



GARY MEEK/GEORGIA TECH

ACADEMIC R&D SPENDING TRENDS

Spending on chemical research and on science and engineering as a whole **ROSE A MODERATE 4.3%** in 2006

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ENTHUSIASM FOR INVESTMENT in research and development in academe appears to be waning. Funding continued to expand in fiscal 2006, the most recent year for which data are available from the National Science Foundation, but the outlook is troubling, particularly in light of the current economic climate.

Overall university and college spending on science and engineering R&D rose just 4.3% to \$47.8 billion in 2006. That year marked the fourth in a row in which spending rose less than the prior year. Average annual growth from 1996 to 2006 was 7.6%, but that strong performance owed a lot to the 9.1 to 10.9% annual increases that occurred in the first four years of the current decade. Growth slipped to 7.9% in 2004 and 5.9% the following year. The 2006 expansion was the smallest since 1996.

Removing inflation from the statistics shows that total R&D spending by universities and colleges edged up 1.0% in terms of constant dollars between 2005 and 2006. From 1996 to 2006, spending grew a total

of 67.2% in constant dollars, compared with 107.2% in current dollars.

For many years, basic research has soaked up three-fourths of the total outlay on academic R&D. In 2006, \$36.0 billion was funneled into basic research, a rise of 4.9% in current dollars versus 2005. That growth pales beside the robust 8.8% annual average increase during the prior decade. Applied R&D spending rose a mere 2.5% to \$11.7 billion in 2006, well off the 10-year annual average increase of 4.5%.

Much of academe's total R&D budget is supplied by the federal government. In 2006, the federal sector's \$30.0 billion outlay—which represented an increase of 2.9% over the prior year—accounted for 62.9% of total funding. Institutions provided just 19.0% of the total, followed by state and local governments, with a 6.3% stake, and industry, with a 5.1% share.

Each year, science absorbs far more academic R&D dollars than does engineering, and 2006 was no different, with 85.2% of the budget directed to science. The \$40.7

TUBULAR Chemical engineers Sankar Nair (right) and Suchitra Konduri of Georgia Tech—one of the top investors in chemical engineering R&D—study nanotubes made from metal oxides.

billion investment in science was 4.2% higher than in 2005. The largest sector by far continued to be the life sciences, accounting for 60.4% of the total academic R&D budget. Spending on the

sector rose 4.4% to \$28.8 billion in 2006.

The physical sciences, among them chemistry, physics, and astronomy, were allotted just 8.0% of total R&D funding in 2006. Academe invested \$3.8 billion in this category, an increase of 3.2% over 2005. Investment in chemistry rose 4.3% to \$1.4 billion in 2006. That growth maintained chemistry's share at 3.0% of the total R&D budget.

On a constant-dollar basis, chemistry spending rose a mere 1.0% between 2005 and 2006. From 1996 to 2006, chemical R&D spending grew a total of 43.3% in constant dollars, compared with 77.6% in current dollars.

From 2005 to 2006, engineering spending grew at a faster rate than science spending, rising 5.0% in current dollars to reach \$7.1 billion. Engineering's 14.8% portion of the total budget was a smidgeon higher than the prior year's share.

Materials engineering spending, which accounted for 1.3% of the total R&D budget in 2006, grew 5.2% compared with the previous year to reach \$644 million. Chemical engineering beat that growth rate, rising a healthy 8.1% to \$547 million, for a 1.1% share of the total budget.

FEDERAL SUPPORT for chemical engineering rose more than usual. Between 2005 and 2006, investment in the sector expanded 6.1% to \$313 million. Federally financed materials engineering spending grew 4.9% to \$387 million. Federal investment in engineering as a whole rose only 2.7% to \$4.2 billion in 2006.

Federal support for science R&D in academe increased just 2.9% to \$25.8 billion between 2005 and 2006. Within the science sector, the life sciences gained 3.2% in funding to reach \$18.3 billion in 2006. Chemistry's pickings were slim, with federal R&D backing edging up just 2.6% to \$974 million.

MORE ONLINE

For tables on postdocs and grad students; the source of academic funds; and spending on basic and applied R&D, chemical engineering, and research equipment, visit www.cen-online.org.

For the second year in a row, California Institute of Technology spent more than any other school on chemical R&D. Its investment shot up 16.1% to \$34.3 million in 2006. Harvard University's outlay surged 27.7% to \$33.9 million, maintaining its second-place rank for a second consecutive year.

The University of California, Berkeley, climbed from fifth to third place by hiking its spending to \$27.3 million in 2006. UC San Francisco slipped down one spot to take fourth as its expenditure shrank to

\$25.7 million. Meanwhile, the University of Illinois, Urbana-Champaign, moved from seventh to fifth with a \$25.0 million outlay. The University of Texas, Austin; Rutgers, State University of New Jersey; Georgia Institute of Technology; Pennsylvania State University; and Texas A&M University rounded out the list of the 10 biggest spenders. Georgia Tech and Penn State were the only newcomers in this top tier in 2006; they displaced UC San Diego and Cornell University.

Harvard benefited from the largest

federal allocation for chemical R&D in 2006. Its \$31.7 million allotment marked a 31.4% surge over its share in the previous year. Second-place Caltech pulled in \$28.7 million. The federal government provided less than \$20 million each to the next three schools, UC San Francisco, UC Berkeley, and Rutgers.

An outlay of \$18.9 million boosted Massachusetts Institute of Technology into first place in terms of chemical engineering R&D spending in 2006. The school's investment was 37.2% higher compared with

FIELDS OF ACADEMIC R&D SPENDING

On average, annual growth in spending for chemistry has lagged that for life sciences since 1996

\$ MILLIONS	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	ANNUAL CHANGE	
												2005-06	1996-2006
ALL SCIENCES	\$19,341	\$20,534	\$21,789	\$23,273	\$25,518	\$27,792	\$30,872	\$34,094	\$36,933	\$39,039	\$40,684	4.2%	7.7%
Life ^a	12,717	13,593	14,598	15,632	17,471	19,229	21,439	23,757	25,948	27,604	28,831	4.4	8.5
Physical ^b	2,259	2,372	2,484	2,606	2,713	2,805	3,017	3,276	3,546	3,704	3,823	3.2	5.4
Physics	988	1,059	1,079	1,149	1,208	1,241	1,287	1,418	1,522	1,604	1,608	0.2	5.0
Chemistry	802	821	877	920	962	1,008	1,129	1,226	1,318	1,365	1,424	4.3	5.9
Environmental	1,489	1,533	1,625	1,692	1,765	1,829	2,017	2,194	2,353	2,551	2,602	2.0	5.7
Psychology & social	1,479	1,522	1,576	1,717	1,816	2,027	2,269	2,444	2,458	2,511	2,578	2.7	5.7
Computer	690	710	747	861	876	956	1,125	1,305	1,404	1,406	1,438	2.3	7.6
Mathematical	289	290	311	314	342	360	388	428	448	495	530	7.1	6.3
Other	419	515	449	452	535	585	616	690	774	769	882	14.7	7.7
ALL ENGINEERING	\$3,708	\$3,839	\$4,070	\$4,261	\$4,555	\$5,019	\$5,522	\$5,993	\$6,310	\$6,738	\$7,076	5.0%	6.7%
Materials	349	389	391	384	399	453	468	548	565	612	644	5.2	6.3
Chemical	317	317	327	349	376	414	431	453	493	506	547	8.1	5.6
TOTAL	\$23,049	\$24,373	\$25,859	\$27,534	\$30,073	\$32,811	\$36,394	\$40,087	\$43,242	\$45,777	\$47,760	4.3%	7.6%

NOTE: Institutional fiscal years. Totals may not add because of rounding. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAS Database System

FEDERALLY FINANCED R&D SPENDING AT UNIVERSITIES

Growth in chemistry spending in 2006 was less than half the average annual increase of the prior decade

\$ MILLIONS	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	ANNUAL CHANGE	
												2005-06	1996-2006
ALL SCIENCES	\$11,609	\$12,060	\$12,799	\$13,656	\$14,959	\$16,382	\$18,634	\$21,149	\$23,728	\$25,067	\$25,797	2.9%	8.3%
Life ^a	7,406	7,765	8,334	8,959	10,069	11,201	12,856	14,652	16,667	17,693	18,268	3.2	9.4
Physical ^b	1,630	1,684	1,762	1,864	1,916	1,974	2,132	2,356	2,569	2,675	2,705	1.1	5.2
Physics	757	803	818	869	902	927	975	1,088	1,169	1,233	1,213	-1.6	4.8
Chemistry	554	552	587	617	631	660	737	819	921	949	974	2.6	5.8
Environmental	1,007	1,013	1,077	1,103	1,134	1,187	1,291	1,446	1,596	1,727	1,763	2.1	5.8
Psychology & social	682	680	725	782	842	947	1,094	1,222	1,284	1,309	1,340	2.4	7.0
Computer	502	506	514	583	584	644	770	937	1,025	1,022	1,015	-0.7	7.3
Mathematical	208	202	214	210	230	242	269	295	318	346	373	7.8	6.0
Other	174	210	173	156	184	187	222	241	269	295	334	13.2	6.7
ALL ENGINEERING	\$2,232	\$2,256	\$2,354	\$2,447	\$2,579	\$2,851	\$3,230	\$3,610	\$3,903	\$4,125	\$4,236	2.7%	6.6%
Materials	190	222	222	218	227	241	263	314	352	369	387	4.9	7.4
Chemical	174	166	169	180	196	215	230	248	268	295	313	6.1	6.0
TOTAL	\$13,842	\$14,316	\$15,153	\$16,103	\$17,538	\$19,233	\$21,864	\$24,759	\$27,631	\$29,191	\$30,033	2.9%	8.1%
ANNUAL CHANGE	3.8%	3.4%	5.8%	6.3%	8.9%	9.7%	13.7%	13.2%	11.6%	5.6%	2.9%		

NOTE: Institutional fiscal years. Totals may not add because of rounding. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAS Database System

SCHOOL SPENDING ON CHEMICAL R&D

Growth in 2006 among top 50 schools came close to average annual growth of the prior decade

RANK			\$ THOUSANDS					% FEDERAL FUNDS, 2006 ^a	ANNUAL CHANGE		
2006	2005		1996	2002	2003	2004	2005		2006	2005-06	1996-2006
1	1	California Inst. of Technology	\$15,599	\$15,590	\$18,099	\$22,968	\$29,563	\$34,322	83.5%	16.1%	8.2%
2	2	Harvard U	11,362	15,549	19,456	22,135	26,572	33,943	93.3	27.7	11.6
3	5	U of California, Berkeley	14,277	21,787	24,907	25,984	25,666	27,315	72.8	6.4	6.7
4	3	U of California, San Francisco	na	27,256	28,798	29,609	26,041	25,664	77.8	-1.4	nm
5	7	U of Illinois, Urbana-Champaign	12,956	20,962	20,949	21,217	22,603	25,034	65.9	10.8	6.8
6	4	U of Texas, Austin	11,393	22,782	23,382	24,154	25,818	24,247	62.5	-6.1	7.8
7	9	Rutgers, State U of New Jersey	7,523	16,891	15,552	16,416	21,049	23,629	74.9	12.3	12.1
8	18	Georgia Inst. of Technology	8,302	8,948	9,652	14,528	17,930	22,837	45.4	27.4	10.6
9	11	Pennsylvania State U	12,670	17,070	18,214	22,330	20,711	22,652	53.3	9.4	6.0
10	8	Texas A&M U	12,478	18,587	19,703	19,475	21,739	22,448	45.0	3.3	6.0
Total, first 10 institutions			\$106,560	\$185,422	\$198,712	\$218,816	\$237,692	\$262,091	69.5%	10.3%	9.4%
11	6	U of California, San Diego	9,683	14,593	17,530	19,638	23,028	21,789	80.1	-5.4	8.4
12	13	U of North Carolina, Chapel Hill	7,492	13,446	16,045	16,186	18,521	21,280	74.0	14.9	11.0
13	10	Cornell U	11,712	13,340	20,804	20,600	20,770	21,090	68.9	1.5	6.1
14	37	Indiana U	9,081	13,737	14,701	15,642	11,734	19,684	33.0	67.8	8.0
15	15	U of Colorado	12,701	15,623	15,164	14,960	18,251	19,274	87.4	5.6	4.3
16	16	U of Washington, Seattle ^b	6,914	13,934	16,947	19,354	18,154	18,716	81.4	3.1	10.5
17	22	U of Michigan	6,007	11,623	15,191	14,901	16,435	18,472	70.2	12.4	11.9
18	14	U of California, Los Angeles	10,859	17,758	19,607	20,453	18,377	18,381	73.4	0.0	5.4
19	25	U of Wisconsin, Madison	12,910	15,214	15,546	17,115	15,710	18,348	63.4	16.8	3.6
20	20	U of Massachusetts, Amherst	9,322	13,387	15,688	18,074	17,088	18,146	61.3	6.2	6.9
Total, first 20 institutions			\$203,241	\$328,077	\$365,935	\$395,739	\$415,760	\$457,271	69.5%	10.0%	8.4%
21	17	Massachusetts Inst. of Technology	14,856	18,352	20,184	20,926	17,984	18,142	88.2	0.9	2.0
22	19	Northwestern U	7,476	13,776	16,108	17,704	17,825	17,258	79.8	-3.2	8.7
23	26	U of Pennsylvania	12,855	11,107	11,165	12,435	14,751	16,459	90.5	11.6	2.5
24	21	Stanford U	12,010	17,856	18,097	18,863	16,781	16,283	79.7	-3.0	3.1
25	30	U of California, Irvine	10,127	9,949	10,856	11,315	14,192	16,186	67.3	14.1	4.8
26	12	Louisiana State U	4,761	11,104	14,200	13,409	19,134	15,988	52.2	-16.4	12.9
27	27	U of Utah	6,371	10,349	12,247	13,477	14,251	15,136	66.9	6.2	9.0
28	28	U of Minnesota	7,468	9,372	9,569	12,018	14,222	14,204	70.5	-0.1	6.6
29	34	U of Arizona	5,601	9,253	10,874	11,312	13,046	13,734	74.5	5.3	9.4
30	33	Purdue U	10,927	13,553	13,268	12,776	13,070	13,723	70.0	5.0	2.3
Total, first 30 institutions			\$295,693	\$452,748	\$502,503	\$539,974	\$571,016	\$614,384	70.7%	7.6%	7.6%
31	35	U of Chicago	7,791	7,387	8,802	10,083	12,108	13,261	58.8	9.5	5.5
32	32	Michigan State U	6,007	14,142	13,230	13,234	13,692	12,927	63.7	-5.6	8.0
33	29	Arizona State U, Tempe	9,087	8,244	10,162	11,376	14,196	12,840	69.2	-9.6	3.5
34	24	U of Florida	8,182	12,154	11,594	13,011	16,153	12,828	72.0	-20.6	4.6
35	36	Johns Hopkins U ^c	5,581	10,512	11,330	11,890	12,038	12,693	93.6	5.4	8.6
36	50	U of South Carolina	6,321	12,358	8,911	10,515	8,801	12,627	46.7	43.5	7.2
37	23	Ohio State U	10,784	14,174	15,512	14,423	16,378	12,574	63.0	-23.2	1.5
38	31	U of Pittsburgh	5,904	7,668	9,630	13,025	14,031	12,524	80.1	-10.7	7.8
39	41	U of Akron	7,483	10,091	11,260	10,299	10,618	11,645	32.6	9.7	4.5
40	39	State U of New York, Buffalo	5,630	10,407	12,382	11,898	11,158	11,625	50.3	4.2	7.5
Total, first 40 institutions			\$368,463	\$559,885	\$615,316	\$659,728	\$700,189	\$739,928	69.5%	5.7%	7.2%
41	88	U of Puerto Rico, Rio Piedras	1,775	1,445	2,439	3,244	5,011	10,843	99.4	116.4	19.8
42	38	Virginia Polytechnic Inst. & State U	6,737	9,524	11,694	11,332	11,382	10,828	55.6	-4.9	4.9
43	46	Florida State U	5,273	13,709	13,321	13,841	9,351	10,825	41.1	15.8	7.5
44	48	U of Texas M. D. Anderson Cancer Center	na	na	na	8,465	9,041	10,790	53.7	19.3	nm
45	54	U of Georgia	6,332	6,735	7,521	8,349	8,511	10,437	32.0	22.6	5.1
46	53	U of Notre Dame	8,030	11,252	10,657	11,325	8,591	9,731	90.1	13.3	1.9
47	42	State U of New York, Stony Brook	6,291	8,203	9,007	10,656	10,191	9,388	64.9	-7.9	4.1
48	58	Washington U	3,856	5,993	6,547	7,473	7,910	9,323	74.2	17.9	9.2
49	56	Emory U	5,031	7,526	10,667	7,734	8,223	9,290	87.5	13.0	6.3
50	61	U of California, Davis	3,589	6,249	7,526	8,455	7,692	9,218	74.9	19.8	9.9
Total, first 50 institutions			\$415,377	\$630,521	\$694,695	\$750,602	\$786,092	\$840,601	69.1%	6.9%	7.3%
TOTAL, ALL INSTITUTIONS			\$802,219	\$1,128,859	\$1,225,607	\$1,317,727	\$1,365,306	\$1,424,307	68.4%	4.3%	5.9%

NOTE: Institutional fiscal years. **a** Share of total expenditures funded by the federal government. **b** Corrected data for 2005 provided to C&EN by the university. **c** Includes funding for the Applied Physics Lab. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

SCHOOLS WITH MOST FEDERAL SUPPORT FOR CHEMICAL R&D

Top 10 schools' growth in 2006 funding was more than twice that of the top 50

RANK		\$ THOUSANDS	1996	2002	2003	2004	2005	2006	ANNUAL CHANGE	
2006	2005								2005-06	1996-2006
1	2	Harvard U	\$10,608	\$13,637	\$17,490	\$19,617	\$24,109	\$31,683	31.4%	11.6%
2	1	California Inst. of Technology	12,478	12,135	15,279	19,685	25,171	28,662	13.9	8.7
3	3	U of California, San Francisco	na	20,915	22,787	22,215	19,621	19,962	1.7	nm
4	4	U of California, Berkeley	12,050	15,867	17,078	19,988	19,200	19,891	3.6	5.1
5	6	Rutgers, State U of New Jersey	5,467	11,031	10,992	12,276	16,893	17,695	4.7	12.5
6	5	U of California, San Diego	8,118	11,311	12,749	14,648	18,133	17,451	-3.8	8.0
7	9	U of Colorado	9,442	13,602	13,251	12,843	15,716	16,842	7.2	6.0
8	10	U of Illinois, Urbana-Champaign	7,616	12,266	12,336	14,295	15,694	16,496	5.1	8.0
9	8	Massachusetts Inst. of Technology	13,735	16,357	17,551	18,774	16,149	16,004	-0.9	1.5
10	12	U of North Carolina, Chapel Hill	6,285	9,294	12,455	12,753	14,707	15,757	7.1	9.6
Total, first 10 institutions			\$85,799	\$136,415	\$151,968	\$167,094	\$185,393	\$200,443	8.1%	8.9%
11	11	U of Washington, Seattle ^a	4,847	8,656	12,522	17,900	15,212	15,243	0.2	12.1
12	7	U of Texas, Austin	6,294	14,104	15,122	16,136	16,523	15,163	-8.2	9.2
13	19	U of Pennsylvania	12,181	10,158	9,505	10,852	12,352	14,892	20.6	2.0
14	16	Cornell U	8,805	8,944	15,897	15,350	13,398	14,528	8.4	5.1
15	14	Northwestern U	5,266	10,134	11,484	13,631	14,549	13,767	-5.4	10.1
16	13	U of California, Los Angeles	9,338	13,074	14,598	15,453	14,666	13,491	-8.0	3.7
17	15	Stanford U	10,509	14,844	15,496	16,668	14,250	12,970	-9.0	2.1
18	18	U of Michigan	4,449	9,041	11,202	11,701	12,628	12,962	2.6	11.3
19	17	Pennsylvania State U	8,294	10,312	11,001	14,573	13,227	12,082	-8.7	3.8
20	22	Johns Hopkins U ^b	5,293	10,090	10,753	11,028	11,316	11,875	4.9	8.4
Total, first 20 institutions			\$161,075	\$245,772	\$279,548	\$310,386	\$323,514	\$337,416	4.3%	7.7%
21	29	U of Wisconsin, Madison	9,318	8,053	9,174	10,830	9,696	11,624	19.9	2.2
22	28	U of Massachusetts, Amherst	5,320	7,103	8,567	10,315	9,857	11,123	12.8	7.7
23	26	U of California, Irvine	7,529	7,196	7,175	6,931	10,281	10,901	6.0	3.8
24	59	U of Puerto Rico, Rio Piedras	1,662	1,079	2,380	3,117	4,951	10,779	117.7	20.6
25	27	Georgia Inst. of Technology	4,274	4,356	4,934	8,500	10,201	10,360	1.6	9.3
26	31	U of Arizona	3,912	6,853	8,174	8,758	9,587	10,235	6.8	10.1
27	32	U of Utah	5,949	7,186	7,902	9,164	9,421	10,130	7.5	5.5
28	21	Texas A&M U	7,518	8,450	8,532	8,652	11,642	10,098	-13.3	3.0
29	20	U of Pittsburgh	5,234	6,628	8,516	11,283	11,800	10,037	-14.9	6.7
30	23	U of Minnesota	5,864	6,866	7,051	8,956	11,026	10,014	-9.2	5.5
Total, first 30 institutions			\$217,655	\$309,542	\$351,953	\$396,892	\$421,976	\$442,717	4.9%	7.4%
31	33	Purdue U	7,657	8,496	8,219	8,419	8,931	9,604	7.5	2.3
32	24	U of Florida	4,197	7,901	7,262	9,667	10,427	9,237	-11.4	8.2
33	34	Arizona State U, Tempe	4,426	4,401	5,513	6,259	8,430	8,886	5.4	7.2
34	40	U of Notre Dame	7,100	8,886	9,559	10,204	7,730	8,768	13.4	2.1
35	25	Louisiana State U	2,511	7,005	7,470	8,454	10,293	8,344	-18.9	12.8
36	36	Michigan State U	3,839	6,186	7,452	8,358	8,112	8,235	1.5	7.9
37	42	Emory U	3,821	4,615	5,729	6,764	7,345	8,127	10.6	7.8
38	30	Ohio State U	7,827	7,691	8,271	9,461	9,612	7,916	-17.6	0.1
39	35	U of Chicago	6,938	6,020	6,775	7,315	8,213	7,792	-5.1	1.2
40	43	Columbia U	6,475	6,145	7,341	6,655	7,253	7,167	-1.2	1.0
Total, first 40 institutions			\$272,446	\$376,888	\$425,544	\$478,448	\$508,322	\$526,793	3.6%	6.8%
41	39	U of Southern Mississippi	3,523	4,597	5,636	5,861	7,741	6,991	-9.7	7.1
42	54	Washington U	3,134	4,470	4,744	5,401	5,625	6,918	23.0	8.2
43	52	U of California, Davis	3,371	4,783	5,488	6,628	6,004	6,908	15.1	7.4
44	49	Colorado State U	4,830	5,705	5,372	6,005	6,531	6,624	1.4	3.2
45	45	Indiana U	6,648	5,584	6,503	6,920	6,766	6,494	-4.0	-0.2
46	48	Yale U	4,848	5,199	5,991	6,348	6,534	6,456	-1.2	2.9
47	57	U of California, Santa Cruz	4,564	4,464	5,055	6,108	5,114	6,443	26.0	3.5
48	38	U of Virginia	4,413	6,498	7,234	8,036	7,748	6,216	-19.8	3.5
49	44	Princeton U	5,979	7,920	7,397	8,271	7,065	6,158	-12.8	0.3
50	50	State U of New York, Stony Brook	4,068	5,735	6,287	7,060	6,486	6,094	-6.0	4.1
Total, first 50 institutions			\$317,824	\$431,843	\$485,251	\$545,086	\$573,936	\$592,095	3.2%	6.4%
TOTAL, ALL INSTITUTIONS			\$553,784	\$736,953	\$819,409	\$920,990	\$948,640	\$973,740	2.6%	5.8%

NOTE: Institutional fiscal years. **a** Corrected data for 2005 provided to C&EN by the university. **b** Includes funding for the Applied Physics Lab. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

TOP 25 UNIVERSITIES IN 2006 R&D SPENDING

Top schools invested only 2.5% of their R&D funds in chemistry

RANK		\$ MILLIONS	LIFE SCIENCES ^a	ENGINEERING	PHYSICAL SCIENCES ^b	CHEMISTRY ^c	ENVIRONMENTAL SCIENCES	MATH & COMPUTER SCIENCES	OTHER SCIENCES	TOTAL
2006	2005									
1	1	Johns Hopkins U ^d	\$702	\$467	\$140	\$13	\$40	\$97	\$53	\$1,500
2	3	U of Wisconsin, Madison	508	93	56	18	83	21	72	832
3	4	U of California, Los Angeles	610	52	59	18	11	23	57	811
4	2	U of Michigan	481	152	41	18	11	12	103	800
5	5	U of California, San Francisco	770	0	26	26	0	0	0	796
6	8	U of Washington, Seattle	542	75	34	19	92	7	29	778
7	6	U of California, San Diego	404	83	50	22	127	68	22	755
8	7	Stanford U	389	149	73	16	20	30	19	679
9	9	U of Pennsylvania	547	33	33	16	1	11	52	676
10	10	Duke U	554	35	18	6	14	11	26	657
11	12	Ohio State U	373	135	28	13	9	47	60	652
12	13	Cornell U	411	77	90	21	6	32	33	649
13	11	Pennsylvania State U	201	236	64	23	53	43	48	644
14	14	Massachusetts Inst. of Technology	173	220	98	18	27	54	29	601
15	17	U of Minnesota	435	55	28	14	14	24	38	595
16	18	U of California, Davis	426	59	24	9	26	12	26	573
17	16	Texas A&M U	263	162	38	22	71	16	18	569
18	21	U of Florida	390	93	34	13	10	10	28	565
19	20	Washington U	491	15	17	9	5	8	12	548
20	15	U of California, Berkeley	181	148	106	27	10	9	93	546
21	22	U of Arizona	253	80	149	14	11	12	31	536
22	23	U of Pittsburgh	459	21	19	13	1	7	23	530
23	19	Columbia U	368	38	34	8	58	11	22	530
24	24	U of Colorado	288	37	64	19	91	10	24	513
25	25	U of Illinois, Urbana-Champaign	129	125	57	25	42	85	39	476
Total, listed institutions			\$10,347	\$2,641	\$1,379	\$421	\$834	\$658	\$953	\$16,812
TOTAL, ALL INSTITUTIONS			\$28,831	\$7,076	\$3,823	\$1,424	\$2,602	\$1,968	\$3,460	\$47,760

NOTE: Institutional fiscal years. Totals may not add because of rounding. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **c** Included in physical sciences. **d** Includes Applied Physics Lab expenditures.

SOURCE: National Science Foundation, WebCASPAR Database System

spending in 2005. North Carolina State University placed second, with \$16.5 million in spending. Penn State, Georgia Tech, and UT Austin rounded out the top five.

MIT also topped the list of schools with the most federal support for chemical engineering R&D in 2006. The government's \$13.2 million contribution to MIT dwarfed the \$8.9 million given to second-place Arizona State University, Tempe. The other top five schools—Penn State, Johns Hopkins, and the University of Michigan—received slightly less than Arizona State.

After three years of declines, school spending on chemical research equipment rebounded in 2006. Universities and colleges poured \$120.7 million into these assets, some 7.8% more than in 2005. Meanwhile, the top 25 schools spent a whopping 57.0% more than they did in the prior year, bringing their 2006 total to \$50.9 million.

Indiana University's \$5.1 million outlay put it in first place on the 2006 list. The University of Colorado came in second, with a \$3.8 million investment, followed by UC San Diego, with \$3.6 million in spending. Harvard and Rutgers placed fourth and fifth, respectively.

Total federal support for chemical research equipment slipped modestly in 2006. The government provided universities and colleges with \$79.3 million, or 1.4% less than in 2005. Almost half went to the top 25 schools, which collected \$35.8 million. The largest federal grants went to the University of Colorado, UC San Diego, Harvard, UC San Francisco, and Rutgers.

THE NUMBER of students seeking graduate degrees in chemistry continued a long-term growth trend in 2006. The year's 1.2% rise brought the total to 21,351. The popula-

tion of chemical engineering grad students rose the same percentage, to 7,261 in 2006. As is usual, about half the chemical engineering students were foreign, whereas more than one-third of the chemists were from outside the U.S.

The number of postdoctoral appointments for chemists shrank for the second year in a row, slipping 4.1% to 4,044. Chemical engineering postdocs fared better: Their numbers rose 2.8% to 722 in 2006.

Data for this article were drawn primarily from NSF's WebCASPAR database of academic science and engineering statistics, which can be accessed online at caspar.nsf.gov. Further information came from NSF's annual Academic Research & Development Expenditures Report, which can be viewed at www.nsf.gov/statistics/nsfo8300.

Note that numbers from different tables may not match because of rounding. ■

CHARACTER OF ACADEMIC R&D SPENDING

R&D budget growth slowed again in 2006

\$ MILLIONS	1996	1997	1998 ^a	1999	2000	2001	2002	2003	2004	2005	2006	ANNUAL CHANGE	
												2005-06	1996-2006
Basic research	\$15,481	\$16,602	\$19,051	\$20,368	\$22,456	\$24,387	\$27,312	\$29,997	\$31,947	\$34,348	\$36,044	4.9%	8.8%
Applied R&D	7,568	7,772	6,808	7,166	7,617	8,424	9,082	10,090	11,295	11,429	11,717	2.5	4.5
TOTAL	\$23,049	\$24,373	\$25,859	\$27,534	\$30,073	\$32,811	\$36,394	\$40,087	\$43,242	\$45,777	\$47,760	4.3%	7.6%
ANNUAL CHANGE	3.9%	5.7%	6.1%	6.5%	9.2%	9.1%	10.9%	10.1%	7.9%	5.9%	4.3%		

NOTE: Institutional fiscal years. Totals may not add because of rounding. **a** Calculation method was revised beginning in fiscal 1998.
SOURCE: National Science Foundation, 2007, "Academic Research and Development Expenditures: Fiscal Year 2006"

SCHOOL SPENDING ON CHEMICAL RESEARCH EQUIPMENT

After shrinking for three years, total spending recovered in 2006

RANK, 2006	\$ THOUSANDS	1996	2002	2003	2004	2005	2006	% FEDERAL FUNDS, 2006 ^a	ANNUAL AVERAGE, 2002-06
1	Indiana U	\$1,159	\$3,391	\$3,399	\$1,864	\$1,564	\$5,091	15.0%	\$3,062
2	U of Colorado	1,097	397	458	427	3,562	3,836	99.9	1,736
3	U of California, San Diego	527	1,444	1,409	1,376	2,330	3,560	95.1	2,024
4	Harvard U	1,016	1,038	1,522	1,992	1,711	3,225	91.7	1,898
5	Rutgers, State U of New Jersey	689	1,475	757	333	1,703	2,456	61.2	1,345
6	U of Illinois, Urbana-Champaign	3,317	2,029	2,124	1,655	1,775	2,232	54.8	1,963
7	Old Dominion U	239	314	39	78	234	2,077	1.2	548
8	U of California, San Francisco	na	3,262	3,462	2,461	1,385	2,076	89.5	2,529
9	U of South Carolina	67	1,907	1,065	1,959	489	2,075	20.3	1,499
10	U of California, Davis	31	502	522	691	655	1,906	71.2	855
11	U of Washington, Seattle ^b	247	2,121	1,471	1,911	1,495	1,882	72.2	1,776
12	Pennsylvania State U	999	1,376	1,221	1,152	1,183	1,700	44.5	1,326
13	Massachusetts Inst. of Technology	2,714	1,750	2,718	2,302	1,208	1,660	81.6	1,928
14	U of Georgia	767	389	436	677	604	1,601	6.0	741
15	U of California, Berkeley	748	2,226	1,854	2,409	1,928	1,545	87.7	1,992
16	U of Texas, Austin	1,197	2,842	1,308	1,522	1,671	1,509	51.4	1,770
17	California Inst. of Technology	1,087	745	4,083	3,700	1,485	1,492	97.6	2,301
18	City U of New York, Hunter College	524	164	739	745	105	1,492	91.7	649
19	U of Wisconsin, Madison	2,021	1,826	1,699	1,961	1,308	1,446	53.1	1,648
20	Brandeis U	87	46	140	1,053	63	1,417	99.9	544
21	U of California, Irvine	1,420	1,269	1,199	987	1,813	1,416	63.8	1,337
22	U of Michigan	263	1,415	347	382	685	1,397	20.1	845
23	U of Massachusetts, Amherst	388	946	1,986	820	1,249	1,365	79.9	1,273
24	U of Puerto Rico, Humacao	na	na	na	287	68	1,273	100.0	nm
25	Louisiana State U	676	1,913	2,819	2,049	2,170	1,209	51.3	2,032
	Total, listed institutions	\$21,280	\$34,787	\$36,777	\$34,793	\$32,443	\$50,938	63.2%	\$37,948
	TOTAL, ALL INSTITUTIONS	\$88,053	\$121,957	\$119,097	\$116,671	\$111,959	\$120,667	65.7%	\$118,070

NOTE: Institutional fiscal years. **a** Share of total expenditures funded by the federal government. **b** Corrected data for 2005 provided to C&EN by the university. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

FEDERAL SUPPORT FOR CHEMICAL RESEARCH EQUIPMENT

Funding at the top 25 surged by 53% in 2006, while total funding for all institutions shrank slightly

RANK, 2006	\$ THOUSANDS	1996	2002	2003	2004	2005	2006	ANNUAL AVERAGE, 2002-06
1	U of Colorado	\$1,027	\$360	\$393	\$369	\$3,479	\$3,832	\$1,687
2	U of California, San Diego	318	1,346	1,306	1,270	2,249	3,384	1,911
3	Harvard U	992	963	1,462	1,756	1,593	2,958	1,746
4	U of California, San Francisco	na	1,725	2,694	1,591	877	1,859	1,749
5	Rutgers, State U of NJ	500	701	449	266	1,100	1,503	804
6	California Inst. of Technology	943	622	1,263	418	1,443	1,456	1,040
7	Brandeis U	37	36	95	1,043	59	1,416	530
8	City U of New York, Hunter College	43	77	644	272	31	1,368	478
9	U of Washington, Seattle ^a	247	1,545	931	1,894	1,067	1,358	1,359
10	U of California, Davis	28	340	330	595	332	1,358	591
11	U of California, Berkeley	451	1,603	1,587	1,381	1,701	1,355	1,525
12	Massachusetts Inst. of Technology	2,642	1,466	2,039	1,975	1,136	1,355	1,594
13	U of Puerto Rico, Humacao	na	na	na	287	68	1,273	nm
14	U of Illinois, Urbana-Champaign	1,639	1,259	1,101	949	1,124	1,224	1,131
15	U of Nevada, Reno	39	51	174	68	211	1,107	322
16	U of Massachusetts, Amherst	330	745	1,101	570	859	1,091	873
17	U of Cincinnati	na	71	50	110	200	1,077	302
18	Washington U	278	1,035	322	482	662	1,014	703
19	U of Pennsylvania	906	712	725	944	na	965	nm
20	U of California, Irvine	876	1,005	459	310	1,514	904	838
21	U of California, Santa Barbara	667	1,013	840	291	398	862	681
22	U of Texas, Austin	920	1,522	614	959	1,032	775	980
23	U of Wisconsin, Madison	1,541	763	1,070	1,546	803	768	990
24	Indiana U	834	504	1,066	543	462	765	668
25	Pennsylvania State U	693	731	540	707	956	757	738
	Total, listed institutions	\$15,951	\$20,195	\$21,255	\$20,596	\$23,356	\$35,784	\$24,237
	TOTAL, ALL INSTITUTIONS	\$60,431	\$75,690	\$77,493	\$77,358	\$80,462	\$79,323	\$78,065

NOTE: Institutional fiscal years. **a** Corrected data for 2005 provided to C&EN by the university. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

SOURCES OF ACADEMIC R&D FUNDS

Federal share remained close to two-thirds in 2006

\$ MILLIONS	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	ANNUAL CHANGE	
												2005-06	1996-2006
Federal govt.	\$13,842	\$14,316	\$15,153	\$16,103	\$17,538	\$19,233	\$21,864	\$24,759	\$27,631	\$29,191	\$30,033	2.9%	8.1%
Institutional funds	4,171	4,698	5,003	5,381	5,924	6,614	7,133	7,663	7,752	8,258	9,062	9.7	8.1
State & local govt.	1,812	1,910	1,944	2,022	2,200	2,321	2,506	2,646	2,879	2,942	3,016	2.5	5.2
Industry	1,605	1,737	1,888	2,033	2,156	2,219	2,191	2,162	2,129	2,294	2,428	5.8	4.2
All other sources	1,619	1,712	1,870	1,995	2,254	2,425	2,700	2,857	2,852	3,093	3,221	4.1	7.1
TOTAL	\$23,049	\$24,373	\$25,859	\$27,534	\$30,073	\$32,811	\$36,394	\$40,087	\$43,242	\$45,777	\$47,760	4.3%	7.6%

NOTE: Institutional fiscal years. Totals may not add because of rounding. **SOURCE:** National Science Foundation, 2007, "Academic Research and Development Expenditures: Fiscal Year 2006"

UNIVERSITY SPENDING FOR RESEARCH EQUIPMENT

Outlays for chemistry equipment rebounded in 2006

\$ MILLIONS	1996	2002	2003	2004	2005	2006	% FEDERAL FUNDS, 2006 ^a	ANNUAL CHANGE	
								2005-06	1996-2006
ALL SCIENCES	930	1,338	1,433	1,497	1,437	1,401	59.5%	-2.5%	4.2%
Life ^b	444	737	819	836	825	755	56.4	-8.5	5.5
Physical ^c	234	275	297	337	324	328	67.5	1.2	3.4
Physics	105	122	139	160	160	153	73.0	-4.4	3.8
Chemistry	88	122	119	117	112	121	65.7	8.0	3.2
Environmental	88	132	121	125	122	144	62.8	18.0	5.0
Math & computer	81	111	106	113	81	78	73.1	-3.7	-0.4
Other	82	83	90	86	85	96	40.4	12.9	1.6
ALL ENGINEERING	285	363	385	394	438	439	57.0%	0.2%	4.4%
Materials	32	41	61	38	51	55	58.1	7.8	5.6
Chemical	24	30	32	55	37	38	57.1	2.7	4.7
TOTAL	1,215	1,701	1,817	1,891	1,876	1,839	58.9%	-2.0%	4.2%

NOTE: Institutional fiscal years. Totals may not add because of rounding. **a** Share of total expenditures funded by the federal government. **b** Includes agricultural, biological, medical, and other life sciences. **c** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAR Database System

SCHOOL SPENDING ON CHEMICAL ENGINEERING R&D

Total growth at all institutions in 2006 topped the average annual growth for the prior decade

RANK		\$ THOUSANDS	1996	2002	2003	2004	2005	2006	% FEDERAL FUNDS, 2006 ^a	ANNUAL CHANGE	
2006	2005									2005-06	1996-2006
1	5	Massachusetts Inst. of Technology	\$17,788	\$15,146	\$17,340	\$15,074	\$13,737	\$18,851	69.9%	37.2%	0.6%
2	2	North Carolina State U	10,758	18,851	16,839	13,311	15,231	16,499	49.8	8.3	4.4
3	1	Pennsylvania State U	4,077	14,149	15,060	14,057	17,375	16,129	54.5	-7.2	14.7
4	4	Georgia Inst. of Technology	5,879	9,442	9,519	13,107	13,808	14,955	46.7	8.3	9.8
5	3	U of Texas, Austin	7,515	8,313	9,351	10,204	14,049	13,896	43.8	-1.1	6.3
6	7	Arizona State U, Tempe	2,811	3,965	5,233	7,554	11,977	12,744	69.6	6.4	16.3
7	9	Ohio State U	3,209	7,130	6,962	6,761	10,177	12,325	35.7	21.1	14.4
8	8	Clemson U	1,219	8,321	11,095	11,195	10,915	11,982	55.2	9.8	25.7
9	96	Case Western Reserve U	9,198	4,952	1,806	1,724	1,587	1,187	47.7	604.9	2.0
10	6	Texas A&M U	11,074	9,541	9,528	16,554	12,089	11,089	21.1	-8.3	0.0
11	16	Michigan State U	7,005	7,030	7,712	7,643	8,761	9,970	37.3	13.8	3.6
12	21	U of South Carolina	4,893	5,890	6,607	6,852	7,148	9,780	58.2	36.8	7.2
13	15	U of Michigan	2,436	5,636	7,772	7,706	8,891	9,651	85.5	8.5	14.8
14	17	U of Minnesota	10,973	7,670	7,555	9,256	8,718	9,634	38.6	10.5	-1.3
15	10	Johns Hopkins U	4,792	7,405	8,300	9,834	9,675	9,616	90.3	-0.6	7.2
16	80	State U of New York, Buffalo	1,438	1,985	1,885	1,815	1,957	9,138	34.7	366.9	20.3
17	11	Princeton U	2,402	3,359	6,362	9,543	9,509	9,044	62.2	-4.9	14.2
18	12	Stanford U	6,419	9,361	8,844	8,218	9,272	8,982	59.3	-3.1	3.4
19	23	U of Nebraska	520	5,169	4,339	4,321	6,972	8,501	69.7	21.9	32.2
20	14	U of California, Davis	3,023	4,675	5,310	7,259	8,923	8,204	56.4	-8.1	10.5
21	19	U of Delaware	6,179	8,189	8,333	7,703	7,162	7,613	73.6	6.3	2.1
22	22	U of California, Santa Barbara	4,240	4,974	5,843	6,069	7,129	7,477	65.9	4.9	5.8
23	25	U of Colorado	2,958	3,284	3,672	4,952	6,294	6,887	73.8	9.4	8.8
24	20	U of Wisconsin, Madison	6,367	6,474	6,850	7,735	7,154	6,870	63.8	-4.0	0.8
25	24	U of California, Berkeley	2,042	6,842	6,161	6,592	6,312	6,582	37.5	4.3	12.4
		Total, listed institutions	\$139,215	\$187,753	\$198,278	\$215,039	\$234,822	\$267,606	55.3%	14.0%	6.8%
		TOTAL, ALL INSTITUTIONS	\$317,189	\$430,785	\$453,323	\$492,824	\$505,875	\$547,426	57.1%	8.2%	5.6%

NOTE: Institutional fiscal years. **a** Share of total expenditures funded by the federal government. **SOURCE:** National Science Foundation, WebCASPAR Database System

FEDERAL SUPPORT FOR CHEMICAL ENGINEERING R&D

MIT's large gain put it at the top of the list in 2006

RANK		\$ THOUSANDS	1996	2002	2003	2004	2005	2006	ANNUAL CHANGE	
2006	2005								2005-06	1996-2006
1	5	Massachusetts Inst. of Technology	\$10,443	\$11,014	\$10,740	\$9,124	\$7,514	\$13,172	75.3%	2.3%
2	2	Arizona State U, Tempe	1,157	2,587	3,562	4,129	9,879	8,871	-10.2	22.6
3	1	Pennsylvania State U	1,522	7,466	8,811	8,815	10,944	8,798	-19.6	19.2
4	3	Johns Hopkins U	4,605	6,803	7,608	9,067	9,015	8,688	-3.6	6.6
5	6	U of Michigan	1,296	3,411	5,153	5,526	7,400	8,255	11.6	20.3
6	8	North Carolina State U, Raleigh	4,810	6,936	6,091	6,300	6,382	8,223	28.8	5.5
7	4	Georgia Inst. of Technology	3,027	4,596	4,615	6,865	7,548	6,977	-7.6	8.7
8	7	Clemson U	403	3,504	6,579	6,030	6,414	6,615	3.1	32.3
9	15	U of Texas, Austin	4,187	4,109	4,776	5,174	5,286	6,085	15.1	3.8
10	22	U of Nebraska	163	1,419	1,073	2,354	4,355	5,929	36.1	43.2
11	14	California Inst. of Technology	2,620	3,895	3,579	5,164	5,304	5,858	10.4	8.4
12	28	U of South Carolina	3,015	3,207	3,529	3,795	3,502	5,695	62.6	6.6
13	9	Princeton U	1,324	1,816	4,143	5,778	6,286	5,628	-10.5	15.6
14	13	U of Delaware	3,059	4,657	6,173	5,523	5,351	5,603	4.7	6.2
15	85	Case Western Reserve U	5,841	2,976	630	987	983	5,340	443.2	-0.9
16	10	Stanford U	5,652	7,655	7,137	6,310	5,981	5,324	-11.0	-0.6
17	17	U of Colorado	1,469	2,222	2,518	3,762	4,817	5,081	5.5	13.2
18	16	U of California, Santa Barbara	2,987	3,377	3,698	4,059	5,084	4,925	-3.1	5.1
19	12	U of California, Davis	1,789	2,775	2,957	4,573	5,697	4,627	-18.8	10.0
20	30	Rensselaer Polytechnic Inst.	1,328	2,201	1,283	2,637	3,363	4,513	34.2	13.0
21	19	Northwestern U	1,238	2,912	3,245	3,749	4,648	4,460	-4.0	13.7
22	21	Ohio State U	967	1,132	1,441	2,719	4,378	4,394	0.4	16.3
23	23	U of Wisconsin, Madison	3,204	3,725	3,980	4,225	4,120	4,381	6.3	3.2
24	20	U of Illinois, Urbana-Champaign	1,004	4,309	3,653	3,333	4,593	4,160	-9.4	15.3
25	24	U of Washington, Seattle	678	4,714	4,163	4,123	3,806	3,979	4.5	19.4
		Total, listed institutions	\$67,788	\$103,418	\$111,137	\$124,121	\$142,650	\$155,581	9.1%	8.7%
		TOTAL, ALL INSTITUTIONS	\$173,770	\$230,157	\$248,053	\$268,095	\$295,266	\$312,683	5.9%	6.1%

NOTE: Institutional fiscal years. **SOURCE:** National Science Foundation, WebCASPAR Database System

SCIENCE GRADUATE STUDENTS

Number of grad students studying chemistry and chemical engineering grew slightly in 2006

	1996	2002	2003	2004	2005	2006	ANNUAL CHANGE	
							2005-06	1996-2006
ALL SCIENCES	390,855	420,736	439,744	450,897	461,661	474,602	2.8%	2.0%
Life ^a	148,948	159,356	170,374	178,600	185,553	194,313	4.7	2.7
Biological	57,749	61,088	64,701	66,565	68,479	69,941	2.1	1.9
Agricultural	12,301	12,698	13,197	13,445	13,123	13,016	-0.8	0.6
Psychology & social	141,757	141,367	147,291	151,458	156,709	160,000	2.1	1.2
Math & computer	52,634	73,432	73,161	69,947	68,188	68,468	0.4	2.7
Physical ^b	32,333	32,341	34,298	35,761	36,375	36,901	1.4	1.3
Chemistry	19,334	19,045	20,049	20,776	21,101	21,351	1.2	1.0
Physics	11,728	11,701	12,555	13,298	13,472	13,722	1.9	1.6
Geosciences	15,183	14,240	14,620	15,131	14,836	14,920	0.6	-0.2
ALL ENGINEERING	103,224	119,668	127,377	123,566	120,565	123,041	2.1%	1.8%
Chemical	7,408	7,414	7,516	7,452	7,173	7,261	1.2	-0.2
Materials	4,747	4,992	5,131	5,059	5,160	5,268	2.1	1.0
TOTAL	494,079	540,404	567,121	574,463	582,226	597,643	2.6%	1.9%

NOTE: Includes part- and full-time graduate students at M.S.- and Ph.D.-granting institutions. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAR Database System

FOREIGN GRADUATE STUDENTS

More than one-third of chemistry and nearly half of chemical engineering grad students were from outside the U.S. in 2006

NUMBER OF FOREIGN STUDENTS	2002		2003		2004		2005		2006	
	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	% OF TOTAL	
ALL SCIENCES	94,597	22.5%	94,949	21.6%	94,058	20.9%	93,482	20.2%	95,675	20.2%
Math & computer	34,090	46.4	31,684	43.3	29,162	41.7	28,011	41.1	28,574	41.7
Life ^a	23,721	14.9	24,984	14.7	25,920	14.5	26,860	14.5	27,916	14.4
Biological	13,835	22.6	14,836	22.9	15,831	23.8	16,467	24.0	16,907	24.2
Agricultural	2,613	20.6	2,596	19.7	2,695	20.0	2,659	20.3	2,675	20.6
Psychology & social	20,919	14.8	21,371	14.5	21,569	14.2	21,133	13.5	21,661	13.5
Physical ^b	13,090	40.5	14,127	41.2	14,613	40.9	14,700	40.4	14,757	40.0
Chemistry	7,253	38.1	7,881	39.3	8,139	39.2	8,268	39.2	8,301	38.9
Physics	5,442	46.5	5,811	46.3	6,028	45.3	5,999	44.5	6,000	43.7
Geosciences	2,777	19.5	2,783	19.0	2,794	18.5	2,778	18.7	2,767	18.5
ALL ENGINEERING	58,391	48.8%	60,067	47.2%	57,187	46.3%	54,014	44.8%	55,343	45.0%
Chemical	3,728	50.3	3,780	50.3	3,699	49.6	3,498	48.8	3,576	49.2
Materials	2,510	50.3	2,585	50.4	2,558	50.6	2,642	51.2	2,578	48.9
TOTAL	152,988	28.3%	155,016	27.3%	151,245	26.3%	147,496	25.3%	151,018	25.3%

NOTE: Percent of total is the percentage of part- and full-time graduate students at M.S.- and Ph.D.-granting institutions who were not U.S. citizens or permanent residents. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAR Database System

POSTDOCTORAL POSITIONS

Number of chemistry postdocs slipped again in 2006

	1996	2002	2003	2004	2005	2006	ANNUAL CHANGE	
							2005-06	1996-2006
ALL SCIENCES	34,430	41,468	42,918	43,291	44,389	44,635	0.6%	2.6%
Life ^a	26,127	31,700	32,741	32,850	33,853	34,172	0.9	2.7
Biological	14,890	17,640	18,625	18,716	18,747	18,797	0.3	2.4
Agricultural	699	963	1,054	959	1,007	927	-7.9	2.9
Physical ^b	5,828	6,619	6,829	7,059	7,011	6,674	-4.8	1.4
Chemistry	3,572	3,990	4,147	4,338	4,216	4,044	-4.1	1.2
Physics	1,858	2,155	2,202	2,138	2,208	2,102	-4.8	1.2
Geosciences	861	1,129	1,182	1,263	1,364	1,493	9.5	5.7
Psychology & social	1,038	1,269	1,362	1,267	1,255	1,264	0.7	2.0
Math & computer	576	751	804	852	906	1,032	13.9	6.0
ALL ENGINEERING	2,677	3,566	3,810	3,949	4,166	4,626	11.0%	5.6%
Chemical	545	758	686	689	702	722	2.8	2.9
Materials	496	507	539	567	578	571	-1.2	1.4
TOTAL	37,107	45,034	46,728	47,240	48,555	49,261	1.5%	2.9%

NOTE: Data for Ph.D.-granting institutions. **a** Includes agricultural, biological, medical, and other life sciences. **b** Includes astronomy, chemistry, physics, and other physical sciences. **SOURCE:** National Science Foundation, WebCASPAR Database System