

RESEARCH SPACE AT ACADEMIC INSTITUTIONS INCREASED 4% BETWEEN FY 2007 AND FY 2009

by Leslie Christovich¹

According to the National Science Foundation's Biennial Survey of Science and Engineering Research Facilities, the amount of science and engineering (S&E) research space at research-performing colleges and universities expanded 4% between FY 2007 and FY 2009, from 188 million to 196 million net assignable square feet (NASF) (table 1).² This percentage increase is almost three times the amount of growth found between FY 2005 and FY 2007 and follows two consecutive survey cycles with slowing growth (figure 1).

Research Space

In FY 2009 the greatest amount of S&E research space was available in the biological and biomedical sciences

TABLE 1. Science and engineering research space, by type of institution: FY 2001–09
(Net assignable square feet in millions)

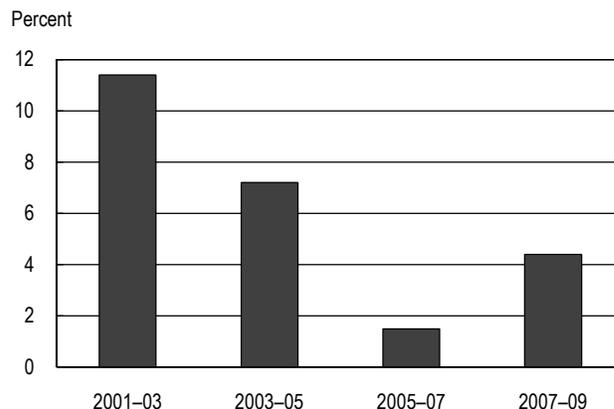
Type of institution	FY 2001	FY 2003	FY 2005	FY 2007	FY 2009
All academic	155.0	172.7	185.1	187.9	196.1
Doctorate granting	147.0	164.2	177.0	180.4	187.8
Nondoctorate granting	8.0	8.5	8.1	7.5	8.3
Public	116.3	131.1	138.5	140.3	146.0
Private	38.9	41.6	46.6	47.6	50.1
Medical schools	na	37.1	40.1	43.8	44.3

na = not applicable; question was not asked.

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.

FIGURE 1. Change in science and engineering research space in academic institutions, by 2-year period: FY 2001–09



NOTE: Space measured in net assignable square feet.

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

(26%) (table 2). The amount of NASF used for research in biological and biomedical sciences increased 12% between FY 2007 and FY 2009, which was the largest increase among all S&E fields. Computer and information sciences followed, with an 8% increase in NASF. Four S&E fields experienced declines in the amount of NASF available for research, including the physical sciences. The overall decline in NASF for research in physical science was due to a small increase (1%) in astronomy, chemistry, and physics combined with a larger decrease (5%) in earth, atmospheric, and ocean sciences. The social sciences experienced the largest decline (8%).



TABLE 2. Science and engineering research space in academic institutions, by field: FY 2007 and FY 2009
(Net assignable square feet in millions)

Field	FY 2007	FY 2009
All research space	187.9	196.1
Agricultural and natural resources sciences	27.9	29.5
Biological and biomedical sciences	44.8	50.3
Computer and information sciences	4.8	5.2
Engineering	28.4	30.2
Health and clinical sciences	37.0	36.3
Mathematics and statistics	1.6	1.5
Physical sciences	28.7	28.5
Earth, atmospheric, and ocean sciences	8.4	8.0
Astronomy, chemistry, and physics	20.3	20.5
Psychology	4.9	5.2
Social sciences	6.0	5.5
Other sciences	3.7	3.9

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.

A significant amount of research NASF (23%) continued to be located in medical schools (table 1). NASF for S&E research in medical schools grew 1% from FY 2007 (43.8 million NASF) to FY 2009 (44.3 million NASF). This compares to growth rates of 8% between FY 2003 and FY 2005 and 9% between FY 2005 and FY 2007.

New Construction of Research Space

Each year many academic institutions begin construction of new space in which to conduct scientific research. New construction of NASF for S&E research began to increase in FY 2008–09 after two biennial periods of substantial declines (table 3). In FY 2006–07 the amount of newly constructed research space fell 13% from the amount constructed in FY 2004–05, reaching a new low of 8.8 million NASF for the decade. This decline followed the previous biennial period decline of 38%. But by FY 2008–09 a total of 171 institutions began construction of almost 10 million NASF for research (table 4), a 13% increase from FY 2006–07. Even with this increase, however, the amount of new construction of NASF begun in FY 2008–09 (9.9 million) was still 39% less than the amount of NASF institutions began in FY 2002–03 (16.2 million).

TABLE 3. New construction of science and engineering research space and medical school research space: FY 2002–09
(Net assignable square feet in millions)

Type of NASF	FY 2002–03	FY 2004–05	FY 2006–07	FY 2008–09
Total academic	16.2	10.1	8.8	9.9
Medical schools	5.1	2.7	2.5	2.5

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.

Academic institutions started new construction in all S&E fields in FY 2008–09 and planned to continue to do so in FY 2010–11 (table 4). However, most new construction was concentrated in three fields: biological and biomedical sciences, engineering, and health and clinical sciences. Together these three fields made up 76% of all NASF new construction. The new construction of NASF for biological and biomedical sciences research combined with health and clinical sciences composed 55% of the total NASF for S&E research.

Medical schools began new construction of 2.5 million NASF for S&E research in FY 2008–09 (table 3). This was only half the amount of new construction that medical schools began in FY 2002–03.

New Construction Funding Sources

In FY 2008–09 the total costs for new construction of S&E research space at academic institutions reached \$7.4 billion (table 5). The sources of funding for these costs typically include the federal government, state or local governments, and institutional and other funds.³

In FY 2008–09 institutional sources contributed \$4.5 billion to funding new construction, an increase of \$0.79 billion from FY 2006–07. Although the dollar amount of new construction funds from institutional funds increased compared to the previous biennial period, their percentage share of total new construction funds declined (from 62% to 60%). Concurrently, state and local government funding of new construction increased 43% to \$2.7 billion. This increased the state and local government share of total funding to 36% in

TABLE 4. New construction of science and engineering research space in academic institutions, by field: FY 2008–11
(Net assignable square feet in millions)

Field	Started in FY 2008–09		Planned to start in FY 2010–11	
	Number of institutions	Total NASF	Number of institutions	Total NASF
All research space	171	9.9	136	10.3
Agricultural and natural resources sciences	26	0.4	28	0.6
Biological and biomedical sciences	79	3.5	64	3.4
Computer and information sciences	16	0.3	12	0.3
Engineering	56	2.1	47	1.7
Health and clinical sciences	63	1.9	34	2.4
Mathematics and statistics	1	*	2	*
Physical sciences				
Earth, atmospheric, and ocean sciences	13	0.1	16	0.3
Astronomy, chemistry, and physics	40	0.9	32	0.7
Psychology	14	0.3	8	0.3
Social sciences	10	0.2	2	*
Other sciences	17	0.3	14	0.6
Research animal space	64	0.8	45	0.6

* = greater than 0, but less than 50,000.

NASF = net assignable square feet.

NOTES: NASF detail may not add to total due to rounding. Institutions may have new construction in one or more fields of science. 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.

FY 2008–09. The federal government’s funding decreased 35% to \$236 million, representing 3% of total new construction funds. This federal government share of new construction funding was the lowest reported for any period since the survey began collecting these data (figure 2).

Planned New Construction

The amount of new construction academic institutions actually began over the decade contrasted greatly with the amount of NASF the institutions had planned to construct. A total of 190 institutions had plans to construct 19 million NASF of research space in FY 2004–05 (table 6). However, only 53% of this amount, or a little over 10 million NASF, was actually started by 164 institutions in FY 2004–05. In FY 2008–09, institutions had started constructing 69% of the amount planned, which was the largest ratio of actual to planned construction for the decade. In FY 2010–11 the smallest

number of institutions ($n = 136$) planned to begin new construction on the least amount of NASF (10.3 million) over the entire decade.

Not surprisingly, during the same decade that institutions began construction on less space than they had planned, the amount of new construction deferred rose. In FY 2002–03 academic institutions deferred \$8.4 billion in new construction, and by FY 2008–09 the amount deferred rose to \$11.5 billion (not shown).

Repair and Renovation

The total costs for repair and renovation of S&E research space at academic institutions begun in FY 2008–09 were about \$3.0 billion (table 7). The largest percentage of these costs was for repair and renovation of biological and biomedical science research space (35%) and of health and clinical science research space (23%).

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: FY 2002–09

(Funds in millions of dollars)

Year of project start and type of institution	All sources	Government		Institutional funds and other sources ^a
		Federal	State/local	
FY 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
FY 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
FY 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
FY 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

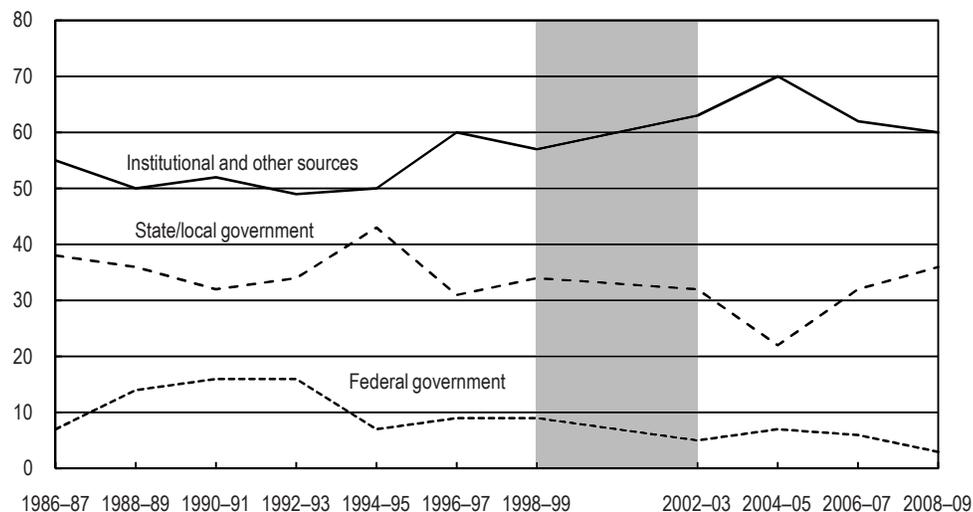
^a Institutional funds and other sources include an institution's operating funds, endowments, private donations, tax-exempt bonds and other debt financing, and indirect costs recovered from federal and nonfederal sources.

NOTES: Details may not add to totals due to rounding. Only construction projects costing over \$250,000 for a single field were reported for FY 2002–09; construction projects costing over \$100,000 were reported in previous cycles.

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

FIGURE 2. Source of funds for new construction of science and engineering research space in academic institutions: FY 1986–09

Percentage of total funds



NOTES: Question on constructions costs was not asked in FY 2000–01; therefore no data are reported here. Only construction projects costing over \$250,000 for a single field were reported for FY 2002–09; construction projects costing over \$100,000 were reported in previous cycles.

SOURCE: 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: FY 2002–11
(Net assignable square feet in millions)

Variable	FY 2002–03		FY 2004–05		FY 2006–07		FY 2008–09		FY 2010–11	
	Planned	Started								
Number of institutions	na	216	190	164	172	162	166	171	136	na
Total NASF	na	16.2	19.0	10.1	13.7	8.8	14.3	9.9	10.3	na

na = not applicable; question was not asked.

NASF = net assignable square feet.

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: FY 2008–11

(Costs in millions of dollars)

Field	Started in FY 2008 or FY 2009	Planned to start in FY 2010 or FY 2011	Deferred projects	
			Included in institutional plan	Not included in institutional plan
			All research space	3,015.8
Agricultural and natural resources sciences	144.8	76.7	241.1	442.9
Biological and biomedical sciences	1,061.1	1,386.7	1,642.7	710.5
Computer and information sciences	34.2	35.8	79.6	99.0
Engineering	438.8	442.9	653.4	404.4
Health and clinical sciences	702.4	838.2	1,426.4	531.4
Mathematics and statistics	10.7	18.4	82.9	60.3
Physical sciences				
Earth, atmospheric, and ocean sciences	78.3	102.9	350.4	148.6
Astronomy, chemistry, and physics	408.7	430.5	794.4	383.2
Psychology	47.5	142.8	256.5	114.6
Social sciences	45.0	55.7	165.2	147.2
Other sciences	44.3	75.6	119.7	105.1
Research animal space	285.1	266.2	303.6	245.3

NOTES: Details may not add to totals due to rounding. Research animal space is listed separately and is also included in individual field totals. Institutional plans will usually include goals, strategies, and budgets for fulfilling institution's mission during a specific time period. Deferred projects are those that (1) are not funded and (2) are not scheduled for FY 2010 or FY 2011.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Science and Engineering Research Facilities, FY 2009.

Institutions plan to start about \$3.6 billion of repair and renovation in FY 2010–11, a 20% increase over what was started in the previous 2-year period. Similar to FY 2008–09, the largest percentage of these costs was planned in the biological and biomedical sciences (38%) and the health and clinical sciences (23%). Even with these current costs for repair and renovation and the planned costs for FY 2010–11, academic institutions

still reported another \$5.8 billion in deferred repair and renovation projects included in institutional plans.

Data Sources and Availability

During the production of this InfoBrief, the America COMPETES Reauthorization Act of 2010 was signed into law. Section 505 of the bill renames the Division of Science Resources Statistics as the National Center

for Science and Engineering Statistics (NCSES). The new name signals the central role of NCSES in the collection, interpretation, analysis, and dissemination of objective data on the science and engineering enterprise.

The data presented in this InfoBrief were obtained from the National Science Foundation (NSF) Survey of Science and Engineering Research Facilities, which collected data from a census of 495 colleges and universities that expended at least \$1 million in S&E research and developments funds in FY 2008. Each institution's level of expenditures was obtained from the NSF Survey of Research and Development Expenditures at Universities and Colleges.

The full set of detailed tables will be available in the forthcoming report *Science and Engineering Research Facilities: Fiscal Year 2009* 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 (<https://webcaspar.nsf.gov/>).

Notes

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2. In addition to academic institutions, the Survey of Science and Engineering Research Facilities also collects data from nonprofit biomedical research institutions (hospitals and research organizations) receiving research funds from the National Institutes of Health. Data from biomedical institutions are not presented in this InfoBrief.
3. Institutional funds and other sources may include operating funds, endowments, tax-exempt bonds and other debt financing, indirect costs recovered from federal grants/contracts, private donations, or other sources.

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