



ACADEMIC R&D SPENDING TRENDS

Chemistry research spending **GREW 6.6% IN 2009**, compared with 5.8% growth for science and engineering

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TODAY'S ACADEMIC CHEMISTS are living in a time of austerity, as major funding agencies are set to receive essentially flat dollar amounts in 2012. But in 2009, the most recent year for which data are available from the National Science Foundation, academic chemists saw a funding boost. In February of that year, Congress passed the American Recovery & Reinvestment Act (ARRA), known as the economic stimulus package. The NSF data are based on university expenditures reported for the period July 1, 2008, through June 30, 2009. Given that range, the 2009 data are not likely to reflect the full impact of the stimulus package's temporary shot in the arm.

In 2009, spending on science and engineering R&D grew at a greater rate than in the prior year. This continues the reversal of a slip in spending rate that occurred continuously from 2003 to 2007, when academic spending growth bottomed out at 3.6%. In 2009, academic R&D spending rose 5.8%

to \$54.9 billion. That growth still doesn't compare with the heady days of 2002, when annual spending growth hit 10.9%.

When inflation is taken into account, R&D spending rose just 4.4% in terms of constant dollars between 2008 and 2009. Over the 10 years ending in 2009, spending grew a total of 57.4% in constant dollars, compared with 99.4% in current dollars.

As usual, the largest chunk of R&D change went toward basic research, representing three-quarters of the total. The sector grew 3.9% in current dollars to \$41.0 billion. Applied R&D fared better in terms of growth, with an 11.6% increase since 2008 to \$14.0 billion, outpacing the average annual increase of 7.0% between 1999 and 2009.

The federal government, as is typical, contributed the largest portion of funds used in academe for R&D. In 2009, the government boosted its R&D contribution 4.2% to \$32.6 billion, accounting for 59.3% of the total. Institutions chipped

BIG INVESTOR At SUNY Stony Brook, one of 2009's top investors in chemical R&D, chemistry chair Benjamin S. Hsiao (center) stands with graduate students Alexandra Reinert (left) and Kanishk Kapilashrami in front of a rendering of anticancer drug Taxol binding to its target protein.

in \$11.2 billion, and state and local governments contributed \$3.6 billion. Notably, industry provided \$3.2 billion, an 11.6% increase over the prior year and an increase more

than double the annual average of 4.6% from 1999 to 2009.

In 2009, the relative share of the budget spent on each sector of science and engineering held steady. Science soaked up 84.3% of total academic R&D spending in 2009. That outlay represented an increase of 5.3% over the prior year to \$46.3 billion. Life sciences again dominated science spending, with a 5.1% increase to \$32.8 billion, or 59.7% of the total R&D budget.

Compared with the life sciences, the physical sciences of astronomy, chemistry, and physics enjoyed a greater increase in outlays in 2009. The boost was a hefty 9.0% to \$4.3 billion in 2009, for a 7.8% share of the total. However, physics contributed the lion's share of that growth. Chemistry spending went up 6.6% to \$1.6 billion. Still, chemistry's hike was higher than the 5.6% average annual increase between 1999 and 2009, and gave chemistry a 2.9% share of the total R&D budget.

REMOVING THE EFFECT of inflation, chemistry spending grew 5.2% from 2008 to 2009. For the decade ending in 2009, chemical R&D spending rose 36.3% in constant dollars versus 72.7% in current dollars.

In current dollars, spending in engineering went up 8.7% to \$8.7 billion, or 15.7% of total R&D expenditures. Chemical engineers got a 5.9% rise in funding to \$695 million, a lower percentage than their brethren in chemistry. Chemical engineers' share of total spending held steady at 1.3%. Materials engineers did slightly better, with a 6.5% hike to \$689 million—also a 1.3% piece of the pie.

As was true in 2008, federal support for engineering R&D grew more than that for science. The boost for science in 2009 was 3.7%, hitting \$27.6 billion,

& DATA ONLINE

For tables on postdocs and grad students; the sources of academic funds; inflation; and spending on chemical engineering, research equipment, and basic versus applied R&D, visit cenm.ag/09rd.

whereas engineering as a whole saw a federally financed spending hike of 6.6% to \$5.0 billion.

Chemistry spending grew 4.5% to top \$1.0 billion. That growth level was still shy of the 5.3% annual average for the prior decade. Federal support for chemical engineering increased at a slower rate this year, 5.6% to \$360 million, compared with a 7.2% annual average for the prior decade.

Reclaiming its spot as the top chemical R&D spender from all sources combined

was California Institute of Technology. In 2008, the school had dropped to third place after three years at No. 1. In 2009, Caltech increased spending 29.5% to \$34.6 million to top the list. Rocketing to second place was Rutgers, the State University of New Jersey, with a whopping 48.8% increase in spending to \$31.6 million. Massachusetts Institute of Technology landed in third place after a 25.8% boost in spending to \$30.3 million.

Other big movers among the top 10

chemical R&D spenders were sixth-place finisher Northwestern University, which placed 21st in 2008; ninth-place finisher State University of New York, Stony Brook, which held the 24th spot in 2008; and the University of California, San Diego, rising to No. 10 from a prior ranking of 15.

In 2009, Georgia Institute of Technology moved into the top slot in terms of school spending on chemical engineering R&D. Its spending increased 27.3% to \$25.1 million. The No. 1 school in 2008,

ACADEMIC R&D SPENDING, BY FIELD

On average, annual growth in spending for chemistry has lagged that for life sciences since 1999

\$ MILLIONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE	
												2008-09	1999-2009
ALL SCIENCES	\$23,281	\$25,527	\$27,802	\$30,880	\$34,103	\$36,943	\$39,053	\$40,658	\$41,980	\$43,976	\$46,285	5.3%	7.1%
Life ^a	15,632	17,471	19,230	21,439	23,757	25,949	27,605	28,804	29,806	31,210	32,791	5.1	7.7
Physical ^b	2,606	2,713	2,806	3,017	3,277	3,547	3,704	3,813	3,864	3,941	4,294	9.0	5.1
Physics	1,149	1,208	1,241	1,287	1,418	1,522	1,597	1,611	1,616	1,611	1,874	16.3	5.0
Chemistry	920	962	1,009	1,129	1,226	1,318	1,372	1,414	1,461	1,491	1,589	6.6	5.6
Psychology & social	1,717	1,816	2,027	2,270	2,445	2,458	2,511	2,581	2,674	2,876	3,054	6.2	5.9
Environmental	1,692	1,766	1,829	2,018	2,195	2,353	2,555	2,602	2,686	2,806	2,940	4.8	5.7
Computer	861	877	956	1,126	1,305	1,404	1,406	1,438	1,430	1,472	1,592	8.2	6.3
Mathematical	314	342	360	388	428	448	494	533	573	620	553	-10.8	5.8
Other	459	543	594	623	697	782	778	888	947	1,051	1,060	0.9	8.7
ALL ENGINEERING	\$4,263	\$4,557	\$5,022	\$5,525	\$5,997	\$6,315	\$6,746	\$7,093	\$7,514	\$7,958	\$8,651	8.7%	7.3%
Chemical	349	376	414	431	453	493	506	560	599	656	695	5.9	7.1
Materials	384	399	453	468	548	565	612	643	633	647	689	6.5	6.0
TOTAL	\$27,544	\$30,084	\$32,824	\$36,405	\$40,100	\$43,258	\$45,799	\$47,751	\$49,493	\$51,934	\$54,935	5.8%	7.1%
ANNUAL CHANGE	6.5%	9.2%	9.1%	10.9%	10.1%	7.9%	5.9%	4.3%	3.6%	4.9%	5.8%		

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, WebCASPASR Database System

FEDERALLY FINANCED ACADEMIC R&D SPENDING, BY FIELD

Growth in federal backing for chemistry in 2009 was slightly below the annual average during the prior decade

\$ MILLIONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE	
												2008-09	1999-2009
ALL SCIENCES	\$13,663	\$14,967	\$16,390	\$18,640	\$21,156	\$23,736	\$25,076	\$25,821	\$25,986	\$26,556	\$27,551	3.7%	7.3%
Life ^a	8,959	10,070	11,202	12,857	14,652	16,667	17,693	18,280	18,332	18,663	19,326	3.6	8.0
Physical ^b	1,864	1,916	1,974	2,132	2,357	2,569	2,673	2,699	2,690	2,744	2,964	8.0	4.7
Physics	869	902	927	975	1,088	1,169	1,227	1,215	1,220	1,215	1,361	12.0	4.6
Chemistry	618	632	661	737	820	921	953	968	976	992	1,037	4.5	5.3
Environmental	1,103	1,135	1,187	1,292	1,446	1,596	1,731	1,768	1,812	1,830	1,899	3.8	5.6
Psychology & social	782	842	947	1,094	1,222	1,284	1,309	1,342	1,366	1,452	1,511	4.1	6.8
Computer	583	584	644	770	937	1,025	1,022	1,017	1,026	1,037	1,107	6.8	6.6
Mathematical	210	230	242	269	295	318	346	375	409	447	369	-17.4	5.8
Other	162	191	195	227	247	276	301	341	352	381	377	-1.0	8.8
ALL ENGINEERING	\$2,448	\$2,581	\$2,854	\$3,233	\$3,614	\$3,908	\$4,133	\$4,307	\$4,457	\$4,726	\$5,036	6.6%	7.5%
Materials	218	227	241	263	314	352	369	386	378	377	389	3.2	6.0
Chemical	180	196	215	230	248	268	295	320	322	341	360	5.6	7.2
TOTAL	\$16,112	\$17,548	\$19,244	\$21,873	\$24,771	\$27,644	\$29,209	\$30,128	\$30,443	\$31,281	\$32,588	4.2%	7.3%
ANNUAL CHANGE	6.3%	8.9%	9.7%	13.7%	13.2%	11.6%	5.7%	3.1%	1.0%	2.8%	4.2%		

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, WebCASPASR Database System

SCHOOL SPENDING ON CHEMICAL R&D

Growth at top 10 spending institutions outpaced that at other schools

RANK		\$ THOUSANDS						% FEDERAL FUNDS, 2009 ^a	ANNUAL CHANGE		
2009	2008		1999	2005	2006	2007	2008		2009	2008-09	1999-2009
1	3	California Inst. of Technology	\$16,310	\$29,563	\$34,322	\$35,420	\$26,706	\$34,576	75.4%	29.5%	7.8%
2	12	Rutgers, State U of New Jersey	11,543	21,049	23,629	21,128	21,207	31,559	81.4	48.8	10.6
3	6	Massachusetts Inst. of Technology	17,050	17,984	18,142	20,620	24,047	30,258	90.5	25.8	5.9
4	1	U of Illinois, Urbana-Champaign	19,426	22,603	25,034	27,981	28,181	30,174	70.7	7.1	4.5
5	2	U of California, Berkeley	21,071	25,666	27,315	28,283	26,758	26,335	64.0	-1.6	2.3
6	21	Northwestern U	10,471	17,825	17,258	20,435	18,579	25,907	66.6	39.4	9.5
7	8	U of Texas, Austin	11,159	25,818	24,247	21,782	22,964	25,557	56.6	11.3	8.6
8	4	Georgia Inst. of Technology	8,919	17,930	22,837	23,356	25,938	25,301	53.9	-2.5	11.0
9	24	State U of New York, Stony Brook	7,240	10,191	9,388	14,383	18,140	24,375	24.9	34.4	12.9
10	15	U of California, San Diego	10,725	23,028	21,789	22,599	19,538	24,124	76.6	23.5	8.4
Total, first 10 institutions			\$133,914	\$211,657	\$223,961	\$235,987	\$232,058	\$278,166	67.3%	19.9%	7.6%
11	11	Pennsylvania State U	15,962	20,711	22,652	18,796	21,629	24,076	51.4	11.3	4.2
12	22	Indiana U	8,202	11,734	19,684	17,253	18,207	23,980	36.1	31.7	11.3
13	5	Harvard U	14,112	26,572	33,943	29,029	24,255	23,387	84.0	-3.6	5.2
14	20	Texas A&M U	17,576	21,739	22,448	23,651	18,585	23,315	42.4	25.5	2.9
15	36	U of Utah	9,359	14,251	15,136	14,312	14,139	22,498	49.7	59.1	9.2
16	19	U of Colorado	11,889	18,251	19,274	17,672	18,802	22,061	83.3	17.3	6.4
17	7	U of North Carolina, Chapel Hill	8,583	18,521	21,280	20,166	23,793	22,047	83.5	-7.3	9.9
18	10	U of California, Los Angeles	13,158	18,377	18,381	22,325	21,681	21,511	71.3	-0.8	5.0
19	17	U of Washington, Seattle	8,100	18,154	18,716	17,843	19,330	21,037	88.0	8.8	10.0
20	25	U of Wisconsin, Madison	13,196	15,710	18,348	17,122	17,703	21,027	60.6	18.8	4.8
Total, first 20 institutions			\$254,051	\$395,677	\$433,823	\$434,156	\$430,182	\$503,105	66.1%	17.0%	7.1%
21	23	U of Michigan	7,744	16,435	18,472	15,939	18,168	19,415	68.8	6.9	9.6
22	13	Purdue U	12,021	13,070	13,723	19,605	20,751	19,331	70.8	-6.8	4.9
23	14	Cornell U	14,132	20,770	21,090	18,380	20,108	19,199	71.5	-4.5	3.1
24	30	Louisiana State U	8,350	20,426	16,610	16,820	15,160	18,849	52.4	24.3	8.5
25	18	Johns Hopkins U ^b	18,297	12,038	12,693	16,376	19,154	18,583	95.8	-3.0	0.2
26	9	U of California, San Francisco	na	26,041	25,664	22,601	22,195	17,414	69.8	-21.5	nm
27	27	U of California, Irvine	10,036	14,192	16,186	17,129	16,576	17,304	64.7	4.4	5.6
28	16	Stanford U	11,835	16,781	16,283	17,056	19,377	17,156	77.0	-11.5	3.8
29	28	U of Arizona	8,524	13,046	13,734	14,094	16,211	16,314	66.6	0.6	6.7
30	31	U of South Carolina	7,727	8,801	12,627	13,008	15,115	15,870	57.2	5.0	7.5
Total, first 30 institutions			\$352,717	\$557,277	\$600,905	\$605,164	\$612,997	\$682,540	67.0%	11.3%	6.8%
31	32	U of Pennsylvania	10,994	14,751	16,459	13,998	14,546	15,728	87.4	8.1	3.6
32	40	Virginia Polytechnic Inst. & State U	6,257	11,382	10,828	13,685	12,247	15,096	47.3	23.3	9.2
33	29	Emory U	5,535	8,223	9,290	15,700	15,195	14,548	48.9	-4.3	10.1
34	38	U of Florida	11,034	16,153	12,828	13,417	12,537	14,537	60.5	16.0	2.8
35	26	U of Puerto Rico, Río Piedras	1,540	5,011	10,843	11,056	17,473	14,270	71.7	-18.3	24.9
36	56	Vanderbilt U	2,873	5,445	6,641	7,695	8,866	13,922	86.9	57.0	17.1
37	37	Ohio State U	8,110	16,378	12,574	11,168	13,027	13,404	72.1	2.9	5.2
38	34	U of Chicago	9,484	12,108	13,261	14,187	14,362	13,398	78.7	-6.7	3.5
39	45	U of Texas M. D. Anderson Cancer Center	na	9,041	10,790	10,149	11,093	13,229	63.7	19.3	nm
40	33	U of Pittsburgh	6,435	14,031	12,524	11,793	14,528	12,392	82.1	-14.7	6.8
Total, first 40 institutions			\$414,979	\$669,800	\$716,943	\$728,012	\$746,871	\$823,064	67.5%	10.2%	7.1%
41	44	U of Minnesota	7,241	14,222	14,204	11,677	11,391	12,303	69.1	8.0	5.4
42	49	U of Akron	6,775	10,618	11,645	13,169	10,091	12,201	27.9	20.9	6.1
43	35	State U of New York, Buffalo	7,347	11,158	11,625	13,148	14,285	12,035	39.7	-15.8	5.1
44	47	U of Southern Mississippi	3,902	9,408	9,029	11,840	10,582	11,988	81.5	13.3	11.9
45	39	U of Southern California	7,545	8,615	7,432	10,520	12,339	11,977	52.5	-2.9	4.7
46	62	U of Kansas	8,800	6,391	6,840	5,851	7,687	11,913	64.5	55.0	3.1
47	48	U of California, Davis	5,010	7,692	9,218	9,054	10,479	11,403	71.6	8.8	8.6
48	41	Arizona State U, Tempe	8,782	14,196	12,840	11,300	12,177	10,761	75.6	-11.6	2.1
49	43	U of Maryland, College Park	8,330	9,543	8,510	10,274	12,060	10,206	57.7	-15.4	2.1
50	59	Florida State U	9,395	9,351	10,825	8,671	8,427	10,097	47.2	19.8	0.7
Total, first 50 institutions			\$488,106	\$770,994	\$819,111	\$833,516	\$856,389	\$937,948	66.4%	9.5%	6.7%
TOTAL, ALL INSTITUTIONS			\$919,921	\$1,372,323	\$1,413,869	\$1,460,846	\$1,490,643	\$1,589,329	65.3%	6.6%	5.6%

NOTE: Institutional fiscal years. School ranks in 2008 revised to reflect revision of U of Puerto Rico, Río Piedras, data. **a** Share of total expenditures funded by the federal government. **b** Includes funding for the Applied Physics Lab. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAS Database System

SCHOOLS WITH MOST FEDERAL SUPPORT FOR CHEMICAL R&D

Changes in federal funding varied greatly by institution in 2009

RANK									ANNUAL CHANGE	
2009	2008		\$ THOUSANDS	1999	2005	2006	2007	2008	2009	2008-09
1	2	Massachusetts Inst. of Technology	\$15,244	\$16,149	\$16,004	\$18,449	\$21,539	\$27,379	27.1%	6.0%
2	1	California Inst. of Technology	13,829	25,171	28,662	28,822	22,279	26,065	17.0	6.5
3	9	Rutgers, State U of New Jersey	7,673	16,893	17,695	16,696	16,937	25,693	51.7	12.8
4	4	U of Illinois, Urbana-Champaign	11,621	15,694	16,496	19,674	20,495	21,340	4.1	6.3
5	3	Harvard U	13,890	24,109	31,683	25,629	21,183	19,649	-7.2	3.5
6	8	U of Washington, Seattle	5,578	15,212	15,243	15,592	16,955	18,504	9.1	12.7
7	14	U of California, San Diego	8,710	18,133	17,451	19,701	15,582	18,490	18.7	7.8
8	5	U of North Carolina, Chapel Hill	6,159	14,707	15,757	16,263	19,650	18,419	-6.3	11.6
9	11	U of Colorado	9,618	15,716	16,842	15,084	15,892	18,387	15.7	6.7
10	7	Johns Hopkins U ^a	17,961	11,316	11,875	15,787	18,101	17,804	-1.6	-0.1
Total, first 10 institutions			\$110,283	\$173,100	\$187,708	\$191,697	\$188,613	\$211,730	12.3%	6.7%
11	18	Northwestern U	8,126	14,549	13,767	14,785	13,645	17,260	26.5	7.8
12	6	U of California, Berkeley	14,195	19,200	19,891	19,561	18,241	16,861	-7.6	1.7
13	10	U of California, Los Angeles	10,604	14,666	13,491	17,123	16,025	15,346	-4.2	3.8
14	15	U of Texas, Austin	6,547	16,523	15,163	14,173	15,124	14,474	-4.3	8.3
15	19	U of Pennsylvania	10,624	12,352	14,892	12,182	13,026	13,745	5.5	2.6
16	23	Cornell U	9,633	13,398	14,528	11,387	12,256	13,732	12.0	3.6
17	16	Purdue U	7,523	8,931	9,604	12,721	15,069	13,680	-9.2	6.2
18	22	Georgia Inst. of Technology	3,817	10,201	10,360	11,260	12,387	13,625	10.0	13.6
19	20	U of Michigan	5,862	12,628	12,962	11,371	12,573	13,349	6.2	8.6
20	13	Stanford U	9,778	14,250	12,970	13,052	15,695	13,209	-15.8	3.1
Total, first 20 institutions			\$196,992	\$309,798	\$325,336	\$329,312	\$332,654	\$357,011	7.3%	6.1%
21	25	U of Wisconsin, Madison	8,287	9,696	11,624	10,230	10,733	12,736	18.7	4.4
22	21	Pennsylvania State U	9,727	13,227	12,082	10,184	12,547	12,371	-1.4	2.4
23	17	U of California, San Francisco	na	19,621	19,962	15,957	14,982	12,158	-18.8	nm
24	39	Vanderbilt U	2,499	4,835	6,014	6,940	7,604	12,093	59.0	17.1
25	27	U of California, Irvine	7,289	10,281	10,901	11,227	10,638	11,190	5.2	4.4
26	28	U of Utah	8,668	9,421	10,130	9,963	10,095	11,188	10.8	2.6
27	26	U of Arizona	6,396	9,587	10,235	10,630	10,646	10,857	2.0	5.4
28	30	U of Chicago	8,349	8,213	7,792	8,805	9,107	10,539	15.7	2.4
29	12	U of Puerto Rico, Río Piedras	1,435	4,951	10,779	10,978	15,740	10,230	-35.0	21.7
30	24	U of Pittsburgh	5,270	11,800	10,037	10,437	11,547	10,180	-11.8	6.8
Total, first 30 institutions			\$254,912	\$411,430	\$434,892	\$434,663	\$446,293	\$470,553	5.4%	6.3%
31	34	Texas A&M U	5,571	11,642	10,098	10,219	8,047	9,886	22.9	5.9
32	36	Louisiana State U	5,085	10,848	9,476	8,580	7,992	9,877	23.6	6.9
33	31	U of Southern Mississippi	2,667	7,741	6,991	9,376	9,075	9,765	7.6	13.9
34	29	Ohio State U	4,629	9,612	7,916	7,924	9,465	9,662	2.1	7.6
35	32	U of South Carolina	4,849	4,383	5,900	5,901	8,653	9,085	5.0	6.5
36	33	U of Florida	7,682	10,427	9,237	8,580	8,060	8,794	9.1	1.4
37	45	Indiana U	5,733	6,766	6,494	5,642	6,603	8,647	31.0	4.2
38	38	U of Minnesota	5,799	11,026	10,014	7,643	7,639	8,501	11.3	3.9
39	43	U of Texas M. D. Anderson Cancer Center	na	4,445	5,799	6,410	6,977	8,431	20.8	nm
40	42	U of California, Davis	4,196	6,004	6,908	6,360	7,317	8,160	11.5	6.9
Total, first 40 institutions			\$301,123	\$494,324	\$513,725	\$511,298	\$526,121	\$561,361	6.7%	6.4%
41	37	Arizona State U, Tempe	4,035	8,430	8,886	8,303	7,787	8,139	4.5	7.3
42	60	U of Kansas	4,335	4,452	4,965	4,311	5,205	7,680	47.6	5.9
43	35	Montana State U, Bozeman	2,507	4,982	5,629	6,006	8,000	7,572	-5.4	11.7
44	44	Yale U	5,914	6,534	6,456	6,193	6,813	7,385	8.4	2.2
45	55	Virginia Polytechnic Inst. & State U	3,271	5,477	6,015	7,360	6,071	7,138	17.6	8.1
46	52	Emory U	4,162	7,345	8,127	7,344	6,154	7,120	15.7	5.5
47	56	Columbia U	6,899	7,253	7,167	6,298	5,961	7,108	19.2	0.3
48	49	Washington U in St. Louis	3,921	5,625	6,918	5,822	6,278	6,803	8.4	5.7
49	41	U of Notre Dame	7,998	7,730	8,768	8,929	7,519	6,586	-12.4	-1.9
50	51	Colorado State U	5,072	6,531	6,624	6,677	6,220	6,502	4.5	2.5
Total, first 50 institutions			\$349,237	\$558,683	\$583,280	\$578,541	\$592,129	\$633,394	7.0%	6.1%
TOTAL, ALL INSTITUTIONS			\$617,588	\$952,731	\$967,738	\$976,188	\$992,423	\$1,037,173	4.5%	5.3%

NOTE: Institutional fiscal years. School ranks in 2008 revised to reflect revision of U of Puerto Rico, Río Piedras, data. **a** Includes funding for the Applied Physics Lab. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

TOP 25 UNIVERSITIES IN 2009 R&D SPENDING

List of big spenders is virtually identical in 2008 and 2009

RANK		\$ MILLIONS	LIFE SCIENCES ^a	ENGINEERING	PHYSICAL SCIENCES ^b	CHEMISTRY ^c	ENVIRONMENTAL SCIENCES	MATH & COMPUTER SCIENCES	OTHER SCIENCES	TOTAL
2009	2008									
1	1	Johns Hopkins U ^d	\$787	\$703	\$146	\$19	\$51	\$100	\$69	\$1,856
2	4	U of Michigan	611	198	42	19	11	13	131	1,007
3	3	U of Wisconsin, Madison	623	97	85	21	50	24	73	952
4	2	U of California, San Francisco	930	0	17	17	0	0	0	948
5	5	U of California, Los Angeles	649	62	71	22	13	23	72	890
6	6	U of California, San Diego	495	99	55	24	148	49	33	879
7	7	Duke U	673	40	18	8	16	12	44	805
8	8	U of Washington, Seattle	518	81	39	21	111	10	19	778
9	11	Pennsylvania State U	239	269	56	24	57	72	61	753
10	13	U of Minnesota	529	85	33	12	25	22	46	741
11	15	Massachusetts Inst. of Technology	257	231	115	30	36	52	45	736
12	9	U of Pennsylvania	607	35	32	16	0	14	39	727
13	10	Ohio State U	426	146	33	13	10	38	63	716
14	14	Texas A&M U	277	217	39	23	131	21	30	714
15	12	Stanford U	426	157	43	17	22	26	31	704
16	17	U of California, Davis	497	80	29	11	31	11	34	682
17	16	Cornell U	433	85	85	19	15	23	30	671
18	19	U of California, Berkeley	200	175	100	26	13	8	156	652
19	25	U of Colorado	383	62	87	22	80	10	28	648
20	26	U of North Carolina, Chapel Hill	506	0	27	22	29	14	70	646
21	21	Washington U in St. Louis	562	17	17	10	6	6	20	628
22	18	U of Pittsburgh	544	26	20	12	2	9	23	623
23	20	U of Florida	420	95	31	15	9	8	29	592
24	23	Columbia U	385	52	32	8	88	12	20	590
25	22	U of Texas M. D. Anderson Cancer Center	510	0	13	13	0	24	31	579
Total, listed institutions			\$12,488	\$3,010	\$1,267	\$447	\$955	\$603	\$1,197	\$19,520
TOTAL, ALL INSTITUTIONS			\$32,791	\$8,651	\$4,294	\$1,589	\$2,940	\$2,145	\$4,114	\$54,935

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

Ohio State University, spent 17.2% less in 2009, slipping to fifth place with \$19.5 million. Filling out the top five were North Carolina State University; MIT; and the University of Massachusetts, Amherst.

THE BIGGEST FEDERAL allotment of funding for chemical R&D in 2009 went to MIT. Its \$27.4 million allocation was a 27.1% jump over the prior year and was more than four times the average annual change of 6.0% between 1999 and 2009. Caltech fell from the top spot to No. 2 despite a 17.0% increase to \$26.1 million. Other schools in the top five were Rutgers; the University of Illinois, Urbana-Champaign (UIUC); and Harvard University.

Tops in federal support for chemical engineering R&D was Johns Hopkins University, with an 18.2% boost to \$14.1 million. MIT lost its No. 1 spot, placing second after

a 12.1% decrease in outlays to \$12.7 million. UMass Amherst, Georgia Tech, and Pennsylvania State University rounded out the top five.

Collectively, colleges and universities shelled out \$135.1 million for chemical research equipment in 2009, up 18.5% over the prior year. First on the list was Indiana University, with a \$4.8 million outlay, followed by Louisiana State University, Cornell University, Emory University, and the University of Akron.

After a three-year slide, federal support for chemical research equipment went up 14.5% to \$81.8 million in 2009. The biggest pieces of the federal pie went to Cornell, UC San Diego, UIUC, Washington University in St. Louis, and MIT.

The number of students seeking master's and Ph.D. degrees in chemistry inched upward in 2009, growing 2.4% to 22,094.

The number of chemical engineering grad students increased 3.8% to 8,188. As usual, about half the chemical engineering students and more than one-third of the chemists were from outside the U.S. Notably, the total number of life sciences graduate students decreased by 7.4% in 2009.

Postdoctoral appointments for chemists increased 7.0% to 4,219, the highest number since 2005. Ranks of chemical engineering postdocs surged 23.2% to 1,084.

Data for this article were drawn primarily from NSF's WebCASPAR database of academic science and engineering statistics, which can be accessed online at webcaspar.nsf.gov. Further information came from NSF's annual "Academic Research & Development Expenditures" report, which can be viewed at nsf.gov/statistics/nsf11313.

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

CHARACTER OF ACADEMIC R&D SPENDING

Growth in applied R&D significantly outpaced that in basic research in 2009

\$ MILLIONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE	
												2008-09	1999-2009
Basic research	\$20,450	\$22,547	\$24,405	\$27,379	\$30,121	\$31,968	\$34,367	\$36,076	\$37,725	\$39,408	\$40,955	3.9%	7.2%
Applied R&D	7,094	7,537	8,419	9,026	9,979	11,290	11,432	11,674	11,768	12,526	13,980	11.6	7.0
TOTAL	\$27,544	\$30,084	\$32,824	\$36,405	\$40,100	\$43,258	\$45,799	\$47,751	\$49,493	\$51,934	\$54,935	5.8%	7.1%
ANNUAL CHANGE	6.5%	9.2%	9.1%	10.9%	10.1%	7.9%	5.9%	4.3%	3.6%	4.9%	5.8%		

NOTE: Institutional fiscal years. Totals may not add because of rounding.

SOURCE: National Science Foundation, National Center for Science & Engineering Statistics, 2011, "Academic Research & Development Expenditures: Fiscal Year 2009"

SOURCES OF ACADEMIC R&D FUNDS

Federal government continues to provide the lion's share of funding

\$ MILLIONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE	
												2008-09	1999-2009
Federal govt.	\$16,112	\$17,548	\$19,244	\$21,873	\$24,771	\$27,644	\$29,209	\$30,128	\$30,443	\$31,281	\$32,588	4.2%	7.3%
Institutional funds	5,382	5,925	6,615	7,134	7,664	7,753	8,266	9,062	9,705	10,408	11,198	7.6	7.6
State & local govt.	2,022	2,200	2,321	2,506	2,647	2,879	2,940	2,962	3,143	3,452	3,647	5.7	6.1
Industry	2,033	2,156	2,219	2,191	2,162	2,129	2,291	2,402	2,670	2,865	3,197	11.6	4.6
All other sources	1,995	2,255	2,426	2,701	2,857	2,852	3,093	3,196	3,533	3,928	4,305	9.6	8.0
TOTAL	\$27,544	\$30,084	\$32,824	\$36,405	\$40,100	\$43,258	\$45,799	\$47,751	\$49,493	\$51,934	\$54,935	5.8%	7.1%

NOTE: Institutional fiscal years. Totals may not add because of rounding.

SOURCE: National Science Foundation, National Center for Science & Engineering Statistics, 2011, "Academic Research & Development Expenditures: Fiscal Year 2009"

SCHOOL SPENDING ON CHEMICAL ENGINEERING R&D

Federal sources provided about half of the money spent in 2009

RANK		\$ THOUSANDS	1999	2005	2006	2007	2008	2009	% FEDERAL FUNDS, 2009 ^a	ANNUAL CHANGE	
2009	2008									2008-09	1999-2009
1	5	Georgia Inst. of Technology	\$5,852	\$13,808	\$14,955	\$16,971	\$19,714	\$25,104	44.4%	27.3%	15.7%
2	2	North Carolina State U	13,954	15,231	16,499	15,512	22,533	24,822	29.7	10.2	5.9
3	3	Massachusetts Inst. of Technology	14,840	13,737	18,851	19,027	21,763	23,375	54.2	7.4	4.6
4	4	U of Massachusetts, Amherst	3,232	4,766	15,227	15,049	20,294	20,593	55.6	1.5	20.3
5	1	Ohio State U	4,605	10,177	12,325	25,570	23,505	19,468	25.4	-17.2	15.5
6	8	U of Texas, Austin	8,265	14,049	13,896	14,820	16,891	18,450	18.5	9.2	8.4
7	6	Pennsylvania State U	4,712	17,375	16,129	17,935	18,660	18,139	53.6	-2.8	14.4
8	10	Texas A&M U	8,858	12,089	11,089	11,777	13,179	16,300	28.0	23.7	6.3
9	11	Johns Hopkins U	5,538	9,675	9,616	11,540	13,153	15,455	91.1	17.5	10.8
10	9	Michigan State U	5,083	8,761	9,970	11,084	13,906	13,443	34.2	-3.3	10.2
11	13	U of California, Davis	4,322	8,923	8,204	10,193	12,212	12,671	53.7	3.8	11.4
12	20	U of Illinois, Urbana-Champaign	5,219	7,355	6,382	7,231	9,027	12,286	68.7	36.1	8.9
13	21	U of Colorado	2,925	6,294	6,887	7,338	8,864	12,166	56.4	37.3	15.3
14	19	U of Delaware	6,871	7,162	7,613	7,945	9,210	11,179	74.2	21.4	5.0
15	12	Clemson U	1,040	10,915	11,982	12,055	12,272	11,176	43.4	-8.9	26.8
16	17	U of South Carolina	6,071	7,148	9,780	9,790	10,007	11,150	57.8	11.4	6.3
17	38	U of Houston	2,106	3,539	4,720	3,549	5,654	11,038	14.5	95.2	18.0
18	18	Purdue U	5,833	5,535	4,204	9,275	9,882	10,102	53.6	2.2	5.6
19	31	New Mexico Inst. of Mining & Technology	4,884	9,039	6,273	8,599	7,325	10,080	77.5	37.6	7.5
20	22	U of Michigan	2,404	8,891	9,651	8,294	8,421	9,842	66.2	16.9	15.1
21	15	Arizona State U, Tempe	2,991	11,977	12,744	11,686	10,600	9,682	64.2	-8.7	12.5
22	27	U of Wisconsin, Madison	6,546	7,154	6,870	7,628	7,755	9,677	67.4	24.8	4.0
23	24	Rutgers, State U of New Jersey	2,602	1,849	1,994	4,805	8,305	9,658	64.7	16.3	14.0
24	34	U of Akron	2,545	3,639	4,517	3,946	6,702	9,606	20.3	43.3	14.2
25	7	State U of New York, Buffalo	1,385	1,957	9,138	15,742	17,923	9,477	62.1	-47.1	21.2
		Total, listed institutions	\$132,683	\$221,045	\$249,516	\$287,361	\$327,757	\$354,939	49.0%	8.3%	10.3%
		TOTAL, ALL INSTITUTIONS	\$349,020	\$505,975	\$559,998	\$599,014	\$655,768	\$695,404	51.7%	6.0%	7.1%

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

Funding in 2009 expanded at less than the average annual rate over the prior decade

RANK										ANNUAL CHANGE	
2009	2008		\$ THOUSANDS	1999	2005	2006	2007	2008	2009	2008-09	1999-2009
1	3	Johns Hopkins U	\$4,953	\$9,015	\$8,688	\$11,007	\$11,912	\$14,081	18.2%	11.0%	
2	1	Massachusetts Inst. of Technology	9,200	7,514	13,172	13,643	14,419	12,676	-12.1	3.3	
3	5	U of Massachusetts, Amherst	1,170	1,977	8,440	7,495	10,316	11,442	10.9	25.6	
4	6	Georgia Inst. of Technology	2,505	7,548	6,977	6,713	7,889	11,143	41.2	16.1	
5	4	Pennsylvania State U	1,522	10,944	8,798	10,470	10,393	9,726	-6.4	20.4	
6	17	U of Illinois, Urbana-Champaign	3,108	4,593	4,160	4,866	5,815	8,435	45.1	10.5	
7	8	U of Delaware	3,473	5,351	5,603	5,984	7,172	8,297	15.7	9.1	
8	38	New Mexico Inst. of Mining & Technology	1,454	5,746	3,138	3,990	3,382	7,816	131.1	18.3	
9	10	North Carolina State U, Raleigh	5,628	6,382	8,223	7,491	6,823	7,371	8.0	2.7	
10	18	U of Colorado	1,804	4,817	5,081	5,171	5,739	6,856	19.5	14.3	
11	13	U of California, Davis	2,472	5,697	4,627	6,152	6,151	6,809	10.7	10.7	
12	30	U of Wisconsin, Madison	3,329	4,120	4,381	4,977	4,098	6,527	59.3	7.0	
13	16	U of Michigan	1,574	7,400	8,255	6,187	5,897	6,512	10.4	15.3	
14	14	U of South Carolina	2,677	3,502	5,695	5,659	6,141	6,448	5.0	9.2	
15	27	Carnegie Mellon U	1,845	3,131	3,260	3,457	4,249	6,389	50.4	13.2	
16	12	Rutgers, State U of New Jersey	546	1,197	1,136	3,448	6,198	6,248	0.8	27.6	
17	9	Arizona State U, Tempe	2,316	9,879	8,871	6,603	6,868	6,214	-9.5	10.4	
18	24	U of Dayton	677	2,188	2,643	3,593	4,473	6,064	35.6	24.5	
19	2	State U of New York, Buffalo	557	1,308	3,174	9,007	13,021	5,882	-54.8	26.6	
20	23	Purdue U	2,390	1,758	1,279	3,410	4,579	5,414	18.2	8.5	
21	19	Ohio State U	785	4,378	4,394	3,296	4,905	4,949	0.9	20.2	
22	34	U of Utah	4,169	3,719	3,574	4,078	3,827	4,856	26.9	1.5	
23	11	Clemson U	283	6,414	6,615	6,036	6,481	4,846	-25.2	32.8	
24	7	U of Nebraska	113	4,355	5,929	5,524	7,181	4,637	-35.4	45.0	
25	28	Michigan State U	1,518	3,180	3,718	3,465	4,198	4,597	9.5	11.7	
		Total, listed institutions	\$60,068	\$126,113	\$139,831	\$151,722	\$172,127	\$184,235	7.0%	11.9%	
		TOTAL, ALL INSTITUTIONS	\$179,939	\$295,339	\$319,993	\$322,477	\$341,054	\$359,793	5.5%	7.2%	

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

UNIVERSITY SPENDING FOR RESEARCH EQUIPMENT

Chemistry and chemical engineering outlays for equipment rose sharply in 2009

\$ MILLIONS	1999	2005	2006	2007	2008	2009	% FEDERAL FUNDS, 2009*	ANNUAL CHANGE	
								2008-09	1999-2009
ALL SCIENCES	\$1,042	\$1,440	\$1,385	\$1,408	\$1,466	\$1,484	55.1%	1.2%	3.6%
Life ^b	557	825	757	748	819	800	49.1	-2.3	3.7
Physical ^c	249	325	329	311	302	332	64.3	9.9	2.9
Physics	106	159	153	143	136	148	66.6	8.8	3.4
Chemistry	103	113	122	113	114	135	60.5	18.4	2.7
Environmental	99	123	123	136	145	128	65.9	-11.7	2.6
Math & computer	75	81	78	85	93	99	75.4	6.5	2.8
Other	62	85	97	128	106	124	41.6	17.0	7.2
ALL ENGINEERING	\$286	\$439	\$443	\$427	\$433	\$472	55.7%	9.0%	5.1%
Materials	28	51	54	54	52	58	54.8	11.5	7.6
Chemical	27	37	39	37	39	48	44.9	23.1	5.9
TOTAL	\$1,328	\$1,879	\$1,828	\$1,835	\$1,899	\$1,956	55.3%	3.0%	3.9%

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 RESEARCH EQUIPMENT

Top 25 institutions' spending nearly doubled in 2009 while total spending for all institutions rose 19%

RANK 2009	\$ THOUSANDS	1999	2005	2006	2007	2008	2009	% FEDERAL FUNDS, 2009 ^a	ANNUAL AVERAGE, 2005-09
1	Indiana U	\$887	\$1,564	\$5,091	\$3,910	\$1,694	\$4,821	26.9%	\$3,416
2	Louisiana State U	1,978	2,170	1,085	2,398	1,332	3,703	43.7	2,138
3	Cornell U	1,663	1,010	709	268	728	3,484	99.7	1,240
4	Emory U	552	590	756	778	483	3,380	10.2	1,197
5	U of Akron	652	436	1,019	2,846	743	3,337	29.9	1,676
6	Pennsylvania State U	2,121	1,183	1,700	901	2,868	3,331	26.8	1,997
7	U of Illinois, Urbana-Champaign	2,079	1,775	2,232	2,201	1,565	3,006	74.2	2,156
8	U of Utah	1,780	1,018	661	441	989	2,886	26.5	1,199
9	Texas A&M U	1,219	901	1,186	2,259	1,114	2,799	37.0	1,652
10	U of Texas, Austin	1,727	1,671	1,509	1,091	1,861	2,747	46.8	1,776
11	U of California, San Diego	1,082	2,330	3,560	2,646	1,150	2,356	99.3	2,408
12	Washington U in St. Louis	522	738	1,052	195	650	2,277	94.5	982
13	U of Wisconsin, Madison	1,718	1,308	1,446	864	1,661	2,253	62.4	1,506
14	Massachusetts Inst. of Technology	2,671	1,208	1,660	1,384	2,166	2,176	86.8	1,719
15	U of Washington, Seattle	1,120	1,495	1,882	585	1,181	2,113	81.0	1,451
16	U of Southern Mississippi	300	1,283	728	988	1,450	2,087	88.0	1,307
17	U of Michigan	219	685	1,397	970	1,051	1,994	61.1	1,219
18	Northwestern U	773	850	377	1,969	1,038	1,878	79.1	1,222
19	U of California, Berkeley	1,576	1,928	1,545	1,489	1,661	1,769	62.4	1,678
20	U of Houston	400	210	245	913	926	1,612	64.7	781
21	Virginia Polytechnic Inst. & State U	418	714	618	1,879	1,423	1,600	57.3	1,247
22	Miami U	568	790	827	864	901	1,516	na	980
23	Rutgers, State U of New Jersey	608	1,703	2,456	2,541	651	1,487	80.7	1,768
24	California Inst. of Technology	2,526	1,485	1,492	679	1,072	1,467	67.1	1,239
25	U of Chicago	2,328	826	714	1,382	1,171	1,405	94.9	1,100
	Total, listed institutions	\$31,487	\$29,871	\$35,947	\$36,441	\$31,529	\$61,484	56.2%	\$39,054
	TOTAL, ALL INSTITUTIONS	\$102,712	\$112,862	\$121,604	\$112,942	\$113,932	\$135,062	60.5%	\$119,280

NOTE: Institutional fiscal years. ^a Share of total expenditures funded by the federal government. **na** = not available.

SOURCE: National Science Foundation, WebCASPAR Database System

FEDERAL SUPPORT FOR CHEMICAL RESEARCH EQUIPMENT

Total funding rose a healthy 15% for all institutions in 2009 and surged 78% for the top 25

RANK 2009	\$ THOUSANDS							ANNUAL AVERAGE,
		1999	2005	2006	2007	2008	2009	2005-09
1	Cornell U	\$1,258	\$839	\$345	\$208	\$712	\$3,474	\$1,116
2	U of California, San Diego	1,034	2,249	3,384	2,527	839	2,340	2,268
3	U of Illinois, Urbana-Champaign	1,360	1,124	1,224	1,894	1,192	2,229	1,533
4	Washington U in St. Louis	500	662	1,014	143	511	2,151	896
5	Massachusetts Inst. of Technology	2,255	1,136	1,355	1,240	2,088	1,889	1,542
6	U of Southern Mississippi	178	1,043	715	937	1,407	1,836	1,188
7	U of Washington, Seattle	924	1,067	1,358	460	892	1,712	1,098
8	Louisiana State U	1,169	1,401	583	786	882	1,619	1,054
9	Northwestern U	727	786	351	1,003	489	1,485	823
10	U of Wisconsin, Madison	1,275	803	768	419	1,304	1,405	940
11	U of Chicago	2,075	712	451	1,034	637	1,334	834
12	Vanderbilt U	246	288	752	325	33	1,311	542
13	Indiana U	776	462	765	1,268	609	1,295	880
14	U of Texas, Austin	795	1,032	775	736	1,548	1,285	1,075
15	U of Michigan	117	362	281	299	356	1,219	503
16	Rutgers, State U of New Jersey	413	1,100	1,503	1,504	302	1,200	1,122
17	U of California, Berkeley	1,009	1,701	1,355	750	1,287	1,104	1,239
18	U of Houston	343	31	5	670	20	1,043	354
19	U of Kansas	194	200	563	523	705	1,042	607
20	Texas A&M U	525	696	346	887	283	1,037	650
21	U of Akron	300	141	292	1,276	179	997	577
22	U of Colorado	596	3,479	3,832	941	636	994	1,976
23	California Inst. of Technology	953	1,443	1,456	617	953	984	1,091
24	U of Pennsylvania	996	0	965	671	949	982	713
25	U of North Carolina, Chapel Hill	317	732	457	2,262	1,899	931	1,256
Total, listed institutions		\$20,335	\$23,489	\$24,895	\$23,380	\$20,712	\$36,898	\$25,875
TOTAL, ALL INSTITUTIONS		\$68,871	\$80,063	\$78,994	\$72,814	\$71,376	\$81,753	\$77,000

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

SCIENCE AND ENGINEERING GRADUATE STUDENTS

Number of chemistry grad students increased in 2009

	1999	2005	2006	2007	2008	2009	ANNUAL CHANGE	
							2008-09	1999-2009
ALL SCIENCES	391,565	461,661	474,602	492,424	499,538	493,772	-1.2%	2.3%
Life ^a	151,345	185,553	194,313	190,344	191,045	176,820	-7.4	1.6
Biological	56,959	68,479	69,941	73,516	74,678	75,660	1.3	2.9
Agricultural	12,312	13,123	13,016	13,528	14,153	15,200	7.4	2.1
Psychology & social	136,711	156,709	160,000	162,767	162,375	164,004	1.0	1.8
Math & computer	58,735	68,188	68,468	69,221	70,953	73,387	3.4	2.3
Physical ^b	30,691	36,375	36,901	36,824	37,319	38,149	2.2	2.2
Chemistry	18,416	21,101	21,351	21,298	21,574	22,094	2.4	1.8
Physics	10,869	13,472	13,722	13,816	13,862	14,060	1.4	2.6
Environmental	14,083	14,836	14,920	14,100	14,389	14,839	3.1	0.5
Other	na	na	na	19,168	23,457	26,573	13.3	nm
ALL ENGINEERING	101,691	120,565	123,041	127,075	131,951	137,873	4.5%	3.1%
Chemical	6,883	7,173	7,261	7,584	7,892	8,188	3.8	1.8
Materials	4,481	5,160	5,268	5,314	5,539	5,863	5.8	2.7
TOTAL	493,256	582,226	597,643	619,499	631,489	631,645	0.0%	2.5%

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. **na** = not available. **nm** = not meaningful.
SOURCE: National Science Foundation, WebCASPAR Database System

FOREIGN GRADUATE STUDENTS

More than one-third of chemistry and half of chemical engineering grad students were from outside the U.S. in 2009

NUMBER OF FOREIGN STUDENTS	2005		2006		2007		2008		2009	
		% OF TOTAL								
ALL SCIENCES	93,482	20.2%	95,675	20.2%	99,722	20.3%	105,499	21.1%	107,155	21.7%
Math & computer	28,011	41.1	28,574	41.7	30,348	43.8	32,402	45.7	33,151	45.2
Life ^a	26,860	14.5	27,916	14.4	27,952	14.7	29,583	15.5	29,672	16.8
Biological	16,467	24.0	16,907	24.2	16,958	23.1	17,932	24.0	17,756	23.5
Agricultural	2,659	20.3	2,675	20.6	2,897	21.4	3,106	21.9	3,262	21.5
Psychology & social	21,133	13.5	21,661	13.5	21,414	13.2	22,273	13.7	22,321	13.6
Physical ^b	14,700	40.4	14,757	40.0	14,407	39.1	14,763	39.6	15,078	39.5
Chemistry	8,268	39.2	8,301	38.9	8,097	38.0	8,419	39.0	8,579	38.8
Physics	5,999	44.5	6,000	43.7	5,898	42.7	5,874	42.4	5,982	42.5
Environmental	2,778	18.7	2,767	18.5	2,612	18.5	2,777	19.3	2,757	18.6
Other	na	nm	na	nm	2,989	15.6	3,701	15.8	4,176	15.7
ALL ENGINEERING	54,014	44.8%	55,343	45.0%	59,483	46.8%	62,540	47.4%	64,842	47.0%
Chemical	3,498	48.8	3,576	49.2	3,840	50.6	4,071	51.6	4,166	50.9
Materials	2,642	51.2	2,578	48.9	2,595	48.8	2,743	49.5	2,914	49.7
TOTAL	147,496	25.3%	151,018	25.3%	159,205	25.7%	168,039	26.6%	171,997	27.2%

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. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

POSTDOCTORAL POSITIONS

After several years of decreases, the number of chemistry postdocs climbed in 2009

	1999	2005	2006	2007	2008	2009	ANNUAL CHANGE	
							2008-09	1999-2009
ALL SCIENCES	37,604	44,389	44,701	45,903	48,713	51,411	5.5%	3.2%
Life ^a	28,667	33,853	34,190	34,996	37,278	38,888	4.3	3.1
Biological	16,097	18,747	18,807	19,394	20,170	20,804	3.1	2.6
Agricultural	750	1,007	927	985	1,147	1,083	-5.6	3.7
Physical ^b	6,157	7,011	6,703	6,719	6,885	7,447	8.2	1.9
Chemistry	3,836	4,216	4,045	3,952	3,943	4,219	7.0	1.0
Physics	1,862	2,208	2,130	2,206	2,327	2,517	8.2	3.1
Psychology & social	1,170	1,255	1,267	1,571	1,585	1,780	12.3	4.3
Environmental	925	1,364	1,495	1,250	1,339	1,424	6.3	4.4
Math & computer	685	906	1,046	1,080	1,216	1,331	9.5	6.9
Other	na	na	na	287	410	541	32.0	nm
ALL ENGINEERING	3,196	4,166	4,642	4,937	5,451	6,394	17.3%	7.2%
Chemical	671	702	735	790	880	1,084	23.2	4.9
Materials	421	578	571	564	605	758	25.3	6.1
TOTAL	40,800	48,555	49,343	50,840	54,164	57,805	6.7%	3.5%

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. **na** = not available. **nm** = not meaningful. **SOURCE:** National Science Foundation, WebCASPAR Database System

CURRENT VERSUS CONSTANT DOLLAR SPENDING

Accounting for inflation shows less of a true boost in spending

ACADEMIC R&D SPENDING (\$ MILLIONS)	1999	2008	2009	ANNUAL CHANGE	
				2008-09	1999-2009
TOTAL					
Current dollars	\$27,544	\$51,934	\$54,935	5.8%	99.4%
Constant dollars	27,544	41,541	43,364	4.4	57.4
CHEMISTRY					
Current dollars	\$920	\$1,491	\$1,589	6.6%	72.7%
Constant dollars	920	1,193	1,254	5.1	36.3

NOTE: Calculated using 1999 = 1.00; deflator data obtained from whitehouse.gov/omb/budget/historicals. **SOURCE:** National Science Foundation, WebCASPAR Database System