



National Center for Science and
Engineering Statistics

Survey of Doctorate Recipients, Longitudinal Data: 2015–19

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General Notes

The Survey of Doctorate Recipients (SDR), conducted by the National Center for Science and Engineering Statistics within the National Science Foundation and by the National Institutes of Health, provides demographic, education, and career history information from individuals with a U.S. research doctoral degree in a science, engineering, or health (SEH) field. This report contains technical documentation for the longitudinal subsample of the 2015 SDR (the LSDR 2015–25 panel), which is designed to provide information about employment changes among the population of U.S.-trained science, engineering, and health (SEH) doctorate holders less than 65 years of age in 2015 over a 10-year period (2015–25). The first release of data from the LSDR 2015–25 panel includes survey data from three cycles of the SDR: 2015, 2017, and 2019.

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TABLE 1-A

Doctoral scientists and engineers, by demographic and degree characteristics and unemployment spells: 2015–19

(Number and percent)

Demographic and degree characteristics	All scientists and engineers		Unemployment spells (number)								Unemployment spells (%)								
			0		1		2		3		0		1		2		3		
	Number	SE	Total	SE	Total	SE	Total	SE	Total	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE	
Total	856,050	1,500	825,650	1,800	24,450	925	4,600	425	1,350	200	96.45	0.15	2.86	0.15	0.54	0.05	0.16	0.05	
Gender																			
Male	556,750	1,475	538,550	1,625	14,300	700	2,850	350	1,050	200	96.73	0.15	2.57	0.15	0.51	0.10	0.19	0.05	
Female	299,300	950	287,100	1,075	10,150	525	1,750	225	300	75	95.92	0.20	3.39	0.20	0.59	0.10	0.09	0.05	
Ethnicity and race																			
Hispanic or Latino ^a	43,100	475	41,100	500	1,600	175	250	75	150	75	95.36	0.40	3.67	0.40	0.61	0.20	0.36	0.20	
Not Hispanic or Latino ^b																			
American Indian or Alaska Native	2,450	200	2,300	200	100	50	D	D	D	D	95.20	1.45	3.81	1.30	D	D	D	D	
Asian	237,150	1,000	227,850	1,225	7,500	525	1,350	275	450	150	96.08	0.30	3.17	0.25	0.57	0.15	0.18	0.10	
Black or African American	29,050	400	27,400	425	1,350	200	200	75	100	50	94.27	0.65	4.72	0.65	0.68	0.20	0.33	0.15	
White	534,100	1,650	517,150	1,825	13,550	725	2,700	350	650	125	96.83	0.15	2.54	0.15	0.51	0.10	0.12	0.05	
More than one race ^c	10,150	450	9,800	475	350	75	50	25	D	D	96.32	0.80	3.21	0.75	0.46	0.25	D	D	
Field of degree																			
Science	640,450	1,350	617,600	1,400	18,350	725	3,400	350	1,050	175	96.43	0.15	2.87	0.15	0.53	0.10	0.16	0.05	
Biological, agricultural, and environmental life sciences	219,850	800	210,350	900	7,750	450	1,250	200	500	125	95.68	0.25	3.52	0.20	0.57	0.10	0.23	0.10	
Computer and information sciences	29,600	175	28,550	225	900	150	150	75	D	D	96.44	0.60	2.97	0.50	0.46	0.20	D	D	
Mathematics and statistics	37,650	425	36,600	425	700	175	300	125	D	D	97.22	0.55	1.80	0.45	0.73	0.30	D	D	
Physical sciences, geosciences, atmospheric, and ocean sciences	139,100	675	133,700	700	4,250	325	850	175	250	100	96.13	0.30	3.06	0.25	0.63	0.15	0.18	0.10	
Psychology	105,000	800	102,550	825	2,250	225	200	75	D	D	97.65	0.25	2.12	0.25	0.19	0.10	D	D	
Social sciences	109,250	775	105,850	800	2,600	250	700	150	100	50	96.88	0.30	2.38	0.25	0.63	0.15	0.11	0.05	
Engineering	178,050	700	171,800	850	4,950	450	1,050	225	250	100	96.48	0.30	2.79	0.25	0.60	0.15	0.14	0.05	
Health	37,550	425	36,300	450	1,100	225	100	50	D	D	96.57	0.55	2.96	0.60	0.32	0.15	D	D	
Years since degree																			
≤ 10 years	164,250	675	156,750	800	6,350	400	900	150	200	75	95.45	0.30	3.88	0.25	0.55	0.10	0.13	0.05	
11–20 years	291,850	1,000	282,700	1,100	7,650	500	1,200	200	400	100	96.85	0.20	2.61	0.20	0.40	0.10	0.13	0.05	
21–30 years	243,350	1,325	235,050	1,425	6,150	450	1,750	275	400	125	96.59	0.25	2.53	0.20	0.71	0.15	0.17	0.05	
> 30 years	156,600	1,225	151,150	1,250	4,300	400	800	175	350	125	96.52	0.30	2.75	0.25	0.52	0.15	0.22	0.10	
Residence location in 2015																			
U.S. residing	742,750	1,850	715,800	2,000	21,750	850	4,050	425	1,150	200	96.37	0.15	2.93	0.15	0.55	0.10	0.15	0.05	
Non-U.S. residing	113,300	1,250	109,850	1,250	2,650	300	550	100	200	75	96.97	0.30	2.36	0.30	0.49	0.10	0.18	0.10	
Disability status in 2015																			
With disability	71,700	1,250	68,100	1,225	2,400	275	950	200	200	75	94.97	0.50	3.37	0.40	1.35	0.25	0.31	0.10	
Without disability	784,350	1,950	757,550	2,225	22,050	850	3,650	375	1,150	200	96.58	0.15	2.81	0.15	0.46	0.05	0.14	0.05	

TABLE 1-A

Doctoral scientists and engineers, by demographic and degree characteristics and unemployment spells: 2015–19

(Number and percent)

Demographic and degree characteristics	All scientists and engineers		Unemployment spells (number)								Unemployment spells (%)								
			0		1		2		3		0		1		2		3		
	Number	SE	Total	SE	Total	SE	Total	SE	Total	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE	
Citizenship at graduation																			
U.S. citizen and permanent resident	598,950	2,075	578,050	2,075	16,850	750	3,250	350	850	150	96.51	0.15	2.81	0.15	0.54	0.10	0.14	0.05	
Temporary visa holder	257,100	1,600	247,600	1,675	7,600	475	1,350	225	550	125	96.31	0.25	2.95	0.20	0.53	0.10	0.21	0.05	

D = suppressed to avoid disclosure of confidential information.

SE = standard error.

^a Hispanic or Latino may be of any race.^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.**Note(s):**

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Unemployed includes individuals who were not working during the survey reference week but had been seeking work in the prior 4 weeks or who were on layoff from their job. Number of unemployment spells is the count of times an individual was unemployed on the survey reference week of 1 February 2015, 2017, and 2019. Residence location is based on reported living location on 1 February 2015. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 1-B

Doctoral scientists and engineers, by demographic and degree characteristics and employment sector changes: 2015–19

(Number and percent)

Demographic and degree characteristics	All scientists and engineers employed in all three surveys		Employment sector changes (number)						Employment sector changes (%)					
			0		1		2		0		1		2	
			Number	SE	Total	SE	Total	SE	Total	SE	Percent	SE	Percent	SE
Total	745,400	1,950	601,500	2,350	102,900	1,575	41,050	1,300	80.69	0.25	13.80	0.25	5.51	0.20
Gender														
Male	494,200	1,650	406,750	2,000	62,000	1,200	25,500	975	82.30	0.30	12.54	0.25	5.16	0.20
Female	251,200	1,350	194,750	1,300	40,900	950	15,550	725	77.53	0.45	16.28	0.40	6.19	0.30
Ethnicity and race														
Hispanic or Latino ^a	38,350	525	30,100	525	5,850	300	2,400	225	78.57	0.90	15.20	0.75	6.24	0.60
Not Hispanic or Latino ^b														
American Indian or Alaska Native	2,150	200	1,850	200	200	75	100	50	86.67	3.10	8.92	2.60	4.42	1.80
Asian	211,250	1,400	172,750	1,700	26,300	925	12,200	650	81.78	0.55	12.46	0.45	5.77	0.30
Black or African American	25,450	425	19,100	400	4,300	250	2,050	200	75.07	1.00	16.82	0.85	8.12	0.70
White	459,300	2,025	370,900	2,150	64,850	1,225	23,500	925	80.76	0.30	14.12	0.30	5.12	0.20
More than one race ^c	9,000	425	6,750	400	1,450	175	800	150	75.31	2.10	15.87	1.75	8.82	1.55
Field of degree														
Science	553,950	1,500	442,450	2,025	80,250	1,350	31,250	1,125	79.87	0.30	14.49	0.25	5.64	0.25
Biological, agricultural, and environmental life sciences	189,050	950	146,550	1,150	32,000	850	10,500	500	77.52	0.50	16.93	0.45	5.55	0.30
Computer and information sciences	26,100	375	22,500	450	2,500	275	1,100	200	86.19	1.15	9.65	1.05	4.16	0.75
Mathematics and statistics	33,650	475	30,000	525	2,800	275	850	175	89.07	0.95	8.36	0.85	2.58	0.50
Physical sciences, geosciences, atmospheric, and ocean sciences	120,550	625	98,200	1,050	15,300	700	7,050	500	81.45	0.70	12.69	0.60	5.86	0.45
Psychology	89,300	750	65,550	875	16,350	650	7,400	500	73.43	0.85	18.30	0.70	8.27	0.55
Social sciences	95,300	825	79,650	925	11,300	525	4,350	375	83.59	0.65	11.85	0.55	4.55	0.40
Engineering	159,650	975	133,300	1,250	18,200	775	8,150	600	83.51	0.60	11.40	0.50	5.09	0.40
Health	31,800	525	25,750	575	4,400	350	1,650	225	80.85	1.25	13.88	1.05	5.26	0.70
Years since degree														
≤ 10 years	150,000	875	109,800	1,150	29,250	750	10,950	550	73.20	0.60	19.49	0.50	7.30	0.40
11–20 years	270,400	1,150	221,650	1,475	34,950	1,125	13,800	725	81.97	0.50	12.92	0.45	5.11	0.30
21–30 years	214,150	1,450	179,000	1,700	24,800	925	10,350	725	83.58	0.55	11.58	0.45	4.84	0.35
> 30 years	110,850	1,150	91,050	1,150	13,900	750	5,900	450	82.14	0.70	12.52	0.65	5.33	0.40
Residence location in 2015														
U.S. residing	643,500	1,950	519,250	2,275	89,400	1,475	34,850	1,150	80.69	0.30	13.89	0.25	5.42	0.20
Non-U.S. residing	101,900	1,225	82,250	1,300	13,500	625	6,200	500	80.70	0.80	13.23	0.60	6.08	0.50
Disability status in 2015														
With disability	58,050	1,200	47,150	1,175	7,450	575	3,450	350	81.22	1.15	12.85	0.95	5.93	0.60
Without disability	687,350	2,250	554,350	2,450	95,400	1,550	37,600	1,250	80.65	0.30	13.88	0.25	5.47	0.20
Citizenship at graduation														
U.S. citizen and permanent resident	513,900	2,075	410,300	2,225	75,150	1,375	28,450	1,000	79.84	0.30	14.62	0.30	5.54	0.20
Temporary visa holder	231,500	1,600	191,150	1,750	27,750	925	12,600	700	82.58	0.50	11.98	0.40	5.44	0.30

SE = standard error.

^a Hispanic or Latino may be of any race.

^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.

^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.

Note(s):

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2015. Number of changes in detailed employment sectors for principal job held since baseline of 2015, as reported during the survey reference week of 1 February 2015, 2017, and 2019. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 1-C

Doctoral scientists and engineers, by demographic and degree characteristics and changes between U.S. and non-U.S. location: 2015–19

(Number and percent)

Demographic and degree characteristics	All scientists and engineers		Changes in location (number)						Changes in location (%)					
			0		1		2		0		1		2	
	Number	SE	Total	SE	Total	SE	Total	SE	Percent	SE	Percent	SE	Percent	SE
Total	856,050	1,500	831,350	1,675	20,150	750	4,550	425	97.12	0.15	2.35	0.10	0.53	0.05
Gender														
Male	556,750	1,475	538,950	1,650	14,400	700	3,450	375	96.80	0.15	2.58	0.15	0.62	0.10
Female	299,300	950	292,450	1,000	5,750	400	1,100	175	97.71	0.15	1.93	0.15	0.36	0.10
Ethnicity and race														
Hispanic or Latino ^a	43,100	475	41,200	500	1,600	200	350	75	95.54	0.45	3.68	0.45	0.77	0.20
Not Hispanic or Latino ^b														
American Indian or Alaska Native	2,450	200	2,400	175	D	D	D	D	97.44	1.20	D	D	D	D
Asian	237,150	1,000	227,300	1,125	7,950	525	1,950	300	95.83	0.25	3.35	0.25	0.81	0.15
Black or African American	29,050	400	28,400	400	600	125	50	25	97.64	0.40	2.13	0.40	0.23	0.10
White	534,100	1,650	522,200	1,750	9,800	500	2,100	275	97.77	0.15	1.84	0.10	0.39	0.05
More than one race ^c	10,150	450	9,950	450	150	50	50	50	97.79	0.55	1.51	0.40	0.71	0.35
Field of degree														
Science	640,450	1,350	622,300	1,425	14,800	575	3,300	350	97.17	0.10	2.31	0.10	0.52	0.10
Biological, agricultural, and environmental life sciences	219,850	800	214,750	850	4,200	350	900	200	97.69	0.20	1.91	0.15	0.41	0.10
Computer and information sciences	29,600	175	28,400	275	1,000	225	200	75	95.90	0.75	3.45	0.75	0.65	0.25
Mathematics and statistics	37,650	425	36,300	475	1,050	200	300	125	96.46	0.60	2.75	0.55	0.79	0.30
Physical sciences, geosciences, atmospheric, and ocean sciences	139,100	675	134,700	725	3,600	325	750	175	96.85	0.25	2.59	0.25	0.56	0.15
Psychology	105,000	800	103,550	825	1,200	225	250	75	98.62	0.25	1.13	0.20	0.25	0.10
Social sciences	109,250	775	104,600	800	3,750	300	900	150	95.74	0.30	3.43	0.30	0.82	0.15
Engineering	178,050	700	172,400	800	4,600	425	1,050	200	96.83	0.30	2.58	0.25	0.59	0.15
Health	37,550	425	36,650	450	750	175	150	75	97.53	0.45	2.01	0.45	0.46	0.20
Years since degree														
≤ 10 years	164,250	675	156,600	850	6,750	400	850	175	95.35	0.30	4.12	0.25	0.52	0.10
11–20 years	291,850	1,000	283,100	1,125	6,900	400	1,900	275	96.99	0.20	2.37	0.15	0.64	0.10
21–30 years	243,350	1,325	237,550	1,275	4,450	375	1,350	250	97.61	0.20	1.84	0.20	0.55	0.10
> 30 years	156,600	1,225	154,150	1,250	2,000	325	450	150	98.44	0.25	1.27	0.20	0.29	0.10
Residence location in 2015														
U.S. residing	742,750	1,850	730,300	2,000	9,450	525	3,000	325	98.32	0.10	1.27	0.10	0.40	0.05
Non-U.S. residing	113,300	1,250	101,050	1,200	10,700	550	1,550	250	89.21	0.50	9.43	0.50	1.36	0.25
Disability status in 2015														
With disability	71,700	1,250	69,700	1,225	1,550	250	450	150	97.19	0.40	2.17	0.35	0.63	0.20
Without disability	784,350	1,950	761,650	2,050	18,600	700	4,100	425	97.11	0.15	2.37	0.10	0.52	0.10
Citizenship at graduation														
U.S. citizen and permanent resident	598,950	2,075	587,050	2,050	9,950	500	1,950	225	98.01	0.10	1.66	0.10	0.33	0.05
Temporary visa holder	257,100	1,600	244,300	1,625	10,200	575	2,600	325	95.03	0.25	3.96	0.25	1.01	0.15

D = suppressed to avoid disclosure of confidential information.

SE = standard error.

^a Hispanic or Latino may be of any race.

^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.

^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.

Note(s):

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2015. Number of changes in residence location since baseline of 2015 as reported during the survey reference week of 1 February 2015 (baseline), 2017, and 2019. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 2-A

Doctoral scientists and engineers, by demographic and degree characteristics and workforce transitions: 2015–19

(Number)

Demographic and degree characteristics	All doctoral scientists and engineers		Not working in 2015														Working in 2015													
			Total		Employed in 2017		Unemployed in 2017		Not in labor force in 2017		Employed in 2019		Unemployed in 2019		Not in labor force in 2019		Total		Employed in 2017		Unemployed in 2017		Not in labor force in 2017		Employed in 2019		Unemployed in 2019		Not in labor force in 2019	
	Total	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE
Total	856,050	1,500	48,750	950	15,000	600	4,200	350	29,550	750	17,150	700	2,700	325	28,850	750	807,300	1,700	777,450	1,950	9,500	625	20,400	725	756,450	1,900	8,500	675	42,350	1,000
Gender																														
Male	556,750	1,475	23,450	750	7,300	475	2,450	300	13,650	575	7,700	525	1,800	300	13,950	575	533,350	1,500	514,900	1,650	6,100	575	12,350	625	500,950	1,575	5,500	550	26,850	825
Female	299,300	950	25,300	800	7,700	450	1,750	175	15,850	625	9,450	525	950	125	14,900	625	273,950	1,225	262,550	1,225	3,400	300	8,050	400	255,450	1,350	3,000	300	15,500	600
Ethnicity and race																														
Hispanic or Latino ^a	43,100	475	2,350	200	1,000	150	300	100	1,050	150	1,050	150	250	100	1,050	150	40,750	525	39,400	525	650	100	750	125	39,000	550	550	100	1,200	150
Not Hispanic or Latino ^b																														
American Indian or Alaska Native	2,450	200	150	75	D	D	D	D	100	50	D	D	D	D	100	50	2,250	200	2,200	200	D	D	D	D	2,150	200	D	D	50	50
Asian	237,150	1,000	11,350	625	5,100	375	1,200	225	5,100	500	5,750	425	700	175	4,900	450	225,800	1,175	218,050	1,350	3,100	350	4,650	475	214,650	1,300	2,400	325	8,750	575
Black or African American	29,050	400	1,450	150	750	100	200	75	500	100	750	100	150	50	600	100	27,600	400	26,450	425	500	100	700	125	26,100	425	500	125	1,000	150
White	534,100	1,650	32,950	775	7,850	450	2,550	250	22,550	725	9,350	525	1,600	250	21,950	650	501,150	1,825	481,900	2,025	5,150	500	14,100	575	465,400	1,975	4,900	500	30,850	875
More than one race ^c	10,150	450	500	100	250	75	D	D	250	75	250	75	D	D	200	75	9,700	450	9,400	450	100	50	150	50	9,100	425	100	50	500	100
Field of degree																														
Science	640,450	1,350	39,250	825	11,800	550	3,450	300	24,000	675	13,550	625	2,050	250	23,650	650	601,200	1,500	578,400	1,550	7,000	550	15,800	650	562,000	1,525	5,950	525	33,250	925
Biological, agricultural, and environmental life sciences	219,850	800	14,500	450	4,900	325	1,500	200	8,150	400	5,800	350	750	175	7,950	350	205,300	800	197,050	850	3,000	300	5,250	375	192,050	925	2,250	300	11,000	575
Computer and information sciences	29,600	175	1,400	175	550	150	150	75	700	150	550	150	D	D	750	150	28,200	250	27,100	325	400	100	700	150	26,750	350	200	75	1,250	200
Mathematics and statistics	37,650	425	1,950	225	550	150	300	100	1,100	175	700	175	150	75	1,100	175	35,700	425	34,650	450	350	125	700	150	34,050	475	150	100	1,500	225
Physical sciences, geosciences, atmospheric, and ocean sciences	139,100	675	7,750	300	2,500	275	800	150	4,400	275	2,500	250	550	125	4,700	275	131,350	675	126,100	650	1,750	225	3,500	350	122,300	625	1,350	225	7,700	425
Psychology	105,000	800	7,750	325	1,500	225	400	100	5,850	350	1,900	250	D	D	5,750	300	97,300	800	93,900	800	600	125	2,800	275	90,300	775	900	175	6,050	350
Social sciences	109,250	775	5,900	300	1,800	200	350	125	3,750	275	2,000	225	450	125	3,450	250	103,400	750	99,600	800	950	175	2,850	325	96,550	800	1,050	175	5,750	400
Engineering	178,050	700	7,150	375	2,550	275	600	150	3,950	350	2,950	325	550	150	3,700	300	170,900	775	165,400	850	2,150	300	3,350	375	161,950	950	2,250	325	6,700	500
Health	37,550	425	2,350	200	650	125	150	50	1,600	200	700	125	150	75	1,550	200	35,200	450	33,650	450	350	100	1,200	200	32,500	525	300	125	2,400	275
Years since degree																														
≤ 10 years	164,250	675	7,200	375	4,650	300	450	100	2,100	225	5,100	325	500	100	1,600	175	157,050	750	152,950	800	2,450	225	1,700	200	152,650	850	1,700	225	2,700	250
11–20 years	291,850	1,000	10,650	500	4,600	325	1,100	150	4,950	350	5,600	375	650	125	4,400	300	281,200	1,025	275,350	1,075	3,050	325	2,800	300	274,200	1,125	2,850	325	4,200	350
21–30 years	243,350	1,325	11,750	575	3,400	325	1,400	225	6,900	425	3,800	375	850	175	7,100	425	231,600	1,375	224,000	1,425	2,350	300	5,250	375	216,350	1,425	2,800	375	12,500	600
> 30 years	156,600	1,225	19,150	600	2,350	250	1,250	225	15,550	550	2,700	325	650	175	15,800	575	137,450	1,175	125,150	1,225	1,650	250	10,650	625	113,250	1,175	1,200	225	23,000	800
Residence location in 2015																														
U.S. residing	742,750	1,850	44,900	900	13,100	600	3,800	325	28,050	750	15,200	700	2,400	300	27,350	700	697,850	1,875	671,550	2,000	8,250	625	18,000	650	652,950	1,925	7,600	650	37,300	950
Non-U.S. residing	113,300	1,250	3,850	325	1,900	250	450	125	1,500	200	1,950	225	350	125	1,500	200	109,450	1,225	105,850	1,200	1,250	200	2,350	300	103,450	1,275	900	175	5,050	350
Disability status in 2015																														
With disability	71,700	1,250	6,450	375	1,600	225	700	150	4,150	350	1,650	250	500	125	4,300	350	65,250	1,250	61,900	1,225	1,200	200	2,150	275	59,300	1,200	1,150	225	4,800	375
Without disability	784,350	1,950	42,300	925	13,400	575	3,500	325	25,350	750	15,500	675	2,200	300	24,600	750	742,050	2,050	715,500	2,250	8,300	550	18,250	700	697,150	2,150	7,400	625	37,550	1,000

TABLE 2-A

Doctoral scientists and engineers, by demographic and degree characteristics and workforce transitions: 2015–19

(Number)

Demographic and degree characteristics	All doctoral scientists and engineers		Not working in 2015												Working in 2015															
			Total		Employed in 2017		Unemployed in 2017		Not in labor force in 2017		Employed in 2019		Unemployed in 2019		Not in labor force in 2019		Total		Employed in 2017		Unemployed in 2017		Not in labor force in 2017		Employed in 2019		Unemployed in 2019		Not in labor force in 2019	
	Total	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE		
Citizenship at graduation																														
U.S. citizen and permanent resident	598,950	2,075	38,000	850	9,850	450	2,950	275	25,150	750	11,200	550	1,850	250	24,950	700	561,000	2,100	538,550	2,200	6,550	575	15,850	600	521,300	2,075	6,000	550	33,650	925
Temporary visa holder	257,100	1,600	10,750	550	5,150	375	1,250	200	4,350	450	5,950	425	900	175	3,900	375	246,350	1,575	238,850	1,550	2,950	325	4,500	400	235,150	1,625	2,500	275	8,700	550

D = suppressed to avoid disclosure of confidential information.

SE = standard error.

^a Hispanic or Latino may be of any race.^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.**Note(s):**

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Unemployed includes individuals who were not working during the survey reference week but had been seeking work in the prior 4 weeks or who were on layoff from their job. Residence location is based on reported living location on 1 February 2015. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 2-B

Employed doctoral scientists and engineers, by demographic and degree characteristics and transitions to retirement: 2015–19

(Number and percent)

Demographic and degree characteristics	All employed doctoral scientists and engineers in 2015			Retired in 2017				Retired in 2019			
	Number	SE	Percent	Number	SE	Percent	SE	Number	SE	Percent	SE
Total	807,300	1,700	100.00	15,600	675	1.93	0.10	36,350	900	4.50	0.15
Gender											
Male	533,350	1,500	100.00	11,000	625	2.06	0.15	24,800	825	4.65	0.20
Female	273,950	1,225	100.00	4,600	325	1.68	0.15	11,550	550	4.21	0.20
Ethnicity and race											
Hispanic or Latino ^a	40,750	525	100.00	500	100	1.20	0.25	850	125	2.05	0.30
Not Hispanic or Latino ^b											
American Indian or Alaska Native	2,250	200	100.00	D	D	D	D	D	D	D	D
Asian	225,800	1,175	100.00	3,350	425	1.48	0.20	7,000	500	3.10	0.25
Black or African American	27,600	400	100.00	500	100	1.74	0.35	950	150	3.41	0.55
White	501,150	1,825	100.00	11,200	525	2.24	0.15	27,150	825	5.42	0.20
More than one race ^c	9,700	450	100.00	100	50	0.89	0.45	350	100	3.77	0.85
Field of degree											
Science	601,200	1,500	100.00	12,250	600	2.03	0.10	28,250	850	4.70	0.15
Biological, agricultural, and environmental life sciences	205,300	800	100.00	4,000	350	1.94	0.20	9,300	550	4.54	0.30
Computer and information sciences	28,200	250	100.00	350	100	1.30	0.35	950	200	3.33	0.65
Mathematics and statistics	35,700	425	100.00	600	150	1.67	0.40	1,150	200	3.17	0.55
Physical sciences, geosciences, atmospheric, and ocean sciences	131,350	675	100.00	3,050	325	2.33	0.25	6,700	425	5.10	0.35
Psychology	97,300	800	100.00	1,950	225	2.01	0.25	4,950	375	5.07	0.40
Social sciences	103,400	750	100.00	2,250	275	2.19	0.30	5,200	375	5.05	0.40
Engineering	170,900	775	100.00	2,450	350	1.43	0.20	5,850	425	3.42	0.25
Health	35,200	450	100.00	950	175	2.69	0.50	2,250	275	6.36	0.75
Years since degree											
≤ 10 years	157,050	750	100.00	100	50	0.07	0.05	650	125	0.41	0.10
11–20 years	281,200	1,025	100.00	800	150	0.28	0.10	2,300	250	0.82	0.10
21–30 years	231,600	1,375	100.00	4,100	375	1.78	0.20	10,800	625	4.67	0.30
> 30 years	137,450	1,175	100.00	10,600	625	7.70	0.45	22,550	800	16.42	0.55
Residence location in 2015											
U.S. residing	697,850	1,875	100.00	13,850	625	1.98	0.10	32,000	875	4.59	0.15
Non-U.S. residing	109,450	1,225	100.00	1,800	275	1.63	0.25	4,350	325	3.95	0.30
Disability status in 2015											
With disability	65,250	1,250	100.00	1,600	250	2.47	0.35	4,050	350	6.23	0.50
Without disability	742,050	2,050	100.00	14,000	650	1.89	0.10	32,250	900	4.35	0.15
Citizenship at graduation											
U.S. citizen and permanent resident	561,000	2,100	100.00	12,600	600	2.25	0.15	29,450	875	5.25	0.20
Temporary visa holder	246,350	1,575	100.00	3,000	375	1.22	0.15	6,900	500	2.79	0.20

D = suppressed to avoid disclosure of confidential information.

SE = standard error.

^a Hispanic or Latino may be of any race.^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.

Note(s):

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2015. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 2-C

Transitions between out-of-field job and in-field job among doctoral scientists and engineers: 2015–19

(Number)

Demographic and degree characteristics	Total employed in all survey cycles (2015, 2017, and 2019)		In field in 2015										Out of field in 2015													
			In field in 2017		Out of field in 2017				In field in 2019		Out of field in 2019				In field in 2017		Out of field in 2017				In field in 2019		Out of field in 2019			
					Voluntarily		Involuntarily				Voluntarily		Involuntarily				Voluntarily		Involuntarily				Voluntarily		Involuntarily	
			Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE
All employed for all survey cycles (2015, 2017, and 2019)	745,400	1,950	672,100	2,250	15,000	750	7,700	525	668,250	2,225	17,950	700	8,600	600	23,550	950	16,300	700	10,750	675	25,150	975	16,400	750	9,050	575
Gender																										
Male	494,200	1,650	444,000	1,950	10,450	650	5,250	450	441,150	1,900	12,450	600	6,100	525	16,250	825	11,200	650	7,050	600	17,250	850	11,300	675	6,000	500
Female	251,200	1,350	228,100	1,375	4,600	350	2,450	225	227,100	1,350	5,500	375	2,500	225	7,300	450	5,050	325	3,700	300	7,900	500	5,100	350	3,050	250
Ethnicity and race																										
Hispanic or Latino ^a	38,350	525	35,350	575	650	125	250	75	35,150	550	650	125	450	150	1,100	175	500	100	450	100	1,200	175	500	125	400	75
Not Hispanic or Latino ^b																										
American Indian or Alaska Native	2,150	200	1,900	175	D	D	D	D	1,900	175	D	D	D	D	S	S	D	D	D	D	100	50	D	D	D	D
Asian	211,250	1,400	190,750	1,375	3,450	350	2,300	300	188,650	1,425	5,250	450	2,600	325	6,950	550	4,350	425	3,400	375	7,050	550	4,500	450	3,200	350
Black or African American	25,450	425	22,550	450	700	125	400	100	22,500	425	800	150	350	100	800	125	600	100	400	125	950	125	600	125	250	75
White	459,300	2,025	413,500	2,150	10,100	575	4,500	375	412,200	2,075	10,900	625	4,950	425	14,350	750	10,600	550	6,250	525	15,600	825	10,550	600	5,050	400
More than one race ^c	9,000	425	8,050	450	150	50	150	50	7,900	450	300	100	200	75	200	75	200	50	250	100	350	100	150	50	150	50
Field of degree																										
Science	553,950	1,500	499,500	1,775	11,150	675	5,400	400	496,950	1,725	12,750	625	6,350	450	17,500	750	11,900	650	8,450	550	18,450	775	12,150	675	7,250	550
Biological, agricultural, and environmental life sciences	189,050	950	168,450	1,150	4,450	425	2,200	275	167,850	1,150	4,900	400	2,350	275	7,350	425	3,900	375	2,650	300	7,250	450	4,450	425	2,250	300
Computer and information sciences	26,100	375	24,650	375	300	100	200	75	24,550	375	450	125	150	75	350	125	450	150	150	75	600	150	250	100	D	D
Mathematics and statistics	33,650	475	30,650	525	500	125	450	125	30,500	525	650	200	450	100	950	225	650	150	500	175	1,150	225	650	175	250	125
Physical sciences, geosciences, atmospheric, and ocean sciences	120,550	625	102,000	850	3,750	425	1,800	250	101,250	825	4,100	400	2,200	250	5,600	425	4,300	350	3,150	300	5,800	450	4,050	325	3,150	325
Psychology	89,300	750	85,300	800	950	175	250	75	85,000	800	1,100	175	450	100	1,150	225	1,100	200	500	125	1,400	225	1,100	225	300	100
Social sciences	95,300	825	88,500	900	1,150	200	600	125	87,850	900	1,600	225	800	175	2,100	250	1,500	250	1,500	225	2,250	300	1,650	275	1,200	200
Engineering	159,650	975	142,800	1,125	3,250	325	1,950	300	141,500	1,175	4,500	350	2,000	275	5,500	500	3,950	375	2,150	300	6,000	500	4,000	400	1,600	225
Health	31,800	525	29,750	575	600	175	350	125	29,750	550	700	200	250	100	550	125	400	100	150	75	700	150	200	75	150	75
Years since degree																										
≤ 10 years	150,000	875	137,900	925	2,800	250	2,000	225	136,550	925	3,650	350	2,500	250	3,900	375	1,950	225	1,500	225	4,250	325	1,700	200	1,400	200
11–20 years	270,400	1,150	246,500	1,275	4,550	375	3,250	350	245,300	1,225	5,900	375	3,050	325	7,400	550	5,150	400	3,600	375	8,150	525	5,200	425	2,750	300
21–30 years	214,150	1,450	189,200	1,575	4,850	475	1,650	225	188,300	1,525	5,250	500	2,200	275	8,500	600	5,850	450	4,100	400	8,750	625	6,100	500	3,600	350
> 30 years	110,850	1,150	98,500	1,225	2,800	325	850	200	98,100	1,225	3,200	375	900	200	3,750	375	3,350	350	1,600	200	4,000	425	3,350	375	1,350	200
Residence location in 2015																										
U.S. residing	643,500	1,950	575,900	2,300	13,750	725	7,200	475	573,250	2,300	15,850	700	7,750	550	21,600	900	15,000	650	10,000	625	23,100	950	15,050	775	8,450	575
Non-U.S. residing	101,900	1,225	96,200	1,275	1,300	200	500	125	95,000	1,325	2,100	250	850	175	1,950	300	1,300	200	750	175	2,050	300	1,300	250	600	150
Disability status in 2015																										
With disability	58,050	1,200	52,300	1,125	950	225	700	150	51,850	1,100	1,350	250	800	200	2,550	350	900	175	650	125	2,400	325	1,050	200	650	150

TABLE 2-C

Transitions between out-of-field job and in-field job among doctoral scientists and engineers: 2015–19

(Number)

Demographic and degree characteristics	Total employed in all survey cycles (2015, 2017, and 2019)		In field in 2015										Out of field in 2015													
			In field in 2017		Out of field in 2017				In field in 2019		Out of field in 2019				In field in 2017		Out of field in 2017				In field in 2019		Out of field in 2019			
					Voluntarily	SE	Number	SE			Number	SE	Voluntarily	SE			Number	SE	Voluntarily	SE			Number	SE	Voluntarily	SE
			Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE
Without disability	687,350	2,250	619,750	2,450	14,050	725	7,000	500	616,400	2,350	16,600	650	7,800	575	21,000	850	15,400	700	10,150	675	22,750	925	15,350	725	8,400	550
Citizenship at graduation																										
U.S. citizen and permanent resident	513,900	2,075	459,550	2,275	11,850	625	5,250	375	458,200	2,300	12,600	625	5,900	475	17,250	725	12,500	600	7,500	525	18,550	800	12,350	650	6,400	425
Temporary visa holder	231,500	1,600	212,550	1,650	3,150	300	2,450	325	210,050	1,725	5,350	425	2,700	325	6,300	575	3,800	400	3,250	400	6,600	525	4,050	475	2,650	350

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

SE = standard error.

^a Hispanic or Latino may be of any race.

^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.

^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.

Note(s):

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2015. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

TABLE 2-D

Doctoral scientists and engineers, by demographic and degree characteristics and transitions into and out of the United States: 2015–19

(Number)

Demographic and degree characteristics	All doctoral scientists and engineers		In United States in 2015										Out of United States in 2015									
			Total		In United States in 2017		Out of United States in 2017		In United States in 2019		Out of United States in 2019		Total		In United States in 2017		Out of United States in 2017		In United States in 2019		Out of United States in 2019	
	Total	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE	Number	SE
Total	856,050	1,500	742,750	1,850	734,000	1,950	8,750	600	733,300	1,925	9,450	525	113,300	1,250	8,150	500	105,150	1,175	10,700	550	102,600	1,250
Gender																						
Male	556,750	1,475	473,050	1,775	466,600	1,800	6,450	525	466,300	1,775	6,750	500	83,700	1,225	5,850	450	77,850	1,150	7,600	500	76,100	1,225
Female	299,300	950	269,700	1,125	267,400	1,150	2,300	275	267,000	1,175	2,700	300	29,600	700	2,300	225	27,250	700	3,050	275	26,500	700
Ethnicity and race																						
Hispanic or Latino ^a	43,100	475	32,000	525	31,350	550	600	100	31,300	550	650	100	11,100	425	650	100	10,500	400	950	175	10,200	375
Not Hispanic or Latino ^b																						
American Indian or Alaska Native	2,450	200	2,300	200	2,300	175	D	D	2,300	175	D	D	100	75	D	D	100	75	D	D	100	75
Asian	237,150	1,000	180,050	1,300	176,050	1,375	4,050	450	175,900	1,350	4,150	450	57,100	1,000	2,850	325	54,300	950	3,800	350	53,300	1,000
Black or African American	29,050	400	26,200	450	25,950	450	250	50	25,900	450	300	75	2,900	250	200	75	2,700	250	300	75	2,550	225
White	534,100	1,650	493,000	1,850	489,300	1,900	3,700	325	488,750	1,900	4,250	325	41,100	950	4,450	375	36,650	900	5,600	400	35,550	925
More than one race ^c	10,150	450	9,200	425	9,100	425	100	50	9,150	425	50	50	950	200	D	D	900	200	100	25	850	175
Degree field																						
Science	640,450	1,350	560,200	1,725	553,550	1,725	6,650	450	552,900	1,750	7,300	450	80,250	1,075	5,900	425	74,300	1,050	7,500	450	72,750	1,050
Biological, agricultural, and environmental life sciences	219,850	800	196,100	1,100	194,250	1,100	1,850	225	193,950	1,150	2,100	250	23,750	750	1,400	200	22,350	725	2,050	250	21,650	675
Computer and information sciences	29,600	175	25,300	300	24,950	350	350	100	24,750	350	550	150	4,300	275	450	175	3,850	300	500	175	3,800	300
Mathematics and statistics	37,650	425	30,700	500	30,200	500	550	175	30,200	525	550	150	6,950	350	550	150	6,350	350	500	125	6,450	350
Physical sciences, geosciences, atmospheric, and ocean sciences	139,100	675	121,800	825	120,300	825	1,500	225	120,100	850	1,750	225	17,250	550	1,550	225	15,700	550	1,850	225	15,400	575
Psychology	105,000	800	100,700	900	100,200	900	500	125	100,150	875	600	150	4,300	325	400	125	3,900	300	600	150	3,700	275
Social sciences	109,250	775	85,550	900	83,650	925	1,900	225	83,750	925	1,750	200	23,750	650	1,550	225	22,200	650	2,000	250	21,750	650
Engineering	178,050	700	148,950	900	147,100	925	1,850	350	147,050	900	1,900	300	29,100	800	1,750	250	27,350	775	2,700	300	26,400	750
Health	37,550	425	33,600	575	33,350	550	250	125	33,350	550	250	100	3,950	350	500	125	3,500	325	500	150	3,500	325
Years since degree																						
≤ 10 years	164,250	675	141,900	875	139,450	950	2,450	250	139,100	925	2,750	250	22,350	650	2,600	275	19,750	625	4,000	325	18,350	575
11–20 years	291,850	1,000	252,950	1,250	249,700	1,325	3,250	375	249,350	1,275	3,600	325	38,900	700	2,850	300	36,050	700	3,300	275	35,600	725
21–30 years	243,350	1,325	206,950	1,350	204,750	1,375	2,200	275	204,800	1,375	2,150	275	36,400	775	2,000	225	34,450	750	2,350	275	34,100	725
> 30 years	156,600	1,225	141,000	1,300	140,100	1,325	900	200	140,000	1,325	950	225	15,600	675	700	175	14,950	650	1,000	200	14,600	650
Disability status in 2015																						
With disability	71,700	1,250	60,100	1,175	59,300	1,175	850	175	59,350	1,175	750	175	11,600	550	600	175	11,000	550	800	150	10,800	550
Without disability	784,350	1,950	682,650	2,125	674,750	2,125	7,900	525	673,950	2,175	8,700	475	101,700	1,250	7,550	475	94,150	1,175	9,900	525	91,800	1,225
Citizenship at graduation																						
U.S. citizen and permanent resident	598,950	2,075	573,600	2,000	569,900	2,050	3,700	325	569,150	2,025	4,450	350	25,350	800	4,350	350	21,000	775	5,550	375	19,850	750
Temporary visa holder	257,100	1,600	169,150	1,650	164,100	1,700	5,050	475	164,150	1,700	5,050	425	87,900	1,250	3,800	350	84,100	1,200	5,150	400	82,750	1,200

D = suppressed to avoid disclosure of confidential information.

SE = standard error.

^a Hispanic or Latino may be of any race.

^b American Indian or Alaska Native, Asian, Black or African American, and White are single race.

^c Other race includes Native Hawaiian or Other Pacific Islander and persons reporting more than one race who are not of Hispanic or Latino ethnicity.

Note(s):

Numbers are rounded to the nearest 50. Standard errors are rounded up to the nearest 25. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2015. Survey asks degree of difficulty—none, slight, moderate, severe, or unable to do—an individual has in seeing (with glasses), hearing (with hearing aid), walking without assistance, lifting 10 pounds, or concentrating, remembering, or making decisions. Those respondents who answered "moderate," "severe," or "unable to do" for any activity were classified as having a disability.

Source(s):

National Center for Science and Engineering Statistics, Survey of Doctorate Recipients longitudinal panel 2015–25 (LSDR 2015–19 data file).

Technical Notes

Survey Overview

Purpose. The Survey of Doctorate Recipients (SDR), conducted by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF) and by the National Institutes of Health, provides data on the characteristics of science, engineering, and health (SEH) doctorate degree holders. A research doctorate is a doctoral degree that (1) requires the completion of an original intellectual contribution in the form of a dissertation or an equivalent culminating project (e.g., a published manuscript) and (2) is not primarily intended as a degree for the practice of a profession. The most common research doctorate degree is the PhD. The SDR samples individuals who have earned an SEH research doctorate from a U.S. academic institution and are less than 76 years of age. The longitudinal subsample of the 2015 SDR (LSDR 2015–25 panel) was selected from among those who were 65 or younger as of 1 February 2015 and responded to the 2015 SDR.

Some of the education and demographic information in the SDR comes from the Survey of Earned Doctorates (SED, <https://www.nsf.gov/statistics/srvydoctorates/>), an annual census of research doctorates earned in the United States. The SED provides the sampling frame for the SDR through its annual update of the longstanding Doctorate Records File (DRF), a cumulative listing of all U.S.-earned doctorate recipients dating back to 1920.

The technical notes in the SDR data tables for 2015, 2017, and 2019 (<https://www.nsf.gov/statistics/srvydoctoratework/#tabs-2>) provide overviews of the baseline and two follow up SDR surveys, which form the basis of the longitudinal data of the LSDR panel for the period 2015–19. Information for data collection authority, survey contractor, survey authority, and major changes to each survey cycle is also provided in the technical notes of these survey cycles.

Key Survey Information

Frequency. Biennial.

Initial survey year. 2015.

Reference period. The week of 1 February 2015, 2017, and 2019.

Response unit. Individuals with an SEH research doctorate from a U.S. academic institution.

Sample or census. Sample.

Population size. Approximately 860,300 individuals; 85% resided in the United States during all three survey reference periods.

Sample size. 40,148 individuals.

Key variables.

- Demographics (e.g., age, sex, race, ethnicity, and citizenship)
- Educational history
- Employment status
- Field of degree
- Occupation

Survey Design

Target population. The target population of the LSDR 2015–25 panel includes individuals that meet the following criteria:

- Earned an SEH research doctorate from a U.S. academic institution prior to 1 July 2013.
- Are not institutionalized or terminally ill on 1 February 2015.
- Are less than 65 years of age as of 1 February 2015.

Sampling frame. The sampling frame of the LSDR 2015–25 panel consists of 66,270 eligible 2015 SDR respondents.

Sample design. A stratified sampling with proportional allocation was implemented. The sample stratification design defined strata by crossing four 2015 survey outcome variables: employment sector, age group, underrepresented minority indicator, and sex. In addition, seven 2015 survey outcome variables are used as implicit stratification variables in selecting the sample: field of degree, residential location, citizenship when awarded degree, sex, race and ethnicity, disability indicator, and years since degree. The stratification was implemented to strengthen reporting by baseline employment characteristics and minority groups.

The overall sampling rate was about 1 in 20 (4.7%), although sampling rates varied across strata.

Data Collection and Processing Methods

Technical notes in the SDR data tables for 2015, 2017, and 2019 detail methods used in each survey cycle for data collection, quality assurance procedures, data editing and coding, and item-level missing data imputation (<https://www.nsf.gov/statistics/srvydoctoratework/#tabs-2>).

Of the 40,148 persons in the sample for the LSDR 2015–25 panel, 6,147 did not complete the 2017 SDR, 10,164 did not complete the 2019 SDR, and 3,897 did not complete both the 2017 and 2019 SDR. Out of the 40,148 sampled cases, 36,399 individuals who responded at least once after 2015 or who became permanently ineligible in 2017 or 2019 were included in the released 2015–19 LSDR data file.

Imputation. For sample cases who did not complete the 2017 SDR form or the 2019 SDR form, hot-deck imputation was conducted to impute all variables in a selected set of 32 critical items. The donor pool for the imputation utilized all sample cases in the frame that responded to all three SDR surveys—2015, 2017, and 2019—regardless of whether they were selected into the LSDR panel. Other item-level missing data imputed in each survey cycle were retained without being re-imputed.

Weighting. Because the SDR is based on a complex sampling design and subject to nonresponse bias, sampling weights were created for each respondent to support unbiased population estimates. The final analysis weights from the SDR 2015 were used for computing the initial base weight for the LSDR 2015–25 panel. The 2015 final analysis weights account for: differential sampling rates, adjustments for unknown eligibility, adjustments for nonresponse, and adjustments to align the sample distribution with the DRF distribution with respect to gender, race and ethnicity, degree year, and degree field. The initial panel base weight is the 2015 final weight divided by the probability of selection for the longitudinal sample.

Raking adjustments were made to the panel base weights to compensate for cases that were not included in the 2015–19 LSDR final data file while aligning the weighted sample distribution with the population totals. The raking variables include field of degree, year of award, sex, race and ethnicity, citizenship status, residence as of 1 February 2015 (in or outside the U.S.), along with labor force status, employment sector, and disability status. The final longitudinal sample weights enable data users to derive survey-based estimates of the LSDR target population.

Variance estimation. The successive difference replication method (SDRM) was used to develop replicate weights for variance estimation. The theoretical basis for the SDRM is described in Wolter (1984) and in Fay and Train (1995). As with any replication method, successive difference replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around their corresponding full sample estimate provides an estimate of the sampling variance of the statistic of interest. The final 2015–19 LSDR data file includes 104 sets of replicate weights.

Disclosure protection. To protect against the disclosure of confidential information provided by SDR respondents, the estimates presented in data tables are rounded to the nearest 50, although calculations of percentages are based on unrounded estimates.

Data table cell values based on counts of respondents that fall below a predetermined threshold are deemed to be sensitive to potential disclosure, and the letter “D” indicates this type of suppression in a table cell.

Survey Quality Measures

Sampling error. SDR estimates are subject to sampling errors. Estimates of sampling errors associated with this survey were calculated using replicate weights and are included in each table of estimates. Data table estimates with a coefficient of variation (that is, the estimate divided by the standard error) that exceeds a predetermined threshold are deemed unreliable and are suppressed. The letter “S” indicates this type of suppression in a table cell.

Coverage error. Coverage error occurs in sample estimates when the sampling frame does not accurately represent the target population and is a type of nonsampling error. The initial SDR sampling frame is the DRF which is derived from the SED, a census survey of research doctorates awarded annually in the United States. To the extent that the DRF does not include all awarded research doctorates, the SDR would suffer from undercoverage. Reporting errors in the SED could lead to incorrect classification of doctorates as not having earned an SEH research doctorate, which could result in further undercoverage.

Nonresponse error. The weighted response rate for the baseline survey (2015 SDR) was 66%; the unweighted response rate was 68%. Results from the research and analysis of SDR nonresponse trends have been used in the development of the nonresponse weighting adjustments to minimize the potential for nonresponse bias in the SDR estimates. The raking adjustment, as mentioned above, further align the LSDR sample representation to the target population to account for panel attrition.

Measurement error. The SDR is subject to reporting errors from differences in interpretation of questions and by modality (Web, mail, and CATI).

Data Comparability and Changes

Data comparability. The 2015–19 LSDR data file is the first release of longitudinal data from the LSDR 2015–25 panel. The survey questions remained the same across the three survey cycles. The 2015 SDR sample design improved population coverage in the 2015, 2017, and 2019 survey cycles to include all SEH doctorates awarded by U.S. institutions regardless of the academic year of award or the graduate’s post-graduation residency location.

Changes in survey coverage and population. None.

Changes in data processing. None.

Definitions

Field of doctorate. The doctoral field is as specified by the respondent in the SED at the time of degree conferral. The more than 200 SED coded fields were subsequently recoded to the 77 field-of-study codes used in the SDR questionnaire. (See SDR 2019 [technical table A-1](#) for a list and cross-classification of the 77 SDR detailed fields of degree based on the ToD with over 200 fine fields of degree reported in the SED sampling frame.)

Full-time and part-time employment. Full-time (working 35 hours or more per week) and part-time (working less than 35 hours per week) employment status is for the principal job only and not for all jobs held in the labor force. For example, an individual could work part time in his or her principal job but full time in the labor force. Full-time and part-time employment status is not comparable to data reported before 2006, when no distinction was made between the principal job and the other jobs held by the individual.

Involuntarily out-of-field rate. Involuntarily out-of-field rate is the percentage of employed individuals who reported, for their principal job, working in an area not related to the first doctoral degree at least partially because a job in their doctoral field was not available.

Labor-force participation rate. The labor-force participation rate is the ratio $(E + U) / P$, where E (employed) + U (unemployed; not-employed and actively seeking work) = the total labor force, and P = population, defined as all noninstitutionalized SEH doctorate holders less than 76 years of age on the survey reference date and who earned their doctorate from a U.S. institution.

Occupation data. The occupational classification of the respondent was based on his or her principal job (including job title) held during the reference week—or on his or her last job held, if not employed in the reference week (survey questions A5 and A6 as well as A19 and A20). Also used in the occupational classification was a respondent-selected job code (survey questions A7 and A21). (See SDR 2019 [technical table A-2](#) for a list and classification of occupations reported in the SDR.)

Race and ethnicity. Ethnicity is defined as Hispanic or Latino or not Hispanic or Latino. Values for those selecting a single race include American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. Persons who report more than one race and who are not of Hispanic or Latino ethnicity also have a separate value. Race and ethnicity data are from the SED and prior rounds of the SDR. The most recently reported race and ethnicity data are given precedence.

Salary. Median annual salaries are reported for the principal job, rounded to the nearest \$1,000, and computed for full-time employed SEH doctorate holders only. For individuals employed by educational institutions, no accommodation was made to convert academic year salaries to calendar year salaries. Users are advised that, due to changes in the salary question after 1993, salary data for 1995–2019 are not strictly comparable with 1993 salary data.

Sector of employment. Employment sector is a derived variable based on responses to questionnaire items A13, A14, and A15. Questionnaire item A13 (type of principal employer) includes a separate response “In a non-U.S. government at any level” as of the 2015 survey. In the data tables, the category 4-year educational institutions include 4-year colleges or universities, medical schools (including university-affiliated hospitals or medical centers), and university-affiliated research institutes. Other educational institutions include 2-year colleges, community colleges, technical institutes, precollege institutions, and other educational institutions (which respondents reported verbatim in the survey questionnaire). Users should note that prior to 2008 these other educational institutions that were written verbatim by respondents were grouped with 4-year educational institutions rather than with 2-year colleges. Private, for-profit includes respondents who were self-employed in an incorporated business. Self-employed includes respondents who were self-employed or were a business owner in a non-incorporated business.

Unemployment rate. The unemployment rate (RU) is the ratio $U / (E + U)$, where U = unemployed (not-employed and actively seeking work), and E (employed) + U = the total labor force.

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