



FFRDC Research and Development Expenditures: Fiscal Year 2019

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General Notes

This report provides data from the 2019 Federally Funded Research and Development Center (FFRDC) Research and Development Survey. This survey is the primary source of information on separately accounted R&D expenditures at FFRDCs in the United States. Conducted annually for university-administered FFRDCs since FY 1953 and all FFRDCs since FY 2001, the survey collects information on R&D expenditures by source of funds and types of research and expenses. The survey is an annual census of the full population of eligible FFRDCs. See <https://www.nsf.gov/statistics/ffrdclist/> for the Master Government List of FFRDCs.

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TABLE 1

R&D expenditures at federally funded research and development centers, by source of funds: FYs 2001–19

(Dollars in thousands)

Fiscal year	All R&D expenditures	Federal government	State and local government	Business	Nonprofit organizations	All other sources ^a
2001	10,071,307	9,709,221	19,389	144,043	na	198,654
2002	11,536,424	11,095,110	31,423	134,251	na	275,640
2003	12,126,880	11,681,318	33,301	138,685	na	273,576
2004	12,632,207	12,321,652	29,959	119,843	na	160,753
2005	13,254,522	12,917,206	32,339	129,036	na	175,941
2006	13,218,497	12,824,552	30,122	170,879	na	192,944
2007	13,824,987	13,401,081	32,072	172,592	na	219,242
2008	15,616,390	15,177,347	32,188	202,534	na	204,321
2009	16,390,111	15,942,851	35,442	189,721	na	222,097
2010	18,880,609	18,453,552	52,871	168,561	23,665	181,960
2011	18,671,245	18,276,088	26,744	190,111	38,878	139,424
2012	18,280,943	17,875,012	39,428	184,434	45,926	136,143
2013	17,667,184	17,284,513	50,449	186,911	39,390	105,921
2014	17,718,556	17,331,396	28,337	220,735	37,182	100,906
2015	18,458,257	18,097,189	18,427	208,780	27,984	105,877
2016	19,219,702	18,855,593	21,556	192,239	40,195	110,119
2017	20,038,307	19,667,804	29,029	192,107	46,526	102,841
2018	21,171,529	20,770,388	43,458	197,975	43,630	116,078
2019	22,737,500	22,338,855	51,167	180,583	48,238	118,657

na = not applicable; data from nonprofit organizations were not collected separately.

^a Prior to FY 2010, R&D expenditures from nonprofit organizations were collected under All other sources.**Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

TABLE 2

Total and federally financed R&D expenditures at federally funded research and development centers, by type of R&D: FYs 2001–19

(Dollars in millions)

Fiscal year	Total								Federally financed							
	All R&D expenditures	Basic research		Applied research		Experimental development		All R&D expenditures	Basic research		Applied research		Experimental development			
		Amount	Percent	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent	Amount	Percent		
2001	10,071	3,875	38.5	na	na	na	na	9,709	3,726	38.4	na	na	na	na		
2002	11,536	4,744	41.1	na	na	na	na	11,095	4,523	40.8	na	na	na	na		
2003	12,127	5,122	42.2	na	na	na	na	11,681	4,880	41.8	na	na	na	na		
2004	12,632	4,931	39.0	na	na	na	na	12,322	4,790	38.9	na	na	na	na		
2005	13,255	5,110	38.5	na	na	na	na	12,917	4,977	38.5	na	na	na	na		
2006	13,218	5,197	39.3	na	na	na	na	12,825	5,048	39.4	na	na	na	na		
2007 ^a	13,825	5,296	38.3	3,479	25.2	4,411	31.9	13,401	5,151	38.4	3,314	24.7	4,319	32.2		
2008	15,616	5,379	34.4	3,992	25.6	6,245	40.0	15,177	5,210	34.3	3,825	25.2	6,143	40.5		
2009	16,390	5,871	35.8	4,545	27.7	5,974	36.4	15,943	5,714	35.8	4,346	27.3	5,884	36.9		
2010	18,881	6,655	35.2	5,191	27.5	7,034	37.3	18,454	6,487	35.2	5,031	27.3	6,935	37.6		
2011	18,671	6,582	35.3	5,175	27.7	6,914	37.0	18,276	6,439	35.2	5,006	27.4	6,830	37.4		
2012	18,281	6,153	33.7	5,382	29.4	6,746	36.9	17,875	6,013	33.6	5,209	29.1	6,653	37.2		
2013	17,667	4,186	23.7	6,818	38.6	6,663	37.7	17,285	4,081	23.6	6,636	38.4	6,568	38.0		
2014	17,719	4,195	23.7	6,839	38.6	6,684	37.7	17,331	4,098	23.6	6,648	38.4	6,585	38.0		
2015	18,458	4,094	22.2	7,292	39.5	7,072	38.3	18,097	4,012	22.2	7,118	39.3	6,968	38.5		
2016	19,220	4,224	22.0	7,527	39.2	7,468	38.9	18,856	4,136	21.9	7,373	39.1	7,347	39.0		
2017	20,038	4,111	20.5	7,931	39.6	7,996	39.9	19,668	4,039	20.5	7,756	39.4	7,873	40.0		
2018	21,172	4,180	19.7	8,391	39.6	8,600	40.6	20,770	4,099	19.7	8,205	39.5	8,466	40.8		
2019	22,738	4,536	19.9	9,200	40.5	9,002	39.6	22,339	4,455	19.9	9,014	40.4	8,869	39.7		

na = not applicable; separate data for applied research and experimental development were not collected before FY 2007.

^a FY 2007 detail does not add to total because one institution was unable to provide a breakout of applied research and experimental development expenditures.**Note(s):**

Because of rounding, detail may not add to total.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

TABLE 3

Federally financed R&D expenditures from federal agencies: FY 2019

(Dollars in thousands)

Federal agency	R&D expenditures
All federal agencies	22,338,855
Agency for International Development	5,854
Central Intelligence Agency	1,401
Consumer Financial Protection Bureau	197
Department of Agriculture	4,454
Department of Commerce	91,371
Department of Defense	5,039,345
Department of Energy	11,417,801
Department of Health and Human Services	1,041,189
Department of Homeland Security	511,475
Department of Justice	25,380
Department of State	68,158
Department of the Interior	9,301
Department of the Treasury	99,091
Department of Transportation	200,993
Department of Veterans Affairs	88,437
Environmental Protection Agency	4,848
Federal Deposit Insurance Corporation	99
General Services Administration	1,896
Library of Congress	117
National Aeronautics and Space Administration	2,889,883
National Credit Union Administration	464
National Science Foundation	288,256
National Transportation Safety Board	2
Nuclear Regulatory Commission	44,044
Office of the Director of National Intelligence	18,353
Smithsonian Institution	29
U.S. Postal Service	2,152
United States Courts	7,331
Other agencies not listed	476,934

FFRDC = federally funded research and development center.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2019.

TABLE 4

R&D expenditures at federally funded research and development centers, by source of funds and FFRDC: FY 2019

(Dollars in thousands)

FFRDC	All R&D expenditures	Federal government	State and local government	Business	Nonprofit organizations	All other sources
All FFRDCs	22,737,500	22,338,855	51,167	180,583	48,238	118,657
University-administered FFRDCs	6,946,262	6,796,696	17,975	53,304	22,556	55,731
Ames Laboratory	33,612	33,211	204	197	0	0
Argonne National Laboratory	810,693	787,513	0	17,093	522	5,565
Fermi National Accelerator Laboratory	334,258	333,460	0	238	36	524
Jet Propulsion Laboratory	2,709,063	2,709,063	0	0	0	0
Lawrence Berkeley National Laboratory	872,237	807,967	12,919	25,574	8,666	17,111
Lincoln Laboratory	1,103,870	1,084,953	0	2,055	0	16,862
National Center for Atmospheric Research	199,476	187,615	1,108	3,575	7,178	0
National Radio Astronomy Observatory	101,901	99,881	0	229	330	1,461
National Solar Observatory	15,931	15,892	0	0	0	39
NSF's National Optical-Infrared Astronomy Research Laboratory (NSF's NOIRLab)	38,262	28,760	0	0	0	9,502
Princeton Plasma Physics Laboratory	91,271	91,119	0	151	0	1
SLAC National Accelerator Laboratory	368,938	352,527	2,329	3,617	5,824	4,641
Software Engineering Institute	140,954	140,940	0	14	0	0
Thomas Jefferson National Accelerator Facility	125,796	123,795	1,415	561	0	25
Nonprofit-administered FFRDCs	7,033,162	6,891,730	31,738	54,010	25,107	30,577
Aerospace Federally Funded Research and Development Center	1,065,989	1,062,804	0	2,974	0	211
Arroyo Center	37,956	37,956	0	0	0	0
Brookhaven National Laboratory	590,470	561,030	20,463	4,952	459	3,566
Center for Advanced Aviation System Development	174,123	152,539	100	4,951	808	15,725
Center for Communications and Computing	68,371	68,371	0	0	0	0
Center for Enterprise Modernization	174,712	173,127	913	0	216	456
Center for Naval Analyses	96,697	96,697	0	0	0	0
Center for Nuclear Waste Regulatory Analyses	6,987	6,340	17	336	171	123
CMS Alliance to Modernize Healthcare	213,369	213,369	0	0	0	0
Homeland Security Operational Analysis Center	54,751	54,751	0	0	0	0
Homeland Security Systems Engineering and Development Institute	115,813	115,813	0	0	0	0
Judiciary Engineering and Modernization Center	7,331	7,331	0	0	0	0
National Biodefense Analysis and Countermeasures Center	39,003	39,003	0	0	0	0
National Cybersecurity Center of Excellence	22,205	22,205	0	0	0	0
National Defense Research Institute	67,647	67,647	0	0	0	0
National Renewable Energy Laboratory	455,016	405,923	7,202	27,207	14,684	0
National Security Engineering Center	1,124,861	1,123,616	0	0	5	1,240
Oak Ridge National Laboratory	1,470,372	1,454,122	0	6,770	2,444	7,036
Pacific Northwest National Laboratory	1,012,136	993,733	3,043	6,820	6,320	2,220
Project Air Force	48,325	48,325	0	0	0	0
Science and Technology Policy Institute	9,080	9,080	0	0	0	0
Systems and Analyses Center	177,948	177,948	0	0	0	0
Industry-administered FFRDCs	8,758,076	8,650,429	1,454	73,269	575	32,349
Frederick National Laboratory for Cancer Research	751,452	751,452	0	0	0	0
Idaho National Laboratory	478,324	463,588	510	6,724	245	7,257
Lawrence Livermore National Laboratory	1,517,429	1,480,978	671	24,361	330	11,089
Los Alamos National Laboratory	2,461,275	2,440,514	0	20,761	0	0
Sandia National Laboratories	3,373,217	3,340,658	273	18,612	NA	13,674
Savannah River National Laboratory	176,379	173,239	0	2,811	0	329

NA = not available; data were not provided by institution.

FFRDC = federally funded research and development center; NSF = National Science Foundation.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2019.

TABLE 5

Federally financed R&D expenditures at federally funded research and development centers, by federal agency and FFRDC: FY 2019

(Dollars in thousands)

FFRDC	All federal R&D expenditures	DOD	DOE	HHS	DHS	DOT	NASA	NSF	Other
National Defense Research Institute	67,647	66,494	0	0	0	0	0	0	1,153
National Renewable Energy Laboratory	405,923	8,818	383,571	0	616	862	255	0	11,801
National Security Engineering Center	1,123,616	905,689	221	0	0	0	120	0	217,586
Oak Ridge National Laboratory	1,454,122	36,811	1,251,873	4,948	13,447	4,841	28,592	0	113,610
Pacific Northwest National Laboratory	993,733	133,960	744,015	18,924	68,145	0	1,718	830	26,141
Project Air Force	48,325	48,325	0	0	0	0	0	0	0
Science and Technology Policy Institute	9,080	336	196	1,331	0	0	375	5,799	1,043
Systems and Analyses Center	177,948	166,355	68	0	8,638	0	31	0	2,856
Industry-administered FFRDCs	8,650,429	1,377,036	6,097,380	763,536	119,790	1,907	62,389	0	228,391
Frederick National Laboratory for Cancer Research	751,452	1,009	0	750,442	0	0	0	0	1
Idaho National Laboratory	463,588	60,374	336,172	0	39,110	5	11,767	0	16,160
Lawrence Livermore National Laboratory	1,480,978	252,990	1,185,857	5,526	24,157	0	1,316	0	11,132
Los Alamos National Laboratory	2,440,514	79,753	2,222,251	6,724	8,507	0	46,393	0	76,886
Sandia National Laboratories	3,340,658	956,375	2,209,348	844	45,186	1,902	2,910	0	124,093
Savannah River National Laboratory	173,239	26,535	143,752	0	2,830	0	3	0	119

DHS = Department of Homeland Security; DOD = Department of Defense; DOE = Department of Energy; DOT = Department of Transportation; FFRDC = federally funded research and development center; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2019.

TABLE 6
Total and federally financed R&D expenditures at federally funded research and development centers, by type of R&D and FFRDC: FY 2019
(Dollars in thousands)

FFRDC	Sponsor	Location	Total				Federally financed			
			All R&D expenditures	Basic research	Applied research	Experimental development	All R&D expenditures	Basic research	Applied research	Experimental development
All FFRDCs	-	-	22,737,500	4,535,637	9,200,139	9,001,724	22,338,855	4,455,413	9,014,286	8,869,156
University-administered FFRDCs	-	-	6,946,262	2,291,759	1,833,021	2,821,482	6,796,696	2,222,599	1,782,136	2,791,961
Ames Laboratory	DOE	Ames, IA	33,612	10,088	22,632	892	33,211	10,084	22,235	892
Argonne National Laboratory	DOE	Argonne, IL	810,693	175,065	367,255	268,373	787,513	175,065	346,334	266,114
Fermi National Accelerator Laboratory	DOE	Batavia, IL	334,258	333,523	735	0	333,460	332,798	662	0
Jet Propulsion Laboratory	NASA	Pasadena, CA	2,709,063	270,906	270,906	2,167,251	2,709,063	270,906	270,906	2,167,251
Lawrence Berkeley National Laboratory	DOE	Berkeley, CA	872,237	715,099	132,014	25,124	807,967	672,843	113,940	21,184
Lincoln Laboratory	DOD, OSD	Lexington, MA	1,103,870	3,217	974,361	126,292	1,084,953	3,217	974,361	107,375
National Center for Atmospheric Research	NSF	Boulder, CO	199,476	65,525	33,475	100,476	187,615	61,900	28,481	97,234
National Radio Astronomy Observatory	NSF	Charlottesville, VA	101,901	88,000	1,212	12,689	99,881	87,450	891	11,540
National Solar Observatory	NSF	Sunspot, NM	15,931	15,931	0	0	15,892	15,892	0	0
NSF's National Optical-Infrared Astronomy Research Laboratory (NSF's NOIRLab)	NSF	Tucson, AZ	38,262	38,262	0	0	28,760	28,760	0	0
Princeton Plasma Physics Laboratory	DOE	Princeton, NJ	91,271	90,814	457	0	91,119	90,814	305	0
SLAC National Accelerator Laboratory	DOE	Menlo Park, CA	368,938	350,381	18,557	0	352,527	339,923	12,604	0
Software Engineering Institute	DOD, OSD	Pittsburgh, PA	140,954	9,152	11,417	120,385	140,940	9,152	11,417	120,371
Thomas Jefferson National Accelerator Facility	DOE	Newport News, VA	125,796	125,796	0	0	123,795	123,795	0	0
Nonprofit-administered FFRDCs	-	-	7,033,162	1,596,555	2,092,525	3,344,082	6,891,730	1,591,010	2,028,873	3,271,847
Aerospace Federally Funded Research and Development Center	DOD, Air Force	El Segundo, CA	1,065,989	21,719	79,502	964,768	1,062,804	21,560	76,476	964,768
Arroyo Center	DOD, Army	Santa Monica, CA	37,956	0	37,956	0	37,956	0	37,956	0
Brookhaven National Laboratory	DOE	Upton, NY	590,470	448,707	85,450	56,313	561,030	446,847	76,209	37,974
Center for Advanced Aviation System Development	DOT, FAA	McLean, VA	174,123	1,129	16,909	156,085	152,539	1,107	16,524	134,908
Center for Communications and Computing	DOD, NSA/CSS	Alexandria, VA	68,371	17,093	34,186	17,092	68,371	17,093	34,186	17,092
Center for Enterprise Modernization	Treasury/IRS, VA, SSA	McLean, VA	174,712	417	18,684	155,611	173,127	413	18,626	154,088
Center for Naval Analyses	DOD, Navy	Arlington, VA	96,697	0	96,697	0	96,697	0	96,697	0
Center for Nuclear Waste Regulatory Analyses	NRC	San Antonio, TX	6,987	0	6,987	0	6,340	0	6,340	0
CMS Alliance to Modernize Healthcare	HHS, CMS	Baltimore, MD	213,369	227	34,306	178,836	213,369	227	34,306	178,836
Homeland Security Operational Analysis Center	DHS, S&T	Pentagon City, VA	54,751	0	54,751	0	54,751	0	54,751	0

TABLE 6
Total and federally financed R&D expenditures at federally funded research and development centers, by type of R&D and FFRDC: FY 2019
(Dollars in thousands)

FFRDC	Sponsor	Location	Total				Federally financed			
			All R&D expenditures	Basic research	Applied research	Experimental development	All R&D expenditures	Basic research	Applied research	Experimental development
Homeland Security Systems Engineering and Development Institute	DHS, S&T	McLean, VA	115,813	144	2,494	113,175	115,813	144	2,494	113,175
Judiciary Engineering and Modernization Center	U.S. Courts	McLean, VA	7,331	17	306	7,008	7,331	17	306	7,008
National Biodefense Analysis and Countermeasures Center	DHS, S&T	Frederick, MD	39,003	0	39,003	0	39,003	0	39,003	0
National Cybersecurity Center of Excellence	NIST	Rockville, MD	22,205	27	467	21,711	22,205	27	467	21,711
National Defense Research Institute	DOD, OSD	Santa Monica, CA	67,647	0	67,647	0	67,647	0	67,647	0
National Renewable Energy Laboratory	DOE	Golden, CO	455,016	40,592	252,714	161,710	405,923	40,592	223,258	142,073
National Security Engineering Center	DOD, OSD	Bedford, MA/ McLean, VA	1,124,861	27,703	159,469	937,689	1,123,616	27,684	159,364	936,568
Oak Ridge National Laboratory	DOE	Oak Ridge, TN	1,470,372	847,330	623,042	0	1,454,122	847,330	606,792	0
Pacific Northwest National Laboratory	DOE	Richland, WA	1,012,136	191,450	246,602	574,084	993,733	187,969	242,118	563,646
Project Air Force	DOD, Air Force	Santa Monica, CA	48,325	0	48,325	0	48,325	0	48,325	0
Science and Technology Policy Institute	NSF	Washington, DC	9,080	0	9,080	0	9,080	0	9,080	0
Systems and Analyses Center	DOD, OSD	Alexandria, VA	177,948	0	177,948	0	177,948	0	177,948	0
Industry-administered FFRDCs	-	-	8,758,076	647,323	5,274,593	2,836,160	8,650,429	641,804	5,203,277	2,805,348
Frederick National Laboratory for Cancer Research	HHS, NIH	Frederick, MD	751,452	149,695	601,757	0	751,452	149,695	601,757	0
Idaho National Laboratory	DOE	Idaho Falls, ID	478,324	28,699	253,512	196,113	463,588	27,815	245,702	190,071
Lawrence Livermore National Laboratory	DOE	Livermore, CA	1,517,429	106,197	1,163,283	247,949	1,480,978	103,380	1,129,649	247,949
Los Alamos National Laboratory	DOE	Los Alamos, NM	2,461,275	196,902	2,239,760	24,613	2,440,514	195,241	2,220,868	24,405
Sandia National Laboratories	DOE	Albuquerque, NM	3,373,217	157,011	928,091	2,288,115	3,340,658	157,011	918,681	2,264,966
Savannah River National Laboratory	DOE	Aiken, SC	176,379	8,819	88,190	79,370	173,239	8,662	86,620	77,957

CMS = Centers for Medicare and Medicaid Services; DHS = Department of Homeland Security; DOD = Department of Defense; DOE = Department of Energy; DOT = Department of Transportation; FAA = Federal Aviation Administration; FFRDC = federally funded research and development center; HHS = Department of Health and Human Services; IRS = Internal Revenue Service; NASA = National Aeronautics and Space Administration; NIH = National Institutes of Health; NIST = National Institute of Science and Technology; NRC = Nuclear Regulatory Commission; NSA/CSS = National Security Agency/Central Security Service; NSF = National Science Foundation; OSD = Office of the Secretary of Defense; S&T = Science and Technology Directorate; SSA = Social Security Administration; VA = Department of Veterans Affairs.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2019.

TABLE 7

Total R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2010–19

(Dollars in thousands)

FFRDC	2010	2011 ^a	2012	2013	2014	2015	2016	2017	2018	2019
All FFRDCs	18,880,609	18,671,245	18,280,943	17,667,184	17,718,556	18,458,257	19,219,702	20,038,307	21,171,529	22,737,500
Aerospace Federally Funded Research and Development Center ^b	880,653	908,458	874,653	835,068	838,708	888,119	909,868	942,704	1,020,827	1,065,989
Ames Laboratory	30,836	32,442	33,853	34,234	41,824	45,845	46,886	53,527	36,858	33,612
Argonne National Laboratory	650,504	710,435	679,387	708,501	719,459	719,521	733,377	723,824	777,246	810,693
Arroyo Center	28,647	32,180	31,278	32,789	33,391	40,594	44,616	42,723	39,738	37,956
Brookhaven National Laboratory	535,546	526,571	516,921	529,634	573,364	587,194	579,087	556,875	552,640	590,470
Center for Advanced Aviation System Development	149,686	165,645	159,311	146,860	149,054	155,696	156,644	168,169	177,530	174,123
Center for Communications and Computing	71,927	72,600	62,600	51,477	63,199	56,478	61,625	66,692	68,237	68,371
Center for Enterprise Modernization	170,460	187,785	226,539	202,319	158,069	145,442	146,436	154,933	162,690	174,712
Center for Naval Analyses	109,068	85,165	91,628	86,132	80,283	80,358	84,232	90,401	95,198	96,697
Center for Nuclear Waste Regulatory Analyses	15,346	16,377	13,147	12,331	12,314	12,636	8,600	6,312	5,054	6,987
CMS Alliance to Modernize Healthcare	na	na	na	17,521	70,458	168,142	141,860	169,013	175,030	213,369
Fermi National Accelerator Laboratory	402,658	420,119	412,438	376,472	334,522	319,700	323,507	320,516	328,419	334,258
Frederick National Laboratory for Cancer Research	643,935	431,600	430,100	433,900	448,500	495,300	642,165	704,223	748,500	751,452
Homeland Security Operational Analysis Center	na	na	na	na	na	na	na	8,622	46,321	54,751
Homeland Security Studies and Analysis Institute	33,402	36,870	30,213	22,452	20,866	16,965	22,038	na	na	na
Homeland Security Systems Engineering and Development Institute	58,715	85,154	77,159	75,530	94,353	77,176	101,628	104,414	104,689	115,813
Idaho National Laboratory	478,356	425,072	536,399	496,818	479,801	476,376	521,618	482,840	395,112	478,324
Jet Propulsion Laboratory	1,640,341	1,543,969	1,493,613	1,519,258	1,664,539	1,749,689	1,852,369	2,324,826	2,733,908	2,709,063
Judiciary Engineering and Modernization Center	na	4,650	5,309	6,399	2,299	4,318	9,289	8,030	6,697	7,331
Lawrence Berkeley National Laboratory	759,381	788,386	767,554	768,563	762,601	792,457	797,831	813,267	832,457	872,237
Lawrence Livermore National Laboratory	1,370,747	1,424,993	1,353,454	1,313,293	1,170,571	1,273,066	1,363,525	1,290,134	1,386,687	1,517,429
Lincoln Laboratory	789,502	822,358	873,104	872,298	830,076	914,071	949,138	969,090	1,013,320	1,103,870
Los Alamos National Laboratory	2,505,913	2,307,197	2,056,878	1,708,000	1,767,000	1,865,000	1,987,000	1,972,769	2,145,232	2,461,275
National Astronomy and Ionosphere Ctr.	13,203	14,317	na							
National Biodefense Analysis and Countermeasures Center	50,058	41,786	31,201	29,849	30,310	30,716	32,902	34,991	37,598	39,003
National Center for Atmospheric Research	220,328	198,231	169,743	172,527	162,259	166,385	177,422	171,551	158,260	199,476
National Cybersecurity Center of Excellence	na	na	na	na	na	7,843	13,076	13,436	19,556	22,205
National Defense Research Institute	51,652	46,330	53,832	59,460	62,073	56,736	62,848	69,013	57,743	67,647
National Radio Astronomy Observatory	137,607	81,305	79,168	93,253	85,327	89,689	90,411	91,720	100,691	101,901
National Renewable Energy Laboratory	326,652	386,539	398,873	347,368	359,998	378,436	362,087	357,916	388,500	455,016
National Security Engineering Center	925,027	941,187	946,737	928,614	885,382	919,441	966,542	1,012,155	1,078,610	1,124,861
National Solar Observatory	11,549	11,724	10,236	10,648	10,039	11,752	12,783	11,841	14,733	15,931

TABLE 7

Total R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2010–19

(Dollars in thousands)

FFRDC	2010	2011 ^a	2012	2013	2014	2015	2016	2017	2018	2019
NSF's National Optical-Infrared Astronomy Research Laboratory (NSF's NOIRLab)	45,596	36,165	36,321	30,021	25,161	23,660	24,917	25,906	33,874	38,262
Oak Ridge National Laboratory	1,538,412	1,558,073	1,553,460	1,451,684	1,293,722	1,333,332	1,283,729	1,403,204	1,399,445	1,470,372
Pacific Northwest National Laboratory	1,116,648	1,095,923	1,033,768	934,491	1,021,912	951,099	914,747	983,962	956,193	1,012,136
Princeton Plasma Physics Laboratory	83,932	84,863	81,389	85,088	97,768	81,348	82,246	81,444	82,435	91,271
Project Air Force	43,957	44,171	41,031	36,003	39,351	44,393	49,165	48,521	48,858	48,325
Sandia National Laboratories	2,157,022	2,277,166	2,293,307	2,412,476	2,507,099	2,621,891	2,781,547	2,878,000	3,009,105	3,373,217
Savannah River National Laboratory	127,160	134,530	132,357	115,857	121,013	121,675	125,881	141,477	154,281	176,379
Science and Technology Policy Institute	6,000	8,700	7,547	5,010	10,949	8,724	7,459	8,401	8,086	9,080
SLAC National Accelerator Laboratory	354,393	327,716	329,747	327,005	316,646	310,167	313,031	327,453	341,615	368,938
Software Engineering Institute	99,334	107,837	113,371	134,973	123,217	131,146	145,981	132,967	142,891	140,954
Systems and Analyses Center	156,000	156,200	149,150	142,977	145,211	157,645	169,580	163,125	168,034	177,948
Thomas Jefferson National Accelerator Facility	90,456	90,456	94,167	100,031	105,868	128,036	120,009	107,320	118,631	125,796

na = not applicable.

FFRDC = federally funded research and development center; NSF = National Science Foundation.

^a R&D expenditures decreased in FY 2011 due to removal of expenditures for capital projects. In this survey, R&D expenditures do not include capital projects. In previous years, some FFRDCs included capital expenditures in their R&D totals. Previous years include an unknown amount of capital expenditures, estimated to be less than \$500 million per year.

^b Prior to FY 2014, the Aerospace Corporation reported only internal R&D projects. After discussion with the National Center for Science and Engineering Statistics, the Aerospace Corporation agreed to report all R&D expenditures for FY 2014 and provide revised data to include all R&D expenditures for FYs 2010–13.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

TABLE 8

Total and federally financed R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2016–19

(Dollars in thousands)

FFRDC	Total				Federally financed			
	2016	2017	2018	2019	2016	2017	2018	2019
All FFRDCs	19,219,702	20,038,307	21,171,529	22,737,500	18,855,593	19,667,804	20,770,388	22,338,855
University-administered FFRDCs	5,669,908	6,155,252	6,715,338	6,946,262	5,529,238	6,013,003	6,560,094	6,796,696
Ames Laboratory	46,886	53,527	36,858	33,612	46,190	52,830	35,696	33,211
Argonne National Laboratory	733,377	723,824	777,246	810,693	704,100	690,234	747,349	787,513
Fermi National Accelerator Laboratory	323,507	320,516	328,419	334,258	322,196	319,559	327,630	333,460
Jet Propulsion Laboratory	1,852,369	2,324,826	2,733,908	2,709,063	1,852,369	2,324,826	2,733,908	2,709,063
Lawrence Berkeley National Laboratory	797,831	813,267	832,457	872,237	741,250	755,899	769,839	807,967
Lincoln Laboratory	949,138	969,090	1,013,320	1,103,870	942,049	963,584	1,001,849	1,084,953
National Center for Atmospheric Research	177,422	171,551	158,260	199,476	155,584	151,138	139,532	187,615
National Radio Astronomy Observatory	90,411	91,720	100,691	101,901	87,649	89,791	98,642	99,881
National Solar Observatory	12,783	11,841	14,733	15,931	11,821	11,833	14,027	15,892
NSF's National Optical-Infrared Astronomy Research Laboratory (NSF's NOIRLab)	24,917	25,906	33,874	38,262	21,890	22,479	24,172	28,760
Princeton Plasma Physics Laboratory	82,246	81,444	82,435	91,271	81,187	81,123	82,057	91,119
SLAC National Accelerator Laboratory	313,031	327,453	341,615	368,938	300,207	311,686	326,587	352,527
Software Engineering Institute	145,981	132,967	142,891	140,954	145,725	132,870	142,877	140,940
Thomas Jefferson National Accelerator Facility	120,009	107,320	118,631	125,796	117,021	105,151	115,929	123,795
Nonprofit-administered FFRDCs	6,128,058	6,413,612	6,617,274	7,033,162	6,019,726	6,297,166	6,490,564	6,891,730
Aerospace Federally Funded Research and Development Center	909,868	942,704	1,020,827	1,065,989	905,468	939,793	1,018,425	1,062,804
Arroyo Center	44,616	42,723	39,738	37,956	44,616	42,723	39,738	37,956
Brookhaven National Laboratory	579,087	556,875	552,640	590,470	563,400	539,075	525,170	561,030
Center for Advanced Aviation System Development	156,644	168,169	177,530	174,123	137,578	148,610	156,437	152,539
Center for Communications and Computing	61,625	66,692	68,237	68,371	61,625	66,692	68,237	68,371
Center for Enterprise Modernization	146,436	154,933	162,690	174,712	146,432	154,829	161,448	173,127
Center for Naval Analyses	84,232	90,401	95,198	96,697	84,232	90,401	95,198	96,697
Center for Nuclear Waste Regulatory Analyses	8,600	6,312	5,054	6,987	7,583	5,207	4,647	6,340
CMS Alliance to Modernize Healthcare	141,860	169,013	175,030	213,369	141,860	169,013	175,030	213,369
Homeland Security Operational Analysis Center	na	8,622	46,321	54,751	na	8,622	46,321	54,751
Homeland Security Studies and Analysis Institute	22,038	na	na	na	22,038	na	na	na
Homeland Security Systems Engineering and Development Institute	101,628	104,414	104,689	115,813	101,628	104,414	104,689	115,813
Judiciary Engineering and Modernization Center	9,289	8,030	6,697	7,331	9,289	8,030	6,697	7,331
National Biodefense Analysis and Countermeasures Center	32,902	34,991	37,598	39,003	32,902	34,991	37,598	39,003
National Cybersecurity Center of Excellence	13,076	13,436	19,556	22,205	13,076	13,436	19,556	22,205
National Defense Research Institute	62,848	69,013	57,743	67,647	62,848	69,013	57,743	67,647
National Renewable Energy Laboratory	362,087	357,916	388,500	455,016	337,017	328,197	349,410	405,923
National Security Engineering Center	966,542	1,012,155	1,078,610	1,124,861	966,404	1,009,971	1,077,697	1,123,616

TABLE 8

Total and federally financed R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2016–19

(Dollars in thousands)

FFRDC	Total				Federally financed			
	2016	2017	2018	2019	2016	2017	2018	2019
Oak Ridge National Laboratory	1,283,729	1,403,204	1,399,445	1,470,372	1,251,237	1,373,042	1,378,398	1,454,122
Pacific Northwest National Laboratory	914,747	983,962	956,193	1,012,136	904,289	971,060	943,147	993,733
Project Air Force	49,165	48,521	48,858	48,325	49,165	48,521	48,858	48,325
Science and Technology Policy Institute	7,459	8,401	8,086	9,080	7,459	8,401	8,086	9,080
Systems and Analyses Center	169,580	163,125	168,034	177,948	169,580	163,125	168,034	177,948
Industry-administered FFRDCs	7,421,736	7,469,443	7,838,917	8,758,076	7,306,629	7,357,635	7,719,730	8,650,429
Frederick National Laboratory for Cancer Research	642,165	704,223	748,500	751,452	642,165	704,223	748,500	751,452
Idaho National Laboratory	521,618	482,840	395,112	478,324	504,245	462,659	376,053	463,588
Lawrence Livermore National Laboratory	1,363,525	1,290,134	1,386,687	1,517,429	1,326,375	1,259,015	1,353,502	1,480,978
Los Alamos National Laboratory	1,987,000	1,972,769	2,145,232	2,461,275	1,962,000	1,950,268	2,120,857	2,440,514
Sandia National Laboratories	2,781,547	2,878,000	3,009,105	3,373,217	2,745,963	2,839,993	2,967,822	3,340,658
Savannah River National Laboratory	125,881	141,477	154,281	176,379	125,881	141,477	152,996	173,239

na = not applicable.

FFRDC = federally funded research and development center; NSF = National Science Foundation.

Source(s):

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

Technical Notes

Survey Overview

Purpose. The FFRDC Research and Development Survey is conducted by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF). It is the primary source of information on separately accounted for R&D expenditures at FFRDCs in the United States.

Data collection authority. The information is solicited under the authority of the National Science Foundation Act of 1950, as amended, and the American COMPETES Reauthorization Act of 2010. The Office of Management and Budget control number for the FY 2019 FFRDC R&D Survey is 3145-0100, with an expiration date of 31 August 2022.

Survey contractor. ICF.

Survey sponsor. NCSES.

Key Survey Information

Frequency. Annual.

Initial survey year. 2001.

Reference period. FY 2019.

Response unit. Establishment.

Sample or census. Census.

Population size. 42.

Sample size. The survey is a census of all known eligible FFRDCs.

Survey Design

Target population. All FFRDCs.

Sampling frame. The total survey universe is identified through the NSF Master Government List of FFRDCs. NSF is responsible for maintaining this list and queries all federal agencies annually to determine any changes to, additions to, or deletions from the list.

Sample design. The FFRDC R&D Survey is a census of all eligible organizations.

Data Collection and Processing Methods

Data collection. The FY 2019 survey announcements were sent by e-mail to all FFRDCs in November 2019. Respondents could choose to complete a questionnaire downloaded from the Web or use a Web-based data collection system to respond to the survey. Every effort was made to maintain close contact with respondents to preserve the consistency and continuity of the resulting data. Survey data reports were available on the survey website for each institution; these reports showed comparisons between the current year and the 2 prior years of data and noted any substantive disparities. Questionnaires were carefully examined for completeness upon receipt. Respondents were sent personalized e-mail messages asking them to provide any necessary revisions before the final processing and tabulation of data. These e-mail messages included a link to the FFRDC R&D Survey Web-based collection system, allowing respondents to view and correct their data online.

Respondents were asked to explain significant differences between current year reporting and established patterns of reporting verified for prior years. They were encouraged to correct prior year data, if necessary. When respondents updated or amended figures from past years, NCSSES made corresponding changes to trend data in the 2019 data tables and to the underlying microdata. For accurate historical data, use only the most recently released data tables.

Mode. Respondents could respond to the survey by completing an Adobe PDF or Microsoft Excel questionnaire downloaded from the Web or by using a Web-based data collection system. All FFRDCs submitted data using the Web-based survey.

Response rates. All 42 FFRDCs included on the NSF Master Government List of FFRDCs during the FY 2019 survey cycle completed the key survey questions.

Data editing. The FFRDC R&D Survey was subject to very little editing; respondents were contacted and asked to resolve possible self-reporting issues themselves. Questionnaires were carefully examined by survey staff upon receipt. These reviews focused on unexplained missing data and explanations provided for changes in reporting patterns. If additional explanations or data revisions were needed, respondents were sent personalized e-mail messages asking them to provide any necessary revisions before the final processing and tabulation of data.

Imputation. No data were imputed for FY 2019.

Weighting. FFRDC R&D Survey data were not weighted.

Variance estimation. No variance estimation techniques were used.

Survey Quality Measures

Sampling error. Because the FY 2019 survey was a survey distributed to all organizations in the universe, there was no sampling error.

Coverage error. Given the availability of a comprehensive FFRDC list, there is no known coverage error for this survey. FFRDCs are identified through the NSF **Master Government List of FFRDCs**. NSF is responsible for maintaining the master list and queries all federal agencies annually to determine changes to, additions to, or deletions from the list.

Nonresponse error. Most FFRDCs have incorporated the data needed to complete most of the survey questions into their record-keeping systems. Twelve FFRDCs chose not to complete Question 5 of the survey, which asks for expenditures by type of cost. Eleven of those FFRDCs are managed by private companies for whom salary information is considered proprietary. One FFRDC, which is managed by a university, could not separate its expenditures by type from those of the managing institution. Other FFRDCs did not answer all sections of Question 5: five FFRDCs could not provide information on software expenditures, and four could not provide data on equipment expenditures. One FFRDC did not report its operating budget (Question 6). One FFRDC could not provide expenditures funded by nonprofit organizations separately from those funded by businesses (Question 1); the combined amount was reported as business-funded.

Measurement error. NCSSES discovered during the FY 2011 survey cycle that seven FFRDCs were including capital project expenditures in the R&D totals reported on the survey. Corrections made for the FY 2011 survey cycle lowered total expenditures by \$468 million. However, previous years still include an unknown amount of capital expenditures in the total. The amount is estimated to be less than \$500 million per year.

Prior to the FY 2011 survey, the five FFRDCs administered by the MITRE Corporation had reported only internally funded R&D expenditures. After discussions with NCSSES, these five FFRDCs agreed to report all FY 2011 operating expenditures for R&D and to revise their data for FYs 2008–10.

NCSES discovered during the FY 2013 survey cycle that Los Alamos National Laboratory (LANL) was reporting some expenditures that were not for R&D, as defined by this survey. Corrections made for the FY 2013 survey cycle lowered the laboratory's total expenditures by \$349 million. LANL also incorrectly was reporting that all expenditures were for basic research. In corrections made for FY 2013, LANL reported that \$1,554 million (91%) of its total research expenditures was for applied research. LANL data from previous years still include an unknown amount of expenditures that were not for R&D and categorize all expenditures as basic research.

Prior to FY 2014, the Aerospace FFRDC reported only expenditures on internal R&D projects. After discussions with NCSES, the Aerospace Corporation agreed to report all R&D expenditures for FY 2014 and provide revised data to include all R&D expenditures for FYs 2010–13. R&D expenditures increased by more than \$800 million each year.

During the FY 2014 survey, NCSES discovered that the National Optical Astronomy Observatory had been including data for the National Solar Observatory since FY 2010. The Association of Universities for Research in Astronomy, the administrator of both FFRDCs, provided revised data for both FFRDCs for FYs 2010–13.

During the FY 2016 survey, NCSES discovered that the Judiciary Engineering and Modernization Center was incorrectly classified as an industry-administered FFRDC in FYs 2011–15. This FFRDC is administered by the MITRE Corporation, a nonprofit organization, and should have been classified as a nonprofit-administered FFRDC. The classification was corrected for FY 2016, and the Judiciary Engineering and Modernization Center's FYs 2011–15 data were reclassified as coming from a nonprofit-administered FFRDC.

Data Comparability (Changes)

Annual data are available for FYs 2001–19. When the review for consistency between each year's data and submissions in prior years reveals discrepancies, it is sometimes necessary to modify prior year data. For accurate historical data, use only the most recently released data tables. Individuals wishing to analyze trends other than those in the most recent NCSES publication are encouraged to contact the Project Officer for more information about the comparability of data over time.

Changes in survey coverage and population. Most years, there are some changes to the FFRDC population that may affect trend analyses. FFRDCs have been created, decertified, renamed, or restructured, as described below:

- On 20 December 2006, the National Biodefense Analysis and Countermeasure Center was created.
- Prior to FY 2009, the Center for Enterprise Modernization was listed as the Internal Revenue Service FFRDC.
- On 5 March 2009, the Homeland Security Studies and Analysis Institute and the Homeland Security Systems Engineering and Development Institute were created. These new FFRDCs replaced the Homeland Security Institute.
- On 1 October 2009, the National Solar Observatory split from the National Optical Astronomy Observatory, with both retaining their FFRDC status.
- On 2 September 2010, the Judiciary Engineering and Modernization Center was created.
- Prior to FY 2011, the National Security Engineering Center was listed as C3I FFRDC.
- On 1 October 2011, the National Astronomy and Ionosphere Center was decertified as an FFRDC.
- Prior to FY 2012, the Frederick National Laboratory for Cancer Research was listed as the National Cancer Institute at Frederick.
- On 27 September 2012, the Centers for Medicare and Medicaid Services FFRDC was created. On 15 August 2013, its name was changed to the CMS Alliance to Modernize Healthcare.
- Prior to FY 2013, the Systems and Analyses Center was listed as the Studies and Analyses Center.
- On 19 September 2014, the National Cybersecurity Center of Excellence was created.
- On 15 September 2016, the Homeland Security Operational Analysis Center was created.

- The Homeland Security Studies and Analysis Institute was phased out on 31 October 2016.
- In June 2020, the National Optical Astronomy Observatory changed its name to NSF's National Optical-Infrared Astronomy Research Laboratory or NSF's NOIRLab.

Changes in questionnaire. FFRDCs are asked to provide R&D expenditures by source of funding and type of R&D. In FY 2010, NCSSES revised the survey to include three new questions requesting expenditures funded by the American Recovery and Reinvestment Act of 2009 (ARRA), expenditures by type of cost, and total operating budget. In FY 2015, NCSSES revised the survey to exclude the question requesting expenditures funded by ARRA. In FY 2016, NCSSES added a question (Question 2) asking for R&D expenditures funded by seven specific federal agencies. In FY 2019, NCSSES added a question (Question 3) asking which federal agencies funded the expenditures reported under Other federal agencies in Question 2.

Changes in reporting procedures or classification. The FFRDC R&D Survey has been conducted annually for university-administered FFRDCs since FY 1953 and for all FFRDCs since FY 2001.

Definitions

- *Expenditures by federal agency.* In Question 2, FFRDCs were asked for the amount of R&D expenditures by federal funding agency. FFRDCs were asked to report expenditures funded by seven specific agencies (Department of Defense; Department of Energy; Department of Health and Human Services, including the National Institutes of Health; Department of Homeland Security; Department of Transportation; National Aeronautics and Space Administration; and National Science Foundation). Any expenditures funded by other federal agencies were reported under Other federal agencies. In Question 3, FFRDCs were asked to list the specific agencies and corresponding expenditures included in Other federal agencies.
- *Expenditures by source.* In Question 1, FFRDCs were asked to report their total R&D expenditures by funding source, as defined below:
 - *U.S. federal government.* Any agency of the U.S. government. Federal funds that were passed through to the reporting institution from another institution were included.
 - *State and local government.* Any state, county, municipality, or other local government entity in the United States, including state health agencies.
 - *Business.* Domestic or foreign for-profit organizations. Funds from a company's nonprofit foundation were not reported here; they were reported under Nonprofit organizations.
 - *Nonprofit organizations.* Domestic or foreign nonprofit foundations and organizations.
 - *All other sources.* Sources not reported in other categories, such as funds from foreign governments.
- *Expenditures by type of cost.* In Question 5, FFRDCs were asked for expenditures by type of cost, as defined below:
 - *Salaries, wages, and fringe benefits.* Included compensation for all R&D personnel, whether full time or part time, temporary or permanent, including salaries, wages, and fringe benefits paid from institution funds and from external support.
 - *Software purchases.* Included payments for all software, both purchases of software packages and license fees for systems.
 - *Equipment.* Included payments for movable equipment, including ancillary costs such as delivery and setup.
 - *Subcontracts.* Payments to subcontractors or subrecipients for services on R&D projects.
 - *Other direct costs.* Other costs that did not fit into one of the above categories, including (but not limited to) travel, computer usage fees, and supplies.
 - *Indirect costs.* Included all indirect costs (overhead) associated with R&D projects.

- *Expenditures by type of R&D.* In Question 4, FFRDCs were asked for the amount of federal and nonfederal R&D expenditures by type of R&D, as defined below:
 - *Basic research.* Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.
 - *Applied research.* Original investigation undertaken to acquire new knowledge. It is directed primarily toward a specific, practical aim or objective.
 - *Experimental development.* Systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.
- *Fiscal year.* FFRDCs were asked to report data for their fiscal year (or financial year).
- *R&D.* The FFRDC R&D Survey requested data from FFRDCs on their R&D, defined as systematic study directed toward fuller knowledge or understanding of the subject studied. R&D included basic research, applied research, and experimental development (see *Expenditures by type of R&D* above for additional information). R&D did not include outreach or nonresearch training programs. Respondents were also asked to exclude capital projects (i.e., construction or renovation of research facilities) from reported expenditures.
- *R&D expenditures.* FFRDCs were asked to report all current operating expenditures for activities specifically organized to produce R&D outcomes, including those funded by external sponsors or separately budgeted and accounted for by the organization using internal funds. Expenditures included indirect costs, equipment, software, clinical trials, and subcontract expenditures.
- *Total operating budget.* Total executed operating budget for the FFRDC excluding capital construction costs.

Acknowledgments and Suggested Citation

Acknowledgments

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Contact Us

Report Author

Michael T. Gibbons
Survey Manager
Research and Development Statistics Program, NCSES
Tel: (703) 292-4590
E-mail: mgibbons@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