Section 16

Science and Technology

This section presents statistics on scientific, engineering, and technological resources, with emphasis on patterns of research and development (R&D) funding and on scientific, engineering, and technical personnel; education; and employment. Also included are statistics on space program outlays and accomplishments. Principal sources of these data are the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA).

NSF gathers data chiefly through recurring surveys. Current NSF publications containing data on funds for research and development and on scientific and engineering personnel include detailed statistical tables; issue briefs; and annual, biennial, triennial, and special reports. Titles or the areas of coverage of these reports include the following: *Science and Engineering Indicators; National Patterns of R&D Resources; Women, Minorities, and Persons with Disabilities in Science and Engineering*—science and technology data presented in chart and tabular form in a pocket-sized publication—*Federal Funds for Research and Development; Federal R&D Funding by Budget Function; Federal Support to Universities, Colleges, and Selected Nonprofit Institutions; Research and Development in Industry;* R&D expenditures and graduate enrollment and support in academic science and engineering; and characteristics of doctoral scientists and engineers and of recent graduates in the United States. Statistical surveys in these areas pose problems of concept and definition and the data should therefore be regarded as broad estimates rather than precise, quantitative statements. See sources for methodological and technical details.

The National Science Board's biennial *Science and Engineering Indicators* contains data and analysis of international and domestic science and technology, including measures of inputs and outputs.

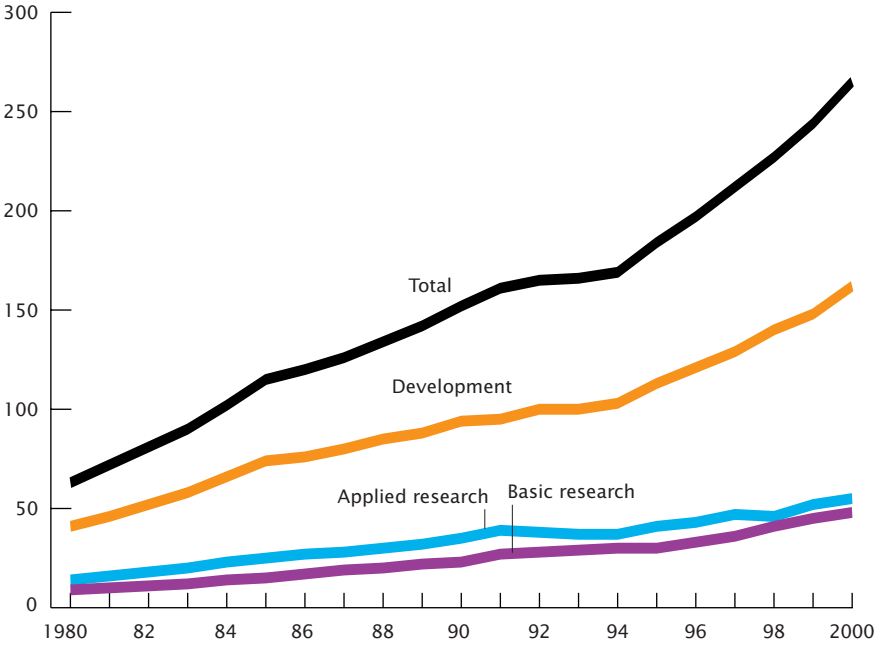
The *Budget of the United States Government,* published by the U.S. Office of Management and Budget, contains summary financial data on federal R&D programs.

Research and development outlays— NSF defines research as "systematic study directed toward fuller scientific knowledge of the subject studied" and development as "the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes." National coverage of R&D expenditures is developed primarily from periodic surveys in four principal economic sectors: (1) *Government,* made up primarily of federal executive agencies; (2) *industry,* consisting of manufacturing and nonmanufacturing firms and the federally funded research and development centers (FFRDCs) they administer; (3) *universities and colleges,* composed of universities, colleges, and their affiliated institutions, agricultural experiment stations, and associated schools of agriculture and of medicine, and FFRDCs administered by educational institutions; and (4) *other nonprofit institutions,* consisting of such organizations as private philanthropic foundations, nonprofit research institutes, voluntary health agencies, and FFRDCs administered by nonprofit organizations. The R&D funds reported consist of current operating costs, including planning and administration costs, except as otherwise noted. They exclude funds for routine testing, mapping and surveying, collection of general-purpose data, dissemination of scientific information, and training of scientific personnel.

Scientists, engineers, and technicians—Scientists and engineers are defined as persons engaged in scientific and engineering work at a level requiring a knowledge of sciences equivalent at least to that acquired through completion of a 4-year college course. Technicians are defined as persons engaged in technical

work at a level requiring knowledge acquired through a technical institute, junior college, or other type of training less extensive than 4-year college training. Craftsmen and skilled workers are excluded.

Figure 16.1
Research and Development Expenditures: 1980 to 2000
Billions



U.S. Census Bureau, Statistical Abstract of the United States: 2001

No. 767. R&D Expenditures: 1960 to 2000

[**In millions of dollars (13,711 represents $13,711,000,000) except as indicated.** For calendar years]

Year	Sources of funds						Objective (percent of total)			Character of work		
	Total	Federal government	Industry	Universities/ colleges	Nonprofit	Nonfederal government [1]	Defense related [2]	Space related [3]	Other	Basic research	Applied research	Development
1960	13,711	8,915	4,516	67	123	90	53	3	44	1,286	3,065	9,360
1961	14,564	9,484	4,757	75	148	101	50	6	44	1,512	3,123	9,930
1962	15,636	10,138	5,124	84	179	112	49	7	45	1,824	3,698	10,116
1963	17,519	11,645	5,456	96	197	125	42	14	43	2,115	3,865	11,540
1964	19,103	12,764	5,888	114	200	138	37	19	43	2,396	4,201	12,506
1965	20,252	13,194	6,549	136	225	150	33	21	45	2,664	4,374	13,215
1966	22,072	14,165	7,331	165	252	160	32	20	47	2,930	4,653	14,490
1967	23,346	14,563	8,146	200	271	168	35	14	49	3,168	4,848	15,332
1968	24,666	14,964	9,008	221	290	185	35	14	52	3,376	5,137	16,154
1969	25,996	15,228	10,011	233	316	208	35	11	54	3,491	5,454	17,051
1970	26,271	14,984	10,449	259	343	237	33	10	56	3,594	5,752	16,925
1971	26,952	15,210	10,824	290	366	262	33	10	59	3,720	5,833	17,399
1972	28,740	16,039	11,715	312	393	282	33	8	59	3,850	6,147	18,743
1973	30,952	16,587	13,299	343	422	302	32	7	62	4,099	6,655	20,197
1974	33,359	17,287	14,885	393	474	320	29	7	64	4,511	7,344	21,504
1975	35,671	18,533	15,824	432	534	348	28	8	65	4,875	8,091	22,706
1976	39,435	20,292	17,702	480	592	369	27	8	66	5,373	8,976	25,085
1977	43,421	22,155	19,642	569	662	394	27	7	67	6,075	9,670	27,677
1978	48,774	24,468	22,457	679	727	443	26	6	69	6,998	10,710	31,067
1979	55,457	27,303	26,097	785	791	482	25	6	70	7,864	12,117	35,475
1980	63,273	30,035	30,929	920	871	519	24	5	71	8,825	13,745	40,703
1981	72,267	33,714	35,948	1,058	967	581	24	5	70	9,844	16,393	46,030
1982	80,848	37,233	40,692	1,207	1,095	621	26	5	68	10,863	18,286	51,698
1983	90,075	41,576	45,264	1,357	1,220	658	28	4	67	12,110	20,394	57,571
1984	102,344	46,571	52,187	1,514	1,351	721	29	3	67	13,503	22,517	66,323
1985	114,778	52,748	57,962	1,743	1,491	834	30	3	66	14,885	25,403	74,489
1986	120,337	54,711	60,991	2,019	1,647	969	32	3	65	17,287	27,251	75,799
1987	126,299	58,548	62,576	2,262	1,849	1,065	32	3	65	18,551	27,914	79,833
1988	133,930	60,180	67,977	2,527	2,081	1,165	30	3	66	19,813	29,545	84,572
1989	141,914	60,489	74,966	2,852	2,333	1,274	28	4	68	21,908	32,279	87,727
1990	152,051	61,669	83,208	3,187	2,589	1,399	25	4	70	23,069	34,974	94,008
1991	160,914	60,822	92,300	3,457	2,852	1,483	23	4	73	27,201	38,632	95,081
1992	165,358	60,923	96,229	3,568	3,113	1,525	22	4	74	27,628	37,938	99,793
1993	165,714	60,515	96,549	3,708	3,387	1,556	22	4	74	28,754	37,285	99,676
1994	169,214	60,790	99,203	3,936	3,664	1,621	20	4	76	29,578	36,613	103,023
1995	183,611	62,961	110,870	4,108	3,924	1,750	19	5	77	29,560	40,999	113,053
1996	197,330	63,392	123,412	4,430	4,238	1,858	18	4	78	32,812	43,169	121,348
1997	212,379	64,783	136,231	4,846	4,593	1,926	17	4	79	36,270	47,211	128,898
1998	226,872	66,827	147,867	5,183	5,007	1,987	16	4	81	41,294	45,702	139,875
1999	244,143	67,711	163,397	5,562	5,390	2,083	15	3	83	44,625	51,632	147,886
2000, [4]	264,622	69,627	181,040	5,969	5,789	2,197	14	3	83	47,903	55,041	161,679

[1] Nonfederal R&D expenditures to university and college performers. [2] R&D spending by the Department of Defense, including space activities, and a portion of the Department of Energy funds. [3] For the National Aeronautics and Space Administration only. [4] Preliminary.

Source: U.S. National Science Foundation, *National Patterns of R&D Resources*, annual.

No. 768. Federal Obligations for R&D in Current and Constant (1996) Dollars by Agency: 1980 to 2001

[**In millions of dollars (29,830 represents $29,830,000,000). For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment. Includes those agencies with obligations of $1 billion or more in 2000]

Agency	1980	1985	1990	1995	1997	1998	1999	2000, prel.	2001, prel.
CURRENT DOLLARS									
Obligations, total [1]	**29,830**	**48,360**	**63,559**	**68,187**	**69,827**	**72,101**	**75,341**	**79,470**	**81,526**
Dept. of Defense	13,981	29,792	37,268	33,796	34,788	35,286	35,646	36,876	36,397
Dept. of Health and Human Services	3,780	5,451	8,406	11,455	12,785	13,902	15,915	18,140	19,235
National Aeronautics and Space Administration	3,234	3,327	6,533	9,015	9,327	9,568	9,526	9,568	9,602
Dept. of Energy	4,754	4,966	5,631	6,145	5,604	5,874	6,010	6,306	6,793
National Science Foundation	882	1,346	1,690	2,149	2,249	2,289	2,506	2,656	3,180
Dept. of Agriculture	688	943	1,108	1,380	1,389	1,441	1,614	1,752	1,779
CONSTANT (1996) DOLLARS [2]									
Obligations, total	**53,278**	**65,804**	**73,863**	**69,550**	**68,660**	**69,730**	**71,856**	**74,361**	**74,719**
Dept. of Defense	24,971	40,538	43,310	34,472	34,207	34,258	33,997	34,505	33,358
Dept. of Health and Human Services	6,752	7,417	9,769	11,684	12,572	13,445	15,179	16,974	17,629
National Aeronautics and Space Administration	5,776	4,527	7,592	9,195	9,171	9,289	9,085	8,953	8,800
Dept. of Energy	8,490	6,757	6,544	6,268	5,510	5,703	5,732	5,901	6,226
National Science Foundation	1,575	1,831	1,964	2,192	2,211	2,223	2,390	2,485	2,914
Dept. of Agriculture	1,228	1,283	1,288	1,408	1,365	1,399	1,539	1,639	1,630

[1] Includes other agencies, not shown separately. [2] Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Federal Funds for Research and Development,* annual.

No. 769. Performance Sector of R&D Expenditures: 1995 to 2000

[**In millions of dollars (183,611 represents $183,611,000,000).** For calendar year. FFRDCs are federally funded research and development centers. For most academic institutions and the federal government before 1997 began on July 1 instead of October 1]

Year	Industry						Universities and colleges							Other nonprofit institutions				
			Funded by—				Funded by—							Funded by—				
	Total	Federal government	Total	Federal government	Industry [1]	Industry FFRDCs	Total	Federal government	Nonfederal government [2]	Industry	Universities & colleges	Nonprofits	Universities & colleges FFRDCs [3]	Total	Federal government	Industry	Nonprofits FFRDCs	Nonprofit FFRDCs
RESEARCH AND DEVELOPMENT TOTAL																		
1995	183,611	16,904	129,830	21,178	108,652	2,273	22,599	13,580	1,750	1,547	4,108	1,616	5,372	5,827	2,847	671	2,308	808
1996	197,330	16,585	142,371	21,356	121,015	2,297	23,686	14,067	1,858	1,667	4,430	1,665	5,410	6,209	2,906	730	2,574	772
1997	212,379	16,819	155,409	21,798	133,611	2,130	25,088	14,716	1,926	1,812	4,846	1,790	5,486	6,626	3,014	809	2,804	821
1998	226,872	17,362	167,102	22,086	145,016	2,078	26,664	15,589	1,987	1,971	5,183	1,934	5,589	7,234	3,281	880	3,073	843
1999	244,143	18,332	180,450	20,162	160,288	2,373	28,363	16,518	2,083	2,133	5,562	2,066	5,698	8,017	3,718	976	3,323	909
2000 prel.	264,622	19,143	197,280	19,635	177,645	2,575	30,154	17,475	2,197	2,310	5,969	2,203	5,801	8,750	4,079	1,085	3,586	918
BASIC RESEARCH																		
1995	29,560	2,689	5,569	190	5,379	530	15,137	9,628	1,069	945	2,509	987	2,661	2,899	1,170	390	1,338	75
1996	32,812	2,680	7,498	650	6,848	708	16,029	10,085	1,148	1,030	2,738	1,028	2,632	3,187	1,248	428	1,510	79
1997	36,270	2,746	9,795	1,029	8,766	625	17,015	10,608	1,190	1,119	2,993	1,105	2,660	3,322	1,317	449	1,557	108
1998	41,294	3,003	13,027	1,326	11,701	568	18,143	11,358	1,217	1,208	3,175	1,185	2,685	3,656	1,461	489	1,706	213
1999	44,625	3,312	14,024	1,211	12,813	649	19,439	12,154	1,281	1,312	3,421	1,271	2,759	4,092	1,705	542	1,845	351
2000 prel.	47,903	3,525	15,378	1,179	14,199	704	20,656	12,857	1,351	1,421	3,672	1,355	2,809	4,492	1,898	602	1,991	339
APPLIED RESEARCH																		
1995	40,999	4,952	26,919	3,164	23,755	535	5,653	2,774	558	494	1,311	516	1,119	1,692	934	170	589	129
1996	43,169	4,872	29,010	3,640	25,370	231	5,870	2,856	582	522	1,388	522	1,283	1,781	960	182	640	122
1997	47,211	4,997	32,430	2,648	29,782	213	6,152	2,900	604	568	1,519	561	1,364	1,926	1,011	205	711	128
1998	45,702	5,146	30,341	2,533	27,808	230	6,475	2,957	631	626	1,646	614	1,326	2,062	1,060	223	779	123
1999	51,632	5,503	35,367	3,440	31,927	274	6,814	3,075	658	673	1,756	652	1,276	2,284	1,194	247	842	114
2000 prel.	55,041	5,826	37,648	2,252	35,396	285	7,260	3,259	693	729	1,884	695	1,401	2,504	1,320	275	909	117
DEVELOPMENT																		
1995	113,053	9,262	97,342	17,824	79,518	1,208	1,809	1,177	123	108	288	113	1,592	1,236	744	111	381	603
1996	121,348	9,033	105,863	17,066	88,797	1,358	1,787	1,125	128	115	305	115	1,495	1,241	698	120	423	571
1997	128,898	9,077	113,184	18,121	95,063	1,292	1,921	1,207	132	125	333	123	1,462	1,378	687	155	536	585
1998	139,875	9,214	123,734	18,227	105,507	1,280	2,046	1,274	139	137	361	135	1,577	1,516	760	168	588	507
1999	147,886	9,517	131,060	15,512	115,548	1,450	2,110	1,290	144	148	385	143	1,663	1,641	819	187	636	445
2000 prel.	161,679	9,792	144,254	16,205	128,050	1,586	2,238	1,360	152	160	413	153	1,592	1,754	860	208	686	463

[1] For R&D funded by the federal government. FFRDCs are federally funded research and development centers. [2] Includes all nonfederal sources. [3] Includes all R&D expenditures of FFRDCs administered by academic institutions and funded by the federal government.

Source: National Science Foundation. Data derived from: *Research and Development in Industry,* annual; *Academic Research and Development Expenditures,* annual; and *Federal Funds for Research and Development,* annual.

No. 770. Performance Sector of R&D Expenditures by State: 1998

[**In millions of dollars (226,872 represents $226,872,000,000).** Industry R&D data refer to calendar years; other R&D data refer to fiscal years but may serve as approximation to calendar year data]

State	Total R&D [1]	Federal government [2]	Industry			Universities and colleges						Other nonprofit institutions funded by federal government [5]
				Funded by—			Funded by—					
			Total	Federal government [3]	Industry [4]	Total	Federal government	Nonfederal government	Industry	U&Cs	Nonprofits	
U.S . .	**226,872**	**17,403**	**169,180**	**24,164**	**145,016**	**26,547**	**15,533**	**1,993**	**1,933**	**5,166**	**1,923**	**3,236**
AL.	1,926	753	707	180	527	442	282	7	30	82	40	24
AK.	(D)	44	(D)	(D)	9	76	32	4	16	24	-	4
AZ.	2,318	138	1,727	490	1,237	406	210	12	22	147	15	8
AR.	283	46	118	(D)	(D)	117	41	33	8	27	7	2
CA.	43,919	1,595	35,568	3,803	31,764	3,345	2,009	146	213	702	274	519
CO	4,565	202	3,565	1,237	2,329	489	332	26	27	68	36	55
CT.	3,559	18	3,113	179	2,935	404	262	13	26	67	35	24
DE.	2,556	4	2,476	13	2,463	73	36	5	4	19	9	3
DC	2,606	1,718	503	90	413	233	166	2	19	26	19	150
FL.	4,773	750	3,300	889	2,411	713	356	81	52	184	40	11
GA	2,492	236	1,444	86	1,358	802	370	70	86	246	30	10
HI	242	55	17	(D)	(D)	148	87	37	11	13	-	22
ID	1,127	25	1,028	(D)	(D)	72	25	22	8	16	1	1
IL	8,830	72	6,892	136	6,755	1,046	587	57	60	262	81	62
IN	3,089	38	2,622	(D)	(D)	425	214	26	40	126	19	3
IA	1,054	33	634	(D)	(D)	358	167	53	31	89	18	4
KS.	1,518	25	1,279	(D)	(D)	213	80	47	12	56	17	1
KY.	645	7	427	(D)	(D)	210	80	15	19	86	9	2
LA.	542	84	102	14	87	352	144	78	23	87	20	4
ME	159	11	82	(D)	(D)	35	14	2	7	11	1	31
MD	8,019	4,766	1,744	655	1,089	1,330	1,014	63	42	143	69	179
MA	13,382	301	10,604	2,419	8,185	1,343	987	32	107	99	118	707
MI	13,655	111	12,648	(D)	(D)	878	472	56	59	221	69	18
MN	3,818	38	3,321	334	2,986	365	206	48	25	56	29	94
MS	366	133	73	17	57	153	80	29	10	31	2	8
MO	1,868	49	1,313	(D)	(D)	484	278	24	30	109	43	22
MT	191	33	82	(D)	(D)	72	36	14	8	13	1	3
NE.	315	29	93	(D)	(D)	186	63	47	17	55	5	7
NV.	571	49	434	(D)	(D)	84	45	5	5	24	4	4
NH	1,340	34	1,187	(D)	(D)	117	71	8	6	17	14	2
NJ.	11,368	393	10,415	134	10,282	485	228	40	27	150	39	17
NM	3,032	396	1,205	(D)	(D)	229	152	13	13	46	5	15
NY.	13,731	192	11,176	2,216	8,960	1,925	1,224	82	96	286	236	221
NC	4,560	236	3,362	12	3,350	899	516	129	121	96	36	64
ND	119	27	34	-	34	57	23	1	4	26	4	1
OH	6,970	698	5,338	605	4,732	808	444	74	88	152	49	125
OK	513	51	245	2	243	209	84	37	13	60	15	8
OR	1,910	88	1,492	26	1,467	310	203	33	10	38	25	21
PA.	8,762	133	7,083	485	6,598	1,342	873	44	156	199	70	174
RI	1,677	222	1,320	(D)	(D)	112	78	3	2	26	3	23
SC.	989	45	695	(D)	(D)	246	113	27	11	83	11	3
SD.	60	28	5	-	5	25	12	8	-	3	2	2
TN.	2,503	38	2,040	(D)	(D)	346	208	37	20	54	28	28
TX.	10,774	597	8,408	223	8,185	1,698	910	179	140	290	179	69
UT.	1,495	135	1,109	181	928	249	165	18	14	43	10	1
VT.	175	4	112	32	80	58	31	3	6	12	6	1
VA.	4,934	1,480	2,707	1,614	1,093	491	289	49	46	77	30	44
WA	8,466	184	7,476	(D)	(D)	534	384	13	42	77	19	122
WV	421	97	225	(D)	(D)	63	25	3	5	27	4	1
WI.	2,501	38	1,919	(D)	(D)	536	300	44	20	111	61	8
WY	65	12	2	-	2	49	18	5	3	21	1	3
Unknown.	12,119	912	5,709	8,092	34,452	905	507	89	73	183	65	301

- Represents zero. D Data withheld to avoid disclosing information about individual companies. [1] Includes university and college Federally Funded Research and Development Centers (FFRDCs.) Nonprofit FFRDCs not shown separately. [2] For R&D funded by the federal government. [3] Includes performance at industry Federally Funded Research and Development Centers (FFRDCs). Nonprofit FFRDCs not shown separately. [4] Includes all nonfederal sources. [5] Data by state are for R&D funded by the federal government.

Source: U.S. National Science Foundation. Data derived from *Research and Development in Industry,* annual; *Academic Research and Development Expenditures,* annual; and *Federal Funds For Research and Development,* annual.

No. 771. Federal Funding for R&D in Current and Constant (1996) Dollars by Selected Budget Functions: 1970 to 2001

[**In millions of dollars (15,339 represents $15,339,000,000). For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment. Excludes R&D plant. Represents budget authority. Functions shown are those for which $1 billion or more was authorized since 1995]

Function	1970	1980	1985	1990	1995	1998	1999	2000, prel.	2001, prel.
CURRENT DOLLARS									
Total [1]	**15,339**	**29,739**	**49,887**	**63,781**	**68,791**	**73,569**	**77,637**	**80,733**	**82,730**
Eight functions, percent of total	96.6	96.5	98.3	98.0	97.7	97.7	97.6	97.8	97.6
National defense	7,981	14,946	33,698	39,925	37,204	39,823	41,306	41,846	41,414
Health	1,084	3,694	5,418	8,308	11,407	13,576	15,553	17,762	18,858
Space research and technology [2]	3,606	2,738	2,725	5,765	7,916	8,198	8,245	8,447	8,732
Energy [2]	574	3,603	2,389	2,726	2,844	948	1,131	1,112	1,184
General science	452	1,233	1,862	2,410	2,794	4,360	4,690	4,885	5,529
Natural resources and environment	340	999	1,059	1,386	1,988	1,855	1,842	1,906	1,932
Transportation	535	887	1,030	1,045	1,833	1,833	1,725	1,570	1,665
Agriculture	238	585	836	950	1,194	1,249	1,288	1,405	1,450
CONSTANT (1996) DOLLARS [3]									
Total [1]	**53,840**	**53,115**	**67,883**	**73,872**	**70,166**	**71,426**	**74,046**	**75,543**	**75,823**
National defense	28,013	26,694	45,854	46,242	37,948	38,663	39,395	39,156	37,956
Health	3,805	6,598	7,372	9,622	11,635	13,181	14,834	16,620	17,283
Space research and technology [2]	12,657	4,890	3,708	6,677	8,074	7,959	7,864	7,904	8,003
Energy [2]	2,015	6,435	3,251	3,157	2,901	920	1,079	1,041	1,085
General science	1,587	2,202	2,534	2,791	2,850	4,233	4,473	4,571	5,067
Natural resources and environment	1,193	1,784	1,441	1,605	2,028	1,801	1,757	1,783	1,771
Transportation	1,878	1,584	1,402	1,210	1,870	1,780	1,645	1,469	1,526
Agriculture	835	1,045	1,138	1,100	1,218	1,213	1,228	1,315	1,329

[1] Includes other functions, not shown separately. [2] Beginning in FY 1998, a number of DOE programs were reclassified from energy (270). [3] Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Federal R&D Funding by Budget Function,* annual.

No. 772. National R&D Expenditures as a Percent of Gross Domestic Product by Country: 1981 to 1999

Year	Total R&D						Nondefense R&D [1]					
	United States	Japan	Unified Germany	France	United Kingdom	Italy	United States	Japan	Unified Germany	France	United Kingdom	Italy
1981	2.31	2.13	2.47	1.93	2.38	0.88	1.7	2.1	2.3	1.6	1.8	0.9
1985	2.72	2.58	2.75	2.22	2.24	1.12	1.9	2.6	2.6	1.8	1.8	1.1
1990	2.62	2.85	2.75	2.37	2.16	1.29	2.0	2.8	2.6	1.9	1.7	1.3
1994	2.40	2.63	2.26	2.34	2.07	1.05	1.9	2.6	2.2	2.0	1.8	1.0
1995	2.48	2.77	2.26	2.31	1.98	1.00	2.0	2.7	2.2	2.0	1.7	1.0
1996	2.53	2.80	2.26	2.30	1.91	1.01	2.1	2.8	2.2	2.0	1.6	1.0
1997	2.55	2.88	2.29	2.22	1.83	0.99	2.1	2.8	2.2	2.0	1.6	1.0
1998	2.58	3.01	2.31	2.18	1.83	1.02	2.2	3.0	2.2	2.0	1.6	1.0
1999	2.63	3.01	2.38	2.17	1.87	1.04	2.2	(NA)	2.3	(NA)	(NA)	(NA)

NA Not available. [1] Estimated.

Source: National Science Foundation, *National Patterns of R&D Resources,* annual; and Organization for Economic Cooperation and Development.

No. 773. R&D Expenditures in Science and Engineering at Universities and Colleges: 1981 to 1999

[**In millions of dollars (6,847 represents $6,847,000,000)**]

Characteristic	1981	1990	1999	Characteristic	1981	1990	1999
CURRENT DOLLARS				CONSTANT (1996)[1]			
Total	**6,847**	**16,286**	**27,489**	**Total**	**11,090**	**18,863**	**26,217**
Basic research	4,594	10,643	18,844	Basic research	7,441	12,327	17,972
Applied R&D	2,253	5,643	8,645	Applied R&D	3,649	6,536	8,245
Source of funds:				Source of funds:			
All governments	5,117	10,962	18,075	All governments	8,288	12,696	17,239
Institutions' own funds	1,004	3,006	5,366	Institutions' own funds	1,626	3,482	5,118
Industry	291	1,127	2,048	Industry	471	1,305	1,953
Other	435	1,191	2,000	Other	705	1,379	1,907
Fields:				Fields:			
Physical sciences	765	1,807	2,600	Physical sciences	1,239	2,093	2,480
Environmental sciences	550	1,069	1,690	Environmental sciences	891	1,238	1,612
Mathematical sciences	87	222	313	Mathematical sciences	141	257	299
Computer sciences	144	515	860	Computer sciences	233	596	820
Life sciences	3,695	8,726	15,591	Life sciences	5,985	10,107	14,870
Psychology	127	253	465	Psychology	206	293	443
Social sciences	366	703	1,262	Social sciences	593	814	1,204
Other sciences	145	336	452	Other sciences	235	389	431
Engineering	967	2,656	4,257	Engineering	1,566	3,076	4,060

[1] Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Survey of Research and Development Expenditures at Universities and Colleges,* annual.

No. 774. Federal Obligations to Universities and Colleges: 1970 to 1999

[**In millions of dollars (3,237 represents $3,237,000,000) except percent. For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment. Minus sign (-) indicates decrease]

Item	1970	1980	1990	1995	1997	1998	1999
CURRENT DOLLARS							
Federal obligations, total	**3,237**	**8,299**	**15,226**	**(NA)**	**(NA)**	**(NA)**	**(NA)**
Annual percent change [1]	-6.5	9.1	-1.8	(NA)	(NA)	(NA)	(NA)
Academic science/engineering obligations	2,188	4,791	10,471	14,461	15,096	16,094	18,058
Percent of total	67.6	57.7	68.8	(NA)	(NA)	(NA)	(NA)
Research and development	1,447	4,161	9,017	12,181	13,019	13,877	15,570
Research and development plant	45	38	142	341	276	157	173
Other science/engineering activities	696	593	1,312	1,939	1,801	2,060	2,315
Nonscience/engineering activities	1,049	3,508	4,755	(NA)	(NA)	(NA)	(NA)
CONSTANT (1996) DOLLARS [2]							
Federal obligations, total	**11,361**	**14,822**	**17,694**	**(NA)**	**(NA)**	**(NA)**	**(NA)**
Annual percent change [1]	-11.4	0.2	-5.4	(NA)	(NA)	(NA)	(NA)
Academic science/engineering obligations	7,678	8,557	12,168	14,750	14,807	15,565	17,223
Percent of total	67.6	57.7	68.8	(NA)	(NA)	(NA)	(NA)
Research and development	5,078	7,431	10,478	12,424	12,770	13,421	14,850
Research and development plant	157	67	165	348	271	151	165
Other science/engineering activities	2,444	1,058	1,525	1,978	1,767	1,993	2,208
Nonscience/engineering activities	3,682	6,265	5,526	(NA)	(NA)	(NA)	(NA)

NA Not available. [1] Percent change from immediate prior year. [2] Based on gross domestic product implicit price deflator.
Source: U.S. National Science Foundation, *Survey of Federal S&E Support to Universities, Colleges, and Nonprofit Institutions,* annual.

No. 775. Federal R&D Obligations to Selected Universities and Colleges: 1981 to 1999

[**In millions of dollars (4,410.9 represents $4,410,900,000), except rank. For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment. For the top 45 institutions receiving federal R&D funds in 1998. Awards to the administrative offices of university systems are excluded from totals for individual institutions because that allocation of funds is unknown, but those awards are included in "total all institutions"]

Major institution ranked by total **1998** federal R&D obligations	Obligations				Rank			
	1981	1985	1995	1999	1981	1985	1995	1999
Total, all institutions [1]	**4,410.9**	**6,246.2**	**12,180.9**	**15,569.9**	**(X)**	**(X)**	**(X)**	**(X)**
45 institutions, percent of total	61.6	60.1	58.6	59.5	(X)	(X)	(X)	(X)
Johns Hopkins University	363.4	297.4	569.3	777.9	1	1	1	1
University of Washington	100.0	146.2	299.7	385.7	4	4	2	2
Stanford University	106.1	175.0	266.7	321.3	3	3	4	3
University of Pennsylvania	76.1	103.1	202.3	319.6	10	15	10	4
University of Michigan	74.0	108.0	243.6	315.9	11	11	5	5
University of California—San Diego	91.4	103.6	239.2	296.4	6	13	6	6
University of California—Los Angeles	94.9	128.2	216.4	275.2	5	5	7	7
Harvard University	87.8	109.4	191.5	265.6	7	9	13	8
Washington University	54.2	72.0	165.4	258.5	17	22	18	9
Massachusetts Institute of Technology	146.0	189.6	280.3	253.2	2	2	3	10
University of California—San Francisco	64.8	98.5	201.8	251.9	15	16	12	11
Columbia University—Main Division	83.7	127.3	185.7	251.6	9	6	14	12
University of Colorado	46.1	71.4	165.4	247.1	22	23	17	13
Yale University	73.5	109.2	179.5	246.0	12	10	15	14
University of Wisconsin—Madison	86.9	124.6	207.7	236.0	8	7	8	15
University of Minnesota	72.0	103.3	202.8	228.7	14	14	9	16
University of Pittsburgh	38.5	58.6	166.3	221.0	29	28	16	17
Duke University	44.3	69.2	155.0	210.7	23	26	20	18
Pennsylvania State University	47.1	76.7	152.5	207.8	21	19	21	19
Cornell University	72.7	120.0	202.2	203.8	13	8	11	20
University of North Carolina at Chapel Hill	38.4	63.1	156.3	199.3	30	27	19	21
University of California—Berkeley	64.1	106.7	142.4	189.9	16	12	23	22
University Southern California	49.2	89.7	152.2	189.9	20	17	22	23
University of Alabama—Birmingham	30.0	44.1	120.2	171.0	44	46	26	24
Case Western Reserve University	33.7	48.0	127.4	167.0	38	40	25	25
University of Chicago	54.0	71.2	106.7	155.6	18	24	31	26
University of Arizona	36.3	49.7	137.1	151.7	33	37	24	27
Baylor College of Medicine	35.1	45.8	84.1	149.4	35	45	43	28
University of Illinois—Urbana Champaign	53.6	83.1	115.7	145.5	19	18	28	29
California Institute of Technology	33.0	55.1	113.7	143.5	40	32	29	30
Northwestern University	32.4	48.3	101.9	138.6	47	39	32	31
University of Rochester	43.0	70.4	107.6	135.7	25	25	30	32
Boston University	27.0	46.2	86.1	131.2	51	43	41	33
University of Iowa	35.3	55.1	93.9	129.3	34	31	36	34
Emory University	17.4	27.0	75.8	128.5	72	70	49	35
University of California—Davis	31.8	43.2	98.9	128.4	42	47	33	36
The Scripps Research Institute	-	-	83.2	124.8	(NA)	(NA)	44	37
University of Texas at Austin	43.8	72.4	115.9	121.1	24	21	27	38
Vanderbilt University	27.4	39.9	94.4	118.2	49	48	35	39
Ohio State University	42.9	56.1	96.5	115.5	26	30	34	40
University of Utah	38.2	50.9	93.8	114.7	31	36	37	41
New York University	40.6	74.6	85.5	113.3	28	20	42	42
University of Florida	30.8	47.7	82.5	111.1	43	41	45	43
Indiana University	29.3	39.1	89.0	110.5	45	49	39	44
University of Virginia	24.3	37.4	79.0	109.8	52	52	48	45

- Represents zero. NA Not available. X Not applicable. [1] Includes other institutions, not shown separately.
Source: U.S. National Science Foundation, *Federal S&E Support to Universities and Colleges and Nonprofit Institutions,* annual.

No. 776. Percentage of U.S. Scientific and Technical Articles Which Are Coauthored and Internationally Coauthored: 1989 to 1999

[Coauthorships are based on authors' corporate address. The database consists of the Institute of Scientific Information's Science and Social Science Citation Indexes (SCI, SSCI)]

Science field	Percentage coauthored				Percentage internationally coauthored			
	1989-91	1992-94	1995-97	1998-99	1989-91	1992-94	1995-97	1998-99
Science and engineering, total	**49.4**	**52.9**	**56.8**	**59.7**	**11.8**	**14.9**	**18.0**	**20.9**
Physics	47.9	54.3	59.3	62.2	19.1	24.7	30.1	34.0
Chemistry	34.5	38.6	42.6	45.6	11.6	14.5	16.9	19.6
Earth & space science	53.3	58.2	63.1	67.2	20.2	24.2	28.7	33.1
Mathematics	42.8	46.8	49.6	52.3	21.0	24.3	26.8	30.2
Biology	34.5	38.6	42.5	49.0	11.6	14.5	16.9	19.4
Biomedical research	54.7	58.8	61.8	65.2	14.0	17.0	19.5	22.9
Clinical medicine	61.4	63.3	66.4	68.3	9.5	12.2	15.0	17.6
Engineering	39.3	43.3	47.0	51.2	11.5	13.8	16.5	20.2
Psychology	38.5	41.3	43.6	47.0	5.7	6.9	8.9	10.6
Social science	30.8	32.9	35.7	35.4	7.0	8.8	10.3	10.8
Health & professional fields	34.9	36.1	39.6	40.1	3.8	4.6	6.5	6.3

Source: CHI Research, Inc., Haddon Heights, NJ; and U.S. National Science Foundation, special tabulation.

No. 777. Citations on U.S. Patents to the U.S. Scientific and Technical Literature by Cited Field: 1990 to 2000

[Citations to articles with authors in different sectors are assigned fractionally to participating sectors. Citations are to articles published in a 12-year period, lagged by 3 years from the patent data. For example, 1997 citations are to articles published in 1993-95]

Science field	1990	1993	1994	1995	1996	1997	1998	1999	2000
Total	**19,422**	**38,493**	**40,266**	**46,961**	**66,129**	**102,111**	**143,541**	**143,215**	**142,008**
Physics	3,414	4,931	5,693	5,432	5,578	6,739	7,699	8,247	9,238
Chemistry	3,451	5,961	6,190	7,070	8,373	11,594	13,007	13,009	15,009
Earth & space science	138	122	152	164	238	259	369	440	434
Mathematics	7	23	22	26	34	48	52	42	48
Biology	544	868	1,172	1,336	2,017	2,244	3,683	4,515	4,063
Biomedical research	4,999	13,812	13,709	16,389	26,537	45,273	68,074	67,264	64,276
Clinical medicine	4,682	9,986	9,789	12,576	18,339	30,549	43,823	42,988	41,454
Engineering technology	2,187	2,790	3,538	3,969	5,014	5,418	6,838	6,720	7,496

Source: CHI Research, Inc., Haddon Heights, NJ; and U.S. National Science Foundation, special tabulation.

No. 778. Percentage of Citations to Foreign Articles in U.S. Scientific and Technical Public Publications: 1990 to 1999

[Citations are to 3 years' articles with 2-year lag. For example, 1997 citations are to articles published in 1993-1995]

Science field	1990	1992	1993	1994	1995	1996	1997	1998	1999
Total science & engineering	**29.6**	**30.4**	**31.0**	**31.7**	**32.1**	**32.9**	**33.5**	**34.0**	**35.1**
Physics	34.4	34.6	35.5	36.9	38.0	39.4	40.9	41.3	43.3
Chemistry	36.4	37.3	37.6	38.6	38.1	39.3	40.7	41.8	41.9
Earth & space science	28.8	28.5	29.7	29.7	29.6	31.2	32.0	32.7	34.0
Mathematics	29.5	30.9	29.9	29.8	31.7	32.5	32.7	32.2	34.0
Biology	28.7	29.5	29.9	29.5	30.4	32.3	33.4	34.3	36.6
Biomedical research	29.8	30.4	30.9	31.5	31.6	32.0	32.3	32.4	33.1
Clinical medicine	30.0	31.4	32.0	32.8	33.4	34.2	34.5	35.4	36.6
Engineering technology	26.7	26.9	26.7	29.4	28.7	29.6	31.8	31.4	33.8
Psychology	17.8	17.5	17.7	17.7	18.2	19.2	20.2	20.6	21.3
Social science	14.7	14.4	14.7	15.1	15.6	16.9	17.2	17.2	17.1
Health & professional fields	9.5	9.3	9.8	9.9	9.9	10.1	10.7	10.7	11.9

Source: CHI Research, Inc., Haddon Heights, NJ; and U.S. National Science Foundation, special tabulation.

No. 779. Funds for Performance of Industrial R&D by Source of Funds and Selected Industries: 1997 to 1999

[**In millions of dollars (157,539 represents $157,539,000,000). For calendar years.** Covers basic research, applied research, and development]

Industry	NAICS [1] code	1997	1998	1999
CURRENT DOLLARS				
Total funds	(X)	157,539	169,180	182,823
Petroleum and coal products	324	(D)	1,395	615
Chemicals and allied products	325	16,492	18,969	20,246
Machinery	333	5,610	(D)	6,057
Navigational, measuring, electromedical, and control instruments	3345	8,030	11,232	14,337
Electrical equipment, appliances, and components	335	2,741	2,280	(D)
Motor vehicles, trailers, and parts	3361-3363	(D)	(D)	(D)
Aerospace products and parts	3364	17,865	16,359	14,425
All other [2]	(X)	(D)	(D)	(D)
Company funds	(X)	133,611	145,016	160,288
Petroleum and coal products	324	1,349	1,390	(D)
Chemicals	325	16,385	18,733	20,051
Machinery	333	5,470	5,831	5,658
Navigational, measuring, electromedical, and control instruments	3345	4,659	5,483	8,632
Electrical equipment, appliances, and components	335	2,580	2,139	3,820
Motor vehicles, trailers, and parts	3361-3363	14,340	13,781	17,987
Aerospace products and parts	3364	6,961	6,521	5,309
All other [2]	(X)	81,867	91,138	(D)
CONSTANT (1996) DOLLARS [3]				
Total funds	(X)	160,611	174,628	191,544
Petroleum and coal products	324	(D)	1,440	644
Chemicals	325	16,814	19,580	21,212
Machinery	333	5,719	(D)	6,346
Navigational, measuring, electromedical, and control instruments	3345	8,187	11,594	15,021
Electrical equipment, appliances, and components	335	2,794	2,353	(D)
Motor vehicles, trailers, and parts	3361-3363	(D)	(D)	(D)
Aerospace products and parts	3364	18,213	16,886	15,113
All other [2]	(X)	(D)	(D)	(D)
Company funds	(X)	136,216	149,686	167,934
Petroleum and coal products	324	1,375	1,435	(D)
Chemicals	325	16,705	19,336	21,007
Machinery	333	5,577	6,019	5,928
Navigational, measuring, electromedical, and control instruments	3345	4,750	5,660	9,044
Electrical equipment, appliances, and components	335	2,630	2,208	4,002
Motor vehicles, trailers, and parts	3361-3363	14,620	14,225	18,845
Aerospace products and parts	3364	7,097	6,731	5,562
All other [2]	(X)	83,463	94,073	(D)

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable. [1] 1997 North American Industry Classification System; see text, Section 15, Business Enterprise. [2] All other manufacturing and nonmanufacturing. [3] Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Research and Development in Industry,* annual.

No. 780. R&D Funds in R&D-Performing Manufacturing Companies by Industry: 1997 to 1999

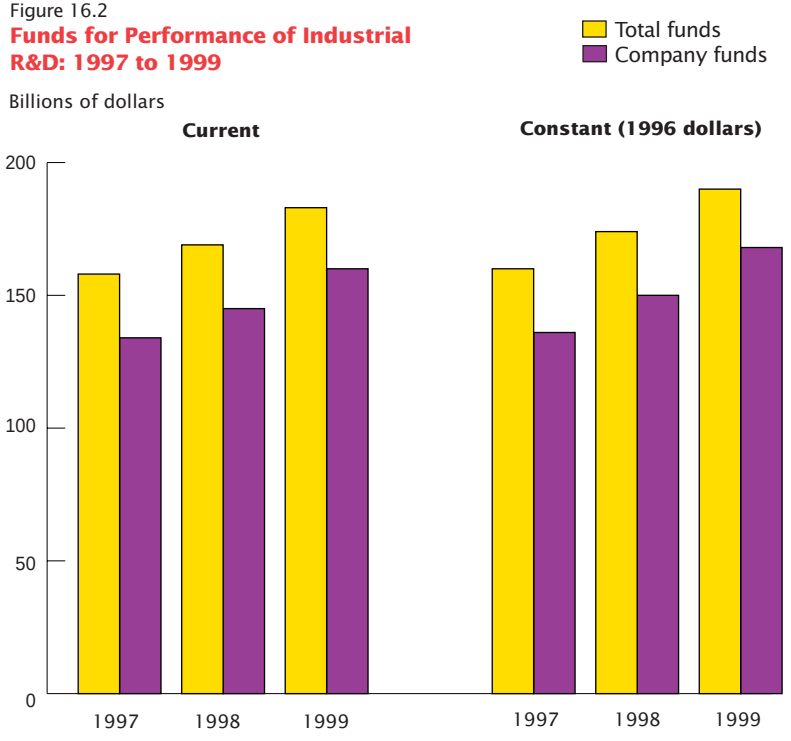
Industry	NAICS [1] code	Total R&D funds as a percent of net sales			Company R&D funds as a percent of net sales		
		1997	1998	1999	1997	1998	1999
Total [2]	(X)	3.9	3.7	3.7	3.3	3.2	3.2
Food	311	0.4	0.4	0.4	0.4	0.4	0.4
Paper, printing, and support activities	322, 326	(D)	(D)	(D)	1.4	1.0	1.4
Petroleum and coal products	324	(D)	0.8	0.4	0.5	0.8	(D)
Chemicals	325	5.5	6.3	5.2	5.5	6.2	5.1
Plastic and rubber products	326	1.3	2.0	1.9	1.3	2	1.9
Nonmetallic mineral products	327	1.9	1.3	(D)	1.9	(D)	1.5
Primary metals	331	0.8	(D)	0.4	0.6	0.5	0.4
Fabricated metal products	332	1.7	1.5	1.5	1.7	1.4	1.4
Machinery	333	3.2	(D)	3.5	3.1	3.1	3.3
Navigational, measuring, electromedical, and control instruments	3345	12.4	13.6	15.2	7.2	6.6	9.1
Electrical equipment, appliances, and components	335	3.1	2.9	(D)	2.9	2.7	2.3
Motor vehicles, trailers, and parts	3361-3367	(D)	(D)	(D)	3.7	2.2	2.9
Aerospace products and parts	3364	8.4	7.2	8.8	3.3	2.9	3.2

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable. [1] 1997 North American Industry Classification System; see text, Section 15, Business Enterprise. [2] Includes all manufacturing industries.

Source: U.S. National Science Foundation, *Research and Development in Industry,* annual.

Figure 16.2

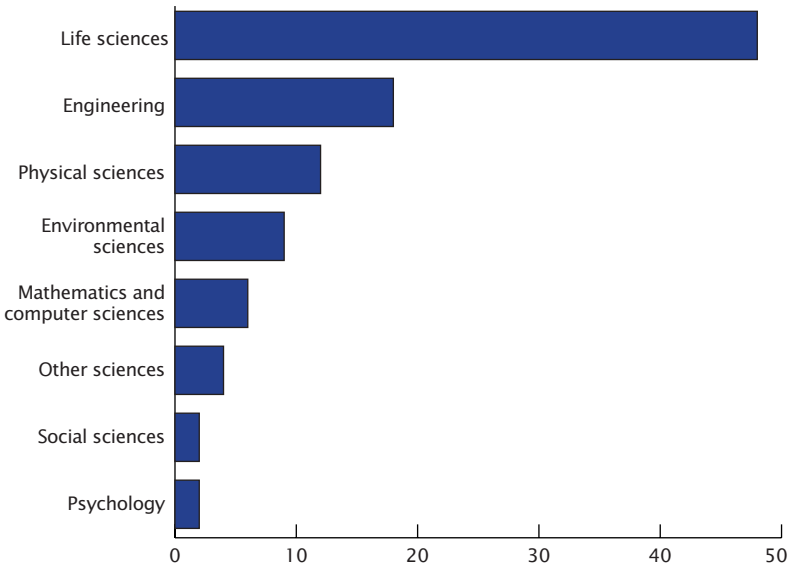
Funds for Performance of Industrial R&D: 1997 to 1999



Source: Chart prepared by U.S. Census Bureau. For data, see Table 779.

Figure 16.3

Federal Funding for Research—Percent Distribution by Field of Science: 2000



Source: Chart prepared by U.S. Census Bureau. For data, see Table 781.

No. 781. Federal Obligations for Research in Current and Constant (1996) Dollars by Field of Science: 1980 to 2001

[**In millions of dollars (11,597 represents $11,597,000,000). For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment. Excludes R&D plant]

Field	1980	1985	1990	1995	1997	1998	1999	2000, prel.	2001, prel.
CURRENT DOLLARS									
Research, total	**11,597**	**16,133**	**21,622**	**28,434**	**29,365**	**30,922**	**33,528**	**36,330**	**38,688**
Basic	4,674	7,819	11,286	13,877	14,942	15,613	17,444	18,982	20,274
Applied	6,923	8,315	10,337	14,557	14,423	15,309	16,084	17,348	18,414
Life sciences	4,192	6,363	8,830	11,811	12,661	13,558	15,422	17,422	18,249
Psychology	199	327	449	623	545	591	633	720	752
Physical sciences	2,001	3,046	3,809	4,278	4,149	4,210	4,066	4,183	4,430
Environmental sciences	1,261	1,404	2,174	2,854	3,046	3,062	3,095	3,102	3,243
Mathematics and computer sciences	241	575	841	1,579	1,672	1,837	1,981	2,178	2,517
Engineering	2,830	3,618	4,227	5,708	5,690	5,895	6,263	6,548	7,089
Social sciences	524	460	630	679	696	806	855	902	996
Other sciences, n.e.c. [1]	350	342	664	902	905	964	1,212	1,273	1,412
CONSTANT (1996) DOLLARS [2]									
Research, total	**20,713**	**21,953**	**25,128**	**29,003**	**28,804**	**29,906**	**31,977**	**33,995**	**35,458**
Basic	8,348	10,639	13,116	14,154	14,656	15,100	16,637	17,762	18,581
Applied	12,365	11,314	12,013	14,848	14,148	14,806	15,340	16,233	16,877
Life sciences	7,488	8,658	10,261	12,047	12,419	13,112	14,709	16,302	16,725
Psychology	355	445	522	635	535	572	604	674	689
Physical sciences	3,573	4,145	4,426	4,364	4,070	4,071	3,878	3,914	4,060
Environmental sciences	2,252	1,910	2,526	2,911	2,987	2,961	2,952	2,903	2,972
Mathematics and computer sciences	430	782	977	1,611	1,640	1,776	1,889	2,038	2,307
Engineering	5,055	4,923	4,912	5,823	5,581	5,702	5,973	6,127	6,497
Social sciences	936	626	732	692	683	780	815	844	913
Other sciences, n.e.c. [1]	624	465	772	920	888	932	1,156	1,191	1,294

[1] N.e.c. = Not elsewhere classified. [2] Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Federal Funds for Research and Development,* annual.

No. 782. R&D Scientists and Engineers—Employment and Cost by Industry: 1997 to 1999

[**918.6 represents 918,600.** Data are estimates; on average full-time-equivalent (FTE) basis]

Industry	NAICS [1] code	1997	1998	1999
EMPLOYED SCIENTISTS (1,000)				
Average FTE of scientists and engineers [2] [3]	**(X)**	**918.6**	**974.6**	**1,015.7**
Chemicals	325	89.3	90.1	86.7
Machinery	333	100.4	104.1	74.1
Electrical equipment, appliances, and components	335	153.8	172.7	98.8
Motor vehicles, trailers, and parts	3361-3363	64.0	63.5	69.2
Aerospace products and parts	3364	85.8	71.7	60.9
CONSTANT (1996) DOLLARS [4] ($1,000)				
Cost per scientist or engineer [3] [5]	**(X)**	**168.6**	**168.7**	**171.8**
Chemicals	325	(D)	235	234.3
Machinery	333	181.2	139.2	113.6
Electrical equipment, appliances, and components	335	157.2	146.2	(D)
Motor vehicles, trailers, and parts	3361-3363	(D)	(D)	(D)
Aerospace products and parts	3364	186.8	195.8	210.0

D Withheld to avoid disclosure. X Not applicable. [1] 1997 North American Industry Classification System; see text, Section 15, Business Enterprise. [2] The mean number of FTE R&D scientists and engineers employed in January of the year shown and the following January. [3] Includes industries not shown separately. [4] Based on gross domestic product implicit price deflator. [5] Represents the arithmetic mean of the numbers of R&D scientists and engineers reported in each industry for January in 2 consecutive years divided into total R&D expenditures in each industry.

Source: U.S. National Science Foundation, *Research and Development in Industry,* annual.

No. 783. Civilian Employment of Scientists, Engineers, and Technicians by Occupation and Industry: 1998

[**In thousands (5,808.7 represents 5,808,700).** Based on sample and subject to sampling error. For details, see source]

Occupation	Wage and salary workers									Self employed [5]
	Total [1]	Mining [2]	Construction	Manufacturing	Transportation [3]	Trade	Fire [4]	Services	Government	
Scientists, engineers, and technicians	5,808.7	57.7	84.0	1,444.9	263.8	305.7	284.9	2,316.2	692.8	358.4
Scientists	708.0	12.3	0.2	74.8	6.8	5.7	13.4	274.3	198.6	121.7
Physical scientists	199.8	9.1	0.2	54.2	3.7	3.0	0.4	75.4	45.7	8.0
Life scientists	173.5	3.3	(NA)	16.8	0.6	1.6	0.5	69.5	73.5	7.7
Mathematical scientists	14.0	-	-	2.0	0.1	0.1	0.8	6.9	4.1	(NA)
Social scientists	320.7	(NA)	(NA)	1.8	2.3	0.9	11.7	122.4	75.3	106.1
Computer systems analysts, engineers and scientists	1,530.5	5.3	3.5	214.6	66.9	100.6	187.1	714.1	124.2	114.1
Engineers [6]	1,461.8	17.1	35.4	667.0	77.3	47.4	11.2	390.4	166.1	49.9
Civil engineers	195.0	0.7	13.5	5.9	4.2	0.9	0.6	93.6	63.6	12.0
Electrical/electronics	357.0	0.4	6.8	163.4	35.4	14.9	1.3	87.1	32.1	15.6
Mechanical engineers	219.7	0.6	5.6	127.8	3.2	7.2	1.4	58.0	11.6	4.5
Engineering and science technicians	1,350.6	18.2	40.8	428.9	75.3	103.8	6.4	490.6	151.7	35.1
Electrical/electronics technicians	334.8	0.9	15.6	113.7	29.2	71.9	2.0	78.0	16.2	7.3
Engineering technicians	436.5	2.7	6.5	146.1	25.2	19.1	0.5	149.1	84.9	2.5
Drafters	283.2	2.8	17.0	84.2	12.9	7.4	1.0	130.4	9.8	17.6
Science technicians	227.4	10.1	0.4	84.7	6.3	5.4	2.6	86.3	28.6	3.1
Surveyors [7]	110.0	2.5	2.8	0.3	2.7	0.1	0.6	75.9	18.2	6.8
Computer programmers	647.8	2.2	1.2	59.4	34.9	48.2	66.1	370.9	34.0	30.8

- Represents zero. NA Not available. [1] Includes agriculture, forestry, and fishing not shown separately. [2] Includes oil and gas extraction. [3] Includes communications and public utilities. [4] Finance, insurance, and real estate. [5] Includes secondary jobs. [6] Includes kinds of engineers and technicians not shown separately. [7] Includes cartographers, photogrammetrists, and surveying and mapping technicians.

Source: U.S. Bureau of Labor Statistics, *National Industry-Occupation Employment Matrix* November 1999; and unpublished data. (Data collected biennially.)

No. 784. Graduate Science/Engineering Students in Doctorate-Granting Colleges: 1985 to 1999

[**358.8 represents 358,800. As of fall.** Includes outlying areas]

Field of science or engineering	Total (1,000)			Percent—							
				Female			Foreign		Part-time		
	1985	1990	1999	1985	1990	1999	1990	1999	1985	1990	1999
Total, all surveyed fields	**358.8**	**403.3**	**432.7**	**124.2**	**152.4**	**194.9**	**101.9**	**110.1**	**117.4**	**126.9**	**123.2**
Science/engineering	319.4	355.4	364.4	94.4	115.4	144.1	97.9	104.8	98.9	104.0	98.5
Engineering, total	90.7	100.6	95.5	10.4	13.7	18.6	36.7	40.3	36.1	36.4	29.4
Sciences, total	228.7	254.8	268.9	84.0	101.7	125.5	61.2	64.6	62.8	67.7	69.1
Physical sciences	29.5	32.6	29.5	6.1	7.7	8.5	12.1	10.9	3.5	3.7	3.3
Environmental	14.2	13.0	12.8	3.6	3.8	5.1	2.6	2.5	3.4	3.1	2.8
Mathematical sciences	15.5	17.7	14.3	4.5	5.4	5.1	6.3	5.6	4.3	4.4	3.1
Computer sciences	24.2	28.6	35.4	6.1	6.6	10.1	9.4	15.1	11.7	13.5	15.2
Agricultural sciences	10.9	10.7	11.2	2.8	3.1	4.5	3.1	2.5	2.0	1.9	2.5
Biological sciences	42.5	46.7	53.3	18.1	21.3	27.5	11.2	11.1	7.0	7.1	7.9
Psychology	31.3	37.0	39.3	18.7	24.4	27.8	1.7	2.0	9.8	11.1	10.7
Social sciences	60.5	68.6	73.1	24.1	29.4	36.9	14.8	15.0	21.0	22.8	23.6
Health fields, total	39.3	48.0	68.3	29.8	36.9	50.7	4.1	5.3	18.4	22.8	24.7

Source: U.S. National Science Foundation, *Survey of Graduate Science Engineering Students and Postdoctorates,* annual.

No. 785. Science and Engineering Degree Recipients in 1995 and 1996

[In thousands (708.9 represents 708,900) except for percent. Based on survey a and subject to sampling error; see source for details]

Degree and field	Graduates 1995 and 1996 (1,000)	1996 [1] Percent distribution				Median salary [4] ($1,000)
			Employed		Not employed or not FT students	
		In school [2]	In S&E [3]	In other		
Bachelor's recipients	**708.9**	**21**	**21**	**53**	**5**	**28.2**
All science fields	593.8	23	12	60	5	26.0
Computer and information sciences	41.0	6	57	34	3	37.7
Mathematical sciences	26.8	19	15	63	3	29.8
Life and related sciences	139.0	31	11	53	5	22.8
Physical and related sciences	36.6	38	26	33	3	27.3
Psychology	138.0	24	6	65	5	22.3
Social and related sciences	212.4	18	6	70	6	26.4
All engineering fields	115.1	13	65	18	3	37.7
Aerospace and related engineering	3.0	22	48	27	2	34.0
Chemical engineering	11.6	17	65	14	4	39.3
Civil and architectural engineering	20.7	14	63	20	3	34.4
Electrical, electronics, computer, and communications engineering	32.9	10	70	16	4	40.5
Industrial engineering	5.8	8	66	24	2	37.6
Mechanical engineering	27.9	11	71	15	3	38.2
Other engineering	13.2	21	52	25	3	34.1
Master's recipients	**149.5**	**21**	**49**	**27**	**3**	**41.5**
All science fields	102.5	23	36	36	4	37.2
Computer and mathematical sciences	18.2	6	74	18	2	51.2
Mathematical sciences	7.9	27	37	32	3	39.7
Life and related sciences	15.3	32	37	27	4	32.4
Physical and related sciences	9.7	37	42	18	3	33.6
Psychology	26.4	22	29	43	5	29.7
Social and related sciences	25.1	26	15	54	5	35.0
All engineering fields	47.0	15	75	9	2	49.9
Aerospace and related engineering	1.5	31	54	15	1	48.8
Chemical engineering	2.0	33	61	4	2	47.6
Civil and architectural engineering	6.5	11	76	11	1	41.9
Electrical, electronics, computer, and communications engineering	16.2	15	77	7	1	55.0
Industrial engineering	3.2	13	70	16	1	49.9
Mechanical engineering	7.2	16	72	10	2	47.7
Other engineering	10.4	10	78	9	4	49.0

[1] As of April. [2] Full-time students. [3] In science and engineering. [4] For the principal job. Excludes full-time students, the self-employed, and persons whose principal job is less than 35 hours per week.

Source: National Science Foundation/SRS, *National Survey of Recent College Graduates: 1997*.

No. 786. Doctorates Conferred by Recipients' Characteristics: 1990 and 1998

[In percent, except as indicated]

Characteristic	1990, total	1998									
		All fields [1]	Engineering	Physical sciences [2]	Earth sciences	Mathematics	Computer sciences	Biological sciences [3]	Agricultural	Social sciences [4]	Psychology
Total conferred (number)	**36,068**	**42,683**	**5,919**	**3,801**	**838**	**1,177**	**923**	**6,646**	**1,192**	**3,394**	**3,681**
Male	63.7	58.0	87.0	77.0	73.0	75.0	83.0	56.0	72.0	59.0	33.0
Female	36.3	42.0	13.0	23.0	27.0	25.0	17.0	44.0	28.0	41.0	67.0
Median age [5]	33.9	33.7	31.6	29.8	33.7	30.7	33.2	31.1	34.6	33.8	32.5
CITIZENSHIP [6]											
Total conferred (number)	**34,697**	**39,556**	**5,413**	**3,526**	**781**	**1,085**	**860**	**5,509**	**1,102**	**3,113**	**3,410**
U.S. citizen	71.8	78.2	55.8	68.5	73.9	61.4	64.1	77.7	56.7	75.6	95.6
Foreign citizen	28.2	21.8	44.2	31.5	26.1	38.6	35.9	22.3	43.3	24.4	4.4
RACE/ETHNICITY [7]											
Total conferred (number)	**26,604**	**30,914**	**3,021**	**4,211**	**577**	**666**	**551**	**4,279**	**625**	**2,352**	**3,259**
White [8]	86.5	78.1	71.5	78.3	82.8	78.4	73.7	75.4	76.8	78.1	80.7
Black [8]	3.8	5.1	2.8	2.2	1.6	2.4	2.5	2.5	3.7	6.2	4.8
Asian/Pacific [8]	4.9	8.8	18.4	12.9	8.8	10.7	16.5	15.4	9.3	7.9	3.5
Indian/Alaskan [8]	0.4	0.6	0.4	0.5	0.5	0.5	0.5	0.3	1.4	0.5	1.0
Hispanic	3.1	4.2	3.6	2.6	2.8	4.1	2.5	3.9	6.1	4.5	6.4
Other/unknown	1.4	3.1	3.3	3.5	3.5	4.1	4.2	2.5	2.7	2.9	3.7

[1] Includes other fields, not shown separately. [2] Astronomy, physics, and chemistry. [3] Biochemistry, botany, microbiology, physiology, zoology, and related fields. [4] Anthropology, sociology, political science, economics, international relations, and related fields. [5] For definition of median, see Guide to Tabular Presentation. [6] For those with known citizenship. Includes those with temporary visas. [7] Excludes those with temporary visas. [8] Non-Hispanic.

Source: U.S. National Science Foundation, Division of Science Resources Studies, Survey of Earned Doctorates, *Selected Data on Science and Engineering Doctorate Awards*, annual.

No. 787. Space Vehicle Systems—Net Sales and Backlog Orders: 1965 to 1999

[**In millions of dollars (2,449 represents $2,449,000,000).** Backlog orders as of Dec. 31. Based on data from major companies engaged in manufacture of aerospace products. Includes parts but excludes engines and propulsion units]

Year	Net sales			Backlog orders			Year	Net sales			Backlog orders		
	Total	Military	Non-military	Total	Military	Non-military		Total	Military	Non-military	Total	Military	Non-military
1965	2,449	602	1,847	2,203	503	1,700	1994	10,594	5,707	4,887	12,888	6,732	6,156
1970	1,956	1,025	931	1,184	786	398	1995	11,314	4,782	6,532	15,650	5,872	9,778
1975	2,119	1,096	1,023	1,304	1,019	285	1996	11,698	5,613	6,085	23,004	9,125	13,879
1980	3,483	1,461	2,022	1,814	951	863	1997	13,410	4,916	8,494	23,357	8,790	14,567
1985	6,300	4,241	2,059	6,707	4,941	1,766	1998	9,490	4,227	5,264	20,371	7,970	12,402
1990	9,691	6,556	3,135	12,462	8,130	4,332	1999	9,022	5,107	3,915	21,026	10,036	10,989

Source: U.S. Census Bureau, *Current Industrial Reports,* MA-37D, *Aerospace Industry (Orders, Sales, and Backlog)* and, beginning 1994, Internet site <http://www.census.gov/cir/www>.

No. 788. Federal Outlays for General Science, Space, and Other Technology: 1970 to 2006

[**In billions of dollars (4.5 represents $4,500,000,000). For fiscal years ending in year shown;** see text, Section 8, State and Local Government Finances and Employment]

Year	Current dollars			Constant (1996) dollars		
	Total	General science/basic research	Space and other technologies	Total	General science/basic research	Space and other technologies
1970	4.5	0.9	3.6	18.5	3.9	14.6
1980	5.8	1.4	4.5	11.6	2.7	8.9
1985	8.6	2.0	6.6	12.8	3.0	9.8
1990	14.4	2.8	11.6	18.4	3.6	14.8
1995	16.7	4.1	12.6	17.3	4.3	13.0
1996	16.7	4.0	12.7	16.7	4.0	12.7
1997	17.2	4.1	13.1	16.9	4.0	12.9
1998	18.2	5.4	12.9	17.5	5.1	12.4
1999	18.1	5.7	12.4	17.0	5.3	11.7
2000	18.6	6.2	12.4	17.0	5.6	11.3
2001, est	19.7	6.9	12.9	17.6	6.1	11.5
2002, est	20.8	7.4	13.4	18.1	6.4	11.7
2003, est	21.4	7.7	13.7	18.2	6.5	11.8
2004, est	22.2	7.9	14.2	18.6	6.6	12.0
2005, est	22.6	8.0	14.6	18.6	6.6	12.1
2006, est	23.1	8.2	15.0	18.7	6.6	12.1

Source: U.S. Office of Management and Budget, *Budget of the United States, Historical Tables, Fiscal Year 2002,* annual.

No. 789. U.S. Commercial Space Industry Revenue by Type: 1996 to 2000

[**In billions of dollars (19.6 represents $19,600,000,000). For calendar years**]

Industry	1996	1997	1998	1999	2000, est.
Total	**19.6**	**26.7**	**30.5**	**31.9**	**37.5**
Satellite manufacturing [1]	7.3	10.3	11.8	10.0	10.0
Launch industry	3.2	3.6	3.5	3.5	5.8
Satellite services [1]	4.8	6.3	7.4	9.8	12.2
Ground equipment manufacturing [1]	4.3	6.5	7.8	8.6	9.5

[1] See footnotes for corresponding objects in Table 790.

No. 790. Worldwide Commercial Space Industry Revenue by Type: 1996 to 2000

[**In billions of dollars (44.8 represents $44,800,000,000). For calendar years**]

Industry	1996	1997	1998	1999	2000, est.
Total	**44.8**	**57.5**	**63.9**	**69.1**	**82.6**
Satellite manufacturing [1]	12.4	15.9	18.5	15.8	18.3
Launch industry	6.9	7.9	7.0	6.6	9.6
Satellite services [2]	15.8	21.2	24.5	30.7	37.0
Ground equipment manufacturing [3]	9.7	12.5	13.9	16.0	17.7

[1] Includes revenues from the construction and sale of satellites to both commercial and government. [2] Includes revenues derived from transponder leasing and subscription/retail services such as direct-to-home television and satellite mobile and data communications. [3] Includes revenues from the manufacture of gateways and satellite control stations, satellite news-gathering trucks, very small aperture terminals, direct-to-home television equipment and mobile satellite phones.

Source of Tables 789 and 790: Satellite Industry Association/Futron Corporation, Bethesda, MD, *1999 Satellite Survey* (copyright).

No. 791. National Aeronautics and Space Administration—Budget Authority: 1999 and Projections to 2004

[In millions of dollars (13,653.0 represents $13,653,000,000)]

Item	1999	2000	2001	2002	2003	2004
Budget authority, total	**13,653.0**	**13,600.8**	**14,035.3**	**14,465.4**	**14,769.2**	**15,305.4**
Human space flight	5,480.0	5,467.7	5,499.9	5,387.6	4,939.0	4,817.4
International space station	2,299.7	2,323.1	2,114.5	1,858.5	1,452.5	1,327.0
Space flight operations (space shuttle)	2,998.3	2,979.5	3,165.7	3,307.8	3,264.9	3,253.3
Payload utilization and operations	182.0	165.1	(NA)	(NA)	(NA)	(NA)
Payload and elv support	(X)	(X)	90.2	90.3	91.5	97.0
Investments and support	(X)	(X)	129.5	131.0	130.1	140.1
Science, aeronautics and technology	5,653.9	5,580.9	5,929.4	6,388.9	6,993.9	7,571.3
Space science	2,119.2	2,192.8	2,398.8	2,606.4	2,961.4	3,298.8
Life and microgravity sciences and applications	263.5	274.7	302.4	300.3	304.1	323.2
Earth science	1,413.8	1,443.4	1,405.8	1,332.5	1,293.3	1,303.4
Aerospace technology	1,338.9	1,124.9	1,193.0	1,548.9	1,948.8	2,244.7
Mission communication services	380.0	406.3	(NA)	(NA)	(NA)	(NA)
Space operations	(X)	(X)	529.4	500.8	386.3	301.2
Academic programs	138.5	138.8	100.0	100.0	100.0	100.0
Mission support	2,499.5	2,532.2	2,584.0	2,666.2	2,812.7	2,892.2
Safety, mission assurance, engineering and advanced concepts	35.6	43.0	47.5	51.5	51.5	51.5
Space communication services	185.8	89.7	(NA)	(NA)	(NA)	(NA)
Research and program management	2,109.6	2,217.6	2,290.6	2,383.7	2,482.2	2,569.7
Construction of facilities	168.5	181.9	245.9	231.0	279.0	271.0
Inspector General	19.6	20.0	22.0	22.7	23.6	24.5

NA Not available. X Not applicable.

Source: U.S. National Aeronautics and Space Administration, <http://ifmp.nasa.gov/codeb/budget2002/2002websites.html>.

No. 792. NASA Space Shuttle Operations Expenditures: 1996 to 2001

[In millions of dollars (2,485.4 represents $2,485,400,000). Data are funding requirements for fiscal years shown]

Operation	1996	1997	1998	1999	2000	2001, est.
Total	**2,485.4**	**2,464.9**	**2,369.4**	**2,998.3**	**2,979.5**	**3,165.7**
Shuttle operations	2,485.4	2,464.9	2,369.4	2,426.7	2,490.7	2,672.8
Orbiter and integration	521.0	492.6	502.9	608.0	698.8	724.5
Propulsion	1,061.5	1,124.7	1,061.8	1,071.2	1,053.1	1,167.4
External tank	327.5	352.4	341.3	363.2	355.2	349.7
Space shuttle main engine	185.0	208.3	204.6	200.0	187.5	261.9
Reusable solid rocket motor	395.7	412.8	380.4	339.0	356.7	418.3
Solid rocket booster	153.3	151.2	135.5	169.0	153.7	137.5
Mission and launch operations	902.9	847.6	804.7	747.5	738.8	780.9
Safety and performance upgrades	(X)	(X)	(X)	571.6	488.8	492.9
Orbiter improvements	(X)	(X)	(X)	234.8	183.7	327.2
Propulsion upgrades	(X)	(X)	(X)	175.7	213.2	60.2
Flight operations and launch site equipment	(X)	(X)	(X)	147.6	80.9	90.0
Construction of facilities	(X)	(X)	(X)	13.5	11.0	15.5

X Not applicable.

Source: U.S. National Aeronautics and Space Administration, *NASA, 1996-97, Pocket Statistics,* annual; thereafter, <http://ifmp.nasa.gov/codeb/budget2002/2002websites.html>.

No. 793. World-Wide Successful Space Launches: 1957 to 2000

[Criterion of success is attainment of Earth orbit or Earth escape]

Country	Total, 1957-99	1957-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999	2000
Total	**4,042**	**289**	**586**	**555**	**607**	**605**	**550**	**466**	**384**	**73**	**82**
Soviet Union/Russia [1]	2,598	82	302	405	461	483	447	283	135	26	35
United States	**1,188**	**207**	**279**	**139**	**126**	**93**	**61**	**122**	**161**	**30**	**28**
Japan	54	-	-	5	10	12	11	9	7	-	-
ESA [2]	117	-	-	-	1	8	21	33	54	10	12
China	59	-	-	2	6	6	9	15	21	4	5
France	10	-	4	3	3	-	-	-	-	-	-
India	9	-	-	-	-	3	-	3	3	1	-
Israel	3	-	-	-	-	-	1	1	1	-	-
Ukraine [1]	2	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	2	2	2
Australia	1	-	1	-	-	-	-	-	-	-	-
United Kingdom	1	-	-	1	-	-	-	-	-	-	-

- Represents zero. NA Not available. [1] Since Commonwealth of Independent States (CIS) barely exists, now show Russia as the successor to the Soviet space program and Ukraine separately. [2] European Space Agency. Includes launches by Arianespace.

Source: Library of Congress, Congressional Research Service, Science Policy Research Division, *Space Activities of the United States, CIS, and Other Launching Countries/Organizations 1957-1994,* July 31, 1995; and forthcoming report.

No. 794. Space Shuttle Launches—Summary: 1981 to July 2001

Flight number	Mission date	Orbiter name	Crew size (up/down)	Days/hours duration	Flight number	Mission date	Orbiter name	Crew size (up/down)	Days/hours duration
1	04/12/81	Columbia	2	2	61	12/2/93	Endeavour	7	11
2	11/12/81	Columbia	2	2	60	2/3/94	Discovery	6	8
3	03/22/82	Columbia	2	8	62	3/4/94	Columbia	5	14
4	06/27/82	Columbia	2	7	59	4/9/94	Endeavour	6	11
5	11/11/82	Columbia	4	5	65	7/8/94	Columbia	7	15
6	04/04/83	Challenger	4	5	64	9/9/94	Discovery	6	11
7	6/18/83	Challenger	5	6	68	9/30/94	Endeavour	6	11
8	8/30/83	Challenger	5	6	66	11/3/94	Atlantis	6	11
9	11/28/83	Columbia	6	10	63	2/3/95	Discovery	6	8
10	02/03/84	Challenger	5	8	67	3/2/95	Endeavour	7	17
11	04/06/84	Challenger	5	7	71	6/27/95	Atlantis	7/8	10
12	08/30/84	Discovery	6	7	70	7/13/95	Discovery	5	9
13	10/05/84	Challenger	7	8	69	9/7/95	Endeavour	5	11
14	11/08/84	Discovery	5	8	73	10/20/95	Columbia	7	16
15	01/24/85	Discovery	5	4	74	11/8/95	Atlantis	5	8
16	04/12/85	Discovery	7	7	72	1/11/96	Endeavour	6	9
17	04/29/85	Challenger	7	7	75	2/22/96	Columbia	7	16
18	06/17/85	Discovery	7	7	76	3/22/96	Atlantis	6/5	9
19	7/29/85	Challenger	7	8	77	5/19/96	Endeavour	6	10
20	8/27/85	Discovery	5	7	78	6/20/96	Columbia	7	17
21	10/3/85	Atlantis	5	4	79	9/16/96	Atlantis	6	10
22	10/30/85	Challenger	8	7	80	11/20/96	Columbia	5	18
23	11/26/85	Atlantis	7	7	81	01/12/97	Atlantis	6	10/05
24	1/12/86	Columbia	7	6	82	02/11/97	Discovery	7	10/00
25	1/28/86	Challenger	7	-	83	04/04/97	Columbia	7	03/23
26	9/29/88	Discovery	5	4	84	05/15/97	Atlantis	7/7	09/05
27	12/2/88	Atlantis	5	4	94	07/01/97	Columbia	7	15/07
29	3/13/89	Discovery	5	5	85	08/07/97	Discovery	5	11/20
30	5/4/89	Atlantis	5	4	86	09/25/97	Atlantis	7/7	10/19
28	8/8/89	Columbia	5	5	87	11/19/97	Columbia	6	15/17
34	10/18/89	Atlantis	5	5	89	01/22/98	Endeavor	7/7	08/20
33	11/22/89	Discovery	5	5	90	04/17/98	Columbia	7	15/22
32	1/9/90	Columbia	5	11	91	06/02/98	Discovery	6/7	09/19
36	2/28/90	Atlantis	5	4	95	11/20/98	Discovery	7	08/22
31	4/24/90	Discovery	5	5	88	12/04/98	Endeavor	6	11/19
41	10/6/90	Discovery	5	4	96	05/27/99	Discovery	7	09/19
38	11/15/90	Atlantis	5	5	93	07/23/99	Columbia	5	04/24
35	12/2/90	Columbia	7	9	103	12/19/99	Atlantis	7	07/23
37	4/5/91	Atlantis	5	6	99	02/11/00	Endeavor	6	11/04
39	4/28/91	Discovery	7	8	101	05/19/00	Atlantis	7	09/21
40	6/5/91	Columbia	7	9	106	09/08/00	Atlantis	7	11/19
43	8/2/91	Atlantis	5	9	92	10/11/00	Discovery	7	12/21
48	9/12/91	Discovery	5	5	98	12/02/00	Endeavor	5	10/20
44	11/24/91	Atlantis	6	7	97	02/07/01	Atlantis	5	12/21
42	1/22/92	Discovery	7	8	102	03/08/01	Discovery	7/7	12/20
45	3/24/92	Atlantis	7	9	100	04/19/01	Endeavor	7	11/20
49	5/7/92	Endeavour	7	9	104	07/12/01	Atlantis	5	12/19
50	6/25/92	Columbia	7	14					
46	7/31/92	Atlantis	7	8	FUTURE				
47	9/12/92	Endeavour	7	8	MISSIONS				
52	10/22/92	Columbia	6	10	IN WORK				
53	12/2/92	Discovery	5	7					
54	1/13/93	Endeavour	5	6	105	10/05/2000	Discovery	7/7	7
56	4/8/93	Discovery	5	9	108	11/30/2000	Endeavor	7/7	10
55	4/26/93	Columbia	7	10	109	1/18/2001	Columbia	7	11
57	6/21/93	Endeavour	6	10	110	2/15/2001	Atlantis	7	9
51	9/12/93	Discovery	5	10	107	4/04/2002	Columbia	7	16
58	10/18/93	Columbia	7	14	111	4/18/2002	Endeavor	4	10

- Represents zero.

Source: U.S. National Aeronautics and Space Administration, Internet site <http://www.ksc.nasa.gov/shuttle/missions/missions.html> (accessed 13 August 2001).

No. 795. Nobel Prize Laureates in Selected Sciences: 1901 to 1999

[Presented by location of award-winning research and by date of award]

Country	1901-1999				1901-1930	1931-1945	1946-1960	1961-1975	1976-1990	1991-1998	1999
	Total	Physics	Chemistry	Physiology/Medicine							
Total	**459**	**158**	**132**	**169**	**93**	**49**	**74**	**92**	**98**	**51**	**4**
United States	199	70	47	82	6	14	38	41	63	36	3
United Kingdom	71	21	26	24	15	11	14	20	9	2	-
Germany [1]	61	17	29	15	27	11	4	8	7	3	-
France	25	11	7	7	13	2	-	5	2	3	-
Soviet Union	10	7	1	2	2	-	4	3	1	-	-
Japan	4	3	1	-	-	-	1	2	1	-	-
Other countries	89	29	21	39	30	11	13	13	15	7	1

- Represents zero. [1] Between 1946 and 1991, data are for the former West Germany only.

Source: U.S. National Science Foundation, unpublished data.