



Growing tomorrow's scientists

By Bernadette Starzee

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Given the well-documented dearth of scientists in the United States, Long Island's labs, through various programs for middle and high school students, are doing their part to pique young people's interest and help them see a viable career path in science.

"As a federal lab, we feel a strong responsibility to help develop the next generation of scientists, engineers and technicians," said Kenneth White, manager of the Office of Educational Programs for Brookhaven National Laboratory, which each year works with about 7,000 Long Island students, who attend workshops and lectures and participate in science contests and summer research projects. "With disciplines ranging from computer science to medicine to nanotechnology, we are able to provide a really good opportunity for career exploration," White said.

Each year, about 4,000 middle and high school students participate in Stony Brook University's science programs, which include summer biotechnology sleepover camps, forensic camps, competitions, half-day workshops and independent research projects.

"One of our goals is to form closer relationships between the university and middle and high schools," said R. David Bynum, a professor of biochemistry and cell biology and the director of Stony Brook's Center for Science and Mathematics Education. He noted that the science programs align with New York state education standards, and that most districts on Long Island participate.

"It takes years to grow a scientist, and the earlier you start, the better," Bynum said, noting that the great need for scientists and mathematicians in the United States will lead to the development of similar programs at all major universities within the next 10 to 20 years. "A university should be a hub where teachers and students can come and learn," he said. He noted that teacher education is another important focus of Stony Brook's programs, as it is at other Long Island labs.

"We work with a lot of high-needs districts, many of whose students have never been on a university campus before," Bynum said. "This program helps demystify a major

university for them, and working in a modern biotechnology lab helps them get a sense of what's possible."

Besides developing young scientists, programs at local labs provide a broader-reaching service to the community, said David Micklos, executive director of the Dolan DNA Learning Center in Cold Spring Harbor, operated by Cold Spring Harbor Laboratory, which has hosted more than 300,000 middle and high school students in programs ranging from one-day workshops to internships to summer camps.

"When we started the center in the mid-1980s, there was very little biotechnology business on Long Island, and we did not have a population that knew a lot about biotechnology," Micklos said. "But now, hundreds of thousands of kids have come through here, which is important in developing a constituency of people who understand biotechnology. Because they have learned this is a safe industry and that it can be done here, they are more likely to support biotechnology enterprise, which is important when their opinion is asked on whether to give tax breaks to attract biotechnology companies or to open a biotechnology park."

In addition to opening the DNA Learning Center's doors to a wide range of students, Cold Spring Harbor Lab offers the Partners for the Future program to help develop a select group of Long Island's brightest scientists. The chairs of science departments at Long Island high schools may each nominate three junior-year students. Twelve semifinalists are interviewed and at least six winners are chosen to spend a minimum of 10 hours per week for about seven months during their senior year, doing original research under the guidance of a scientist mentor.

While the students learn a lot about molecular biology and state-of-the-art research techniques, an equally important goal of the program is to expose students to the day-to-day life of working in a lab.

According to Bynum, Stony Brook literally has hundreds of labs available for independent research, and high school students can be paired up with mentors to guide them through projects. A record five of the 40 high school students selected nationwide as finalists in this year's Intel Science Talent Search were mentored by Stony Brook faculty.

At Stony Brook's summer camps, students first learn techniques and then develop the research projects that they will work on. Last year, students examined the use of biodiesel as an alternative fuel source; they studied the therapeutic potential of a component of green tea and they looked at the bioactivity of cinnamon to examine its potential health benefits for type 2 diabetes patients.

At Cold Spring Harbor Lab, forensic research projects are always a crowd pleaser. "Kids examine their own DNA, which helps them understand forensic biology," Micklos said. "They see how DNA can be used in crime scene investigations, identifying people in a disaster and in studying human evolution."

Brookhaven National Lab's programs include regional competitions for the Department of Energy's National Science Bowl, in which teams compete by answering questions. There are separate contests for middle and high school students.

Brookhaven also hosts an annual Bridge Building Contest, in which high school students erect bridges that are then submitted to a pressure test. The contest is designed to give students a taste of what it's like to be an engineer, as they design their structures to a set of specifications.

While the labs do not track the thousands of students that participate in their programs each year, they do see some of them again. "I have two employees on my own staff that came through the programs here," White said. "Other former students are employees in other departments, while others work for outside companies that use our facilities."