Section 20

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.

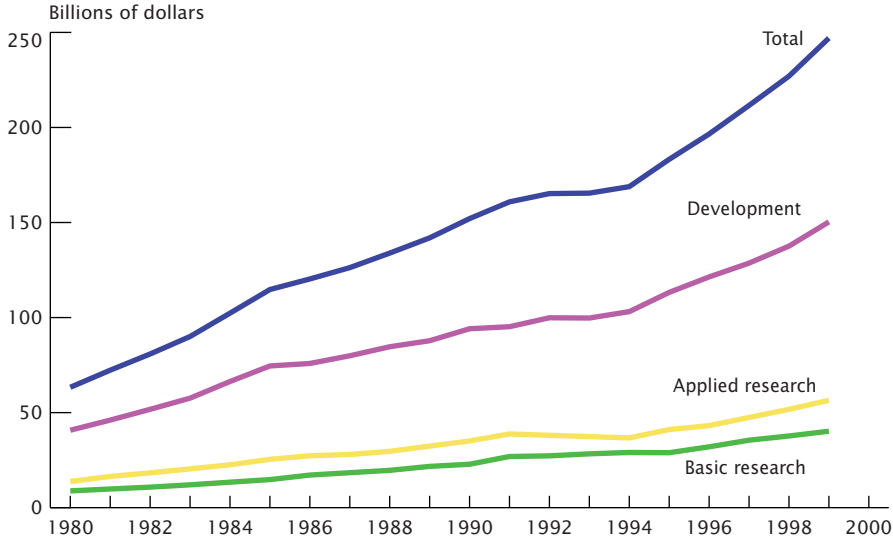
The National Science Board's biennial *Science and Engineering Indicators* contains data and analysis of international and domestic science and technology, including measures of inputs and outputs. The *Budget of the United States Government,* published by the U.S. Office of Management and Budget, contains 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 20.1
Research and Development Expenditures: 1980 to 1999



Source: Chart prepared by U.S. Census Bureau. For data, see Table 978.

No. 978. R&D Expenditures: 1960 to 1999

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

Year	Total	Sources of funds					Objective (percent of total)			Character of work		
		Federal Government	Industry	Universities/ colleges	Nonprofit	Non-Federal 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	46	9	45	1,824	3,698	10,116
1963	17,519	11,645	5,456	96	197	125	41	15	43	2,115	3,865	11,540
1964	19,103	12,764	5,888	114	200	138	37	20	43	2,396	4,201	12,506
1965	20,252	13,194	6,549	136	225	150	33	22	45	2,664	4,374	13,215
1966	22,072	14,165	7,331	165	252	160	32	21	47	2,930	4,653	14,490
1967	23,346	14,563	8,146	200	271	168	32	18	49	3,168	4,848	15,332
1968	24,666	14,964	9,008	221	290	185	32	17	52	3,376	5,137	16,154
1969	25,996	15,228	10,011	233	316	208	31	15	54	3,491	5,454	17,051
1970	26,271	14,984	10,449	259	343	237	30	14	56	3,594	5,752	16,925
1971	26,952	15,210	10,824	290	366	262	29	12	59	3,720	5,833	17,399
1972	28,740	16,039	11,715	312	393	282	30	11	59	3,850	6,147	18,743
1973	30,952	16,587	13,299	343	422	302	29	10	62	4,099	6,655	20,197
1974	33,365	17,287	14,886	393	480	320	27	9	64	4,515	7,347	21,503
1975	35,686	18,533	15,825	432	548	348	26	8	65	4,880	8,098	22,708
1976	39,458	20,292	17,702	480	616	369	26	9	66	5,376	8,990	25,092
1977	43,456	22,155	19,645	569	695	394	26	7	67	6,075	9,690	27,691
1978	48,822	24,468	22,462	679	771	443	25	6	69	7,001	10,731	31,090
1979	55,521	27,303	26,103	785	850	482	24	6	70	7,867	12,148	35,506
1980	63,332	30,035	30,940	920	919	519	24	5	71	8,825	13,773	40,734
1981	72,307	33,714	35,967	1,058	988	581	25	5	70	9,827	16,421	46,059
1982	80,837	37,233	40,718	1,207	1,059	621	28	4	68	10,803	18,303	51,730
1983	90,030	41,576	45,295	1,357	1,145	658	30	3	67	12,018	20,408	57,603
1984	102,308	46,571	52,245	1,514	1,258	721	30	3	67	13,403	22,540	66,365
1985	114,747	52,748	58,049	1,743	1,373	834	31	3	66	14,772	25,437	74,538
1986	120,297	54,711	61,097	2,019	1,502	969	32	3	65	17,152	27,292	75,853
1987	126,255	58,548	62,683	2,262	1,697	1,065	32	3	65	18,393	27,968	79,894
1988	133,903	60,179	68,102	2,527	1,931	1,165	30	3	66	19,637	29,621	84,646
1989	141,909	60,488	75,118	2,852	2,177	1,274	28	4	68	21,712	32,381	87,816
1990	152,039	61,668	83,382	3,186	2,405	1,399	25	4	70	22,837	35,095	94,107
1991	160,863	60,821	92,490	3,457	2,614	1,482	23	4	73	26,915	38,764	95,184
1992	165,212	60,922	96,411	3,568	2,787	1,524	22	4	74	27,258	38,066	99,889
1993	165,442	60,524	96,700	3,719	2,950	1,550	22	4	74	28,312	37,379	99,751
1994	168,854	60,881	99,326	3,960	3,076	1,611	20	4	76	29,046	36,689	103,119
1995	183,232	63,220	111,005	4,139	3,126	1,741	19	5	77	28,909	41,085	113,239
1996	196,540	63,547	123,561	4,375	3,218	1,839	18	4	78	32,012	43,156	121,372
1997	211,586	65,016	136,394	4,842	3,436	1,898	17	4	79	35,495	47,453	128,638
1998	226,984	64,853	151,105	5,366	3,686	1,974	15	4	81	37,695	51,722	137,566
1999	247,000	65,853	169,312	5,838	3,913	2,085	14	3	83	40,224	56,462	150,315

[1] Non-Federal 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.

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

No. 979. Federal Obligations for R&D by Agency: 1980 to 2000

[In millions of dollars (29,830 represents $29,830,000,000). For fiscal years ending in year shown; see text, Section 9, State and Local Government. Includes those agencies with obligations of $1 billion or more in 2000]

Agency	1980	1985	1990	1995	1996	1997	1998	1999, prel.	2000, prel.
CURRENT DOLLARS									
Obligations, total [1]	**29,830**	**48,360**	**63,559**	**68,187**	**67,653**	**69,827**	**71,903**	**75,351**	**75,104**
Dept. of Defense	13,981	29,792	37,268	33,796	34,535	34,788	35,286	35,637	34,441
Dept. of Health and Human Services	3,780	5,451	8,406	11,455	11,951	12,785	13,704	15,629	16,148
National Aeronautics and Space Administration	3,234	3,327	6,533	9,015	8,570	9,327	9,568	9,308	9,370
Dept. of Energy	4,754	4,966	5,631	6,145	5,345	5,604	5,874	6,499	6,518
National Science Foundation	882	1,346	1,690	2,149	2,188	2,249	2,289	2,513	2,698
Dept. of Agriculture	688	943	1,108	1,380	1,300	1,389	1,441	1,637	1,597
CONSTANT (1996) DOLLARS [2]									
Obligations, total [1]	**52,966**	**65,510**	**73,615**	**69,500**	**67,653**	**68,660**	**69,809**	**72,217**	**70,920**
Dept. of Defense	24,824	40,357	43,164	34,447	34,535	34,207	34,258	34,155	32,522
Dept. of Health and Human Services	6,712	7,384	9,736	11,676	11,951	12,572	13,305	14,979	15,248
National Aeronautics and Space Administration	5,742	4,507	7,567	9,189	8,570	9,171	9,289	8,921	8,848
Dept. of Energy	8,441	6,727	6,522	6,263	5,345	5,510	5,703	6,229	6,155
National Science Foundation	1,566	1,823	1,957	2,191	2,188	2,211	2,223	2,408	2,548
Dept. of Agriculture	1,221	1,277	1,283	1,407	1,300	1,365	1,399	1,569	1,508

[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. 980. Performance Sector of R&D Expenditures: 1994 to 1999

[In millions of dollars (168,854 represents $168,854,000,000). 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	Non-Federal government [2]	Industry	Universities & colleges	Nonprofits	Universities & colleges FFRDCs [3]	Total	Federal Government	Industry	Nonprofits FFRDCs	Nonprofit FFRDCs
RESEARCH AND DEVELOPMENT TOTAL																		
1994	168,854	16,432	117,392	20,261	97,131	2,202	21,626	13,009	1,611	1,448	3,960	1,598	5,317	5,125	2,900	747	1,478	759
1995	183,232	17,133	129,830	21,178	108,652	2,273	22,647	13,604	1,741	1,539	4,139	1,624	5,372	5,165	2,848	814	1,502	812
1996	196,540	16,627	142,371	21,356	121,015	2,297	23,720	14,180	1,839	1,655	4,375	1,672	5,410	5,343	2,906	891	1,546	771
1997	211,586	16,814	155,409	21,798	133,611	2,130	25,136	14,805	1,898	1,805	4,842	1,785	5,612	5,665	3,036	978	1,651	820
1998, prelim	226,984	17,189	168,291	20,249	148,042	1,979	26,684	15,446	1,974	1,983	5,366	1,915	5,913	6,105	3,254	1,079	1,771	823
1999, prelim	247,000	17,362	185,892	19,937	165,955	2,166	28,256	16,137	2,085	2,163	5,838	2,032	6,169	6,319	3,246	1,194	1,880	836
BASIC RESEARCH																		
1994	29,046	2,553	6,514	436	6,078	503	14,472	9,186	988	888	2,429	980	2,870	2,060	1,126	343	591	74
1995	28,909	2,695	5,569	190	5,379	530	15,233	9,683	1,068	945	2,540	997	2,661	2,146	1,170	375	601	76
1996	32,012	2,689	7,498	650	6,848	708	16,129	10,201	1,143	1,028	2,719	1,039	2,632	2,277	1,249	410	619	79
1997	35,495	2,735	9,795	1,029	8,766	625	17,030	10,740	1,157	1,099	2,947	1,087	2,788	2,428	1,317	450	660	95
1998, prelim	37,695	2,920	10,669	956	9,713	581	17,832	11,241	1,158	1,163	3,147	1,123	2,958	2,625	1,420	496	709	111
1999, prelim	40,224	3,100	11,778	890	10,888	601	18,758	11,743	1,207	1,252	3,379	1,176	3,086	2,795	1,494	549	752	107
APPLIED RESEARCH																		
1994	36,689	5,003	22,988	3,616	19,372	503	5,357	2,625	511	459	1,255	507	980	1,746	960	254	532	112
1995	41,085	5,007	26,919	3,164	23,755	535	5,622	2,758	551	487	1,311	514	1,117	1,753	935	277	541	131
1996	43,156	4,874	29,010	3,640	25,370	231	5,816	2,854	571	514	1,358	519	1,284	1,819	960	303	557	122
1997	47,453	5,079	32,430	2,648	29,782	213	6,229	2,917	608	579	1,554	572	1,442	1,937	1,010	333	594	123
1998, prelim	51,722	5,421	35,458	2,460	32,998	198	6,864	3,054	669	672	1,820	649	1,633	2,045	1,040	367	638	104
1999, prelim	56,462	5,494	39,367	2,376	36,991	212	7,401	3,216	720	747	2,016	702	1,729	2,156	1,073	406	677	101
DEVELOPMENT																		
1994	103,119	8,876	87,890	16,209	71,681	1,196	1,798	1,198	112	101	276	111	1,467	1,319	815	149	355	573
1995	113,239	9,431	97,342	17,824	79,518	1,209	1,792	1,163	121	107	288	113	1,593	1,266	743	163	361	606
1996	121,372	9,064	105,863	17,066	88,797	1,358	1,775	1,125	125	113	298	114	1,495	1,247	697	178	371	570
1997	128,638	9,001	113,184	18,120	95,064	1,292	1,876	1,149	133	127	341	126	1,382	1,300	708	196	396	603
1998, prelim	137,566	8,848	122,164	16,833	105,331	1,200	1,988	1,152	147	148	399	142	1,322	1,435	794	216	425	608
1999, prelim	150,315	8,768	134,747	16,671	118,076	1,353	2,096	1,178	158	164	443	154	1,354	1,369	679	239	451	628

[1] Includes all non-Federal sources. [2] Because of limitations in the survey information, data on non-Federal government funding to other performers are not available but included in other sectors' support for their own R&D performance. [3] Includes all R&D expenditures of FFRDCs administered by academic institutions. In 1997, 99 percent of total funds used were from Federal sources.

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

No. 981. Performance Sector of R&D Expenditures by State: 1998

[In millions of dollars (226,984 represents $226,984,000,000). 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]
			Total	Funded by—		Total	Funded by—					
				Federal Government [3]	Industry [4]		Federal Government	Non-Federal government	Industry	U&Cs	Nonprofits	
U.S	226,984	17,189	168,291	20,249	148,042	26,684	15,446	1,974	1,983	5,366	1,915	3,254
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	13,514	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	12,449	700	4,820	4,177	37,478	1,043	418	70	118	380	55	319

- Represents or rounds to zero. D Data withheld to avoiding 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. [3] Includes performance at university and college FFRDCs. [4] Includes all non-Federal sources. [5] Data by state are for R&D 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. 982. Federal Funding for R&D by Selected Budget Functions: 1970 to 2000

[In millions of dollars (15,339 represents $15,339,000,000). For fiscal years ending in year shown; see text, Section 9, State and Local Government. 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	1997	1998	1999, prel.	2000, prel.
CURRENT DOLLARS									
Total [1]	15,339	29,739	49,887	63,781	68,791	71,653	73,569	76,886	75,415
Eight functions, percent of total	96.6	96.5	98.3	98.0	97.7	98.1	97.7	97.6	97.5
National defense	7,981	14,946	33,698	39,925	37,204	39,591	39,823	40,387	37,710
Health	1,084	3,694	5,418	8,308	11,407	12,670	13,576	15,479	15,824
Space research and technology [2]	3,606	2,738	2,725	5,765	7,916	7,844	8,198	8,239	8,422
Energy [2]	574	3,603	2,389	2,726	2,844	2,372	948	1,164	1,348
General science	452	1,233	1,862	2,410	2,794	2,944	4,360	4,739	4,951
Natural resources and environment	340	999	1,059	1,386	1,988	1,886	1,855	1,928	1,944
Transportation	535	887	1,030	1,045	1,833	1,785	1,833	1,731	1,840
Agriculture	238	585	836	950	1,194	1,203	1,249	1,352	1,522
CONSTANT (1996) DOLLARS [3]									
Total [1]	53,446	52,804	67,579	73,872	70,116	70,455	71,426	73,688	71,213
National defense	27,808	26,538	45,649	46,242	37,921	38,929	38,663	38,707	35,609
Health	3,777	6,559	7,339	9,622	11,627	12,458	13,181	14,835	14,942
Space research and technology [2]	12,564	4,862	3,691	6,677	8,068	7,713	7,959	7,896	7,953
Energy [2]	2,000	6,397	3,236	3,157	2,899	2,332	920	1,116	1,273
General science	1,575	2,189	2,522	2,791	2,848	2,895	4,233	4,542	4,675
Natural resources and environment	1,185	1,774	1,435	1,605	2,026	1,854	1,801	1,848	1,836
Transportation	1,864	1,575	1,395	1,210	1,868	1,755	1,780	1,659	1,737
Agriculture	829	1,039	1,132	1,100	1,217	1,183	1,213	1,296	1,437

[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. 983. National R&D Expenditures as a Percent of Gross Domestic Product by Country: 1981 to 1998

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	2.32	(NA)	2.43	1.97	2.37	0.88	(NA)	2.34	1.57	1.84	0.85	1.21
1985	2.74	2.58	2.72	2.25	2.23	1.13	2.56	2.60	1.87	1.76	1.07	1.40
1990	2.65	2.85	2.75	2.41	2.18	1.30	2.83	2.62	1.95	1.84	1.26	1.41
1993	2.52	2.68	2.42	2.45	2.15	1.14	2.65	2.34	2.10	1.86	1.09	1.56
1994	2.43	2.63	2.32	2.38	2.11	1.06	2.60	2.25	2.05	1.84	1.01	(NA)
1995	2.52	2.77	2.31	2.34	2.02	1.01	2.73	2.23	2.04	1.78	0.98	1.55
1996	2.57	2.83	2.30	2.32	1.95	1.02	2.80	2.21	2.03	1.72	1.01	(NA)
1997	2.60	2.92	2.31	2.23	1.87	1.08	(NA)	2.23	(NA)	1.65	1.07	1.57
1998	2.67	(NA)	2.33	(NA)	(NA)	1.11	(NA)	(NA)	(NA)	(NA)	(NA)	1.57

NA Not available. [1] Estimated.

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

No. 984. R&D Expenditures in Science and Engineering at Universities and Colleges: 1981 to 1998

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

Characteristic	1981	1990	1998	Characteristic	1981	1990	1998
CURRENT DOLLARS				CONSTANT (1996) DOLLARS [1]			
Total	6,847	16,286	25,735	Total	11,090	18,863	24,985
Basic research	4,594	10,643	17,382	Basic research	7,441	12,327	16,876
Applied R&D	2,253	5,643	8,353	Applied R&D	3,649	6,536	8,110
Source of funds:				Source of funds:			
All governments	5,117	10,962	17,005	All governments	8,288	12,696	16,510
Institutions' own funds	1,004	3,006	4,999	Institutions' own funds	1,626	3,482	4,853
Industry	291	1,127	1,870	Industry	471	1,305	1,816
Other	435	1,191	1,861	Other	705	1,379	1,807
Fields:				Fields:			
Physical sciences	765	1,807	2,440	Physical sciences	1,239	2,093	2,369
Environmental sciences	550	1,069	1,615	Environmental sciences	891	1,238	1,568
Mathematical sciences	87	222	308	Mathematical sciences	141	257	299
Computer sciences	144	515	754	Computer sciences	233	596	732
Life sciences	3,695	8,726	14,547	Life sciences	5,985	10,107	14,123
Psychology	127	253	437	Psychology	206	293	424
Social sciences	366	703	1,121	Social sciences	593	814	1,088
Other sciences	145	336	460	Other sciences	235	389	447
Engineering	967	2,656	4,054	Engineering	1,566	3,076	3,936

[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. 985. Federal Obligations to Universities and Colleges: 1970 to 1998

[In millions of dollars (3,237 represents $3,237,000,000) except percent. For fiscal years ending in year shown; see text, Section 9, State and Local Government. Minus sign (-) indicates decrease]

Item	1970	1980	1985	1990	1995	1996	1997	1998
CURRENT DOLLARS								
Federal obligations, total	**3,237**	**8,299**	**10,972**	**15,226**	**(NA)**	**(NA)**	**(NA)**	**(NA)**
Annual percent change [1]	-6.5	9.1	9.3	-1.8	(NA)	(NA)	(NA)	(NA)
Academic science/engineering obligations	2,188	4,791	7,258	10,471	14,461	14,450	15,096	16,032
Percent of total	67.6	57.7	66.2	68.8	(NA)	(NA)	(NA)	(NA)
Research and development	1,447	4,161	6,246	9,017	12,181	12,346	13,019	13,847
Research and development plant	45	38	114	142	341	248	276	157
Other science/engineering activities	696	593	898	1,312	1,939	1,856	1,801	2,028
Nonscience/engineering activities	1,049	3,508	3,714	4,755	(NA)	(NA)	(NA)	(NA)
CONSTANT (1996) DOLLARS [2]								
Federal obligations, total	**11,277**	**14,735**	**14,863**	**17,634**	**(NA)**	**(NA)**	**(NA)**	**(NA)**
Annual percent change [1]	-11.3	0.5	5.9	-5.4	(NA)	(NA)	(NA)	(NA)
Academic science/engineering obligations	7,622	8,507	9,832	12,127	14,740	14,450	14,844	15,565
Percent of total	67.6	57.7	66.2	68.8	(NA)	(NA)	(NA)	(NA)
Research and development	5,040	7,387	8,461	10,443	12,416	12,346	12,802	13,444
Research and development plant	156	67	154	164	348	248	271	152
Other science/engineering activities	2,426	1,052	1,216	1,520	1,976	1,856	1,771	1,969
Nonscience/engineering activities	3,655	6,228	5,031	5,507	(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. 986. Federal R&D Obligations to Selected Universities and Colleges: 1981 to 1998

[In millions of dollars (4,410.9 represents $4,410,900,000), except rank. For fiscal years ending in year shown; see text, Section 9, State and Local Government. 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	1998	1981	1985	1995	1998
Total, all institutions [1]	**4,410.9**	**6,246.2**	**12,180.9**	**13,847.4**	**(X)**	**(X)**	**(X)**	**(X)**
45 institutions, percent of total	61.6	60.1	58.6	59.3	(X)	(X)	(X)	(X)
Johns Hopkins University	363.4	297.4	569.3	618.4	1	1	1	1
University of Washington	100.0	146.2	299.7	335.5	4	4	2	2
Stanford University	106.1	175.0	266.7	329.7	3	3	4	3
University of Michigan	74.0	108.0	243.6	288.6	11	11	5	4
University of Pennsylvania	76.1	103.1	202.3	273.6	10	15	10	5
University of California—San Diego	91.4	103.6	239.2	262.2	6	13	6	6
University of California—Los Angeles	94.9	128.2	216.4	246.4	5	5	7	7
Massachusetts Institute of Technology	146.0	189.6	280.3	242.7	2	2	3	8
Harvard University	87.8	109.4	191.5	229.5	7	9	13	9
University of California—San Francisco	64.8	98.5	201.8	221.4	15	16	12	10
Columbia University—Main Division	83.7	127.3	185.7	220.6	9	6	14	11
Yale University	73.5	109.2	179.5	216.1	12	10	15	12
University of Colorado	46.1	71.4	165.4	214.9	22	23	17	13
Washington University	54.2	72.0	165.4	212.8	17	22	18	14
University of Wisconsin—Madison	86.9	124.6	207.7	210.9	8	7	8	15
Duke University	44.3	69.2	155.0	198.8	23	26	20	16
University of Minnesota	72.0	103.3	202.8	198.8	14	14	9	17
Cornell University	72.7	120.0	202.2	196.0	13	8	11	18
University of Pittsburgh	38.5	58.6	166.3	193.5	29	28	16	19
University of North Carolina at Chapel Hill	38.4	63.1	156.3	182.7	30	27	19	20
Pennsylvania State University	47.1	76.7	152.5	176.5	21	19	21	21
University of California—Berkeley	64.1	106.7	142.4	173.3	16	12	23	22
University Southern California	49.2	89.7	152.2	167.1	20	17	22	23
University of Alabama—Birmingham	30.0	44.1	120.2	160.7	44	46	26	24
Case Western Reserve University	33.7	48.0	127.4	151.1	38	40	25	25
California Institute of Technology	33.0	55.1	113.7	133.8	40	32	29	26
University of Illinois—Urbana Champaign	53.6	83.1	115.7	130.9	19	18	28	27
University of Rochester	43.0	70.4	107.6	129.8	25	25	30	28
University of Arizona	36.3	49.7	137.1	129.8	33	37	24	29
Boston University	27.0	46.2	86.1	125.0	51	43	41	30
University of Chicago	54.0	71.2	106.7	121.6	18	24	31	31
Northwestern University	32.4	48.3	101.9	119.7	47	39	32	32
University of California—Davis	31.8	43.2	98.9	118.5	42	47	33	33
Baylor College of Medicine	35.1	45.8	84.1	115.2	35	45	43	34
The Scripps Research Institute	-	-	83.2	113.2	(NA)	(NA)	44	35
University of Iowa	35.3	55.1	93.9	112.6	34	31	36	36
Emory University	17.4	27.0	75.8	109.6	72	70	49	37
Vanderbilt University	27.4	39.9	94.4	108.3	49	48	35	38
University of Texas at Austin	43.8	72.4	115.9	107.4	24	21	27	39
Indiana University	29.3	39.1	89.0	105.9	45	49	39	40
New York University	40.6	74.6	85.5	104.3	28	20	42	41
Ohio State University	42.9	56.1	96.5	101.3	26	30	34	42
University of Virginia	24.3	37.4	79.0	100.6	52	52	48	43
University of Florida	30.8	47.7	82.5	98.5	43	41	45	44
University of Utah	38.2	50.9	93.8	97.3	31	36	37	45

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. 987. Percentage of U.S. Scientific and Technical Articles Which Are Coauthored and Internationally Coauthored: 1986 to 1997

[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			
	1986-88	1989-91	1992-94	1995-97	1986-88	1989-91	1992-94	1995-97
Science and engineering, total	**46.4**	**49.4**	**52.9**	**56.8**	**9.8**	**11.8**	**14.9**	**18.0**
Physics	43.5	47.9	54.3	59.3	16.1	19.1	24.7	30.1
Chemistry	31.2	34.5	38.6	42.6	10.0	11.6	14.5	16.9
Earth & space science	48.8	53.3	58.2	63.1	16.7	20.2	24.2	28.7
Mathematics	40.0	42.8	46.8	49.6	19.7	21.0	24.3	26.8
Biology	37.9	42.5	46.0	50.1	8.7	11.1	13.1	15.9
Biomedical research	51.1	54.7	58.8	61.8	11.8	14.0	17.0	19.5
Clinical medicine	59.6	61.4	63.3	66.4	7.8	9.5	12.2	15.0
Engineering	35.5	39.3	43.3	47.0	9.8	11.5	13.8	16.5
Psychology	36.5	38.5	41.3	43.6	4.3	5.7	6.9	8.9
Social science	29.6	30.8	32.9	35.8	6.4	7.0	8.8	10.3
Health & professional fields	32.9	34.9	36.1	39.6	3.3	3.8	4.6	6.5

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

No. 988. Citations on U.S. Patents to the U.S. Scientific and Technical Literature by Cited Field: 1990 to 1998

[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 three years from the patent data. For example, 1997 citations are to articles published in 1993-95]

Science field	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total	**12,936**	**15,720**	**19,425**	**26,721**	**27,437**	**32,536**	**47,142**	**74,839**	**108,335**
Physics	2,169	2,424	2,667	3,024	3,589	3,366	3,506	4,150	4,719
Chemistry	1,673	1,921	2,451	3,027	3,114	3,689	4,535	6,218	6,900
Earth & space science	76	123	94	93	122	134	195	207	285
Mathematics	3	2	18	21	14	19	25	30	35
Biology	306	437	436	548	677	812	1,349	1,508	2,426
Biomedical research	3,818	5,199	6,945	10,735	10,332	12,719	20,646	36,397	55,891
Clinical medicine	3,415	4,205	5,293	7,393	7,215	9,173	13,637	22,649	33,437
Engineering technology	1,443	1,401	1,492	1,850	2,346	2,593	3,207	3,589	4,452
Psychology	30	2	24	26	15	25	11	52	91
Social sciences	-	-	1	-	-	-	1	-	10
Health & professional fields	1	2	1	-	10	2	24	33	88

- Represents zero.

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

No. 989. Percentage of Citations to Foreign Articles in U.S. Scientific and Technical Public Publications: 1990 to 1997

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

Science field	1990	1991	1992	1993	1994	1995	1996	1997
Total science & engineering	**29.6**	**29.9**	**30.4**	**31.0**	**31.7**	**32.1**	**32.9**	**33.5**
Physics	34.4	34.9	34.6	35.5	36.9	38.0	39.4	40.9
Chemistry	36.4	36.1	37.3	37.6	38.6	38.1	39.3	40.7
Earth & space science	28.8	28.7	28.5	29.7	29.7	29.6	31.2	32.0
Mathematics	29.5	31.0	30.9	29.9	29.8	31.7	32.5	32.7
Biology	28.7	29.4	29.5	29.9	29.5	30.4	32.3	33.4
Biomedical research	29.8	29.9	30.4	30.9	31.5	31.6	32.0	32.3
Clinical medicine	30.0	30.4	31.4	32.0	32.8	33.4	34.2	34.5
Engineering technology	26.7	27.5	26.9	26.7	29.4	28.7	29.6	31.8
Psychology	17.8	17.7	17.5	17.7	17.7	18.2	19.2	20.2
Social science	14.7	14.9	14.4	14.7	15.1	15.6	16.9	17.2
Health & professional fields	9.5	9.3	9.3	9.8	9.9	9.9	10.1	10.7

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

No. 990. Funds for Performance of Industrial R&D by Source of Funds and Selected Industries: 1980 to 1998

[In millions of dollars (44,505 represents $44,505,000,000). For calendar years. Covers basic research, applied research, and development]

Industry	1987 SIC [1] code	1980	1985	1990	1995	1997	1998
CURRENT DOLLARS							
Total funds	(X)	44,505	84,239	109,727	132,103	157,539	169,180
Chemicals and allied products	28	4,636	8,540	13,291	17,547	(D)	21,764
Petroleum refining and extraction	13,29	1,552	(D)	2,306	1,760	(D)	1,808
Machinery	35	5,901	12,216	14,446	(D)	18,499	14,919
Electrical equipment	36	9,175	14,432	13,400	18,751	24,585	25,990
Motor vehicles and motor vehicles equipment	371	4,955	6,984	(D)	(D)	(D)	(D)
Aircraft and missiles	372,376	9,198	22,231	20,635	16,951	16,296	14,449
Professional and scientific instruments	38	3,029	5,013	7,055	11,976	13,458	(D)
All other [2]	(X)	6,059	(D)	(D)	(D)	(D)	(D)
Company funds	(X)	30,476	57,043	81,602	108,652	133,611	145,016
Chemicals and allied products	28	4,264	8,310	13,168	17,337	18,628	21,282
Petroleum refining and extraction	13,29	1,401	2,194	2,289	1,754	1,612	1,802
Machinery	35	5,254	10,721	13,575	9,676	18,393	14,846
Electrical equipment	36	5,431	9,271	9,267	17,060	22,747	24,378
Motor vehicles and motor vehicles equipment	371	4,300	6,164	8,594	13,590	13,758	13,502
Aircraft and missiles	372,376	2,570	5,649	5,387	5,489	5,677	5,108
Professional and scientific instruments	38	2,456	4,622	6,318	8,516	8,958	9,625
All other [2]	(X)	4,800	10,112	23,004	35,230	43,838	54,473
CONSTANT (1996) DOLLARS [3]							
Total funds	(X)	77,535	113,683	126,414	134,524	154,906	164,412
Chemicals and allied products	28	8,077	11,525	15,312	17,869	(D)	21,151
Petroleum refining and extraction	13,29	2,704	(D)	2,657	1,792	(D)	1,757
Machinery	35	10,280	16,486	16,643	(D)	18,190	14,499
Electrical equipment	36	15,984	19,476	15,438	19,095	24,174	25,258
Motor vehicles and motor vehicles equipment	371	8,632	9,425	(D)	(D)	(D)	(D)
Aircraft and missiles	372,376	16,024	30,001	23,773	17,262	16,024	14,042
Professional and scientific instruments	38	5,277	6,765	8,128	12,196	13,233	(D)
All other [2]	(X)	10,556	(D)	(D)	(D)	(D)	(D)
Company funds	(X)	53,094	76,981	94,012	110,644	131,378	140,929
Chemicals and allied products	28	7,429	11,215	15,171	17,655	18,317	20,682
Petroleum refining and extraction	13,29	2,441	2,961	2,637	1,786	1,585	1,751
Machinery	35	9,153	14,468	15,639	9,853	18,086	14,428
Electrical equipment	36	9,462	12,511	10,676	17,373	22,367	23,691
Motor vehicles and motor vehicles equipment	371	7,491	8,318	9,901	13,839	13,528	13,121
Aircraft and missiles	372,376	4,477	7,623	6,206	5,590	5,582	4,964
Professional and scientific instruments	38	4,279	6,238	7,279	8,672	8,808	9,354
All other [2]	(X)	8,362	13,646	26,502	35,876	43,105	52,938

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable. [1] Prior to 1993, 1972 Standard Industrial Classification; beginning 1993, 1987 Standard Industrial Classification; see text, Section 17, Business. [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. 991. R&D Funds in R&D-Performing Manufacturing Companies by Industry: 1980 to 1998

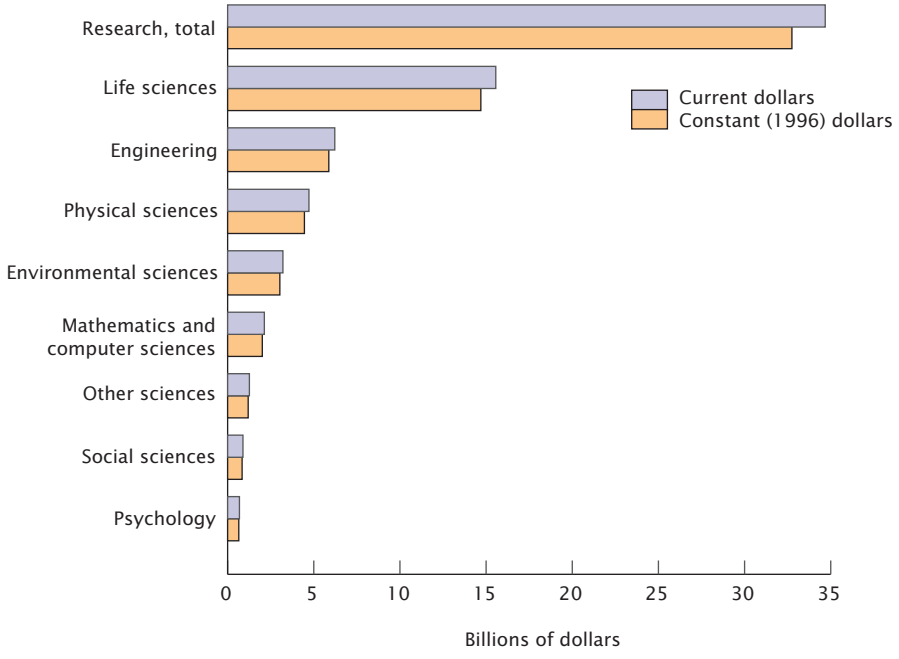
Industry	1987 SIC [1] code	Total R&D funds as a percent of net sales					Company R&D funds as a percent of net sales				
		1980	1990	1995	1997	1998	1980	1990	1995	1997	1998
Total [2]	(X)	3.0	4.2	3.6	3.9	3.6	2.1	3.1	2.9	2.9	3.1
Food and kindred products [3]	20	0.4	(D)	0.5	0.5	0.4	(D)	0.5	0.5	0.5	0.4
Paper and allied products	26	1.0	1.0	(D)	(D)	(D)	1.0	1.0	1.0	1.1	1.0
Chemicals and allied products	28	3.6	5.3	4.7	(D)	6.5	3.3	5.3	4.7	5.3	6.4
Petroleum refining and extraction	13,29	0.6	0.9	0.7	(D)	0.8	0.5	0.9	0.7	0.6	0.8
Rubber products	30	2.2	(D)	(D)	(D)	(D)	(D)	2.1	1.6	1.4	2.1
Stone, clay, and glass products	32	1.4	(D)	1.5	1.8	(D)	1.3	1.7	1.5	1.8	1.4
Primary metals	33	0.7	0.8	0.5	0.7	(D)	0.5	0.8	0.5	0.6	0.6
Fabricated metal products	34	1.4	1.4	1.1	1.6	1.4	1.2	1.1	1.1	1.5	1.4
Machinery	35	5.0	7.7	(D)	5.6	5.1	4.5	7.2	3.6	5.6	5.1
Electrical equipment	36	6.6	6.5	6.0	6.2	7.1	3.9	4.5	5.4	5.7	6.6
Motor vehicles and motor vehicle equipment	371	4.9	(D)	(D)	(D)	(D)	4.2	3.7	3.6	3.8	2.2
Aircraft and missiles	372,376	13.7	11.8	12.9	11.2	9.3	3.8	3.1	4.2	3.9	3.3
Professional and scientific instruments	38	7.5	8.0	10.3	11.6	(D)	6.1	7.1	7.3	7.7	8.0

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable. [1] Prior to 1994, 1972 Standard Industrial Classification; beginning 1994, 1987 Standard Industrial Classification; see text, Section 17, Business. [2] Includes all manufacturing industries. [3] Includes tobacco products (SIC 21) beginning 1985.

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

Figure 20.2

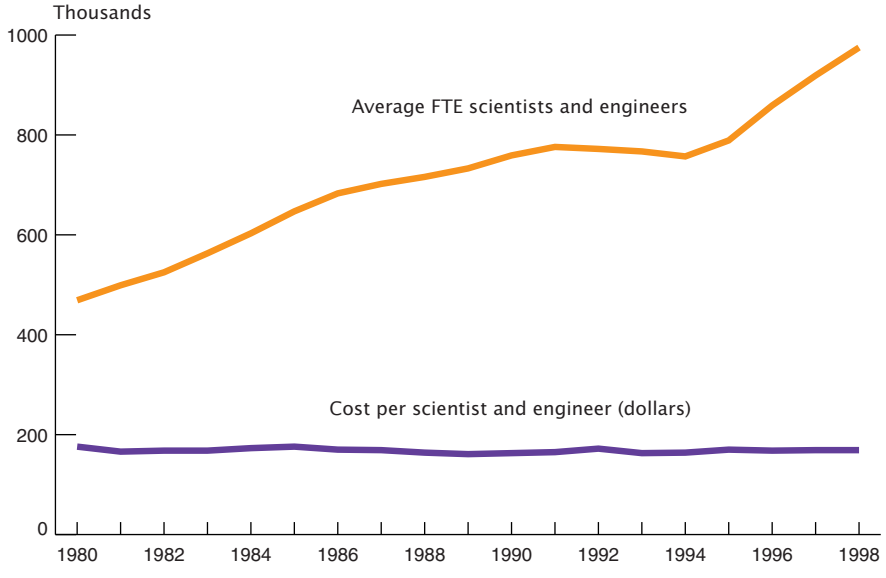
Federal Obligations for Research, by Field of Science in Current and Constant (1996) dollars: 2000



Source: Chart prepared by U.S. Bureau of the Census. For data, see Table 992.

Figure 20.3

R&D Scientists and Engineers Employment and Cost: 1980 to 1998



Source: Chart prepared by U.S. Bureau of the Census. For data, see Table 993.

No. 992. Federal Obligations for Research by Field of Science: 1980 to 2000

[In millions of dollars (11,597 represents $11,597,000,000). For fiscal years ending in year shown; see text, Section 9, State and Local Government. Excludes R&D plant]

Field	1980	1985	1990	1995	1996	1997	1998	1999, prel.	2000, prel.
CURRENT DOLLARS									
Research, total	**11,597**	**16,133**	**21,622**	**28,434**	**28,260**	**29,365**	**30,922**	**33,822**	**34,680**
Life sciences	4,192	6,363	8,830	11,811	12,064	12,661	13,558	15,385	15,562
Psychology	199	327	449	623	525	545	591	662	686
Physical sciences	2,001	3,046	3,809	4,278	3,923	4,149	4,210	4,457	4,719
Environmental sciences	1,261	1,404	2,174	2,854	3,020	3,046	3,062	3,171	3,209
Mathematics and computer sciences	241	575	841	1,579	1,572	1,672	1,837	2,008	2,131
Engineering	2,830	3,618	4,227	5,708	5,681	5,690	5,895	6,092	6,219
Social sciences	524	460	630	679	655	696	806	895	890
Other sciences, n.e.c. [1]	350	342	664	902	821	905	964	1,153	1,264
CONSTANT (1996) DOLLARS [2]									
Research, total	**20,592**	**21,855**	**25,043**	**28,982**	**28,260**	**28,874**	**30,022**	**32,427**	**32,747**
Life sciences	7,444	8,619	10,227	12,039	12,064	12,450	13,163	14,751	14,695
Psychology	353	443	520	635	525	536	574	634	648
Physical sciences	3,552	4,126	4,412	4,361	3,923	4,080	4,087	4,273	4,456
Environmental sciences	2,239	1,902	2,518	2,909	3,020	2,995	2,973	3,040	3,030
Mathematics and computer sciences	428	779	974	1,610	1,572	1,644	1,783	1,925	2,012
Engineering	5,025	4,901	4,895	5,818	5,681	5,595	5,724	5,840	5,872
Social sciences	930	623	730	692	655	685	783	858	840
Other sciences, n.e.c. [1]	621	463	769	919	821	890	936	1,105	1,193

[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. 993. R&D Scientists and Engineers—Employment and Cost by Industry: 1980 to 1998

[469.2 represents 469,200. Data are estimates; on average full-time-equivalent (FTE) basis]

Industry	1987 SIC [1] code	1980	1985	1990	1993	1994	1995	1996	1997	1998
EMPLOYED SCIENTISTS										
Average FTE of scientists and engineers (1,000) [2 3]	**(X)**	**469.2**	**646.8**	**758.5**	**766.6**	**757.3**	**789.5**	**859.3**	**918.6**	**974.6**
Chemicals [4]	28	53.1	73.5	81.0	89.8	96.4	97.0	91.7	89.3	90.1
Machinery	35	65.7	85.7	111.5	83.9	69.5	78.0	88.0	100.4	104.1
Electrical equipment [5]	36	100.7	115.6	100.55	92.9	99.9	114.6	130.9	153.8	172.7
Motor vehicles	371	36.7	31.3	47.35	48.1	51.1	54.1	60.4	64.0	63.5
Aircraft and missiles	372,376	90.6	137.5	107.75	85.4	68.2	79.5	95.1	85.8	71.7
CONSTANT (1996) DOLLARS [6]										
Cost per scientist or engineer ($1,000) [3 7]	**(X)**	**176.4**	**175.7**	**162.8**	**162.8**	**163.8**	**170.4**	**168.4**	**168.6**	**168.7**
Chemicals [4]	28	162.5	157.0	183.2	(D)	(D)	184.3	(D)	(D)	235
Machinery	35	167.1	192.3	159.6	106.8	(D)	(D)	152.9	181.2	139.2
Electrical equipment [5]	36	169.3	168.6	164.5	153.6	158.8	166.6	171.9	157.2	146.2
Motor vehicles	371	251.3	301.1	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Aircraft and missiles	372,376	188.8	218.2	246.2	187.3	194.5	217.2	170.7	186.8	195.8

D Withheld to avoid disclosure. X Not applicable. [1] Prior to 1992, 1972 Standard Industrial Classification; beginning 1992, 1987 Standard Industrial Classification; see text, Section 17, Business. [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] Includes allied products. [5] Includes communication. [6] Based on gross domestic product implicit price deflator. [7] 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. 994. Civilian Employment of Scientists, Engineers, and Technicians by Occupation and Industry: 1998

[In thousands (5,818.5 represents 5,818,500). Based on sample and subject to sampling error. For details, see source]

Occupation	Total [1]	Wage and salary workers								Self employed [5]
		Mining [2]	Construction	Manufacturing	Transportation [3]	Trade	Fire [4]	Services	Government	
Scientists, engineers, and technicians	5,818.5	45.4	82.8	1,427.9	260.6	308.6	311.7	2,316.1	692.7	356.5
Scientists	711.9	8.3	0.3	57.9	6.7	8.6	13.8	274.2	198.5	120.7
Physical scientists	200.6	8.2	0.2	54.2	3.6	3.0	0.4	75.4	45.7	8.0
Life scientists	176.7	0.1	(NA)	(NA)	1.0	1.6	0.5	69.5	73.5	6.6
Mathematical scientists	14.0	(NA)	(NA)	2.0	0.1	-	1.0	6.9	4.0	(NA)
Social scientists	320.6	(NA)	(NA)	1.7	2.0	1.0	11.9	122.4	75.3	106.1
Computer systems analysts, engineers and scientists	1,530.1	4.9	3.5	214.5	66.8	100.6	211.5	714.1	124.2	114.0
Engineers [6]	1,464.0	15.0	35.4	667.0	77.3	47.4	13.2	390.4	166.1	49.9
Civil engineers	195.0	0.7	13.5	5.9	4.2	0.9	11.3	93.6	63.6	12.0
Electrical/electronics	357.0	0.4	6.8	163.4	35.4	14.9	1.5	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	1,354.2	13.3	39.6	428.9	75.2	103.8	6.9	490.5	151.7	33.3
Electrical/electronics technicians	334.8	0.9	15.6	113.7	29.2	71.9	2.0	78.0	16.2	5.8
Engineering technicians	771.3	2.7	6.5	259.8	54.4	91.0	2.6	227.1	101.1	8.2
Drafters	285.0	1.0	17.0	84.2	13.0	7.4	1.1	130.4	9.7	17.6
Science technicians	228.8	8.7	0.4	84.7	(NA)	5.4	2.8	86.3	28.6	4.6
Surveyors [7]	110.1	2.1	2.8	0.2	(NA)	-	0.2	75.9	18.2	7.8
Computer programmers	648.2	1.8	1.2	59.4	34.9	48.2	66.1	371.0	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, photogramnotrists, and surveying and mapping technicians.

Source: U.S. Bureau of Labor Statistics, *Monthly Labor Review,* November 1999; and unpublished data. (Data collected biennially.)

No. 995. Graduate Science/Engineering Students in Doctorate-Granting Colleges: 1985 to 1998

[355.8 represents 355,800. As of fall. Includes outlying areas]

Field of science or engineering	Total (1,000)			Percent—							
				Female			Foreign		Part time		
	1985	1990	1998	1985	1990	1998	1990	1998	1985	1990	1998
Total, all surveyed fields	355.8	398.8	422.8	34.5	37.6	44.4	25.4	24.1	32.4	31.1	28.7
Science/engineering	317.2	351.7	356.9	29.5	32.4	38.9	27.7	27.2	30.7	28.9	27.0
Engineering, total	90.2	99.8	93.8	11.5	13.6	19.0	36.6	39.3	39.7	35.9	32.0
Sciences, total	226.9	251.9	263.1	36.6	39.8	45.9	24.1	22.9	27.2	26.1	25.2
Physical sciences	29.4	32.5	29.1	20.5	23.4	28.1	37.0	35.7	11.9	11.3	11.6
Environmental	14.1	12.9	12.8	25.3	29.1	38.0	20.1	19.0	23.8	23.6	22.0
Mathematical sciences	15.4	17.5	14.4	29.0	30.6	34.8	35.5	35.1	27.6	24.5	22.9
Computer sciences	24.2	28.1	31.1	25.2	23.2	27.2	32.7	40.1	48.6	47.2	43.8
Agricultural sciences	10.9	10.6	11.0	25.8	29.3	39.6	28.8	23.1	18.4	17.9	22.6
Biological sciences	42.2	46.4	52.7	42.5	45.5	50.3	24.2	21.2	16.1	14.8	14.5
Psychology	30.8	35.9	39.8	59.7	65.6	69.7	4.6	5.0	30.6	29.0	27.0
Social sciences	59.9	68.0	72.2	39.8	42.8	49.5	21.7	19.6	34.4	32.9	31.0
Health fields, total	38.7	47.2	65.9	75.7	76.9	74.3	8.6	7.4	46.2	47.4	37.8

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

No. 996. 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. 997. 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. 998. 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. 999. Federal Outlays for General Science, Space, and Other Technology: 1980 to 1999, and Projections 2000 to 2005

[In billions of dollars (5.8 represents $5,800,000,000). For fiscal years ending in year shown; see text, Section 9, State and Local Government]

Year	Current dollars			Constant (1996) dollars		
	Total	General science/basic research	Space and other technologies	Total	General science/basic research	Space and other technologies
1980	5.8	1.4	4.5	11.5	2.7	8.8
1985	8.6	2.0	6.6	12.8	3.0	9.8
1990	14.4	2.8	11.6	18.2	3.6	14.7
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	17.0	4.1	12.9
1998	18.2	5.4	12.9	17.6	5.1	12.5
1999	18.1	5.7	12.4	17.3	5.4	11.9
2000, est.	18.9	6.3	12.6	17.7	5.8	11.9
2001, est.	19.6	6.9	12.7	18.1	6.3	11.8
2002, est.	20.5	7.4	13.1	18.6	6.7	11.9
2003, est.	21.2	7.7	13.5	18.8	6.8	12.1
2004, est.	21.6	7.7	13.9	18.9	6.7	12.2
2005, est.	22.2	7.8	14.3	19.0	6.7	12.3

Source: U.S. Office of Management and Budget, *Budget of the United States, Historical Tables, Fiscal Year 2001,* annual.

No. 1000. 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 [2]	4.8	6.3	7.4	9.8	12.2
Ground equipment manufacturing [3]	4.3	6.5	7.8	8.6	9.5

[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.

No. 1001. 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 1000 and 1001: Satellite Industry Association/Futron Corporation, Bethesda, MD, *1999 Satellite Survey* (copyright).

No. 1002. National Aeronautics and Space Administration—Budget Summary: 1999 and Projections 2000 to 2005

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

Item	1999	2000	2001	2002	2003	2004	2005
Total	**13,653.0**	**13,600.8**	**14,035.3**	**14,465.4**	**14,769.2**	**15,305.4**	**15,570.3**
Human space flight	5,480.0	5,467.7	5,499.9	5,387.6	4,939.0	4,817.4	4,686.3
International space station	2,299.7	2,323.1	2,114.5	1,858.5	1,452.5	1,327.0	1,275.0
Space flight operations (space shuttle)	2,998.3	2,979.5	3,165.7	3,307.8	3,264.9	3,253.3	3,169.5
Payload utilization and operations	182.0	165.1	(NA)	(NA)	(NA)	(NA)	(NA)
Payload and elv support	(X)	(X)	90.2	90.3	91.5	97.0	101.7
Investments and support	(X)	(X)	129.5	131.0	130.1	140.1	140.1
Science, aeronautics and technology	5,653.9	5,580.9	5,929.4	6,388.9	6,993.9	7,571.3	7,913.5
Space science	2,119.2	2,192.8	2,398.8	2,606.4	2,961.4	3,298.8	3,577.9
Life and microgravity sciences and applications	263.5	274.7	302.4	300.3	304.1	323.2	326.0
Earth science	1,413.8	1,443.4	1,405.8	1,332.5	1,293.3	1,303.4	1,306.3
Aerospace technology	1,338.9	1,124.9	1,193.0	1,548.9	1,948.8	2,244.7	2,302.6
Mission communication services	380.0	406.3	(NA)	(NA)	(NA)	(NA)	(NA)
Space operations	(X)	(X)	529.4	500.8	386.3	301.2	300.7
Academic programs	138.5	138.8	100.0	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	2,945.1
Safety, mission assurance, engineering and advanced concepts	35.6	43.0	47.5	51.5	51.5	51.5	51.5
Space communication services	185.8	89.7	(NA)	(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	2,662.6
Construction of facilities	168.5	181.9	245.9	231.0	279.0	271.0	231.0
Inspector General	19.6	20.0	22.0	22.7	23.6	24.5	25.4

NA Not available. X Not applicable.

Source: U.S. National Aeronautics and Space Administration, Internet site <http://ifmp.nasa.gov/codeb/budget/2000?HTML/MYB.htm>.

No. 1003. NASA Space Shuttle Operations Expenditures: 1996 to 2001

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

Operation	1996	1997	1998	1999	2000	2001
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/budget2001/html>.

No. 1004. World-Wide Successful Space Launches: 1957 to 1999

[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	1998	1999
Total	**4,042**	**289**	**586**	**555**	**607**	**605**	**550**	**466**	**384**	**77**	**73**
Soviet Union/Russia [1]	2,598	82	302	405	461	483	447	283	135	24	26
United States	1,188	207	279	139	126	93	61	122	161	34	30
Japan	54	-	-	5	10	12	11	9	7	2	-
ESA [2]	117	-	-	-	1	8	21	33	54	11	10
China	59	-	-	2	6	6	9	15	21	6	4
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	(NA)	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. 1005. Space Shuttle Launches—Summary: 1981 to May 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	55	04/26/93	Columbia	7	10
2	11/12/81	Columbia	2	2	57	06/21/93	Endeavour	6	10
3	03/22/82	Columbia	2	8	51	09/12/93	Discovery	5	10
4	06/27/82	Columbia	2	7	58	10/18/93	Columbia	7	14
5	11/11/82	Columbia	4	5	61	12/02/93	Endeavour	7	11
6	04/04/83	Challenger	4	5	60	02/03/94	Discovery	6	8
7	06/18/83	Challenger	5	6	62	03/04/94	Columbia	5	14
8	08/30/83	Challenger	5	6	59	04/09/94	Endeavour	6	11
9	11/28/83	Columbia	6	10	65	07/08/94	Columbia	7	15
10	02/03/84	Challenger	5	8	64	09/09/94	Discovery	6	11
11	04/06/84	Challenger	5	7	68	09/30/94	Endeavour	6	11
12	08/30/84	Discovery	6	7	66	11/03/94	Atlantis	6	11
13	10/05/84	Challenger	7	8	63	02/03/95	Discovery	6	8
14	11/08/84	Discovery	5	8	67	03/02/95	Endeavour	7	17
15	01/24/85	Discovery	5	4	71	06/27/95	Atlantis	7/8	10
16	04/12/85	Discovery	7	7	70	07/13/95	Discovery	5	9
17	04/29/85	Challenger	7	7	69	09/07/95	Endeavour	5	11
18	06/17/85	Discovery	7	7	73	10/20/95	Columbia	7	16
19	07/29/85	Challenger	7	8	74	11/08/95	Atlantis	5	8
20	08/27/85	Discovery	5	7	72	01/11/96	Endeavour	6	9
21	10/03/85	Atlantis	5	4	75	02/22/96	Columbia	7	16
22	10/30/85	Challenger	8	7	76	03/22/96	Atlantis	6/5	9
23	11/26/85	Atlantis	7	7	77	05/19/96	Endeavour	6	10
24	01/12/86	Columbia	7	6	78	06/20/96	Columbia	7	17
25	01/28/86	Challenger	7	-	79	09/16/96	Atlantis	6	10
26	09/29/88	Discovery	5	4	80	11/20/96	Columbia	5	18
27	12/02/88	Atlantis	5	4	81	01/12/97	Atlantis	6	10/5
29	03/13/89	Discovery	5	5	82	02/11/97	Discovery	7	10/0
30	05/04/89	Atlantis	5	4	83	04/04/97	Columbia	7	3/23
28	08/08/89	Columbia	5	5	84	05/15/97	Atlantis	7/7	9/5
34	10/18/89	Atlantis	5	5	94	07/01/97	Columbia	7	15/7
33	11/22/89	Discovery	5	5	85	08/07/97	Discovery	5	11/20
32	01/09/90	Columbia	5	11	86	09/25/97	Atlantis	7/7	10/19
36	02/28/90	Atlantis	5	4	87	11/19/97	Columbia	6	15/17
31	04/24/90	Discovery	5	5	89	01/22/98	Endeavor	7/7	8/20
41	10/06/90	Discovery	5	4	90	04/17/98	Columbia	7	15/22
38	11/15/90	Atlantis	5	5	91	06/02/98	Discovery	6/7	9/19
35	12/02/90	Columbia	7	9	95	11/20/98	Discovery	7	8/22
37	04/05/91	Atlantis	5	6	88	12/04/98	Endeavor	6	11/19
39	04/28/91	Discovery	7	8	96	05/27/99	Discovery	7	9/19
40	06/05/91	Columbia	7	9	93	07/23/99	Columbia	5	4/24
43	08/02/91	Atlantis	5	9	103	12/19/99	Atlantis	7	7/23
48	09/12/91	Discovery	5	5	99	02/11/00	Endeavor	6	11/4
44	11/24/91	Atlantis	6	7	101	05/19/00	Atlantis	7	10/19
42	01/22/92	Discovery	7	8					
45	03/24/92	Atlantis	7	9	FUTURE				
49	05/07/92	Endeavour	7	9	MISSIONS				
50	06/25/92	Columbia	7	14	IN WORK				
46	07/31/92	Atlantis	7	8					
47	09/12/92	Endeavour	7	8	92	10/05/00	Discovery	7	10
52	10/22/92	Columbia	6	10	97	11/30/00	Endeavor	5	9
53	12/02/92	Discovery	5	7	98	01/18/01	Atlantis	5	10
54	01/13/93	Endeavour	5	6	102	02/15/01	Discovery	10	11
56	04/08/93	Discovery	5	9	100	04/19/01	Atlantis	5	11

- Represents zero.

Source: U.S. National Aeronautics and Space Administration, Internet site <http://www.ksc.nasa.gov/shuttle/missions/missions.html> (accessed 1 August 2000).

No. 1006. Nobel Prize Laureates in Selected Sciences: 1901 to 1998

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

Country	1901-1997				1901-1930	1931-1945	1946-1960	1961-1975	1976-1990	1991-1997	1998
	Total	Physics	Chemistry	Physiology/Medicine							
Total	456	157	131	168	93	49	74	92	98	42	8
United States	198	70	46	82	6	14	38	41	63	28	8
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	87	28	21	38	30	11	13	13	15	6	-

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

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