

Quest: Creating a Biotechnology Workforce Pipeline

According to the Bureau of Labor Statistics, developing and maintaining the healthcare talent stream to supply the growing need for laboratory technicians and technologists is a critical human resource concern.¹ Last year, Jefferson School of Health Professions joined several local non-profits - the [Philadelphia Youth Network](#), [Philadelphia Academies](#), and [District 1199C Training & Upgrading Fund](#) - in creating and implementing [Quest](#), an innovative pilot program designed to take 25 low-income inner-city high school students away from textbook science and into the dynamic world of a working laboratory. The goal is to provide exposure to and raise interest in bioscience as a career, a vast occupational field often unknown to these students.

In Pennsylvania, the bioscience industry employs more than 79,000 people directly and generates annual wages of \$7.2 billion.² According to the University City Science Center, the economic impact to the region is substantial: about 15,000 people are employed regionally at an average wage of \$89,000; they contribute \$22 million in wage taxes to the City of Philadelphia and \$42.5 million in income taxes to the state.³ However, there is a lack of racial diversity in the bioscience field, even at its entry level. For example, hospitals hire half of the 350,000 people that are employed in the country as technologists (BA level) or technicians (AA level) but less than one-third of that force is comprised of minorities.⁴ This is more significant when one considers that the country's population is growing ever more diverse. The challenge to increase and diversify tomorrow's STEM (Science, Technology, Education and Math) workforce is difficult given the generally low levels of math and reading proficiency of America's students. According to the U.S. Department of Education, only 26% of 12th graders in the U.S. demonstrated proficiency in math and

38% in reading, with African-Americans and Hispanics scoring well below the average in both categories.⁵

"The goal was to introduce them to laboratory-based profession and the career pathways. To make them aware," explained Esther E. Biswas-Fiss, PhD, associate professor, and director of Jefferson's Biotechnology programs. Dr. Biswas-Fiss was charged with writing the curriculum and coordinating the graduate student mentors. The logistics included two graduate students traveling weekly to the two participating high schools—Roxborough and Lincoln—to provide additional science lessons, and for the high school students to travel to Center City on a monthly basis to try their hand at such things as DNA fingerprinting. "The kids got the most enjoyment from being in the lab," recalled Ronit Caplan, Philadelphia Academies Inc.'s manager for Internships and Industry Pipelines and the project manager for Quest. "It made them feel as if they were academically ready to do college-level work."

The most important aspect of the Quest program, according to Dr. Biswas-Fiss, was the mentorship relationships developed between the high school students, many of whom will be first-generation college students, and the graduate students in Jefferson's biotechnology programs. Dr. Biswas-Fiss strongly believes that the key to diversifying the biotechnology pipeline is developing high quality coordinated mentorships that are integrated into the academic setting and that occur throughout the academic life of a student, from kindergarten through graduate school. These relationships, she argues, helps to demystify the process. "When I compare what my daughter knows with what I knew when I started college, it

is just amazing," said Dr. Biswas-Fiss, herself a first-generation college student whose academic career started in community college.

District 1199C Training & Upgrading Fund, a healthcare labor-management collaborative, asked Jefferson University's Biotechnology Program to join the partnership. Said Executive Director Cheryl Feldman, "They have an incredible amount of experience in the field of bioscience at the highest levels of excellence. Dr. Biswas-Fiss and Shirley E. Greening, MS, JD, CT (ASCP), CFIAC (Chairman and Director for the Biosciences Technology Graduate and Cytotechnology programs), are so committed to exposing youth to lab careers and it was after having worked with Dr. Greening on other projects that I knew I wanted their expertise on this program."

With a poverty rate in the city of 28.4%, biotechnology careers offer one of the few occupational opportunities for low-income minority students to earn the type of wages necessary to lift a family into the middle class. "The jobs of tomorrow will rely even more on the skills derived from STEM education," said Mary Linda Andrews, Director, Community Partnerships at GlaxoSmithKline (GSK). GSK partnered with the [Philadelphia Foundation](#) to provide the initial round of funding for the pilot program with the hope that it would "inspire high school students and lay the groundwork for science careers." Indeed, Quest successfully met its lofty goals to build 21st century skills, provide work experience and connect students to college mentors through laboratory-based educational programs focused on biotechnology science applications and clinical molecular diagnostics "Quest opens up new worlds for me and my fellow classmates such as new subjects, new career possibilities in the biotechnology industry, the chance to be

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on a college campus like Thomas Jefferson University, and the chance to meet amazing people, including our Thomas Jefferson University, and the chance to meet amazing people, including our Thomas Jefferson University mentors,” said Kayla Hadley, a former Quest participant from Roxborough High School.

Unfortunately, once the pilot program ended, there has been no funding for another Quest project. With biotechnology as one

of Philadelphia’s prime economic drivers and healthcare institutions the city’s major employers, there is an urgency to continue to find a way to connect minority and poor students to science and engineering fields. Roxborough High School is currently attempting to replicate the program by developing a Bioscience Academy to implement the lesson learned from the Quest project, but it is still in its infancy. “We must continue to find ways to partner with investors like GlaxoSmithKline and The

Philadelphia Foundation so we can diversify resources to help us strengthen career preparation opportunities for Philadelphia’s youth,” said Stephanie Gambone, Vice President of External Relations, Philadelphia Youth Network.

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