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 the *Science Resources Studies Highlights* summaries series; Detailed Statistical Tables; 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; Science and Engineering Personnel—A National Overview; Women and Minorities in Science and Engineering;* science and technology data presented in chart and tabular form in a pocket-size publication; *International Science and Technology Data Update;* profiles on human resources and funding in individual fields of science and engineering; *Federal Funds for Research and Development; Federal R&D Funding by Budget Function; Federal Support to Universities, Colleges, and Selected Nonprofit Institutions; Scientific and Engineering Facilities at Universities and Colleges; Geographic Distribution of Industrial R&D Expenditures; Research and Development in Industry;* R&D funds and graduate enrollment and support in academic science and engineering; characteristics of doctoral scientists and engineers and of recent graduates in the United States; *U.S. Scientists and Engineers;* and scientists, engineers, and technicians in manufacturing, nonmanufacturing, and trade and regulated industries. 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 details.

In Brief

R&D expenditures in constant (1987) dollars:

1970	*74.6 bil.*
1980	*87.6 bil.*
1996	*140.9 bil.*

Federal outlays for space and technologies in constant 1992 dollars:

1970	*13.1 bil.*
1980	*7.6 bil.*
1990	*12.6 bil.*
1997	*10.7 bil.*

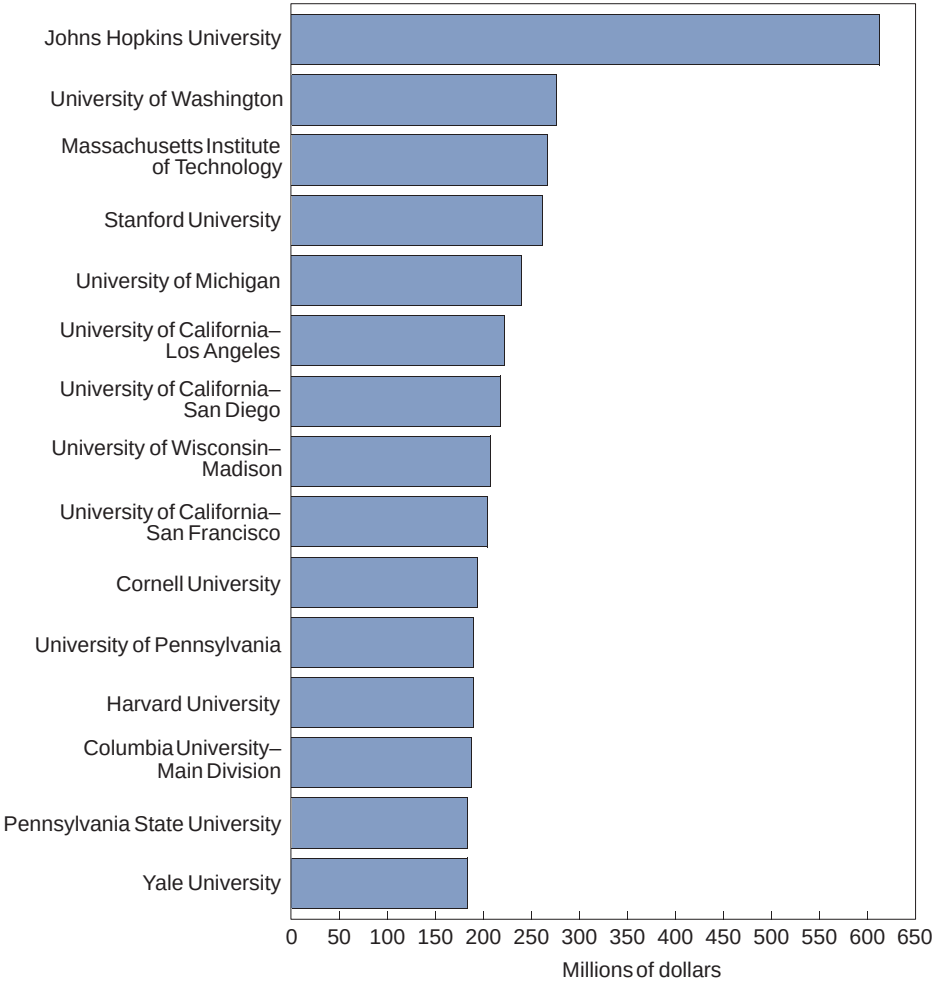
The National Science Board's biennial *Science and Engineering Indicators* contains data and analyses of international and domestic science and technology, including measures of inputs and outputs. *The Budget of the United States Government,* published by the U.S. Office of Management and Budget, contains summary financial data on Federal R&D programs.

Research and development outlays—NSF defines research as a "systematic and intensive study directed toward a fuller knowledge of the subject studied" and development as "the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, methods, or 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 (FFRDC's) they administer; (3) *universities and colleges,* composed of universities, colleges, and their affiliated institutions, agricultural experiment stations, and associated schools of agriculture, and FFRDC's administered by educational institutions; and (4) *other nonprofit institutions,* consisting of such

organizations as private philanthropic foundations, nonprofit research institutes, voluntary health agencies, and FFRDC's 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
Top 15 Universities—Federal Research and Development Obligations: 1994



Source: Chart prepared by U.S. Bureau of the Census. For data, see table 970.

No. 961. R&D Expenditures: 1960 to 1996

[Includes basic research, applied research, and development. Defense-related outlays comprise all research and development spending by Dept. of Defense, including space activities, and a portion of Department of Energy funds. Space-related outlays are those of the National Aeronautics and Space Administration; they exclude space activities of other Federal agencies, estimated at less than 5 percent of all space research and development spending. Minus sign (-) indicates decrease]

YEAR	CURRENT DOLLARS (bil. dol.)			CONSTANT (1987) DOLLARS [1]		ANNUAL PERCENT CHANGE [3]		PERCENT OF TOTAL R&D OUTLAYS				
								Federally funded defense/space-related			Other outlays	
	Total	Defense space related	Other	Total (bil. dol.)	Percent of GDP [2]	Current dollars	Constant dollars	Total	Defense	Space	Non-Federal	Federal
1960	13.5	7.5	6.0	52.0	2.6	9.4	7.6	55	52	3	35	9
1965	20.0	10.8	9.3	70.6	2.9	6.3	3.7	54	33	21	35	11
1970	26.1	11.4	14.7	74.6	2.6	2.0	-3.2	44	33	10	43	13
1974	32.9	11.8	21.1	73.9	2.3	7.0	-1.4	36	29	7	49	15
1975	35.2	12.3	23.0	72.2	2.2	7.2	-2.3	35	27	7	49	17
1976	39.0	13.4	25.6	75.0	2.2	10.8	3.9	34	27	8	49	17
1977	42.8	14.3	28.5	76.7	2.2	9.6	2.2	33	27	7	50	17
1978	48.1	15.3	32.8	80.1	2.2	12.5	4.4	32	26	6	50	18
1979	54.9	16.6	38.4	84.1	2.2	14.2	5.0	30	25	6	51	19
1980	62.6	18.4	44.2	87.6	2.3	13.9	4.3	29	24	5	53	18
1981	71.9	21.2	50.6	91.4	2.4	14.8	4.3	30	24	5	54	17
1982	80.0	24.6	55.4	95.5	2.5	11.3	4.5	31	26	5	54	15
1983	89.1	28.3	60.9	102.3	2.6	11.4	7.1	32	27	4	54	14
1984	101.2	31.8	69.3	111.2	2.7	13.5	8.7	31	28	3	55	14
1985	113.8	37.5	76.3	120.6	2.8	12.5	8.5	33	30	3	54	13
1986	119.6	41.2	78.3	123.3	2.8	5.0	2.3	34	31	3	55	11
1987	125.4	43.7	81.7	125.4	2.8	4.9	1.7	35	32	3	54	11
1988	132.7	44.8	87.9	127.8	2.7	5.9	2.0	34	30	3	55	11
1989	140.8	44.4	96.5	129.9	2.7	6.1	1.6	32	28	4	58	11
1990	151.4	44.7	106.7	134.0	2.7	7.5	3.2	30	25	4	59	11
1991	160.0	43.0	117.0	136.3	2.8	5.7	1.7	27	22	4	62	11
1992	164.4	42.3	122.1	136.2	2.7	2.8	-0.1	26	21	4	63	11
1993	165.0	42.8	122.3	133.8	2.6	0.4	-1.8	26	22	4	63	11
1994	168.1	40.7	127.4	133.5	2.5	1.8	-0.2	24	20	4	64	12
1995, prel.	178.6	41.9	136.7	139.4	2.5	6.2	4.4	23	19	4	65	12
1996, est.	184.3	40.3	144.0	140.9	2.5	3.2	1.1	22	18	4	66	12

[1] Based on GDP implicit price deflator. [2] GDP = Gross Domestic Product. [3] Change from immediate prior year.

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

No. 962. R&D, Source of Funds and Performance Sector: 1970 to 1996

[**In millions of dollars.** See headnote, table 963]

YEAR	Total	SOURCE OF FUNDS				PERFORMANCE SECTOR				
		Federal Govt.	Industry	Univ., colleges	Non-profits	Federal Govt.	Industry	Univ., colleges	Associated FFRDC's [1]	Non-profits
Current dollars:										
1970	26,134	14,891	10,444	462	337	4,079	18,067	2,335	737	916
1980	62,596	29,455	30,912	1,326	903	7,632	44,505	6,063	2,246	2,150
1985	113,819	52,128	57,978	2,369	1,344	12,945	84,239	9,687	3,523	3,425
1988	132,723	59,382	68,044	3,462	1,835	14,115	97,015	13,462	4,531	3,600
1989	140,836	59,799	75,046	3,920	2,071	15,025	102,055	14,976	4,730	4,050
1990	151,392	61,342	83,380	4,329	2,341	15,849	109,727	16,284	4,832	4,700
1991	159,997	60,120	92,485	4,835	2,557	15,138	116,952	17,579	5,078	5,250
1992	164,398	60,192	96,418	5,029	2,759	15,583	119,110	18,808	5,247	5,650
1993	165,048	60,323	96,702	5,137	2,886	16,663	117,400	19,940	5,295	5,750
1994	168,085	60,234	99,361	5,400	3,090	16,139	119,594	21,081	5,271	6,000
1995, prel.	178,550	62,500	107,300	5,600	3,150	16,400	128,700	21,900	5,400	6,150
1996, est.	184,300	61,900	113,450	5,800	3,150	16,200	134,200	22,400	5,400	6,100
Constant (1987) dollars: [2]										
1970	74,597	42,622	29,673	1,335	966	11,789	51,327	6,749	2,130	2,602
1980	87,649	41,385	43,118	1,878	1,268	10,810	62,071	8,588	3,181	2,999
1985	120,600	55,246	61,418	2,512	1,425	13,727	89,236	10,273	3,736	3,628
1988	127,831	57,228	65,492	3,342	1,769	13,625	93,373	12,994	4,374	3,465
1989	129,892	55,188	69,169	3,623	1,911	13,886	94,060	13,841	4,372	3,733
1990	133,999	54,452	73,604	3,865	2,078	14,151	96,846	14,539	4,314	4,148
1991	136,300	51,322	78,652	4,143	2,183	12,972	99,449	15,063	4,351	4,464
1992	136,197	49,962	79,757	4,187	2,290	12,975	98,519	15,660	4,369	4,673
1993	133,780	48,956	78,306	4,176	2,342	13,547	95,061	16,211	4,305	4,656
1994	133,483	47,918	78,802	4,306	2,457	12,870	94,841	16,811	4,203	4,758
1995, prel.	139,408	48,859	83,702	4,385	2,462	12,843	100,390	17,150	4,229	4,797
1996, est.	140,893	47,416	86,611	4,455	2,412	12,442	102,443	17,204	4,147	4,656

[1] Nonprofit institutions. [1] University associated federally-funded R&D centers. [2] Based on gross domestic product implicit price deflator.

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

No. 963. R&D Funds, by Performance Sector: 1980 to 1996

[**In millions of dollars, except percent.** Data primarily on calendar year basis—calendar year data for industry and other nonprofit institutions combined with Federal and university fiscal year data. Data refer, in general, to natural sciences including engineering, and to social sciences in all but industry sector. Excludes capital expenditures data. Expenditures at associated federally funded research and development centers administered by industry and other nonprofit institutions included in totals of respective sectors]

PERFORMANCE SECTOR	1980	1985	1990	1992	1993	1994	1995, prel.	1996, est.
Total R&D [1]	**62,596**	**113,819**	**151,392**	**164,398**	**165,048**	**168,085**	**178,550**	**184,300**
In 1987 dollars [2]	87,649	120,600	133,999	136,197	133,780	133,483	139,408	140,893
Percent Federal as source	47.1	45.8	40.5	36.6	36.5	35.8	35.0	33.6
Percent of gross domestic product	2.3	2.8	2.7	2.7	2.6	2.5	2.5	2.5
Federal Government	7,632	12,945	15,849	15,583	16,663	16,139	16,400	16,200
Industry	44,505	84,239	109,727	119,110	117,400	119,594	128,700	134,200
Federal funds	14,029	27,196	28,125	24,722	22,809	22,463	23,700	23,200
Industry funds	30,476	57,043	81,602	94,388	94,591	97,131	105,000	111,000
Universities and colleges	6,063	9,687	16,284	18,808	19,940	21,081	21,900	22,400
Federal funds	4,098	6,064	9,636	11,090	11,956	12,661	13,200	13,400
Industry funds	236	560	1,128	1,280	1,361	1,430	1,500	1,600
University and college funds [3]	1,326	2,369	4,329	5,029	5,137	5,400	5,600	5,800
Other nonprofit institutions funds [4]	403	694	1,191	1,409	1,486	1,590	1,600	1,600
Universities and colleges, associated federally funded R&D centers	2,246	3,523	4,832	5,247	5,295	5,271	5,400	5,400
Other nonprofit institutions	2,150	3,425	4,700	5,650	5,750	6,000	6,150	6,100
Federal funds	1,450	2,400	2,900	3,550	3,600	3,700	3,800	3,700
Industry funds	200	375	650	750	750	800	800	850
Other nonprofit institutions funds [4]	500	650	1,150	1,350	1,400	1,500	1,550	1,550
Total basic research	**8,435**	**14,211**	**22,253**	**26,736**	**27,981**	**28,796**	**29,390**	**29,760**
In 1987 dollars [2]	11,902	15,066	19,798	22,212	22,719	22,923	22,987	22,814
Percent Federal as source	13.5	12.5	14.7	16.3	17.0	17.1	16.5	16.1
Percent Federal as source	70.1	64.7	61.7	57.0	57.9	57.6	57.8	57.6
Federal Government	1,182	1,923	2,295	2,338	2,662	2,505	2,500	2,500
Industry	1,325	2,862	5,128	7,002	6,919	7,017	7,000	6,900
Federal funds	290	489	1,368	1,186	958	939	1,000	900
Industry funds	1,035	2,373	3,760	5,816	5,961	6,078	6,000	6,000
Universities and colleges	4,036	6,556	10,642	12,513	13,302	14,096	14,700	15,100
Federal funds	2,861	4,343	6,646	7,715	8,397	8,945	9,300	9,500
Industry funds	141	342	678	796	836	875	900	1,000
University and college funds [3]	793	1,447	2,602	3,126	3,156	3,303	3,500	3,600
Other nonprofit institutions funds [3]	241	424	716	876	913	973	1,000	1,000
Universities and colleges, associated federally funded R&D centers	1,132	1,765	2,428	2,843	2,938	3,008	3,000	3,000
Other nonprofit institutions	760	1,105	1,760	2,040	2,160	2,170	2,190	2,260
Federal funds	450	675	1,000	1,150	1,250	1,200	1,200	1,250
Industry funds	95	170	300	350	350	370	370	390
Other [4]	215	260	460	540	560	600	620	620
Total applied research	**13,610**	**25,327**	**34,748**	**37,805**	**37,206**	**36,591**	**37,530**	**38,750**
In 1987 dollars [2]	19,078	26,836	30,756	31,324	30,162	29,067	29,309	29,634
Percent of total R&D	21.7	22.3	23.0	23.0	22.5	21.8	21.0	21.0
Percent Federal as source	45.3	43.0	38.8	35.7	37.5	37.5	37.3	36.4
Federal Government	2,484	3,133	3,515	4,186	4,790	4,983	5,000	4,900
Industry	8,450	18,255	24,785	26,167	24,686	23,491	24,200	25,300
Federal funds	1,900	5,347	6,353	4,983	4,730	4,119	4,200	4,300
Industry funds	6,550	12,908	18,432	21,184	19,956	19,372	20,000	21,000
Universities and colleges	1,530	2,418	4,344	4,717	5,008	5,230	5,450	5,650
Federal funds	878	1,262	2,157	2,338	2,488	2,551	2,750	2,850
Industry funds	78	179	371	394	430	455	500	500
University and college funds [3]	440	756	1,424	1,551	1,621	1,717	1,700	1,800
Other nonprofit institutions funds [4]	134	221	392	434	469	507	500	500
Universities and colleges, associated federally funded R&D centers	421	586	624	935	962	977	950	1,000
Other nonprofit institutions	725	935	1,480	1,800	1,760	1,910	1,930	1,900
Federal funds	480	575	850	1,050	1,000	1,100	1,100	1,050
Industry funds	65	130	220	260	260	270	270	290
Other nonprofit institutions funds [4]	180	230	410	490	500	540	560	560
Total development	**40,551**	**74,281**	**94,391**	**99,857**	**99,863**	**102,700**	**111,630**	**115,790**
In 1987 dollars [2]	56,669	78,698	83,445	82,661	80,901	81,495	87,112	88,445
Percent of total R&D	64.8	65.3	62.3	60.7	60.5	61.1	62.5	62.8
Percent Federal as source	42.9	43.1	36.1	31.5	30.2	29.1	28.2	26.5

[1] Basic research, applied research, and development. [2] Based on gross domestic product implicit price deflator. [3] Includes State and local government funds received by these institutions and used for research and development. [4] Includes estimates for independent nonprofit hospitals and voluntary health agencies.

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

No. 964. Funds for R&D—Performance Sector, by State: 1993

[In millions of dollars. See headnote, table 963]

STATE	Total	Federal government [1]	Industry	Universities and colleges [2]	Other nonprofit [3]	STATE	Total	Federal government [1]	Industry	Universities and colleges [2]	Other nonprofit [3]
U.S.	165,048	16,663	117,400	19,940	11,045	MO	1,789	51	1,375	345	18
						MT	85	22	14	48	1
AL	1,967	833	833	281	20	NE	295	25	128	136	6
AK	130	48	14	67	1	NV	218	71	67	79	1
AZ	1,608	206	1,042	311	49	NH	438	89	248	99	2
AR	301	41	185	74	1	NJ	9,181	509	8,162	374	136
CA	33,721	1,785	26,541	2,380	3,015	NM	2,752	504	962	187	1,099
CO	2,864	170	2,111	331	252	NY	10,974	131	8,820	1,545	478
CT	2,809	53	2,373	365	18	NC	2,745	174	1,929	605	37
DE	1,247	12	1,181	53	1	ND	91	27	9	54	1
DC	2,543	1,713	540	145	145	OH	6,398	583	5,144	594	77
FL	3,526	608	2,425	489	4	OK	533	34	311	173	15
GA	1,577	159	860	547	11	OR	774	51	471	226	26
HI	380	42	255	74	9	PA	8,278	354	6,711	1,019	194
ID	477	37	391	49	-	RI	484	185	176	103	20
IL	6,778	83	5,242	758	695	SC	713	38	495	178	2
IN	2,560	77	2,177	303	3	SD	58	13	22	22	1
IA	902	30	533	299	40	TN	1,214	87	792	278	57
KS	463	12	292	154	5	TX	6,966	468	4,882	1,387	229
KY	429	16	289	122	2	UT	753	141	411	196	5
LA	470	43	170	255	2	VT	343	6	284	50	3
ME	114	13	59	25	17	VA	2,941	1,227	1,087	405	222
MD	7,423	4,010	2,076	1,128	209	WA	5,422	113	4,689	428	192
MA	9,486	384	6,952	1,094	1,056	WV	280	93	100	55	32
MI	10,778	96	9,924	700	58	WI	1,851	38	1,343	444	26
MN	2,922	40	2,458	332	92	WY	63	10	15	33	5
MS	325	163	52	106	4	Other [4]	3,612	945	-220	437	2,450

- Represents or rounds to zero. [1] Total funds used by Federal government from Federal sources. [2] Distribution by States includes R&D performed in only doctoral degree granting institutions; U.S. total includes R&D performed in all institutions. [3] For other sector, funds distributed by State include only Federal obligations to organizations in the nonprofit sector, including university associated federally funded R&D cneters. Estimated nonfederal support to the nonprofit sector is included in "other". [4] Includes unknown.

Source: U.S. National Science Foundation, *National Patterns of R&D Resources,* 1996.

No. 965. Federal Obligations for R&D, by Agency: 1980 to 1996

[In millions of dollars. For fiscal years ending in year shown; see text, section 9. Includes those agencies with obligations of $1 billion or more in 1995]

AGENCY	1980	1985	1990	1991	1992	1993	1994	1995	1996, est.
CURRENT DOLLARS									
Obligations, total [1]	29,830	48,360	63,668	61,295	65,593	67,314	67,256	70,094	68,842
Dept. of Defense	13,981	29,792	37,268	32,135	36,130	35,849	34,566	35,424	33,706
Dept. of Health and Human Services	3,780	5,451	8,406	9,756	8,988	10,349	11,022	11,451	11,828
National Aeronautics and Space Administration	3,234	3,327	6,533	7,280	7,658	8,020	8,296	8,541	8,106
Dept. of Energy	4,754	4,966	5,631	5,983	6,172	6,262	6,048	6,419	6,842
National Science Foundation	882	1,346	1,690	1,785	1,868	1,882	2,040	2,145	2,303
Dept. of Agriculture	688	943	1,108	1,237	1,327	1,328	1,400	1,390	1,393
CONSTANT (1987) DOLLARS [2]									
Obligations, total [1]	42,253	51,283	56,846	52,524	54,615	54,727	53,633	54,890	52,874
Dept. of Defense	19,803	31,592	33,275	27,536	30,083	29,146	27,565	27,740	25,888
Dept. of Health and Human Services	5,354	5,780	7,505	8,360	7,484	8,414	8,789	8,967	9,084
National Aeronautics and Space Administration	4,581	3,528	5,833	6,238	6,376	6,520	6,616	6,712	6,226
Dept. of Energy	6,733	5,266	5,028	5,127	5,139	5,691	4,823	5,027	5,255
National Science Foundation	1,249	1,427	1,509	1,530	1,555	1,530	1,627	1,680	1,769
Dept. of Agriculture	974	1,000	989	1,060	1,105	1,080	1,116	1,088	1,070

[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. 966. Federal Funding for R&D, by Selected Budget Functions: 1970 to 1997

[In millions of dollars. For fiscal years ending in year shown; see text, section 9. Excludes R&D plant. Represents budget authority. Functions shown are those for which $1 billion or more was authorized for 1996]

FUNCTION	1970	1980	1985	1990	1993	1994	1995	1996	1997, est.
CURRENT DOLLARS									
Total [1]	15,339	29,739	49,887	63,781	69,884	68,331	68,870	69,148	69,923
Eight functions, percent of total	96.6	96.5	98.3	98.0	98.1	97.9	97.5	98.0	97.8
National defense	7,981	14,946	33,698	39,925	41,249	37,764	37,204	37,791	37,477
Health	1,084	3,694	5,418	8,308	10,280	10,993	11,407	11,902	12,165
Space research and technology	3,606	2,738	2,725	5,765	6,988	7,414	7,916	7,871	8,166
Energy	574	3,603	2,389	2,715	2,677	2,873	2,844	2,504	2,555
General science	452	1,233	1,862	2,410	2,691	2,712	2,794	2,862	2,984
Natural resources and environment	340	999	1,059	1,386	1,802	2,062	1,988	1,877	1,959
Transportation	535	887	1,030	1,045	1,703	1,888	1,833	1,752	1,857
Agriculture	238	585	836	950	1,152	1,193	1,194	1,178	1,192
CONSTANT (1987) DOLLARS [2]									
Total [1]	44,332	42,123	52,902	56,947	56,816	54,490	53,931	53,109	52,534
National defense	23,066	21,170	35,735	35,647	33,536	30,115	29,134	29,025	28,157
Health	3,133	5,232	5,745	7,418	8,358	8,766	8,933	9,141	9,140
Space research and technology	10,422	3,878	2,890	5,147	5,681	5,912	6,199	6,045	6,135
Energy	1,659	5,103	2,533	2,424	2,176	2,291	2,227	1,923	1,920
General science	1,306	1,746	1,975	2,152	2,188	2,163	2,188	2,198	2,242
Natural resources and environment	983	1,415	1,123	1,238	1,465	1,644	1,557	1,442	1,472
Transportation	1,546	1,256	1,092	933	1,385	1,506	1,435	1,346	1,395
Agriculture	688	829	887	848	937	951	935	905	896

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

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

No. 967. National R&D Expenditures as a Percent of Gross Domestic Product, by Country: 1981 to 1995

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	2.37	2.13	2.43	1.97	2.37	0.87	1.77	2.12	2.34	1.57	1.84	0.85
1985	2.82	2.58	2.72	2.25	2.27	1.13	1.95	2.56	2.60	1.87	1.80	1.07
1990	2.73	2.89	2.76	2.41	2.23	1.30	2.04	2.87	2.63	1.95	1.89	1.26
1992	2.73	2.81	2.48	2.42	2.18	1.31	2.14	2.78	2.39	2.03	1.88	1.27
1993	2.60	2.73	2.43	2.45	2.20	1.26	2.04	2.70	2.36	2.09	1.89	1.21
1994	2.49	2.69	2.33	2.38	2.19	1.19	2.00	2.66	2.26	(NA)	1.88	1.14
1995	2.52	(NA)	2.27	(NA)	(NA)	1.13	2.04	(NA)	(NA)	(NA)	(NA)	(NA)

NA Not available. [1] Estimated.

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

No. 968. R&D Expenditures in Science and Engineering at Universities and Colleges: 1981 to 1995

[In millions of dollars]

CHARACTERISTIC	1981	1990	1995	CHARACTERISTIC	1981	1990	1995
CURRENT DOLLARS				CONSTANT (1987) DOLLARS [1]			
Total	6,846	16,285	22,101	Total	8,799	14,540	17,307
Basic research	4,593	10,641	14,811	Basic research	5,904	9,501	11,598
Applied R&D	2,253	5,644	7,291	Applied R&D	2,896	5,039	5,709
Source of funds:				Source of funds:			
All governments	5,115	10,960	14,986	All governments	6,575	9,786	11,735
Institutions' own funds	1,004	3,006	4,024	Institutions' own funds	1,290	2,684	3,151
Industry	292	1,128	1,492	Industry	375	1,007	1,168
Other	435	1,191	1,599	Other	559	1,063	1,252
Fields:				Fields:			
Physical sciences	765	1,807	2,241	Physical sciences	983	1,613	1,755
Environmental sciences	550	1,068	1,434	Environmental sciences	707	954	1,123
Mathematical sciences	87	222	284	Mathematical sciences	112	198	222
Computer sciences	144	515	680	Computer sciences	185	460	532
Life sciences	3,695	8,726	12,133	Life sciences	4,749	7,791	9,501
Psychology	127	253	370	Psychology	163	226	290
Social sciences	366	703	1,018	Social sciences	470	628	797
Other sciences	145	336	395	Other sciences	186	300	309
Engineering	967	2,656	3,545	Engineering	1,243	2,371	2,776

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

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

No. 969. Federal Obligations to Universities and Colleges: 1970 to 1994

[In millions of dollars, except percent. For fiscal years ending in year shown; see text, section 9. Minus sign (-) indicates decrease]

ITEM	1970	1980	1985	1990	1991	1992	1993	1994
CURRENT DOLLARS								
Federal obligations, total	**3,237**	**8,299**	**10,972**	**15,200**	**17,557**	**19,065**	**(NA)**	**(NA)**
Annual percent change [1]	-6.5	9.1	9.3	-2.0	15.5	8.6	(NA)	(NA)
Academic science/engineering obligations	2,188	4,791	7,258	10,445	11,835	12,749	12,731	13,739
Percent of total	67.6	57.7	66.2	68.7	67.4	66.9	(NA)	(NA)
Research and development	1,447	4,161	6,246	9,008	10,031	10,845	10,923	11,768
Research and development plant	45	38	114	125	152	205	259	214
Other science/engineering activities	696	593	898	1,312	1,652	1,699	1,548	1,756
Nonscience/engineering activities	1,049	3,508	3,714	4,755	5,722	6,317	(NA)	(NA)
CONSTANT (1987) DOLLARS [2]								
Federal obligations, total	**9,355**	**11,755**	**11,635**	**13,572**	**15,045**	**15,875**	**(NA)**	**(NA)**
Annual percent change [1]	-11.4	-	5.4	-5.3	10.9	5.5	(NA)	(NA)
Academic science/engineering obligations	6,324	6,786	7,697	9,326	10,142	10,615	10,350	10,956
Percent of total	67.6	57.7	66.2	68.7	67.4	66.9	(NA)	(NA)
Research and development	4,182	5,894	6,624	8,043	8,596	9,030	8,881	9,385
Research and development plant	130	54	121	111	130	170	211	171
Other science/engineering activities	2,012	840	952	1,172	1,416	1,415	1,259	1,401
Nonscience/engineering activities	3,032	4,969	3,938	4,245	4,903	5,260	(NA)	(NA)

- Represents or rounds to zero. 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 Support to Universities, Colleges, and Nonprofit Institutions,* annual.

No. 970. Federal R&D Obligations to Selected Universities and Colleges: 1981 to 1994

[For fiscal years ending in year shown; see text, section 9. For the top 45 institutions receiving Federal R&D funds in 1993. 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 1993 FEDERAL R&D OBLIGATIONS	OBLIGATIONS ($1,000)			RANK		
	1981	1985	1994	1981	1985	1994
Total, all institutions [1]	**4,410,931**	**6,246,181**	**11,768,416**	**(X)**	**(X)**	**(X)**
45 institutions, percent of total	62.6	61.3	59.3	(X)	(X)	(X)
Johns Hopkins University	363,429	297,374	612,681	1	1	1
University of Washington	99,965	146,179	275,905	4	4	2
Massachusetts Institute of Technology	146,035	189,558	267,404	2	2	3
Stanford University	106,073	174,961	262,438	3	3	4
University of Michigan	73,999	108,035	240,390	11	11	5
University of California—Los Angeles	94,945	128,211	221,820	5	5	6
University of California—San Diego	91,403	103,633	218,272	6	13	7
University of Wisconsin—Madison	86,918	124,604	207,625	8	7	8
University of California—San Francisco	64,814	98,536	204,404	15	16	9
Cornell University	72,671	119,966	194,482	13	8	10
University of Pennsylvania	76,136	103,119	190,296	10	15	11
Harvard University	87,830	109,414	190,125	7	9	12
Columbia University—Main Division	83,659	127,331	187,308	9	6	13
Pennsylvania State University	47,099	76,726	184,376	21	19	14
Yale University	73,526	109,227	182,754	12	10	15
University of Minnesota	72,001	103,272	179,848	14	14	16
University of Colorado	46,146	71,424	166,455	22	23	17
Duke University	44,287	69,169	154,649	23	26	18
University of Pittsburgh	38,512	58,620	152,901	29	28	19
University Southern California	49,221	89,706	149,909	20	17	20
Washington University	54,170	71,978	149,860	17	22	21
University of California—Berkeley	64,065	106,710	148,838	16	12	22
University of North Carolina at Chapel Hill	38,447	63,105	146,606	30	27	23
University of Arizona	36,308	49,740	144,036	33	37	24
University of Illinois—Urbana Champaign	53,583	83,122	119,674	19	18	25
University of Rochester	42,983	70,379	108,638	25	25	26
University of Alabama—Birmingham	29,970	44,093	104,409	44	46	27
University of Texas at Austin	43,756	72,379	103,155	24	21	28
University of Chicago	53,992	71,194	102,363	18	24	29
Northwestern University	32,446	48,260	99,896	47	39	30
Case Western Reserve University	33,744	47,994	99,483	38	40	31
University of California—Davis	31,757	43,156	98,856	42	47	32
Baylor Col of Medicine	35,062	45,837	98,514	35	45	33
University of Iowa	35,300	55,117	94,500	34	31	34
New York University	40,636	74,577	92,762	28	20	35
Ohio State University	42,899	56,065	92,320	26	30	36
Vanderbilt University	27,426	39,909	87,238	49	48	37
University of Utah	38,163	50,938	84,896	31	36	38
California Inst of Tech	32,959	55,083	83,772	40	32	39
Indiana University	29,276	39,118	82,941	45	49	41
University of Maryland—College Park	27,313	51,073	80,617	50	35	42
Purdue University	36,549	51,544	77,870	32	34	43
Boston University	27,019	46,152	77,844	51	43	44
University of Virginia	24,333	37,415	76,395	52	52	45
University of Florida	30,845	47,716	73,037	43	41	47

X Not applicable. [1] Includes other institutions, not shown separately.

Source: U.S. National Science Foundation, *Federal Support to Universities and Colleges and Nonprofit Institutions,* annual.

No. 971. Funds for Performance of Industrial R&D, by Source of Funds and Selected Industries: 1980 to 1994

[In millions of dollars. For calendar years. Covers basic research, applied research, and development]

INDUSTRY	1987 SIC [1] code	1980	1985	1990	1992	1993	1994
CURRENT DOLLARS							
Total funds	(X)	44,505	84,239	109,727	119,110	117,400	119,595
Chemicals and allied products	28	4,636	8,540	13,291	15,381	(D)	(D)
Petroleum refining and extraction	13,29	1,552	(D)	2,306	2,277	2,152	1,950
Machinery	35	5,901	12,216	14,446	14,938	8,381	8,110
Electrical equipment	36	9,175	14,432	13,400	13,360	13,349	15,338
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	17,158	15,056	14,260
Professional and scientific instruments	38	3,029	5,013	7,055	9,542	10,119	11,441
All other [2]	(X)	6,059	(D)	(D)	(D)	(D)	(D)
Company funds	(X)	30,476	57,043	81,602	94,388	94,591	97,131
Chemicals and allied products	28	4,264	8,310	13,168	15,091	16,658	16,559
Petroleum refining and extraction	13,29	1,401	2,194	2,289	2,268	2,138	1,939
Machinery	35	5,254	10,721	13,575	13,903	8,295	8,011
Electrical equipment	36	5,431	9,271	9,267	9,516	11,682	13,537
Motor vehicles and motor vehicles equipment	371	4,300	6,164	8,594	9,132	10,659	11,950
Aircraft and missiles	372,376	2,570	5,649	5,387	6,871	5,684	5,466
Professional and scientific instruments	38	2,456	4,622	6,318	7,321	7,542	8,058
All other [2]	(X)	4,800	10,132	23,004	30,286	31,933	31,611
CONSTANT (1987) DOLLARS [3]							
Total funds	(X)	62,071	89,236	96,846	98,519	95,061	94,841
Chemicals and allied products	28	6,466	9,047	11,730	12,722	(D)	(D)
Petroleum refining and extraction	13,29	2,165	(D)	2,035	1,883	1,743	1,546
Machinery	35	8,230	12,941	12,750	12,355	6,786	6,431
Electrical equipment	36	12,796	15,288	11,827	11,050	10,809	12,163
Motor vehicles and motor vehicles equipment	371	6,911	7,398	(D)	(D)	(D)	(D)
Aircraft and missiles	372,376	12,828	23,550	18,212	14,191	12,191	11,308
Professional and scientific instruments	38	4,225	5,310	6,226	7,892	8,194	9,073
All other [2]	(X)	8,450	(D)	(D)	(D)	(D)	(D)
Company funds	(X)	42,505	60,427	72,022	78,071	76,592	77,027
Chemicals and allied products	28	5,947	8,803	11,622	12,482	13,488	13,132
Petroleum refining and extraction	13,29	1,954	2,324	2,020	1,875	1,731	1,538
Machinery	35	7,328	11,357	11,981	11,499	6,717	6,353
Electrical equipment	36	7,575	9,821	8,179	7,871	9,459	10,735
Motor vehicles and motor vehicles equipment	371	5,997	6,530	7,585	7,553	8,631	9,477
Aircraft and missiles	372,376	3,584	5,984	4,754	5,683	4,602	4,335
Professional and scientific instruments	38	3,425	4,896	5,576	6,055	6,107	6,390
All other [2]	(X)	6,695	10,733	20,303	25,050	25,857	25,068

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable. [1] Prior to 1992, 1972 Standard Industrial Classification; beginning 1992, 1987 Standard Industrial Classification; see text, section 13. [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. 972. R&D Funds in R&D-Performing Manufacturing Companies, by Industry: 1980 to 1994

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	1985	1990	1993	1994	1980	1985	1990	1993	1994
Total [2]	(X)	3.0	4.4	4.2	3.8	3.6	2.1	3.0	3.1	3.1	2.9
Food and kindred products [3]	20	0.4	(D)	(D)	0.5	0.5	(D)	0.6	0.5	0.5	0.5
Paper and allied products	26	1.0	(D)	1.0	(D)	(D)	1.0	0.8	1.0	1.1	1.0
Chemicals and allied products	28	3.6	5.0	5.3	(D)	(D)	3.3	4.9	5.3	6.0	5.1
Petroleum refining and extraction	13,29	0.6	(D)	0.9	0.9	0.8	0.5	0.9	0.9	0.9	0.8
Rubber products	30	2.2	(D)	(D)	(D)	(D)	(D)	1.8	2.1	2.1	2.3
Stone, clay, and glass products	32	1.4	(D)	(D)	1.5	1.7	1.3	2.3	1.7	1.5	1.5
Primary metals	33	0.7	(D)	0.8	0.7	0.6	0.5	0.9	0.8	0.7	0.6
Fabricated metal products	34	1.4	1.5	1.4	1.4	1.2	1.2	1.4	1.1	1.1	1.0
Machinery	35	5.0	7.6	7.7	4.6	3.8	4.5	6.7	7.2	4.5	3.8
Electrical equipment	36	6.6	7.6	6.5	6.2	5.9	3.9	4.8	4.5	5.4	5.2
Motor vehicles and motor vehicle equipment	371	4.9	3.8	(D)	(D)	(D)	4.2	3.1	3.7	3.7	3.4
Aircraft and missiles	372,376	13.7	14.9	11.8	12.5	13.8	3.8	3.9	3.1	4.7	5.3
Professional and scientific instruments	38	7.5	8.9	8.0	9.7	9.2	6.1	8.3	7.1	7.2	6.5

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 13. [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.

No. 973. Federal Obligations for Research, by Field of Science: 1980 to 1996

[In millions of dollars. For fiscal years ending in year shown; see text, section 9. Excludes R&D plant]

FIELD	1980	1985	1990	1991	1992	1993	1994	1995	1996, est.
CURRENT DOLLARS									
Research, total	**11,597**	**16,133**	**21,731**	**23,968**	**24,491**	**26,890**	**27,440**	**27,804**	**28,271**
Basic	4,674	7,819	11,286	12,171	12,490	13,399	13,553	13,569	14,037
Applied	6,923	8,315	10,446	11,798	12,001	13,491	13,887	14,235	14,234
Life sciences	4,192	6,363	8,830	9,622	9,910	10,772	11,079	11,401	11,663
Psychology	199	327	449	482	298	551	550	582	585
Physical sciences	2,001	3,046	3,809	4,235	4,439	4,427	6,793	5,988	6,253
Environmental sciences	1,261	1,404	2,174	2,150	2,208	2,608	2,032	1,941	2,055
Mathematics and computer sciences	241	575	841	904	1,160	1,225	1,242	1,499	1,565
Engineering	2,830	3,618	4,335	4,945	4,977	5,499	4,023	4,537	4,291
Social sciences	524	460	630	727	690	675	655	741	741
Other sciences, n.e.c. [1]	350	342	664	903	808	1,133	1,066	1,116	1,120
CONSTANT (1987) DOLLARS [2]									
Research, total	**16,427**	**17,109**	**19,403**	**20,538**	**20,392**	**21,862**	**21,882**	**21,773**	**21,714**
Basic	6,621	8,291	10,077	10,429	10,400	10,893	10,808	10,626	10,781
Applied	9,806	8,817	9,327	10,110	9,993	10,968	11,074	11,147	10,932
Life sciences	5,938	6,747	7,884	8,245	8,251	8,758	8,835	8,928	8,958
Psychology	282	347	401	413	248	448	439	456	449
Physical sciences	2,834	3,230	3,401	3,629	3,696	3,599	5,417	4,689	4,803
Environmental sciences	1,786	1,489	1,941	1,842	1,838	2,120	1,620	1,520	1,578
Mathematics and computer sciences	341	610	751	775	966	996	990	1,174	1,202
Engineering	4,009	3,836	3,871	4,237	4,144	4,471	3,208	3,553	3,296
Social sciences	742	488	563	623	575	549	522	580	569
Other sciences, n.e.c. [1]	495	362	593	774	673	921	850	874	860

[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. 974. R&D Scientists and Engineers— Employment and Cost, by Industry: 1975 to 1994

[Data are estimates; on average full-time-equivalent (FTE) basis]

INDUSTRY	1987 SIC [1] code	1975	1980	1985	1989	1990	1991	1992	1993	1994
EMPLOYED SCIENTISTS										
Average FTE of scientists and engineers (1,000) [2 3]	**(X)**	**363.9**	**469.2**	**646.8**	**733.1**	**758.5**	**776.4**	**772.0**	**766.6**	**758.9**
Chemicals [4]	28	44.8	53.1	73.5	79.4	81.0	83.6	86.1	89.8	92.3
Machinery	35	54.3	65.7	85.7	106.9	111.5	104.5	98.4	83.9	68.4
Electrical equipment [5]	36	81.5	100.7	115.6	113.9	100.6	93.9	90.6	92.9	101.0
Motor vehicles	371	25.7	36.7	31.3	47.6	47.4	44.9	44.8	48.1	51.2
Aircraft and missiles	372,376	67.2	90.6	137.5	125.1	107.8	96.6	95.4	85.4	65.7
CONSTANT (1987) DOLLARS [6]										
Cost per scientist or engineer ($1,000) [3 7]	**(X)**	**135.2**	**132.3**	**138.0**	**124.0**	**124.7**	**126.4**	**130.6**	**124.2**	**125.0**
Chemicals [4]	28	123.8	121.9	123.2	137.3	140.3	142.5	151.8	(D)	(D)
Machinery	35	119.7	125.4	151.0	119.8	122.2	125.7	126.4	81.5	94.1
Electrical equipment [5]	36	127.5	127.0	132.4	122.0	126.0	125.1	124.2	117.2	120.4
Motor vehicles	371	185.2	188.5	236.4	(D)	(D)	(D)	184.4	(D)	(D)
Aircraft and missiles	372,376	173.0	141.7	171.3	191.1	188.6	150.5	149.3	142.9	172.3

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 13. [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. 975. Scientists and Engineers Employed in R&D: 1970 to 1993

[For full-time equivalent employees. Data are estimates. Yearly averages for industry sector only. Excludes those employed by State and local government agencies]

SECTOR	1970	1980	1983	1984	1985	1987	1989	1991	1993
Total [1] (1,000)	543.8	651.1	751.6	797.6	801.9	877.8	924.2	960.4	962.7
PERCENT DISTRIBUTION									
Industry (excl. social scientists)	69.1	72.1	74.8	75.6	80.7	80.0	79.3	80.8	79.4
Federal Government	12.4	9.0	8.2	7.8	6.5	6.2	6.4	6.1	6.2
Other [2]	18.5	18.9	17.0	16.6	12.9	13.8	14.3	13.1	14.4

[1] Due to change in methodology, data beginning 1985 are not comparable with data for previous years. [2] Includes professional R&D personnel employed at universities and colleges, other nonprofit institutions, and federally funded R&D centers administered by organizations in these sectors and graduate students engaged in R&D at universities and colleges.

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

No. 976. Civilian Employment of Scientists, Engineers, and Technicians, by Occupation and Industry: 1994

[In thousands. Based on sample and subject to sampling error. For details, see source]

OCCUPATION	Total [1]	WAGE AND SALARY WORKERS								Self employed
		Mining [2]	Construction	Manufacturing	Transportation [3]	Trade	FIRE [4]	Services	Government	
Scientists and engineers	2,822.7	36.6	31.5	866.0	116.7	96.5	109.7	891.1	480.6	185.0
Scientists	1,495.3	16.3	2.4	261.1	46.9	60.3	98.7	554.8	300.0	146.0
Physical scientists	209.2	10.4	0.3	58.1	3.0	2.3	0.7	76.0	46.3	12.0
Life scientists	185.9	0.2	0.1	28.1	1.3	1.3	0.6	61.4	75.2	10.0
Mathematical scientists	14.0	(NA)	(NA)	1.5	0.4	(NA)	3.0	4.1	5.0	-
Social scientists	258.7	1.5	(NA)	(NA)	0.8	(NA)	7.6	105.0	68.9	75.0
Computer systems analysts, engineers and scientists	827.5	4.1	2.0	173.4	41.3	56.7	86.9	308.3	104.7	49.0
Engineers [5]	1,327.4	20.3	29.1	604.9	69.9	36.2	11.0	336.3	180.6	39.0
Civil engineers	184.4	0.6	10.4	7.7	5.5	0.4	0.5	79.5	70.8	9.0
Electrical/electronics	348.6	0.6	8.5	156.7	35.2	12.4	1.3	86.4	37.5	10.0
Mechanical engineers	230.5	1.7	4.8	134.5	4.4	6.7	1.1	56.2	13.1	8.0
Engineering and science technicians	1,219.6	16.8	27.2	441.8	67.8	84.8	4.4	385.2	161.9	25.0
Electrical/electronics technicians	314.0	1.0	7.1	122.9	21.4	64.0	1.5	62.4	26.6	7.0
Engineering technicians	371.1	5.3	4.0	128.9	25.8	10.6	0.3	96.3	92.8	7.0
Drafters	303.6	2.1	15.7	102.2	17.1	6.6	1.3	137.2	10.2	9.0
Science technicians	230.9	8.4	0.4	87.7	3.5	3.5	1.3	89.3	32.3	2.0
Surveyors	95.5	2.5	2.5	(NA)	3.0	(NA)	0.8	57.5	22.2	7.0
Computer programmers	536.7	2.7	1.5	77.8	22.1	38.3	78.6	254.8	35.1	26.0

- Represents or rounds to 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 kinds of engineers and technicians not shown separately.

Source: U.S. Bureau of Labor Statistics, unpublished data.

No. 977. Graduate Science/Engineering Students in Doctorate-Granting Colleges: 1985 to 1995

[As of fall. Includes outlying areas]

FIELD OF SCIENCE OR ENGINEERING	TOTAL (1,000)			PERCENT—							
				Female			Foreign		Part-time		
	1985	1990	1995	1985	1990	1995	1990	1995	1985	1990	1995
Total, all surveyed fields	355.8	398.2	436.3	34.5	37.6	42.3	25.4	22.6	32.4	31.0	29.9
Science/engineering	317.2	351.1	372.5	29.5	32.3	36.4	27.7	25.4	30.7	28.9	27.7
Engineering, total	90.2	99.8	100.0	11.5	13.6	16.9	36.6	34.3	39.7	35.9	34.2
Sciences, total	226.9	251.3	272.6	36.6	39.8	43.5	24.2	22.1	27.2	26.0	25.3
Physical sciences	29.4	32.5	31.8	20.5	23.4	26.7	37.0	34.8	11.9	11.2	11.3
Environmental	14.1	12.9	14.0	25.3	29.1	34.1	20.2	20.5	23.8	23.5	23.7
Mathematical sciences	15.4	17.5	16.4	29.0	30.6	32.6	35.6	33.9	27.6	24.4	22.3
Computer sciences	24.2	28.0	28.1	25.2	23.1	23.5	32.8	33.8	48.6	47.2	46.0
Agricultural sciences	10.9	10.6	11.6	25.8	29.3	35.4	28.8	26.5	18.4	17.9	21.0
Biological sciences	42.2	46.4	53.9	42.5	45.6	48.4	24.2	22.4	16.1	14.8	14.1
Psychology	30.8	35.8	39.4	59.7	65.8	68.9	4.6	4.9	30.6	29.7	27.0
Social sciences	59.9	67.7	77.3	39.8	42.9	46.7	21.8	18.3	34.4	32.8	32.1
Health fields, total	38.7	47.1	63.8	75.7	77.0	76.5	8.6	6.7	46.2	47.4	43.1

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

No. 978. Science and Engineering Degree Recipients in 1993 and 1994: 1995

[Based on survey and subject to sampling error; see source for details]

DEGREE AND FIELD	Graduates 1993 and 1994 (1,000)	1995 [1]—PERCENT DISTRIBUTION				Median salary [4] ($1,000)
		In school [2]	Employed		Not employed or FT students	
			In S&E [3]	In other		
Bachelor's recipients	**698.6**	**23**	**19**	**52**	**6**	**25.0**
All science fields	580.2	25	10	59	6	22.8
Computer and mathematical sciences	69.2	13	32	51	4	29.0
Life and related sciences	121.1	37	10	47	5	21.8
Physical and related sciences	33.2	39	27	30	4	25.5
Social and related sciences	356.7	21	5	67	7	21.2
All engineering fields	118.4	15	62	20	4	33.5
Aerospace and related engineering	4.4	25	43	30	2	30.0
Chemical engineering	9.6	23	58	14	5	37.7
Civil and architectural engineering	18.1	13	67	17	3	31.0
Electrical, electronics, computer and communications engineering	38.6	11	64	21	4	35.0
Industrial engineering	6.4	9	59	28	3	34.0
Mechanical engineering	28.9	12	66	17	4	34.0
Other engineering	12.5	26	50	21	3	31.5
Master's recipients	**146.6**	**24**	**43**	**28**	**5**	**39.0**
All science fields	100.0	27	32	36	5	34.8
Computer and mathematical sciences	24.3	14	54	28	4	43.5
Life and related sciences	15.0	35	30	29	6	31.5
Physical and related sciences	9.7	39	41	15	4	35.5
Social and related sciences	51.0	27	21	46	6	30.5
All engineering fields	46.6	20	65	11	4	43.8
Aerospace and related engineering	1.7	24	59	(B)	(B)	43.3
Chemical engineering	1.7	(B)	65	(B)	(B)	42.3
Civil and architectural engineering	6.1	(B)	77	(B)	(B)	39.5
Electrical, electronics, computer and communications engineering	16.5	21	65	(B)	(B)	46.0
Industrial engineering	3.1	(B)	65	(B)	(B)	42.8
Mechanical engineering	7.5	20	65	(B)	(B)	43.0
Other engineering	10.1	21	59	16	4	44.5

B Base figure too small to meet statistical standards of reliability of a derived figure. [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: 1995.*

No. 979. Doctorates Conferred, by Recipients' Characteristics: 1980 and 1995

[**In percent, except as indicated**]

CHARACTERISTIC	1980, total	1995										
		All fields [1]	Engineering	Physical sciences [2]	Earth sciences	Mathematics	Computer sciences	Biological sciences [3]	Agricultural	Social sciences [4]	Psychology
Total conferred (number)	**31,020**	**41,610**	**6,007**	**3,840**	**778**	**1,190**	**998**	**5,370**	**1,036**	**3,877**	**3,419**
Male	69.7	60.7	88.4	77.1	78.1	77.7	81.4	58.8	78.0	62.2	36.5
Female	30.3	39.3	11.6	22.9	21.9	22.3	18.6	41.2	22.0	37.8	63.5
Median age [5]	32.2	33.9	31.7	30.5	33.6	31.1	32.2	31.5	34.3	36.2	33.5
CITIZENSHIP [6]											
Total conferred (number)	**30,156**	**40,716**	**5,859**	**3,770**	**765**	**1,153**	**982**	**5,292**	**1,027**	**3,774**	**3,331**
U.S. citizen	83.6	67.8	40.6	56.7	62.4	48.0	49.3	65.9	47.9	63.0	92.1
Foreign citizen	16.4	32.2	59.4	43.3	37.6	52.0	50.7	34.1	52.1	37.0	7.9
RACE/ETHNICITY [7]											
Total conferred (number)	**26,512**	**31,910**	**3,336**	**2,840**	**593**	**771**	**617**	**4,321**	**598**	**2,716**	**3,169**
White [8]	84.7	77.1	62.5	67.6	78.2	69.4	73.4	72.1	79.1	77.9	85.7
Black [8]	4.2	4.6	2.1	1.5	0.5	0.6	1.8	2.4	2.8	5.6	4.7
Asian/Pacific [8]	4.2	13.5	30.9	26.4	17.5	27.0	22.4	21.4	13.0	11.5	3.8
Indian/Alaskan [8]	0.3	0.5	0.3	0.3	0.0	0.3	0.0	0.3	0.3	0.6	0.4
Hispanic	1.8	3.3	2.3	2.6	2.0	1.9	1.0	2.9	3.5	3.4	4.6
Other/unknown	4.9	1.6	1.3	1.4	1.0	1.0	0.5	1.6	2.3	1.7	1.7

[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. 980. Space Vehicle Systems—Net Sales and Backlog Orders: 1965 to 1995

[In millions of dollars. 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	1987	8,051	5,248	[1]2,803	12,393	9,460	[1]2,933
1970	1,956	1,025	931	1,184	786	398	1988	8,622	6,190	[1]2,432	10,838	7,880	[1]2,958
1975	2,119	1,096	1,023	1,304	1,019	285	1989	9,758	6,457	[1]3,301	13,356	9,192	[1]4,164
1980	3,483	1,461	2,022	1,814	951	863	1990	9,691	6,556	[1]3,135	12,462	8,130	[1]4,332
1982	4,749	2,606	2,143	4,337	2,403	1,934	1991	10,515	6,770	[1]3,745	11,664	6,221	[1]5,443
1983	4,940	2,420	2,520	4,865	2,733	2,132	1992	9,266	5,887	[1]3,379	12,809	7,622	[1]5,187
1984	5,225	3,019	2,206	4,624	3,099	1,525	1993	8,309	4,175	[1]4,133	15,203	8,332	[1]6,871
1985	6,300	4,241	2,059	6,707	4,941	1,766	1994	10,284	5,360	[1]4,924	13,139	7,079	[1]6,059
1986	6,304	4,579	[1]1,725	8,063	6,028	[1]2,035	1995	11,077	4,782	[1]6,295	14,625	5,872	[1]8,753

[1] Includes data for nonmilitary missile systems and parts.

Source: U.S. Bureau of the Census, *Current Industrial Reports,* MA-37D, *Aerospace Industry (Orders, Sales, and Backlog)* and, beginning 1994, Internet site <http://www.census.gov/cir/www> (Accessed 10 June 1997)

No. 981. Federal Outlays for General Science, Space, and Other Technology: 1970 to 1997

[In billions of dollars. For fiscal years ending in year shown; see text, section 9]

YEAR	CURRENT DOLLARS			CONSTANT (1992) 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	16.6	3.5	13.1
1975	4.0	1.0	3.0	10.0	2.6	7.4
1980	5.8	1.4	4.4	10.0	2.4	7.6
1982	7.2	1.6	5.6	10.4	2.3	8.1
1983	7.9	1.6	6.3	10.9	2.3	8.7
1984	8.3	1.8	6.5	11.1	2.4	8.6
1985	8.6	2.0	6.6	11.1	2.6	8.5
1986	9.0	2.2	6.8	11.2	2.8	8.5
1987	9.2	2.2	7.0	11.2	2.7	8.4
1988	10.8	2.4	8.4	12.6	2.8	9.8
1989	12.8	2.6	10.2	14.4	2.9	11.4
1990	14.4	2.8	11.6	15.6	3.1	12.6
1991	16.1	3.1	13.0	16.5	3.2	13.3
1992	16.4	3.5	12.8	16.4	3.5	12.8
1993	17.0	3.9	13.1	16.5	3.8	12.7
1994	16.2	3.8	12.4	15.1	3.6	11.5
1995	16.7	4.1	12.6	15.2	3.7	11.5
1996	16.7	4.0	12.7	14.8	3.5	11.2
1997, est.	16.5	4.2	12.3	14.3	3.6	10.7

Source: U.S. Office of Management and Budget, *Budget of the United States, Historical Tables, Fiscal Year 1998,* annual.

No. 982. NASA Financial Summary: 1970 to 1994

[In millions of dollars. For fiscal year ending in year shown; see text, section 9]

YEAR	Total appropriations	Total direct obligations	OUTLAYS							
			Total	R&D	Communications [1]	Facility construction	Research and program management	Trust funds	Office of the Inspector General	GSA building delegation
1970	3,749	3,859	3,753	2,992	(NA)	54	707	(NA)	(NA)	(NA)
1975	3,231	3,266	3,267	2,420	(NA)	85	761	(NA)	(NA)	(NA)
1980	5,243	5,098	4,852	3,701	(NA)	140	1,010	(NA)	(NA)	(NA)
1985	7,552	7,638	7,318	2,118	3,707	170	1,323	(NA)	(NA)	(NA)
1986	7,764	7,463	7,404	2,615	3,267	189	1,332	(NA)	(NA)	(NA)
1987	10,621	8,604	7,591	2,436	3,597	149	1,409	(NA)	(NA)	(NA)
1988	9,002	9,915	9,092	2,916	4,362	166	1,648	(NA)	(NA)	(NA)
1989	10,898	11,316	11,052	3,922	5,030	190	1,908	1	(NA)	(NA)
1990	12,296	13,069	12,429	5,094	5,117	218	1,991	1	8	(NA)
1991	14,015	13,974	13,878	5,765	5,590	326	2,185	1	9	(NA)
1992	14,316	14,160	13,961	6,579	5,118	463	1,788	2	12	(NA)
1993	14,323	14,118	14,306	7,086	5,025	557	1,622	1	15	1
1994	14,550	13,949	13,696	6,758	4,899	371	1,650	1	15	1

NA Not available. [1] Space flight, control, and data communications.

Source: U.S. National Aeronautics and Space Administration, *NASA Pocket Statistics,* 1996.

No. 983. National Aeronautics and Space Administration—Budget Summary: 1996 to 2001

[In millions of dollars]

ITEM	1996	1997	1998	1999	2000	2001
Total	**13,884**	**13,709**	**13,500**	**13,410**	**13,200**	**13,200**
Human space flight	5,710	5,675	5,327	5,306	5,077	4,832
Space station	2,144	2,149	2,121	2,109	1,915	1,597
U.S. and Russian cooperative program	100	100	-	-	-	-
Space shuttle	3,144	3,151	2,978	3,019	2,979	3,054
Payload and utilization operations	323	275	227	179	184	181
Science, aeronautics and technology	5,670	5,453	5,642	5,626	5,750	5,951
Space science	2,176	1,969	2,044	2,025	2,156	2,220
Life and microgravity sciences and applications	304	244	214	250	257	266
Mission to planet earth	1,361	1,362	1,417	1,446	1,576	1,543
Aeronautical research and technology	1,270	1,340	1,470	1,366	1,147	1,173
Mission communication services	450	419	401	436	438	438
Academic programs	110	120	96	102	102	102
Future planning	(NA)	(NA)	(NA)	(NA)	74	209
Mission support	2,487	2,564	2,513	2,459	2,354	2,398
Safety, reliability and quality assurance	39	39	38	43	43	42
Space communication services	255	278	246	204	140	148
Research and program management	2,048	2,093	2,070	2,023	1,968	2,011
Construction of facilities	145	155	159	189	204	197
Inspector General	16	17	18	19	19	19

- Represents zero. NA Not available.

Source: U.S. National Aeronautics and Space Administration, Internet site <http://www.hq.nasa.gov/office/codeb/budget> (Acccessed 27 March 1997)

No. 984. U.S. Commercial Space Revenues: 1990 to 1995

[In millions of dollars. For calendar years]

INDUSTRY	1990	1991	1992	1993	1994	1995 [1]
Total	**3,385**	**4,370**	**4,860**	**5,295**	**6,640**	**7,850**
Commercial satellites delivered	1,000	1,300	1,300	1,100	1,400	1,550
Satellite services	800	1,200	1,500	1,850	2,330	2,740
Fixed	735	1,115	1,275	1,600	1,980	2,340
Mobile	65	85	225	250	350	400
Satellite ground equipment	860	1,300	1,400	1,600	1,970	2,570
Mobile-equipment	145	280	350	420	480	510
Commercial launches	570	380	450	465	580	600
Remote sensing data and services	155	190	210	250	300	330
Commercial R&D infrastructure	-	-	-	30	60	60

- Represents zero. [1] Forecast.

Source: U.S. Department of Commerce, International Trade Administration, *U.S. Industrial Outlook, 1994*; and unpublished data.

No. 985. NASA Space Shuttle Operations Expenditures: 1996 to 1998

[In millions of dollars. Data are funding requirements fiscal years shown]

OPERATION	1996	1997	1998
Total	**2,485.4**	**2,514.9**	**2,494.4**
Orbiter and integration	521.0	516.6	463.1
Orbiter	378.5	375.4	356.1
System integration	142.5	141.2	107.0
Propulsion	1,061.5	1,098.7	1,136.9
External tank	327.5	339.0	359.7
Space shuttle main engine	185.0	182.3	184.9
Reusable solid rocket motor	395.7	427.0	434.6
Solid rocket booster	153.3	150.4	157.7
Mission and launch operations	902.9	899.6	894.4
Launch and landing operations	544.0	609.9	605.3
Mission and crew operations	358.9	289.7	289.1

Source: U.S. National Aeronautics and Space Administration, Internet site <http://www.hq.nasa.gov/office/codeb/budget> (Accessed 12 June 1997)

No. 986. Space Shuttle Flights—Summary: 1981 to May 1997

FLIGHT NUMBER	Mission date	Orbiter name	Crew size (up/down)	Days duration	FLIGHT NUMBER	Mission date	Orbiter name	Crew size (up/down)	Days duration
1-5	1981-1982	Columbia	12	24	42	1/22/92	Discovery	7	8
6	4/4/83	Challenger	4	5	45	3/24/92	Atlantis	7	9
7	6/18/83	Challenger	5	6	49	5/7/92	Endeavour	7	9
8	8/30/83	Challenger	5	6	50	6/25/92	Columbia	7	14
9	11/28/83	Columbia	6	10	46	7/31/92	Atlantis	7	8
10	2/3/84	Challenger	5	8	47	9/12/92	Endeavour	7	8
11	4/6/84	Challenger	5	7	52	10/22/92	Columbia	6	10
12	8/30/84	Discovery	6	7	53	12/2/92	Discovery	5	7
13	10/5/84	Challenger	7	8	54	1/13/93	Endeavour	5	6
14	11/8/84	Discovery	5	8	56	4/8/93	Discovery	5	9
15	1/24/85	Discovery	5	4	55	4/26/93	Columbia	7	10
16	4/12/85	Discovery	7	7	57	6/21/93	Endeavour	6	10
17	4/29/85	Challenger	7	7	51	9/12/93	Discovery	5	10
18	6/17/85	Discovery	7	7	58	10/18/93	Columbia	7	14
19	7/29/85	Challenger	7	8	61	12/2/93	Endeavour	7	11
20	8/27/85	Discovery	5	7	60	2/3/94	Discovery	6	8
21	10/3/85	Atlantis	5	4	62	3/4/94	Columbia	5	14
22	10/30/85	Challenger	8	7	59	4/9/94	Endeavour	6	11
23	11/26/85	Atlantis	7	7	65	7/8/94	Columbia	7	15
24	1/12/86	Columbia	7	6	64	9/9/94	Discovery	6	11
25	1/28/86	Challenger	7	-	68	9/30/94	Endeavour	6	11
26	9/29/88	Discovery	5	4	66	11/3/94	Atlantis	6	11
27	12/2/88	Atlantis	5	4	63	2/3/95	Discovery	6	8
29	3/13/89	Discovery	5	5	67	3/2/95	Endeavour	7	17
30	5/4/89	Atlantis	5	4	71	6/27/95	Atlantis	7/8	10
28	8/8/89	Columbia	5	5	70	7/13/95	Discovery	5	9
34	10/18/89	Atlantis	5	5	69	9/7/95	Endeavour	5	11
33	11/22/89	Discovery	5	5	73	10/20/95	Columbia	7	16
32	1/9/90	Columbia	5	11	74	11/8/95	Atlantis	5	8
36	2/28/90	Atlantis	5	4	72	1/11/96	Endeavour	6	9
31	4/24/90	Discovery	5	5	75	2/22/96	Columbia	7	16
41	10/6/90	Discovery	5	4	76	3/22/96	Atlantis	6/5	9
38	11/15/90	Atlantis	5	5	77	5/19/96	Endeavour	6	10
35	12/2/90	Columbia	7	9	78	6/20/96	Columbia	7	17
37	4/5/91	Atlantis	5	6	79	9/16/96	Atlantis	6	10
39	4/28/91	Discovery	7	8	80	11/19/96	Columbia	5	18
40	6/5/91	Columbia	7	9	81	1/12/97	Atlantis	6	10
43	8/2/91	Atlantis	5	9	82	2/11/97	Discovery	7	10
48	9/12/91	Discovery	5	5	83	4/4/97	Columbia	7	4
44	11/24/91	Atlantis	6	7	84	5/15/97	Atlantis	7/7	9

- Represents zero.
Source: U.S. National Aeronautics and Space Administration, Internet site <http://www.osf.hq.nasa.gov/shuttle> (Accessed 11 June 1997)

No. 987. World-Wide Successful Space Launches: 1957 to 1996

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

COUNTRY	Total	1957-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995	1996
Total	**3,806**	**289**	**586**	**555**	**607**	**605**	**550**	**466**	**75**	**73**
Soviet Union/CIS [1]	2,520	82	302	405	461	483	447	283	32	25
United States	1,087	207	279	139	126	93	61	122	27	33
Japan	50	-	-	5	10	12	11	9	2	1
ESA [2]	84	-	-	-	1	8	21	33	11	10
China	43	-	-	2	6	6	9	15	2	3
France	10	-	4	3	3	-	-	-	-	-
India	7	-	-	-	-	3	-	3	-	1
Israel	3	-	-	-	-	-	1	1	1	-
Australia	1	-	1	-	-	-	-	-	-	-
United Kingdom	1	-	-	1	-	-	-	-	-	-

- Represents zero. [1] Commonwealth of Independent States. [2] European Space Agency.
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. 988. Nobel Prize Laureates in Selected Sciences: 1901 to 1995

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

COUNTRY	1901-1995				1901-1930	1931-1945	1946-1960	1961-1975	1976-1990	1991-1994	1995
	Total	Physics	Chemistry	Physiology/ Medicine							
Total	**433**	**149**	**123**	**161**	**93**	**49**	**74**	**92**	**98**	**19**	**8**
United States	179	63	41	75	6	14	38	41	63	12	5
United Kingdom	70	21	25	24	15	11	14	20	9	-	1
Germany [1]	59	17	28	14	27	11	4	8	7	2	-
France	24	10	7	7	13	2	-	5	2	2	-
Soviet Union	10	7	1	2	2	-	4	3	1	-	-
Japan	4	3	1	-	-	-	1	2	1	-	-
Other countries	87	28	20	39	30	11	13	13	15	3	2

- Represents zero. [1] Between 1946 and 1991, data are for the former West Germany only.
Source: U.S. National Science Foundation, unpublished data.