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R&D

Research and Development: U.S. Trends and International Comparisons

Supplemental Tables

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TABLE S4-1

Gross expenditures on R&D and expenditures for R&D as a share of gross domestic product, for selected countries or regions: 1981–2017

(PPP in billions and in constant 2012 billions of dollars, GERD-to-GDP ratio, and annual growth rates)

Year	United States	EU ^a	France	Germany	United Kingdom	China	Japan	South Korea	India	
GERD (PPP \$billions)										
1981	72.7	na	11.0	18.9	11.6	NA	24.0	NA	NA	
1982	81.2	na	12.5	20.5	NA	NA	27.4	NA	NA	
1983	90.4	na	13.4	21.6	12.5	NA	31.1	NA	NA	
1984	102.9	na	14.7	23.2	NA	NA	35.0	NA	NA	
1985	115.2	na	15.9	26.0	14.4	NA	40.4	NA	NA	
1986	120.6	na	16.5	27.7	15.3	NA	42.0	NA	NA	
1987	126.7	na	17.7	29.8	15.9	NA	46.1	NA	NA	
1988	134.2	na	19.1	32.0	16.8	NA	51.4	NA	NA	
1989	142.2	na	21.1	34.3	17.9	NA	58.4	NA	NA	
1990	152.4	na	23.3	36.0	18.6	NA	65.4	NA	NA	
1991	161.4	na	24.4	40.2	18.3	9.2	69.2	7.0	NA	
1992	165.8	na	25.4	39.9	18.5	10.8	70.0	8.0	NA	
1993	166.1	na	26.3	39.1	19.6	12.0	69.8	9.5	NA	
1994	169.6	na	26.9	39.4	20.5	12.5	70.5	11.6	NA	
1995	184.1	137.3	27.7	41.0	19.7	12.8	76.6	13.2	NA	
1996	197.8	142.7	28.3	42.2	20.1	14.2	83.0	14.9	9.9	
1997	212.5	149.6	28.6	44.1	20.7	17.9	87.8	16.3	11.3	
1998	226.2	157.3	29.5	46.1	21.4	19.8	91.1	14.6	12.4	
1999	245.0	169.1	31.0	50.7	23.3	25.0	92.8	15.8	14.1	
2000	268.6	183.4	33.3	53.9	25.1	33.1	98.9	18.5	15.7	
2001	279.1	195.1	36.1	56.2	26.3	38.6	103.8	21.3	16.3	
2002	278.4	205.9	38.3	58.6	27.9	48.1	108.2	22.5	17.0	
2003	292.2	210.3	37.1	61.0	28.6	57.2	112.4	24.1	18.5	
2004	303.8	218.0	38.1	62.9	29.4	70.2	117.5	27.9	21.6	
2005	326.2	226.9	39.5	64.0	30.6	86.8	128.7	30.6	26.5	
2006	351.7	249.7	42.3	69.5	33.3	105.6	138.7	35.4	29.4	
2007	378.5	266.8	44.2	73.4	35.2	124.2	147.5	40.6	33.5	
2008	405.4	290.8	46.6	81.2	36.5	146.1	148.7	43.9	37.8	
2009	404.2	297.1	49.6	82.7	36.4	185.3	137.4	46.0	40.2	
2010	408.5	307.7	50.9	87.0	37.5	213.5	140.6	52.2	43.7	
2011	427.1	328.5	53.6	95.8	38.8	247.8	148.4	58.4	48.1	
2012	434.3	340.9	55.1	100.5	38.5	292.2	152.3	64.9	NA	
2013	454.8	355.3	58.4	102.9	41.5	334.1	164.7	68.2	NA	
2014	476.5	371.2	60.6	109.6	43.8	370.6	169.6	73.1	NA	
2015	495.1	386.0	61.6	114.1	45.7	407.5	168.5	76.9	49.7	
2016	516.6	399.1	62.3	119.9	47.4	451.4	164.8	80.5	NA	
2017	549.0	430.1	64.7	132.0	49.3	496.0	170.9	91.0	NA	
GERD (2012 constant PPP \$billions)										
1981	157.2	na	23.8	40.8	25.0	NA	52.0	NA	NA	
1982	165.2	na	25.5	41.8	NA	NA	55.8	NA	NA	
1983	177.1	na	26.3	42.3	24.5	NA	60.9	NA	NA	
1984	194.5	na	27.9	43.8	NA	NA	66.2	NA	NA	
1985	211.1	na	29.1	47.7	26.4	NA	74.0	NA	NA	
1986	216.6	na	29.6	49.7	27.4	NA	75.4	NA	NA	
1987	222.0	na	31.0	52.2	27.8	NA	80.8	NA	NA	
1988	227.2	na	32.3	54.2	28.5	NA	87.1	NA	NA	
1989	231.7	na	34.4	55.9	29.1	NA	95.1	NA	NA	
1990	239.3	na	36.7	56.6	29.2	NA	102.7	NA	NA	

TABLE S4-1

Gross expenditures on R&D and expenditures for R&D as a share of gross domestic product, for selected countries or regions: 1981–2017

(PPP in billions and in constant 2012 billions of dollars, GERD-to-GDP ratio, and annual growth rates)

Year	United States	EU ^a	France	Germany	United Kingdom	China	Japan	South Korea	India
1991	245.2	na	37.1	61.0	27.8	13.9	105.1	10.7	NA
1992	246.3	na	37.8	59.2	27.4	16.0	104.0	11.9	NA
1993	241.1	na	38.1	56.8	28.5	17.4	101.3	13.8	NA
1994	241.0	na	38.2	56.0	29.2	17.8	100.1	16.4	NA
1995	256.1	191.1	38.5	57.1	27.3	17.8	106.6	18.4	NA
1996	270.3	195.0	38.7	57.7	27.4	19.4	113.4	20.3	13.6
1997	285.4	200.9	38.5	59.2	27.8	24.0	117.9	21.9	15.1
1998	300.5	208.9	39.1	61.2	28.5	26.2	121.0	19.4	16.5
1999	320.8	221.5	40.6	66.4	30.5	32.8	121.5	20.7	18.5
2000	344.0	234.9	42.6	69.0	32.2	42.4	126.7	23.7	20.1
2001	349.7	244.6	45.2	70.4	33.0	48.4	130.1	26.6	20.5
2002	343.5	254.0	47.3	72.3	34.4	59.4	133.5	27.8	20.9
2003	353.9	254.7	45.0	73.9	34.6	69.3	136.2	29.2	22.4
2004	358.4	257.1	45.0	74.2	34.7	82.8	138.6	32.9	25.5
2005	373.2	259.6	45.2	73.2	35.0	99.3	147.2	35.0	30.3
2006	390.5	277.2	47.0	77.2	37.0	117.2	154.0	39.3	32.6
2007	409.3	288.4	47.8	79.3	38.1	134.3	159.5	43.9	36.3
2008	430.0	308.4	49.4	86.1	38.8	155.0	157.7	46.6	40.1
2009	425.5	312.7	52.3	87.1	38.3	195.0	144.6	48.4	42.3
2010	425.0	320.2	52.9	90.5	39.1	222.1	146.3	54.3	45.4
2011	435.3	334.8	54.6	97.6	39.5	252.6	151.2	59.5	49.0
2012	434.3	340.9	55.1	100.5	38.5	292.2	152.3	64.9	NA
2013	447.0	349.1	57.3	101.1	40.8	328.4	161.8	67.1	NA
2014	459.7	358.2	58.5	105.7	42.3	357.6	163.6	70.5	NA
2015	472.8	368.6	58.9	109.0	43.6	389.1	161.0	73.5	47.5
2016	488.3	377.2	58.9	113.3	44.8	426.7	155.7	76.1	NA
2017	509.3	399.0	60.0	122.5	45.8	460.1	158.5	84.4	NA
GERD-to-GDP ratio (%)									
1981	2.27	na	1.87	2.35	2.24	NA	2.05	NA	NA
1982	2.43	na	1.95	2.42	NA	NA	2.13	NA	NA
1983	2.48	na	1.98	2.41	2.06	NA	2.24	NA	NA
1984	2.55	na	2.07	2.43	NA	NA	2.33	NA	NA
1985	2.65	na	2.13	2.59	2.09	NA	2.48	NA	NA
1986	2.63	na	2.12	2.63	2.10	NA	2.44	NA	NA
1987	2.60	na	2.16	2.73	2.02	NA	2.50	NA	NA
1988	2.55	na	2.15	2.73	1.96	NA	2.52	NA	NA
1989	2.51	na	2.19	2.71	1.95	NA	2.63	NA	NA
1990	2.55	na	2.27	2.61	1.95	NA	2.71	NA	NA
1991	2.61	na	2.28	2.40	1.87	0.72	2.68	1.74	NA
1992	2.54	na	2.28	2.28	1.84	0.73	2.63	1.83	NA
1993	2.42	na	2.32	2.21	1.86	0.70	2.57	1.98	NA
1994	2.32	na	2.27	2.13	1.84	0.63	2.52	2.16	NA
1995	2.40	1.58	2.24	2.13	1.66	0.57	2.61	2.20	NA
1996	2.44	1.58	2.22	2.14	1.59	0.56	2.69	2.26	0.63
1997	2.48	1.59	2.15	2.18	1.54	0.64	2.77	2.30	0.67
1998	2.50	1.60	2.09	2.21	1.56	0.65	2.87	2.16	0.69
1999	2.54	1.65	2.11	2.34	1.64	0.75	2.89	2.07	0.71
2000	2.62	1.67	2.09	2.40	1.63	0.89	2.91	2.18	0.74
2001	2.64	1.69	2.14	2.40	1.62	0.94	2.97	2.34	0.72

TABLE S4-1

Gross expenditures on R&D and expenditures for R&D as a share of gross domestic product, for selected countries or regions: 1981–2017

(PPP in billions and in constant 2012 billions of dollars, GERD-to-GDP ratio, and annual growth rates)

Year	United States	EU ^a	France	Germany	United Kingdom	China	Japan	South Korea	India
2002	2.55	1.70	2.17	2.42	1.63	1.06	3.01	2.27	0.71
2003	2.55	1.69	2.12	2.47	1.59	1.12	3.04	2.35	0.71
2004	2.49	1.66	2.09	2.43	1.54	1.21	3.03	2.53	0.74
2005	2.50	1.66	2.05	2.43	1.56	1.31	3.18	2.63	0.81
2006	2.55	1.68	2.05	2.46	1.58	1.37	3.28	2.83	0.80
2007	2.62	1.69	2.02	2.45	1.62	1.37	3.34	3.00	0.81
2008	2.76	1.76	2.06	2.60	1.62	1.45	3.34	3.12	0.87
2009	2.80	1.83	2.21	2.73	1.68	1.66	3.23	3.29	0.84
2010	2.72	1.83	2.18	2.71	1.66	1.71	3.14	3.47	0.82
2011	2.75	1.87	2.19	2.80	1.66	1.78	3.24	3.74	0.83
2012	2.68	1.91	2.23	2.87	1.59	1.91	3.21	4.03	NA
2013	2.71	1.92	2.24	2.82	1.64	2.00	3.31	4.15	NA
2014	2.72	1.94	2.28	2.87	1.66	2.03	3.40	4.29	NA
2015	2.72	1.96	2.27	2.91	1.67	2.07	3.28	4.22	0.62
2016	2.76	1.94	2.22	2.92	1.68	2.12	3.16	4.23	NA
2017	2.81	1.97	2.19	3.04	1.66	2.15	3.21	4.55	NA
GERD, annual growth rates, recent years, current and constant dollars (%)									
Current PPP\$									
CAGR 2000–10	4.3	5.3	4.3	4.9	4.1	20.5	3.6	10.9	10.8
CAGR 2010–17	4.3	4.9	3.5	6.1	4.0	12.8	2.8	8.3	2.6
Constant 2012 PPP\$									
CAGR 2000–10	2.1	3.1	2.2	2.7	1.9	18.0	1.4	8.6	8.5
CAGR 2010–17	2.6	3.2	1.8	4.4	2.3	11.0	1.2	6.5	0.9
GDP, annual growth rates, recent years, current and constant dollars (%)									
Current PPP\$									
CAGR 2000–10	3.9	4.3	3.9	3.6	3.9	12.9	2.8	5.9	9.7
CAGR 2010–17	3.8	3.8	3.4	4.4	4.0	9.2	2.5	4.1	8.5
Constant 2012 PPP\$									
CAGR 2000–10	1.7	2.2	1.8	1.5	1.7	10.6	0.7	3.7	7.5
CAGR 2010–17	2.2	2.1	1.8	2.7	2.3	7.5	0.8	2.4	6.7

na = not applicable; NA = not available.

CAGR = compound average annual growth rate; EU = European Union; GDP = gross domestic product; GERD = gross domestic expenditure on R&D; PPP = purchasing power parity.

^a Data for the EU include the 28 EU member countries.

Note(s)

Top eight R&D-performing countries in 2017. Conversions of foreign currencies to U.S. dollars are calculated with each country's GDP implicit price deflator and with Organisation for Economic Co-operation and Development (OECD) PPP exchange rates. Data for the United States in this table reflect international standards for calculating GERD, which vary slightly from the National Science Foundation's protocol for tallying U.S. total R&D. Data for Japan for 1996 onward may not be consistent with earlier data because of changes in methodology. Data for Germany for 1981–90 are for West Germany.

Source(s)

National Center for Science and Engineering Statistics, National Science Foundation, National Patterns of R&D Resources (annual series); Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (2019/1); United Nations Educational, Scientific and Cultural Organization Institute for Statistics Data Centre.

Science and Engineering Indicators

TABLE S4-2

Federal obligations for R&D and R&D plant, by type of work: FYs 1953–2018

(Millions of current and constant 2012 dollars)

Fiscal year	Total, R&D and R&D plant	R&D				R&D plant
		All R&D	Basic	Applied	Development	
Current \$millions						
1953	2,167	1,920	116	NA	NA	248
1954	1,918	1,762	116	NA	NA	156
1955	2,252	2,045	130	NA	NA	207
1956	3,267	2,988	206	646	2,136	279
1957	4,389	3,932	262	662	3,007	457
1958	4,906	4,570	335	744	3,491	336
1959	7,123	6,694	466	874	5,353	429
1960	8,080	7,552	590	1,282	5,679	528
1961	9,607	9,059	815	1,663	6,581	548
1962	11,069	10,290	986	2,018	7,285	779
1963	13,663	12,495	1,152	2,356	8,987	1,168
1964	15,324	14,225	1,303	2,571	10,351	1,099
1965	15,746	14,614	1,435	2,812	10,367	1,132
1966	16,179	15,320	1,579	3,081	10,660	858
1967	17,149	16,529	1,846	2,786	11,898	620
1968	16,525	15,921	1,841	2,941	11,140	604
1969	16,310	15,641	1,945	2,700	10,996	669
1970	15,863	15,339	1,926	2,975	10,438	524
1971	16,154	15,543	1,980	3,143	10,419	611
1972	17,098	16,496	2,187	3,361	10,948	602
1973	17,574	16,800	2,232	3,349	11,219	774
1974	18,176	17,410	2,388	3,788	11,235	766
1975	19,860	19,039	2,588	4,141	12,309	821
1976	21,616	20,780	2,767	4,852	13,160	837
1977	24,818	23,450	3,259	5,255	14,936	1,367
1978	27,141	25,845	3,699	5,908	16,238	1,296
1979	29,621	28,145	4,193	6,342	17,610	1,475
1980	31,386	29,830	4,674	6,923	18,233	1,556
1981	34,590	33,104	5,041	7,171	20,891	1,486
1982	37,822	36,433	5,482	7,541	23,410	1,390
1983	40,009	38,712	6,260	7,993	24,458	1,297
1984	44,012	42,225	7,067	7,911	27,246	1,787
1985	50,180	48,360	7,819	8,315	32,226	1,821
1986	52,951	51,412	8,153	8,349	34,910	1,539
1987	57,100	55,254	8,942	8,998	37,313	1,846
1988	58,827	56,769	9,474	9,177	38,119	2,057
1989	63,572	61,406	10,602	10,164	40,641	2,165
1990	65,831	63,559	11,286	10,337	41,937	2,272
1991	64,148	61,295	12,171	11,798	37,327	2,853
1992	68,577	65,593	12,490	12,001	41,102	2,985
1993	70,415	67,314	13,399	13,491	40,424	3,101
1994	69,451	67,235	13,523	13,888	39,824	2,215
1995	70,443	68,187	13,877	14,557	39,752	2,256
1996	69,399	67,653	14,464	13,796	39,393	1,746
1997	71,753	69,827	14,942	14,423	40,461	1,927
1998	73,914	72,101	15,613	15,309	41,178	1,813
1999	77,386	75,341	17,444	16,084	41,813	2,046
2000	80,403	75,910	19,570	18,901	37,440	4,493

TABLE S4-2

Federal obligations for R&D and R&D plant, by type of work: FYs 1953–2018

(Millions of current and constant 2012 dollars)

Fiscal year	Total, R&D and R&D plant	R&D				R&D plant
		All R&D	Basic	Applied	Development	
2001	88,562	84,493	21,958	22,756	39,779	4,070
2002	98,013	93,709	23,668	24,338	45,702	4,305
2003	107,794	103,528	24,751	26,320	52,456	4,267
2004	116,069	112,074	26,121	27,237	58,717	3,994
2005	122,620	118,848	27,140	26,598	65,110	3,771
2006	123,855	121,730	26,585	26,951	68,194	2,125
2007	129,431	127,263	26,866	27,228	73,169	2,168
2008	129,050	127,106	27,154	26,740	73,212	1,944
2009 ^a	144,758	141,090	32,879	30,813	77,398	3,668
2010 ^a	146,968	140,355	31,795	31,933	76,627	6,613
2011	139,703	135,533	29,314	28,751	77,468	4,171
2012	140,670	138,525	30,959	31,027	76,538	2,146
2013	127,626	125,720	29,779	29,753	66,188	1,905
2014	132,779	130,561	31,588	31,604	67,370	2,218
2015	131,578	128,753	31,527	32,298	64,928	2,825
2016	118,274	115,833	32,293	34,812	48,728	2,441
2017	121,627	118,975	33,271	36,600	49,103	2,652
2018 preliminary	133,278	129,425	36,195	38,392	54,837	3,853
Constant 2012 \$millions						
1953	15,010	13,293	803	NA	NA	1,717
1954	13,128	12,059	794	NA	NA	1,069
1955	15,298	13,890	884	NA	NA	1,408
1956	21,635	19,789	1,367	4,275	14,147	1,846
1957	28,028	25,109	1,675	4,229	19,205	2,920
1958	30,415	28,331	2,074	4,614	21,642	2,085
1959	43,484	40,864	2,845	5,337	32,682	2,620
1960	48,645	45,465	3,554	7,719	34,192	3,180
1961	57,083	53,824	4,840	9,884	39,101	3,258
1962	65,112	60,529	5,802	11,873	42,854	4,583
1963	79,435	72,643	6,696	13,699	52,248	6,792
1964	87,967	81,661	7,480	14,761	59,420	6,306
1965	88,859	82,473	8,101	15,868	58,505	6,386
1966	89,385	84,643	8,725	17,022	58,896	4,742
1967	91,953	88,628	9,897	14,936	63,795	3,325
1968	85,622	82,493	9,537	15,236	57,721	3,129
1969	80,822	77,507	9,637	13,380	54,490	3,315
1970	74,616	72,149	9,059	13,993	49,098	2,467
1971	72,309	69,573	8,864	14,069	46,640	2,736
1972	73,068	70,495	9,346	14,362	46,787	2,573
1973	71,968	68,797	9,140	13,716	45,941	3,171
1974	69,482	66,552	9,127	14,478	42,947	2,929
1975	68,813	65,970	8,969	14,350	42,651	2,844
1976	70,024	67,313	8,965	15,717	42,631	2,710
1977	74,978	70,847	9,845	15,878	45,125	4,131
1978	76,821	73,154	10,469	16,723	45,962	3,667
1979	77,581	73,717	10,981	16,612	46,124	3,864
1980	75,611	71,863	11,260	16,678	43,924	3,748
1981	75,871	72,612	11,058	15,730	45,824	3,259
1982	77,568	74,718	11,242	15,465	48,011	2,850

TABLE S4-2

Federal obligations for R&D and R&D plant, by type of work: FYs 1953–2018

(Millions of current and constant 2012 dollars)

Fiscal year	Total, R&D and R&D plant	R&D				R&D plant
		All R&D	Basic	Applied	Development	
1983	78,619	76,069	12,301	15,707	48,061	2,550
1984	83,499	80,108	13,408	15,009	51,691	3,391
1985	92,125	88,782	14,354	15,265	59,163	3,343
1986	95,082	92,319	14,640	14,992	62,687	2,763
1987	100,280	97,038	15,705	15,803	65,531	3,242
1988	100,079	96,579	16,117	15,612	64,851	3,500
1989	103,943	100,403	17,335	16,618	66,450	3,540
1990	103,835	100,252	17,801	16,304	66,147	3,583
1991	97,697	93,352	18,536	17,968	56,849	4,345
1992	101,898	97,463	18,558	17,832	61,073	4,435
1993	102,228	97,727	19,453	19,587	58,687	4,502
1994	98,680	95,532	19,215	19,732	56,585	3,148
1995	98,001	94,862	19,306	20,252	55,304	3,139
1996	94,769	92,384	19,752	18,839	53,794	2,384
1997	96,275	93,689	20,048	19,352	54,289	2,585
1998	97,951	95,548	20,690	20,288	54,570	2,403
1999	101,251	98,575	22,823	21,044	54,708	2,677
2000	103,081	97,321	25,090	24,232	48,000	5,760
2001	110,925	105,827	27,503	28,502	49,823	5,097
2002	120,825	115,518	29,177	30,003	56,339	5,307
2003	130,501	125,336	29,965	31,865	63,506	5,165
2004	137,229	132,507	30,883	32,203	69,421	4,722
2005	140,683	136,357	31,139	30,516	74,702	4,327
2006	137,693	135,331	29,555	29,962	75,814	2,362
2007	140,077	137,730	29,076	29,467	79,188	2,347
2008	136,836	134,775	28,792	28,353	77,630	2,061
2009 ^a	151,738	147,893	34,465	32,298	81,130	3,845
2010 ^a	152,741	145,868	33,044	33,187	79,637	6,873
2011	142,351	138,101	29,869	29,296	78,936	4,250
2012	140,670	138,525	30,959	31,027	76,538	2,146
2013	125,320	123,449	29,241	29,216	64,992	1,871
2014	127,906	125,770	30,429	30,444	64,897	2,136
2015	125,229	122,540	30,006	30,740	61,795	2,689
2016	111,537	109,235	30,453	32,829	45,953	2,302
2017	112,659	110,203	30,818	33,901	45,483	2,456
2018 preliminary	120,832	117,339	32,815	34,807	49,716	3,493

NA = not available; data collected for this table were not recorded at that level in that particular fiscal year.

^a Includes obligations from the additional federal R&D funding authorized by the American Recovery and Reinvestment Act of 2009.**Note(s)**

Beginning in FY 2016 (and continuing in subsequent years), agency reports of obligations for R&D reflect the application of a definition for development that is narrowed to "experimental development." This revision was introduced to align federal R&D budget formulation to be consistent with the Office of Management and Budget's Circular A-11, Section 84. This change in definition applies to all agencies, but the predominant impact is that the Department of Defense's (DOD's) Operational Systems Development (Budget Activity 7) is no longer included as development. DOD Operational Systems Development was about \$24.6 billion in FY 2016, \$26.0 billion in FY 2017, and \$26.7 billion in FY 2018. Accordingly, the obligations data listed above for FYs 2016–18 are not directly comparable with those for FY 2015 and earlier years.

Source(s)

National Center for Science and Engineering Statistics, National Science Foundation, Survey of Federal Funds for Research and Development, FYs 2018–19 (Volume 68).

TABLE S4-3

Federal obligations for R&D and R&D plant, by agency, performer, and type of work: FY 2017

(Millions of dollars)

Agency	All federal obligations	Federal intramural ^a	Extramural performers								
			Business firms	United States and U.S. territories						State and local governments	Foreign
				Industry FFRDCs	Universities and colleges	University FFRDCs	Other nonprofits	Nonprofit FFRDCs			
Total R&D and R&D plant											
All agencies	121,626.6	31,819.7	38,209.2	4,158.1	29,313.2	5,030.9	8,298.4	3,460.7	553.4	782.9	
Department of Agriculture	2,575.2	1,685.1	31.2	0.0	824.1	0.0	23.5	0.0	8.6	2.7	
Department of Commerce	1,847.1	1,409.0	65.2	0.0	277.5	32.8	51.1	1.2	6.7	3.7	
Department of Defense	45,163.8	15,779.2	24,385.9	245.7	2,421.9	363.8	601.0	877.4	22.5	466.5	
Department of Education	261.8	10.6	6.7	0.0	181.3	0.0	63.3	0.0	0.0	0.0	
Department of Energy	13,583.9	1,223.4	2,829.1	3,179.1	1,158.7	2,632.4	184.2	2,343.3	32.4	1.5	
Department of Health and Human Services	33,901.8	7,201.1	1,739.1	665.6	18,433.4	21.3	5,370.7	33.9	200.3	236.3	
Department of Homeland Security	869.9	373.9	303.2	49.4	47.5	4.6	15.9	62.0	11.8	1.6	
Department of the Interior	868.1	766.8	15.0	0.0	52.8	0.4	4.1	0.0	28.2	0.8	
Department of Justice	126.9	11.4	8.0	0.0	63.8	0.0	33.4	0.0	10.3	0.0	
Department of Transportation	987.0	212.4	366.7	0.2	70.3	0.2	39.6	83.4	214.2	0.0	
Department of Veterans Affairs	682.3	682.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Agency for International Development	192.2	10.9	0.0	0.0	49.1	0.0	128.8	0.0	0.0	3.4	
Environmental Protection Agency	498.4	263.3	183.3	0.0	51.5	0.0	0.0	0.0	0.0	0.2	
National Aeronautics and Space Administration	12,638.1	1,784.6	7,701.5	1.8	927.3	1,755.7	376.2	33.5	7.6	49.9	
National Science Foundation	5,945.7	27.5	410.3	0.0	4,744.6	216.8	517.0	5.0	10.8	13.9	
Patient-Centered Outcomes Research Trust Fund	883.9	0.0	0.0	0.0	0.0	0.0	883.9	0.0	0.0	0.0	
Smithsonian Institution	240.5	240.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Social Security Administration	109.5	31.2	69.3	0.0	5.4	0.0	3.6	0.0	0.0	0.0	
All other agencies	250.4	106.4	94.9	16.4	4.3	2.9	2.1	21.1	-0.0	2.2	

TABLE S4-3

Federal obligations for R&D and R&D plant, by agency, performer, and type of work: FY 2017

(Millions of dollars)

Agency	All federal obligations	Federal intramural ^a	Extramural performers							
			Business firms	United States and U.S. territories					State and local governments	Foreign
				Industry FFRDCs	Universities and colleges	University FFRDCs	Other nonprofits	Nonprofit FFRDCs		
R&D										
All agencies	118,974.8	30,990.2	37,875.4	4,075.8	28,963.2	4,445.3	8,140.6	3,173.0	553.4	757.9
Department of Agriculture	2,418.5	1,528.5	31.2	0.0	823.9	0.0	23.5	0.0	8.6	2.7
Department of Commerce	1,612.5	1,174.4	65.2	0.0	277.5	32.8	51.1	1.2	6.7	3.7
Department of Defense	44,872.6	15,520.0	24,355.0	245.7	2,421.3	363.6	600.5	877.4	22.5	466.5
Department of Education	261.8	10.6	6.7	0.0	181.3	0.0	63.3	0.0	0.0	0.0
Department of Energy	12,308.4	1,221.2	2,588.9	3,096.7	1,058.7	2,059.6	184.2	2,065.3	32.4	1.5
Department of Health and Human Services	33,774.2	7,078.4	1,739.1	665.6	18,428.5	21.3	5,370.7	33.9	200.3	236.3
Department of Homeland Security	856.6	370.3	303.2	49.4	47.5	4.6	15.9	52.3	11.8	1.6
Department of the Interior	862.6	764.5	11.9	0.0	52.8	0.4	4.1	0.0	28.2	0.8
Department of Justice	126.9	11.4	8.0	0.0	63.8	0.0	33.4	0.0	10.3	0.0
Department of Transportation	948.6	211.8	329.1	0.2	70.3	0.2	39.4	83.4	214.2	0.0
Department of Veterans Affairs	682.3	682.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agency for International Development	192.2	10.9	0.0	0.0	49.1	0.0	128.8	0.0	0.0	3.4
Environmental Protection Agency	493.6	263.3	178.5	0.0	51.5	0.0	0.0	0.0	0.0	0.2
National Aeronautics and Space Administration	12,594.6	1,784.6	7,684.6	1.8	927.3	1,754.0	376.2	33.5	7.6	25.1
National Science Foundation	5,517.6	12.5	409.8	0.0	4,500.2	205.8	359.8	5.0	10.8	13.7
Patient-Centered Outcomes Research Trust Fund	883.9	0.0	0.0	0.0	0.0	0.0	883.9	0.0	0.0	0.0
Smithsonian Institution	207.9	207.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Social Security Administration	109.5	31.2	69.3	0.0	5.4	0.0	3.6	0.0	0.0	0.0
All other agencies	250.4	106.4	94.9	16.4	4.3	2.9	2.1	21.1	-0.0	2.2

TABLE S4-3

Federal obligations for R&D and R&D plant, by agency, performer, and type of work: FY 2017

(Millions of dollars)

Agency	All federal obligations	Federal intramural ^a	Extramural performers								
			Business firms	United States and U.S. territories						State and local governments	Foreign
				Industry FFRDCs	Universities and colleges	University FFRDCs	Other nonprofits	Nonprofit FFRDCs			
Basic research											
All agencies	33,271.5	6,116.1	2,692.3	600.3	15,847.1	3,078.3	3,359.1	1,315.2	66.3	196.6	
Department of Agriculture	965.2	650.4	2.4	0.0	300.6	0.0	8.4	0.0	2.2	1.3	
Department of Commerce	246.0	210.1	14.2	0.0	17.7	0.0	2.6	0.0	1.1	0.2	
Department of Defense	2,110.1	490.0	333.0	11.2	1,047.7	16.2	139.5	11.7	1.4	59.4	
Department of Education	32.7	1.4	0.3	0.0	22.9	0.0	8.1	0.0	0.0	0.0	
Department of Energy	4,500.3	256.5	267.8	249.0	668.1	1,755.4	30.4	1,266.9	5.0	1.2	
Department of Health and Human Services	16,700.1	3,510.9	788.6	339.5	9,200.6	10.9	2,681.3	12.0	45.1	111.3	
Department of Homeland Security	11.6	0.0	0.4	0.0	11.2	0.0	0.0	0.0	0.0	0.0	
Department of the Interior	54.3	51.2	0.1	0.0	2.3	0.0	0.2	0.0	0.6	0.0	
Department of Justice	2.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Department of Transportation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Department of Veterans Affairs	274.1	274.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Agency for International Development	0.8	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4	
Environmental Protection Agency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
National Aeronautics and Space Administration	3,425.8	450.0	1,041.8	0.6	608.8	1,090.0	205.1	18.3	1.8	9.5	
National Science Foundation	4,739.1	11.5	243.8	0.0	3,967.3	205.8	283.2	5.0	9.1	13.4	
Patient-Centered Outcomes Research Trust Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Smithsonian Institution	207.9	207.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Social Security Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
All other agencies	1.4	0.0	0.0	0.0	0.0	-0.0	0.0	1.4	-0.0	0.0	

TABLE S4-3

Federal obligations for R&D and R&D plant, by agency, performer, and type of work: FY 2017

(Millions of dollars)

Agency	All federal obligations	Federal intramural ^a	Extramural performers								
			Business firms	United States and U.S. territories						State and local governments	Foreign
				Industry FFRDCs	Universities and colleges	University FFRDCs	Other nonprofits	Nonprofit FFRDCs			
Applied research											
All agencies	36,599.8	9,788.6	6,270.9	2,959.3	11,779.0	422.8	4,217.0	599.8	386.8	175.6	
Department of Agriculture	1,251.1	698.4	28.8	0.0	502.4	0.0	13.9	0.0	6.4	1.2	
Department of Commerce	1,056.3	735.0	49.0	0.0	187.7	29.3	46.9	1.2	3.8	3.4	
Department of Defense	5,068.0	1,986.7	2,123.6	47.4	614.3	67.1	142.7	52.6	0.4	33.1	
Department of Education	141.4	5.9	2.6	0.0	107.4	0.0	25.6	0.0	0.0	0.0	
Department of Energy	5,084.2	675.8	874.4	2,559.4	214.3	175.9	86.1	486.7	11.4	0.2	
Department of Health and Human Services	16,977.3	3,542.5	946.6	326.2	9,184.8	10.5	2,674.4	21.9	149.7	120.7	
Department of Homeland Security	264.4	126.8	73.7	12.6	30.0	0.0	7.5	7.5	6.2	0.1	
Department of the Interior	667.5	591.6	10.0	0.0	38.7	0.4	3.3	0.0	23.5	0.0	
Department of Justice	84.6	4.0	4.5	0.0	43.0	0.0	29.8	0.0	3.4	0.0	
Department of Transportation	695.6	155.4	259.1	0.2	62.8	0.2	38.1	4.7	175.1	0.0	
Department of Veterans Affairs	394.7	394.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Agency for International Development	191.5	10.9	0.0	0.0	49.1	0.0	128.5	0.0	0.0	3.0	
Environmental Protection Agency	417.5	222.9	142.8	0.0	51.5	0.0	0.0	0.0	0.0	0.2	
National Aeronautics and Space Administration	2,319.5	524.0	1,431.4	0.5	150.7	136.5	54.5	5.5	5.1	11.2	
National Science Foundation	778.6	1.0	166.0	0.0	532.9	0.0	76.6	0.0	1.7	0.3	
Patient-Centered Outcomes Research Trust Fund	883.9	0.0	0.0	0.0	0.0	0.0	883.9	0.0	0.0	0.0	
Smithsonian Institution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Social Security Administration	109.5	31.2	69.3	0.0	5.4	0.0	3.6	0.0	0.0	0.0	
All other agencies	214.3	81.8	89.2	13.0	4.0	2.9	1.6	19.7	0.0	2.2	

TABLE S4-3

Federal obligations for R&D and R&D plant, by agency, performer, and type of work: FY 2017

(Millions of dollars)

Agency	All federal obligations	Federal intramural ^a	Extramural performers								
			Business firms	United States and U.S. territories						State and local governments	Foreign
				Industry FFRDCs	Universities and colleges	University FFRDCs	Other nonprofits	Nonprofit FFRDCs			
Development											
All agencies	49,103.5	15,085.5	28,912.2	516.2	1,337.1	944.1	564.4	1,258.0	100.3	385.6	
Department of Agriculture	202.1	179.7	0.0	0.0	20.9	0.0	1.2	0.0	0.0	0.2	
Department of Commerce	310.2	229.2	2.0	0.0	72.0	3.6	1.6	0.0	1.7	0.0	
Department of Defense	37,694.6	13,043.4	21,898.5	187.1	759.3	280.3	318.3	813.0	20.7	374.0	
Department of Education	87.8	3.2	3.9	0.0	51.0	0.0	29.6	0.0	0.0	0.0	
Department of Energy	2,723.9	288.9	1,446.7	288.4	176.3	128.2	67.6	311.7	16.0	0.1	
Department of Health and Human Services	96.8	25.0	3.9	0.0	43.0	0.0	15.0	0.0	5.5	4.4	
Department of Homeland Security	580.6	243.5	229.1	36.7	6.3	4.6	8.3	44.8	5.6	1.5	
Department of the Interior	140.7	121.7	1.7	0.0	11.8	0.0	0.6	0.0	4.1	0.8	
Department of Justice	40.2	5.3	3.5	0.0	20.8	0.0	3.6	0.0	6.9	0.0	
Department of Transportation	253.0	56.4	70.1	0.0	7.4	0.0	1.3	78.7	39.1	0.0	
Department of Veterans Affairs	13.5	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Agency for International Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Environmental Protection Agency	76.2	40.4	35.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
National Aeronautics and Space Administration	6,849.4	810.6	5,211.4	0.6	167.8	527.5	116.6	9.7	0.7	4.5	
National Science Foundation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Patient-Centered Outcomes Research Trust Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Smithsonian Institution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Social Security Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
All other agencies	34.6	24.6	5.7	3.4	0.3	0.0	0.5	0.0	0.0	-0.0	

FFRDC = federally funded research and development center.

^a Includes costs associated with administration of intramural and extramural programs by federal personnel and actual intramural performance.

Note(s)

Detail may not add to total because of rounding. Agencies included have total annual R&D obligations of \$100 million or more. All other agencies include Department of Housing and Urban Development, Department of Labor, Department of State, Department of the Treasury, Appalachian Regional Commission, Consumer Product Safety Commission, Federal Communications Commission, Federal Trade Commission, Library of Congress, National Archives and Records Administration, Nuclear Regulatory Commission, Tennessee Valley Authority, and U.S. Postal Service.

Source(s)

National Center for Science and Engineering Statistics, National Science Foundation, Survey of Federal Funds for Research and Development, FYs 2018–19 (Volume 68).

Science and Engineering Indicators

TABLE S4-4

Federal obligations for research, by agency and S&E field: FY 2017

(Millions of dollars and percent share)

Agency	All federal obligations	Computer sciences and mathematics	Environmental sciences	Life sciences	Physical sciences	Psychology	Social sciences	Other sciences nec	Engineering
\$millions									
All agencies	69,871	3,894	4,470	34,090	6,581	2,081	1,027	4,521	13,207
Departments									
Department of Agriculture	2,216	8	19	1,828	87	0	209	0	66
Department of Commerce	1,302	157	437	84	243	0	53	59	269
Department of Defense	7,178	1,188	216	566	700	98	36	1,566	2,808
Department of Education	174	0	0	0	0	0	12	162	0
Department of Energy	9,584	1,119	336	387	2,764	0	0	494	4,484
Department of Health and Human Services	33,677	186	494	28,108	106	1,825	171	1,116	1,673
Department of Homeland Security	276	2	12	4	5	0	7	187	60
Department of Housing and Urban Development	41	0	0	0	0	0	38	2	1
Department of the Interior	722	2	335	237	104	0	24	1	19
Department of Justice	87	1	0	1	1	4	79	0	1
Department of Labor	5	0	0	0	0	0	5	0	0
Department of State	2	0	0	0	0	0	2	0	0
Department of Transportation	696	38	37	9	5	22	18	72	495
Department of the Treasury	1	0	0	0	0	0	0	0	1
Department of Veterans Affairs	669	0	0	561	0	77	0	0	31
Other agencies									
Administrative Office of the U.S. Courts	8	8	0	0	0	0	0	0	0
Agency for International Development	192	0	1	172	0	0	19	0	0
Appalachian Regional Commission	0	0	0	0	0	0	0	0	0
Consumer Product Safety Commission	2	0	2	0	0	0	0	0	0
Environmental Protection Agency	417	9	172	165	10	0	2	0	59

TABLE S4-4

Federal obligations for research, by agency and S&E field: FY 2017

(Millions of dollars and percent share)

Agency	All federal obligations	Computer sciences and mathematics	Environmental sciences	Life sciences	Physical sciences	Psychology	Social sciences	Other sciences nec	Engineering
Federal Communications Commission	6	0	0	0	1	0	4	0	1
Federal Trade Commission	6	0	0	0	0	0	6	0	0
Library of Congress	1	0	0	0	1	0	0	0	0
National Aeronautics and Space Administration	5,745	98	1,330	327	1,574	21	1	292	2,102
National Archives and Records Administration	1	1	0	0	0	0	0	0	0
National Science Foundation	5,518	1,078	1,072	664	922	33	186	568	995
Nuclear Regulatory Commission	67	0	0	0	0	0	0	1	66
Patient-Centered Outcomes Research Trust Fund	884	0	0	884	0	0	0	0	0
Smithsonian Institution	208	0	9	93	60	1	45	0	0
Social Security Administration	110	0	0	0	0	0	110	0	0
Tennessee Valley Authority	3	0	0	0	0	0	0	0	3
U.S. Postal Service	73	0	0	0	0	0	0	0	73
Share by field (%)									
All agencies	100.0	5.6	6.4	48.8	9.4	3.0	1.5	6.5	18.9
Departments									
Department of Agriculture	100.0	0.4	0.9	82.5	3.9	0.0	9.4	0.0	3.0
Department of Commerce	100.0	12.1	33.5	6.5	18.7	0.0	4.1	4.5	20.7
Department of Defense	100.0	16.5	3.0	7.9	9.8	1.4	0.5	21.8	39.1
Department of Education	100.0	0.0	0.0	0.0	0.0	0.0	6.9	93.1	0.0
Department of Energy	100.0	11.7	3.5	4.0	28.8	0.0	0.0	5.2	46.8
Department of Health and Human Services	100.0	0.6	1.5	83.5	0.3	5.4	0.5	3.3	5.0
Department of Homeland Security	100.0	0.7	4.2	1.4	1.8	0.1	2.6	67.7	21.6
Department of Housing and Urban Development	100.0	0.0	0.0	0.0	0.0	0.0	93.5	4.8	1.7

TABLE S4-4

Federal obligations for research, by agency and S&E field: FY 2017

(Millions of dollars and percent share)

Agency	All federal obligations	Computer sciences and mathematics	Environmental sciences	Life sciences	Physical sciences	Psychology	Social sciences	Other sciences nec	Engineering
Department of the Interior	100.0	0.3	46.4	32.9	14.4	0.0	3.3	0.1	2.7
Department of Justice	100.0	1.2	0.0	1.2	0.8	4.2	91.3	0.3	0.9
Department of Labor	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Department of State	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Department of Transportation	100.0	5.4	5.3	1.3	0.7	3.1	2.6	10.4	71.1
Department of the Treasury	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Department of Veterans Affairs	100.0	0.0	0.0	83.9	0.0	11.5	0.0	0.0	4.6
Other agencies									
Administrative Office of the U.S. Courts	100.0	100	0	0	0	0	0	0	0
Agency for International Development	100.0	0.0	0.4	89.7	0.0	0.0	10.0	0.0	0.0
Appalachian Regional Commission	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Consumer Product Safety Commission	100.0	0.0	80.0	0.0	20.0	0.0	0.0	0.0	0.0
Environmental Protection Agency	100.0	2.1	41.2	39.5	2.4	0.0	0.6	0.0	14.2
Federal Communications Commission	100.0	2.9	0.0	0.0	12.2	0.0	65.3	0.0	19.5
Federal Trade Commission	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Library of Congress	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
National Aeronautics and Space Administration	100.0	1.7	23.2	5.7	27.4	0.4	0.0	5.1	36.6
National Archives and Records Administration	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
National Science Foundation	100.0	19.5	19.4	12.0	16.7	0.6	3.4	10.3	18.0
Nuclear Regulatory Commission	100.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	97.9
Patient-Centered Outcomes Research Trust Fund	100.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Smithsonian Institution	100.0	0.0	4.5	44.6	28.7	0.7	21.4	0.0	0.0

TABLE S4-4

Federal obligations for research, by agency and S&E field: FY 2017

(Millions of dollars and percent share)

Agency	All federal obligations	Computer sciences and mathematics	Environmental sciences	Life sciences	Physical sciences	Psychology	Social sciences	Other sciences nec	Engineering
Social Security Administration	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Tennessee Valley Authority	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
U.S. Postal Service	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

nec = not elsewhere classified.

Note(s)

Research includes basic research and applied research.

Source(s)

National Center for Science and Engineering Statistics, National Science Foundation, Survey of Federal Funds for Research and Development, FYs 2018–19 (Volume 68).

Science and Engineering Indicators

TABLE S4-5

Federal obligations for research, by detailed S&E field: Selected years, FYs 1990–2018

(Millions of current and constant 2012 dollars, percent share by field, and annual growth rates)

S&E field	1990	1995	2000	2005	2010	2015	2016	2017	2018	Average annual growth rate		
										1990–2000	2000–10	2010–17
	Current \$millions									Percent		
Total, all fields	21,622.4	28,434.4	38,470.6	53,738.2	63,728.0	63,825.4	67,104.6	69,871.3	74,587.6	5.9	5.2	1.3
Computer sciences and mathematics	840.7	1,579.1	2,205.6	2,983.4	3,411.8	3,862.7	4,222.8	3,894.2	4,206.9	10.1	4.5	1.9
Computer sciences	562.1	1,013.9	1,659.6	2,157.1	2,362.0	2,645.6	2,815.4	2,734.7	NA	-	-	-
Mathematics	241.3	258.6	432.9	686.6	835.5	1,005.9	1,160.0	941.7	NA	-	-	-
Other computer sciences and mathematics	37.3	306.6	113.1	139.7	214.4	211.2	247.3	217.8	NA	-	-	-
Environmental sciences	2,174.1	2,854.4	3,328.8	3,502.6	3,338.9	4,413.7	4,450.4	4,469.6	4,567.6	4.4	0.0	4.3
Atmospheric sciences	773.4	1,135.6	1,104.3	1,185.1	953.8	1,567.9	1,597.0	1,651.3	NA	-	-	-
Geological sciences	661.1	848.3	639.2	673.5	530.4	643.3	562.4	580.3	NA	-	-	-
Oceanography	520.1	407.3	673.0	771.5	743.7	726.0	773.0	774.3	NA	-	-	-
Other environmental sciences	219.5	463.3	912.2	872.5	1,111.0	1,476.5	1,518.0	1,463.8	NA	-	-	-
Life sciences	8,829.8	11,811.0	17,964.7	28,127.8	33,909.1	30,625.1	32,045.4	34,089.6	36,994.4	7.4	6.6	0.1
Biological and agricultural	5,178.4	na	na	na	na	na	na	na	na	-	-	-
Agricultural sciences	691.4	670.3	895.0	1,094.2	1,131.9	1,320.3	1,283.1	1,353.4	NA	-	-	-
Biological sciences (excluding environmental biology)	4,144.6	4,925.4	10,740.0	13,351.6	17,213.9	14,839.7	15,922.6	16,555.7	NA	-	-	-
Environmental biology	342.3	806.9	740.0	699.0	816.4	819.1	788.1	783.4	NA	-	-	-
Medical sciences	3,382.4	4,972.2	4,463.8	10,862.1	11,677.0	11,086.8	11,358.6	12,648.7	NA	-	-	-
Clinical medical	na	na	na	na	na	na	na	na	na	-	-	-
Other medical	na	na	na	na	na	na	na	na	na	-	-	-
Other life sciences	269.1	436.3	1,125.9	2,120.9	3,070.0	2,559.2	2,693.0	2,748.4	NA	-	-	-
Physical sciences	3,808.7	4,278.3	4,788.0	5,493.7	5,870.8	6,510.3	6,705.6	6,581.5	7,881.4	2.3	2.1	1.6
Astronomy	597.2	764.5	880.3	884.9	559.9	1,230.2	1,246.7	1,292.4	NA	-	-	-
Chemistry	761.7	863.5	1,225.6	1,197.5	1,310.6	967.7	998.9	969.2	NA	-	-	-
Physics	2,254.9	2,451.2	2,405.4	3,041.3	3,470.1	3,040.2	3,731.9	3,675.9	NA	-	-	-
Other physical sciences	195.0	199.2	276.7	370.0	530.2	1,272.2	728.1	643.9	NA	-	-	-
Psychology	448.6	622.6	1,626.7	1,891.8	2,155.6	1,994.9	2,021.4	2,081.2	2,326.9	13.7	2.9	-0.5
Biological aspects	130.6	58.8	8.2	2.3	13.6	19.1	19.8	10.4	NA	-	-	-
Social aspects	177.5	156.3	56.0	46.6	74.5	58.5	56.0	56.4	NA	-	-	-
Other psychological sciences	140.5	407.5	1,562.5	1,842.8	2,067.4	1,917.2	1,945.6	2,014.4	NA	-	-	-
Social sciences	630.0	678.7	1,050.4	1,097.1	1,197.3	1,136.3	1,226.7	1,027.2	1,039.4	5.2	1.3	-2.2
Anthropology	14.4	21.7	15.9	18.0	24.7	29.9	31.5	32.1	NA	-	-	-
Economics	197.2	206.5	249.5	215.9	274.0	336.8	370.9	294.1	NA	-	-	-
Political science	13.1	22.3	22.6	32.7	14.2	16.0	14.6	17.6	NA	-	-	-
Sociology	116.2	47.8	90.6	70.2	132.3	128.2	197.4	178.0	NA	-	-	-
Other social sciences	289.1	380.3	671.8	760.4	752.0	625.3	612.2	505.4	NA	-	-	-
History	na	na	na	na	na	na	na	na	na	-	-	-

TABLE S4-5

Federal obligations for research, by detailed S&E field: Selected years, FYs 1990–2018

(Millions of current and constant 2012 dollars, percent share by field, and annual growth rates)

S&E field	1990	1995	2000	2005	2010	2015	2016	2017	2018	Average annual growth rate		
										1990–2000	2000–10	2010–17
Linguistics	na	na	na	na	na	na	na	na	na	-	-	-
Other social sciences	na	na	na	na	na	na	na	na	na	-	-	-
Other sciences nec	663.7	901.8	1,160.2	2,088.9	2,763.2	3,298.8	3,460.8	4,520.6	3,812.4	5.7	9.1	7.3
Engineering	4,226.6	5,708.4	6,346.4	8,552.9	11,081.2	11,983.6	12,971.5	13,207.4	13,758.6	4.1	5.7	2.5
Aeronautical engineering	927.1	1,248.3	1,463.9	1,276.3	830.1	1,825.1	1,836.1	1,892.1	NA	-	-	-
Astronautical engineering	580.8	546.5	515.0	494.1	389.9	660.6	650.7	651.4	NA	-	-	-
Chemical engineering	241.9	246.1	196.5	283.8	509.7	374.6	373.0	302.3	NA	-	-	-
Civil engineering	317.7	339.4	239.2	279.2	699.8	457.6	461.9	605.9	NA	-	-	-
Electrical engineering	640.0	756.3	744.8	1,033.5	1,360.9	897.3	1,062.9	1,102.7	NA	-	-	-
Mechanical engineering	268.3	412.5	289.3	323.7	363.6	323.6	374.2	449.8	NA	-	-	-
Metallurgy and materials engineering	554.5	815.3	918.1	1,184.1	1,758.8	1,756.9	1,975.4	1,941.1	NA	-	-	-
Other engineering	696.3	1,344.0	1,979.6	3,678.3	5,168.4	5,688.0	6,237.3	6,262.1	NA	-	-	-
	Constant 2012 \$millions									Percent		
Total, all fields	34,104.7	39,558.2	49,321.3	61,654.7	66,231.6	60,745.6	63,282.3	64,719.6	67,622.5	3.8	3.0	-0.3
Computer sciences and mathematics	1,326.1	2,196.9	2,827.7	3,422.9	3,545.8	3,676.3	3,982.3	3,607.1	3,814.1	7.9	2.3	0.2
Computer sciences	886.6	1,410.5	2,127.7	2,474.9	2,454.8	2,517.9	2,655.0	2,533.1	NA	-	-	-
Mathematics	380.7	359.8	555.0	787.7	868.3	957.4	1,093.9	872.3	NA	-	-	-
Other computer sciences and mathematics	58.8	426.5	145.0	160.3	222.8	201.0	233.2	201.7	NA	-	-	-
Environmental sciences	3,429.2	3,971.1	4,267.7	4,018.6	3,470.1	4,200.7	4,196.9	4,140.1	4,141.1	2.2	-2.0	2.6
Atmospheric sciences	1,219.9	1,579.9	1,415.8	1,359.7	991.3	1,492.2	1,506.0	1,529.5	NA	-	-	-
Geological sciences	1,042.8	1,180.2	819.5	772.7	551.2	612.3	530.4	537.5	NA	-	-	-
Oceanography	820.4	566.6	862.8	885.2	772.9	691.0	729.0	717.2	NA	-	-	-
Other environmental sciences	346.1	644.5	1,169.5	1,001.0	1,154.6	1,405.3	1,431.5	1,355.9	NA	-	-	-
Life sciences	13,927.2	16,431.6	23,031.7	32,271.5	35,241.2	29,147.3	30,220.1	31,576.1	33,539.8	5.2	4.3	-1.6
Biological and agricultural	8,167.8	na	na	na	na	na	na	na	na	-	-	-
Agricultural sciences	1,090.6	932.5	1,147.4	1,255.4	1,176.4	1,256.6	1,210.0	1,253.6	NA	-	-	-
Biological sciences (excluding environmental biology)	6,537.3	6,852.3	13,769.2	15,318.5	17,890.1	14,123.6	15,015.7	15,335.0	NA	-	-	-
Environmental biology	540.0	1,122.6	948.7	802.0	848.5	779.6	743.2	725.6	NA	-	-	-
Medical sciences	5,334.9	6,917.4	5,722.8	12,462.3	12,135.7	10,551.8	10,711.6	11,716.1	NA	-	-	-
Clinical medical	na	na	na	na	na	na	na	na	na	-	-	-
Other medical	na	na	na	na	na	na	na	na	na	-	-	-
Other life sciences	424.5	607.0	1,443.5	2,433.3	3,190.6	2,435.7	2,539.6	2,545.8	NA	-	-	-

TABLE S4-5

Federal obligations for research, by detailed S&E field: Selected years, FYs 1990–2018

(Millions of current and constant 2012 dollars, percent share by field, and annual growth rates)

S&E field	1990	1995	2000	2005	2010	2015	2016	2017	2018	Average annual growth rate		
										1990–2000	2000–10	2010–17
Physical sciences	6,007.4	5,952.0	6,138.5	6,303.0	6,101.4	6,196.2	6,323.7	6,096.2	7,145.4	0.2	-0.1	-0.0
Astronomy	941.9	1,063.6	1,128.6	1,015.3	581.9	1,170.8	1,175.7	1,197.1	NA	-	-	-
Chemistry	1,201.4	1,201.3	1,571.3	1,373.9	1,362.1	921.0	942.0	897.7	NA	-	-	-
Physics	3,556.7	3,410.1	3,083.8	3,489.3	3,606.4	2,893.5	3,519.3	3,404.9	NA	-	-	-
Other physical sciences	307.5	277.1	354.7	424.5	551.0	1,210.8	686.6	596.4	NA	-	-	-
Psychology	707.6	866.2	2,085.5	2,170.5	2,240.3	1,898.6	1,906.3	1,927.8	2,109.6	11.4	0.7	-2.1
Biological aspects	206.1	81.8	10.5	2.6	14.1	18.2	18.7	9.6	NA	-	-	-
Social aspects	279.9	217.4	71.8	53.5	77.4	55.7	52.8	52.2	NA	-	-	-
Other psychological sciences	221.6	566.9	2,003.2	2,114.3	2,148.6	1,824.7	1,834.8	1,865.9	NA	-	-	-
Social sciences	993.7	944.2	1,346.7	1,258.7	1,244.3	1,081.5	1,156.8	951.5	942.3	3.1	-0.8	-3.8
Anthropology	22.7	30.2	20.4	20.7	25.7	28.5	29.7	29.7	NA	-	-	-
Economics	311.0	287.3	319.9	247.7	284.8	320.5	349.8	272.4	NA	-	-	-
Political science	20.7	31.0	29.0	37.5	14.8	15.2	13.8	16.3	NA	-	-	-
Sociology	183.2	66.5	116.2	80.5	137.5	122.0	186.2	164.9	NA	-	-	-
Other social sciences	456.1	529.1	861.3	872.4	781.5	595.1	577.3	468.1	NA	-	-	-
History	na	na	na	na	na	na	na	na	na	-	-	-
Linguistics	na	na	na	na	na	na	na	na	na	-	-	-
Other social sciences	na	na	na	na	na	na	na	na	na	-	-	-
Other sciences nec	1,046.9	1,254.6	1,487.4	2,396.6	2,871.8	3,139.6	3,263.7	4,187.3	3,456.4	3.6	6.8	5.5
Engineering	6,666.6	7,941.6	8,136.4	9,812.9	11,516.5	11,405.3	12,232.6	12,233.6	12,473.8	2.0	3.5	0.9
Aeronautical engineering	1,462.3	1,736.6	1,876.8	1,464.3	862.7	1,737.0	1,731.5	1,752.6	NA	-	-	-
Astronautical engineering	916.1	760.3	660.3	566.9	405.2	628.7	613.6	603.4	NA	-	-	-
Chemical engineering	381.5	342.4	251.9	325.6	529.7	356.5	351.8	280.0	NA	-	-	-
Civil engineering	501.1	472.2	306.7	320.3	727.3	435.5	435.6	561.2	NA	-	-	-
Electrical engineering	1,009.5	1,052.2	954.9	1,185.8	1,414.4	854.0	1,002.4	1,021.4	NA	-	-	-
Mechanical engineering	423.2	573.9	370.9	371.4	377.9	308.0	352.9	416.6	NA	-	-	-
Metallurgy and materials engineering	874.6	1,134.3	1,177.1	1,358.5	1,827.9	1,672.1	1,862.9	1,798.0	NA	-	-	-
Other engineering	1,098.3	1,869.8	2,537.9	4,220.2	5,371.4	5,413.5	5,882.0	5,800.4	NA	-	-	-
Share by field (%)										Percent		
Total, all fields	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-	-
Computer sciences and mathematics	3.9	5.6	5.7	5.6	5.4	6.1	6.3	5.6	5.6	-	-	-
Computer sciences	2.6	3.6	4.3	4.0	3.7	4.1	4.2	3.9	NA	-	-	-
Mathematics	1.1	0.9	1.1	1.3	1.3	1.6	1.7	1.3	NA	-	-	-
Other computer sciences and mathematics	0.2	1.1	0.3	0.3	0.3	0.3	0.4	0.3	NA	-	-	-
Environmental sciences	10.1	10.0	8.7	6.5	5.2	6.9	6.6	6.4	6.1	-	-	-
Atmospheric sciences	3.6	4.0	2.9	2.2	1.5	2.5	2.4	2.4	NA	-	-	-

TABLE S4-5

Federal obligations for research, by detailed S&E field: Selected years, FYs 1990–2018

(Millions of current and constant 2012 dollars, percent share by field, and annual growth rates)

S&E field	1990	1995	2000	2005	2010	2015	2016	2017	2018	Average annual growth rate		
										1990–2000	2000–10	2010–17
Geological sciences	3.1	3.0	1.7	1.3	0.8	1.0	0.8	0.8	NA	-	-	-
Oceanography	2.4	1.4	1.7	1.4	1.2	1.1	1.2	1.1	NA	-	-	-
Other environmental sciences	1.0	1.6	2.4	1.6	1.7	2.3	2.3	2.1	NA	-	-	-
Life sciences	40.8	41.5	46.7	52.3	53.2	48.0	47.8	48.8	49.6	-	-	-
Biological and agricultural	23.9	na	na	na	na	na	na	na	na	-	-	-
Agricultural sciences	3.2	2.4	2.3	2.0	1.8	2.1	1.9	1.9	NA	-	-	-
Biological sciences (excluding environmental biology)	19.2	17.3	27.9	24.8	27.0	23.3	23.7	23.7	NA	-	-	-
Environmental biology	1.6	2.8	1.9	1.3	1.3	1.3	1.2	1.1	NA	-	-	-
Medical sciences	15.6	17.5	11.6	20.2	18.3	17.4	16.9	18.1	NA	-	-	-
Clinical medical	na	na	na	na	na	na	na	na	na	-	-	-
Other medical	na	na	na	na	na	na	na	na	na	-	-	-
Other life sciences	1.2	1.5	2.9	3.9	4.8	4.0	4.0	3.9	NA	-	-	-
Physical sciences	17.6	15.0	12.4	10.2	9.2	10.2	10.0	9.4	10.6	-	-	-
Astronomy	2.8	2.7	2.3	1.6	0.9	1.9	1.9	1.8	NA	-	-	-
Chemistry	3.5	3.0	3.2	2.2	2.1	1.5	1.5	1.4	NA	-	-	-
Physics	10.4	8.6	6.3	5.7	5.4	4.8	5.6	5.3	NA	-	-	-
Other physical sciences	0.9	0.7	0.7	0.7	0.8	2.0	1.1	0.9	NA	-	-	-
Psychology	2.1	2.2	4.2	3.5	3.4	3.1	3.0	3.0	3.1	-	-	-
Biological aspects	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	NA	-	-	-
Social aspects	0.8	0.5	0.1	0.1	0.1	0.1	0.1	0.1	NA	-	-	-
Other psychological sciences	0.6	1.4	4.1	3.4	3.2	3.0	2.9	2.9	NA	-	-	-
Social sciences	2.9	2.4	2.7	2.0	1.9	1.8	1.8	1.5	1.4	-	-	-
Anthropology	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	NA	-	-	-
Economics	0.9	0.7	0.6	0.4	0.4	0.5	0.6	0.4	NA	-	-	-
Political science	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	NA	-	-	-
Sociology	0.5	0.2	0.2	0.1	0.2	0.2	0.3	0.3	NA	-	-	-
Other social sciences	1.3	1.3	1.7	1.4	1.2	1.0	0.9	0.7	NA	-	-	-
History	na	na	na	na	na	na	na	na	na	-	-	-
Linguistics	na	na	na	na	na	na	na	na	na	-	-	-
Other social sciences	na	na	na	na	na	na	na	na	na	-	-	-
Other sciences nec	3.1	3.2	3.0	3.9	4.3	5.2	5.2	6.5	5.1	-	-	-
Engineering	19.5	20.1	16.5	15.9	17.4	18.8	19.3	18.9	18.4	-	-	-
Aeronautical engineering	4.3	4.4	3.8	2.4	1.3	2.9	2.7	2.7	NA	-	-	-
Astronautical engineering	2.7	1.9	1.3	0.9	0.6	1.0	1.0	0.9	NA	-	-	-
Chemical engineering	1.1	0.9	0.5	0.5	0.8	0.6	0.6	0.4	NA	-	-	-
Civil engineering	1.5	1.2	0.6	0.5	1.1	0.7	0.7	0.9	NA	-	-	-
Electrical engineering	3.0	2.7	1.9	1.9	2.1	1.4	1.6	1.6	NA	-	-	-

TABLE S4-5

Federal obligations for research, by detailed S&E field: Selected years, FYs 1990–2018

(Millions of current and constant 2012 dollars, percent share by field, and annual growth rates)

S&E field	1990	1995	2000	2005	2010	2015	2016	2017	2018	Average annual growth rate		
										1990–2000	2000–10	2010–17
Mechanical engineering	1.2	1.5	0.8	0.6	0.6	0.5	0.6	0.6	NA	-	-	-
Metallurgy and materials engineering	2.6	2.9	2.4	2.2	2.8	2.8	2.9	2.8	NA	-	-	-
Other engineering	3.2	4.7	5.1	6.8	8.1	8.9	9.3	9.0	NA	-	-	-

na = not applicable; data collected for this table were not recorded at that level in that particular fiscal year, or the agency or subagency did not exist as such or in that organization in that year. NA = not available.

nec = not elsewhere classified.

Note(s)

Detail may not add to total because of rounding.

Source(s)

National Center for Science and Engineering Statistics, National Science Foundation, Survey of Federal Funds for Research and Development, FYs 2018–19 (Volume 68).

Science and Engineering Indicators