



## Federal Funding for Basic Research at Universities and Colleges Essentially Unchanged in FY 2012

by Michael Yamaner<sup>1</sup>

According to the latest data from the National Science Foundation (NSF), federal funding for basic research performed at universities and colleges decreased 0.3% between FY 2011 and FY 2012. Nonetheless, universities and colleges received 50.8% of the \$31.0 billion total in federal obligations for basic research and accounted for 11.4% of total research and development obligations in FY 2012. Basic research at universities and colleges is estimated to increase to 11.8% of total R&D obligations in FY 2013 and is projected to grow to 12.5% in FY 2014 (table 1).

Despite a 1.2% drop in development, current-dollar federal obligations for total R&D reached \$138.5 billion in FY 2012, an increase of 2.2% over FY 2011. R&D is estimated to decrease by 4.4%, to \$132.4 billion, in FY 2013 and is projected to decrease by 1.2%, to \$130.8 billion, in FY 2014. Both decreases are being driven by development, which shows an estimated 7.5% drop in FY 2013 and is projected to drop 5.9% in FY 2014 (table 1).

In contrast to the reported decline each year in total R&D obligations for FYs 2012–14, federal basic research obliga-

tions are reported to increase incrementally from \$29.3 billion in FY 2011 to a projected \$32.5 billion in FY 2014 (table 1).

### Basic Research at Universities and Colleges, by Agency

In FY 2012, five federal departments and agencies provided \$15.4 billion (98.3%) of all federal basic research obligations to universities and colleges: the Department of Health and Human Services (HHS) obligated \$9.2 billion (58.6%) of this basic research total. NSF obligated \$3.8 billion (24.0%), the Department of Defense (DOD) \$1.2 billion (7.6%), the Department of Energy (DOE) \$0.7 billion (4.5%), and the National Aeronautics and Space Administration (NASA) \$0.6 billion (3.7%) (table 2).

In FY 2012, 85.0% of HHS obligations for basic research at universities and colleges were in support of the life sciences. HHS provided almost all of the support for psychology-related basic research (92.4%). NSF's obligations for academic basic research were more evenly spread across computer sciences and mathematics (22.3%), engineering (15.9%), environmental sciences

(14.1%), life sciences (16.5%), and physical sciences (19.7%), reflecting NSF's role in supporting a wide mix of research disciplines. NSF was also the largest funder of basic research in the social sciences. DOD's obligations for academic basic research were primarily in three broad fields: engineering (32.2%), physical sciences (21.9%), and computer sciences and mathematics (19.7%). DOE's support was largely in the physical sciences (62.9%). NASA primarily supported physical sciences (39.4%) and environmental sciences (28.4%) (table 2).

### Basic Research at Universities and Colleges, by Field of Science and Engineering

In FY 2012, three of the eight broad fields of science and engineering received 77.7% of total federal basic research dollars obligated to universities and colleges: life sciences (56.9% of total basic research obligations to universities), physical sciences (11.2%), and engineering (9.6%) (table 2).

Three broad fields of science in basic research performed at universities and colleges declined between FY 2011 and FY 2012. Computer sciences and math-

TABLE 1. Federal obligations for research and development and R&D plant, by character of work and basic research performer: FYs 2011–14  
(Dollars in millions)

Character of work	2011	2012	2013 preliminary	2014 projected
All R&D and R&D plant	139,662	140,636	134,546	134,042
R&D	135,491	138,485	132,436	130,847
Research	58,024	61,947	61,617	64,199
Basic research	29,314	30,959	31,191	32,541
Performer				
Intramural <sup>a</sup>	4,870	5,579	6,002	5,791
Industry	1,727	2,155	2,134	2,490
FFRDCs	3,595	4,081	4,001	4,358
Universities and colleges	15,771	15,730	15,565	16,324
Other nonprofits	3,067	3,123	3,214	3,300
State and local governments	76	80	81	83
Foreign	209	210	194	195
Applied research	28,710	30,988	30,426	31,658
Development	77,467	76,538	70,819	66,647
R&D plant	4,171	2,151	2,111	3,196

FFRDCs = federally funded research and development centers.

<sup>a</sup> Intramural activities cover costs associated with the administration of intramural and extramural programs by federal personnel as well as actual intramural performance.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development.

ematics decreased \$75 million (6.1%), life sciences decreased \$55 million (0.6%), and other sciences not elsewhere classified (*nec*) decreased \$160 million (26.0%). Between FY 2012 and FY 2013, five of the eight broad fields of science are estimated to decrease by a combined \$225 million. The other three fields—life sciences, psychology, and the social sciences—are estimated to increase a combined \$79 million. In FY 2014, all eight of the broad fields of sciences are projected to increase, with the physical sciences showing the largest dollar increase at \$156 million (9.6%) (table 2).

In FY 2012, the majority of life science funding was obligated within the subfields of biological sciences (\$4.9

billion), which decreased 2.9%, and medical sciences (\$2.9 billion), which increased 1.5%. The physical sciences increased by \$102.3 million in FY 2012, with astronomy experiencing the largest percentage growth of the physical science subfields, rising 38.9% (\$61.9 million). Engineering increased by 3.9% (\$56.7 million) in FY 2012 (table 3).

### Data Notes

The data presented here are from the NSF Survey of Federal Funds for Research and Development for FYs 2012–14. The 27 federal agencies that report R&D obligations to the survey submitted actual obligations for FY 2012, preliminary data for FY 2013, and projected data for FY 2014. Data were requested from agencies begin-

ning in February 2013. Agencies later revise the preliminary data based on actual changes in the funding levels of R&D programs. Further, agencies may provide changes in prior-year data to reflect program reclassifications or other data corrections.

### Definitions

*Obligations* represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required.

*Basic research* is defined as systematic study directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

*Other sciences nec* is used for multidisciplinary or interdisciplinary projects that cannot be classified within one of the broad fields of science.

### Data availability

The full set of detailed tables from this survey will be available in the report *Federal Funds for Research and Development: Fiscal Years 2012–14* (<http://www.nsf.gov/statistics/fedfunds/>). Individual detailed tables from the FY 2012–14 survey may be available in advance of the full report. For more information, please contact the author.

### Note

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TABLE 2. Federal obligations for basic research performed at universities and colleges, by selected agency and broad field of science and engineering: FYs 2011–14

(Dollars in millions)

Agency	Total	Computer sciences	Environmental	Life	Physical	Psychology	Social	Other	
		and mathematics	Engineering	sciences	sciences	sciences	sciences	sciences nec	
All agencies surveyed									
2011	15,720	1,237	1,455	896	8,972	1,652	646	245	617
2012	15,674	1,162	1,511	930	8,917	1,754	688	255	457
2013 (preliminary)	15,528	1,143	1,498	922	8,987	1,620	690	262	406
2014 (projected)	16,279	1,265	1,610	1,016	9,099	1,776	707	279	527
Department of Health and Human Services									
2011	9,439	67	387	117	7,832	89	606	55	284
2012	9,181	42	374	99	7,808	75	636	46	101
2013 (preliminary)	9,247	43	376	98	7,867	76	641	46	101
2014 (projected)	9,296	43	378	99	7,909	76	644	46	101
National Science Foundation									
2011	3,797	936	582	539	619	729	27	135	231
2012	3,759	838	599	530	620	742	31	160	239
2013 (preliminary)	3,822	852	609	539	631	755	31	163	243
2014 (projected)	4,128	920	658	582	681	815	34	176	263
Department of Defense									
2011	1,084	181	383	87	121	261	12	27	11
2012	1,188	234	383	91	160	260	19	21	20
2013 (preliminary)	1,027	218	358	94	133	172	17	19	16
2014 (projected)	1,228	256	401	105	137	262	28	23	16
Department of Energy									
2011	725	44	26	50	111	438	0	0	56
2012	699	35	28	37	109	440	0	0	51
2013 (preliminary)	535	18	23	24	85	386	0	0	0
2014 (projected)	678	33	31	44	107	365	0	0	98
National Aeronautics and Space Administration									
2011	314	3	58	89	14	124	1	*	25
2012	578	6	107	164	26	228	1	*	47
2013 (preliminary)	557	6	103	158	25	219	1	*	45
2014 (projected)	623	6	115	177	28	245	1	*	50
Other agencies									
2011	360	7	18	13	273	11	*	27	10
2012	269	7	22	10	194	9	0	27	0
2013 (preliminary)	340	8	29	9	247	13	0	34	0
2014 (projected)	326	7	27	9	237	13	0	33	0

\* = value less than \$500,000 in obligations.

nec = not elsewhere classified.

NOTES: Because of rounding, detail may not add to total. Seven agencies are required to report data for this section of the survey: the Departments of Agriculture (USDA), Defense, Energy, Health and Human Services, and Homeland Security (DHS); the National Aeronautics and Space Administration; and the National Science Foundation. Basic research obligations of these seven agencies represented over 99% of total federal basic research obligations to universities and colleges in FYs 2011–14. Other agencies includes USDA and DHS.

TABLE 3. Federal obligations for basic research performed at universities and colleges for selected agencies, by detailed field of science and engineering: FYs 2011–12  
(Dollars in thousands)

Field	2011	2012	% change 2011–12
All fields	15,720,039	15,674,387	-0.3
Computer sciences and mathematics	1,237,479	1,161,711	-6.1
Computer sciences	817,428	732,706	-10.4
Mathematics	381,245	374,883	-1.7
Other computer sciences and mathematics	38,806	54,121	39.5
Engineering <sup>a</sup>	1,454,762	1,511,438	3.9
Aeronautical engineering	77,611	127,513	64.3
Astronautical engineering	8,812	18,356	108.3
Chemical engineering	134,663	67,118	-50.2
Civil engineering	137,507	28,618	-79.2
Electrical engineering	189,505	180,352	-4.8
Mechanical engineering	51,542	123,490	139.6
Metallurgy and materials engineering	231,465	293,540	26.8
Other engineering	623,656	672,452	7.8
Environmental sciences	895,653	930,465	3.9
Atmospheric sciences	223,772	263,037	17.5
Geological sciences	187,597	200,888	7.1
Oceanography	317,876	305,397	-3.9
Other environmental sciences	166,407	161,143	-3.2
Life sciences	8,971,552	8,917,042	-0.6
Agricultural sciences	120,537	73,402	-39.1
Biological sciences (excluding environmental biology)	5,053,423	4,905,789	-2.9
Environmental biology	221,597	202,364	-8.7
Medical sciences	2,881,627	2,925,030	1.5
Other life sciences	694,367	810,456	16.7
Physical sciences	1,652,075	1,754,342	6.2
Astronomy	159,360	221,277	38.9
Chemistry	498,657	485,586	-2.6
Physics	791,465	834,561	5.4
Other physical sciences	202,593	212,918	5.1
Psychology	646,026	687,546	6.4
Biological aspects	9,173	11,500	25.4
Social aspects	7,616	8,514	11.8
Other psychological sciences	629,237	667,531	6.1
Social sciences	245,281	254,990	4.0
Anthropology	19,469	18,867	-3.1
Economics	31,518	29,586	-6.1
Political science	9,114	9,831	7.9
Sociology	13,636	21,968	61.1
Other social sciences	171,544	174,738	1.9
Other sciences nec	617,213	456,856	-26.0

nec = not elsewhere classified.

<sup>a</sup> For the FY 2012 survey, the National Science Foundation's Directorate for Engineering updated its data mapping to improve the accuracy of their reporting.

NOTES: Because of rounding, detail may not add to total. Seven agencies are required to report data for this section of the survey: the Departments of Agriculture, Defense, Energy, Health and Human Services, and Homeland Security; the National Aeronautics and Space Administration; and the National Science Foundation. Basic research obligations of these seven agencies represented over 99% of total federal basic research obligations to universities and colleges in FYs 2011–12.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development.



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