National Center for Science and Engineering Statistics

InfoBrief

Postdoc Employment at Federally Funded Research and Development Centers Increased 12% between 2017 and 2019

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Jack M. Stoetzel, Caren A. Arbeit, and Michael I. Yamaner

Federally funded research and development centers (FFRDCs) are some of the preeminent research facilities in the United States. Postdoctoral researchers (postdocs) perform high-level research in FFRDCs while gaining additional training to advance both their careers and strategic federal research. Of the nation's 42 FFRDCs, 24 reported employing postdocs in 2019. In total, these 24 FFRDCs employed 3,335 postdocs. Since 2012, the number of postdocs working at FFRDCs has grown by 542 individuals—almost a 20% increase during this period, with a 12% increase since 2017. Overall, the FFRDCs that employ postdocs are expanding the postdoctoral training available at their centers and influencing an increasing number of early career scholars.

The data in this report are from the 2019 Survey of Postdocs at Federally Funded Research and Development Centers (FFRDC Postdoc Survey). This survey provides information about the demographic characteristics, sources of financial support, and fields of research of postdocs working at FFRDCs. It is conducted in conjunction with the Survey of Graduate Students and Postdoctorates in Science and Engineering, which is sponsored by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF) and by the National Institutes of Health. The FFRDC Postdoc Survey provides some of the only publicly available data on the research training of early career doctorates at FFRDCs. The postdocs employed by FFRDCs represent an important part of the science and engineering workforce in the United States.

Postdoc Employment by FFRDC Sponsoring Agency and Administrator

FFRDCs conduct research and development (R&D) and related activities in support of a federal agency's mission. They are intended to provide R&D capabilities that cannot be met by the federal government or the private sector alone.[1] Currently, 13 federal agencies sponsor the 42 FFRDCs, with the Department of Energy and the Department of Defense sponsoring a majority of the FFRDCs (16 and 10, respectively). Over 90% of the 3,335 postdocs employed at FFRDCS in 2019 were working at Department of Energy–sponsored research facilities (see table 1).

FFRDCs are operated, managed, and administered by either a university, nonprofit organization, or an industrial firm. Among the FFRDCs with a postdoc program, those administered by universities employed the largest percentage of postdocs (41.9 %), followed by those administered by industrial firms (30.7%), and those administered by nonprofit organizations (27.3%). The growth in postdoc counts since 2012 has occurred across all three types of FFRDC administration.

Table 1

Postdocs at federally funded research and development centers, by FFRDC type and sponsoring agency: 2012–19

(Number)

FFRDCs and postdocs	2012	2013	2015	2017[a,b]	2019[a]	Change 2012–19	Change 2017–19
FFRDCs							
All FFRDCs	39	40	42	42	42	3	0
FFRDCs with postdocs	22	21	24	23	24	2	1
Postdocs							
All postdocs	2,793	2,613	2,696	2,975	3,335	542	360
FFRDC type							
University administered	1,248	1,204	1,227	1,296	1,398	150	102
Nonprofit administered	681	653	698	788	912	231	124
Industry administered	864	756	771	891	1,025	161	134
Federal sponsoring agency							
Department of Energy	2,579	2,367	2,463	2,685	3,034	455	349
All other sponsors	214	246	233	290	301	87	11

FFRDC = federally funded research and development center.

[a] The Master Government List contains 42 FFRDCs. In the FFRDC Postdocs Survey, two FFRDCs are surveyed together.

[b] While there was no change in the number of FFRDCs between the 2015 and 2017 surveys, the Homeland Security Studies and Analysis Institute was replaced by the Homeland Security Operational Analysis Center.

Source(s):
National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

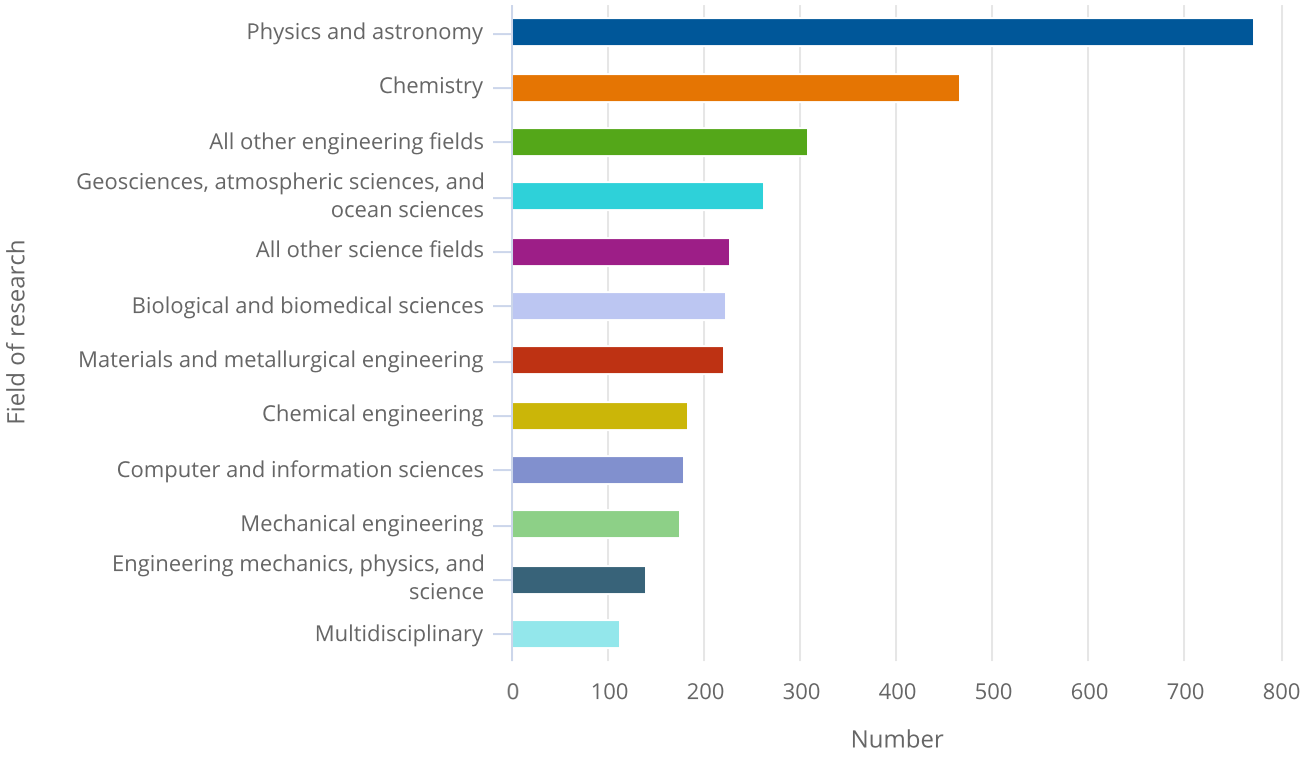
Postdoc Fields of Research at FFRDCs

Science and engineering (S&E) fields accounted for 94.7% of all research performed by FFRDC postdocs in 2019. The most common research fields among postdocs reported by the FFRDCs include physics and astronomy (23.2%) and chemistry (14.0%), both physical science disciplines. Geosciences, atmospheric sciences, and ocean sciences was the next largest research field with 7.9% of the postdocs engaged in this area of research. (See figure 1 and table 2.)

The number of postdocs doing research in science fields in 2019 is similar to that in 2012 (2,132 postdocs compared with 2,108), although the percentage has declined about 12 points. The growth in FFRDC postdoc research is happening in engineering fields, which increased from a 22% share in 2012 to 31% in 2019. Additionally, 113 postdocs (3.4%) conducted multidisciplinary research in 2019. Together, these trends indicate that FFRDC postdocs are doing research and being trained in a more diverse set of fields than in 2012, including nontraditional or noncategorical research.

Figure 1

Field of research of postdocs at federally funded research and development centers: 2019



Note(s):
All other engineering fields includes Aerospace, aeronautical and astronautical engineering; Agricultural engineering; Bioengineering and biomedical engineering; Industrial and manufacturing engineering; Petroleum engineering; and Other engineering. All other science fields includes Agricultural sciences, Natural resources and conservation, Psychology, Social sciences, and Other science fields. The following fields of research are not shown: Health, Non-science and engineering, and Field of research not known.

Source(s):
National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

Table 2

Field of research of postdocs at federally funded research and development centers: 2012 and 2019

(Number and percent)

Field of research	2012		2019	
	Total	% of total	Total	% of total
All postdocs	2,793	100.0	3,335	100.0
Science	2,108	75.5	2,132	63.9
Agricultural sciences	0	*	3	0.1
Biological and biomedical sciences	247	8.8	222	6.7
Chemistry	496	17.8	467	14.0
Computer and information sciences	123	4.4	180	5.4
Geosciences, atmospheric sciences, and ocean sciences	240	8.6	262	7.9
Mathematics and statistics	61	2.2	70	2.1
Natural resources and conservation[a]	na	na	27	0.8
Physics and astronomy	861	30.8	773	23.2
Psychology	1	*	0	*

Table 2

Field of research of postdocs at federally funded research and development centers: 2012 and 2019

(Number and percent)

Field of research	2012		2019	
	Total	% of total	Total	% of total
Social sciences	6	0.2	7	0.2
Other science fields	73	2.6	121	3.6
Engineering	612	21.9	1,028	30.8
Aerospace, aeronautical, and astronautical engineering	17	0.6	30	0.9
Agricultural engineering	0	0.0	0	0.0
Bioengineering and biomedical engineering	17	0.6	18	0.5
Chemical engineering	84	3.0	183	5.5
Civil engineering	15	0.5	61	1.8
Electrical, electronics, and communications engineering	42	1.5	97	2.9
Engineering mechanics, physics, and science	20	0.7	140	4.2
Industrial and manufacturing engineering	0	*	4	0.1
Materials and metallurgical engineering	226	8.1	221	6.6
Mechanical engineering	91	3.3	176	5.3
Nuclear engineering	48	1.7	66	2.0
Petroleum engineering	0	*	3	0.1
Other engineering fields	52	1.9	29	0.9
Health	30	1.1	1	*
Multidisciplinary	31	1.1	113	3.4
Non-science and engineering	0	*	15	0.4
Field of research not known	12	0.4	46	1.4

* = value < 0.05%; na = not applicable.

[a] Natural resources and conservation was added in 2017.

Source(s):
National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

Demographic Characteristics of Postdocs

The number of women employed as postdocs in FFRDCs increased between 2012 and 2019, as did the number of men (see table 3). While women gained 1.5 percentage points of the share of the total postdocs employed at FFRDCs, they continue to comprise only about a quarter of FFRDC postdocs. For context, the relatively low rate of women's employment as FFRDC postdocs is similar to the percentage of U.S. doctorates awarded to women in related fields. From 2014 to 2018, women earned 30.3% of U.S. research doctorates in the physical sciences and 23.6% in engineering.[2]

Table 3

Postdocs at federally funded research and development centers, by sex, citizenship, race, and ethnicity: 2012–19

(Number and percent)

Sex, citizenship, race, and ethnicity	2012		2013		2015		2017		2019	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All postdocs	2,793	100.0	2,613	100.0	2,696	100.0	2,975	100.0	3,335	100.0
Female	678	24.3	593	22.7	648	24.0	716	24.1	859	25.8
Male	2,115	75.7	2,020	77.3	2,048	76.0	2,259	75.9	2,476	74.2
U.S. citizens and permanent residents[a]	1,156	41.4	1,150	44.0	1,246	46.2	1,341	45.1	1,429	42.8

Table 3

Postdocs at federally funded research and development centers, by sex, citizenship, race, and ethnicity: 2012–19

(Number and percent)

Sex, citizenship, race, and ethnicity	2012		2013		2015		2017		2019	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Hispanic or Latino	54	1.9	52	2.0	55	2.0	67	2.3	76	2.3
Not Hispanic or Latino	1,045	37.4	1,065	40.8	1,140	42.3	1,217	40.9	1,311	39.3
Asian	137	4.9	171	6.5	181	6.7	170	5.7	193	5.8
Black or African American	14	0.5	14	0.5	19	0.7	27	0.9	38	1.1
White	853	30.5	861	33.0	908	33.7	991	33.3	1,043	31.3
All other races[b]	41	1.5	19	0.7	32	1.2	29	1.0	37	1.1
Unknown ethnicity or race	57	2.0	33	1.3	51	1.9	57	1.9	42	1.3
Female	290	10.4	283	10.8	344	12.8	353	11.9	385	11.5
Male	866	31.0	867	33.2	902	33.5	988	33.2	1,044	31.3
Temporary visa holders	1,637	58.6	1,463	56.0	1,450	53.8	1,634	54.9	1,906	57.2
Female	388	13.9	310	11.9	304	11.3	363	12.2	474	14.2
Male	1,249	44.7	1,153	44.1	1,146	42.5	1,271	42.7	1,432	42.9

[a] Race and ethnicity data are available only for U.S. citizens and permanent residents.

[b] All other races includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and More than one race.

Source(s):
National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

Temporary visa holders remain the majority of FFRDC postdocs (57.2%), although their number is slightly lower (1.5 percentage points) than in 2012. The percentage of FFRDC postdocs who are temporary visa holders is higher than the annual percentage of U.S. doctorates awarded to temporary visa holders in S&E fields. The proportion of S&E doctorates awarded to temporary visa holders peaked at 41% in 2007, but overall it has held steady at around 36% since 2011.[3] About one-fourth of the temporary visa holder postdocs at FFRDCs with S&E doctorates are women, a similar percentage as for U.S. citizens and permanent residents (27%).

Among U.S. citizens and permanent residents, the numbers of FFRDC postdocs in almost all racial and ethnic groups grew between 2012 and 2019. While the number of Black or African American postdocs at FFRDCs more than doubled during this period and the number of Hispanic or Latino postdocs increased by 41%, these two groups combined make up less than 5% of the postdocs at FFRDCs in 2019. By comparison, for the 5-year period from 2014 to 2018, Hispanics or Latinos earned 5.5% of U.S. research doctorates in the physical sciences, and Blacks or African Americans earned 3.0%. In engineering, Hispanics or Latinos earned 6.5% of doctorates and Blacks or African Americans earned 4.0%.[4] These recent doctorates form the hiring pool of U.S. doctorate recipients that FFRDCs can draw upon for postdoc positions in these fields.

Data Sources, Limitations, and Availability

The 2019 FFRDC Postdoc Survey collected data from FFRDCs listed in the April 2019 Master Government List of FFRDCs. This list is maintained by NSF and available at https://www.nsf.gov/statistics/ffrdclist/. Representatives from each FFRDC report data on the number of postdocs employed at the institution; data reported to the survey are categorized by citizenship, sex, ethnicity and race, source of financial support, and fields of research. The reference date of the most recent survey is 1 October 2019; the survey is conducted in conjunction with the Survey of Graduate Students and Postdoctorates in Science and Engineering, which is sponsored by NCSES within NSF and by the National Institutes of Health.

The FFRDC Postdoc Survey defines a postdoc as an appointee who holds a PhD or equivalent doctoral degree; whose doctorate was awarded recently, generally within the past 5 years; whose appointment is for a limited term, generally no more than 5–7 years; who works under the supervision of a senior researcher; and whose appointment is primarily for the purpose of training in research or scholarship.

Use caution when assessing trend data because data comparability are affected by changes in how FFRDCs define their postdocs, maintain their administrative data, and report unknown responses.

Detailed data from this survey are available at https://www.nsf.gov/statistics/srvyffrdcpd/. For more information on the FFRDC Postdoc Survey, please contact NCSES author Michael Yamaner.

Notes

1 For more information on the federal policy regarding the establishment, use, review, and termination of federally funded research and development centers (FFRDCs), see Code of Federal Regulations, Title 48, Part 35, Section 35.017.

2 National Center for Science and Engineering Statistics (NCSES). 2020. *Science and Engineering Degrees, by Race and Ethnicity of Recipients: 2005–15*, tables 13 and 15. Alexandria, VA: National Science Foundation. Available at https://ncsesdata.nsf.gov/sere/2018/.

3 National Center for Science and Engineering Statistics (NCSES). 2019. *Doctorate Recipients from U.S. Universities: 2018*, section U.S. Doctorate Awards, "Citizenship." NSF 20-301. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf20301/report/u-s-doctorate-awards#citizenship.

4 Race and ethnicity are collected only for U.S. citizens and permanent residents in this survey as well as in the Survey of Earned Doctorates. For the numbers of doctorate recipients, see table 16 in National Center for Science and Engineering Statistics. 2020. *Science and Engineering Degrees, by Race and Ethnicity of Recipients: 2008–18.* Alexandria, VA: National Science Foundation. Available at https://ncsesdata.nsf.gov/sere/2018/.

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Contact Us

Report Authors

Jack M. Stoetzel
RTI International, under contract to NCSES

Caren A. Arbeit
RTI International, under contract to NCSES

Michael I. Yamaner
Survey Manager
Human Resources Statistics Program, NCSES
Tel: (703) 292-7815
E-mail: myamaner@nsf.gov

NCSES

National Center for Science and Engineering Statistics
Directorate for Social, Behavioral and Economic Sciences
National Science Foundation
2415 Eisenhower Avenue, Suite W14200
Alexandria, VA 22314

Tel: (703) 292-8780
FIRS: (800) 877-8339
TDD: (800) 281-8749
E-mail: ncsesweb@nsf.gov