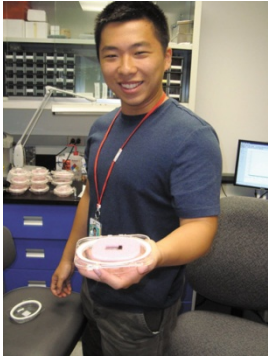


Long Island Science Camps Allow Teens To Research At Nation's Top Labs

By [Natalie Crnosija](#) on October 8th, 2010



Jimmy Ye holds a Cadmium Zinc Telluride crystal at Brookhaven National Lab.

Laura D'Aquila, 16, pressed a soldering iron to a circuit board as a wisp of smoke unraveled from the melting metal and dissolved into the air. The network of wires has wheels destined for a curving racetrack and will eventually be a self-guiding mini car.

For two weeks in mid-July, D'Aquila had forgone the beach and backyard barbecues for Stony Brook University's engineering workshop, one of three high-tech laboratories Long Island high schoolers visited to wet their feet in the waves of science this summer.

Stony Brook University's Center for Science and Mathematics Education (CESAME), Cold Spring Harbor Laboratory's Dolan DNA Learning Center and Brookhaven National Laboratory hosted science camps and research programs to encourage interested high school students to learn about science, research and career opportunities during the summer's academic doldrums. Though the warm weather may now be long gone, the memories of science camp—along with the knowledge it instilled—is burning bright within the teenagers who participated, many from Long Island.

D'Aquila, like her fellow engineering camp students, was participating in one of CESAME's summer camps, where programs range from engineering to microbiology to forensics.

"It gives me faith in the future when you see these young people in there," said Dr. David Bynum, director of CESAME. "They could be out there hanging out. What are they doing? They're learning science. That's hard to beat.

"The math and science are kind of a vehicle for letting them get an expanded view of what's possible with their life," he added.

The engineering camp is one of the five under the CESAME umbrella and was founded by Dr. Monica Bugallo and Bynum. The program's hands-on approach allowed D'Aquila to apply what she already learned in physics class.

"I took physics in high school so it was great to see the principles applied, like with electricity and voltage and resistors and everything, so it was really cool to just see it in practice," she said.

This hands-on education is a major feature of engineering camp, explained Bugallo.

"That is what the students like," she said. "They like to see a product or they like to see something they made...a final product...for them it's very important. They like to play."

In another building, the other half of the engineering camp was assembling AM receiving radios. Alex Frieder, 15, of Half Hollow Hills East High School, radiated joy as his radio caught a few Spanish channels in the corner of the back room. After this experience, he said he knows he wants to work in some realm of engineering for the rest of his life.

“The best part is yet to come,” said Chris Datsikas, 15, still working on his radio. “After all the problem-solving and troubleshooting and it works. That’s the best part.”

Datsikas, who attends Hicksville High School, said he feels lucky to live in the proximity of programs like CESAME.



Ravyn Mason extracts a substance from a test tube.

The week before, at Cold Spring Harbor Laboratory’s Dolan DNA Learning Center, 15-year-old Kevin Clare hovered over his gel electrophoresis experiment. He raised his hand and aimed a pipette—an ultra-precise type of dropper—its tip filled with dyed bacteria, over a 1-centimeter-wide well in a tile of clear gel within a plastic box.

The students were working on the creation of a plasmid, or circular strand of DNA, that is antibiotic resistant. The group tested the successful creation of the experiment’s ingredients by performing gel electrophoresis—a technique used to compare DNA sequences.

Clare and his fellow scientists were students at one of the Center’s eight camps, where sixth-to-twelfth graders learn about genetics.

“It’s really going to help me when I become a biologist in the field,” he said, confidently.

This level of science was the natural step for Clare—he’s attended summer programs at the DNA Learning Center for the past four years.

“I love DNA,” remarked Madeline Allnatt, who came to the facility from Los Angeles exclusively for the program. “I love learning about genetics and I ultimately want to be a cancer researcher when I am older.”

Yet producing researchers wasn’t the initial intent behind the DNA Learning Center, said Founder and Executive Director Dave Micklos: “It’s great if they do [go into research], but I think we’ve always been more interested in generally helping kids to understand something about themselves and the world that they live in. Increasingly, we understand about ourselves and about the living things around us by looking at their genes.”

The DNA Learning Center was founded to educate science teachers, but expanded its purview to helping schools enrich their genetics curricula and offering summer programs for students. The Center houses a genetics museum with interactive exhibits and video presentations, which initially brought Nadine Smith, from Limerick, Ireland, to the center. One year later, she was in the one-week class, called DNA Science, with Clare and the other young scientists.

“Even in two and a half days, I’ve learned so much. This amount of detail in genetics isn’t on our curriculum in Ireland, so I’m having an opportunity to get an insight into higher work here,” she explained with wide smile.

Brookhaven National Laboratory, a U.S. Department of Energy facility in Upton, is another Long Island science institution. Their high school research program hosts 32 students, each engaged in their own six-week-long research project in one of Brookhaven’s 13 departments.

Education Programs Administrator Scott Bronson said students are placed based on their strengths and interests. He first met Gourav Khadge, 16, of Bellport High School, at the Department of Energy Science Bowl and encouraged him to apply to the program.



Gabrielle Khalife and SaiPriya Iyer test the “mystery substance” at CESAME

In late July, Khadge in a tiny cubicle and using an event simulator, was modeling collisions of particles for a project which could reveal the workings of the universe.

“There’s so much we don’t actually know,” he mused. “In here [as opposed to at school], you’re actually doing things to advance civilization, knowledge.”

In the Nonproliferation and National Security Department, Jimmy Ye, 17, cradled a plastic-encased cadmium zinc telluride crystal, the heart of a radiation detector. Within it, there are tellurium occlusions, or defects within the crystalline structure. An infrared camera is used to imagine them.



Laura D’Aquila solders her mini-car together.

“Basically, we’re trying to figure out if there’s a correlation between the amount of defect in the crystal and how well the radiation detector performs,” he explained.

Ye, who hopes to go into nuclear engineering, couldn’t do this type of work in his high school, Sachem East.

The National Synchrotron Light Source (NSLS), known as the beamline, is one of Brookhaven’s major installations. The NSLS accelerates stationary charged particles in a circular pathway nearly to the speed of light to produce intense light, which is used to view and image specimens. Absorption spectroscopy can be performed on a protein crystal—a process that records the absorption of light wavelengths to monitor bonding changes caused by the crystal’s exposure to x-ray beams when imaged.

This specific use of the beamline is being perfected for scientists by Michael Skinner, 16, of Riverhead High School. He was writing programs in Java that will help beamline users with their decision-making by finding the best angle for performing spectroscopy on a crystal for the most accurate results. His work has tremendous implications for users investigating protein structures, explained his adviser, Dr. Allen Orville.

Skinner’s contributions have already been acknowledged by biochemists - who used his program and named him as a co-author on their paper - extremely rare for someone his age, said Orville.

The teen enjoys writing code and plans to study programming in college, he said during a break from his computer. He, too, recognizes the importance of his work.

“It’s better than what I was going to do [this past summer],” said Skinner. “At least this is helping somebody.”