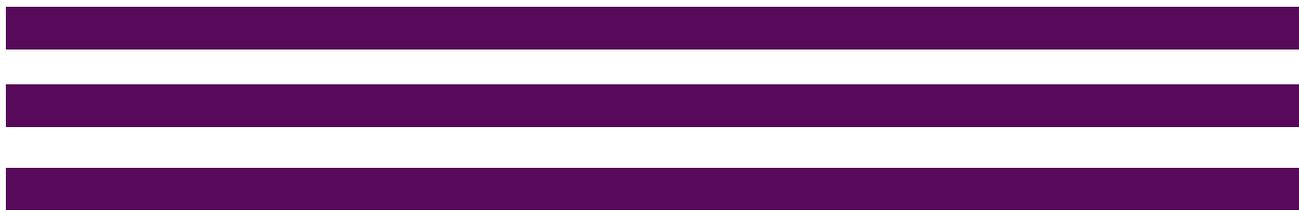


# Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)



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**National Science Foundation**

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# **Contents**

<b>Executive Overview</b>	<b>1</b>
<b>Program Background</b>	<b>3</b>
The Origins of HBCUs	3
HBCUs and NSF	3
Table: NSF Program Support of HBCUs (FY 2001)	5
The Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)	6
Figure: National Distribution of HBCU-UP Awards (FY 2001)	7
<b>Observations on the National Condition</b>	<b>9</b>
<b>HBCU-UP Awards Through FY 2001</b>	<b>13</b>
FY 1998 – The First HBCU-UP Awards	13
FY 1999 – The Inaugural HBCU-UP Cohort	14
FY 2000-2001 – The HBCU-UP Millennial Cohort	19
<b>References</b>	<b>23</b>
<b>Directory of HBCU-UP Project Directors and Project Managers</b>	<b>24</b>
<b>Program Contact</b>	<b>26</b>

# Executive Overview

The National Science Foundation's Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) seeks to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) as a means to broaden diversity and overall participation in the Nation's STEM workforce. Begun in Fiscal Year (FY) 1998 and administered by NSF's Division of Human Resource Development within the Directorate for Education and Human Resources, HBCU-UP provides support for the implementation of comprehensive strategies to strengthen STEM teaching and learning. In so doing, the program encourages improved access for and retention of underrepresented groups in STEM study and careers.

Through FY 2001, HBCU-UP has granted over 30 awards totaling more than \$64 million in Federal support to historically black colleges and universities in 12 states, the District of Columbia, and the U.S. Virgin Islands. Typical HBCU-UP project implementation strategies include STEM course and curricular reform and enhancement, faculty professional development, and supervised research opportunities. HBCU-UP projects also include other active-learning experiences for STEM undergraduates, student support, scientific instrumentation to improve STEM instruction, and complementary educational initiatives that meet institutional needs.

HBCU-UP continues to have a national impact on the way in which HBCUs and their affiliated communities work together. The program also helps to promote reform—both regionally and within individual campuses—to provide unprecedented levels of education and opportunity for minorities underrepresented in STEM fields. Through these efforts, this program seeks to broaden the diversity of the Nation's workforce while promoting individual excellence each step of the way.

# Program Background

## *The Origins of HBCUs*

Today's national cadre of 117 HBCUs owes its origins to the dedicated efforts of legislators and teachers to education and an equal dedication of generations of minority students to learning. Encouraged by the 1862 and 1890 Morrill Land-Grant Acts, venues designated for the education of black students evolved from the occasional use of churches and abandoned train cars to a handful of modest state-supported colleges and universities. Through the early 1900s, however, the 16 recognized HBCUs remained disproportionately supported as institutions for higher learning and necessarily banded together to create a stronger, unified voice in academe.

The Higher Education Act of 1965 provided increased Federal assistance for HBCUs. The Carter Administration established a program for expanding the capacity of HBCUs, then Executive Orders by the Reagan, George H.W. Bush, and Clinton Administrations continued this momentum. A 1992 Supreme Court ruling (*United States v. Fordice*) marked the end of state-sanctioned segregated schooling while allowing HBCUs to continue their unique service to students, graduates, and the community (CollegeView, 2001).

## *HBCUs and NSF*

As noted by Fortenberry, Powlik and Baker (2001), NSF programs devoted to diversity were not created until the 1970s. Through that decade, NSF's efforts to improve undergraduate education focused on the development of instructional materials, alternative or interdisciplinary degree development, and continuing education of science professionals. Early minority-focused programs included the Minority Science Improvement Program (MSIP), the Research Initiatives in Minority Institutions (RIMI) and the Resource Centers for Science and Engineering (RCSE). The release of *A Nation at Risk* (NCEE, 1983) and "The Neal Report" (NSB, 1986) stirred the national impetus for improved undergraduate laboratories and teaching faculty. In the late 1980s, the Minority Advancement Award (MAA) and Minority Research Planning Grant (MRPG) programs

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were popular at NSF, eventually giving way to the Career Advancement Awards (CAA) for young minority faculty.

In the 1990s, programs focusing on laboratory, curriculum, and faculty enhancement became more comprehensive and more inclusive of minority students. Early efforts on behalf of HBCUs were concentrated in the areas of student support, faculty enhancement and the development of disciplinary expertise, curricula, and facilities. The Research Careers for Minority Scholars (RCMS) program and the Alliances for Minority Participation (AMP)/Louis Stokes Alliances for Minority Participation (LSAMP) were part of this increased commitment to STEM academics and careers. Several HBCUs benefited from partnerships with Research I institutions as well as linkages with industry and NSF's Research Experiences for Undergraduates (REU) program.

Since 1995, NSF has awarded more than \$288 million to HBCUs, including more than \$40 million to 47 institutions in FY 2001 alone. Half of all HBCUs are currently leading or participating in an NSF-supported project. In so doing, they fulfill a key NSF strategy: to help HBCUs move beyond campus boundaries and forge links with other institutions of higher education, K-12 school districts, Federal and private research centers and laboratories, and U.S. business and industry.

## NSF Program Support of HBCUs (FY 2001)

	NSF Directorate	Program	Support
Education and Training	Education and Human Resources (EHR)	<b>Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)</b>	<b>27 awards \$14.6 M</b>
	EHR	Louis Stokes Alliances for Minority Participation (LSAMP)	9 awards \$4.23 M
	EHR	Computer Science, Engineering and Mathematics Scholarship (CSEMS)	19 awards \$5.53 M
	EHR	Course, Curriculum, and Laboratory Improvement (CCLI)	3 awards \$500,000
	EHR	Model Institutions for Excellence (MIE)	1 award \$2.16 M
	EHR	Rural Systemic Initiatives (RSI)	1 award \$2.55 M
	EHR	Teacher Enhancement (TE)	2 awards \$1.8 M
Research and Development	EHR	Centers of Research Excellence in Science and Technology (CREST)	7 awards \$6.25 M
	EHR	Experimental Program to Stimulate Competitive Research (EPSCoR)	2 awards \$600,000
	Computer and Information Sciences Engineering (CISE)	Minority Institutions Infrastructure (MII)	2 awards \$1.1 M
	Foundation-wide	Collaboratives to Integrate Research and Education (CIRE)	1 award \$440,000
	Foundation-wide	Research Experiences for Undergraduates (REU)	7 awards \$360,000
	Foundation-wide	Faculty Early Career Development (CAREER)	12 awards \$500,000
	Inter-agency	Interagency Education Research Initiative (IERI)	1 increment \$1 M
		<b>TOTAL</b>	<b>94 awards \$40.6 M</b>

Source: National Science Foundation, 2001.

Taken collectively, NSF's agency-wide support has enabled HBCUs to:

- make substantial contributions in fundamental research and discovery in established and emerging fields of science and engineering;
- create high-caliber undergraduate and graduate education activities leading to successful careers in the STEM workforce;
- integrate research into education at the graduate and undergraduate levels, ensuring distinctive opportunities for learning and discovery; and
- simulate capacity building through the development of human intellectual capital and the acquisition of state-of-the-art facilities.

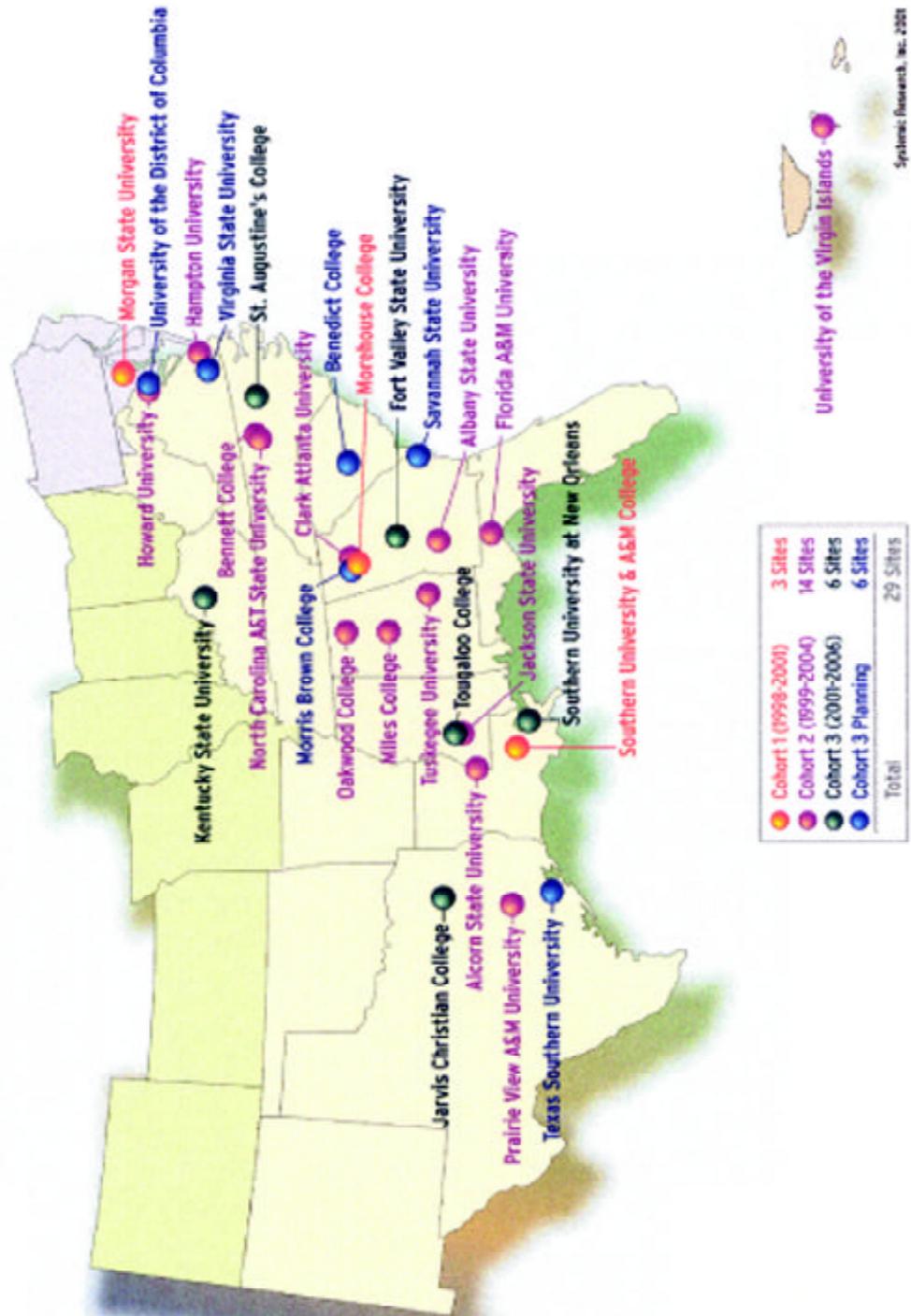
These emphases have helped to provide HBCUs with the fundamental tools and human capital that have allowed them to compete successfully for mainstream NSF support in education and research. Those targeted efforts continue with HBCU-UP and the progress has been impressive.

### *The Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)*

Administered within NSF's Directorate for Education and Human Resources, the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) began in FY 1998 by announcing awards totaling \$42 million over five years. Fourteen HBCU-UP awards were made in FY 1999, the program's first full year, with the intent of "promoting diversity and increased participation of underrepresented groups in science, mathematics, engineering and technology" (NSF, 1999b). The five-year HBCU-UP cooperative agreements represented an expansion of the three-year agreements of earlier programs and a 25 percent increase in funding for the undergraduate program. The new, longer-duration awards also were intended to increase the number of institutions and students participating in HBCU-UP, improve the quality of programs, and increase student enrollment and degree completion in STEM.

Today, HBCU-UP continues to provide awards to enhance the quality of STEM instructional and outreach programs at HBCUs. Funded at a level of approximately \$15 million annually, the program offers multi-year Cooperative Agreements as well as smaller one-year planning grants to allow a broader group of institutions to develop full proposals for such agreements. In this way, institutional support is made available to HBCUs for the implementation of comprehensive approaches to strengthen teaching and learning in ways that improve access to, retention within, and graduation from STEM programs (NSF, 2001).

# National Distribution of HBCU-UP Awards (FY 2001)



*“We must recognize not only demographic differences [of selected student groups including prospective teachers, two-year college students, and underrepresented populations], but differences in learning styles, personal values and career goals.”*

— Fortenberry, Powlik and Baker (2001)

*“These initiatives will provide a rich, stimulating environment for students that will provide a unique window on the reasons why people become scientists.”*

— Artee Young  
HBCU-UP Principal Investigator  
Tougaloo College (2000)

# Observations on the National Condition

Although much has been done to improve and diversify Federal support of HBCUs, the need for continued efforts in this area persists, as is evident in NSF's own reporting and that of its awardees:

- “Research universities are less prominent in the undergraduate S&E [science & engineering] education of underrepresented minority groups than they are in the overall student population. Black students receive their undergraduate S&E education mainly in comprehensive universities and liberal arts colleges. Historically black colleges and universities (HBCUs) still play a significant role in the undergraduate S&E education of black students.” (NSF 2000a, p. 4-2)
- “[HBCUs] produce 30 percent of engineering degrees [for undergraduate black students], 44 percent of their natural science degrees, and 25 percent of their social science degrees. These percentages have remained relatively stable for the past 20 years.” (NSF 2000a, p. 4-10)
- Thirty-one percent of blacks awarded S&E bachelor's degrees in 1996 attended HBCUs, up slightly from 28 percent in 1990. HBCUs represented about two-thirds of the 25 institutions that awarded the largest number of S&E bachelor's degrees to black males and females. (NSF 2000b, p. 22)
- Black students completing their undergraduate education at HBCUs are more likely than those from other schools to attend graduate school and to complete doctoral degrees in science and engineering. HBCUs also account for 17 percent of black graduate students in science and engineering fields. (NSF 2000b, p. 30)
- As of 1997, HBCUs accounted for higher percentages of black graduate student enrollment in the agricultural sciences (38 percent), physical sciences (30 percent), and biological sciences (27 percent). (NSF 2000b, p. 30)
- “Among black women earning doctorates in the biological sciences [between 1975 and 1992], almost 75 percent earned undergraduate degrees from HBCUs.” (NSF 1999a, p. 60)

- In 1971, 82 percent of whites and 59 percent of blacks aged 25 to 29 had completed high school. By 1998, 94 percent of whites and 88 percent of blacks in that age range had completed high school. Consequently, the pool of potential black STEM undergraduates has increased significantly. (NSF Division of Human Resource Development)
- Non-white enrollment in undergraduate programs has increased over the last two decades, both in absolute numbers and as a percentage of total undergraduate enrollment. The number of black students rose from approximately 1.1 million in 1990 to approximately 1.4 million in 1996—that is, from 9.5 percent to 10.9 percent of total undergraduate enrollment, with females representing more than half the students in each group. (NSF Division of Human Resource Development)
- Black enrollment in engineering peaked in 1993 and dropped in 3 of the 4 years from 1994 to 1997. Black full-time first-time undergraduate enrollment in engineering dropped 16 percent from 1992 to 1996. (NSF Division of Human Resource Development)
- In 1998, blacks were less likely than whites to graduate from college. Among those aged 15 to 29 in 1998 and who had completed high school, only 18 percent of blacks had earned bachelor's degrees or higher (compared to 16 percent of Hispanics and 34 percent of whites). Thirty-seven percent of black students who entered a bachelor's degree program in 1989 had earned no degree and were no longer enrolled in a bachelor's program in 1994. (NSF, 2000b)
- The percentage of S&E graduate students who are black or Hispanic increased from 4 percent in 1982 to 6 percent in 1997. Black students earned 3,518 science and engineering master's degrees in 1996 (5 percent of the total), up from 1,652 (3 percent) in 1989. (NSF Division of Human Resource Development)
- The percentage of master's degrees earned by blacks in each of the major science and engineering fields increased between 1989 and 1996, with the numbers of master's degrees earned by blacks in some fields (e.g., mathematics) more than doubling over the seven-year period. (NSF Division of Human Resource Development)
- At the doctorate level, the number of science and engineering doctorates awarded to blacks remained fairly constant from 1975 to 1990—approximately 300 to 375 per year—but rose in the 1990s, reaching 607 in 1997. Blacks accounted for 3 percent of all science and engineering doctorate recipients in 1997, up from 2 percent in 1975. (NSF Division of Human Resource Development)

- “Only about 21 percent of entering freshmen complete graduation in STEM fields in stipulated period of four years.” (Bennett College, HBCU-UP proposal #9909030)
- “HBCUs have been the major source of [baccalaureate] degrees awarded to African Americans in science, engineering, and mathematics (SEM) disciplines. But the situation is rapidly changing. Several data also suggest that SEM bachelor degrees awarded to African Americans by HBCUs have been declining since 1987.” (Jackson State University, HBCU-UP proposal #9909023)
- “Nationwide statistics show marked under-representation of minority students attending graduate schools or pursuing careers in the areas of [SEM]. HBCUs are in the most ideal situation to provide solutions to this problem.” (Kentucky State University, HBCU-UP proposal #0102828)
- “The shortage of qualified labor in the science and technical workforce is particularly acute within the underrepresented minority population. Minorities make up only 14.5 percent of the present enrollment in graduate science and engineering programs and 6 percent of the science and technical work force. Compared to the 28 percent minority representation in the population as a whole, there is an untapped minority resource for building the Nation’s scientific and technical workforce.” (Southern University at New Orleans, HBCU-UP proposal #0102620).

# HBCU-UP Awards Through FY 2001

***For the interested reader, Abstracts and detailed award information for the HBCU-UP projects summarized on the following pages can be searched at: <http://www.fastlane.nsf.gov/a6/A6AwardSearch.htm> using the award number indicated in parentheses. Unless otherwise noted, quotations in project summaries are taken from these Abstracts.***

## *FY 1998 – The First HBCU-UP Awards*

Based on merit review of eligible proposals, HBCU-UP made 3 awards to institutions in 3 states prior to the program's first full year of administration. However, each of these initial proposals amply demonstrated the various avenues of impact envisioned by this exciting new initiative.

- Atlanta's **Morehouse College** (#9815529) submitted a successful proposal to develop research and educational opportunities in the neurosciences. The project, including new undergraduate lecture and laboratory courses, intends to stimulate student interest in neuroscience as a career path. The *Promoting Excellence in Teaching and Research in the Neurosciences* project includes a collaborative teaching component drawing on faculty experience from several universities and colleges in the Atlanta area. In addition to a substantial investment in updated software and hardware, the project is making laboratory experiments more engaging and relevant for students by using activities that better emulate basic research techniques. Since the college's HBCU-UP award, the number of students participating in faculty research has shown a steady and significant rise. Additionally, the programs made possible by the HBCU-UP grant have served as pilot projects of inter-departmental cooperation, curriculum development and student support.
- Baltimore's **Morgan State University** (#9815514) also received a FY 1998 HBCU-UP Cooperative Agreement for its proposal to extend the influence of undergraduate STEM education by enhancing pre-college bridge programs and initiating bridges to post-baccalaureate institutions. The project also features a focus on interdisciplinary courses designed to emphasize the interconnectedness of STEM disciplines. Morgan State's other activities include financial and other incentives for STEM majors to assist their

focus on academic achievement. As one early example, during the Fall 1999 semester, students in the General Physics and University Physics courses were introduced to computer-based real-time physics (RTP) experiments. The experiments are designed to enhance students' understanding of fundamental concepts and introduce them to data acquisition and analysis methods used in modern research laboratories.

- Also in FY 1998, Louisiana's **Southern University A&M College** (SU, #9815451) proposed *Strengthening Minority Access to Research and Training (SMART)*, a strategic plan using research training to increase the preparedness of minority undergraduate STEM majors. This Cooperative Agreement enforced a fundamental HBCU-UP tenet: that better-prepared undergraduate students are more likely to undertake and complete graduate degrees, in turn decreasing the critical shortage of minority doctorates in STEM disciplines. The SU proposal also included professional development activities and a restructuring of the university's educational infrastructure toward a research-oriented curriculum. To date, the project has supported 134 STEM students in research experiences for undergraduates (REU) activities, and 39 faculty members have voluntarily served as research mentors for SMART Scholars. Additionally, 7 faculty members have received SMART mini-grants to support the development of research capabilities for young faculty or those without externally funded research.

### *FY 1999 –The Inaugural HBCU-UP Cohort*

By the program's first full year of administration, several institutions had developed projects with a clear focus on producing increased numbers of underrepresented minority students in STEM fields. Among the 14 awards to 8 states, the District of Columbia, and the U.S. Virgin Islands were:

- **Florida A&M University** (FAMU, #9979944), which focused on increasing the number of black students qualifying for graduate degrees in STEM fields. This effort, aimed especially at the doctoral level, also seeks to increase the number of baccalaureate degrees awarded in biology, chemistry, computer and information sciences, electrical engineering, mathematics and physics. Research-based teaching and learning methods, faculty development and incentives for undergraduate teaching, and increased use of Internet-based technologies provide the foundation of the FAMU proposal. Start-up activities included the consolidation of the FAMU-UP's Academic Learning Center (ALC) and main administrative offices into a renovated modular building. The ALC has begun providing tutorial services in mathematics, chemistry, physics and engineering,

and, in 2001, began providing workshops for STEM students. FAMU-UP has also funded 12 mini-grant projects directed by FAMU STEM faculty. The projects are designed to increase the use of active-learning opportunities for students at the university.

- Virginia's **Hampton University** (#9979903) received an HBCU-UP Cooperative Agreement to implement a model undergraduate program offering curriculum enhancement of interdisciplinary programs and research, a pre-freshmen summer institute program, faculty-development opportunities, scholarships for qualified students, an Integrated Learning Environment (ILE) for science majors, and expanded opportunities for undergraduate research. "Hampton recruits and retains faculty who are committed to utilizing their own research as an integral part of the curriculum," say project staff. "The university's emphasis on the integration of teaching and research is reflected in the faculty evaluation process, where research activities are assessed explicitly in terms of the degree to which they contribute to the undergraduate academic experience."
- The **University of the Virgin Islands** (UVI, #9979896) is also using HBCU-UP funds to build upon its faculty commitment to STEM students, mentoring, and systemic reform. Hands-on research opportunities and a relevant, engaging curriculum were proposed to increase student interest in STEM disciplines. Scholarships and summer programs as well as bridge programs with Columbia University in New York City and Washington University in St. Louis will ensure that STEM graduates from the only provider of higher education in the Virgin Islands will have tangible opportunities to apply their enthusiasm and investment. Like several other HBCU-UP proposals, the UVI project intends to create a model program for other HBCUs to emulate. One hundred percent of students participating in the summer programs would recommend it and project staff have seen an increase of 52 percent in science majors while the overall university enrollment has decreased by 16 percent.
- Mississippi's **Alcorn State University** (#9909090) proposed a joint effort of its STEM departments to increase student diversity in the STEM workforce. Rigorous instruction and mentoring are also to be used to facilitate student transition into graduate school. There are now 61 STEM majors involved in faculty-supervised activities at Alcorn, with 44 of them involved in supervised research in technology, biology, chemistry, and mathematics. Course syllabi have been revised, and supplemental textbooks and software have been placed in the university library for general and organic chemistry, microbiology, cell and molecular biology, and genetics.

- **North Carolina A&T State University** (#9909058) presented its *TALENT-21* project as a conduit to increase the number of students in STEM, enhance the career competitiveness of STEM graduates, and encourage more graduates to pursue Ph.D.s in these fields. Specific goals of TALENT-21 include curricular reform in calculus, chemistry, and physics; broadening interdisciplinary programs; faculty development; research training and experience for students; scholarships; summer institutes; and aggressive recruitment. The first annual NC A&T STEM summer institute, a six-week residential program, was successfully implemented in Summer 2001, serving 19 students. Thirty faculty members in the departments of physics, mathematics, and chemistry have also been trained to use the smart classrooms for instruction and presentations.
- The District of Columbia's **Howard University** (#9909040) is focusing its efforts on the production of more minorities earning STEM degrees, proposing to double its production of these graduates within five years. Specific activities of this Cooperative Agreement include mentoring and advising activities as well as research-for-credit and teamwork-based learning environments. The project also addresses retention rates in STEM through the preparation of undergraduate students for graduate study. During Summer 2001, 25 high school graduates participated in Howard's four-week chemistry- and mathematics-intensive pre-freshman program; during the Fall 2001 semester, faculty from the Department of Chemistry established laboratories in Advanced Placement Chemistry for high schools in the Washington area.
- Alabama's **Miles College** (#9909035) received a Cooperative Agreement from HBCU-UP for its strategic plan to "develop a systematic educational continuum from the undergraduate to the doctorate level" with a mind toward increased student enrollment and student encouragement. Summer internships will provide students with research experience, faculty will receive increased professional training, and partnerships between the college and the private and public sector will increase the opportunities for students within the broader community. The college's HBCU-UP program sponsored the third Miles College High School Science Day in 2001, involving over 200 high school students in a science-research poster competition. Miles College students also participate each year in the annual Alabama Alliance for Graduate Education and the Professoriate (AGEP) Graduate School Fair, another NSF-supported project.
- Texas' **Prairie View A&M University** (#9909032) applied its HBCU-UP Cooperative Agreement to the development of improved recruitment and retention systems for STEM undergraduates while increasing partnerships with local high schools, corporations, and industry and government laboratories. This tri-partite approach gives

students the opportunity to participate in STEM education at the undergraduate level, encourages this interest with relevant academic support, then provides outlets for graduates to further their studies or chosen career. Collaborations with grade schools in the region continue to expand, with recruitment efforts now reaching more than 100 districts and campuses covering a wide area of Texas and other states. The PVAMU STEM Summer Institute has proven to be a viable bridge program to develop the mathematical, computer, communications, and professional skills of recent high-school graduates.

- **Bennett College** (#9909030), a black women's liberal arts college in Greensboro, North Carolina, received a Cooperative Agreement to address STEM student retention by improving the college preparation of first-year students, providing an appropriate technology infrastructure, and establishing more relevant instructional methods for increasing student motivation. A pre-college summer academy, tutorial center, classroom presentation equipment, upgraded science laboratories, computer laboratories in the dormitories, and faculty training are included in the project. A fully developed NSF Summer Academy for entering students, designed to prepare its participants for college with course work, enrichment activities, and laboratory experiences, brought 31 first-year women to Bennett's Campus in July 2000.
- Georgia's **Albany State University** (ASU, #9909028) received a FY 1999 HBCU-UP Cooperative Agreement to strengthen its science, mathematics, pre-engineering, and technology programs. The project's specific goals include: 1) reducing the student attrition in gateway courses by two-fold; 2) establishing a technology-based resource center for students and faculty; 3) increasing the infusion of technology in all phases of STEM instruction; 4) increasing student internships and co-op programs by 250 percent; and 5) developing a bridge program with local high schools. ASU will provide competencies for students matriculating in programs such as pre-engineering and who transfer to other baccalaureate-granting institutions. Albany State University also hosted the 2002 NSF HBCU-UP National Research Conference in February, 2002. Students and professionals representing 29 colleges and universities from across the country as well as Puerto Rico and Virgin Islands attended the conference.
- Mississippi's **Jackson State University** (JSU, #9909023) entered into an HBCU-UP Cooperative Agreement with its *Science and Technology Access to Research and Graduate Education* proposal. The project includes measures to improve the integration of teaching and research at the undergraduate level and to improve student recruitment, retention, and graduation using proven models. The university is now strengthening its STEM

degree production at all levels via curriculum, student, and faculty development. Partnerships with national laboratories and other universities and the increased use of information technology will also enhance the undergraduate experience of JSU students. The university has enhanced its Comprehensive Student Support Center to include a new 30-station state-of-the-art computer lab with an electronic sign-in that provides an accurate record of students use, including: major, classification, topic studied, tutor, resources, instructor and course and number. A total of 748 students have used the lab, while smart classrooms offer student computer stations along with electronic presentation equipment and network connectivity to instructors via laptop computers.

- **Clark Atlanta University** (#9909014) in Georgia received a FY 1999 HBCU-UP Cooperative Agreement for its *Enhancing Science, Mathematics, Engineering and Technology Education* project. Among the institution's specific goals are: an undergraduate STEM enrollment of 1,500 students, 250 graduate-level STEM majors, 80-percent retention of STEM students, and 60-percent successful transition to graduate school. New courses will include preparatory general chemistry, problem solving, introduction to high-performance computing, environmental management and treatment technologies, precalculus, and electives in astronomy and semiconductor devices. A design- and research-integration learning lab will be initiated to enhance the curriculum and improve science writing and Graduate Records Exam workshops will help prepare students for graduate school. The techniques and practices adapted or modified for use at the university—especially for gatekeeping courses—include: improved use of technology and distance learning, use of workshop formats and smaller class size, hands-on science education, and after-hours peer tutoring by other STEM students.
- Alabama's **Tuskegee University** (#9908994) and its *Preparing for the Future: Strengthening Basic Science, Mathematics, and Biochemistry* project provides a broad range of activities to promote undergraduate student success in STEM subjects. A summer program supports motivated but poorly prepared college sophomores. First-year chemistry and mathematics courses are strengthened through tutorials, and the higher-level biochemistry curriculum has been enhanced. Partnerships with industry, partnerships with other institutions such as Georgia State University, Iowa State University, and Michigan State University, a resource center and mentoring activities round out the HBCU-UP activities. A Math Lab was established at the university during the 2000-2001 academic year and students began using the facility in January 2001. Twelve students were involved in an eight-week research experience during summer 2001 at one of the

Academic Partner Institutions. Fourteen students have been accepted for this same program for summer 2002. For summer 2001, 56 students from agricultural science, biology and chemistry were noted to be involved in summer programs at external universities.

- **Oakwood College** in Huntsville, Alabama, received a Cooperative Agreement (#9908993) to attract students to its biosciences, chemistry, and chemical engineering courses. The project aims to provide these students with a strong foundation in research experience and encourage them to pursue STEM degrees. Among its goals, the program aims to have 75 percent of its graduates earn admission to Ph.D. programs. Additionally, students will be mentored, given research experiences and exposure to visiting scientists, and afforded opportunities to publish research and attend national professional conferences. Students also have opportunities for summer research experiences, and it will be their choice to use their stipends to travel to other institutions or remain at Oakwood College to participate in research projects on campus.

### *FY 2000-2001 – The HBCU-UP Millennial Cohort*

For FY 2000 and FY 2001, HBCU-UP made another 14 awards—7 standard grants, 1 continuing grant and 6 Cooperative Agreements—totaling more than \$13 million to HBCUs in 8 states and the District of Columbia. Included in this “millennial” cohort were:

- The Washington, DC-based **Quality Education for Minorities Network** (QEM, #0003232) received a two-year standard grant to provide technical assistance to HBCU-UP. This support includes the provision of technical assistance to 6 FY 1999 and 6 FY 2000 HBCU-UP awardees as well as a foundation for enlarging the pool of potential program grantees via workshops and information dissemination. QEM’s goals include HBCU-UP proposal submission by 67 percent of its workshop participants with a success rate of 50 percent for such submissions.
- Massachusetts’ **Systemic Research** (#0136117) also received HBCU-UP support as a continuing grant to develop and implement a progress-monitoring system for program grantees. The system will be based on the specified goals of the program as well as those of successful proposals. It will be delivered to HBCU-UP principal investigators and data managers in a workshop setting and the results will be compiled into a fact book for the program. Systemic Research will also host a web site to facilitate communication between program grantees.

- **Jarvis Christian College** in Hawkins, Texas (JCC, #0103501) received a FY 2001 Cooperative Agreement for proposing a “community of academic partners” to increase significantly the minority participation in and access to STEM study. JCC’s efforts include pre-college outreach; undergraduate student scholars; and faculty, curriculum, equipment, and laboratory development. The project goals include a significant increase in STEM enrollment among high-school graduates and unparalleled achievement in Jarvis’s summer bridge program. Efforts will also seek significant levels of undergraduate retention and enrollment in graduate or professional STEM programs. The project also aims to increase the number of STEM majors by 20 percent annually.
- Houston’s **Texas Southern University** (#0102874) received a one-year HBCU-UP planning grant to develop comprehensive recruitment and retention plans for undergraduate STEM education. The university will utilize a corporate and professional advisory committee to assist the faculty’s use of technology and improvements to curricula. Additionally, an assessment and evaluation plan will help to ensure that the university’s plan strives for autonomy after NSF funding has ended.
- Atlanta’s **Morris Brown College** (MBC, #0102835) received an HBCU-UP planning grant to prepare an assessment plan for its infrastructure, faculty preparedness, and student population considering STEM degrees. The plan will result in an academic institution that is cognizant of these factors and contributes to self-sustaining pedagogical reform. MBC’s ultimate goal is to increase minority participation in the STEM “knowledge workforce.”
- **Kentucky State University** (#0102828) proposed *Teams Enhancing Access for Minorities in Science (TEAMS)*, which includes an undergraduate bridge program for high-school seniors and graduates and a bridge program for undergraduate students preparing for graduate school. The Cooperative Agreement also proposes a challenging STEM curriculum and study/research teams to develop problem solving and cooperative approaches to learning. Additionally, faculty-development activities will enhance undergraduate students’ learning experiences.
- The goals of the HBCU-UP Cooperative Agreement with Mississippi’s **Tougaloo College** (#0102512) include an increase in the number of: science, mathematics, and computer-science majors; undergraduates who complete their studies with honors; and students who pursue STEM majors in graduate school. The project will include improvements to the introductory biology, chemistry, and mathematics curricula; supplemental tutorial assistance and exam preparation; and summer programs in

introductory physics, pre-engineering, and computer science. Activities will also include the development of reading and English skills and scholarships for students who maintain a 3.3 science grade-point average. Faculty will also be encouraged to develop a viable on-campus research program for undergraduates.

- Georgia's **Savannah State University** (#0102801) was awarded a FY 2001 planning grant to conduct an assessment of its STEM education programming and develop an institutional plan to enhance its academic environment for minority STEM majors. The number of qualified graduates (those with a 3.0 grade-point average or higher) and students moving on to graduate programs will be particularly addressed.
- **Fort Valley State College** (#0102798), also in Georgia, received a FY 2001 Cooperative Agreement to augment its retention rate for STEM majors and its placement of science majors in medical and graduate school. The project is committed to increasing the number of STEM undergraduate majors by 30 percent and increasing the number of STEM graduates by 10 percent over five years. Revised gateway courses, improved tutorials and research exercises, improved pedagogy and internships, and job placement for students are also part of the project.
- The **University of the District of Columbia** (#0102722) is using a HBCU-UP planning grant to establish a STEM research and training center. The center will be used to develop and implement effective strategies for teaching and retaining students in STEM fields. The project will include the modification of gatekeeper courses, activities to develop the STEM education capabilities and performance of students and faculty, and obtaining information on successful practices and programs in these areas. One hundred freshmen—50 STEM majors and 50 undeclared majors—will be randomly selected to participate in the center.
- **Benedict College** in Columbia, South Carolina, also received a planning grant (#0102676) to assess its strengths and weaknesses in mathematics and other gatekeeper courses and to assess the opportunities for undergraduate STEM research activities. Assessment of faculty and student exam performance will be complemented by visits to other institutions with STEM curricula recently reformed with NSF support. Such information will advise the college on those areas most in need of attention and will help them prepare a full HBCU-UP proposal for a future competition.
- **Southern University at New Orleans** received a FY 2001 Cooperative Agreement (SUNO, #0102620) for its *Program of Excellence in Science, Mathematics and Computer Technology (PESMaCT)* project. The SUNO objectives are to incorporate technology into

all gatekeeper courses, double its current retention rate to 60 percent, graduate 300 STEM majors within a five-year period, and have 15 percent of these accepted to graduate or professional schools. The project also plans to establish linkages with the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP)—another major NSF-funded education project in the area—local high schools, and existing graduate programs in social work, criminal justice, computer information systems, and education.

- **Virginia State University** received a FY 2001 planning grant (#0102533) that, like other HBCU-UP planning grants, seeks to provide an assessment of the institution's needs and assets in STEM education. The resulting action plan will enable the university to compete with other HBCUs for a full Cooperative Agreement in a future award competition.
- **Saint Augustine's College** of Raleigh, North Carolina, was awarded a Cooperative Agreement (#0102892) for its *Living and Learning Science Retention Program (LALSRP)* proposal. The project will implement curriculum revision, research experiences for undergraduates; increased student confidence through role models, mentors, and other academic support; and research and curriculum development opportunities for faculty. The project will support 50 to 60 students per year and will impact the approximately 1,400 undergraduate students living on the college's campus. It is also hoped that LALSRP can provide a model for implementation at other HBCUs.

For more than two decades, the National Science Foundation has made investments in the research and education activities and infrastructure of the Nation's HBCUs. By recognizing the common—and uniquely individual—efforts of each institution, these awards represent the fundamental programmatic goal of HBCU-UP: to promote diversity and increased participation of underrepresented groups in STEM research, education, and the national workforce.

See <http://www.ehr.nsf.gov/hrd/> for the current portfolio of programs in NSF's Division of Human Resource Development.

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