions. A sample of doctorate recipients is followed throughout their careers until they reach age 76, and the panel is refreshed each survey cycle with a sample of recent doctoral graduates. The SDR has been conducted since 1973 and is sponsored by the National Science Foundation (NSF) in conjunction with the National Institutes of Health.

The 2013 SDR provides data from 30,696 responding sample members

TABLE 3. Employment status of scientists and engineers with U.S. doctoral degrees, by sex, ethnicity, race, and citizenship: 2013
(Percent)

Sex, ethnicity, race, and citizenship	Total (number)	In labor force					Not in labor force		
		All	Working for pay or profit			Unemployed ^a	All	Retired	Not working, not seeking work
			All working	Full time	Part time				
All U.S. SEH doctorate holders	837,900	87.8	86.0	76.0	10.1	1.8	12.2	10.4	1.7
Sex									
Male	562,400	87.2	85.5	77.5	7.9	1.7	12.8	12.1	0.8
Female	275,500	89.1	87.1	72.7	14.4	2.0	10.9	7.2	3.7
Ethnicity and race									
Hispanic or Latino	28,800	93.8	92.0	81.9	10.1	2.1	6.3	4.5	1.4
Not Hispanic or Latino	809,200	87.6	85.8	75.7	10.1	1.8	12.4	10.7	1.7
American Indian or Alaska Native	1,800	94.4	88.9	77.8	11.1	D	5.6	5.6	D
Asian	159,400	94.2	92.2	87.6	4.5	2.1	5.8	4.1	1.7
Black or African American	25,900	94.2	91.1	79.9	11.2	3.1	5.4	4.6	0.8
Native Hawaiian or Other Pacific Islander	1,000	90.0	90.0	80.0	10.0	D	10.0	D	D
White	611,400	85.5	83.9	72.4	11.5	1.6	14.5	12.7	1.8
More than one race	9,700	89.7	85.6	76.3	9.3	3.1	11.3	8.2	3.1
Citizenship									
U.S. citizen or permanent resident	809,200	87.4	85.6	75.3	10.4	1.8	12.6	10.8	1.7
Temporary visa holder	28,700	98.6	96.9	94.8	2.1	1.7	1.7	D	1.7

D = suppressed to avoid disclosure of confidential information.

SEH = science, engineering, and health.

^a Based on the count of all doctorate recipients.

NOTES: Numbers represent weighted counts, rounded to the nearest 100. Details may not add to totals due to rounding. Designation of full-time and part-time employment status is based on principal job only, not on all jobs held in labor force. Full-time employed persons are those working at least 35 hours per week at their principal job. Part-time employed persons are those working fewer than 35 hours per week. Persons of Hispanic or Latino origin may be of any race.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2013.

(76.4% response rate), representing an estimated 837,900 SEH doctorate recipients in the United States. Historically, the SDR sample included only U.S.-degreed doctorate recipients residing or working in the United States on the survey reference date. Beginning in 2010, an integrated sample design was implemented, allowing U.S.-degreed doctorate recipients located outside of the United States to be considered eligible for the survey and counted among the national sample. Once the integrated approach was developed, it was retroactively applied to the 2008 SDR data.

Data tables from the 2013 SDR are available at <http://ncesdata.nsf.gov/doctoratework/2013/>. Please contact Steve Proudfoot for more information. Data from the SDR are also available in the Scientists and Engineers Statistical Data System (SESTAT) at <http://www.nsf.gov/statistics/sestat/>.

Notes

1. Lance A. Selfa is with NORC at the University of Chicago. For more information, contact Steven Proudfoot, Human Resources Statistics Program, National Center for Science and Engineering Statistics, National Science

Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230 (sproutfoot@nsf.gov; 703-292-4434). The authors thank Eric Hedberg, Carolina Milesi, Zachary Gebhardt, NORC at the University of Chicago, for their work on this InfoBrief.

2. Counts in this InfoBrief represent weighted numbers rounded to the nearest 100. The standard error of the overall doctoral population of 837,900 is 950 (rounded up to the nearest 50). As such, the true number of doctorate recipients with U.S. doctoral degrees living in the United States in

TABLE 4. Employed scientists and engineers with U.S. doctoral degrees, by employment sector and field of doctorate: 2013

Field of doctorate	Employment sector							
	All employed	4-year educational institution ^a	Private for-profit ^b	Private non-profit	Federal government	State or local government	Self-employed ^c	Other ^d
All SEH fields	720,800	304,400	233,100	45,500	49,200	16,900	43,400	28,400
Biological, agricultural, and environmental life sciences	183,500	88,800	47,300	14,000	15,700	4,000	6,700	7,000
Computer and information sciences	21,900	8,300	10,500	900	800	D	800	400
Mathematics and statistics	32,600	18,600	9,000	1,300	1,200	200	800	1,400
Physical sciences	122,200	43,600	51,200	6,300	9,500	2,300	4,100	5,200
Psychology	104,900	35,300	20,500	10,000	6,400	5,200	20,800	6,700
Social sciences	88,500	55,500	11,200	5,300	5,100	2,200	4,300	4,900
Engineering	133,700	35,100	77,700	4,600	8,000	2,000	4,500	1,800
Health	33,500	19,000	5,700	3,200	2,300	800	1,500	1,000

D = suppressed to avoid disclosure of confidential information.

SEH = science, engineering, and health.

^a Includes 4-year colleges or universities, medical schools (including university-affiliated hospitals or medical centers), and university-affiliated research institutes.

^b Includes those self-employed in an incorporated business.

^c Self-employed or business owner in a nonincorporated business.

^d Includes 2-year colleges, community colleges, technical institutes, other precollege institutions, and employers not broken out separately.

NOTES: Numbers represent weighted counts, rounded to the nearest 100. Details may not add to totals due to rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2013.

February 2013 is estimated (at a 95% confidence interval) to be between 836,000 and 839,700. For a listing of science, engineering, and health fields included in the 2013 Survey of Doctorate Recipients, see technical table B-1 at <http://ncesdata.nsf.gov/doctoratework/2013/#tabs-2>.

3. Unemployment statistics for the general population aged 25 years or older are published by the U.S. Bureau of Labor Statistics (BLS) and were obtained from http://www.bls.gov/news.release/archives/empisit_03082013.htm (accessed 8 April 2014). The civilian unemployment rate for the population aged 16 years or older—the labor force measure

as defined by BLS (http://www.bls.gov/cps/cps_htgm.htm#concepts (accessed 7 May 2014)—in February 2013 was 7.7%, which is available at <http://data.bls.gov/timeseries/LNS14000000> (accessed on 8 April 2014). Persons are classified as unemployed if they do not have a job, have actively looked for work in the prior 4 weeks, and are currently available for work.

4. The length of time since doctorate receipt is associated with age: the median age of those with more than 25 years since doctorate receipt is 65 years, and the median age of those with 25 or fewer years since doctorate receipt is 44 years.

5. Two measures of unemployment are used in this InfoBrief: (1) the unemployment rate as noted in table 1, which is based on the count of doctorate recipients in the labor force, and (2) the percentage unemployed as noted in tables 2 and 3, which is based on the count of all doctorate recipients, regardless of whether they are in the labor force.

6. Because of the small sizes of the populations of (1) American Indians or Alaska Natives and (2) Native Hawaiians or Other Pacific Islanders, statistically reliable comparisons between these two groups and others were not possible.

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