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*Federal Research and Development Funding at Historically  
Black Colleges and Universities*

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September 26, 2008

**Abstract.** An August 2008 report of the NSF reveals that for the academic year 2006, approximately 33.0% of the black science and engineering doctorate recipients had earned their bachelor degrees at an HBCU. While HBCUs have played an important role in providing the undergraduate preparation for many of those black students entering highly specialized science and engineering disciplines, forecasts indicate that their efforts at attracting, retaining, preparing, and graduating students in the sciences and engineering may need to be expanded in order to respond to changing demographics. A September 2006 report of the Department of Education (ED) states that between 2004 and 2015, enrollment in degree-granting institutions is projected to increase 27% for black, non-Hispanic students, 42% for Hispanic students, 30% for Native American/Alaskan Natives, 28% for Asian/Pacific Islanders, and 6% for white, non-Hispanic students. These groups, the "new majority," on which the economy must increasingly rely, have traditionally been underrepresented in the sciences compared to their fraction of the total population.

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# Federal Research and Development Funding at Historically Black Colleges and Universities

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September 26, 2008

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## Summary

The historically black colleges and universities (HBCUs), which have traditionally educated a significant number of the nation's blacks, have faced, and continue to face, substantial challenges in attempting to enhance their academic and research capabilities. Some of these institutions have a myriad of problems—aging infrastructures, limited access to digital and wireless networking technology, absence of state-of-the-art equipment, low salary structures, small endowments, and limited funds for faculty development and new academic programs for students. While many of these problems exist in other institutions, they appear to be considerably more serious in HBCUs. In addition, those HBCUs damaged by Hurricane Katrina have the added costs in the millions of replacing facilities, research equipment, and rebuilding their infrastructure. This is an issue for Congress because the distribution of federal funding for HBCUs is one of the critical issues facing these institutions.

HBCUs comprise approximately 2.3% of all institutions of higher education, and enroll approximately 11.6% of all black students attending post-secondary institutions. Approximately 33.0% of the undergraduate degrees in science and engineering earned by blacks were awarded at HBCUs. Some of the most successful programs designed to attract and retain underrepresented minorities into the sciences and in research careers have been initiated at HBCUs. Data indicate that in 2004, HBCUs provided the education for approximately 20.2% of blacks earning bachelor degrees in engineering, 39.5% in the physical sciences, 26.3% in computer science, 37.0% in mathematics, 36.1% in the biological sciences, 47.0% in agricultural sciences, 16.4% in social sciences, and 21.4% in psychology.

On August 14, 2008, the President signed into law P.L. 110-315, the Higher Education Opportunity Act (HEOA). The HEOA provides authority for loans for repair and renovation of academic research facilities, among other facilities. Language in Title III, Part B, provides formula grants to eligible institutions. The percentage of funds allocated to each institution is based on several factors, and no institution can receive less than \$250,000. Title III, Part D of the HEOA establishes a bonding authority to raise capital to be lent to HBCUs for repair and renovation of facilities. The total amount that would be available for financing is \$1.1 billion. The aggregate authority principal and unpaid accrued interest on these loans cannot be more than \$733.3 million for private HBCUs and no more than \$366.7 million for public HBCUs. Title III, Part E of the HEOA provides funding for two new minority science and engineering improvement programs. A partnership grant program is directed at increasing the participation of underrepresented minority youth or low-income youth in science, mathematics, engineering, and technology education. Activities to be supported include outreach, hands-on, and experiential-based learning projects. Another program will focus on encouraging minorities to pursue careers in the scientific and technical disciplines.

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## Introduction

The historically black colleges and universities (HBCUs), which have traditionally educated a significant number of the nation's blacks, have faced and continue to face substantial challenges in attempting to enhance their academic and research capabilities and develop programs to compete with other institutions of higher education. Some of these black institutions have a myriad of problems—aging infrastructures, limited access to computer resources and digital network technology, absence of state-of-the-art equipment, low salary structures, small endowments, and limited funds for faculty development and new academic programs for students.<sup>1</sup> While many of these problems exist in other institutions, they appear to be considerably more serious in HBCUs.<sup>2</sup> In addition, those HBCUs damaged by Hurricane Katrina have the added costs in the millions for replacing facilities, research equipment, and rebuilding their infrastructure.<sup>3</sup>

The changing external environment (increasing public demand for institutional accountability and effectiveness) and new competitive conditions in higher education (varying levels of state support coupled with spiraling costs of research) have made it increasingly harder for HBCUs to develop and expand their research programs.<sup>4</sup> Because of their level of financial support (federal, state, and private), some believe many HBCUs are unable to engage in the level of cutting-edge scientific research conducted by many non-HBCUs.<sup>5</sup> Many HBCUs face difficulty competing for federal research dollars with other research-performing universities.<sup>6</sup> Coupled with limited

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<sup>1</sup> House Committee on Education and Labor, *America's Black Colleges and Universities: Models of Excellence and Challenges for the Future*, 110<sup>th</sup> Cong., 2<sup>nd</sup> Sess., March 13, 2008, Written testimonies of Hazel O'Leary, President, Fisk University and Earl S. Richardson, President, Morgan State University. See also Chalokwu, Christopher I., "A Rationale for Increasing Funding for HBCUs," *Black Issues in Higher Education*, v. 20, January 1, 2004, p. 98, Frazier, Matt, "Survival Is Evolving Struggle for Black Colleges," *Fort-Worth Star-Telegram*, February 2, 2003, Metro, p. 1.

<sup>2</sup> See for example Powell, Tracie, "Surviving Tough Times: From Administrative Reorganizations to Finding New Streams of Revenue, Some Historically Black Colleges and Universities are Determined to Stay Afloat," *Black Issues in Higher Education*, v. 20, January 1, 2004, pp. 34 -37.

<sup>3</sup> See for example Minor, James T., *Contemporary HBCUs: Considering Institutional Capacity and State Priorities*, Michigan State University, College of Education, January 2008, 37 pp., Southern Education Foundation, "Education After Katrina: Time for a New Federal Response," Atlanta, GA, August 2007, 35 pp., Hamilton, Kendra, "Restructuring, Restoring and Rebuilding," *Diverse Issues in Higher Education*, v. 23, March 23, 2006, pp. 24-27, and Schuman, Jamie, "Southern U. At New Orleans May Have to Rebuild From Scratch, at a Cost of \$300-Million or More," *The Chronicle of Higher Education*, v. 52, September 23, 2005, p. A16.

<sup>4</sup> Educational Testing Service, *A Culture of Evidence III: An Evidence-Centered Approach to Accountability for Student Learning Outcomes*, Princeton, NJ, February 2008, 24 pp., Department of Education, *A Test of Leadership, Charting the Future of U.S. Higher Education, A Report of the Commission on the Future of Higher Education*, September 2006, 76 pp., Carey, Kevin, "Make Universities Accountable for What Matters," Education Sector, November 2007, Redden, Elizabeth, "Explaining State Spending on Higher Ed," *Inside Higher Ed*, October 11, 2007, <http://www.insidehighered.com/news/2007/10/11/spending>, and National Science Foundation, "Universities Report Stalled Growth in Federal R&D Funding in FY2006," InfoBrief, NSF07-336, Rhonda Britt, Arlington, VA, September 2007, 6 pp.

<sup>5</sup> Chalokwu, Christopher I., "A Rationale for Increasing Funding for HBCUs," and House Committee on Science and Technology, Subcommittee on Research, *Preparing a 21<sup>st</sup> Century Workforce: Strengthening and Improving K-12 and Undergraduate Science, Math, and Engineering Education*, 107<sup>th</sup> Cong., 2<sup>nd</sup> Sess., April 22, 2002, Testimony of Sebetha Jenkins, President, Jarvis Christina College.

<sup>6</sup> See for example The Southern Education Foundation, *Igniting Potential, Historically Black Colleges and Universities and Science, Technology, Engineering and Mathematics*, Summer 2005, 36 pp.

federal support, HBCUs have very small endowments. A 2005 report of the Southern Education Foundation found that HBCUs have received attention and support from only a few foundations.<sup>7</sup>

Amid criticism by officials and representatives of HBCUs concerning the disparity in their receipt of federal science and engineering support, several executive orders were issued between 1980 to 2002, designed to strengthen and increase the participation of the HBCUs in federally sponsored programs and to improve the administrative infrastructure of the institutions.<sup>8</sup> The most recent executive order was released on February 12, 2002, and states that:

In developing its annual plan, each executive department and agency identified by the Secretary shall emphasize programs and activities that develop the capacity of historically black colleges and universities to contribute to the development of human capital and to strengthen America's economic and technological base through: (1) infrastructure development and acquisitions for instruction and research; (2) student and faculty doctoral fellowships and faculty development; (3) domestic and international faculty and student exchanges and study-abroad opportunities; (4) undergraduate and graduate student internships; and (5) summer, part-time, and permanent employment opportunities.<sup>9</sup>

An August 2008 report of the NSF reveals that for the academic year 2006, approximately 33.0% of the black science and engineering doctorate recipients had earned their bachelor degrees at an HBCU.<sup>10</sup> While HBCUs have played an important role in providing the undergraduate preparation for many of those black students entering highly specialized science and engineering disciplines, forecasts indicate that their efforts at attracting, retaining, preparing, and graduating students in the sciences and engineering may need to be expanded in order to respond to changing demographics.<sup>11</sup> A September 2006 report of the Department of Education (ED) states that between 2004 and 2015, enrollment in degree-granting institutions is projected to increase 27% for black, non-Hispanic students, 42% for Hispanic students, 30% for Native American/Alaskan Natives, 28% for Asian/Pacific Islanders, and 6% for white, non-Hispanic students.<sup>12</sup> These groups, the "new majority,"<sup>13</sup> on which the economy must increasingly rely, have traditionally

<sup>7</sup> The Southern Education Foundation, *Igniting Potential, Historically Black Colleges and Universities and Science, Technology, Engineering and Mathematics*, pp. 22-23.

<sup>8</sup> The various executive orders include Executive Order 12232, August 1980; Executive Order 12320, September 1981; Executive Order 12677, April 1989; Executive Order 12876, November 1993, and Executive Order 13256, February 2002.

<sup>9</sup> The White House, Executive Order 13256, Advisors for Historically Black Colleges and Universities, February 2002, <http://www.whitehouse.gov/news/releases/2002/02/20020212-3.html>.

<sup>10</sup> National Science Foundation, "Role of HBCUs as Baccalaureate-Origin Institutions of Black S&E Doctorate Recipients," *InfoBrief*, NSF08-319, Joan Burrelli and Alan Rapoport, Arlington, VA, August 2008, 8 pp.

<sup>11</sup> Lomax, Michael, "The HBCU Mission: A Fresh Look for a New Congress," *Diverse Issues in Higher Education*, v. 24, February 22, 2007, p. 51, Allen, Walter R., Joseph O. Jewell, Kimberly A. Griffin, and De'Sha S. Wolf, "Historically Black Colleges and Universities: Honoring the Past, Engaging the Present, Touching the Future," *Journal of Negro Education*, Summer 2007, pp. 263-281, and *Igniting Potential, Historically Black Colleges and Universities and Science, Technology, Engineering and Mathematics*, 36 pp.

<sup>12</sup> Department of Education, National Center for Education Statistics, *Projections of Education Statistics to 2015*, NCES2006-084, September 2006, p. 10. Note: Demographic data indicate that blacks, Hispanics, Native Americans/Alaskan Natives, and Asians/Pacific Islanders will comprise more than 52% of the undergraduate population (18-24 years old) of the United States by 2050, an increase from the recorded 34% in 1999. National Science Foundation, *Women, Minorities, and Persons with Disabilities in Science and Engineering:2007*, NSF07-315, Arlington, VA, February 2007, p.4. See also National Science Board, *America's Pressing Challenge—Building a Stronger Foundation*, NSB06-02, Arlington, VA, January 2006, p. 3.

<sup>13</sup> The U.S. Census Bureau reports that 303 counties in the nation, out of a total of 3,141, have a "majority-minority" population—more than 50% racial/ethnic minority. U.S. Census Press Releases, August 9, 2007.

been underrepresented in the sciences compared to their fraction of the total population.<sup>14</sup> There are those observers who believe that the problem of underrepresented minorities in science, mathematics, engineering, and technology could compromise the United States' ability to develop and advance its traditional industrial base and to compete in international marketplaces.<sup>15</sup> Freeman A. Hrabowski, President, University of Maryland, Baltimore County, states that : "... [T]he paucity of minority scientists is not simply a minority issue; it is an American issue."<sup>16</sup>

## Historical Background<sup>17</sup>

HBCUs are defined as those institutions that were established prior to 1964, with the principal mission of educating black Americans.<sup>18</sup> While three HBCUs were established prior to the Civil War, the majority of these institutions were established after the War, several with the public support of land grants through the Freedman's Bureau.<sup>19</sup> The National Land-Grant Colleges Act of 1862 (P.L. 37-108), otherwise known as the 1862 Morrill Act, provided public lands to various states for the purpose of constructing educational institutions.<sup>20</sup> Funds appropriated under this act were distributed to the states "with the intention that they would foster equal educational opportunities for all students, especially newly freed Blacks."<sup>21</sup> However, the land-grant higher education system resulting from the 1862 Morrill Act failed to provide equal educational opportunities. Black students were excluded from enrolling in traditionally white institutions.

Funds from the Morrill Act began to flow systemically to schools offering only all-white education. Congress attempted by various legislation to force racial equality, including equality of educational opportunity. However, the U.S. Supreme Court initiated a series of interpretations of the post-Civil War constitutional amendments which ultimately defeated these various legislative efforts. Culminating with its landmark 1882 decision finding the

<sup>14</sup> For discussion of the participation of underrepresented groups in the sciences see for example *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2007*, 304 pp., Johnson, Angela, "Graduating Underrepresented African Americans, Latino, and American Indian Students in Science," *Journal of Women and Minorities in Science and Engineering*, v. 13, 2007, pp. 1-21, White, Jeffrey L., James W. Altschuld, and Yi-Fang Lee, "Persistence of Interest in Science, Technology, Engineering, and Mathematics: A Minority Retention Study," *The Journal of Women and Minorities in Science and Engineering*, v. 12, 2006, pp. 47-64, and CRS Report 98-871, *Science, Engineering, and Mathematics Education: Status and Issues*, by Christine M. Matthews.

<sup>15</sup> See for example Heriot, Gail, "Civil Rights Commission to Explore Ways to Encourage More Minorities to Enter Science, Technology, Engineering & Math," *The Right Coast*, September 4, 2008, <http://rightcoast.typepad.com/rightcoast/2008/09/civil-rights-co.html>, The National Academies, *Rising Above the Gathering Storm, Energizing and Employing America for a Brighter Economic Future*, Committee on Science, Engineering, and Public Policy, Washington, DC, National Academy Press, 2007, pp. 165-168, and Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development, *Land of Plenty - Diversity as America's Competitive Edge in Science, Engineering and Technology*, September 2000, 91 pp.

<sup>16</sup> Pluioise, David, "The Meyerhoff Model," *Diverse Issues in Higher Education*, v. 25, July 10, 2008, pp.18-19.

<sup>17</sup> For an expanded history of HBCUs see for example Jackson, Cynthia L. and Eleanor F. Nunn, *Historically Black Colleges and Universities, A Reference Handbook*, Santa Barbara, California, 2003, 253 pp, and Peltak, Jennifer, *History of African-American Colleges & Universities*, Philadelphia, 2003, 120 pp.

<sup>18</sup> Department of Education, National Center for Education Statistics, Snyder, Thomas D., Stephen Provasnik, and Linda L. Shafer, *Historically Black Colleges and Universities: 1976 to 2001*, NCES2004-062, Washington, DC, September 2004, p. 1.

<sup>19</sup> The Freedman's Bureau operated from 1865-1873 to provide assistance for newly freed slaves. *Ibid.*, p. 2.

<sup>20</sup> The establishment of a public land-grant system is considered to be one of the most significant developments in U.S. higher education. Prior to the First Morrill Act, higher education opportunities were limited to the very elite.

<sup>21</sup> *Historically Black Colleges and Universities, 1976 to 2001*, op. cit., p. 1.

first Civil Rights Act [1866] unconstitutional, the Supreme Court held that the 14<sup>th</sup> amendment only protected against direct discriminatory action by a State government.<sup>22</sup>

A Second Morrill Act was passed in 1890, which included language mandating States with dual systems of higher education to provide land-grant institutions for both systems. As a result, 19 institutions were established as black land-grant institutions, enrolling those black students who had been excluded under the 1862 legislation. While there was the creation of two land-grant systems—one established under the 1862 Land-Grant Act (1862 Morrill Act) and the other under the 1890 Land-Grant Act (Second Morrill Act)—the level of support for the 1890 institutions (both federal and state) never approximated the level received by the 1862 land-grant institutions.<sup>23</sup> In particular, during the expansion of program offerings and disciplines at the 1890 institutions, the disparity in funding for research infrastructure between them and the earlier established institutions severely limited their efforts to support basic and applied research.<sup>24</sup> In written testimony before the House Committee on Agriculture in support of legislation providing assistance to 1890 institutions, the Honorable Harold E. Ford noted that:

The 1890 institutions were never adequately funded the way they should have been by the various states. With assistance from the various states and Federal Government, the 1862 institutions were permitted to thrive and expand, while the 1890 institutions received meager funding from both their respective state and Federal Government.

Furthermore, the 1890 institutions were not eligible to participate in the facilities programs provided in the late 1960s and early 1970s by the Federal Government. Under the Research Facilities Act of 1963, only the 1862 land-grant institutions were permitted to participate in this program. Not until 1967 did the Federal Government start to provide research funds to the 1890 programs. These funds were for research projects, and not for constructing research facilities.<sup>25</sup>

## Classification of HBCUs

The diversity of HBCUs parallels that of other institutions of higher education. HBCUs are composed of public and private institutions, single-sex and coeducational, predominantly black and predominantly white,<sup>26</sup> two-year and four-year institutions, research universities, liberal arts

<sup>22</sup> Ibid.

<sup>23</sup> For a discussion of the history of land-grant institutions, see McDowell, George R., "Land-Grant Colleges of Agriculture: Renegotiating or Abandoning A Social Contract", *Choices*, Second Quarter 1988, p. 18-21, Schuh, G. Edward, "Revitalizing Land-Grant Universities," *Choices*, Second Quarter 1986, p. 6-10, National Research Council, Board on Agriculture, *Colleges of Agriculture at the Land Grant Universities: A Profile*, Washington, DC, 1995, and Bonnen, James T, "Land Grant Universities Are Changing," November 1996, <http://www.adec.edu/clemson/papers/bonnen1.html>.

<sup>24</sup> Most HBCUs began as "normal" schools—with the fundamental mission to train teachers. Beginning in the late 1960s and early 1970s, there was a shift in that focus to other professions. HBCUs do, however, continue to graduate and award a large number of degrees in the field of education.

<sup>25</sup> In 1967, the federal government provided \$285,000 to be divided among 16 1890 land-grant institutions (approximately \$17,812.50 per institution). House Committee on Agriculture, Subcommittee on Department Operations, Research, and Foreign Agriculture, *Hearing on H.R. 1309, 1890 Land-Grant Colleges Facilities*, 97<sup>th</sup> Cong., 1<sup>st</sup> Sess., June 4, 1981, p. 13-15.

<sup>26</sup> Fall 2005 enrollment data reveal that three HBCUs have predominantly white student populations—Bluefield State College (88.5%), West Virginia State College (84.5%), and Lincoln University, Missouri (60.4%). In addition, St. Phillip's College, San Antonio, a two-year institution, has a large Hispanic enrollment—47.7%. St. Phillip's College is (continued...)



colleges, professional schools, and community colleges. A March 2008 report of ED provides statistical data on 100 HBCUs—41 public four-year colleges, 11 public two-year colleges, 46 private four-year colleges, and 2 private two-year colleges.<sup>27</sup>

HBCUs comprise almost 2.3% of all institutions of higher education and enroll approximately 11.6% of black students attending post-secondary institutions.<sup>28</sup> Approximately 33.0%, on average, of the undergraduate degrees in science and engineering earned by blacks were awarded by HBCUs. In addition, some of the most successful programs designed to attract underrepresented minorities into the sciences and in research careers have been initiated at HBCUs.<sup>29</sup> An analysis of ED 2006-2007 preliminary data shows that Xavier University, an HBCU, ranks first nationally in the number of blacks earning undergraduate degrees in the biological and biomedical sciences.<sup>30</sup> The institution has received national recognition for its model science program and has participated in NSF's Model Institutions for Excellence program. North Carolina A&T State University, also an HBCU, ranks first in the number of blacks earning undergraduate degrees in engineering.<sup>31</sup> Data compiled by the NSF reveal that in 2004, HBCUs provided the education for approximately 20.2% of blacks earning bachelor degrees in engineering, 39.5% in the physical sciences, 26.3% in computer sciences, 37.0% in mathematics, 36.1% in the biological sciences, 42.0% in agricultural sciences, 16.4% in social sciences, and 21.4% in psychology.<sup>32</sup>

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(...continued)

the only institution with the dual designation of being both an HBCU *and* a Hispanic-serving institution. The black student enrollment at St. Phillip's is 16.2%, and the white student enrollment is 33.8%. See also Goldman, Russell, ABC News, "Changing Face of Historically Black Colleges," May 19, 2008, <http://abcnews.go.com/print?id=4874870>.

<sup>27</sup> Department of Education, *Digest of Education Statistics 2007*, NCES2008-022, Washington, DC, March 2008, Table 230, pp. 348-349. Documents provided by the White House Initiative on Historically Black Colleges and Universities list, as of September 2008, a total of 105 HBCUs. The list of the 100 institutions detailed in the *Digest of Education Statistics*, excludes those HBCUs that are not participating in Title IV programs (Higher Education Act). Title IV eligible institutions are required to meet certain criteria in order to receive federal student financial aid. A Title IV eligible institutions must have, among other things, "acceptable accreditation and admission standards, eligible academic program(s), administrative capability, and financial responsibility." *Digest of Education Statistics 2007*, p. 666.

<sup>28</sup> *Digest of Education Statistics 2007*, Tables 218 and 231, pp. 314, 350. ED data reveal that for the academic school year 2006-2007, there were 2,629 four-year institutions, and 1,685 two-year institutions. Disaggregated data show that HBCUs are approximately 3.3% of all four-year institutions and less than 1.0% of all two-year institutions.

<sup>29</sup> The underrepresented minorities include blacks, Hispanics, Native Americans, and women. Asian Americans are excluded because they are not statistically underrepresented in science, mathematics, and engineering. See for example National Science Foundation, *Women, Minorities, and Persons with Disabilities in Science and Engineering*, Figure D-2, p. 10, and Wyer, Mary, "Intending to Stay: Images of Scientists, Attitudes Toward Women, and Gender as Influences on Persistence Among Science and Engineering Majors," *Journal of Women and Minorities in Science and Engineering*, vol. 9, 2003, pp. 1-16.

<sup>30</sup> Borden, Victor M. H., "Top 100 Undergraduate Degree Producers—Interpreting the Data," *Diverse Issues in Higher Education*, v. 25, June 12, 2008, p. 28.

<sup>31</sup> *Ibid.*, p. 34.

<sup>32</sup> National Science Foundation, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1995-2004*, NSF07-308, Arlington, VA, January 2007, Table 13. Note: An expanded discussion of HBCUs is contained in Department of Education, *Characteristics of Minority-Serving Institutions and Minority Undergraduates Enrolled in These Institutions*, NCES2008-156, November 2007, 196 pp.

## Federal Research and Development Support at HBCUs

The National Science Foundation (NSF) provides data on federal academic science and engineering support to colleges and universities in six categories: research and development (R&D); fellowships, traineeships, and training grants; R&D plant; facilities and equipment for instruction; general support for science and engineering; and other science and engineering activities.<sup>33</sup> An important issue in the academic community, and in science and technology policy in general, is the distribution of federal R&D funds to colleges and universities. A major criticism of federal R&D funding patterns is that there is concentration in certain colleges and universities, restricting the development and expansion of scientific and technical capabilities in other institutions. In an analysis of 650 research-performing institutions, NSF found that the top 100 institutions accounted for approximately 80% of all academic R&D funding in FY2006. Those institutions falling in the top 100 category showed only minimal changes in more than 20 years.<sup>34</sup> The charge is that the elite institutions (“haves”) continue in their status, and the less-prestigious research institutions (“have-nots”) continue to struggle for research funding.<sup>35</sup> While various measures of equity can be calculated based on the number of institutions, geographic distribution, student enrollments, science and engineering students, graduate students, and so forth—the following analysis will examine federal obligations for R&D to HBCUs as a percentage of all institutions receiving R&D expenditures.

An October 2007 report of the NSF reveals that in FY2005, 908 U.S. colleges and universities received R&D support.<sup>36</sup> Of that total, 72 are HBCUs.<sup>37</sup> Trend data reveal that these research-performing HBCUs have not shared proportionately in the distribution of federal R&D obligations to colleges and universities.<sup>38</sup> Although funding to HBCUs has increased in the past

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<sup>33</sup> Other science and engineering activities are defined as “... technical conferences, teacher institutes, and programs geared to increase the scientific knowledge of precollege and undergraduate students. Such activities comprise some of the building blocks of science education and future research capability.” National Science Foundation, “The Extent of Federal S&E Funding to Minority-Serving Institutions,” *InfoBrief*, NSF04-325, Richard J. Bennof, Arlington, VA, June 2004, p. 2.

<sup>34</sup> National Science Foundation, “Universities Report Stalled Growth in Federal R&D Funding in FY2006,” NSF07-336, *InfoBrief*, September 2007, 6 pp.

<sup>35</sup> In 1990, the first Bush Administration proposed to categorize and classify HBCUs based on their missions and programs. The premise was that it would allow federal agencies to select the appropriate group for developing linkages, rather than having them work with the various programs in all the institutions. Considerable criticism voiced by presidents and department chairs of HBCUs contributed to the withdrawal of the proposal. Opposition was based on the concern that only a small group of the institutions would receive funding—those that were already considered to be the research “elite.” It was believed that the remainder would be abandoned. Mercer, Joye, “White House Scraps Classification Plan for Black Institutions,” *Black Issues in Higher Education*, v. 8, May 23, 1991, p. 7.

<sup>36</sup> National Science Foundation, “FY2005 Federal S&E Obligations Reach Over 2,400 Academic and Nonprofit Institutions: Data Presented on Minority-Serving Institutions,” NSF07-326 (Revised), *InfoBrief*, Richard J. Bennof, October 2007, p. 2. A total of 1,227 academic institutions received federal S&E support in FY2005 (with R&D being one of the six categories of S&E support).

<sup>37</sup> National Science Foundation, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY2005*, Table 24.

<sup>38</sup> See for example Anderson, Lauren Bayne, “Black Colleges Continue Fighting for Federal Funds,” *The Wall Street Journal*, October 29, 2003, p. B.4J, “Pork Barrel Grants: Tidbits for Black Colleges,” *The Journal of Blacks in Higher Education*, Autumn 2003, pp. 68-69, and Salandy, Anthony, “Correcting the Inequities in Federal Research Funding,” *Black Issues in Higher Education*, v. 19, May 23, 2002, p. 42.

10 years in absolute terms, it remains only a small fraction of the total awarded to all U.S. colleges and universities. A 2007 report of the NSF, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2005*, reveals that for FY2005, HBCUs received approximately \$294.2 million for R&D, an increase of \$19.4 million (7.1%) over the FY2004 level of \$274.8 million.<sup>39</sup> Data from FY1996-FY2005 show that while research-performing HBCUs are approximately 5.9% of all U.S. institutions conducting R&D, they receive approximately 1.2%, on average, of all federal academic R&D support.<sup>40</sup>

## Research Funding at HBCUs

An analysis of federal academic R&D support finds that funding is concentrated at selected institutions. Funding for non-HBCUs also is concentrated at selected institutions.<sup>41</sup> In FY2005, the top 10 HBCUs (in terms of receipt of federal R&D to HBCUs) accounted for approximately 52.7% of total federal R&D support, and the top 20 HBCUs accounted for approximately 72.3% of total R&D support. (In FY1996, the top 10 HBCUs received 61.2% of funding to these institutions, and the top 20 institutions received 82.7% of funding.)

**Table 2** below provides a listing of the top 20 HBCUs and their level of total academic science and engineering support.<sup>42</sup> The rankings (by R&D amounts received in FY2005) reveal that there has been only relative change in the concentration of federal R&D support among the top 20 HBCUs since FY1996. Eight of the top 10 HBCUs in FY2005 for R&D support also were ranked in the top 10 for FY1996 (in different ordinal positions). In addition, 15 of the top 20 institutions for R&D support in FY2005, also were among the top 20 institutions in FY1996. However, a few institutions have received increased support so as to change their ranking. In FY2005, Jackson State University ranked sixth in R&D support; in FY1996, it had ranked fifteenth. Lincoln University (Jefferson City) ranked fifteenth in FY2005. It had ranked twenty-fifth in FY1996. South Carolina State University, which ranked sixteenth in FY2005, ranked twenty-third in FY1996. North Carolina Central University ranked nineteenth in FY2005, and had ranked forty-

<sup>39</sup> The data on federal support to academic R&D result from a compilation of 19 agencies. R&D includes all research activities, both basic and applied, and all development activities that are supported at colleges and universities. Obligations reported do not include funds to federally funded research and development centers (FFRDCs). The institutions compiling this population are those receiving current year obligations. Caution should be exercised in reviewing the data. Because of the relatively small number of HBCUs, data from a few institutions can skew the quantitative findings and have a marked effect on the resulting analysis. National Science Foundation, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2001*, Detailed Statistical Tables, NSF 02-319, Arlington, VA, August 2003, Table B-22, pp. 173-174.

<sup>40</sup> National Science Foundation, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2005*, NSF07-333, Arlington, VA, October 2007, Tables 1 and 24, and *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2003*, NSF06-309, Arlington, VA, June 2006, Table 22.

<sup>41</sup> In FY2005, approximately 30% of the total federal academic R&D expenditures in science and engineering went to the leading 20 institutions. National Science Foundation, "Universities Report Stalled Growth in Federal R&D Funding in FY2006," *InfoBrief*, NSF07-336, Richard J. Bennof, Arlington, VA, September 2007, p. 4.

<sup>42</sup> NSF reports that federal academic science and engineering support for HBCUs, and minority institutions as a whole (includes Hispanic-serving institutions and tribal colleges), is "allocated relatively less for R&D and relatively more for S&E capacity building activities when compared to non-minority-serving institutions. National Science Foundation, "The Extent of Federal S&E Funding to Minority-Serving Institutions," p. 1.

fourth in FY1996. The Hampton University ranked first in R&D support for FY2005; it had ranked eighth in FY1996.<sup>43</sup>

**Table 1. Federal R&D Support and Total Academic S&E Funding to the Top 20 HBCUs in FY2005, Ranked by R&D Support**

(dollars in millions)

Institutions	R&D	Total S&E
All HBCUs	\$294.2	\$479.2
Top 20 HBCUs		
1. Hampton University	40.1	44.1
2. Howard University	24.1	32.2
3. Morehouse School of Medicine	20.9	28.7
4. Florida A&M University	18.2	23.2
5. Meharry Medical College	18.1	30.7
6. Jackson State University	16.5	22.1
7. Morgan State University	10.8	12.8
8. North Carolina A&T State University	10.8	21.4
9. Tennessee State University	9.3	16.9
10. Tuskegee University	8.1	20.5
11. Alabama A&M University	7.5	11.7
12. Lincoln University (Jefferson City, MO)	6	9.4
13. North Carolina Central University	5.9	8
14. Prairie View A&M University	5.5	10.1
15. Southern University A&M College (all campuses)	5.4	11.6
16. Fort Valley State University	4.4	8.4
17. South Carolina State University	3.8	8.5
18. Fisk University	3.7	4.9
19. Clark Atlanta University	3.7	5.4
20. Virginia State University	3.7	8.3

**Source:** National Science Foundation, *Federal Science and Engineering Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 2005*, Detailed Statistical Tables, NSF07-333, Arlington, VA, October 2007, Table 24. Total academic S&E includes R&D; R&D plant; facilities for instruction in S&E; fellowships, traineeships, and training grants; general support for S&E; and other S&E activities. See footnote 42.

<sup>43</sup> *Federal Science and Engineering Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 2005*, Table 21, and *Federal Science and Engineering Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1996*, Table B-22. Howard University had consistently ranked number one in R&D support to HBCUs for several decades. In FY2003, Howard University ranked number two, fell to number three in FY2004, and again regained the ranking of number two in FY2005. For expanded discussion of academic support to HBCUs see National Science Foundation, "FY2005 Federal S&E Obligations Reach Over 2,400 Academic and Nonprofit Institutions; Data Presented on Minority-Serving Institutions," 8 pp.

## Research Facilities at HBCUs

Facility construction/modernization/maintenance probably represents the largest capital investment for institutions of higher education. Many in academia contend that the quality of an institution's facilities is directly linked to the quality of education offered. While estimates vary on the level of deferred research facilities expenditures at all institutions of higher education, the amount of deteriorating physical plant and backlog of maintenance at HBCUs may be more pronounced.<sup>44</sup> Approximately 70% of the HBCUs were established prior to 1900 (55% date from before 1890). Some have aging facilities with electrical systems that are inadequate for the loads that complex computer systems and other state-of-the-art equipment (if available) would require.

In the mid-1980s, hearings were held in both the House and the Senate to examine the condition of the nation's scientific and engineering research facilities.<sup>45</sup> In addition to congressional interest, there was particular concern by those in the academic and scientific community about the quantity and quality of research space at nondoctorate-granting institutions, minority-serving institutions, and biomedical institutions. As a result of the hearings, NSF was directed to collect and analyze data on a range of academic research facilities issues (How much space is there for conducting scientific research?, What is the condition of the existing space?, How much of the space requires renovation or repair?, Is there enough space to meet the Nation's scientific research needs?, How do colleges and universities fund their research projects?, etc.). In October 2000, the NSF released a topical report on the needs and requirements of academic research facilities.<sup>46</sup> This particular survey and analysis included 660 research-performing institutions, of which 57 were HBCUs.<sup>47</sup>

In a 1998 survey of 57 research-performing HBCUs, the institutions reported having approximately 2.3 million net assignable square feet (NASF) of science and engineering research space.<sup>48</sup> The majority of the space was in the biological sciences, agricultural sciences, and

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<sup>44</sup> House Committee on Science, Subcommittee on Research, *H.R. 2183, the Minority Serving Institutions Digital and Wireless Technology Opportunity Act*, 108<sup>th</sup> Cong., 1<sup>st</sup> Sess., July 9, 2003, House Committee on Education and the Workforce, Subcommittee on Select Education and the Subcommittee on 21<sup>st</sup> Century Competitiveness, *Responding to the Needs of Historically Black Colleges and Universities in the 21<sup>st</sup> Century*, 107<sup>th</sup> Cong., 1<sup>st</sup> Sess., April 23, 2001, pp. 69-98, 107<sup>th</sup> Cong., 2<sup>nd</sup> Sess., February 13, 2002, pp. 77-94, and 107<sup>th</sup> Cong., 2<sup>nd</sup> Sess., September 19, 2002, pp. 51-60.

<sup>45</sup> See for example House Committee on Science and Technology, *Improving the Research Infrastructure at U.S. Universities and Colleges*, 98<sup>th</sup> Cong., 2<sup>nd</sup> Sess., May 8, 1984.

<sup>46</sup> National Science Foundation, *Scientific and Engineering Research Facilities at Colleges and Universities, 1998*, Topical Report, NSF01-301, Arlington, VA, October 2000. For this particular survey and analysis, research-performing institutions were defined as (1) those institutions that offer a master's or a doctorate degree in science and engineering; (2) report in excess of \$50,000 expenditures in 1993 academic R&D survey; and (3) all HBCUs, non-HBCU-black institutions, and Hispanic-serving institutions with any research expenditures.

<sup>47</sup> The other minority institutions in the survey included 13 non-HBCU-black institutions, and 9 Hispanic-serving institutions. Non-HBCU-black institutions are those colleges and universities with at least a 25% black student enrollment according to the Integrated Postsecondary Education Data System, but do not have the designation as HBCUs.

<sup>48</sup> National Science Foundation, *Scientific and Engineering Research Facilities at Colleges and Universities, 1998*, NSF01-301, Arlington, VA, October 2000, 232 pp. Since 1986, the NSF has collected, on a biennial basis, data on scientific and engineering research facilities in higher education. Different analyses and various reports are released. This topical report contains data from the 1998 survey that included a total of 80 research-performing, minority-serving institutions—57, HBCUs; 13, non-HBCU-black institutions; and 10, Hispanic serving institutions. (This is the most current published data available for an analysis of this type.) Note: "Net assignable square feet (NASF) is defined as the sum of all area, in square feet, on all floors of a building assigned to, or available to be assigned to, an occupant for specific use." p. 2.

engineering. However, 88% of the institutions reported that the amount of existing science and engineering research space was insufficient for meeting current research efforts. When asked to evaluate the condition of the existing space, 48% of the HBCUs indicated that their existing research space was effective for most levels of research, but required limited repair/renovation. An additional 15% determined that their institutions' existing space required major renovation in order to be used effectively for research in the science and engineering disciplines.

The NSF survey revealed that for FY1996 and FY1997, approximately 15% of HBCUs initiated repair/renovation projects, and 14% began major construction projects. In the 1998 survey, HBCUs reported \$331.0 million in construction and repair/renovation projects and campus infrastructure projects that had to be deferred due to lack of funding.<sup>49</sup> This constitutes 2.4% of all deferred projects reported by research-performing institutions.

Aggregate data were collected from a reduced sample of 29 institutions in order to compare research facility construction with similar surveys beginning in 1988.<sup>50</sup> This separate analysis of 29 HBCUs revealed that the amount of science and engineering research space increased from 1.1 million NASF in 1988 to 1.9 million in 1998 (72.7%). Between the 1996 survey and the 1998 survey, research space at the original 29 HBCUs increased by 88 thousand NASF (4.9%). The amount of research space increased the most in engineering and the agricultural sciences. During the period 1988 to 1998, research space increased in every field except the medical sciences in medical schools and computer science.

An additional analysis of the 29 HBCUs revealed that in 1996 and 1997, 11 of the 29 HBCUs initiated research facility construction projects, the same number of institutions that began construction startups in the 1988 survey. During the intervening years, specifically 1992-1995, only 4 of the 29 HBCUs initiated science and engineering research construction projects on their campuses. In the 1998 survey, FY1996 to FY1997, the 29 HBCUs provided \$64.3 million in support of new construction projects. (The projects cost in excess of \$100,000.) It was anticipated that the new projects would translate into 335 thousand NASF of new research space, 18% above the current available space.<sup>51</sup>

For the periods 1986-87 and 1992-93, the federal government was the largest source of funding for science and engineering research construction projects at the 29 HBCUs. The primary source of funding changed, and during 1994-95 and 1996-97, state and local governments provided the bulk of funding to these institutions for construction projects. Federal support to the 29 institutions did increase from 1994 to 1997, but the increase had slowed relative to other funding sources. **Table 2** below details the source for research facility funding (in constant dollars) for the sample of 29 HBCUs.

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<sup>49</sup> Ibid., p. 79.

<sup>50</sup> These were the "original" HBCUs that reported separately budgeted R&D expenditures and science and engineering research space in the 1988 survey (FY1986 and FY1987).

<sup>51</sup> Ibid., p. 81.

**Table 2. Source of Funds for Science/Engineering Research Facilities at the Original 29 HBCUs: 1986-97**

(in millions of constant 1997 dollars)

Funding Source	Construction			Repair/Renovation		
	1986-87	1990-91	1996-97	1986-87	1990-91	1996-97
Federal Government	43.5	14.5	4.6	11.6	4.2	2.2
State/Local Government	34.3	7.6	50.5	6.5	9.6	1.8
Private Donations	14.8	0.0	3.0	0.7	0.1	0.0
Institutional Funds/Other	3.1	5.0	6.1	0.0	0.1	3.6
Total	95.5	27.0	64.3	18.8	14.0	7.6

**Source:** Scientific and Engineering Research Facilities at Universities and Colleges: 1998, op. cit., pp. 83-84. Components may not add to totals due to rounding.

## Various Agency Programs to Enhance Support of Research at HBCUs<sup>52</sup>

The NSF has several programs supporting HBCUs and other minority institutions. The Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP) funds projects to improve the quality of undergraduate scientific and technical programs through curricular reform and enhancement, faculty development, upgrading of scientific instrumentation, and improvement of research infrastructure.<sup>53</sup> The FY2008 estimate is \$16.1 million. Centers of Research Excellence in Science and Technology (CREST) seeks to upgrade the research capabilities of the most productive minority institutions. HBCUs and other minority-serving institutions develop alliances with other universities, laboratories, and centers in order to provide their students with direct experience in science, technology, engineering, and mathematics. The FY2008 enacted level for CREST is \$14.9 million.<sup>54</sup>

In January 2008, NSF announced a collaborative project involving eight HBCUs and seven major research institutions to encourage black students to pursue degrees in robotics and computer science.<sup>55</sup> The Advancing Robotics Technology for Societal Impact (ARTSI) initiative would

<sup>52</sup> This is not a complete compilation of federal agency support, but illustrates the various efforts to address the support of research infrastructure at HBCUs. Many of the programs in the various agencies are an outgrowth of Executive Orders 12232 and 12320. Note: For an expanded discussion of federal support to HBCUs see Department of Education, White House Initiative on Historically Black Colleges and Universities, Office of Postsecondary Education, *Fulfilling the Covenant—The Way Forward 2004-05 Annual Report to the President on the Results of Participation of Historically Black Colleges and Universities in Federal Programs*, by the President's Board of Advisors on Historically Black Colleges and Universities, November 2007, 53 pp.

<sup>53</sup> Since 2001, the HBCU-UP has provided funding for science and mathematics education and research programs at 80 HBCUs. This includes support of programs at 82.0% of four-year HBCUs and to 46.0% at two-year HBCUs.

<sup>54</sup> See also Robinson, Natasha, "NC Historically Black College 1<sup>st</sup> to Get NSF Grant," September 8, 2008, <http://www.dailyadvance.com/news/state>. North Carolina A&T State University will receive approximately \$18.0 million over a period of five years to develop and operate the Engineering Research Center for Revolutionizing Metallic Biomaterials.

<sup>55</sup> Currently, approximately 2 million computer and information scientists are in the United States, of which 4.8% are black.

offer outreach programs at the K-12 and college levels and support research activities at HBCUs, internships for minority students in university laboratories, and provide mentoring programs for undergraduates. ARTSI would be funded at \$2.0 million for a period of three years.

The Department of Agriculture, Cooperative State Research, Education and Extension Service (CSREES), administers a Capacity Building Grants Program to assist the 1890 land-grant institutions and Tuskegee University strengthen their research and teaching capabilities in high priority areas of the food and agricultural sciences. These activities include obtaining state-of-the-art scientific instrumentation for laboratories. For FY2008, \$13.7 million will be made available for this program.<sup>56</sup> In addition to the Capacity Building Grants Program, the CSREES provides funding for research at the 1890 institutions through the Evans-Allen formula. The FY2008 enacted level for this program is \$41.3 million.

The National Aeronautics and Space Administration (NASA) has established a University Research Centers (URC) program to fund research projects in space science and applications, advanced space technology, and advanced astronautics technology. Currently, the URC provides \$1.0 million a year for five years to seven HBCUs. The Curriculum Improvement Partnership Award (CIPA) is designed to improve and strengthen the scientific and technical undergraduate curricula at minority institutions. CIPA provides \$125,000 per year for three years. CIPA currently supports nine minority-serving institutions, of which three are HBCUs. FY2008 is the final year of funding for this program. CIPA was restructured and combined with the Partnership Award for the Integration of Research into the Undergraduate STEM Curriculum (PAIR) to form the Curriculum Improvements Partnership Award for the Integration of Research (CIPAIR). CIPAIR will strategically enhance teaching and education strategies across academic programs. CIPAIR is effective beginning in FY2008, and will provide \$100,000 to \$200,000 per year for three years.<sup>57</sup> NASA Science and Technology Institute for Minority Institutions (NSTI-MI) has two main components—student internships and research clusters. Underrepresented and underserved students from minority institutions compete to conduct research with NASA scientists and engineers. Clusters of minority institutions also engage in specific NASA-related research at one of the 10 NASA Centers. Funding for NSTI-MI in FY2008 is \$2.0 million.<sup>58</sup>

P.L. 109-364, The National Defense Authorization Act, FY2006 provides approximately \$11,662.5 million for science and technology programs. Contained in that funding is support for, among other things, the University Research Initiative (URI) and HBCUs. It is anticipated that participating HBCUs will increase their involvement in the performance of defense research and in the scientific disciplines critical to the national security functions of the Department of Defense (DOD). P.L. 110-116, the Department of Defense Appropriations Act, FY2008 provides \$20.0 million for HBCUs and other minority institutions to enhance their R&D activity, develop approaches to inter-university research in the DOD critical technology and homeland security areas, and to increase their personnel in these areas.

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<sup>56</sup> Some matching funds are required.

<sup>57</sup> The CIPAIR budget for FY2008 is \$2.8 million. This amount is for new project solicitation and for completion of those grants awarded within the CIPA structure.

<sup>58</sup> See also “NASA Awards Education Research Grants to Minority Universities,” September 16, 2008, [http://blackengineer.com/artman/publish/printer\\_871.shtml](http://blackengineer.com/artman/publish/printer_871.shtml).



## Policy Options

In testimony before the House Science Committee, Sebetha Jenkins, President, Jarvis Christian College, stated that: “[G]iven the demographic changes taking place in this nation, investing more in HBCUs is, in actuality, about the future prosperity of this nation.”<sup>59</sup> Jenkins proposed the establishment of a program for minority institutions that is similar to the Experimental Program to Stimulate Competitive Research (EPSCoR). EPSCoR is designed for those states and institutions that are perceived as being the “have-nots” and are in the most need of R&D support.<sup>60</sup> This proposed EPSCoR-like program would build new and expanded capacity and capability for minority-serving institutions. Key elements of the EPSCoR-like program would be technical assistance and the development of partnerships between major research institutions and minority-serving institutions. This initiative would support also an HBCU centers program for the education and training of professionals in the scientific and technical disciplines. Jenkins, and others in the academic community, believe that an EPSCoR-like program would stimulate the competitive R&D capacity of HBCUs. Success of the HBCU centers would be dependent on unfettered resources, with funding being provided until the centers were self-sustaining.

The viability of any academic institution is a function of its ability to provide a quality education for its student population. Data reveal that many HBCUs have provided their black student population with a quality education, especially in the scientific and technical disciplines. In testimony before the House Committee on Education and Labor, Dorothy Cowser Yancy, President, Johnson C. Smith University, stated that:

HBCUs today represent only 4% of all higher education institutions, but they graduate approximately 30% of all African-American students, 40% of African American students receiving a four-year degree in [science, technology, engineering, and mathematics], and 50% of African American teachers.... The successes were achieved despite the fact that in recent year’s federal support for HBCUs has only increased in very modest amounts; and in spite of the fact that HBCUs continue to receive significantly less funding for research, facilities, and programs than their historically white counterparts.<sup>61</sup>

However, these institutions are faced with an increased challenge of attracting and preparing an increasingly larger number of blacks in the scientific and technical disciplines. Demographic data show a student population and workforce increasingly composed of minority groups that have been historically underrepresented in science, mathematics, and engineering. Shirley Ann Jackson, President, Rensselaer Polytechnic Institute, contends that this demographic pattern may affect the development of the scientific and engineering workforce and, consequently, the conduct of R&D during the 21<sup>st</sup> century.<sup>62</sup> The success of research programs at HBCUs is inextricably

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<sup>59</sup> House Committee on Science and Technology, Subcommittee on Research, *Preparing a 21<sup>st</sup> Century Workforce: Strengthening and Improving K-12 and Undergraduate Science, Math, and Engineering Education*, 107<sup>th</sup> Cong., 2<sup>nd</sup> Sess., April 22, 2002, Written statement of Sebetha Jenkins, President, Jarvis Christian College.

<sup>60</sup> CRS Report RL30930, *U.S. National Science Foundation: Experimental Program to Stimulate Competitive Research (EPSCoR)*, by Christine M. Matthews, *U.S. National Science Foundation: Experimental Program to Stimulate Competitive Research*, by Christine M. Matthews.

<sup>61</sup> House Committee on Education and Labor, *America’s Black Colleges and Universities: Models of Excellence and Challenges for the Future*, Written statement of Dorothy Cowser Yancy, President, Johnson C. Smith University, p. 3.

<sup>62</sup> Jackson, Shirley Ann, President, Rensselaer Polytechnic Institute, “The Quiet Crisis and the Future of American Competitiveness,” Speech before the American Chemical Society, August 29, 2005.

linked to their ability to provide an environment for fostering additional scientific talent.<sup>63</sup> The National Academies report, *Rising Above the Gathering Storm*, states:

Increasing participation of underrepresented minorities is critical to ensuring a high-quality supply of scientists and engineers in the United States over the long term. As minority groups increase as a percentage of the US population, increasing their participation rate in science and engineering is critical if we are just to maintain the overall participation rate in science among the US population. Perhaps even more important, if some groups are underrepresented in science and engineering in our society, we are not attracting as many of the most talented people to an important segment of our knowledge economy.<sup>64</sup>

The distribution of federal funding for HBCUs is one of the critical issues facing these institutions. Some say that past and current policies have not provided effective remedies for their problems of infrastructure necessary to develop strong scientific programs. Many HBCUs are attempting to expand their research capacity by developing expertise in areas such as homeland security and national defense, cyberinfrastructure, environmental observatories, food security, energy expenditures, genomics, and material science. They contend that improved funding for facilities and instrumentation is needed to strengthen the capability of these colleges and universities to contribute to the nation's long-term economic vitality. While many HBCUs have engaged in strategic planning in order to obtain a more competitive research base, Congress may continue to consider options that would bring HBCUs closer to an equal footing with other institutions and enable them to move toward full partnerships in conducting research. This issue may be examined when assessing the capacity of HBCUs and other minority-serving institutions to contribute to the health of the nation's higher education system, and in producing an increasingly larger number of trained scientific and technical personnel needed to meet the challenge of a highly competitive international economy.<sup>65</sup>

## Congressional Action in the 110<sup>th</sup> Congress

On August 14, 2008, the President signed into law P.L. 110-315, the Higher Education Opportunity Act (HEOA).<sup>66</sup> The HEOA establishes a new program in Title III, Section A to

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<sup>63</sup> Roach, Ronald, "The Journey for Jackson State," *Diverse Issues in Higher Education*, v. 23, February 8, 2007, pp. 22-27, and Suitts, Steve, "Fueling Education Reform: Historically Black Colleges are Meeting a National Science Imperative," *Cell Biology Education*, v. 2, July 2, 2003, pp. 205-206.

<sup>64</sup> The National Academies, *Rising Above the Gathering Storm, Energizing and Employing America for a Brighter Future*, pp.166-167.

<sup>65</sup> P.L. 110-84, the College Cost Reduction and Access Act, added a program entitled "Predominantly Black Institutions." Predominantly Black Institutions (PBIs) are defined as those institutions with at least 1,000 undergraduates in which blacks comprise 40% or more of the total enrollment. In addition, 50% of the enrollment must be either low-income or first-generation students. Grants of at least \$250,000 would be provided for the eligible institutions. In introducing the measure, Senator Barack Obama stated that: "To restore America's competitiveness, we must invest in the success of traditionally underrepresented groups." (Press Release, May 29, 2007). For discussion of this proposal for PBIs see CRS Report RL34283, *Higher Education Act Reauthorization in the 110th Congress: A Comparison of Major Proposals*, by Blake Alan Naughton et al..

<sup>66</sup> Signed into law on August 14, 2008, P.L. 110-315 authorizes, amends, and establishes programs under the Higher Education Act of 1965. (See H.R. 4137, Conf. Report 110-803.) The Higher Education Opportunities Act, also known as the College Opportunity and Affordability Act, was last fully authorized by P.L. 105-244. During that period of time, there were 14 extensions to the Higher Education Act. For expanded discussion of the legislation see CRS Report RL34654, *The Higher Education Opportunity Act: Reauthorization of the Higher Education Act*, by David P. Smole et al..

provide federal support to Predominantly Black Institutions (PBIs). These PBIs that qualify for funding fall outside of the definition of an HBCU.<sup>67</sup> To be eligible as a PBI, the institution must have, among other things, an enrollment of undergraduate students that is at least 40.0% black, and must have a total enrollment of at least 1,000 undergraduates, with half of them being in degree programs. Grant proposals for PBIs can be in the areas of science, technology, engineering, and mathematics, in addition to teacher preparation, health education, and international issues. Title III, Part E of the HEOA provides funding for two new minority science and engineering improvement programs. A partnership grant program is directed at increasing the participation of underrepresented minority youth or low-income youth in science, technology, engineering, and mathematics education. Activities to be supported include outreach, hands-on, and experiential-based learning projects. Partnership grants to be awarded are for a period of five years in an amount not less than \$500,000. Non-federal matching funds are required. An additional program will be directed at encouraging minorities to pursue careers in science, mathematics, engineering, and technology.

The HEOA provides authority for loans for repair and renovation of academic research facilities, among other facilities. Language in Title III, Part B, Investing in HBCUs and Other Minority Institutions, provides formula grants to eligible institutions. The percentage of funds allocated to each institution is based on several factors, and no institution can receive less than \$250,000.<sup>68</sup> Also under Title III, Part B, the HEOA provides assistance to Historically Black Graduate Institutions to increase the number of blacks in certain professional disciplines.<sup>69</sup> Title III, Part D, HBCU Capital Financing, establishes a bonding authority to raise capital to be lent to HBCUs for repair and renovation of facilities. The total amount that would be available for financing is \$1.1 billion.<sup>70</sup> The aggregate authority principal and unpaid accrued interest on these loans are to be made for two types of institutions in the amounts of \$733.3 million and \$366.7 million.<sup>71</sup>

On September 4, 2007, the House passed, as amended, H.R. 694, Minority Serving Institution Digital and Wireless Technology Opportunity Act. The bill would provide, among other things, funding to acquire equipment, instrumentation, networking capability, hardware and software, digital and wireless networking technology, and infrastructure to improve the quality and delivery of educational services of these institutions. The institutions eligible for participation include (1) HBCUs; (2) Hispanic-, Alaskan Native-, or Native Hawaiian-serving institutions; (3) tribally controlled colleges and universities; and (4) institutions with a sufficient enrollment of needy students as defined by the Higher Education Act of 1965. Support also would enable these institutions to obtain capacity-building technical assistance through remote technical support and technical assistance workshops, and to advance the use of wireless networking technology in an effort to improve research and education, including scientific, engineering, mathematics, and technology instructions. Funding would be available through grants, cooperative agreements, or contracts. Non-federal matching requirements would be required in the amount equal to one-quarter of the award, or \$500,000, whichever is the lesser amount. Matching requirements could

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<sup>67</sup> An HBCU is defined as an institution established prior to 1964 and have as its primary mission the education of blacks. Please see footnote 24.

<sup>68</sup> Previous Higher Education Act amendments set the minimum award for institutions at \$500,000.

<sup>69</sup> The Act adds six institutions to the list of eligible institutions, with restrictions. The six institutions are Alabama State University, Prairie View A&M University, Delaware State University, Langston University, Bowie State University, and the University of the District of Columbia, David A. Clarke School of Law.

<sup>70</sup> Previous Higher Education Act amendments set the level of funding at \$375.0 million.

<sup>71</sup> Previous Higher Education Act amendments set the awards at \$250.0 million and \$125.0 million.

be waived for an institution with little or no endowment. The bill would authorize \$250.0 million for FY2008 and such sums as may be necessary for each of FY2009 through FY2012.<sup>72</sup>

On January 8, 2008, similar legislation, S. 1650, Max Cleland Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2007, was reported in the Senate (S.Rept. 110-257). S. 1650 would authorize, also, \$250.0 million annually for each of FY2008 through FY2012. The bill would strengthen the ability of minority institutions to provide course offerings, faculty development, and capacity-building technical assistance in digital and wireless network technologies. S. 1650 is designed to narrow the “economic opportunity divide” that currently exists between students in minority serving institutions and their counterparts in other institutions.<sup>73</sup> Similar to H.R. 694, funding would be awarded through a peer-review process in the form of grants, contracts, or cooperative agreements. An eligible institution could receive as much as \$2.5 million annually. The Senate committee bill would also establish an office in the Department of Commerce and there would be cost sharing requirements from grant recipients similar to that contained in H.R. 694. Cost sharing would be waived for those institutions with no endowment or an endowment valued at less than \$50.0 million.<sup>74</sup>

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<sup>72</sup> Authorizations are to be appropriated to the Technology Administration of the Department of Commerce to carry out section 5(c) of the Stevenson-Wydler Technology Innovation Act of 1980.

<sup>73</sup> Senate Committee on Commerce, Science, and Transportation, *Max Cleland Minority Serving Institution Digital and Wireless Technology Opportunity Act*, S.Rept. 110-257, Report to accompany S. 1650, 110<sup>th</sup> Cong., 2<sup>nd</sup> Sess., January 8, 2008, p. 1.

<sup>74</sup> See also Schmidt, Peter, “New Congressional Caucus Formed to Fight for Black Colleges,” *The Chronicle of Higher Education*, v. 55, September 19, 2008, p. A16.