



## Research Space at Academic Institutions Increased 3.5% Between FY 2009 and FY 2011: Biomedical Fields Account for Most Growth

by Michael Gibbons<sup>1</sup>

**S**cience and engineering (S&E) research space at the nation's research-performing colleges and universities increased 3.5% from FY 2009 to FY 2011, according to the National Science Foundation's (NSF)

Survey of Science and Engineering Research Facilities. The biological and biomedical sciences continued to account for the bulk of growth, increasing by 8.0% during this period (table 1). This follows a 12.3% increase

for this field from FY 2007 to FY 2009. In 2011, the biological and biomedical sciences accounted for 26.8% of research space, measured as total net assignable square feet (NASF). This was three percentage points higher than the share from FY 2007.

TABLE 1. Science and engineering research space in academic institutions, by field: FYs 2007–11 (Net assignable square feet in millions)

Field	FY 2007	FY 2009	FY 2011
All research space	187.9	196.1	202.9
Agricultural and natural resources sciences	27.9	29.5	27.6
Biological and biomedical sciences	44.8	50.3	54.3
Computer and information sciences	4.8	5.2	5.0
Engineering	28.4	30.2	31.7
Health and clinical sciences	37.0	36.3	36.7
Mathematics and statistics	1.6	1.5	1.6
Physical sciences	28.7	28.5	29.6
Earth, atmospheric, and ocean sciences	8.4	8.0	7.8
Astronomy, chemistry, and physics	20.3	20.5	21.8
Psychology	4.9	5.2	5.5
Social sciences	6.0	5.5	5.7
Other	3.7	3.9	5.2
Research animal space	17.8	18.1	18.5

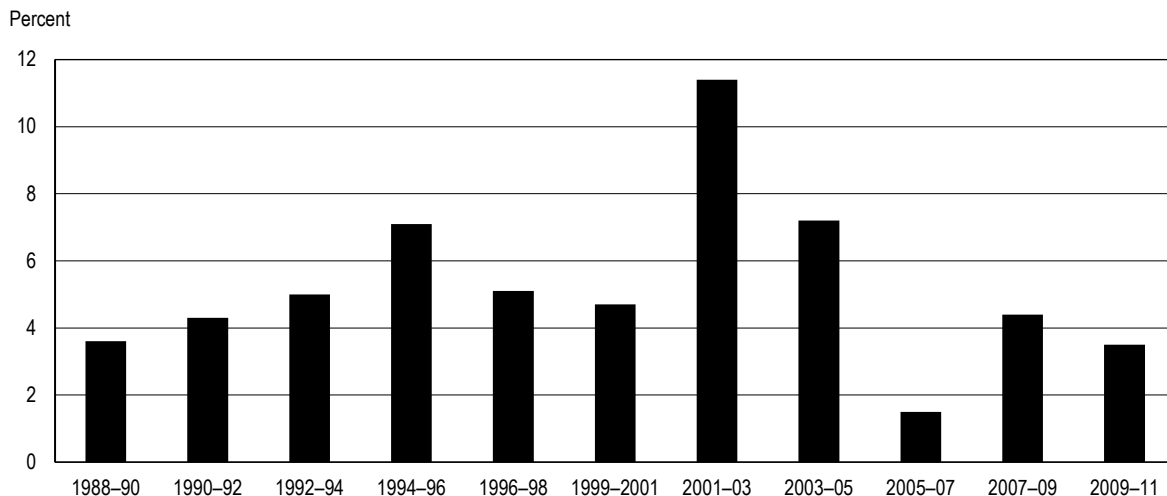
NOTES: Details may not add to totals due to rounding. Research animal space is listed separately and is also included in individual field totals.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

Total S&E research space grew from 196.1 million NASF to 202.9 million NASF during the last biennial period. However, the 3.5% increase is less than the median growth (4.7%) for the 11 biennial survey cycles from FY 1988 to FY 2011 (figure 1). All institution types experienced net growth in research space except nondoctorate granting institutions, in which research space declined 1.2% (table 2).

The psychology (5.8%) and engineering (5.0%) fields gained research space, whereas NASF devoted to the agricultural and natural sciences declined 6.4%, falling slightly below 2007 levels. Although research space for the physical sciences increased by 3.9% from FY 2009 to FY 2011, this growth was not distributed across all

FIGURE 1. Change in science and engineering research space in academic institutions, by 2-year period: FYs 1988–2011



NOTES: Space measured in net assignable square feet. The biennial survey cycle ran on even years from 1988 to 1998 and on odd years from 1999 to 2011.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

TABLE 2. Science and engineering research space, by type of institution: FYs 2003–11  
(Net assignable square feet in millions)

Type of institution	FY 2003	FY 2005	FY 2007	FY 2009	FY 2011
All institutions	172.7	185.1	187.9	196.1	202.9
Doctorate granting	164.2	177.0	180.4	187.8	194.6
Nondoctorate granting	8.5	8.1	7.5	8.3	8.2
Public	131.1	138.5	140.3	146.0	149.6
Private	41.6	46.6	47.6	50.1	53.3
Medical schools	37.1	40.1	43.8	44.3	48.3

NOTE: Details may not add to totals due to rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

subfields. NASF for earth, atmospheric, and ocean sciences declined by 2.5%, whereas NASF for astronomy, chemistry, and physics increased by 6.3%.

### New Construction of Research Space

New construction of S&E research space begun in FYs 2010–11 declined by 18.2% from that begun in FYs 2008–09 and is 50% lower than NASF constructed in FYs 2002–03

(table 3). Construction projects for the biological and biomedical sciences accounted for 2.0 million NASF in FYs 2010–11, a decline of 1.5 million NASF from the previous biennial cycle. As a result of a few large projects, the health and clinical sciences accounted for 2.8 million NASF in new construction—the most in any field (table 4). Institutions also reported 1.3 million NASF in new engineering research space projects.

Combined, these three fields made up 75.3% of all new construction NASF.

### New Construction Funding Sources

Thirty percent of the nation’s research-performing colleges and universities (167 institutions) reported new construction of S&E research space in FYs 2010–11 at a total cost of \$6.4 billion (table 5). This was about \$1 billion less than the estimated cost of new research space construction begun in FYs 2008–09, in current dollars. The federal government provided 7.6% (\$487 million) for the total cost for new S&E research space in FYs 2010–11. The federal share was the highest since FYs 2004–05. State and local governments provided another 30.5%, or just under \$2 billion. Almost 62% of the funding (nearly \$4 billion) for new S&E research space came from the institutions’ own funds and other sources.

### Planned New Construction

The amount of new research space construction actually started by

TABLE 3. New construction of science and engineering research space and medical school research space: FYs 2004–11

(Net assignable square feet in millions)

Type of NASF	FYs 2002–03	FYs 2004–05	FYs 2006–07	FYs 2008–09	FYs 2010–11
All institutions	16.2	10.1	8.8	9.9	8.1
Medical schools	5.1	2.7	2.5	2.5	2.3

NASF = net assignable square feet.

NOTE: Fiscal years are for the year new construction began.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

TABLE 4. New construction of science and engineering research space in academic institutions, by field: FYs 2010–13

(Net assignable square feet in millions)

Field	Started in FY 2010 or FY 2011		Planned to start in FY 2012 or FY 2013	
	Number of institutions	Total NASF	Number of institutions	Total NASF
All research space	167	8.1	128	8.4
Agricultural and natural resources sciences	30	0.4	24	0.6
Biological and biomedical sciences	69	2.0	51	1.8
Computer and information sciences	16	0.1	16	0.3
Engineering	54	1.3	46	1.8
Health and clinical sciences	40	2.8	37	2.2
Mathematics and statistics	5	*	2	*
Physical sciences	47	0.9	28	1.4
Earth, atmospheric, and ocean sciences	18	0.3	15	0.6
Astronomy, chemistry, and physics	35	0.6	19	0.8
Psychology	14	0.1	6	0.1
Social sciences	8	0.1	4	0.1
Other	11	0.3	8	0.1
Research animal space	42	0.6	na	na

\* = value > 0 but < 50,000. na = not applicable; data were not collected on planned new construction of research animal space on the FY 2011 survey.

NASF = net assignable square feet.

NOTES: Details may not add to totals due to rounding. Research animal space is listed separately and is also included in individual field totals. Number of institutions in physical sciences does not equal the sum of subfields due to overlapping counts.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities, FY 2011.

academic institutions has fallen well short of total NASF initially planned for construction over the past decade. However, that gap appears to be shrinking. Institutions planned to start 10.3 million NASF in FYs 2010–11 (table 6), of which 78.6% was started during that period (8.1 million NASF). In FYs 2004–05, the equivalent percentage was 53.2%, followed by 64.2% in FYs 2006–07 and 69.2% in FYs 2008–09. It is also notable that the amount of planned construction over the decade has generally trended downward.

## Repair and Renovation

Academic institutions expended \$3.5 billion on major repairs and renovation of S&E research space in FYs 2010–11 (table 7). Improvements to biological and biomedical space were 37.5% of those costs. Health and clinical sciences (22.1%); engineering (12.4%); and astronomy, chemistry, and physics (10.3%) also accounted for substantial shares of overall costs for research space repair and renovation.

Institutions anticipate \$3.1 billion in costs for planned repair and renovation with start dates in FYs 2012–13. They expected to spend nearly \$1 billion on improving research space in the biological and biomedical sciences and nearly \$1 billion in the health and clinical sciences. In addition to these slated improvements, academic institutions reported another \$4.8 billion in deferred repair and renovation projects included in their institutional plans, as well as \$2.6 billion not included in their institutional plans. The backlog of deferred improvements was greater

TABLE 5. Source of funds for new construction of science and engineering research space in academic institutions, by year of project start and type of institution: FYs 2002–11

(Millions of current dollars)

Year of project start and type of institution	All sources	Government		Institutional funds and other sources <sup>a</sup>
		Federal	State/local	
FYs 2002–03	7,388.7	351.3	2,364.5	4,672.9
Doctorate granting	7,185.2	318.5	2,301.4	4,565.3
Nondoctorate granting	203.5	32.8	63.1	107.6
FYs 2004–05	6,030.3	450.2	1,341.6	4,238.5
Doctorate granting	5,767.3	417.1	1,204.8	4,145.5
Nondoctorate granting	263.0	33.1	136.9	93.1
FYs 2006–07	5,923.5	360.9	1,880.7	3,681.8
Doctorate granting	5,681.3	357.6	1,764.6	3,559.1
Nondoctorate granting	242.2	3.3	116.1	122.7
FYs 2008–09	7,406.8	235.9	2,697.0	4,473.8
Doctorate granting	7,082.4	225.7	2,515.0	4,341.7
Nondoctorate granting	324.4	10.2	182.0	132.1
FYs 2010–11	6,411.3	486.6	1,956.3	3,968.4
Doctorate granting	6,242.8	479.5	1,875.5	3,887.9
Nondoctorate granting	168.5	7.1	80.9	80.5

<sup>a</sup> Institutional funds and other sources include an institution's operating funds, endowments, private donations, tax-exempt bonds and other debt financing, and indirect costs recovered from federal and nonfederal sources.

NOTES: Details may not add to totals due to rounding. Only construction projects costing over \$250,000 for a single field were reported for FYs 2002–11.

SOURCES: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

TABLE 6. New and planned construction of science and engineering research space in academic institutions: FYs 2004–13  
(Net assignable square feet in millions)

Variable	Started in FY 2004 or FY 2005		Started in FY 2006 or FY 2007		Started in FY 2008 or FY 2009		Started in FY 2010 or FY 2011		Planned to start in FY 2012 or FY 2013	
	Planned	Started	Planned	Started	Planned	Started	Planned	Started	Planned	Started
	Number of institutions	190	164	172	162	166	170	136	167	128
Total NASF	19.0	10.1	13.7	8.8	14.3	9.9	10.3	8.1	8.4	na

NASF = net assignable square feet.

NOTE: Details may not add to totals due to rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities.

TABLE 7. Costs for repair and renovation of science and engineering research space in academic institutions, by field and time of repair and renovation: FYs 2010–13  
(Costs in millions of dollars)

Field	Started in FY 2010 or FY 2011	Planned to start in FY 2012 or FY 2013	Deferred projects	
			Included in institutional plan	Not included in institutional plan
All research space	3,511.0	3,107.9	4,826.1	2,552.6
Agricultural and natural resources sciences	87.8	78.4	301.2	282.9
Biological and biomedical sciences	1,318.0	976.0	1,213.9	542.1
Computer and information sciences	48.8	49.3	26.2	56.8
Engineering	434.3	268.5	477.9	573.0
Health and clinical sciences	775.4	963.9	1,279.4	288.1
Mathematics and statistics	39.6	17.0	56.4	16.3
Physical sciences	507.5	494.5	883.3	561.1
Earth, atmospheric, and ocean sciences	146.5	68.1	175.8	103.8
Astronomy, chemistry, and physics	361.1	426.4	707.5	457.3
Psychology	100.6	55.3	145.8	87.4
Social sciences	95.7	181.0	275.5	120.7
Other	103.2	23.9	166.4	24.3

NOTES: Details may not add to totals due to rounding. Data were not collected on repair or renovation of research animal space for the FY 2011 survey.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities, FY 2011.

than all projects started or planned for the FY 2010–13 period in most disciplines. The exceptions were biological and biomedical sciences, computer and information sciences, and health and clinical sciences.

### Data Sources and Availability

The data presented in this InfoBrief were obtained from the National Science Foundation Survey of Science and Engineering Research Facilities, which collected data from 554 colleges

and universities that expended at least \$1 million in S&E research and development funds in FY 2010. The response rate for this survey was 97.7%.

The full set of detailed tables will be available in the report *Science and Engineering Research Facilities: Fiscal Year 2011* at <http://www.nsf.gov/statistics/facilities/>. Individual detailed tables may be available in advance of the full report. Please contact the author for more information. Current survey data for individual institutions

are available from the WebCASPAR database system, a Web tool for retrieval and analysis of statistical data on science and engineering resources (<http://webcaspar.nsf.gov/>).

### Notes

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