



Universities Report Fourth Straight Year of Declining Federal R&D Funding in FY 2015

by Ronda Britt¹

Federal funding of higher education research and development declined in both current and constant dollars for the fourth straight year, according to data from the Higher Education Research and Development (HERD) Survey by the National Center for Science and Engineering Statistics within the National Science Foundation. When adjusted for inflation, federal funding for higher education R&D declined 1.7% between FY 2014 and FY 2015 and has fallen almost 13% since its peak in FY 2011 (figure 1). This decrease continues the longest multiyear decline in federal funding for academic R&D since the beginning of the annual data collection for this series in FY 1972.

Overall, universities reported current dollar R&D expenditures of \$68.8 billion in FY 2015 (table 1), a 2.2% increase from the FY 2014 total of \$67.4 billion. This total represents the reported total R&D expenditures of 906 degree-granting institutions that spent at least \$150,000 in R&D in the previous fiscal year. The remainder of this InfoBrief will focus on the 640 institutions included in the full version of the HERD Survey (standard form) that reported at least \$1 million in R&D during their previous fiscal year and that accounted for 99.8% of the total

R&D expenditures reported for FY 2015. For more information, see “Data Sources, Limitations, and Availability.”

R&D Expenditures, by Source of Funding

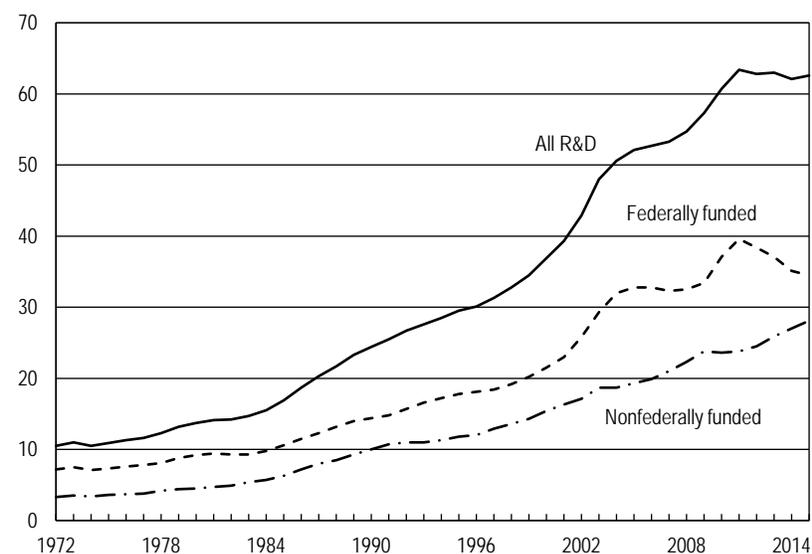
In current dollars, federally funded R&D at universities declined 0.2% to

\$37.9 billion in FY 2015 (table 2). Since FY 2011, federally funded expenditures have dropped from 62.5% to 55.2% of total R&D expenditures.

Despite the overall decrease in federal dollars, universities reported increases in expenditures funded by three agencies in

FIGURE 1. Higher education R&D expenditures, by source of funds: FYs 1972–2015

Billions of constant 2009 dollars



NOTES: Because of rounding, detail may not add to total. Includes all institutions reporting at least \$150,000 in R&D expenditures in the fiscal years shown. Prior to FY 2003, totals did not include R&D expenditures in non-science and engineering fields.

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

TABLE 1. Higher education R&D expenditures, by source of funds, R&D field, and survey population: FY 2015
(Thousands of current dollars)

Source of funds and R&D field	All institutions	Survey population	
		Short form	Standard form
All R&D expenditures	68,807,857	140,056	68,667,801
Federal government	37,939,602	62,723	37,876,879
State and local government	3,821,623	9,215	3,812,408
Institution funds	16,755,935	44,205	16,711,730
Business	4,005,725	5,111	4,000,614
Nonprofit organizations	4,252,036	15,043	4,236,993
All other sources	2,032,936	3,759	2,029,177
Science	54,076,389	102,809	53,973,580
Computer sciences	1,966,814	3,242	1,963,572
Environmental sciences	3,259,240	10,172	3,249,068
Life sciences	38,861,041	41,025	38,820,016
Mathematical sciences	646,515	4,803	641,712
Physical sciences	4,732,198	20,901	4,711,297
Psychology	1,188,935	4,919	1,184,016
Social sciences	2,335,018	13,126	2,321,892
Sciences, nec	1,086,628	4,621	1,082,007
Engineering	11,081,373	11,115	11,070,258
Non-science and engineering	3,650,095	26,132	3,623,963

nec = not elsewhere classified.

NOTES: Institutions reporting \$1 million or more during the previous fiscal year are included in the standard form population. Institutions are included in the short form population if they reported at least \$150,000 but 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 2015.

FY 2015: the Department of Defense, the National Aeronautics and Space Administration, and the Department of Agriculture. The remaining major funding agencies all showed declines between FY 2014 and FY 2015. The largest source, the Department of Health and Human Services (HHS), decreased for the fourth straight year, from nearly \$23 billion in FY 2011 to \$20 billion in FY 2015.

All but one of the nonfederal funding sources increased from FY 2014 to FY 2015. The bulk of the increase came from an increase in universities' own funding of R&D (institution funds), the largest source of nonfederal R&D funding. Institution funds grew 5.9% to \$16.7 billion in FY 2015. This source has increased 32.5% between FY 2011 and FY 2015.

Expenditures funded by businesses rose 7.5% in FY 2015 to top \$4 billion for the first time. Nonprofit-funded expenditures increased 6.9% to \$4.2 billion in FY 2015. Expenditures funded by all other sources—such as foreign governments, other universities, or gifts designated by the donors for research—increased 6.4% to \$2.0 billion in FY 2015. The one nonfederal source showing a decline, state and local government, decreased 1.2% to \$3.8 billion, roughly equaling the amount reported in FY 2011.

R&D Expenditures, by Field

Higher education R&D is heavily concentrated in three fields, which together accounted for 64.3% of the total spent in FY 2015: medical sciences (\$21.3 billion), biological sciences (\$11.7 billion), and engineering (\$11.1 billion)

(table 3). Medical sciences showed modest growth between FY 2014 and FY 2015, increasing 3.1% in current dollars. Biological sciences essentially remained steady and engineering grew less than 1%.

Two science subfields, atmospheric sciences and astronomy, showed double-digit growth in FY 2015. Atmospheric sciences grew 14.7% to \$576 million, and astronomy grew 18.7% to \$673 million. Within engineering, aeronautical and astronautical engineering showed the most growth, increasing 10.9% to \$734 million in FY 2015.

Two small non-science and engineering (non-S&E) fields also showed double-digit growth in R&D spending between FY 2014 and FY 2015, propelling the overall category of non-S&E R&D to a 5.7% increase. Research spending in business and management disciplines grew 18.2% to \$571 million in FY 2015. Law research spending also grew 17.4%, to \$175 million.

Top University Research Performers

The top 30 institutions in R&D spending in FY 2015 nearly mirrored the list in FY 2014 but with one change (table 4). The University of Texas, Austin claimed the number 30 spot with \$651 million, an 11.3% increase from FY 2014. Vanderbilt University moved to number 31 with \$648 million. In contrast to FY 2014, when 12 of the 30 institutions reported declines in their R&D spending from the prior year, only four reported declines for FY 2015. Combined, the top 30 institutions accounted for 41.3% of the total spent on R&D within the higher education sector in FY 2015.

External Funding by Type of Agreement

Of the research funding provided by outside sources, more than 75% comes in the form of grants, reimbursements

TABLE 2. Higher education R&D expenditures, by source of funds: FYs 2011–15
(Millions of current dollars)

Source of funds	2011	2012	2013	2014	2015	% change 2014–15
All R&D expenditures	65,274	65,729	67,013	67,200	68,668	2.2
All federal R&D expenditures	40,766	40,140	39,444	37,961	37,877	-0.2
DOD	4,814	4,908	5,023	4,927	5,095	3.4
DOE	1,866	1,955	1,876	1,806	1,713	-5.1
HHS	22,994	21,916	21,211	20,298	20,025	-1.3
NASA	1,423	1,331	1,332	1,329	1,419	6.7
NSF	5,140	5,276	5,393	5,125	5,114	-0.2
USDA	1,004	1,092	1,089	1,063	1,114	4.8
Other	3,524	3,663	3,519	3,413	3,398	-0.4
All nonfederal R&D expenditures	24,508	25,589	27,569	29,239	30,791	5.3
State and local government	3,828	3,694	3,653	3,858	3,812	-1.2
Institution funds	12,611	13,633	14,984	15,788	16,712	5.9
Business	3,178	3,270	3,506	3,722	4,001	7.5
Nonprofit organizations	3,854	4,022	3,889	3,964	4,237	6.9
All other sources	1,038	969	1,538	1,907	2,029	6.4

DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = Department of Agriculture.

NOTES: Because of rounding, detail may not add to total. Beginning with FY 2012, institutions reporting less than \$1 million in total R&D expenditures completed a shorter version of the survey questionnaire.

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

or other agreements (figure 2). These are defined as agreements in which payments are received but no good or service other than periodic reporting is required in exchange; in other words, the conduct of the research is largely controlled by the institution. The remainder of the funding is received in the form of contracts, including both prime and subcontracts. These agreements are legal commitments for a good or service that benefits the sponsor, and the sponsor specifies the deliverables and gains rights to the results of the R&D.

Since FY 2011, the amount of R&D spending funded by grants and other similar agreements has declined 10.1% in constant dollars, with the FY 2015 share dropping from 78.9% to 76.7%. In contrast, the amount funded by contracts has held relatively steady during the past 5 years.

Data Sources, Limitations, and Availability

The fiscal year referred to throughout this report is the academic fiscal year. For most institutions, FY 2015 represents 1 July 2014 through 30 June 2015. The higher education R&D expenditures data were collected from a census of 906 universities and colleges that grant a bachelor's degree or higher and expended at least \$150,000 in R&D in FY 2015. 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 figure 1 and table 1, the totals shown in this InfoBrief do not include expenditures reported by 266 institutions that completed this short-form version of the survey in FY 2015. These institutions accounted for \$140 million (0.2% of total) of higher education R&D expenditures in FY 2015.

The amounts reported include all funds expended for activities specifically organized to produce research outcomes and sponsored by an outside organization or separately accounted for 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/2015/>.

Note

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TABLE 3. Higher education R&D expenditures, by R&D field: FYs 2014–15
(Millions of current dollars)

Field	FY 2014	FY 2015	% change 2014–15
All R&D fields	67,200	68,668	2.2
Science	52,795	53,974	2.2
Computer sciences	1,927	1,964	1.9
Environmental sciences	3,230	3,249	0.6
Atmospheric sciences	502	576	14.7
Earth sciences	1,160	1,110	-4.3
Oceanography	1,072	1,052	-1.9
Environmental sciences, nec	497	511	2.8
Life sciences	37,961	38,820	2.3
Agricultural sciences	3,390	3,465	2.2
Biological sciences	11,706	11,711	0.0
Medical sciences	20,711	21,347	3.1
Life sciences, nec	2,155	2,297	6.6
Mathematical sciences	658	642	-2.4
Physical sciences	4,617	4,711	2.0
Astronomy	567	673	18.7
Chemistry	1,724	1,758	2.0
Physics	2,056	2,053	-0.1
Physical sciences, nec	270	227	-15.9
Psychology	1,142	1,184	3.7
Social sciences	2,216	2,322	4.8
Economics	430	462	7.4
Political sciences	427	460	7.7
Sociology	505	525	4.0
Social sciences, nec	853	875	2.6
Sciences, nec	1,045	1,082	3.5
Engineering	10,976	11,070	0.9
Aeronautical and astronautical engineering	662	734	10.9
Bioengineering and biomedical engineering	952	1,004	5.5
Chemical engineering	907	915	0.9
Civil engineering	1,257	1,288	2.5
Electrical engineering	2,480	2,494	0.6
Mechanical engineering	1,505	1,516	0.7
Metallurgical and materials engineering	1,203	1,096	-8.9
Engineering, nec	2,011	2,024	0.6
Non-science and engineering	3,428	3,624	5.7
Business and management	483	571	18.2
Communications, journalism, and library science	167	168	0.6
Education	1,245	1,292	3.8
Humanities	402	430	7.0
Law	149	175	17.4
Social work	226	216	-4.4
Visual and performing arts	96	101	5.2
Non-science and engineering, nec	660	671	1.7

nec = not elsewhere classified.

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

TABLE 4. Higher education R&D expenditures, ranked by FY 2015 R&D expenditures: FYs 2013–15

(Millions of current dollars)

Rank	Institution	2013	2014	2015	% change 2014–15
	All institutions	67,013	67,200	68,668	2.2
	Leading 30 institutions in FY 2015	27,504	27,651	28,391	2.7
1	Johns Hopkins U. ^a	2,169	2,242	2,306	2.9
2	U. Michigan, Ann Arbor	1,375	1,349	1,369	1.5
3	U. Washington, Seattle	1,193	1,176	1,181	0.4
4	U. California, San Francisco	1,043	1,084	1,127	4.0
5	U. California, San Diego	1,076	1,067	1,101	3.2
6	U. Wisconsin-Madison	1,124	1,109	1,069	-3.6
7	Duke U.	993	1,037	1,037	0.0
8	Stanford U.	945	959	1,023	6.7
9	U. California, Los Angeles	967	948	1,021	7.7
10	Harvard U.	1,013	934	1,014	8.6
11	U. North Carolina, Chapel Hill	973	990	967	-2.3
12	Cornell U.	845	883	954	8.0
13	Massachusetts Institute of Technology	901	908	931	2.5
14	U. Minnesota, Twin Cities	858	877	881	0.5
15	Columbia U. in the City of New York	889	891	868	-2.6
16	Texas A&M U., College Station and Health Science Center	820	854	867	1.5
17	U. Pennsylvania	828	828	864	4.3
18	U. Pittsburgh, Pittsburgh	873	857	861	0.5
19	U. Texas M. D. Anderson Cancer Center	718	795	833	4.8
20	Ohio State U.	793	815	818	0.4
21	Yale U.	789	773	803	3.9
22	Pennsylvania State U., University Park and Hershey Medical Center	838	801	791	-1.2
23	U. California, Berkeley	727	744	789	6.0
24	Georgia Institute of Technology	730	726	765	5.4
25	U. Florida	695	709	740	4.4
26	U. California, Davis	726	712	721	1.3
27	Washington U., Saint Louis	685	665	694	4.4
28	U. Southern California	646	687	691	0.6
29	Northwestern U.	640	645	656	1.7
30	U. Texas, Austin	634	585	651	11.3

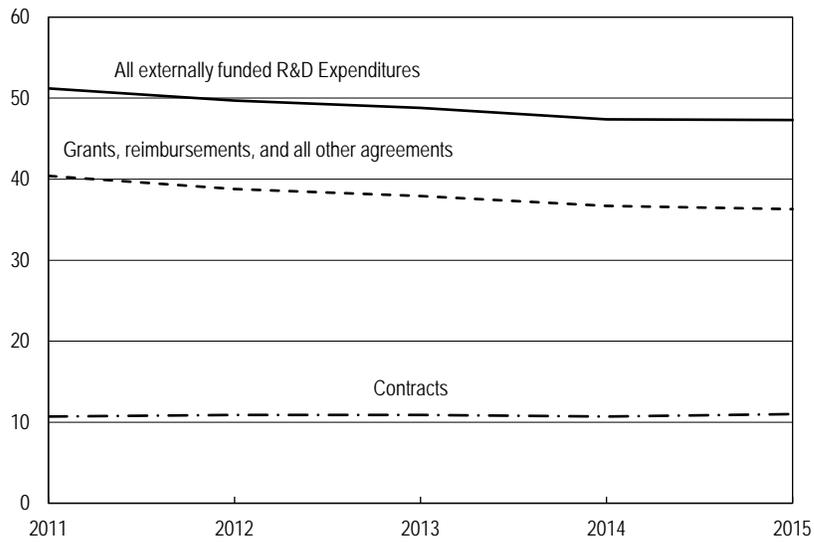
^aJohns Hopkins University includes Applied Physics Laboratory, with \$1,328 million in total R&D expenditures in FY 2015.

NOTES: Because of rounding, detail may not add to total. Institutions ranked are geographically separate campuses headed by a campus-level president or chancellor.

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

FIGURE 2. Externally funded higher education R&D expenditures, by type of agreement: FYs 2011–15

Billions of constant 2009 dollars



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

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