
Chapter 7

Historically Black Colleges and Universities

Highlights . . .

- ◆ In 1996, the 68 research-performing Historically Black Colleges and Universities (HBCUs) contained 9 million net assignable square feet (NASF) of science and engineering (S&E) space. Slightly over a quarter of this space, 2.4 million NASF or 26 percent, was considered to be research space.
- ◆ Ninety-seven percent of the research-performing HBCUs reported research space in the biological sciences outside of medical schools and 79 percent had S&E research space in the physical sciences.
- ◆ The construction of S&E research space in HBCUs has declined steadily since fiscal years 1990-1991, from \$42.5 million to \$21.3 million in fiscal years 1994-1995.
- ◆ Expenditures for repair/renovation fluctuated since fiscal years 1990-1991, decreasing from \$24.2 million in 1990-1991 to \$9.6 million in 1992-1993, and then increasing to \$22 million in 1994-1995.
- ◆ All research-performing HBCUs reported a need for 753,103 additional NASF of S&E research space, only 22 percent of which was scheduled for construction in fiscal year 1996 or 1997.
- ◆ The HBCUs reported that 328,382 NASF of S&E research space needed major renovation or replacement, of which 13 percent was scheduled in fiscal year 1996 or 1997.
- ◆ HBCUs reported a total of \$302 million in S&E capital projects that were needed but had to be deferred because there was not sufficient funding available.

Background

For over a century, HBCUs have played an important role in the higher education of black students. In the fall of 1993, over 282,000 students attended the 107 colleges and universities considered HBCUs by the U.S. Department of Education.

Many of the HBCUs are relatively small institutions, with considerably less research space than other research-performing institutions. Given budget constraints in recent years, the construction of S&E research space has been limited. Yet, HBCUs are important to the production of black scientists and engineers. Although they enroll only 17 percent of all black college students nationwide, HBCUs awarded 44 percent of all bachelor's degrees in the sciences that went to black students in 1990 (*Academe*, January/February 1995).

This chapter profiles S&E research facilities at the research-performing HBCUs; and examines the amount of S&E space, its adequacy and condition, capital project activity, funding sources, and the need for additional or renovated space.

The Survey Questions

The profile of research facilities in HBCUs presented in this chapter is based upon all survey questions examined in previous chapters.

Data Considerations

The National Advisory Committee on Black Higher Education and Black Colleges and Universities identified 107 HBCUs.¹ Of this group, 29 reported separately budgeted research expenditures in 1988, the year in which the first, full-scale facilities survey was conducted by NSF. All of these institutions were included in the 1988 sample and in subsequent samples. In 1992, NSF identified an additional 41 HBCUs that had separately budgeted research and development (R&D) expenditures. In 1992, the survey sample included the original panel of 29

¹The National Center for Education Statistics (NCES) and NSF both used the list developed by the White House Initiative on Historically Black Colleges and Universities to identify HBCUs. The discrepancy in the numbers of HBCUs reported by NCES (105) and NSF (107) results from differences in the way multi-campus institutions were counted. NSF counted each campus of multi-campus institutions as a separate unit; NCES considered multi-campus institutions as single entities.

institutions, and the additional 41, for a total of 70 research-performing HBCUs. Two HBCUs, however, did not have R&D expenditures in 1994 or 1996, resulting in a total of 68 research-performing HBCUs for those two years.

As a result of these additional HBCUs, two sets of estimates can be provided. Previous reports have focused on the original panel of 29 HBCUs. This report breaks from that tradition and presents data on the larger group of HBCUs, from 1992 to 1996. Trends in results based on the panel of 29 HBCUs (from 1988) can be found in tables presented in Appendix F, “Detailed Statistical Tables.”

The reader also should keep in mind an important difference between the HBCUs profiled in this chapter and the research-performing colleges and universities discussed in the previous six chapters. HBCUs with any R&D expenditures are included in the sampling universe. The criterion for all other colleges and universities is more restrictive; they must have R&D expenditures of \$50,000 or more. Many of the HBCUs discussed in this chapter, then, are predominantly teaching institutions with limited research needs.

Findings

How Much Research Space Did HBCUs Have?

The 68 research-performing HBCUs contained 9.0 million NASF of S&E space in 1996. Slightly over a quarter of this space (2.4 million NASF or 26 percent) was considered to be research space (Table 7-1).

The total amount of S&E space in research-performing HBCUs has fluctuated somewhat since 1992. In that year, HBCUs reported a total of 9.1 million NASF of S&E space. Two years later, those same institutions reported 7.9 million NASF. In 1996, the HBCUs reported 9.0 million NASF of S&E space, an amount close to that reported four years earlier.

Table 7-1. Trends in the amount of space assigned to science and engineering (S&E) fields at Historically Black Colleges and Universities: 1992-1996 (Net assignable square feet in millions)

<i>Index</i>	1992	1994	1996
Total S&E space	9.1	7.9	9.0
S&E research space	2.9	2.2	2.4
S&E research space as a percentage of space	32%	28%	26%

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

The S&E research space also has shifted since 1992, from 2.9 million NASF in that year, to 2.2 million NASF in 1994, to 2.4 million in 1996. S&E research space has declined steadily, from 32 percent to 28 percent to 26 percent in the same three time periods.

In What Fields Did HBCUs Have S&E Research Space?

Like other research-performing colleges and universities, HBCUs were most likely to have S&E research space in the biological sciences outside of medical schools and in the physical sciences. In 1996, 97 percent of the research-performing HBCUs reported they had S&E research space in the biological sciences outside of medical schools. Seventy-nine percent of the HBCUs indicated that they had S&E research space in the physical sciences (Table 7-2).

Compared to all research-performing institutions, the HBCUs were less likely than others in that category to have S&E research space in all fields (excepting the biological sciences outside of medical schools and the agricultural sciences). When compared to nondoctorate-granting institutions (the group most similar to the HBCUs in composition), the HBCUs were less likely to have S&E research space in all fields except the biological sciences outside of medical schools, the agricultural sciences, and mathematics (compare Table 7-2 with Table 1-5).

Table 7-2. Trends in the percentage of Historically Black Colleges and Universities with science and engineering (S&E) research space and the amount of S&E research space by field: 1992-1996

Field	Percentage with research space			Amount of research space (NASF in thousands)		
	1992	1994	1996	1992	1994	1996
Biological sciences-- outside medical schools	93%	83%	97%	1,137	480	393
Physical sciences	72	70	79	275	280	352
Psychology	27	40	49	25	33	31
Social sciences	46	45	56	78	61	77
Mathematics	44	43	54	34	36	44
Computer sciences	36	37	49	53	52	64
Earth, atmospheric, and ocean sciences	29	16	22	64	36	54
Engineering	24	28	29	302	355	364
Agricultural sciences	27	24	26	497	483	595
Medical sciences-- outside medical schools	26	28	26	147	141	77
Biological sciences-- medical schools	3	4	4	121	159	150
Medical sciences-- medical schools	5	4	4	187	69	84

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

In 1996, the agricultural sciences dominated the S&E research space, with 595,000 NASF. Similar to other research-performing institutions, the amount of S&E research space in the agricultural sciences was disproportionate to the number of HBCUs that had space in that field; only 26 percent had S&E research space in the agricultural sciences in 1996. The biological sciences outside of medical schools had 393,000 NASF of S&E research space in that same year. Over time, however, the amount of S&E research space in the biological sciences outside of medical schools declined, from 1.1 million NASF in 1992, to 480,000 in 1994, to 393,000 in the most current period. Medical science S&E research space outside of medical schools also declined, from 147,000 NASF in 1992, to 77,000 in 1996 (Table 7-2).

Fields in which S&E research space in HBCUs increased at least 20,000 NASF between 1992 and 1996 include the physical sciences, from 275,000 NASF in 1992, to 352,000 in 1996; engineering, from 302,000 NASF to 364,000 NASF in that time period; and agricultural sciences, from 497,000 to 595,000 NASF.

Did the HBCUs Consider the Amount of S&E Research Space to be Adequate?

In 1996, as in 1994, HBCUs were more likely to report that space in the computer sciences was inadequate than in other S&E fields (Table 7-3). Fifty-seven percent of all HBCUs with S&E research space in the computer sciences indicated in 1996 that the amount of space was inadequate. This percentage declined from 1994, when 79 percent of all HBCUs indicated inadequate space. It should be noted that S&E research space in the computer sciences increased between 1994 and 1996, from 52,000 NASF to 64,000 NASF (Table 7-2).

Table 7-3. Trends in the percentage of Historically Black Colleges and Universities reporting inadequate amounts of science and engineering (S&E) research space in existing fields: 1992-1996

<i>Field</i>	<i>1992</i>	<i>1994</i>	<i>1996</i>
Biological sciences-- outside medical schools	39%	44%	50%
Physical sciences	50	49	45
Psychology	68	77	48
Social sciences	41	43	42
Mathematics	45	68	30
Computer sciences	44	79	57
Earth, atmospheric, and ocean sciences	49	45	34
Engineering	36	53	56
Agricultural sciences	37	25	39
Medical sciences-- outside medical schools	50	53	28
Biological sciences-- medical schools	0	0	0
Medical sciences-- medical schools	30	33	33

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

At least half of the HBCUs reported in 1996 an inadequate amount of S&E research space in engineering (56 percent) and in the biological sciences outside of medical schools (50 percent). Interestingly, the amount of engineering S&E research space increased steadily from 1992, from 302,000 NASF to 364,000 NASF four years later. Biological research space declined dramatically, however, as noted above.

What Was the Condition of Research Space in the HBCUs?

In 1996, 14 percent of the S&E research space in the HBCUs was evaluated as “...requires major renovation or replacement to be used effectively.” This amounted to 336,000 NASF. In 1994, 16 percent of the research space, or 352,000 NASF, was evaluated in the same way. Only 8 percent of the S&E research space (232,000 NASF) was thought to require major renovation or replacement in 1992 (Table 7-4).

Table 7-4. Trends in the percentage and amount of science and engineering (S&E) research space in Historically Black Colleges and Universities considered to require major renovation or replacement: 1992-1996

<i>Requires major renovation or replacement</i>	<i>1992</i>	<i>1994</i>	<i>1996</i>
Percentage of space	8%	16%	14%
NASF in thousands	232	352	336

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

How Much Construction and Repair of S&E Research Space Have HBCUs Undertaken?

Since 1990-1991, the amount spent to construct S&E research space at the research-performing HBCUs has declined dramatically, from \$42.5 million in 1995 constant dollars to \$21.3 million in fiscal years 1994-1995. The fields in which HBCUs constructed space varied from year to year. In 1992-1993, for example, the majority of construction (71 percent) occurred in the biological sciences. In fiscal years 1994-1995, the earth, atmospheric, and ocean sciences dominated the construction of S&E research space in HBCUs, with \$14.5 million. In the two previous fiscal years, only \$1.8 million was spent to construct space in that field (Table 7-5 and Figure 7-1).

Table 7-5. Trends in the construction of science and engineering (S&E) research projects at Historically Black Universities and Colleges by field: 1990-1995 (constant 1995 dollars in thousands)

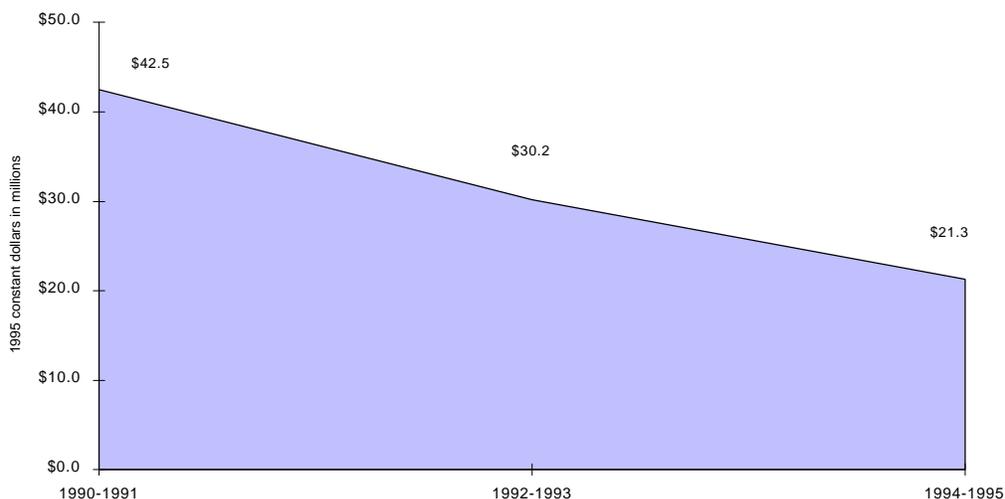
<i>Field</i>	<i>1990-1991</i>	<i>1992-1993</i>	<i>1994-1995</i>
Total	\$42,482	\$30,220	\$21,346
Biological sciences, outside medical schools	7,884	20,870	685
Physical sciences	6,184	1,126	0
Psychology	406	0	0
Social sciences	*	0	2,000
Mathematics	3,554	0	0
Computer sciences	0	0	0
Earth, atmospheric, and ocean sciences	2,615	1,845	14,464
Engineering	0	2,100	0
Agricultural sciences	7,263	2,993	4,197
Medical sciences, outside medical schools	9,492	0	0
Biological sciences, medical schools	0	663	0
Medical sciences, medical schools	0	0	0
Other	5,085	625	0

*Combined with psychology in 1992

¹ Current dollars have been adjusted to 1995 constant dollars using the Bureau of the Census's Composite Fixed-Weighted Price Index for Construction.

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

Figure 7-1. Trends in Funding for New Construction at HBCUs



Source: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

In fiscal years 1994-1995, HBCUs spent only slightly more to repair/renovate S&E research space (\$22 million) as they did to construct space (\$21.3 million). Unlike construction expenditures, repair/renovation expenditures in HBCUs increased from fiscal years 1992-1993, from \$9.6 million to \$22 million. However, the 1994-1995 repair/renovation expenditures were still lower than those in 1990-1991, when HBCUs spent \$24.3 million (Table 7-6).

Table 7-6. Trends in the repair/renovation of science and engineering (S&E) research projects at Historically Black Colleges and Universities by field: 1992-1996 (constant 1995 dollars in thousands)

<i>Field</i>	<i>1990-1991</i>	<i>1992-1993</i>	<i>1994-1995</i>
Total	\$24,222	\$9,594	\$21,959
Biological sciences, outside medical schools	2,963	752	4,643
Physical sciences	11,390	4,159	3,361
Psychology	0	0	0
Social sciences	*	0	882
Mathematics	4,908	557	0
Computer sciences	3,500	293	268
Earth, atmospheric, and ocean sciences	0	105	0
Engineering	0	554	9,551
Agricultural sciences	174	1,691	600
Medical sciences, outside medical schools	362	607	428
Biological sciences, medical schools	0	506	1,700
Medical sciences, medical schools	927	0	171
Other	0	371	353

*Combined with psychology in 1992

¹ Current dollars have been adjusted to 1995 constant dollars using the Bureau of the Census's Composite Fixed-Weighted Price Index for Construction.

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

How Did HBCUs Fund Construction and Repair/Renovation Projects?

Similar to fiscal years 1992-1993, in 1994-1995, HBCUs relied primarily on state and local governments to fund construction projects. In both those years, state and local governments provided more than three-quarters of the total construction funding. In both 1992-1993 and 1994-1995, the Federal government provided 16 percent of construction funding. In fiscal years 1990-1991, however, the Federal government funded 35 percent of construction at HBCUs, and state and local government funded only 48 percent of these projects (Table 7-7).

Table 7-7. Trends in the sources of funding for construction at Historically Black Colleges and Universities: 1990-1995

Source of Funding	1990-1991	1992-1993	1994-1995
Dollar contribution (in millions)			
All sources	\$42,632	\$30,249	\$21,346
Federal government	14,753	4,785	3,342
State/local government	20,424	23,617	16,796
Private donations	0	0	291
Institutional funds	5,269	185	917
Tax exempt bonds	0	0	0
Other debt	0	0	0
Other sources	2,187	1,662	0
Relative contribution			
Federal government	35%	16%	16%
State/local government	48	78	79
Private donations	0	0	1
Institutional funds	12	0.6	4
Tax exempt bonds	0	0	0
Other debt	0	0	0
Other sources	5	5	0

¹ Current dollars have been adjusted to 1995 constant dollars using the Bureau of the Census's Composite Fixed-Weighted Price Index for Construction.

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

In 1992-1993 and 1994-1995, the Federal government provided a much larger percentage of the repair/renovation funding to HBCUs than it did construction funding. In fiscal years 1992-1993, 53 percent of the total repair/renovation funding came from the Federal government, and in fiscal years 1994-1995, 47 percent came from that source. In 1990-1991, only 17 percent of all repair/renovation dollars were provided by the Federal government (Table 7-8).

Table 7-8. Trends in the sources of funding for repair/renovation at Historically Black Colleges and Universities: 1990-1995

<i>Source of Funding</i>	<i>1990-1991</i>	<i>1992-1993</i>	<i>1994-1995</i>
Dollar contribution (in thousands)			
All sources	\$24,221	\$9,594	\$21,959
Federal government	4,012	5,064	10,378
State/local government	19,964	2,185	6,641
Private donations	170	1,825	0
Institutional funds	76	521	2,590
Tax exempt bonds	0	0	0
Other debt	0	0	2,350
Other sources	0	0	0
Relative contribution			
Federal government	17%	53%	47%
State/local government	82	23	30
Private donations	1	19	0
Institutional funds	0	5	12
Tax exempt bonds	0	0	0
Other debt	0	0	11
Other sources	0	0	0

¹ Current dollars have been adjusted to 1995 constant dollars using the Bureau of the Census's Composite Fixed-Weighted Price Index for Construction.

SO URCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

Funding from state and local governments for repair/renovation declined dramatically from fiscal years 1990-1991, in dollars as well as proportions. In 1990-1991, state and local governments provided HBCUs with \$20 million (82 percent of all funding) to repair/renovate S&E research facilities. Two years later, funding from state and local governments to HBCUs totaled \$2.2 million, only 23 percent of all repair/renovation funding.

What are the S&E Facilities Needs of HBCUs?

HBCUs reported a total of \$302 million in S&E capital projects that were needed but had to be deferred because there was not sufficient funding available. These included \$196 million in projects to construct S&E research space and \$106 million to repair/renovate existing S&E research space. Eighty-two percent of the construction needs and 71 percent of the repair/renovation needs had been identified in institutional plans (Table 7-9).

Table 7-9. Expenditures for deferred capital projects to construct or repair/renovate science and engineering (S&E) research facilities at HBCUs by institution type, type of project, and whether project was included in institutional plans (dollars in millions)

<i>Institution type</i>	<i>Included in Institutional Plans</i>		<i>Not Included in Institutional Plans</i>		<i>Total</i>
	<i>To construct new S&E research facilities</i>	<i>To repair/renovate existing S&E research facilities</i>	<i>To construct new S&E research facilities</i>	<i>To repair/renovate existing S&E research facilities</i>	
Total	\$160	\$75	\$36	\$31	\$302
Doctorate-granting	61	8	1	1	71
Nondoctorate-granting	99	67	35	30	231

SOURCE: National Science Foundation/SRS, 1996 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

Doctorate-granting HBCUs accounted for 24 percent of all deferred capital project needs, 31 percent of construction needs and 8 percent of repair/renovation needs.