

Executive Summary

The United States faces a looming shortage of well-trained scientists and engineers to fill jobs vital to long- and short-term economic growth, productivity and competitiveness. To maintain its leadership role in the global economy and ensure a good quality of life at home, there is a need to increase the mathematics and science achievement of members of minority groups. By the mid-century, the United States will have both a student population and an adult workforce that is "majority minority."

Historically Black Colleges and Universities (HBCUs) are a vital resource for efforts to increase the Black presence in science, technology, engineering and mathematics (STEM). In 2000, almost one out of every four African Americans receiving a bachelor's degree graduated from an HBCU. In 2000, HBCUs graduated 40 percent or more of all African Americans who received degrees in physics, chemistry, astronomy, environmental sciences, mathematics and biology. In almost every STEM field, HBCUs lead the nation's larger, better-equipped colleges in producing Black graduates. The National Science Foundation has found that African Americans who graduate from HBCU undergraduate institutions in STEM are more likely to go to graduate school and complete their doctoral degrees than African American undergraduates from other institutions.

The Southern Education Foundation (SEF) studied six HBCUs with high productivity in STEM—the strategies that they use, best practices in the field and the financial underpinnings of their STEM efforts. Essentially, SEF found that these institutions are not receiving either public or private support commensurate with their STEM undergraduate productivity. During the 1990s, HBCUs received less than 2 percent of the \$2.58 billion in federal grants awarded to all higher education institutions. Of that amount, 25 percent supported fellowships, training and teaching-related efforts. Only 1 percent went to support research and development or facilities. SEF found that private foundation grants in STEM are relatively small and declining. HBCUs are the focus of very few foundations.

HBCUs need and warrant support in view of their STEM contributions. Their experiences are also of value to other higher education institutions that are committed to increasing minority group (and female) participation in STEM fields.

Clark Atlanta University, Spelman College, Morehouse College, Xavier University, Tennessee State University and Morgan State University, the institutions on which SEF's study focused, generally conform to "best practices" with good results. More particularly, SEF found that:

- Preseason programs are an important means to encourage African American high school students to pursue STEM studies and careers and help them prepare for success in college. Students who participated in such programs tended to do better than those who did not;
- Financial aid to support students enrolled in STEM is critical, especially in view of the academic rigor of the courses and extended time it takes to graduate. Students participating in scholarship and other such programs develop pride and a sense of identity that helps in retention;

- Strong faculty advisement is a critical component of student success in STEM. HBCUs have small student-to-faculty ratios in STEM fields. This provides the attention, direction and nurture needed by students to excel;
- Involving students in and supporting STEM research is important both to cultivate students' interest in STEM and help students gain entry into graduate school. Enhancing HBCUs' faculty and student research opportunities would enhance student learning and pedagogy and contribute to the generation of scientific knowledge;
- HBCU STEM programs would benefit from more equipment, resources and faculty development opportunities to keep their programs on the "cutting edge" of innovation in research and instruction. Resources in all of these areas are more limited than is optimum and need to be increased;
- STEM programs require periodic curriculum, organizational and structural realignments for which support is needed. HBCUs need resources for study, staffing and other forms of assistance in these areas;
- HBCUs' experiences in STEM at the undergraduate level have not yet been fully or adequately studied for the benefit of the field. At a time when the nation needs more scientists, HBCUs are key to developing large numbers of talented African Americans for STEM careers. Research on what HBCUs do and how they do it is needed to enhance HBCUs' practice and that of other institutions involved in STEM training.

It follows from the foregoing that additional categorical, institutional capacity building, financial aid, research, and community of practice support is needed to strengthen HBCUs' contribution.

The nation's defense, economic growth, and national interest depend upon our actions today.

