



Higher Education R&D Expenditures Resume Slow Growth in FY 2013

by Ronda Britt¹

University spending on research and development in all fields totaled \$67.2 billion² in FY 2013, according to data from the National Science Foundation (NSF) Higher Education Research and Development (HERD) Survey (table 1). When adjusted for inflation, higher education R&D increased by less than half a percent in FY 2013 (figure 1). This overall amount represents the reported totals from 891 degree-granting institutions that spent at least \$150,000 in R&D in the previous fiscal year. The remainder of this InfoBrief focuses on the 645 institutions included in the full version of the survey (standard form) that reported at least \$1 million in R&D during their previous fiscal year and who contributed 99.8% of the total R&D expenditures reported in FY 2013. For more information see Data Sources, Limitations, and Availability.

Academic R&D expenditures funded by the one-time American Recovery and Reinvestment Act of 2009 (ARRA) continued to decrease, declining to \$1.5 billion in FY 2013.³ ARRA funding represented 3.7% of the federally funded R&D expenditures for FY 2013.

TABLE 1. Higher education R&D expenditures, by source of funds, R&D field, and survey population: FY 2013
(Thousands of current dollars)

Source of funds and R&D field	All institutions	HERD Survey population	
		Short form	Standard form
All R&D expenditures	67,173,419	132,265	67,041,154
Source of funds			
Federal government	39,535,199	65,042	39,470,157
State and local government	3,666,940	9,215	3,657,725
Institution funds	15,011,613	37,690	14,973,923
Business	3,505,552	4,244	3,501,308
Nonprofit organizations	3,874,135	14,042	3,860,093
All other sources	1,579,980	2,032	1,577,948
R&D field			
Science	52,765,521	99,559	52,665,962
Computer sciences	2,073,175	4,982	2,068,193
Environmental sciences	3,208,984	9,827	3,199,157
Life sciences	37,631,306	46,106	37,585,200
Mathematical sciences	674,690	3,702	670,988
Physical sciences	4,664,313	18,290	4,646,023
Psychology	1,157,497	5,795	1,151,702
Social sciences	2,175,769	5,745	2,170,024
Sciences, nec	1,179,787	5,112	1,174,675
Engineering	10,737,839	9,154	10,728,685
Non-S&E	3,670,059	23,552	3,646,507

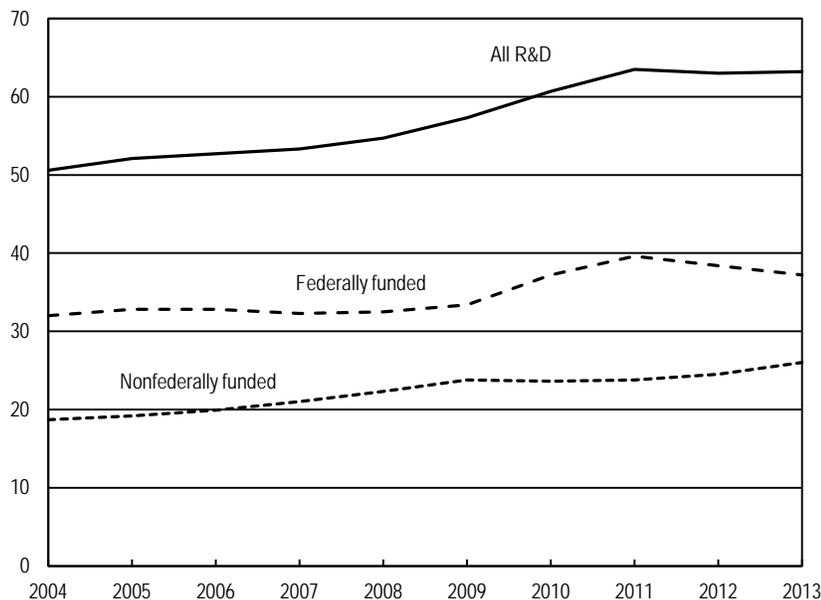
HERD = higher education research and development; nec = not elsewhere classified; S&E = science and engineering.

NOTE: Institutions are included in the short form population if they reported less than \$1 million in total R&D expenditures during the previous fiscal year.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey, FY 2013.

FIGURE 1. Higher education R&D expenditures, by source of funds: FYs 2004–13

Constant 2009 dollars (billions)



NOTE: Includes all institutions reporting over \$150,000 in R&D expenditures in the fiscal years shown.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

Including ARRA funding, the total federal funding for higher education R&D declined from \$40.2 billion in FY 2012 to \$39.5 billion in FY 2013, continuing a decline in the proportion of academic R&D funded by the federal government (table 2). Since

FY 2011, federally funded expenditures have dropped from 62.5% to 58.9% of total R&D expenditures, resuming the pre-ARRA trend (figure 2). In constant dollars, federally funded R&D expenditures declined 3.1% in FY 2013.

R&D Expenditures by Source

Institution-funded R&D continued its rapid growth and rose 9.8% to nearly \$15 billion in FY 2013 (table 2). Institution funds now constitute 22.3% of total R&D, rising from 19.5% in FY 2010. There are three components to institution funds: direct funding of R&D (\$8.9 billion), cost sharing on externally sponsored projects (\$1.4 billion), and indirect costs on external projects that are not reimbursed by the sponsors (\$4.7 billion). Expenditures funded by state and local government held roughly steady at \$3.7 billion in FY 2013, and nonprofit-funded expenditures fell \$162 million to \$3.9 billion. Business-funded R&D continued to grow, rising 7.0% in FY 2013 to \$3.5 billion. Expenditures funded by “all other sources”—such as foreign governments, other universities, or gifts designated by the donors for research—increased \$609 million in FY 2012, reaching \$1.6 billion in FY 2013.⁴

Among federal agencies, the Department of Health and Human Services (HHS), including the National Institutes of Health, continues to provide the majority of the R&D funding (54%, or \$21.2 billion). Eighty-eight percent of the HHS total supported R&D within the life sciences (table 3). The

TABLE 2. Higher education R&D expenditures, by source of funds: FYs 2010–13
(Millions of current dollars)

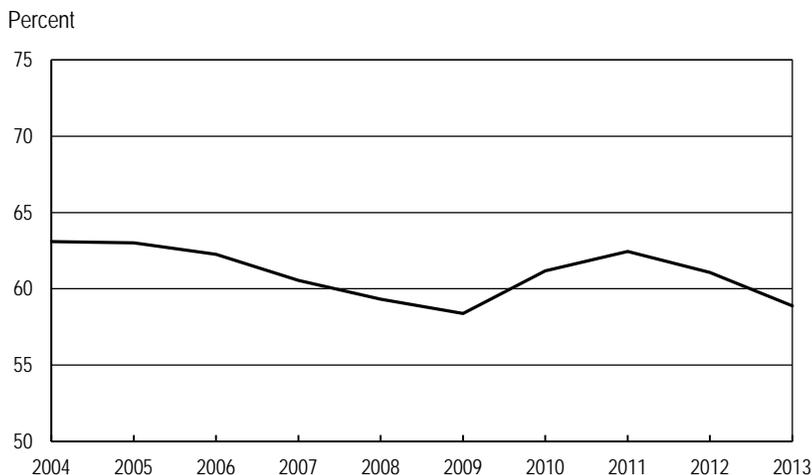
Fiscal year	All R&D expenditures	Federal government (non-ARRA)	Federal government (ARRA)	State and local government	Institution funds	Business	Nonprofit organizations	All other sources
2010	61,257	34,793	2,684	3,853	11,941	3,198	3,740	1,048
2011	65,282	36,597	4,173	3,829	12,612	3,180	3,854	1,037
2012	65,744	37,715	2,436	3,695	13,635	3,272	4,022	969
2013	67,041	37,997	1,473	3,658	14,974	3,501	3,860	1,578

ARRA = American Recovery and Reinvestment Act of 2009.

NOTES: FY 2012 and FY 2013 totals exclude short form institutions (those reporting less than \$1 million in R&D expenditures in the prior fiscal year). The total reported by short form institutions in FY 2012 was \$145 million, of which \$75 million was federally funded. The total reported in FY 2013 was \$132 million, of which \$65 million was federally funded.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

FIGURE 2. Higher education R&D expenditures funded by the federal government: FY 2004–13



SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

National Science Foundation (NSF) and the Department of Defense (DOD) were the next largest funders of R&D, with \$5.4 and \$5.0 billion, respectively. The funding provided by NSF was distributed across many of the broad fields, with somewhat larger concentrations in engineering and physical sciences (23% and 20%, respectively), whereas DOD had a substantial concentration of their funding within the field of engineering (49%).

R&D Expenditures by Field

The largest broad field, life sciences, rose slightly to \$37.6 billion in FY 2013 (table 4), although this represented a second year of decline in constant dollars. Engineering was the next largest broad field and also increased slightly to \$10.7 billion in FY 2013. Computer sciences had the largest percentage increase in constant dollars and rose to over \$2 billion in current

dollars for the first time in FY 2013. Over the past 10 years, non-science and engineering fields, such as education, humanities, and business, experienced the highest average annual constant dollar growth, growing by 6.6% per year. R&D in engineering fields grew by 3.5% annually in constant dollar terms.

Data Sources, Limitations, and Availability

The fiscal year referred to throughout this report is the academic fiscal year. For most institutions, FY 2013 represents 1 July 2012 through 30 June 2013. The higher education R&D expenditures data were collected from a census of 891 universities and colleges that grant bachelors or higher degrees and expended at least \$150,000 in R&D in FY 2013. In order to reduce respondent burden, the HERD Survey was revised beginning in FY 2012 to request abbreviated data from institutions reporting less than \$1 million in R&D expenditures during the previous fiscal year. Except for table 1, the totals shown in this InfoBrief do not include expenditures reported by 246 institutions that completed a short form version of the survey in FY 2013. These institutions

TABLE 3. Federally financed higher education R&D expenditures, by agency and field: FY 2013 (Thousands of current dollars)

Agency	All R&D fields	Computer sciences	Environmental sciences	Life sciences	Mathematical sciences	Physical sciences	Psychology	Social sciences	Sciences, nec	Engineering	Non-S&E fields
All agencies	39,470,157	1,552,070	2,097,153	22,250,416	464,500	3,309,274	789,164	897,076	441,636	6,493,109	1,175,759
DOD	5,037,554	546,717	208,006	913,123	93,531	509,648	56,854	94,522	86,895	2,457,102	71,156
DOE	1,873,818	50,412	143,967	216,176	15,110	610,976	574	11,032	28,216	785,430	11,925
HHS	21,222,929	80,408	79,135	18,662,583	47,345	530,525	531,696	304,843	132,585	632,635	221,174
NASA	1,332,307	16,796	299,909	84,659	3,903	455,111	17,564	15,241	3,790	421,946	13,388
NSF	5,395,972	706,428	768,294	770,373	266,914	1,058,359	77,097	148,895	134,979	1,246,149	218,484
USDA	1,091,575	3,486	56,657	875,931	4,084	7,413	6,168	55,695	8,502	57,796	15,843
All other agencies	3,516,002	147,823	541,185	727,571	33,613	137,242	99,211	266,848	46,669	892,051	623,789

DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; nec = not elsewhere classified; NSF = National Science Foundation; S&E = Science and engineering; USDA = U.S. Department of Agriculture.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey, FY 2013.

TABLE 4. Higher education R&D expenditures, by R&D field: FYs 2004–13

R&D field	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Current \$millions										
Computer sciences	1,404	1,404	1,443	1,431	1,471	1,600	1,638	1,740	1,820	2,068
Environmental sciences	2,353	2,554	2,601	2,681	2,799	2,923	2,992	3,159	3,179	3,199
Life sciences	25,949	27,604	28,804	29,805	31,193	32,779	34,949	37,324	37,187	37,585
Mathematical sciences	448	494	533	573	620	547	594	640	674	671
Physical sciences	3,547	3,703	3,814	3,863	3,932	4,283	4,622	4,783	4,724	4,646
Psychology	782	825	876	873	925	972	1,078	1,159	1,188	1,152
Social sciences	1,675	1,685	1,706	1,803	1,950	2,081	1,997	2,064	2,054	2,170
Sciences, nec	764	761	888	948	1,025	1,029	1,161	1,092	1,102	1,175
Engineering	6,314	6,743	7,095	7,517	7,958	8,649	9,329	10,040	10,292	10,729
Non-S&E ^a	1,601	1,761	1,887	2,095	2,242	2,425	2,897	3,281	3,523	3,647
Constant 2009 \$millions										
Computer sciences	1,586	1,538	1,530	1,477	1,489	1,600	1,624	1,692	1,740	1,947
Environmental sciences	2,658	2,797	2,759	2,769	2,832	2,923	2,966	3,072	3,038	3,012
Life sciences	29,308	30,228	30,548	30,778	31,559	32,779	34,648	36,293	35,538	35,384
Mathematical sciences	507	541	565	592	627	547	589	623	644	632
Physical sciences	4,006	4,055	4,045	3,989	3,978	4,283	4,582	4,651	4,515	4,374
Psychology	884	903	929	901	936	972	1,069	1,127	1,136	1,084
Social sciences	1,892	1,845	1,809	1,862	1,973	2,081	1,979	2,007	1,962	2,043
Sciences, nec	863	834	941	979	1,037	1,029	1,151	1,062	1,053	1,106
Engineering	7,132	7,384	7,525	7,763	8,051	8,649	9,248	9,763	9,836	10,100
Non-S&E ^a	1,808	1,929	2,001	2,163	2,268	2,425	2,872	3,190	3,366	3,433

nec = not elsewhere classified; S&E = science and engineering.

^a Prior to FY 2010, some institution totals for all fields of R&D expenditures may be lower-bound estimates because the National Science Foundation did not attempt to estimate for nonresponse on non-S&E R&D expenditures item.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

accounted for an additional \$132 million to the U.S. total of higher education R&D expenditures in FY 2013. The combined results will be shown within a limited set of data tables.

The amounts reported include all funds expended for activities specifically organized to produce research outcomes and sponsored by an outside organization or separately budgeted using institution funds. R&D expenditures at university-administered federally funded research and development centers (FFRDCs) are collected in a separate survey, the FFRDC R&D Survey, and these data are available at <http://www.nsf.gov/statistics/ffrdc/>.

The full set of data tables from this survey is available at <http://ncesdata.nsf.gov/herd/2013/>.

Notes

1. Ronda Britt, Research and Development Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230 (rbritt@nsf.gov; 703-292-7765).
2. Unless otherwise indicated, references to dollar amounts or percentages are in current dollars.
3. Although the funding was awarded to institutions in federal FY 2009 and FY 2010, much of the funding was

for multiyear projects. The deadline for spending on the majority of ARRA projects was 30 September 2013; therefore, ARRA expenditures are expected to appear in HERD Survey totals through at least academic FY 2014.

4. The increase in “all other sources” may be partly due to more accurate reporting, because the survey instructions were revised in FY 2013 to clarify that non-pass-through funds received from other universities or gifts designated for research by individual donors should be included here rather than under nonprofit organizations or institution funds. Many institutions moved significant amounts of funds between these categories in FY 2013.

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