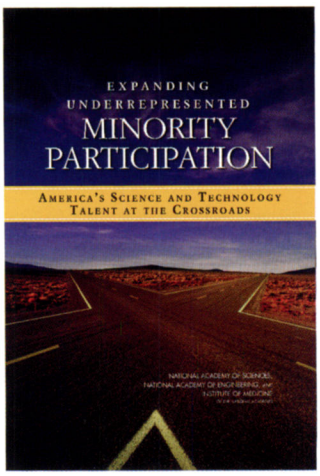

Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads

COMMITTEE ON UNDERREPRESENTED GROUPS AND THE EXPANSION OF THE SCIENCE AND ENGINEERING WORKFORCE PIPELINE; COMMITTEE ON SCIENCE, ENGINEERING, AND PUBLIC POLICY; POLICY AND GLOBAL AFFAIRS; NATIONAL ACADEMY OF SCIENCES, NATIONAL ACADEMY OF ENGINEERING, AND INSTITUTE OF MEDICINE

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[Note: NSF's Louis Stokes Alliances for Minority Participation (LSAMP) Program is referenced multiple times in the NAS Report as follows:]

Figures: Pg. XI: 5-4 Graduate Coursework, Degrees Pursued, and Degrees Completed, LSAMP Participants Compared to National Underrepresented Minorities and National White and Asian American Graduates, (see page 100).

Pg. 79: Postsecondary institutions have a role in outreach as well. In their evaluation of the

NSF's Louis Stokes Alliances for Minority Participation (LSAMP) program, Clewell et al describe the kinds of high school outreach activities undertaken by institutions with LSAMP funding.

Pg. 80: More than half of the Alliances also offer high school outreach activities. This includes LSAMP students visiting local high schools to give a science demonstration, tutoring high school students in STEM subjects, helping out at high school science fairs, and disseminating LSAMP recruitment material to high school staff members and students. In some instances LSAMP collaborates in the outreach efforts of other STEM intervention programs that specifically target high school students. Examples include female LSAMP students visiting high schools to talk to girls about math. LSAMP students participating in a precollege initiative where high school students are invited onto the college campus to learn about science disciplines, and science faculty visiting high schools on Saturdays to expose students to science professions and activities.

Pg. 83: STEM Outreach to Underrepresented Minorities: Programs such as the LSAMP high school outreach activities and the TRIO Upward Bound program that specifically target underrepresented minorities in mathematics, science, and engineering are critical means for reaching these groups and providing a pathway forward in STEM.

Pg. 99: One such model is provided by the NSF's Louis Stokes Alliances for Minority Participation (LSAMP) program. As shown in Figure 5-4, graduates of LSAMP programs have a higher propensity for additional coursework, graduate enrollment, and graduate degree completion, both in STEM and overall, compared to both white and Asian American students and other underrepresented minority students not in an LSAMP program.

continued on reverse

Pg. 100; Figure 5-4 Graduate Coursework, Degrees Pursued, and Degrees Completed, LSAMP Participants compared to National Underrepresented Minorities and National White and Asian American Graduates. Source: Clewell et at, Final Report of the Evaluation of the Louis Stokes Alliances for Minority Participation Program, Washington, DC: Urban Institute, 2005.

Pg. 100-101: Undergraduate

• National Science Foundation, Louis Stokes Alliances for Minority Participation (LSAMP). This program is aimed at increasing the quality and quantity of students successfully completing science, technology, engineering and mathematics (STEM) baccalaureate degree programs, and increasing the number of students interested in, academically qualified for and matriculated into programs of graduate study. LSAMP supports sustained and comprehensive approaches that facilitate achievement of the longterm goal of increasing the number of students who earn doctorates in STEM fields, particularly those from populations underrepresented in STEM fields.

Pg. 103: While independent evaluations have shown the effectiveness of federal programs such as the NSF Louis Stokes Alliances for Minority Participation (LSAMP) and the NIH minority research training programs, to tackle the scale of change necessary in order to increase underrepresented minority participation in STEM, these and other programs like them must be scaled up to meet the national challenge and achieve the national goal of increasing participation in a transformative way.

Pg. 109: The LSAMP model utilizes the Tinto model, adapts it to the goal of retaining minority students in STEM majors (by providing supportive, integrative services specific to STEM), and encourages these students to continue on to graduate programs in STEM by providing professionalization opportunities (that is, opportunities to engage in the doing of science as professionals).

Pg. 115: STEM Fields/Underrepresented Minorities: NSF Louis Stokes Alliance for Minority Participation (LSAMP), Alliance for Graduate Education and the Professoriate (AGEP), HBCU-UP, TCU-UP, NIH Minority Access to Research Careers.

Pg. 118: Indeed, the number of rigorous evaluations of programs designed to increase the participation of underrepresented minorities in STEM is small, even including three large efforts undertaken since the publication of *A Bridge for All*: an assessment of NIH minority research training programs by the National Research Council and evaluations by the Urban Institute of the Louis Stokes Alliances for Minority Participation (LSAMP) and Historically Black College and University Undergraduate Program (HBCU-UP) programs at the NSF.

Pg. 133: Louis Stokes Alliances for Minority Participation (LSAMP)

Established by the National Science Foundation, the LSAMP program aims to develop strategies to increase the quality and quantity of minority students who successfully complete degrees in STEM through multi-institution alliances across the nation.

Pg. 134: Louis Stokes Alliances for Minority Participation (LSAMP) Bridge to the Doctorate.

The NSF LSAMP Bridge to the Doctorate provides two years of fellowship support for graduate students in STEM disciplines. Awards include student stipends and a cost-of-education allowance to the institution for tuition, health insurance, and other normal fees.

Pg. 135: Footnote: Source: Clewell, et al, Final report of the Evaluation of the Louis Stokes Alliances for Minority Progress Program, pp. 38-39.

Pg. 168: Dr. Clewell has been the principal investigator (PI) for several formal evaluations of major NSF intervention programs to increase the participation of women and minorities in STEM, including the Louis Stokes Alliance for Minority Participation (LSAMP), the Program for Women and Girls, and HBCU-UP.

we retrieved data from the US Department of Education and made a longitudinal comparison, we found that the growth in degrees awarded to the Houston minority students in science and engineering was *double* that of the national growth rate of STEM degrees awarded to underrepresented minority students.

During this same period (1998-99 to 2003-2004), the total number of Bachelor's degrees awarded to African-American students in STEM disciplines increased from 14,212 to 18,887, a growth rate of 32.9 %, while Bachelor's degrees awarded to Hispanic students increased from 9,892 to 13,262, a growth rate of 34.1 % (US Department of Education, *Digest of Education Statistics*, 2001 Table 270 and 2005 Table 262). Again, while these national numbers are encouraging, the Houston LSAMP rate of growth was essentially twice that of the national average.

Every alliance encounters barriers and setbacks. For example, the program at Texas State University accelerated rapidly under the dynamic leadership of Dean Stan Israel. Following Dr. Israel's sudden death, the program entered a rocky period. More recently, under new leadership at the college level and at the program level, the program once again is growing and is receiving strong support from the administration.

Beyond presenting hard data to document the success of the Houston LSAMP, we want to discuss what we have learned about why this alliance was so productive. How have the universities in Houston accomplished this remarkable growth?

They have used four strategies. Any other college or university can apply these strategies:

1. Extensive recruitment,
2. Constant mentoring,
3. Creating a peer culture of student support aimed at academic excellence, and
4. Engaging the community colleges and tapping the tremendous talent of people, often from poverty, who begin their college education at a community college.

Try for a moment to look at these strategies from the student's point of view. It's difficult for many of us who have completed college to remember what it was like to be beginning college, let alone for those of us who are white to appreciate the barriers facing a student of color, or for a middle-class person to appreciate the barriers facing a student from poverty. To those students, to use the words of an old hymn, it must seem that the college education that lies ahead is a combination of dangers, toils, and snares.

RECRUITMENT. One of the institutions in the Houston alliance, the University of Houston-Downtown (UHD), is located in a poor neighborhood, with many high school students who assume that a college education is out of their reach. Dr. Richard Alo' leads an effort to reach out to those students and make them realize that both college and a STEM career can be possible for them. He and his UHD staff have connected with the students as early as the seventh grade to present these possibilities. They have been creative in their communication and outreach, even employing a social worker as part of this effort.

We interviewed a student who grew up in a poor neighborhood, went to the local high school, and didn't think he was college material. He was persuaded to apply to two institutions. One

turned him down. The University of Houston-Downtown accepted him and gave him financial support through the LSAMP Program to study computer science. When he got to college, he did outstanding work, and he decided he was more interested in mathematics--abstract mathematics, the mathematics of cryptography. When we interviewed him, he was a senior. He had been a prizewinner at a multi-state regional academic conference for undergraduates. He had just turned down a very lucrative offer from a federal agency specializing in intelligence work--on philosophical grounds. He had his choice of graduate schools. But all he really wanted to talk about was the mathematics of encryption and decoding. This is one brief snapshot of a highly talented individual whose college education was made possible by this program.

MENTORING. At Texas Southern University, Dr. Bobby Wilson is the driving force behind the excellence of the instructional program in the sciences. He expects the best from his students. He and the LSAMP staff and faculty are all committed to extensive mentoring of students.

Dr. Wilson is a distinguished chemist who previously was an NSF program officer. He holds the Shell Oil Endowed Chair of Environmental Toxicology and is the L. Lloyd Woods Distinguished Professor of Chemistry. He served many years as university provost, and for a lengthy period as acting president of Texas Southern, yet he still found time to give undergraduates focused individual attention. His commitment to teaching and mentoring started at a young age. While a doctoral student at Michigan State University, he received a chemistry department Excellence in Teaching citation in 1975.

Dr. Wilson is a visible presence in his lab. He constantly banters with students, communicating high expectations, joking with them, and motivating them. They can see his commitment to research and to excellence in academic science on a daily basis.

In the past ten years, 24 African American students in the United States received doctorates in environmental toxicology; 9 of these students—nearly forty percent nationwide—were mentored by Dr. Wilson. In February, 2012, he received the AAAS Lifetime Achievement Award for outstanding mentoring.

Another influential presence on the Texas Southern campus is Michelle Tolbert, the university's LSAMP program director. Dr. Wilson recruited Tolbert from the business sector, and she has brought executive efficiency to coordinating and directing the LSAMP program. She is devoted to the success of every student and she brings boundless energy to this task. There are over a hundred LSAMP scholars at Texas Southern, but they receive constant guidance and mentoring. They turn to Dr. Wilson, Ms. Tolbert, and committed faculty members. For example, mathematics professor Dr. Willie Taylor, can be found tutoring students who are struggling with mathematics just about every day, all day—including weekends. In addition to the immense contribution Dr. Taylor makes to Texas Southern students, we have observed that students from other Houston universities often quietly come over to Texas Southern for his help in learning and understanding mathematical concepts.

At Texas State University, LSAMP Director Susan Romanella guides, supports, and mentors each cohort of LSAMP scholars. Dr. Salina Vasquez-Mireles was a key person in the early success of the LSAMP mentoring activities. In 2002 and 2005 she won the Presidential Award for Excellence in Teaching in the College of Science, and she has been nominated twice for the Mariel M. Muir Excellence in Mentoring Award. She is also an extraordinary role model for