



National Center for Science and
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InfoBrief

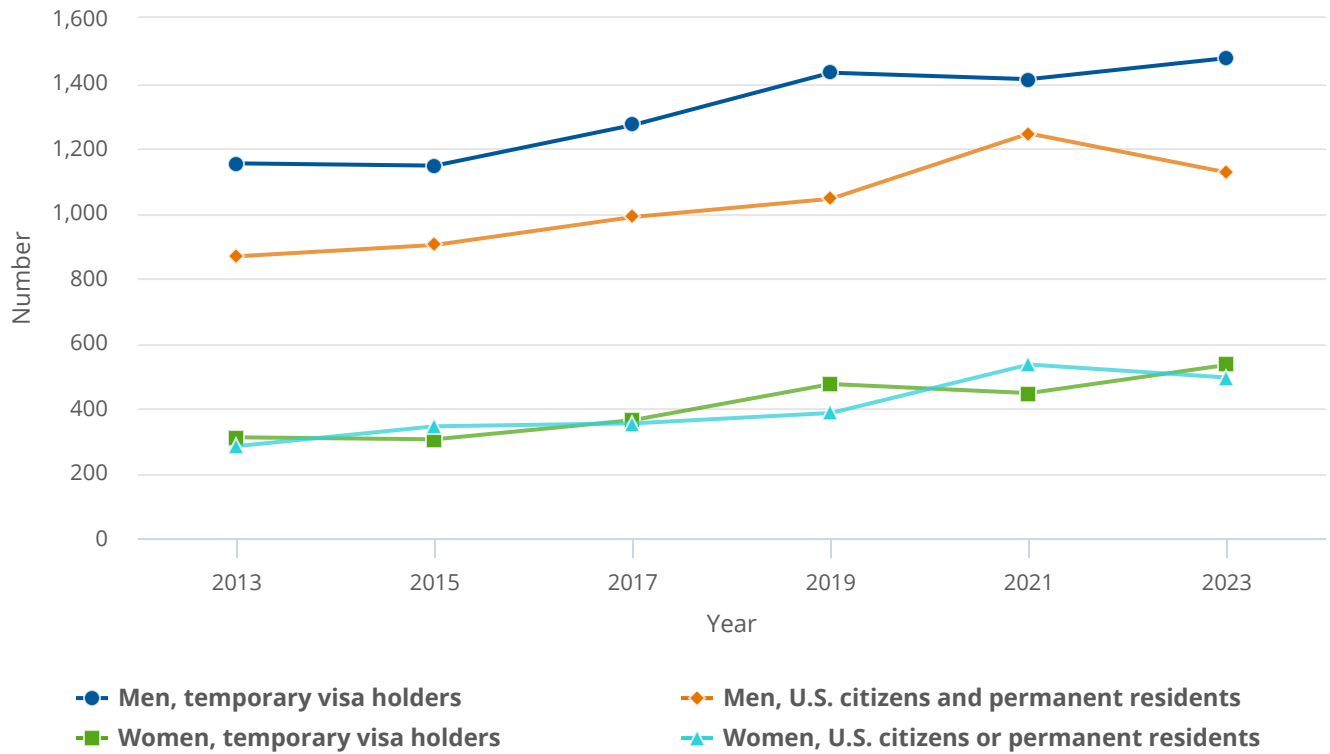
Ongoing Changes in the Demographic Composition of Postdoctoral Researchers at Federally Funded Research and Development Centers: 2023

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Federally funded research and development centers (FFRDCs) in the United States supply researchers with the facilities and resources needed to conduct critical studies in science, engineering, and health (SEH). In so doing, FFRDCs serve a crucial role in national efforts to develop a highly skilled SEH workforce. Postdoctoral researchers (postdocs) are an integral component of the federal research and development (R&D) workforce, as this highly skilled workforce advances the research aspirations of the nation while representing the next generation of scientists working in strategic FFRDCs in the United States.

Between 2021 and 2023, the number of postdocs receiving training at FFRDCs remained stable, with 3,629 postdocs reported in 2023 and 3,637 reported in 2021 ([figure 1](#)). Between 2019 and 2023, the number of postdocs who were U.S. citizens or permanent residents increased by 190 (13% increase), whereas the number of postdocs with temporary visas increased by 104 (5% increase), resulting in a partial recovery of the decline in percentage of temporary visa holder postdocs in 2021 ([figure 1](#) and [table 1](#)). Men continued to make up the majority of FFRDC postdocs in 2023 (72%), although the percentage of women grew by 2.5 percentage points between 2019 and 2023 ([figure 1](#) and [table 1](#)).

Figure 1**Postdocs at federally funded research and development centers, by sex and citizenship status: 2013–23****Source(s):**

National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

Table 1**Sex, race, ethnicity, and citizenship of postdocs at federally funded research and development centers: 2019–23**

(Number and percent)

Demographic characteristics	2019		2021		2023		Change 2019–23		
	Number	Percent	Number	Percent	Number	Percent	Number	Percentage points	Percent
All postdocs	3,335	100.0	3,637	100.0	3,629	100.0	294	0.0	8.8
Women	859	25.8	980	26.9	1,027	28.3	168	2.5	19.6
Men	2,476	74.2	2,657	73.1	2,602	71.7	126	-2.5	5.1
U.S. citizens and permanent residents ^a	1,429	42.8	1,779	48.9	1,619	44.6	190	1.8	13.3
Hispanic or Latino	76	2.3	120	3.3	136	3.7	60	1.4	78.9
Not Hispanic or Latino	1,311	39.3	1,615	44.4	1,448	39.9	137	0.6	10.5
American Indian or Alaska Native	0	0.0	2	0.1	4	0.1	4	0.1	-
Asian	193	5.8	251	6.9	266	7.3	73	1.5	37.8
Black or African American	38	1.1	38	1.0	42	1.2	4	0.1	10.5
Native Hawaiian or Other Pacific Islander	2	0.1	1	0.0	3	0.1	1	0.0	50.0
White	1,043	31.3	1,259	34.6	1,068	29.4	25	-1.9	2.4
More than one race	35	1.0	64	1.8	65	1.8	30	0.8	85.7
Unknown ethnicity or race	42	1.3	44	1.2	35	1.0	-7	-0.3	-16.7
Women	385	11.5	534	14.7	494	13.6	109	2.1	28.3
Men	1,044	31.3	1,245	34.2	1,125	31.0	81	-0.3	7.8
Temporary visa holders	1,906	57.2	1,858	51.1	2,010	55.4	104	-1.8	5.5
Women	474	14.2	446	12.3	533	14.7	59	0.5	12.4
Men	1,432	42.9	1,412	38.8	1,477	40.7	45	-2.2	3.1

^a Race and ethnicity data are available only for U.S. citizens and permanent residents.**Source(s):**

National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers.

This InfoBrief presents data from the 2023 Survey of Postdocs at Federally Funded Research and Development Centers (FFRDC Postdoc Survey). The FFRDC Postdoc Survey collects data directly from the FFRDCs about their postdocs, including the number employed at each FFRDC, demographic characteristics of employed postdocs, sources of funding, and fields of research. The survey is conducted in conjunction with the Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS), which is sponsored by the National Center for Science and Engineering Statistics (NCSES) within the U.S. National Science Foundation (NSF) and by the National Institutes of Health (NIH). This survey is one of the few publicly available sources of data for early career doctorates and their research training at FFRDCs. These postdocs make meaningful contributions to SEH studies in the United States, and the data from the FFRDC Postdoc Survey provide important information about the newest members of the country's science and engineering (S&E) workforce.

Demographic Shifts among Appointees

This section compares data from the 2023 FFRDC Postdoc Survey to data from the 2019 survey. Although data from the 2021 FFRDC Postdoc Survey are also available, the COVID-19 pandemic likely had a substantial impact on the 2021 data. For this reason, the 2021 data may not be indicative of long-term trends, especially because many postdocs were not able to obtain temporary visas for their studies and training in the United States.¹ This is reflected in the 2021 data, which indicated that both the number and percentage of temporary visa holders dropped but that those for U.S. citizens or permanent residents rose.

The overall number of FFRDC postdocs declined slightly between 2021 (3,637 postdocs) and 2023 (3,629 postdocs). However, the number of postdocs in both years were greater than what was reported in 2019 (3,335 postdocs). This trend is notable because it is the first time since 2013 that the count of postdocs did not increase from one survey cycle to the next ([figure 1](#)). However, trends across demographic subgroups varied.

In 2023, there was an increase in the number of temporary visa holders. Out of 3,629 postdocs, 2,010 (55%) were temporary visa holders, which is the highest number recorded by the survey to date ([figure 1](#) and [table 1](#)). This increase demonstrates a partial recovery from the drop in 2021, when the number decreased to 1,858 postdocs from 1,906 postdocs in 2019. The 2023 number of temporary visa holders represents an all-time high. However, the percentage of FFRDC postdocs in 2023 who are temporary visa holders is still lower than the percentage in 2019 (55% versus 57%).

Both the number and percentage of female FFRDC postdocs also changed during this period. The overall number of women increased by 20% (168 postdocs) from 2019 to 2023 ([table 1](#)). In comparison, the overall number of men grew by 5% (126 postdocs), although male postdocs remain the majority at 72%. Still, this growth reflects a slow-but-steady increase in the number of female FFRDC postdocs, continuing a long-term upward trend that has been observed since 2013 ([figure 1](#)). The increase in the number of female FFRDC postdocs is especially notable among temporary visa holders because of the complete recovery in both the number and percentage from the drop in 2021. The 2021 FFRDC Postdoc Survey indicated that there were 446 female temporary visa holders, which made up 12% of all FFRDC postdocs at that time. By 2023, this number rose to 533 female FFRDC postdocs, or 15% of all FFRDC postdocs, which is less than a 1.0 percentage point difference from 2019 ([table 1](#)).

Among U.S. citizens and permanent residents, 494 female postdocs were at FFRDCs, a growth of 28% (109 postdocs) from 2019 and about 2.0 percentage points above the 2019 percentage. This was a slight reversal of the growth of 3.2 percentage points seen between 2019 and 2021, which reflected the single largest increase in female postdoc employment since 2013 ([table 1](#)). Nevertheless, the latest data from 2023 reflect the ongoing, gradual upward trend in the proportion of FFRDC postdocs who are women.

Various racial and ethnic demographic groups also showed some notable changes. Among U.S. citizens and permanent residents, the number of FFRDC postdocs who are Hispanic or Latino or Asian increased substantially from 2019 to 2023. Over this time, the number of Hispanic or Latino postdocs increased by 79% (60 postdocs) and the number of Asian postdocs increased by 38% (73 postdocs). The number of White postdocs also increased slightly by 2% (25 postdocs), but White postdocs represented a smaller proportion of all postdocs than in 2019, dropping by 1.9 percentage points ([table 1](#)). These changes, combined with the growing number of women, suggest a gradual diversification of the postdoc population at FFRDCs.

Fields of Research at FFRDCs

Of the 3,629 postdocs reported in the 2023 FFRDC Postdoc Survey, 2,579 postdocs (71%) are engaged in science research; 939 (26%) are in engineering; and the remaining 111 (3%) are spread across health, multidisciplinary, non-science or engineering, and field of research not known or reported ([table 2](#)). Physics and astronomy was the most common field, with 838 postdocs making up 23% of all FFRDC postdocs. Materials science and chemistry (450, or 12%) and chemistry (428, or 12%) were also common fields of research among FFRDC postdocs. The next-largest fields were geosciences, atmospheric sciences, and ocean sciences (272, or 7%) and biological and biomedical sciences (237, or 7%).

Table 2

Field of research of postdocs at federally funded research and development centers, by citizenship: 2023

(Number and percent)

Field of research	Total	U.S. citizens and permanent residents		Temporary visa holders	
		Number	Percent	Number	Percent
All postdocs	3,629	1,619	44.6	2,010	55.4
Science and engineering	3,518	1,571	44.7	1,947	55.3
Science	2,579	1,145	44.4	1,434	55.6
Agricultural and veterinary sciences	7	4	57.1	3	42.9
Biological and biomedical sciences	237	127	53.6	110	46.4
Chemistry	428	228	53.3	200	46.7
Computer and information sciences	188	92	48.9	96	51.1
Geosciences, atmospheric sciences, and ocean sciences	272	120	44.1	152	55.9
Materials science and chemistry	450	176	39.1	274	60.9
Mathematics and statistics	59	27	45.8	32	54.2
Natural resources and conservation	10	7	70.0	3	30.0
Physics and astronomy	838	335	40.0	503	60.0
Psychology	1	1	100.0	0	0.0
Social sciences	12	4	33.3	8	66.7
Other sciences	77	24	31.2	53	68.8
Engineering	939	426	45.4	513	54.6
Aerospace, aeronautical, and astronautical engineering	31	14	45.2	17	54.8
Biological, biomedical, and biosystems engineering	89	43	48.3	46	51.7
Chemical, petroleum, and related engineering fields	192	101	52.6	91	47.4
Civil, environmental, transportation, and related engineering fields	81	24	29.6	57	70.4
Electrical, electronics, communications, and computer engineering	153	69	45.1	84	54.9
Engineering science, mechanics, and physics	26	15	57.7	11	42.3
Industrial, manufacturing, systems engineering, and operations research	8	1	12.5	7	87.5
Mechanical engineering	155	53	34.2	102	65.8
Metallurgical, mining, materials, and related engineering fields	121	66	54.5	55	45.5
Nuclear engineering	58	32	55.2	26	44.8
Other engineering fields	25	8	32.0	17	68.0
Health	4	3	75.0	1	25.0
Multidisciplinary	85	34	40.0	51	60.0

Table 2**Field of research of postdocs at federally funded research and development centers, by citizenship: 2023**

(Number and percent)

Field of research	Total	U.S. citizens and permanent residents		Temporary visa holders	
		Number	Percent	Number	Percent
Non-science or engineering	12	7	58.3	5	41.7
Field of research not known or reported	10	4	40.0	6	60.0

Source(s):

National Center for Science and Engineering Statistics, Survey of Postdocs at Federally Funded Research and Development Centers, 2023.

The general distribution of postdocs across fields varies for temporary visa holders and U.S. citizens and permanent residents (table 2). Of the fields with at least 7 postdocs, those with the highest proportions of temporary visa holders were civil, environmental, transportation, and related engineering fields (70%, or 57 postdocs); other sciences (69%, or 53 postdocs); other engineering fields (68%, or 17 postdocs); social sciences (67%, or 8 postdocs); and mechanical engineering (66%, or 102 postdocs). Among the fields of research with at least 7 postdocs, the ones with the highest proportions of U.S. citizens and permanent residents were natural resources and conservation (70%, or 7 postdocs); non-science or engineering (58%, or 7 postdocs); engineering science, mechanics, and physics (58%, or 15 postdocs); nuclear engineering (55%, or 32 postdocs); and metallurgical, mining, materials, and related engineering fields (55%, or 66 postdocs).

Data Sources, Limitations, and Availability

The 2023 Survey of Postdocs at FFRDCs collected data from FFRDCs listed in the March 2023 Master Government List of FFRDCs that is maintained by NSF.² Of the 42 FFRDCs listed, 27 FFRDCs reported employing postdocs to the 2023 FFRDC Postdoc Survey. Representatives from each FFRDC reported their data on the number of postdocs employed at the institution, and data reported to the survey are categorized by citizenship, sex, race, and ethnicity; source of financial support; and fields of research. The reference date for this survey cycle was 1 October 2023. The survey is conducted in conjunction with the GSS, which is sponsored by NCSES and NIH.

Consistent with the NSF and NIH definitions, 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 term limited, generally no more than 5–7 years;³ who works under the supervision of a senior researcher; and whose appointment is primarily for the purpose of training in research or scholarship.

Exercise caution when using trend data because changes in how FFRDCs define their postdocs, maintain their administrative data, and report unknown responses can affect data comparability trends. The FFRDC Postdoc Survey continues to include a small number of postdocs at FFRDCs who do not engage primarily in SEH research.

Detailed data from this survey are available at <https://nces.nsf.gov/surveys/ffrdc-postdocs/>. For more information on the FFRDC Postdoc Survey, please contact the Survey Manager, Michael Yamaner.

NCSES has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN24-021).

Notes

1 Results from the GSS in 2020 indicated a decrease in temporary visa holder postdocs. See Davies C, Arbeit CA, Yamaner MI; National Center for Science and Engineering Statistics (NCSES). 2022. *Assessing the Impact of COVID-19 on Science, Engineering, and Health Graduate Enrollment: U.S. Part-Time Enrollment Increases as Full-Time Temporary Visa Holder Enrollment Declines*. NSF 22-317. Alexandria, VA: U.S. National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf22317/>.

2 For the Master Government List of Federally Funded R&D Centers used for this survey, please see <https://nces.nsf.gov/881/assets/0/files/ffrdc-2023.xlsx>.

3 In the GSS COVID Impact Module, 16% of coordinators (and over 24% of coordinators at very high research activity institutions) reported changes to postdoctoral duration due to the pandemic. Thus, although the general rule is 5–7 years for a postdoc, on account of the COVID-19 pandemic, some FFRDCs could have extended postdoc training periods. See Arbeit CA, Yamaner MI; National Center for Science and Engineering Statistics (NCSES). 2021. *Universities Report Growth in U.S. Citizen and Permanent Resident Enrollment along with Declines in Enrollment of Temporary Visa Holders at Master’s and Doctoral Levels Due to the COVID-19 Pandemic*. NSF 22-313. Alexandria, VA: U.S. National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf22313/>.

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