

Schoolteachers get a 'lift' at MIT Lincoln Laboratory

Program spurs students to pursue scientific careers

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Dan Gabriner asks students to solve a quadratic equation in his Weston High School class. A voice of discontent issues a challenge familiar to math teachers everywhere: "What can you do with this stuff anyway?"

That's when Gabriner tells his class what he did over the summer. The students are surprised to learn that their teacher worked beside MIT Lincoln Laboratory scientists to produce an algorithm to control airport runway warning lights, minimizing the chance that two airplanes approach the same runway simultaneously. After hearing Gabriner describe his work, the students begin solving equations with new vigor.

To encourage high-school students to pursue careers in science, technology, engineering and math, Lincoln Laboratory hires local teachers every summer to work alongside seasoned scientists. This public, private and education sector partnership is possible through the Leadership Initiatives for Teaching and Technology Program (LIFT²), is sponsored by the Massachusetts Department of Education and is funded through the No Child Left Behind Act.

LIFT² teachers immerse themselves in various fields, including biotechnology, nanotechnology, information technology and process manufacturing. Through the five- to eight-week externship, the teachers gain insight to the skill sets needed in a technical profession, thereby enabling them to prepare their students for a career in such a field. Students are more likely to hear exciting real-world uses of science, making a career in science and engineering more desirable and accessible.

Gabriner, mentored by James Kuchar, an aeronautical engineer and assistant head of Lincoln Laboratory's Surveillance Systems group, evaluated data for the Runway Status Lights project. He analyzed the scenario of two planes simultaneously approaching a runway intersection at high speed, and researched the algorithm logic that controls the warning lights.

"My teaching style relies on applying math to real world problems," explains Gabriner. "These stories are more effective when I can say that I used the math myself. The Runway Status Lights project uses multilateration, quadratics, probability and statistics. I can show my students how each type of math was used to create a system that prevents airplanes from crashing into one another while landing."

The long-term goals of LIFT² are to entice students to pursue a technical career and help teachers apply information technology to science and math classes. Gabriner says, "After I've had a recent engineering experience, I can develop better projects based on real-world situations ... plus, the animations of runway incursions are cool!"

Mark Zagaeski, Lexington High School physics teacher, says he'll draw on the experience of his externship to convey the importance of collaboration in science. Zagaeski was mentored by Tom Jeys, a senior staff member in Lincoln Laboratory's Laser Technology and Applications group, while working on bioaerosol detection. With a team of scientists, they built a sensor that can detect harmful particles in the atmosphere. "Students often perform alone, but in real-life research situations, people work in teams," he says. "Each team member brings different specialties--they can solve problems together that might be too difficult for one of them alone."



The time at Lincoln Laboratory "reinvigorated my passion for science," Zagaeski says. The LIFT² Program hopes that enthusiasm is transferred to the students, drawing them into the technical workforce and easing the national shortage of scientists and engineers.

Such an influx of young talent is sorely needed.

According to the Metro Southwest Regional Employment Board, which runs LIFT², over the past two decades the number of students receiving technical degrees at U.S. universities "has remained unchanged" while "demand for science and engineering workers has grown at four times the rate of the U.S. workforce." In fact, China now graduates six times more engineering students than the United States. By participating in LIFT², MIT Lincoln Laboratory hopes to strengthen U.S. engineering by leading youths to become the next generation of inventors, scientists and engineers.

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URL: <http://web.mit.edu/newsoffice/2008/lift2-0104.html>