



**SOLID SPENDING** At the University of Washington, Seattle, a top investor in chemistry R&D, Pradip Rathod (left) and Mark Stevens examine a mosquito sculpture. Rathod runs a malaria drug discovery program.

## 2010 ACADEMIC R&D SPENDING TRENDS

Outlays up 10.6% for chemistry, above the 6.3% **GROWTH FOR SCIENCE AND ENGINEERING** as a whole

CARMEN DRAHL, C&EN WASHINGTON

**IN 2010**, the most recent fiscal year for which data are available from the National Science Foundation, funds from the American Recovery & Reinvestment Act of 2009, known as the economic stimulus package, made their long-awaited appearance. Those new funds explain why spending figures are far better than might be expected, given the current economic malaise.

Academic R&D spending for science and engineering fields totaled \$58.3 billion in 2010. That figure increased 6.3% from 2009. This is an improvement over 2009's growth of 5.8% as well as 2008's growth of 4.8%. But it still lags behind the early 2000s, when annual spending growth approached or hit double digits.

Taking into account the effect of inflation, R&D spending went up 5.4% in terms of constant dollars between 2009 and 2010. For the decade ending in 2010, spending increased 54.7% in constant dollars (93.9% in current dollars) over the previous decade.

Academe receives most of its monies

from the federal government. The federal sector's 2010 contribution—\$36.5 billion, a 12.1% increase over the prior year—amounted to 62.6% of the total. That boost is far above the 7.6% annual average increase between 2000 and 2010. However, some other sources decreased outlays. Institutions kicked in \$10.6 billion, down from \$11.1 billion in 2009, and state and local governments contributed \$3.6 billion, only slightly down from \$3.7 billion.

The 2010 fiscal year saw little change to the relative share of expenditures within the various sectors of science and engineering. Science accounted for 84.0% of science and engineering R&D spending in 2010, a 6.0% increase over 2009 to \$49.0 billion. The biggest portion of that went to the life sciences, as usual, which saw a 6.5% increase to \$34.9 billion, or 59.8% of the total 2010 science, technology, engineering, and mathematics (STEM) R&D budget.

The physical sciences had more to cel-

ebate in 2010 compared with the life sciences. Chemistry, physics, astronomy, and other physical sciences expenditures saw a jump of 8.0% overall to \$4.6 billion in 2010, for a 7.9% share of the total. As opposed to last year, when physics saw most of the growth, 2010 was chemistry's turn, with a spending increase of 10.6% to \$1.8 billion. Chemistry's piece of the science budget

pie hit 3.0% in 2010 after several years at 2.9%.

On a constant-dollar basis, chemistry saw a 9.6% spending hike between 2009 and 2010. Between 2000 and 2010, chemistry R&D spending rose 45.2% in constant dollars (82.0% in current dollars).

Spending in engineering increased 8.0% to \$9.3 billion in current dollars, or 16.0% of the total STEM R&D expenditures. Although the sector overall posted a smaller increase than last year, chemical and materials engineers enjoyed big boosts. Chemical engineering spending increased 14.5% to \$797 million, holding steady at 1.4% of the total. Materials engineers saw a whopping 32.0% boost to \$908 million, 1.6% of the STEM total.

**FEDERAL INVESTMENT** in engineering R&D has for several years grown more than investment in basic science. But in 2010 the gap was not quite as large as in previous years. Support for science R&D from the government grew 11.7% in 2010, reaching \$30.8 billion, and engineering saw growth of 13.8% to \$5.7 billion. Chemistry's \$1.2 billion outlay topped 2009's by 15.8%, above the 6.6% average throughout the prior decade.

California Institute of Technology once again spent the most money for chemistry R&D from all sources combined. Caltech has been top dog for five of the past six years. It took only a 3.0% spending increase to \$35.6 million to retain its rank. Rutgers,

the State University of New Jersey, stayed in second place with an 8.2% boost to \$34.2 million. Despite a 0.3% decline in spending to \$30.1 million, the University of Illinois, Urbana-Champaign (UIUC), moved up to third. Massachusetts Institute of Technology and Harvard University completed the top five.

Harvard and the University of North Carolina, Chapel Hill, in ninth place, were the biggest upward movers among the top 10 chemical R&D spenders. In 2009,

Harvard placed 12th and UNC Chapel Hill placed 16th.

The top chemical engineering R&D spender in 2010, Georgia Institute of Technology, also kept its place from 2009. Its expenditure increased 12.3% to \$28.2 million, a more modest increase from its 27.3% rise for 2009. Rounding out the top five were Ohio State University, MIT, the University of South Carolina, and the University of Texas, Austin.

The federal government's biggest outlay

for chemical R&D in 2010 went to Rutgers. The university's \$29.1 million share was a 13.3% boost from 2009, about on par with its average annual change for the past decade. Caltech stayed at number two with a more modest 3.7% increase to \$27.0 million. However, MIT fell to number three with an 11.6% decline in federal dollars. Other schools in the top five were UNC Chapel Hill and UIUC.

The largest federal allotment for chemical engineering R&D in 2010 went again to

## ACADEMIC R&D SPENDING, BY FIELD

Compared with most sciences, chemistry and chemical engineering had bigger spending boosts in 2010

\$ MILLIONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
<b>ALL SCIENCES</b>	<b>\$25,527</b>	<b>\$27,782</b>	<b>\$30,861</b>	<b>\$34,083</b>	<b>\$36,923</b>	<b>\$39,031</b>	<b>\$40,664</b>	<b>\$41,978</b>	<b>\$43,914</b>	<b>\$46,215</b>	<b>\$48,994</b>	<b>6.0%</b>	<b>6.7%</b>
Life <sup>a</sup>	17,471	19,229	21,438	23,756	25,949	27,604	28,804	29,805	31,193	32,779	34,903	6.5	7.2
Physical <sup>b</sup>	2,713	2,804	3,016	3,275	3,547	3,703	3,814	3,863	3,932	4,283	4,625	8.0	5.5
Physics	1,208	1,240	1,286	1,418	1,522	1,596	1,611	1,616	1,607	1,870	2,003	7.1	5.2
Chemistry	962	1,008	1,129	1,226	1,318	1,372	1,414	1,460	1,487	1,583	1,751	10.6	6.2
Psychology & social	1,816	2,025	2,268	2,443	2,457	2,510	2,582	2,676	2,875	3,053	3,070	0.6	5.4
Environmental	1,766	1,829	2,017	2,194	2,353	2,554	2,601	2,682	2,799	2,923	2,990	2.3	5.4
Computer	877	954	1,124	1,303	1,404	1,404	1,443	1,431	1,471	1,600	1,658	3.6	6.6
Mathematical	342	360	388	428	448	494	533	573	620	547	599	9.5	5.8
Other	543	581	610	683	764	761	888	948	1,025	1,029	1,150	11.8	7.8
<b>ALL ENGINEERING</b>	<b>\$4,557</b>	<b>\$5,019</b>	<b>\$5,522</b>	<b>\$5,994</b>	<b>\$6,314</b>	<b>\$6,743</b>	<b>\$7,095</b>	<b>\$7,517</b>	<b>\$7,958</b>	<b>\$8,649</b>	<b>\$9,344</b>	<b>8.0%</b>	<b>7.4%</b>
Materials	399	453	468	548	565	612	643	633	647	688	908	32.0	8.6
Chemical	376	414	431	453	493	506	560	599	656	696	797	14.5	7.8
<b>TOTAL</b>	<b>\$30,084</b>	<b>\$32,801</b>	<b>\$36,383</b>	<b>\$40,077</b>	<b>\$43,238</b>	<b>\$45,774</b>	<b>\$47,759</b>	<b>\$49,495</b>	<b>\$51,872</b>	<b>\$54,863</b>	<b>\$58,338</b>	<b>6.3%</b>	<b>6.8%</b>
<b>ANNUAL CHANGE</b>	<b>9.2%</b>	<b>9.0%</b>	<b>10.9%</b>	<b>10.2%</b>	<b>7.9%</b>	<b>5.9%</b>	<b>4.3%</b>	<b>3.6%</b>	<b>4.8%</b>	<b>5.8%</b>	<b>6.3%</b>		

**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, WebCASPAR Database System

## FEDERALLY FINANCED ACADEMIC R&D SPENDING, BY FIELD

All fields increased spending in 2010

\$ MILLIONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
<b>ALL SCIENCES</b>	<b>\$14,967</b>	<b>\$16,375</b>	<b>\$18,625</b>	<b>\$21,141</b>	<b>\$23,721</b>	<b>\$25,057</b>	<b>\$25,824</b>	<b>\$25,975</b>	<b>\$26,547</b>	<b>\$27,541</b>	<b>\$30,771</b>	<b>11.7%</b>	<b>7.5%</b>
Life <sup>a</sup>	10,070	11,201	12,856	14,651	16,667	17,692	18,280	18,327	18,659	19,323	21,686	12.2	8.0
Physical <sup>b</sup>	1,916	1,972	2,130	2,355	2,568	2,671	2,700	2,689	2,743	2,963	3,380	14.1	5.8
Physics	902	926	974	1,087	1,169	1,226	1,216	1,220	1,215	1,361	1,556	14.3	5.6
Chemistry	632	660	737	819	921	952	968	976	992	1,037	1,201	15.8	6.6
Environmental	1,135	1,187	1,291	1,446	1,596	1,730	1,768	1,808	1,828	1,890	2,014	6.6	5.9
Psychology & social	842	945	1,093	1,221	1,282	1,306	1,342	1,366	1,451	1,511	1,657	9.7	7.0
Computer	584	643	769	936	1,024	1,021	1,018	1,026	1,036	1,107	1,175	6.1	7.2
Mathematical	230	242	268	295	318	346	375	409	447	369	419	13.6	6.2
Other	191	186	217	237	265	290	341	351	382	378	439	16.1	8.7
<b>ALL ENGINEERING</b>	<b>\$2,581</b>	<b>\$2,851</b>	<b>\$3,231</b>	<b>\$3,612</b>	<b>\$3,907</b>	<b>\$4,130</b>	<b>\$4,308</b>	<b>\$4,456</b>	<b>\$4,725</b>	<b>\$5,035</b>	<b>\$5,732</b>	<b>13.8%</b>	<b>8.3%</b>
Materials	227	241	263	314	352	369	386	378	377	389	437	12.3	6.8
Chemical	196	215	230	248	268	295	320	322	341	360	419	16.4	7.9
<b>TOTAL</b>	<b>\$17,548</b>	<b>\$19,227</b>	<b>\$21,856</b>	<b>\$24,753</b>	<b>\$27,627</b>	<b>\$29,187</b>	<b>\$30,132</b>	<b>\$30,430</b>	<b>\$31,272</b>	<b>\$32,576</b>	<b>\$36,503</b>	<b>12.1%</b>	<b>7.6%</b>
<b>ANNUAL CHANGE</b>	<b>8.9%</b>	<b>9.6%</b>	<b>13.7%</b>	<b>13.3%</b>	<b>11.6%</b>	<b>5.6%</b>	<b>3.2%</b>	<b>1.0%</b>	<b>2.8%</b>	<b>4.2%</b>	<b>12.1%</b>		

**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, WebCASPAR Database System

# SCIENCE & TECHNOLOGY

## SCHOOL SPENDING ON CHEMICAL R&D

Increase from 2009 at top 10 spending institutions was smaller than the rest of top 50

RANK		2010	2009	\$ THOUSANDS	2000	2006	2007	2008	2009	2010	% FEDERAL FUNDS, 2010 <sup>a</sup>	ANNUAL CHANGE	
2010	2009											2009-10	2000-10
1	1	California Inst. of Technology			\$15,538	\$34,322	\$35,420	\$26,706	\$34,576	\$35,612	75.8%	3.0%	8.6%
2	2	Rutgers, State U of New Jersey			12,351	23,629	21,128	21,207	31,559	34,150	85.3	8.2	10.7
3	4	U of Illinois, Urbana-Champaign			17,667	25,034	27,981	28,181	30,174	30,092	75.0	-0.3	5.5
4	3	Massachusetts Inst. of Technology			18,756	18,142	20,620	24,047	30,258	29,110	83.2	-3.8	4.5
5	12	Harvard U			16,957	33,943	29,029	24,255	23,387	28,723	78.5	22.8	5.4
6	6	Northwestern U			11,373	17,258	20,435	18,579	25,907	28,303	69.6	9.2	9.5
7	8	Georgia Inst. of Technology			9,962	22,837	23,356	25,938	25,301	27,354	56.5	8.1	10.6
8	9	U of California, San Diego			9,831	21,789	22,599	19,538	24,124	26,387	82.0	9.4	10.4
9	16	U of North Carolina, Chapel Hill			10,080	21,280	20,166	23,793	22,047	26,032	89.3	18.1	10.0
10	5	U of California, Berkeley			21,471	27,315	28,283	26,758	26,335	25,549	66.5	-3.0	1.8
		<b>Total, first 10 institutions</b>			<b>\$143,986</b>	<b>\$245,549</b>	<b>\$249,017</b>	<b>\$239,002</b>	<b>\$273,668</b>	<b>\$291,312</b>	<b>76.4%</b>	<b>6.4%</b>	<b>7.3%</b>
11	7	U of Texas, Austin			10,142	24,247	21,782	22,964	25,557	25,089	59.4	-1.8	9.5
12	20	U of Michigan			9,009	18,472	15,939	18,168	19,415	24,956	63.8	28.5	10.7
13	15	U of Colorado			12,251	19,274	17,672	18,802	22,061	24,147	84.6	9.5	7.0
14	29	U of South Carolina			9,321	12,627	13,008	15,115	15,870	23,844	57.7	50.2	9.8
15	28	U of Arizona			9,699	13,734	14,094	16,211	16,314	23,709	70.7	45.3	9.3
16	26	Stanford U			12,947	16,283	17,056	19,377	17,156	23,622	82.0	37.7	6.2
17	19	U of Wisconsin, Madison			14,758	18,348	17,122	17,703	21,027	23,499	62.5	11.8	4.8
18	10	Pennsylvania State U			16,075	22,652	18,796	21,629	24,076	23,220	61.0	-3.6	3.7
19	13	Texas A&M U			15,385	22,448	23,651	18,585	23,315	23,075	45.2	-1.0	4.1
20	18	U of Washington, Seattle			9,167	18,716	17,843	19,330	21,037	23,010	89.6	9.4	9.6
		<b>Total, first 20 institutions</b>			<b>\$262,740</b>	<b>\$432,350</b>	<b>\$425,980</b>	<b>\$426,886</b>	<b>\$479,496</b>	<b>\$529,483</b>	<b>72.4%</b>	<b>10.4%</b>	<b>7.3%</b>
21	21	Purdue U			11,260	13,723	19,605	20,751	19,331	21,944	75.6	13.5	6.9
22	54	U of Massachusetts, Amherst			11,267	6,340	4,976	7,342	9,534	21,591	67.2	126.5	6.7
23	17	U of California, Los Angeles			13,564	18,381	22,325	21,681	21,511	20,935	78.5	-2.7	4.4
24	11	Indiana U			10,812	19,684	17,253	18,207	23,980	20,882	41.9	-12.9	6.8
25	14	U of Utah			8,420	15,136	14,312	14,139	22,498	20,114	55.7	-10.6	9.1
26	22	Cornell U			14,002	21,090	18,380	20,108	19,199	19,365	74.8	0.9	3.3
27	27	State U of New York, Stony Brook			6,774	9,388	14,383	14,042	17,092	18,983	45.8	11.1	10.9
28	23	Johns Hopkins U <sup>b</sup>			12,616	12,693	16,376	19,154	18,583	18,632	95.9	0.3	4.0
29	45	U of Kansas			7,134	6,840	5,851	7,687	11,913	16,909	70.2	41.9	9.0
30	31	Virginia Tech			7,724	10,828	13,685	12,247	15,096	16,791	53.4	11.2	8.1
		<b>Total, first 30 institutions</b>			<b>\$366,313</b>	<b>\$566,453</b>	<b>\$573,126</b>	<b>\$582,244</b>	<b>\$658,233</b>	<b>\$725,629</b>	<b>70.7%</b>	<b>10.2%</b>	<b>7.1%</b>
31	25	U of California, Irvine			9,683	16,186	17,129	16,576	17,304	16,747	75.5	-3.2	5.6
32	39	U of Pittsburgh			7,459	12,524	11,793	14,528	12,392	16,002	62.8	29.1	7.9
33	35	Vanderbilt U			3,227	6,641	7,695	8,866	13,922	15,577	88.0	11.9	17.0
34	41	U of Akron			8,214	11,645	13,169	10,091	12,201	15,310	19.8	25.5	6.4
35	30	U of Pennsylvania			12,886	16,459	13,998	14,546	15,728	15,096	93.9	-4.0	1.6
36	37	U of Chicago			8,676	13,261	14,187	14,362	13,398	15,007	81.3	12.0	5.6
37	24	U of California, San Francisco			12,332	25,664	22,601	22,195	17,414	14,961	72.7	-14.1	2.0
38	32	Emory U			7,155	9,290	15,700	15,195	14,548	14,851	54.2	2.1	7.6
39	64	Montana State U, Bozeman			4,331	6,110	6,563	8,920	8,198	14,833	84.4	80.9	13.1
40	40	U of Minnesota			8,472	14,204	11,677	11,391	12,303	14,774	63.2	20.1	5.7
		<b>Total, first 40 institutions</b>			<b>\$448,748</b>	<b>\$698,437</b>	<b>\$707,638</b>	<b>\$718,914</b>	<b>\$795,641</b>	<b>\$878,787</b>	<b>70.5%</b>	<b>10.5%</b>	<b>7.0%</b>
41	33	U of Florida			10,070	12,828	13,417	12,537	14,537	14,739	63.8	1.4	3.9
42	38	U of Texas M. D. Anderson Cancer Center			na	10,790	10,149	11,093	13,229	14,501	51.0	9.6	nm
43	36	Ohio State U			13,141	12,574	11,168	13,027	13,404	13,203	78.1	-1.5	0.0
44	69	U of California, Santa Barbara			7,056	7,361	4,419	6,073	7,117	12,872	67.7	80.9	6.2
45	42	State U of New York, Buffalo			6,852	11,625	13,148	14,285	12,035	12,805	52.0	6.4	6.5
46	46	U of California, Davis			5,972	9,218	9,054	10,479	11,403	12,479	75.9	9.4	7.6
47	57	Princeton U			9,850	8,915	13,313	12,117	9,290	12,319	59.9	32.6	2.3
48	62	Columbia U			7,072	7,755	7,236	7,113	8,271	12,251	85.2	48.1	5.6
49	47	Arizona State U, Tempe			8,979	12,840	11,300	12,177	10,761	12,149	82.3	12.9	3.1
50	43	U of Southern Mississippi			3,960	9,029	11,840	10,582	11,988	12,012	79.2	0.2	11.7
		<b>Total, first 50 institutions</b>			<b>\$521,700</b>	<b>\$801,372</b>	<b>\$812,682</b>	<b>\$828,397</b>	<b>\$907,676</b>	<b>\$1,008,117</b>	<b>70.3%</b>	<b>11.1%</b>	<b>6.8%</b>
		<b>TOTAL, ALL INSTITUTIONS</b>			<b>\$962,304</b>	<b>\$1,414,311</b>	<b>\$1,460,415</b>	<b>\$1,486,721</b>	<b>\$1,582,562</b>	<b>\$1,751,352</b>	<b>68.6%</b>	<b>10.7%</b>	<b>6.2%</b>

**NOTE:** Institutional fiscal years. School ranks in 2009 revised to reflect revision of State U of New York, Stony Brook, and Louisiana State U 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

Many institutions saw big leaps in federal funding from 2009

RANK		\$ THOUSANDS							ANNUAL CHANGE	
2010	2009		2000	2006	2007	2008	2009	2010	2009-10	2000-10
1	3	Rutgers, State U of New Jersey	\$8,071	\$17,695	\$16,696	\$16,937	\$25,693	\$29,115	13.3%	13.7%
2	2	California Inst. of Technology	12,866	28,662	28,822	22,279	26,065	27,019	3.7	7.7
3	1	Massachusetts Inst. of Technology	16,690	16,004	18,449	21,539	27,379	24,206	-11.6	3.8
4	8	U of North Carolina, Chapel Hill	7,556	15,757	16,263	19,650	18,419	23,240	26.2	11.9
5	4	U of Illinois, Urbana-Champaign	10,294	16,496	19,674	20,495	21,340	22,576	5.8	8.2
6	5	Harvard U	14,788	31,683	25,629	21,183	19,649	22,544	14.7	4.3
7	7	U of California, San Diego	7,251	17,451	19,701	15,582	18,490	21,626	17.0	11.5
8	6	U of Washington, Seattle	6,493	15,243	15,592	16,955	18,504	20,609	11.4	12.2
9	9	U of Colorado	10,281	16,842	15,084	15,892	18,387	20,429	11.1	7.1
10	11	Northwestern U	8,865	13,767	14,785	13,645	17,260	19,713	14.2	8.3
		<b>Total, first 10 institutions</b>	<b>\$103,155</b>	<b>\$189,600</b>	<b>\$190,695</b>	<b>\$184,157</b>	<b>\$211,186</b>	<b>\$231,077</b>	<b>9.4%</b>	<b>8.4%</b>
11	20	Stanford U	10,973	12,970	13,052	15,695	13,209	19,361	46.6	5.8
12	10	Johns Hopkins U <sup>a</sup>	12,217	11,875	15,787	18,101	17,804	17,869	0.4	3.9
13	12	U of California, Berkeley	15,774	19,891	19,561	18,241	16,861	16,987	0.7	0.7
14	27	U of Arizona	7,265	10,235	10,630	10,646	10,857	16,771	54.5	8.7
15	17	Purdue U	6,958	9,604	12,721	15,069	13,680	16,583	21.2	9.1
16	13	U of California, Los Angeles	10,432	13,491	17,123	16,025	15,346	16,429	7.1	4.6
17	19	U of Michigan	7,317	12,962	11,371	12,573	13,349	15,923	19.3	8.1
18	18	Georgia Inst. of Technology	4,127	10,360	11,260	12,387	13,625	15,449	13.4	14.1
19	14	U of Texas, Austin	5,749	15,163	14,173	15,124	14,474	14,891	2.9	10.0
20	21	U of Wisconsin, Madison	8,094	11,624	10,230	10,733	12,736	14,694	15.4	6.1
		<b>Total, first 20 institutions</b>	<b>\$192,061</b>	<b>\$317,775</b>	<b>\$326,603</b>	<b>\$328,751</b>	<b>\$353,127</b>	<b>\$396,034</b>	<b>12.2%</b>	<b>7.5%</b>
21	54	U of Massachusetts, Amherst	5,667	4,004	3,100	4,838	6,153	14,507	135.8	9.9
22	16	Cornell U	9,103	14,528	11,387	12,256	13,732	14,493	5.5	4.8
23	15	U of Pennsylvania	11,992	14,892	12,182	13,026	13,745	14,177	3.1	1.7
24	22	Pennsylvania State U	9,797	12,082	10,184	12,547	12,371	14,154	14.4	3.7
25	34	U of South Carolina	5,826	5,900	5,901	8,653	9,085	13,754	51.4	9.0
26	24	Vanderbilt U	2,910	6,014	6,940	7,604	12,093	13,703	13.3	16.8
27	25	U of California, Irvine	6,979	10,901	11,227	10,638	11,190	12,651	13.1	6.1
28	42	Montana State U, Bozeman	2,869	5,629	6,006	8,000	7,572	12,523	65.4	15.9
29	28	U of Chicago	6,519	7,792	8,805	9,107	10,539	12,199	15.8	6.5
30	41	U of Kansas	4,725	4,965	4,311	5,205	7,680	11,875	54.6	9.7
		<b>Total, first 30 institutions</b>	<b>\$258,448</b>	<b>\$404,482</b>	<b>\$406,646</b>	<b>\$420,625</b>	<b>\$457,287</b>	<b>\$530,070</b>	<b>15.9%</b>	<b>7.4%</b>
31	26	U of Utah	7,172	10,130	9,963	10,095	11,188	11,205	0.2	4.6
32	23	U of California, San Francisco	9,033	19,962	15,957	14,982	12,158	10,880	-10.5	1.9
33	31	Texas A&M U	6,986	10,098	10,219	8,047	9,886	10,438	5.6	4.1
34	46	Columbia U	6,747	7,167	6,298	5,961	7,108	10,433	46.8	4.5
35	33	Ohio State U	5,529	7,916	7,924	9,465	9,662	10,317	6.8	6.4
36	29	U of Puerto Rico, Río Piedras	1,400	10,779	10,978	15,740	10,230	10,173	-0.6	21.9
37	30	U of Pittsburgh	6,436	10,037	10,437	11,547	10,180	10,043	-1.3	4.6
38	40	Arizona State U, Tempe	4,304	8,886	8,303	7,787	8,139	10,004	22.9	8.8
39	32	U of Southern Mississippi	2,861	6,991	9,376	9,075	9,765	9,519	-2.5	12.8
40	39	U of California, Davis	4,752	6,908	6,360	7,317	8,160	9,467	16.0	7.1
		<b>Total, first 40 institutions</b>	<b>\$313,668</b>	<b>\$503,356</b>	<b>\$502,461</b>	<b>\$520,641</b>	<b>\$553,763</b>	<b>\$632,549</b>	<b>14.2%</b>	<b>7.3%</b>
41	35	U of Florida	6,088	9,237	8,580	8,060	8,794	9,397	6.9	4.4
42	37	U of Minnesota	6,122	10,014	7,643	7,639	8,501	9,333	9.8	4.3
43	44	Virginia Tech	3,435	6,015	7,360	6,071	7,138	8,959	25.5	10.1
44	52	Boston U	2,070	3,375	3,843	6,267	6,201	8,838	42.5	15.6
45	36	Indiana U	5,988	6,494	5,642	6,603	8,647	8,742	1.1	3.9
46	70	U of California, Santa Barbara	4,946	6,088	3,223	4,469	4,516	8,717	93.0	5.8
47	55	State U of New York, Stony Brook	4,773	6,094	6,349	5,716	6,077	8,695	43.1	6.2
48	50	New York U	2,068	4,886	4,482	5,882	6,326	8,309	31.3	14.9
49	45	Emory U	4,917	8,127	7,344	6,154	7,120	8,056	13.1	5.1
50	51	U of Southern California	5,762	4,915	5,566	6,455	6,288	7,838	24.7	3.1
		<b>Total, first 50 institutions</b>	<b>\$359,837</b>	<b>\$568,601</b>	<b>\$562,493</b>	<b>\$583,957</b>	<b>\$623,371</b>	<b>\$719,433</b>	<b>15.4%</b>	<b>7.2%</b>
		<b>TOTAL, ALL INSTITUTIONS</b>	<b>\$631,606</b>	<b>\$968,134</b>	<b>\$975,723</b>	<b>\$992,275</b>	<b>\$1,037,432</b>	<b>\$1,201,243</b>	<b>15.8%</b>	<b>6.6%</b>

**NOTE:** Institutional fiscal years. School ranks in 2009 revised to reflect revision of Louisiana State U data. **a** Includes funding for the Applied Physics Lab.  
**SOURCE:** National Science Foundation, WebCASPAR Database System

## TOP 25 UNIVERSITIES IN 2010 R&D SPENDING

Compared with 2009, just one new arrival to 2010's list of big spenders

RANK		\$ MILLIONS	LIFE SCIENCES <sup>a</sup>	ENGINEERING	PHYSICAL SCIENCES <sup>b</sup>	CHEMISTRY <sup>c</sup>	ENVIRONMENTAL SCIENCES	MATH & COMPUTER SCIENCES	OTHER SCIENCES	TOTAL
2010	2009									
1	1	Johns Hopkins U <sup>d</sup>	\$817	\$782	\$166	\$19	\$51	\$119	\$62	\$1,997
2	2	U of Michigan	702	215	50	25	13	19	137	1,135
3	8	U of Washington, Seattle	671	102	45	23	145	12	20	996
4	7	Duke U	837	47	20	9	18	15	44	981
5	3	U of Wisconsin, Madison	632	98	90	23	46	28	46	940
6	6	U of California, San Diego	537	113	58	26	149	41	39	938
7	4	U of California, San Francisco	921	0	15	15	0	0	0	936
8	5	U of California, Los Angeles	658	65	72	21	14	24	68	900
9	15	Stanford U	500	127	93	24	26	30	35	810
10	22	U of Pittsburgh	700	31	25	16	12	11	28	806
11	12	U of Pennsylvania	663	37	32	15	1	17	44	794
12	10	U of Minnesota	557	89	42	15	26	24	47	786
13	24	Columbia U	555	50	45	12	72	21	26	771
14	9	Pennsylvania State U	253	277	58	23	57	57	66	768
15	14	Texas A&M U	275	248	45	23	129	21	32	749
16	17	Cornell U	487	92	92	19	16	23	37	747
17	20	U of North Carolina, Chapel Hill	593	0	33	26	31	18	72	747
18	19	U of Colorado	410	89	97	24	85	12	29	722
19	13	Ohio State U	432	146	35	13	10	40	57	720
20	21	Washington U in St. Louis	626	20	17	8	8	6	17	694
21	16	U of California, Davis	488	79	28	12	29	12	32	669
22	18	U of California, Berkeley	203	163	93	26	13	7	180	660
23	11	Massachusetts Inst. of Technology	122	265	118	29	40	56	46	646
24	23	U of Florida	458	92	35	15	9	9	33	637
25	31	Yale U	538	27	30	10	4	8	15	621
<b>Total, listed institutions</b>			<b>\$13,636</b>	<b>\$3,254</b>	<b>\$1,433</b>	<b>\$472</b>	<b>\$1,005</b>	<b>\$628</b>	<b>\$1,213</b>	<b>\$21,168</b>
<b>TOTAL, ALL INSTITUTIONS</b>			<b>\$34,903</b>	<b>\$9,344</b>	<b>\$4,625</b>	<b>\$1,751</b>	<b>\$2,990</b>	<b>\$2,257</b>	<b>\$4,220</b>	<b>\$58,338</b>

**NOTE:** Institutional fiscal years. Totals may not add because of rounding. Rankings calculated from unrounded data. **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, WebCASPASR Database System

Johns Hopkins University, which notched a 15.0% increase to \$16.2 million. Oklahoma State University rocketed to number four from number 118 after a large boost in federal chemical engineering funding to its new University Multispectral Laboratories, which are designed to speed commercialization of technologies for defense and energy, according to Alan Tree, associate dean of research. Georgia Tech, MIT, and the University of Delaware rounded out the top five.

Combined outlays for chemical research equipment hit \$162.0 million in 2010, a 19.2% increase over 2009. Ranking highest was MIT with a \$4.4 million outlay, followed by the University of Michigan; Arizona State University, Tempe; the University of Wisconsin, Madison; and Cornell University.

In 2010, federal support for chemical

research equipment was up in a big way—37.9% to \$112.9 million. Schools with the most support were Arizona State, Tempe; MIT; UNC Chapel Hill; the University of Kansas; and UW Madison.

**ONCE AGAIN,** numbers of students seeking graduate degrees in chemistry edged upward in 2010, this time by 1.5% to 22,436. The population of chemical engineering grad students was up 5.9% to 8,668. As is typical, about half of the chemical engineering students and more than one-third of the chemists were from outside the U.S. The number of life sciences graduate students slipped for the second year in a row in 2010.

The number of postdoctoral-level chemists barely budged in 2010, increasing 0.5% to 4,241. Ranks of chemical engineering

postdocs also held steady, with a 0.7% boost to 1,092.

Data for this article were drawn primarily from NSF's WebCASPASR database of academic science and engineering statistics, which can be accessed online at [webcaspar.nsf.gov](http://webcaspar.nsf.gov). Further information came from NSF's Higher Education Research & Development (HERD) Survey, which can be viewed at [nsf.gov/statistics/nsf12330](http://nsf.gov/statistics/nsf12330). For the 2010 fiscal year, which NSF classifies as the period July 1, 2009, through June 30, 2010, the agency rolled out the newly redesigned HERD Survey. The Survey of Research & Development Expenditures at Universities & Colleges collected information for 1972–2009. The HERD Survey includes fields other than science and engineering, whereas the earlier survey does not. ■

### & DATA ONLINE

Visit <http://cenm.ag/10rd> for tables with data about postdocs and grad students; the source of academic funds; inflation; and spending on chemical engineering, research equipment, and basic versus applied R&D.

## SOURCES OF ACADEMIC R&D FUNDS

Federal funds increased by a double-digit percentage, other sources cut back funding

\$ MILLIONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Federal govt.	\$17,548	\$19,227	\$21,856	\$24,753	\$27,627	\$29,187	\$30,132	\$30,430	\$31,272	\$32,576	\$36,503	12.1%	7.6%
Institutional funds	5,925	6,614	7,133	7,663	7,752	8,265	9,062	9,718	10,378	11,147	10,642	-4.5	6.0
State & local govt.	2,200	2,320	2,504	2,645	2,879	2,940	2,966	3,151	3,438	3,650	3,605	-1.2	5.1
Industry	2,156	2,218	2,191	2,161	2,129	2,291	2,401	2,675	2,869	3,197	3,130	-2.1	3.8
All other sources	2,255	2,422	2,698	2,856	2,851	3,092	3,198	3,521	3,916	4,293	4,458	3.8	7.1
<b>TOTAL</b>	<b>\$30,084</b>	<b>\$32,801</b>	<b>\$36,383</b>	<b>\$40,077</b>	<b>\$43,238</b>	<b>\$45,774</b>	<b>\$47,759</b>	<b>\$49,495</b>	<b>\$51,872</b>	<b>\$54,863</b>	<b>\$58,338</b>	<b>6.3%</b>	<b>6.8%</b>

NOTE: Institutional fiscal years. SOURCE: "Higher Education Research and Development Survey: Fiscal Year 2010," National Science Foundation, 2012

## SCHOOL SPENDING ON CHEMICAL ENGINEERING R&D

Federal sources provided roughly half of the money spent in 2010

RANK		\$ THOUSANDS	2000	2006	2007	2008	2009	2010	% FEDERAL FUNDS, 2010 <sup>a</sup>	ANNUAL CHANGE	
2010	2009									2009-10	2000-10
1	1	Georgia Inst. of Technology	\$5,938	\$14,955	\$16,971	\$19,714	\$25,104	\$28,202	45.5%	12.3%	16.9%
2	5	Ohio State U	4,962	12,325	25,570	23,505	19,468	27,771	22.9	42.6	18.8
3	3	Massachusetts Inst. of Technology	16,106	18,851	19,027	21,763	23,375	25,497	48.7	9.1	4.7
4	16	U of South Carolina	5,961	9,780	9,790	10,007	11,150	22,993	31.2	106.2	14.5
5	6	U of Texas, Austin	7,469	13,896	14,820	16,891	18,450	21,947	23.2	19.0	11.4
6	2	North Carolina State U, Raleigh	15,382	16,499	15,512	22,533	24,822	20,589	37.4	-17.1	3.0
7	8	Texas A&M U	9,364	11,089	11,777	13,179	16,300	17,688	28.5	8.5	6.6
8	9	Johns Hopkins U	6,150	9,616	11,540	13,153	15,455	17,351	93.3	12.3	10.9
9	4	U of Massachusetts, Amherst	3,751	15,227	15,049	20,294	20,593	15,383	57.6	-25.3	15.2
10	24	U of Akron	3,160	4,517	3,946	6,702	9,606	14,354	13.8	49.4	16.3
11	111	Oklahoma State U <sup>b</sup>	1,463	1,398	1,321	1,353	1,056	14,327	80.5	1,256.7	25.6
12	11	U of California, Davis	4,081	8,204	10,193	12,212	12,671	14,295	56.5	12.8	13.4
13	18	Purdue U	6,624	4,204	9,275	9,882	10,102	13,958	58.9	38.2	7.7
14	27	Stanford U	6,468	8,982	7,516	8,268	8,438	13,826	66.5	63.9	7.9
15	14	U of Delaware	5,890	7,613	7,945	9,210	11,179	13,531	79.0	21.0	8.7
16	13	U of Colorado	3,521	6,887	7,338	8,864	12,166	13,299	57.5	9.3	14.2
17	7	Pennsylvania State U	14,257	16,129	17,935	18,660	18,139	13,082	49.1	-27.9	-0.9
18	29	U of California, Santa Barbara	4,995	7,477	8,296	8,405	8,083	12,808	53.1	58.5	9.9
19	48	U of Tulsa	4,434	4,999	6,614	6,921	5,268	12,722	7.5	141.5	11.1
20	10	Michigan State U	5,656	9,970	11,084	13,906	13,443	12,409	47.8	-7.7	8.2
21	22	U of Wisconsin, Madison	7,317	6,870	7,628	7,755	9,677	11,656	69.1	20.5	4.8
22	26	U of Minnesota	9,057	9,634	10,507	10,296	9,204	11,024	38.8	19.8	2.0
23	20	U of Michigan	3,623	9,651	8,294	8,421	9,842	10,468	65.9	6.4	11.2
24	25	State U of New York, Buffalo	1,718	9,138	15,742	17,923	9,477	10,259	69.4	8.3	19.6
25	12	U of Illinois, Urbana-Champaign	5,160	6,382	7,231	9,027	12,286	9,324	66.2	-24.1	6.1
<b>Total, listed institutions</b>			<b>\$162,507</b>	<b>\$244,293</b>	<b>\$280,921</b>	<b>\$318,844</b>	<b>\$335,354</b>	<b>\$398,763</b>	<b>48.1%</b>	<b>18.9%</b>	<b>9.4%</b>
<b>TOTAL, ALL INSTITUTIONS</b>			<b>\$375,708</b>	<b>\$560,005</b>	<b>\$598,944</b>	<b>\$655,603</b>	<b>\$695,842</b>	<b>\$797,416</b>	<b>52.6%</b>	<b>14.6%</b>	<b>7.8%</b>

NOTE: Institutional fiscal years. <sup>a</sup> Share of total expenditures funded by the federal government. <sup>b</sup> Data for 2010 include funding for University Multispectral Lab. SOURCE: National Science Foundation, WebCASPAR Database System

## FEDERAL SUPPORT FOR CHEMICAL ENGINEERING R&D

Overall funding in 2010 received a healthy boost as compared with 2009

RANK		INSTITUTION	\$ THOUSANDS						ANNUAL CHANGE	
2010	2009		2000	2006	2007	2008	2009	2010	2009-10	2000-10
1	1	Johns Hopkins U	\$5,295	\$8,688	\$11,007	\$11,912	\$14,081	\$16,192	15.0%	11.8%
2	4	Georgia Inst. of Technology	2,460	6,977	6,713	7,889	11,143	12,828	15.1	18.0
3	2	MIT	10,131	13,172	13,643	14,419	12,676	12,409	-2.1	2.0
4	118	Oklahoma State U <sup>a</sup>	496	742	714	711	346	11,534	3,233.5	37.0
5	7	U of Delaware	2,940	5,603	5,984	7,172	8,297	10,693	28.9	13.8
6	36	Stanford U	5,378	5,324	4,137	4,659	4,144	9,192	121.8	5.5
7	3	U of Massachusetts, Amherst	1,384	8,440	7,495	10,316	11,442	8,860	-22.6	20.4
8	20	Purdue U	2,403	1,279	3,410	4,579	5,414	8,224	51.9	13.1
9	11	U of California, Davis	2,512	4,627	6,152	6,151	6,809	8,075	18.6	12.4
10	12	U of Wisconsin, Madison	4,295	4,381	4,977	4,098	6,527	8,053	23.4	6.5
11	9	North Carolina State U, Raleigh	7,433	8,223	7,491	6,823	7,371	7,699	4.4	0.4
12	10	U of Colorado	2,299	5,081	5,171	5,739	6,856	7,642	11.5	12.8
13	15	Carnegie Mellon U	2,223	3,260	3,457	4,249	6,389	7,500	17.4	12.9
14	26	New Jersey Inst. of Technology	735	2,254	4,246	4,406	4,592	7,209	57.0	25.6
15	14	U of South Carolina	3,000	5,695	5,659	6,141	6,448	7,177	11.3	9.1
16	19	State U of New York, Buffalo	811	3,174	9,007	13,021	5,882	7,120	21.0	24.3
17	18	U of Dayton	441	2,643	3,593	4,473	6,064	7,040	16.1	31.9
18	22	U of Utah	5,497	3,574	4,078	3,827	4,856	6,952	43.2	2.4
19	13	U of Michigan	2,315	8,255	6,187	5,897	6,512	6,894	5.9	11.5
20	29	U of California, Santa Barbara	3,907	4,925	4,069	3,766	4,496	6,806	51.4	5.7
21	5	Pennsylvania State U	8,491	8,798	10,470	10,393	9,726	6,424	-34.0	-2.8
22	21	Ohio State U	1,178	4,394	3,296	4,905	4,949	6,365	28.6	18.4
23	6	U of Illinois, Urbana-Champaign	3,001	4,160	4,866	5,815	8,435	6,174	-26.8	7.5
24	25	Michigan State U	1,465	3,718	3,465	4,198	4,597	5,936	29.1	15.0
25	16	Rutgers, State U of New Jersey	676	1,136	3,448	6,198	6,248	5,926	-5.2	24.2
<b>Total, listed institutions</b>			<b>\$80,766</b>	<b>\$128,523</b>	<b>\$142,735</b>	<b>\$161,757</b>	<b>\$174,300</b>	<b>\$208,924</b>	<b>19.9%</b>	<b>10.0%</b>
<b>TOTAL, ALL INSTITUTIONS</b>			<b>\$196,325</b>	<b>\$319,993</b>	<b>\$322,324</b>	<b>\$341,043</b>	<b>\$359,726</b>	<b>\$419,056</b>	<b>16.5%</b>	<b>7.9%</b>

NOTE: Institutional fiscal years. <sup>a</sup> Data for 2010 include funding for University Multispectral Lab. SOURCE: National Science Foundation, WebCASPAR Database System

## UNIVERSITY SPENDING FOR RESEARCH EQUIPMENT

Chemistry outlays for equipment saw double-digit percentage spike in 2010

\$ MILLIONS	2000	2006	2007	2008	2009	2010	% FEDERAL FUNDS, 2010 <sup>a</sup>	ANNUAL CHANGE	
								2009-10	2000-10
<b>ALL SCIENCES</b>	<b>\$1,132</b>	<b>\$1,383</b>	<b>\$1,395</b>	<b>\$1,439</b>	<b>\$1,471</b>	<b>\$1,602</b>	<b>65.2%</b>	<b>8.9%</b>	<b>3.5%</b>
Life <sup>b</sup>	630	752	737	796	786	905	62.8	15.1	3.7
Physical <sup>c</sup>	251	329	310	302	333	363	75.7	9.0	3.8
Physics	110	153	143	136	149	154	81.7	3.4	3.4
Chemistry	104	122	113	114	136	162	69.7	19.1	4.5
Environmental	100	123	136	144	126	151	76.7	19.8	4.2
Math & computer	66	79	84	89	100	72	70.3	-28.0	0.9
Other	85	99	129	108	126	110	30.5	-12.7	2.6
<b>ALL ENGINEERING</b>	<b>\$306</b>	<b>\$443</b>	<b>\$428</b>	<b>\$435</b>	<b>\$475</b>	<b>\$512</b>	<b>58.1%</b>	<b>7.8%</b>	<b>5.3%</b>
Materials	30	54	54	52	58	65	47.1	12.1	8.0
Chemical	26	39	37	39	48	51	51.5	6.3	7.0
<b>TOTAL<sup>d</sup></b>	<b>\$1,438</b>	<b>\$1,826</b>	<b>\$1,824</b>	<b>\$1,874</b>	<b>\$1,947</b>	<b>\$2,148</b>	<b>62.9%</b>	<b>nm</b>	<b>nm</b>

NOTE: Institutional fiscal years. Totals may not add because of rounding. <sup>a</sup> Share of total expenditures funded by the federal government. <sup>b</sup> Includes agricultural, biological, medical, and other life sciences. <sup>c</sup> Includes astronomy, chemistry, physics, and other physical sciences. <sup>d</sup> Total for 2010 not comparable to earlier years because fields outside of science and engineering were included. nm = not meaningful. SOURCE: National Science Foundation, WebCASPAR Database System

## SCHOOL SPENDING ON CHEMICAL RESEARCH EQUIPMENT

Spending for all institutions grew 19%, same as 2009

RANK 2010	\$ THOUSANDS							% FEDERAL FUNDS, ANNUAL AVERAGE,	
		2000	2006	2007	2008	2009	2010	2010 <sup>a</sup>	2006-10
1	Massachusetts Inst. of Technology	\$2,956	\$1,660	\$1,384	\$2,166	\$2,176	\$4,404	56.3%	\$2,358
2	U of Michigan	575	1,397	970	1,051	1,994	4,060	41.6	1,894
3	Arizona State U, Tempe	518	428	751	631	173	3,748	92.7	1,146
4	U of Wisconsin, Madison	2,527	1,446	864	1,661	2,253	3,371	62.2	1,919
5	Cornell U	822	709	268	728	3,484	3,147	15.0	1,667
6	Wayne State U	206	229	1,039	1,493	725	2,733	43.8	1,244
7	U of Akron	755	1,019	2,846	743	3,337	2,588	21.4	2,107
8	U of North Carolina, Chapel Hill	801	457	2,269	1,941	956	2,532	97.9	1,631
9	U of Kansas	1,078	641	1,443	744	1,210	2,356	97.0	1,279
10	U of Illinois, Urbana-Champaign	1,871	2,232	2,201	1,565	3,006	2,284	78.7	2,258
11	U of California, Berkeley	1,727	1,545	1,489	1,661	1,769	2,240	61.5	1,741
12	Indiana U	1,232	5,091	3,910	1,694	4,821	2,132	35.4	3,530
13	U of Arizona	914	609	696	1,050	816	2,122	94.0	1,059
14	Virginia Tech.	355	618	1,879	1,423	1,600	2,071	51.1	1,518
15	Pennsylvania State U	1,137	1,700	901	2,868	3,331	2,051	60.8	2,170
16	U of Washington, Seattle	1,286	1,882	585	1,181	2,113	2,010	93.1	1,554
17	Northwestern U	1,067	377	1,969	1,038	1,878	1,993	90.3	1,451
18	Montana State U, Bozeman	840	650	372	188	270	1,985	65.8	693
19	U of California, San Diego	392	3,560	2,646	1,150	2,356	1,976	89.2	2,338
20	U of Southern Mississippi	346	728	988	1,450	2,087	1,958	68.2	1,442
21	California Inst. of Technology	2,497	1,492	679	1,072	1,467	1,920	79.9	1,326
22	U of Massachusetts, Amherst	1,289	688	100	289	446	1,916	98.0	688
23	Harvard U	1,451	3,225	1,923	1,476	1,321	1,844	78.7	1,958
24	Virginia Commonwealth U	371	89	35	43	130	1,676	82.7	395
25	Purdue U	1,347	995	1,799	1,116	629	1,638	64.3	1,235
	<b>Total, listed institutions</b>	<b>\$28,360</b>	<b>\$33,467</b>	<b>\$34,006</b>	<b>\$30,422</b>	<b>\$44,348</b>	<b>\$60,755</b>	<b>66.4%</b>	<b>\$40,600</b>
	<b>TOTAL, ALL INSTITUTIONS</b>	<b>\$104,097</b>	<b>\$121,611</b>	<b>\$112,980</b>	<b>\$114,324</b>	<b>\$135,957</b>	<b>\$162,016</b>	<b>69.7%</b>	<b>\$129,378</b>

**NOTE:** Institutional fiscal years. Totals may not add because of rounding. **a** Share of total expenditures funded by the federal government.

**SOURCE:** National Science Foundation, WebCASPAR Database System



## FEDERAL SUPPORT FOR CHEMICAL RESEARCH EQUIPMENT

Total funding zoomed up 38% for all institutions in 2010

RANK 2010	\$ THOUSANDS	2000	2006	2007	2008	2009	2010	ANNUAL AVERAGE, 2006-10
1	Arizona State U, Tempe	\$497	\$293	\$715	\$394	\$142	\$3,473	\$1,003
2 (tie)	Massachusetts Inst. of Technology	2,222	1,355	1,240	2,088	1,889	2,480	1,810
2 (tie)	U of North Carolina, Chapel Hill	770	457	2,262	1,899	931	2,480	1,606
3	U of Kansas	965	563	523	705	1,042	2,285	1,024
4	U of Wisconsin, Madison	1,328	768	419	1,304	1,405	2,098	1,199
5	U of Arizona	881	377	652	921	695	1,995	928
6	U of Massachusetts, Amherst	1,171	485	58	261	283	1,878	593
7	U of Washington, Seattle	847	1,358	460	892	1,712	1,872	1,259
8	Northwestern U	784	351	1,003	489	1,485	1,800	1,026
9	U of Illinois, Urbana-Champaign	908	1,224	1,894	1,192	2,229	1,798	1,667
10	U of California, San Diego	243	3,384	2,527	839	2,340	1,762	2,170
11	U of Michigan	459	281	299	356	1,219	1,690	769
12	California Inst. of Technology	939	1,456	617	953	984	1,534	1,109
13	Harvard U	1,087	2,958	1,395	1,201	785	1,452	1,558
14	Virginia Commonwealth U	292	73	34	37	128	1,386	332
15	U of California, Berkeley	1,421	1,355	750	1,287	1,104	1,377	1,175
16	U of Southern Mississippi	311	715	937	1,407	1,836	1,336	1,246
17	Montana State U, Bozeman	546	625	370	164	251	1,307	543
18	U of California, Los Angeles	1,007	573	509	1,251	757	1,286	875
19	Pennsylvania State U	783	757	850	1,270	893	1,248	1,004
20	New York U	86	68	176	67	178	1,229	344
21	U of Toledo	0	68	0	11	0	1,227	261
22	Wayne State U	199	142	429	421	196	1,196	477
23	U of Louisville	42	35	830	258	524	1,172	564
24	Stanford U	1,033	614	927	1,156	710	1,164	914
<b>Total, listed institutions</b>		<b>\$18,821</b>	<b>\$20,335</b>	<b>\$19,876</b>	<b>\$20,823</b>	<b>\$23,718</b>	<b>\$42,525</b>	<b>\$25,455</b>
<b>TOTAL, ALL INSTITUTIONS</b>		<b>\$63,651</b>	<b>\$78,994</b>	<b>\$72,837</b>	<b>\$71,426</b>	<b>\$81,868</b>	<b>\$112,875</b>	<b>\$83,600</b>

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

## SCIENCE AND ENGINEERING GRADUATE STUDENTS

Overall number of grad students inched up in 2010, but life sciences see second dip in a row

	2000	2006	2007	2008	2009	2010	ANNUAL CHANGE	
							2009-10	2000-10
<b>ALL SCIENCES</b>	<b>389,199</b>	<b>474,602</b>	<b>492,424</b>	<b>499,538</b>	<b>493,772</b>	<b>490,206</b>	<b>-0.7%</b>	<b>2.3%</b>
Life <sup>a</sup>	148,080	194,313	190,344	191,045	176,820	169,502	-4.1	1.4
Biological	56,282	69,941	73,516	74,678	75,660	77,726	2.7	3.3
Agricultural	12,023	13,016	13,528	14,153	15,200	15,656	3.0	2.7
Psychology & social	133,793	160,000	162,767	162,375	164,004	162,639	-0.8	2.0
Math & computer	63,000	68,468	69,221	70,953	73,387	74,682	1.8	1.7
Physical <sup>b</sup>	30,385	36,901	36,824	37,319	38,149	38,973	2.2	2.5
Chemistry	18,105	21,351	21,298	21,574	22,094	22,436	1.5	2.2
Physics	10,841	13,722	13,816	13,862	14,060	14,507	3.2	3.0
Environmental	13,941	14,920	14,100	14,389	14,839	15,655	5.5	1.2
Other	na	na	19,168	23,457	26,573	28,755	8.2	nm
<b>ALL ENGINEERING</b>	<b>104,112</b>	<b>123,041</b>	<b>127,075</b>	<b>131,951</b>	<b>137,873</b>	<b>142,446</b>	<b>3.3%</b>	<b>3.2%</b>
Chemical	7,056	7,261	7,584	7,892	8,188	8,668	5.9	2.1
Materials	4,377	5,268	5,314	5,539	5,863	6,274	7.0	3.7
<b>TOTAL</b>	<b>493,311</b>	<b>597,643</b>	<b>619,499</b>	<b>631,489</b>	<b>631,645</b>	<b>632,652</b>	<b>0.2%</b>	<b>2.5%</b>

**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

Percentages barely budged in 2010 for chemistry and chemical engineering grad students from outside the U.S.

NUMBER OF FOREIGN STUDENTS	2006		2007		2008		2009		2010	
		% OF TOTAL		% OF TOTAL		% OF TOTAL		% OF TOTAL		% OF TOTAL
<b>ALL SCIENCES</b>	<b>95,675</b>	<b>20.2%</b>	<b>99,722</b>	<b>20.3%</b>	<b>105,499</b>	<b>21.1%</b>	<b>107,155</b>	<b>21.7%</b>	<b>108,461</b>	<b>22.1%</b>
Math & computer	28,574	41.7	30,348	43.8	32,402	45.7	33,151	45.2	33,991	45.5
Life <sup>a</sup>	27,916	14.4	27,952	14.7	29,583	15.5	29,672	16.8	29,168	17.2
Biological	16,907	24.2	16,958	23.1	17,932	24.0	17,756	23.5	17,897	23.0
Agricultural	2,675	20.6	2,897	21.4	3,106	21.9	3,262	21.5	3,240	20.7
Psychology & social	21,661	13.5	21,414	13.2	22,273	13.7	22,321	13.6	22,660	13.9
Physical <sup>b</sup>	14,757	40.0	14,407	39.1	14,763	39.6	15,078	39.5	15,321	39.3
Chemistry	8,301	38.9	8,097	38.0	8,419	39.0	8,579	38.8	8,670	38.6
Physics	6,000	43.7	5,898	42.7	5,874	42.4	5,982	42.5	6,047	41.7
Environmental	2,767	18.5	2,612	18.5	2,777	19.3	2,757	18.6	2,926	18.7
Other	na	nm	2,989	15.6	3,701	15.8	4,176	15.7	4,395	15.3
<b>ALL ENGINEERING</b>	<b>55,343</b>	<b>45.0%</b>	<b>59,483</b>	<b>46.8%</b>	<b>62,540</b>	<b>47.4%</b>	<b>64,842</b>	<b>47.0%</b>	<b>65,699</b>	<b>46.1%</b>
Chemical	3,576	49.2	3,840	50.6	4,071	51.6	4,166	50.9	4,396	50.7
Materials	2,578	48.9	2,595	48.8	2,743	49.5	2,914	49.7	3,077	49.0
<b>TOTAL</b>	<b>151,018</b>	<b>25.3%</b>	<b>159,205</b>	<b>25.7%</b>	<b>168,039</b>	<b>26.6%</b>	<b>171,997</b>	<b>27.2%</b>	<b>174,160</b>	<b>27.5%</b>

**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

Environmental postdocs numbers boosted the most in 2010, while chemistry and chemical engineering postdocs had the smallest growth

	2000	2006	2007	2008	2009	2010	ANNUAL CHANGE	
							2009-10	2000-10
<b>ALL SCIENCES</b>	<b>39,802</b>	<b>44,701</b>	<b>45,903</b>	<b>48,713</b>	<b>51,411</b>	<b>56,469</b>	<b>9.8%</b>	<b>3.6%</b>
Life <sup>a</sup>	30,447	34,190	34,996	37,278	38,888	42,914	10.4	3.5
Biological	16,734	18,807	19,394	20,170	20,804	22,355	7.5	2.9
Agricultural	822	927	985	1,147	1,083	1,195	10.3	3.8
Physical <sup>b</sup>	6,270	6,703	6,719	6,885	7,447	7,703	3.4	2.1
Chemistry	3,877	4,045	3,952	3,943	4,219	4,241	0.5	0.9
Physics	1,948	2,130	2,206	2,327	2,517	2,628	4.4	3.0
Psychology & social	1,201	1,267	1,571	1,585	1,780	1,723	-3.2	3.7
Environmental	1,155	1,495	1,250	1,339	1,424	1,760	23.6	4.3
Math & computer	729	1,046	1,080	1,216	1,331	1,504	13.0	7.5
Other	na	na	287	410	541	865	59.9	nm
<b>ALL ENGINEERING</b>	<b>3,313</b>	<b>4,642</b>	<b>4,937</b>	<b>5,451</b>	<b>6,394</b>	<b>6,946</b>	<b>8.6%</b>	<b>7.7%</b>
Chemical	703	735	790	880	1,084	1,092	0.7	4.5
Materials	507	571	564	605	758	835	10.2	5.1
<b>TOTAL</b>	<b>43,115</b>	<b>49,343</b>	<b>50,840</b>	<b>54,164</b>	<b>57,805</b>	<b>63,415</b>	<b>9.7%</b>	<b>3.9%</b>

**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

When inflation is considered, increases are more modest

ACADEMIC R&D SPENDING (\$ MILLIONS)	2000	2009	2010	CHANGE	
				2009-10	2000-10
<b>TOTAL</b>					
Current dollars	\$30,084	\$54,863	\$58,338	6.3%	93.9%
Constant dollars	30,084	44,173	46,542	5.4	54.7
<b>CHEMISTRY</b>					
Current dollars	\$962	\$1,583	\$1,751	10.6%	82.0%
Constant dollars	962	1,275	1,397	9.6	45.2

**NOTE:** Calculated using 2000 = 1.00; deflator data obtained from [whitehouse.gov/omb/budget/historicals](http://whitehouse.gov/omb/budget/historicals). **SOURCE:** National Science Foundation, WebCASPAR Database System