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# Federal Science and Engineering Obligations to Academic Institutions Reach \$31.6 Billion in FY 2016; Support to HBCUs Declines for the Second Year in a Row

by Christopher Pece<sup>1</sup>

In FY 2016, federal agencies obligated \$31.6 billion to institutions of higher education in support of science and engineering (S&E), up from the \$30.5 billion obligated in FY 2015. Funding for research and development to universities and colleges accounted for 90% of the total federal S&E support to higher education institutions. However, the R&D share of total federal S&E to minority-serving institutions is lower than the national average. For example, historically black colleges and universities (HBCUs) have an R&D share of 69% and high-Hispanic-enrollment (HHE)

institutions have a share of 87%. These and other estimates in this InfoBrief are from the FY 2016 Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions (Federal S&E Support Survey), conducted by the National Center for Science and Engineering Statistics within the National Science Foundation (NSF).

## National Summary

Federal S&E support includes six categories: R&D; R&D plant; facilities and equipment for instruction in S&E; fellowships, traineeships, and training

grants (FTTG); general support for S&E; and other S&E activities (table 1). The 100 higher education institutions receiving the largest amounts of federal S&E support accounted for about 82% of the federal total. In FY 2016, Johns Hopkins University received the most with nearly \$1.9 billion in total federal obligations for S&E support, followed by the University of Michigan and the University of Washington, at \$668 million and \$642 million, respectively. Among the academic institutions, the top 10 recipients received a total of \$7.1 billion in S&E obligations during FY 2016.

TABLE 1. Federal academic science and engineering obligations, by type of activity: FYs 2012–16  
(Millions of current dollars)

Fiscal year	All federal obligations	Research and development	R&D plant	Facilities and equipment for instruction in S&E	Fellowships, traineeships, and training grants	General support for S&E	Other S&E activities
2012	31,193	27,680	434	4	914	142	2,018
2013	29,387	26,138	271	4	894	132	1,948
2014	31,140	27,634	400	11	1,341	138	1,616
2015	30,546	27,089	371	4	1,347	138	1,597
2016	31,622	28,507	370	4	1,374	128	1,239

S&E = science and engineering.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions.

Five federal agencies accounted for 94% of all S&E support to higher education institutions in FY 2016: the Department of Health and Human Services (HHS) (57%), NSF (17%), the Department of Defense (DOD) (12%), the Department of Agriculture (USDA) (4%), and the National Aeronautics and Space Administration (NASA) (4%). These five agencies also accounted for most of the federal R&D obligations to the academic sector: HHS (61%), NSF (16%), DOD (11%), NASA (4%), and the Department of Energy (DOE) (3%).

## S&E Obligations to Minority-Serving Institutions

Minority-serving institutions tend to receive a lower share of S&E support for R&D, compared with all other institutions of higher education. Summary information is provided here for several types of minority-serving institutions: HBCUs, HHE institutions, tribal

colleges and universities, and high-American Indian-enrollment (HAIE) institutions.

### ***Historically Black Colleges and Universities***

Sixty-six of the 105 HBCUs<sup>2</sup> received federal obligations for S&E support, which totaled \$373 million (table 2). This is the second year of decreasing obligations to HBCUs, down 6% from FY 2015 obligations of \$397 million and a decrease of 9% from FY 2014 obligations of \$408 million. Although HBCUs have seen declines in total federal S&E support in recent years, support for R&D has remained stable. In FY 2016, R&D support was \$258 million, a 0.5% increase from the \$257 million obligated in FY 2015. In FY 2016, R&D accounted for 69% of total S&E support to HBCUs, while FTTG and other S&E activities accounted for 15% and 14%, respectively (table 3).

In FY 2016, four federal agencies accounted for nearly 95% of all federal obligations for S&E support to HBCUs. USDA provided the most in S&E support with \$124 million, or 33% of all federal obligations. HHS followed with \$114 million in S&E support, or 31% of the federal total. NSF and DOD obligations accounted for 25% and 5%, respectively, of all federal S&E obligations to HBCUs. In terms of R&D support, HHS leads all agencies with 38% of total R&D to HBCUs (\$98 million), followed by USDA (\$71 million, or 27%), NSF (\$53 million, or 21%), DOD (\$20 million, or 8%), DOE (\$6 million, or 2%), and NASA (\$5 million, or 2%).

North Carolina Agricultural and Technical State University was the leading recipient of federal obligations for S&E support in FY 2016 with \$26 million, \$17 million of which was for R&D and was supported by DOD, HHS, NSF,

TABLE 2. Federal obligations for science and engineering to historically black colleges and universities, ranked by total amount received, by agency: FY 2016  
(Thousands of dollars)

Institution	All agencies	DOD	DOE	HHS	NASA	NSF	USDA	Other agencies <sup>a</sup>
All HBCUs	372,978.3	19,956.3	5,824.2	114,379.1	5,258.2	94,604.2	123,857.6	9,098.7
North Carolina Agricultural and Technical State U.	26,085.7	2,309.4	0.0	1,625.8	0.0	11,551.5	8,665.5	1,933.5
Morehouse School of Medicine	24,542.8	0.0	0.0	24,542.8	0.0	0.0	0.0	0.0
Jackson State U.	23,346.6	2,787.1	0.0	5,549.8	0.0	14,809.6	0.0	200.0
Meharry Medical C.	18,060.6	0.0	0.0	18,060.6	0.0	0.0	0.0	0.0
Howard U.	17,137.0	1,281.4	0.0	11,991.4	9.0	3,605.1	0.0	250.0
Florida A&M U.	16,704.0	970.7	303.3	5,939.7	0.0	3,052.5	5,853.1	584.7
Hampton U.	15,886.6	1,716.9	719.0	5,136.5	4,193.5	3,880.7	0.0	240.0
Tuskegee U.	14,313.5	0.0	0.0	2,490.0	0.0	3,005.7	8,817.7	0.0
Tennessee State U.	13,123.5	329.0	0.0	1,264.2	0.0	3,677.9	7,852.4	0.0
Prairie View A&M U.	12,900.0	498.8	0.0	0.0	160.0	928.5	11,115.7	197.0
All other HBCUs	190,877.9	10,062.8	4,801.9	37,778.3	895.6	50,092.6	81,553.1	5,512.5

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

<sup>a</sup> Other includes obligations from the following agencies: Department of Homeland Security, Department of Commerce, Department of the Interior, Department of Transportation, Department of Education, Environmental Protection Agency, and the Social Security Administration.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2016.

TABLE 3. Federal obligations for science and engineering to historically black colleges and universities, ranked by total amount received, by type of activity: FY 2016  
(Thousands of dollars)

Institution	All federal obligations	R&D	R&D plant	Facilities for instruction in S&E	Fellowships, traineeships, and training grants	General support for S&E	Other S&E activities
All HBCUs	372,978.3	257,894.2	2,209.8	0.0	56,528.7	5,165.9	51,179.6
North Carolina Agricultural and Technical State U.	26,085.7	17,317.6	0.0	0.0	3,671.1	28.9	5,068.1
Morehouse School of Medicine	24,542.8	24,542.8	0.0	0.0	0.0	0.0	0.0
Jackson State U.	23,346.6	19,316.2	0.0	0.0	4,030.4	0.0	0.0
Meharry Medical C.	18,060.6	11,121.7	0.0	0.0	1,644.3	5,000.0	294.6
Howard U.	17,137.0	13,826.6	0.0	0.0	3,176.2	0.0	134.2
Florida A&M U.	16,704.0	11,836.4	0.0	0.0	2,955.2	20.0	1,892.4
Hampton U.	15,886.6	13,418.7	0.0	0.0	2,442.9	25.0	0.0
Tuskegee U.	14,313.5	9,278.8	138.0	0.0	847.0	0.0	4,049.7
Tennessee State U.	13,123.5	9,164.3	0.0	0.0	946.1	0.0	3,013.0
Prairie View A&M U.	12,900.0	8,279.0	0.0	0.0	158.9	0.0	4,462.1
All other HBCUs	190,877.9	119,792.2	2,071.8	0.0	36,656.9	92.0	32,265.7

HBCUs = historically black colleges and universities; S&E = science and engineering.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2016.

USDA, and other agencies. Morehouse School of Medicine was the second-leading recipient of federal obligations for S&E support with \$25 million, all of which was slated for R&D. Morehouse was also the leading recipient of federal obligations for R&D, all of which was provided by HHS. The top 10 HBCU recipients of federal obligations for R&D received \$138 million, or about 54% of the total R&D support to all HBCUs in FY 2016 (table 3).

### **High-Hispanic Enrollment Institutions**

In FY 2016, HHE institutions<sup>3</sup> received \$1.7 billion in federal obligations for S&E. Support for R&D accounted for \$1.5 billion, or 87% of the total S&E obligations. FTTG and other S&E activities accounted for 8% and 3%, respectively, of federal S&E support. R&D plant and general support for S&E accounted for 1% each of the S&E total (table 4). The majority (55%) of the FY 2016 S&E support for HHE institutions came from HHS with nearly \$941 million in obligations. NSF was

the second-leading federal agency with \$390 million, or 23% of all S&E obligations to HHE academic institutions. DOD accounted for 9% (\$158 million), followed by NASA at 4% (\$66 million), DOE at 3% (\$56 million), and USDA at 3% (\$55 million).

The top 10 HHE recipients of federal S&E support received a total of \$1.2 billion, or 68% of the total support to all 134 recipient institutions. The same top 10 HHEs also accounted for \$1.1 billion in support for R&D, or 71% of total HHE R&D obligations. The University of Arizona was the leading recipient among HHEs of federal obligations for support of S&E and the leading recipient of federal obligations for R&D, which accounted for 88% of their S&E support.

### **Tribal Colleges and Universities**

Federal S&E support to 33 tribal colleges and universities<sup>4</sup> in FY 2016 totaled \$55 million, \$40 million (72%) of which was for R&D, \$11 million (20%) for FTTG, and \$4 million (8%) for other S&E

activities (table 5). FY 2016 showed a decrease of 8% from the \$60 million in FY 2015 obligations for S&E.

The Department of Education was the leading contributor of S&E support to tribal colleges and universities in FY 2016 with \$33 million in obligations, followed by the USDA with \$13 million and NSF with \$8 million. HHS and DOD combined totaled just over \$1 million.

### **High-American Indian Enrollment Institutions**

The nine HAIE institutions<sup>5</sup> were obligated \$75 million in federal funds for S&E support. NSF was the largest contributor with \$28 million, followed by NASA at \$16 million, HHS at \$12 million, and USDA with \$6 million.

The University Alaska, Fairbanks is the largest recipient of federal obligations with \$69 million in support for S&E. All other HAIE institutions combined were obligated \$5.9 million in S&E support.

About 88% of total S&E support to HAIE institutions was for R&D,

TABLE 4. Federal obligations for science and engineering to high-Hispanic-enrollment institutions, ranked by total amount received, by type of activity: FY 2016  
(Thousands of dollars)

Institution	All federal obligations	R&D	R&D plant	Facilities for instruction in S&E	Fellowships, traineeships, and training grants	General support for S&E	Other S&E activities
All HHE institutions	1,717,684.0	1,497,897.4	14,501.4	0.0	134,228.0	11,386.5	59,670.6
U. Arizona	211,508.3	185,962.2	2,384.9	0.0	11,024.8	392.6	11,743.8
U. California, Irvine	181,119.1	167,845.9	17.9	0.0	10,764.1	1,631.5	859.8
U. Illinois, Chicago	145,694.7	133,213.6	1,567.3	0.0	6,603.2	0.0	4,310.6
U. Texas M. D. Anderson Cancer Center	129,867.7	119,082.5	0.0	0.0	2,192.6	0.0	8,592.6
U. New Mexico	108,549.4	99,833.6	235.1	0.0	5,720.9	1,894.4	865.3
U. California, Santa Barbara	100,127.8	95,388.1	1,153.6	0.0	1,331.1	600.0	1,655.0
U. Texas Health Science Center, Houston <sup>a</sup>	86,983.1	84,256.3	0.0	0.0	2,550.2	0.0	176.6
U. California, Santa Cruz	72,393.5	68,812.1	413.0	0.0	2,870.0	0.0	298.3
U. California, Riverside	64,250.5	58,602.5	465.7	0.0	4,768.3	178.0	236.0
U. Texas Health Science Center, San Antonio	61,935.7	56,273.9	0.0	0.0	3,628.2	600.0	1,433.6
All other HHE institutions	555,254.7	428,627.4	8,264.0	0.0	82,774.5	6,090.1	29,499.1

HHE = high Hispanic enrollment; S&E = science and engineering.

<sup>a</sup> Excludes obligations for the University of Texas Health Science Center at Houston's School of Dentistry.

NOTES: Detail may not add to total because of rounding. This list of HHE institutions includes those institutions of higher education whose full-time equivalent (FTE) enrollment of undergraduate students is at least 25% Hispanic, according to fall 2016 enrollment data self-reported by the institutions in the Integrated Postsecondary Education Data System survey conducted by the National Center for Education Statistics (NCES). NCES determined FTE enrollment by calculating that approximately three part-time students are equivalent to one full-time student.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2016.

while other S&E activities and FTTG constituted 6% and 5%, respectively, of total S&E support (table 6).

## Data Sources and Limitations

Data presented here were obtained from the 19 agencies (12 federal departments and 7 independent agencies) that made S&E obligations to academic and nonprofit institutions in FY 2016, as reported to the Federal S&E Support Survey. The survey collects federal S&E support data by funding agency, institution, type of activity, type of institution, and geographic location.

The six funding categories of federal S&E support are defined as:

- *Research and development* includes all direct, indirect, incidental, or related costs resulting from or necessary to perform R&D by private indi-

viduals and organizations under grant, contract, or cooperative agreement.

- *R&D plant* includes all projects whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or fixed equipment for use in scientific or engineering R&D.
- *Facilities and equipment for S&E instruction* includes all programs whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in instruction in S&E.
- *Fellowships, traineeships, and training grants* includes all fellowship, traineeship, and training grant programs that are directed primarily toward the development and maintenance of the scientific workforce.
- *General support for S&E* includes funds used for scientific projects and support for activities within a specified discipline; explicit purpose is not specified.
- *Other S&E activities* includes all academic S&E obligations that cannot be assigned elsewhere and activities in support of technical conferences, teacher institutes, and programs aimed at increasing precollege and undergraduate students' scientific knowledge.

The full set of detailed statistical tables on the FY 2016 Federal S&E Support Survey will be available online at <https://www.nsf.gov/statistics/srvyfedsupport/>. Individual tables may be available in advance of the full report. For more information, please contact the author.

TABLE 5. Federal obligations for science and engineering to tribal colleges and universities, ranked by total amount received, by type of activity: FY 2016  
(Thousands of dollars)

Institution	All federal obligations	R&D	Facilities for instruction in S&E	Fellowships, traineeships, and training grants	General support for S&E	Other S&E activities
All tribal colleges and universities	55,269.5	39,781.8	0.0	0.0	11,282.4	0.0
Salish Kootenai C.	3,856.2	2,572.8	0.0	0.0	1,102.4	0.0
Navajo Technical U.	3,713.2	2,873.2	0.0	0.0	741.0	0.0
Oglala Lakota C.	3,250.4	2,391.2	0.0	0.0	760.2	0.0
Dine C.	2,738.0	2,132.8	0.0	0.0	421.2	0.0
Sitting Bull C.	2,659.8	1,722.2	0.0	0.0	753.6	0.0
Turtle Mountain Community C.	2,407.7	1,787.2	0.0	0.0	521.5	0.0
Northwest Indian C.	2,396.2	1,852.9	0.0	0.0	277.3	0.0
C. of Menominee Nation	2,366.3	1,683.9	0.0	0.0	452.1	0.0
Nueta Hidatsa Sahnish C.	2,364.6	1,496.7	0.0	0.0	683.9	0.0
United Tribes Technical C.	1,972.9	1,443.1	0.0	0.0	348.8	0.0
Haskell Indian Nations U.	1,937.8	1,492.3	0.0	0.0	346.5	0.0
Sinte Gleska U.	1,785.2	1,411.2	0.0	0.0	275.0	0.0
Cankdeska Cikana Community C.	1,751.3	1,218.8	0.0	0.0	433.5	0.0
Stone Child C.	1,717.7	1,311.2	0.0	0.0	225.5	0.0
Fort Peck Community C.	1,659.9	1,259.5	0.0	0.0	216.4	0.0
Blackfeet Community C.	1,649.8	1,294.2	0.0	0.0	256.6	0.0
Aaniih Nakoda C.	1,542.7	1,164.6	0.0	0.0	194.1	0.0
Institute of American Indian Arts	1,515.0	1,204.6	0.0	0.0	211.3	0.0
Southwestern Indian Polytechnic Institute	1,395.1	1,013.4	0.0	0.0	282.7	0.0
Illisagvik C.	1,298.1	944.9	0.0	0.0	169.2	0.0
Sisseton Wahpeton C.	1,199.4	664.2	0.0	0.0	436.2	0.0
Fond du Lac Tribal and Community C.	1,107.8	814.9	0.0	0.0	193.9	0.0
Keweenaw Bay Ojibwa Community C.	1,010.5	841.9	0.0	0.0	168.6	0.0
Leech Lake Tribal C.	1,002.5	689.8	0.0	0.0	213.7	0.0
Lac Courte Oreilles Ojibwa Community C.	988.5	600.1	0.0	0.0	207.5	0.0
Little Big Horn C.	981.0	670.6	0.0	0.0	211.3	0.0
Bay Mills Community C.	932.2	627.4	0.0	0.0	205.7	0.0
Chief Dull Knife C.	907.9	602.2	0.0	0.0	206.7	0.0
Nebraska Indian Community C.	774.2	500.0	0.0	0.0	175.2	0.0
White Earth Tribal and Community C.	762.0	500.0	0.0	0.0	163.0	0.0
Little Priest Tribal C.	674.4	500.0	0.0	0.0	174.4	0.0
Saginaw Chippewa Tribal C.	669.2	500.0	0.0	0.0	70.2	0.0
Tohono O'odham Community C.	282.1	0.0	0.0	0.0	183.1	0.0

S&E = science and engineering.

NOTES: Detail may not add to total because of rounding. The list of tribal colleges and universities is from the White House Initiative on American Indian and Alaska Native Education (see <https://sites.ed.gov/whiaiane/tribes-tcus/tribal-colleges-and-universities/>). In accordance with Executive Order No. 13270, "Tribal Colleges and Universities," as extended by Executive Order No. 13316, the list includes all of the colleges cited in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (7 U.S.C. 301 note), any other institution that qualifies for funding under the Tribally Controlled Community College Assistance Act of 1978 (25 U.S.C. 1801 et seq.), and Diné College, which is authorized in the Navajo Community College Assistance Act of 1978, Public Law 95-471, title II (25 U.S.C. 640a note). The statutory definition of American Indian tribally controlled colleges and universities, to which the Higher Education Act refers at §316(b)(3), 20 U.S.C. 1059c(b)(3), is in section 2(a)(4) of the Tribally Controlled College and University Assistance Act of 1978, 25 U.S.C. 1801(a)(4).

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2016.

TABLE 6. Federal obligations for science and engineering to high-American Indian-enrollment institutions, ranked by total amount received, by type of activity: FY 2016  
(Thousands of dollars)

Institution	All federal obligations	R&D	R&D plant	Facilities for instruction in S&E	Fellowships, traineeships, and training grants	General support for S&E	Other S&E activities
All HAIE institutions	75,122.4	66,066.7	723.7	0.0	3,621.6	55.2	4,655.2
U. Alaska, Fairbanks, Fairbanks Campus	69,185.8	61,883.0	581.7	0.0	3,021.3	55.2	3,644.6
U. Alaska, Southeast, Juneau	4,489.9	3,084.6	142.0	0.0	252.6	0.0	1,010.6
Northern New Mexico C.	599.8	575.8	0.0	0.0	24.0	0.0	0.0
Fort Lewis C.	258.7	135.0	0.0	0.0	123.7	0.0	0.0
East Central U.	253.4	53.4	0.0	0.0	200.0	0.0	0.0
Redlands Community C.	137.2	137.2	0.0	0.0	0.0	0.0	0.0
U. North Carolina, Pembroke	122.7	122.7	0.0	0.0	0.0	0.0	0.0
Northeastern State U.	64.5	64.5	0.0	0.0	0.0	0.0	0.0
Alaska Pacific U.	10.4	10.4	0.0	0.0	0.0	0.0	0.0

HAIE = high American Indian enrollment; S&E = science and engineering.

NOTES: Detail may not add to total because of rounding. This list of HAIE institutions includes those institutions of higher education that are not tribal colleges or universities and that have an enrollment of undergraduate students that is not less than 10% Native American students, according to fall 2016 enrollment data self-reported by the institutions in the Integrated Postsecondary Education Data System survey conducted by the National Center for Education Statistics.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2016.

## Notes

1. Christopher Pece, Research and Development Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 2415 Eisenhower Avenue, Suite W14200, Alexandria, VA 22314 (cpece@nsf.gov; 703-292-7788).

2. The Higher Education Act of 1965, as amended, defines a HBCU as “any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary (of Education) to be a reliable authority as to the quality of training offered or is, according to such an agency or association, making reasonable progress toward accreditation.”

3. HHE institutions are those whose full-time equivalent (FTE) enrollment

of undergraduate students is at least 25% Hispanic, according to fall 2016 enrollment data self-reported by the institutions in the Integrated Postsecondary Education Data System survey conducted by the National Center for Education Statistics (NCES). NCES determined FTE enrollment by calculating that approximately three part-time students are equivalent to one full-time student.

4. The list of tribal colleges and universities is from the White House Initiative on American Indian and Alaska Native Education (see <https://sites.ed.gov/whiaiane/tribes-tcus/tribal-colleges-and-universities/>). In accordance with Executive Order No. 13270, “Tribal Colleges and Universities,” as extended by Executive Order No. 13316, the list includes all of the colleges cited in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (7 U.S.C. 301 note), any other institution that qualifies for funding under the

Tribally Controlled Community College Assistance Act of 1978 (25 U.S.C. 1801 et seq.), and Diné College, which is authorized in the Navajo Community College Assistance Act of 1978, Public Law 95-471, title II (25 U.S.C. 640a note). The statutory definition of American Indian tribally controlled colleges and universities, to which the Higher Education Act refers at §316(b)(3), 20 U.S.C. 1059c(b)(3), is in section 2(a)(4) of the Tribally Controlled College and University Assistance Act of 1978, 25 U.S.C. 1801(a)(4).

5. This list of HAIE institutions includes those institutions of higher education that are not tribal colleges or universities and that have an enrollment of undergraduate students that is not less than 10% Native American students, according to fall 2016 enrollment data self-reported by the institutions in the Integrated Postsecondary Education Data System survey conducted by NCES.