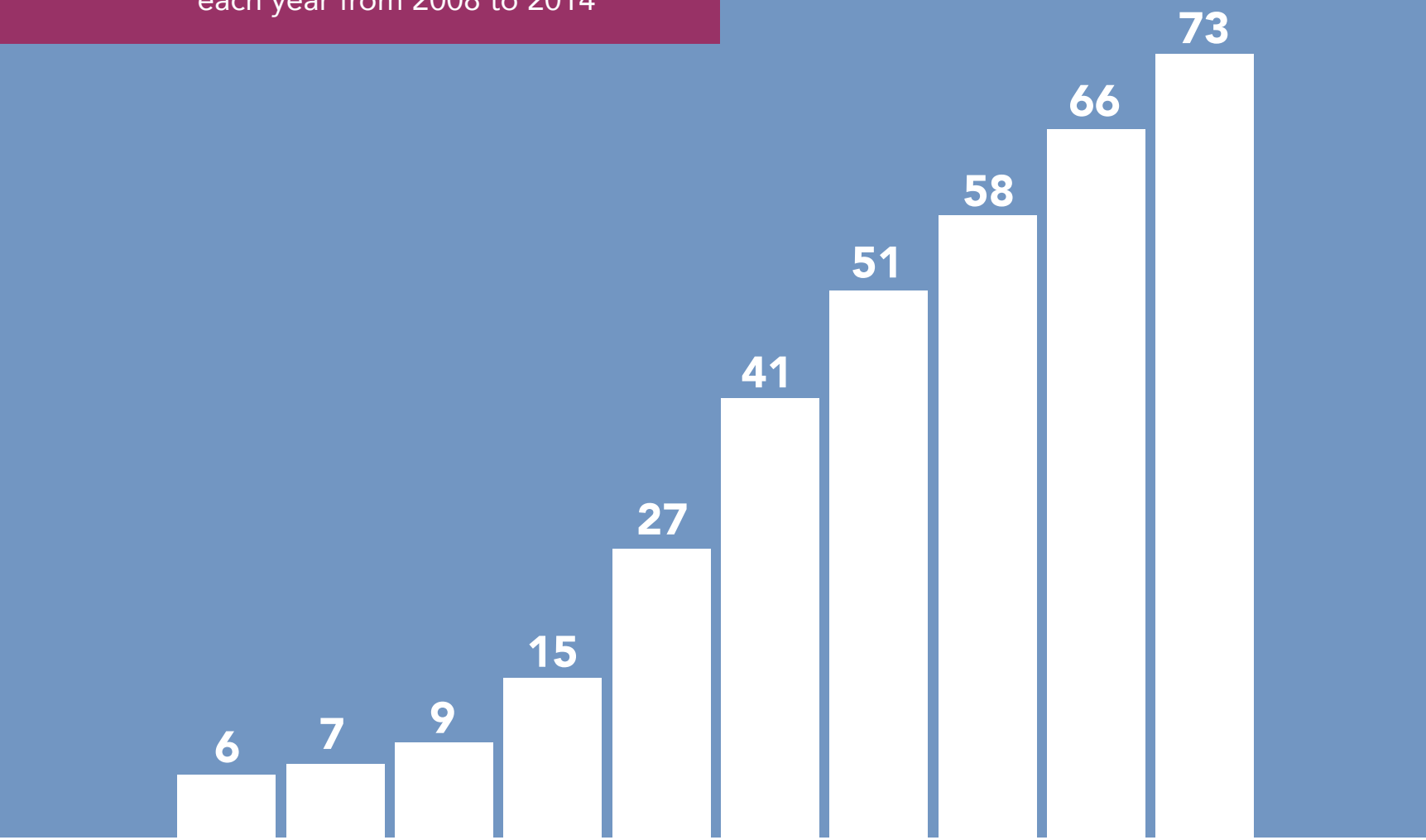
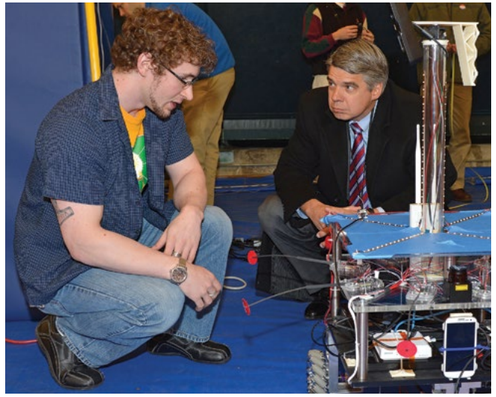
MIT LINCOLN LABORATORY

COMMUNITY **INVOLVEMENT** 2014

LINCOLN LABORATORY COMMUNITY OUTREACH

Laboratory-sponsored outreach programs have steadily increased each year from 2008 to 2014





A MESSAGE FROM THE DIRECTOR

Community and educational outreach programs are important components of the Laboratory's mission. From the beginning, our outreach initiatives have been inspired by employee desires to help people in need and to motivate student interest and participation in engineering and science. There are many opportunities to be involved.

The Laboratory's educational outreach initiatives include delivering in-classroom and Science on Saturday presentations to regional K–12 schools, sponsoring U.S. FIRST robotics programs, and mentoring college and graduate student interns preparing for science and technology careers. Our staff volunteer to serve as judges and advisors for local and regional science fairs and science-based activities.

The Laboratory is committed to giving back to the community by sponsoring fundraising and community service events in support of the United Way, the Alzheimer's Association, the Salvation Army, and other charitable organizations. The involvement of the entire Lincoln Laboratory community is encouraged and supported. Please let us know how we can do more.

Eric D. Evans
Director

Educational Outreach

Lincoln Laboratory takes pride in promoting science and engineering education for all grade levels in four main areas:

- K–12 STEM Outreach
- Partnerships with MIT
- Supporting Local Schools and Teachers
- Community Engagement

Science on Saturday participants use engineering principles to reinforce the stability of gumdrop towers, which are joined to create a gumdrop city.

Science on Saturday demonstrations emphasize the hands-on approach to learning, whether the topic is robotics or primates.

Science on Saturday

Each school year, more than 4000 local K–12 students, parents, and teachers attend Science on Saturday demonstrations hosted by Laboratory technical staff volunteers. Since the program's origin in 2006, attendees have enjoyed watching and participating in demonstrations on rockets, robotics, computers, acoustics, archaeology, lasers, thermal imaging, and many other topics.

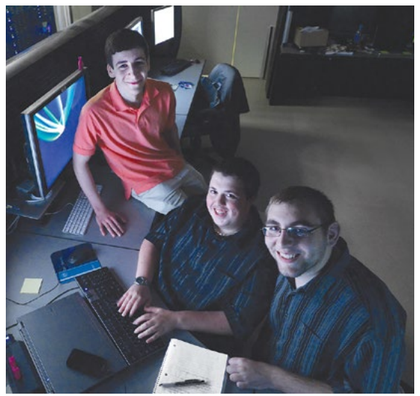
Lincoln Laboratory's winter offerings for Science on Saturday included an always-popular robotics demonstration, hosted by the Robotics Outreach at Lincoln Laboratory (ROLL) group, that featured a "robot zoo" of homemade robots. A hands-on science event hosted by the Technical Women's Network offered activity stations for throwing a ball and measuring its speed using radar, building a stable gumdrop tower using engineering concepts, and examining technology that measures specific biological features. A new Science on Saturday show was led by Harvard primatologist Dr. Zarin Machanda, who shared her research on chimpanzees' social behavior. She showed the similarities between chimpanzee and human skeletal structure and taught attendees how to speak "chimpanzee."

The "Wow! That's Engineering!" workshop offers a reverse engineering station for girls to disassemble a variety of electronics, including the electric guitar shown above. A Laboratory volunteer helps a participant open the lip of a balloon "lung" at the diaphragm dome station (right).

Wow! That's Engineering!

In March, Lincoln Laboratory and the Society of Women Engineers–Boston offered the "Wow! That's Engineering!" workshop for girls in grades 6–8. This day-long event is designed to "wow" girls with what they can accomplish by exposing them to the creativity and innovation of engineering and technology with fun hands-on activities. To engage girls in different types of engineering, four activity stations were established: make a catapult (mechanical engineering), lunar lander (design/mechanical engineering), diaphragm dome (bioengineering), and electronic matching game (electric engineering).

Each year, two women engineers speak to the participants about their careers and why they chose to pursue engineering. Many young girls leave the event with a new understanding of engineering.



Three CyberPatriot alumni work at the Laboratory as summer students in the Cyber Systems and Information Sciences Division. All chose to enter the field of computer science because of their CyberPatriot experience.

"I'm proud to say that the CyberPatriot teams wrapped up their bid to return to the national competition by reaching 16th, 20th, and 29th place in the nation, respectively scoring 257.2, 251.85, and 228.75 points out of 300," said Robert Cunningham, CyberPatriot mentor.

A total of 265 points was needed to qualify for the national finals competition in Washington, D.C., so the Laboratory teams were very close to qualifying, even though this year was dedicated to rebuilding and expanding the team.

"These rookie team members learned a lot and they look forward to increasing their skills and attending the finals competition next year," said Chiamaka Agbasi-Porter, CyberPatriot coach.

The three combined Laboratory CyberPatriot teams, along with coaches Chiamaka Agbasi-Porter, Kevin Bauer, and Robert Cunningham (all seated in front) come together after a six-hour competition.

CyberPatriot National Youth Cyber Defense Competition

For the past three years, Lincoln Laboratory has sponsored high-school defensive computer security teams that compete in the U.S. Air Force Association's CyberPatriot competition. For the first two years, the Laboratory mentored a single team, "DoNut Hack Us," and its top five team members competed at the nationwide finals both years. At the end of 2013, four of the five team members graduated. Recruiting efforts for this year were successful, resulting in three teams. Continuing the donut theme, the new team names are "Pink Sprinkles," "Boston Crème," and "Apple Cinnamon." The teams are led by returning members Akshitha Ramachandran, Alexander Wei, and Arthur Arakelyan. This year, Kevin Bauer and Robert Cunningham of the Cyber Systems and Technology Group at Lincoln Laboratory served as mentors, drawing on expertise across the Cyber Security and Information Sciences Division as well as the Communication Systems Division. Chiamaka Agbasi-Porter of the Communications and Community Outreach Office served as coach. The Apple Cinnamon team ranked as New England Regional Champions at the completion of their season.

The six-hour semifinal competition required each five-member team to secure a Windows 8 client, a Windows 2008 server, and a Ubuntu Linux 12.4 computer. In addition, the teams had to complete a digital forensics challenge and a networking challenge. Every minute of the six hours was filled with team members cleaning up systems, rooting out malware, and establishing a secure environment.

Scouting at Lincoln Laboratory

The Scouting at Lincoln Laboratory (S@L) outreach team participated in the annual Massachusetts Boy Scouts MassJam event: three days of scouting exhibits, challenging activities, competitions, entertainment, and fellowship. Curtis Heisey of the Surveillance Systems Group demonstrated robotics, and scouts constructed their own robots using LEGO Mindstorms kits.

Heisey, David Radue of the Fabrication Engineering Group, and Jack Kartel of the Mechanical Engineering Group assisted at the Harvard Merit Badge University event with the Harvard College Friends of Scouting, a student-run organization at Harvard University, by guiding scouts through the steps needed to earn the Robotics and Game Design merit badges.

Philip McKinley of the Rapid Prototyping Group offered a Robotics merit badge workshop at the Math Science Technology Expo in Nashua, New Hampshire. Frank Schimmoller of the Director's Office offered a Game Design merit badge workshop at the Knox Trail Council Merit Badge College. Heisey and David Coughlin of the Network Engineering Group coordinated and hosted a Merit Badge Saturday event to help scouts meet the requirements for the Robotics and Programming merit badges.

Boy Scouts develop and build their own ready-to-program robots to fulfill merit badge requirements.

In a typical year, **80** schools host Laboratory scientists who give classroom presentations

Classroom Presentations

Lincoln Laboratory technical staff members (predominantly Richard Williamson, Ernest Stern, and Jude Kelly) visit local K–12 classrooms to give free science presentations to approximately 7000 students each year. Since the program's inception in 2005, Laboratory volunteers have visited schools along the East Coast, as far north as Rockport, Maine and as far south as Dover, Delaware. Forty presentations are available in fields including biology, chemistry, physics, earth science, engineering, archaeology, and math. The Laboratory has preassembled kits for hands-on activities to complement each science demonstration, facilitating the presentation process for each volunteer and ensuring an interactive experience for each student. Laboratory employees interested in volunteering may contact David Granchelli at granchelli@ll.mit.edu.

Team America Rocketry Challenge

Francesca Lettang of the Active Optical Systems Group created a team of students for the Team America Rocketry Challenge (TARC) during the 2013–14 school year and mentored them along with Jillian James and Laura Bayley of the Space Systems Analysis Group and Adam Attarian of the Advanced Concepts and Technologies Group. The teams were made up of middle-school students with ties to Lincoln Laboratory and the Russian School of Mathematics in Lexington, Massachusetts.

TARC is an aerospace and engineering design competition for students in grades 7–12 in which teams design, build, and fly rockets that can launch and recover an egg without breaking it. This year's competition challenged teams to reach a target altitude of 825 feet and a target flight time of 48 to 50 seconds.

"The Laboratory team learned a lot about rocketry, engineering, and teamwork. I was really impressed with their attitudes and how they all learned to work together. They had to overcome several challenges with their rocket and work outside during a rough winter, but they refused to get discouraged. The fact that they were able to go from a disqualification on their first flight to a truly fantastic score on their third flight really shows their hard work and dedication."

— Francesca Lettang, TARC mentor

The team performed well in trials but was not one of the 700 teams nationwide that qualified for the final challenge.

The TARC team (left) braves the elements to refine their rocket design on the basis of results from field tests.

LLRISE

LLRISE coordinators and teachers assistants discuss plans for the students' day in the Technology Office Innovation Laboratory (above). Students work collaboratively to assemble their radar (right).

Lincoln Laboratory's summer engineering workshop for high-school students, Lincoln Laboratory Radar Introduction for Student Engineers (LLRISE), was first offered in 2012 to 12 students from local towns. This program proved so successful that, for the second year of the program, the number of students increased to 18, and registration was expanded from a statewide to a national level. For this third year of LLRISE, 18 students were accepted from around the United States to receive a hands-on introduction to radar.

The two-week residential, project-based enrichment program is offered to outstanding students who have completed their junior year. Under the mentorship of talented scientists and engineers, participants build Doppler and range radars by using creative problem-solving strategies. This year, LLRISE coordinator Chiamaka Agbasi-Porter of the Communications and Community Outreach Office was supported by nine technical staff members: Mabel Ramirez, Nestor Lopez, Raoul Ouedraogo, Wingyan Beverly Lykins, Alexis Prasov, Shakti Davis, James McIntire, Bradley Perry, and Alan Fenn.

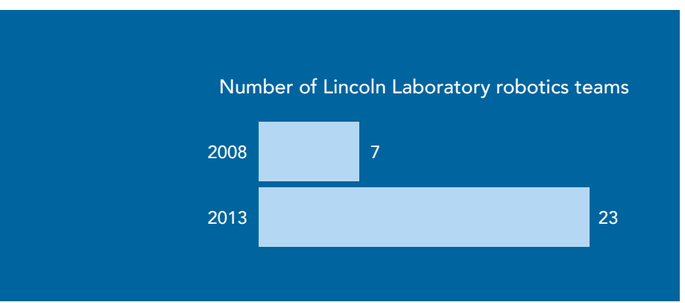
The rising seniors attended college-level classes on physics, electromagnetics, mechanics of Doppler radar, modular radio-frequency (RF) design circuitry, MATLAB, computer-aided design (CAD), pulse compression, signal processing, and antennas. To begin building their radars, the 18 students formed six teams and worked in Lincoln Laboratory's Technology Office Innovation Laboratory to create CAD drawings for 3D printing of their radar components.

The mentors and students in the 2014 LLRISE program are shown above.

In between instructional lectures and engineering activities, the students were given a tour of the Laboratory's Flight Test Facility and RF System Test Facility, and MIT Haystack Observatory in Westford, Massachusetts. The students also attended a presentation on career exploration and visited MIT campus and its financial aid office. The participants learned how to stage an experiment and present a project in preparation for a tech expo at MIT Museum, where they demonstrated the imaging capability of their self-built radars to visitors. Social activities, including a trip to the Boston Museum of Science and sightseeing around Boston, provided participants with breaks from the rigorous workload and gave out-of-staters a taste of Boston.

Robotics Outreach

Robotics Outreach at Lincoln Laboratory (ROLL) is an educational outreach program designed to stimulate youth interest in science and technology through hands-on activities. Members of ROLL help to sponsor robotic teams participating in regional and national competitions and supply mentors to area schools. Staff volunteers Loretta Bessette, Jacob Huang, and Alexander Divinsky, among others, help children learn how to program robots to complete challenges specified by FIRST (For Inspiration and Recognition of Science and Technology). Participants in FIRST also perform research on a topic, engage in team-building activities, and develop gracious professionalism throughout the season.



Nineteen volunteers serve as coaches and mentors for 12 Lincoln Laboratory–sponsored teams totaling 93 students, not counting sister teams. The teams compete in local, state, and national robotic competitions designed by FIRST, whose reach extends to more than 300,000 students worldwide.

The annual programs culminate in an international robotics competition and celebration in which team members win recognition, gain self-confidence, develop people and life skills, make new friends, and perhaps discover an unforeseen career path.

Junior FIRST LEGO League (Jr.FLL)

Grades K–3

Jr.FLL captures young children's inherent curiosity and directs it toward discovering the wonders of science and technology. This program presents a real-world scientific challenge that children explore through research, construction, and imagination. Guided by adult coaches, teams use LEGO bricks to build a model with at least one motorized movable part and develop a "Show-Me Poster" to illustrate what they learned and built.

In the Disaster Blaster Challenge of the 2013–14 competition year, more than 22,000 six- to nine-year-olds from 12 countries explored natural disasters. Teams learned how STEM impacts everyday lives, studied simple machines, and built a model made of LEGO elements with motorized parts. Throughout their experience, youngsters operated as teams under FIRST's signature set of core values. The Laboratory sponsored 12 Jr.FLL members on three teams in the 2013–14 competition year—Team Twister, Blizzard Wizard, and Lightning Cheetahs.

FIRST LEGO League (FLL)

Grades 4–8

In FLL, children are immersed in solving real-world science and technology challenges. The FLL challenge has three parts: the robot game, the project, and the core values. Using LEGO Mindstorms technology, teams build autonomous robots that perform a series of missions. Through their participation, children develop valuable life skills and discover exciting career possibilities while learning that they can make a positive contribution to their local and global communities.

In the 2013–14 Nature's Fury Challenge, more than 200,000 children ages 9 to 16 from more than 70 countries explored the awe-inspiring storms, quakes, and waves that are natural disasters. Teams discovered what can be done when intense natural events occur in the places where people live, work, and play.

Lincoln Laboratory was represented by 12 FLL teams coached by 19 staff members. The Lincoln Laboratory FLL teams competing at the regional level included Pixel Storm, Substitute Teachers, Furious Flames, Phoenix, LLAMAs, Tornados, Kaos Kontroller, Robots Get Kicked Out of a Bar, LLightning Llamas, Landslide Lab Coats, and Here Comes the Storm. The Laboratory FLL team that competed at the state level was the Flaming Ninja Waffles.

Members of the Flaming Ninja Waffles make design adjustments to their LEGO Mindstorms robot.

FIRST Tech Challenge (FTC)

Grades 7–12

FTC is designed for high schoolers who want to compete head-to-head using a sports model. Teams of up to 10 students are responsible for designing, building, and programming their robots to compete in an alliance format against other teams. Robots are built using a TETRIX platform that is reusable from year to year. Teams, including coaches, mentors, and volunteers, are required to strategize and build robots using sound engineering principles. Awards are given for the competition as well as for community outreach and design.

The Block Party Challenge for the 2013–14 competition included robotic tasks to be performed autonomously and under driver control. Allied teams had opportunities to complete specialized tasks for extra points. Lincoln Laboratory sponsored two FTC teams totaling 18 students, who were mentored by six coaches from the technical staff. FTC Team 2875, MITiBot, and FTC Team 7297, LiMITless, met 24 times throughout the season, spending 384 hours building, testing, and competing with their robots.

FTC students also engaged in robotics outreach, providing robotic demonstrations to various groups throughout the year in an effort to not only help other students discover how fun robotics can be, but also to potentially earn a FIRST award for performing the most significant outreach. At New England Thinkfest, a hands-on festival sponsored by Merrimack College's School of Science and Engineering, participants designed CD cars, wind sail rafts, water dams and balloon towers; performed science experiments; modeled bridges; solved math puzzles; and explored how trebuchet catapults work. ROLL was represented by two high-school robotic team members who demonstrated the different skills and capabilities of their competition-ready robot.

One of the Laboratory's two FTC teams reviews their robot's programming in preparation of the competition.

ROLL was also represented at Acton-Boxborough Regional High School's STEM Discovery Fest, a "reverse science fair" for students in grades 7–12 to explore STEM applications and career connections. The two ROLL students discussed robotics in general and their participation in the FIRST FTC robotics competitions.

FIRST Robotics Competition (FRC)

Grades 9–12

Dubbed the "varsity sport for the mind," FRC combines the excitement of sports with the rigors of science and technology. Under strict rules, limited resources, and time limits, teams of 25 students or more are challenged to raise funds, design a team "brand," hone teamwork skills, and build and program a robot to perform prescribed tasks against competitors. It's as close to "real world" engineering as a student can get. Professional engineers volunteer their time and talents to guide each team of students as they learn how to use sophisticated hardware and software to build their robots.

Sister Robotics Teams

ROLL has continuing collaborations with robotics teams from Roxbury, Waltham, Lexington, Weston, Manchester-by-the-Sea, and Shrewsbury, Massachusetts, as well as from Hanscom Air Force Base. ROLL ensures that these teams have adequate supplies, funds, and mentorship to design, build, and program their robots. The Laboratory teams assist their sister teams by staging scrimmages and sharing design concepts and programming tips. Some sister teams visit the Laboratory to demonstrate their robots and to tour the facility.

At least **90** middle- and high-school students have participated in Laboratory robotics teams each year since 2008

ROLL
Robotics Outreach at MIT Lincoln Laboratory

- FTC Team Battery-Powered Picklejar Heads from Lexington, Massachusetts
- FRC Team Beantown Botz from the John D. O'Bryant School of Mathematics and Science in Roxbury, Massachusetts
- FRC Team Robots by the C from Manchester Essex Regional High School in Manchester-by-the-Sea, Massachusetts

Massachusetts FTC (MASSFTC)

All high-school-level Lincoln Laboratory robotics teams and sister robotics teams belong to the Massachusetts FTC, organized by Loretta Bessette of the ISR Systems and Architectures Group. The ROLL teams hold workshops and scrimmages to promote team cooperation prior to competitions. Additionally, the ROLL teams host a regional qualifier tournament. ROLL provides volunteers, referees, and judges for each MASSFTC event.

Raoul Ouedraogo discusses Laboratory careers with participants in the Interphase EDGE program.

Each year, **3000** students listen to engineers and scientists explain why they chose STEM careers

MIT Office of Engineering Outreach Programs (OEOP)

The MIT OEOP in the School of Engineering offers deserving students rigorous academic experiences that provide an understanding of how technical concepts relate to their everyday lives. These programs not only encourage the pursuit of careers in technical fields; they also provide a hands-on curriculum that strengthens foundational math, science, and communication skills in a challenging learning environment in which expectations are set high. Lincoln Laboratory plays a part in four OEOPs: STEM, MITES, SEED, and CORE.

Science, Technology, Engineering and Mathematics (STEM)

STEM is a year-round academic enrichment program for talented local middle-school students who want to get ahead in math and science. The courses use lectures, projects, and experiments to help participants develop mathematical thinking and problem-solving abilities. Lincoln Laboratory sponsored a robotics course, provided facility tours, and organized a liquid nitrogen show led by Richard Williamson of the Communications and Community Outreach Office. Paula Donovan of the Cyber System Assessments Group and John Nwagbaraocha of the Intelligence and Decision Technologies Group presented briefings on their career choices, each highlighting the importance of a technical career path.

Minority Introduction to Engineering and Science (MITES)

OEOP's six-week residential summer program for top high-school students in the nation stresses the value of pursuing advanced technical degrees and careers and helps students develop the skills necessary to achieve success in science and engineering. This year, Lincoln Laboratory sponsored two students in this program. The Laboratory also hosts a guided tour of the Air Traffic Management Laboratory, the Flight Test Facility, and the RF System Test Facility. MITES students listen to presentations by Lincoln Laboratory technical staff. Karen Gettings of the Embedded and Open Systems Group and Crystal Jackson of the Advanced Satcom Systems and Operations Group explained their career paths and why it is important to continue in a technical field.

Saturday Engineering Enrichment and Discovery (SEED) Academy

The SEED Academy is a seven-semester technical career exploration program for traditionally underserved high-school students in Boston, Lawrence, and Cambridge, Massachusetts. Lincoln Laboratory sponsored two students and an aeronautics and astrophysics course. Hayley Reynolds of the Surveillance Systems Group and Edward Bettencourt, formerly of Lincoln Laboratory, presented talks on what they do at work and why they benefited from choosing a technical career.

Confronting Obstacles and Realizing Excellence (CORE)

A new program for Lincoln Laboratory, CORE was held in August at MIT campus. Twelve students were selected to participate in the debut program. CORE is an intensive math course designed to cover specific topics in geometry. The two-week program focuses on increasing the quantitative reasoning skills of underserved rising ninth and tenth graders from public high schools in Boston and Cambridge, Massachusetts. The instructional team helped the participants sharpen and build confidence in their math skills, think creatively, and have fun while challenging themselves academically.

Ceres Connection

Lincoln Laboratory has partnered with Society for Science & the Public to promote science education through the Ceres Connection program. This program names minor planets in honor of students in fifth through twelfth grades and their teachers. Students and teachers are selected through world-wide science competitions directed by the Science Education Department at Society for Science & the Public, which directs Broadcom MASTERS (Math, Applied Science, Technology and Engineering Rising Stars), the Intel Science Talent Search, and the Intel International Science and Engineering Fair.

Since 2003, approximately 3000 students and their teachers have been honored. Each year, the Ceres Connection program awards this honor to about 250 students.

3000 students over 11 years have had a minor planet named in honor of them through the Ceres Connection

SPOTLIGHT: Nathan Han, 15, wins top award at International Science Fair

Nathan Han, son of Hsiu Han, senior staff in the Systems and Analysis Group, was awarded first place in the 2014 Intel International Science and Engineering Fair (ISEF), a program of Society for Science & the Public that is sponsored by Intel. As the world's largest international pre-college science competition, Intel ISEF provides an annual forum for nearly 1800 high-school students from more than 70 countries to showcase their independent research and compete for about $5 million in awards.

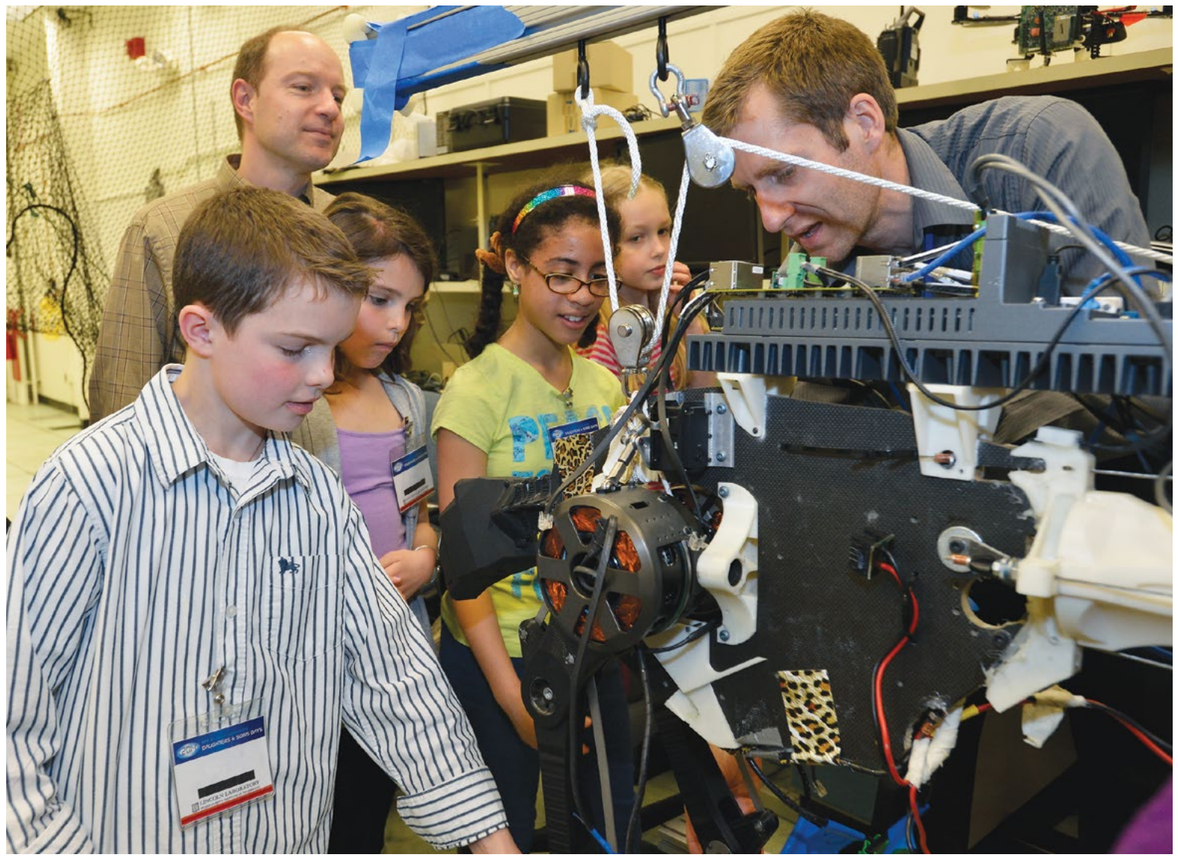
Nathan received the Gordon E. Moore Award of $75,000 for his development of a machine-learning software tool to study the mutations of a gene linked to breast cancer.

"The world needs more scientists, makers, and entrepreneurs to create jobs, drive economic growth, and solve pressing global challenges," said Wendy Hawkins, executive director of the Intel Foundation. "Intel believes that young people are the key to innovation, and we hope that these winners inspire more students to get involved in science, technology, engineering, and math, the foundations for creativity."

Of his win, Nathan said, "I was absolutely thrilled—my dream for high school came true in my freshman year. It was an incredible experience to see so many great projects and meet so many brilliant people at the Intel ISEF. My display booth was surrounded by projects of Intel Science Talent Search finalists and Research Science Institute alumni. I was deeply honored to be among them. Also, I am very grateful to the Science Department of Boston Public Schools and the Massachusetts State Science and Engineering Fair. Without their support over the years, I would not have been able to compete at the 2014 Intel ISEF."

"I was absolutely thrilled—my dream for high school came true in my freshman year."

Nathan would have had a minor planet named in his honor through the Laboratory's Ceres Connection program, which honors science students by naming minor planets discovered by the Lincoln Near-Earth Asteroid Research program, had he not already been awarded this honor for being a finalist in the Broadcom MASTERS competition in 2011.



Daughters and Sons Days attendees learn about a cheetah-like robot in the Autonomous Systems Laboratory.

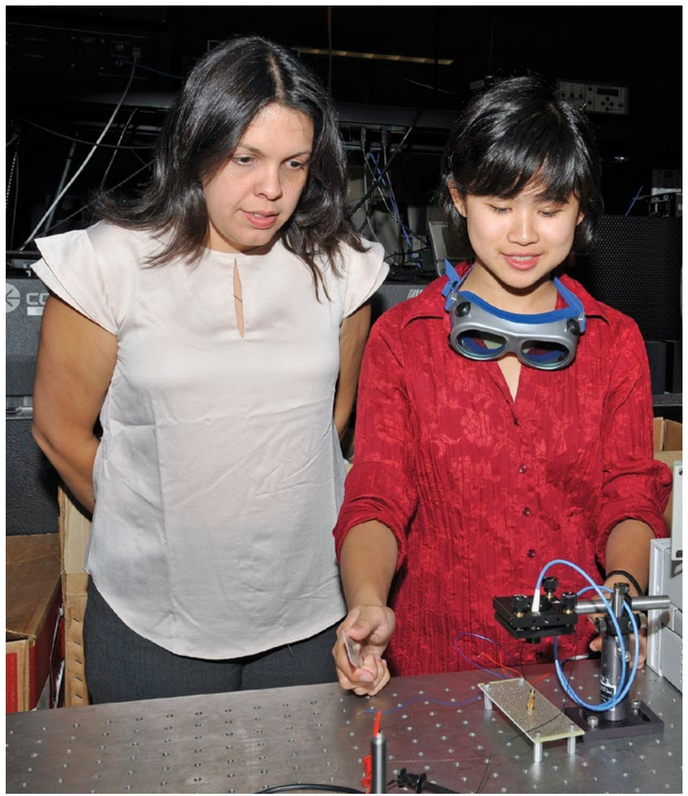
Daughters and Sons Days

In the Machine Shop, a waterjet cuts aluminum to make nametags (far left). TOIL houses a Foucault pendulum (left).

Lincoln Laboratory extends its outreach to the students of many local schools by way of the annual Daughters and Sons Days offered for employees' children aged 9–17.

The 2014 event featured eight activities designed to spark interest in science and technology. A tour of the Radio Frequency (RF) RF System Test Facility was offered so that visitors could learn how Lincoln Laboratory uses anechoic chambers and performs antenna measurements. The Flight Test Facility was also open for tours, offering opportunities to talk with pilots and see the Laboratory's fleet of research and development aircraft. The Autonomous Systems Laboratory provided interactive demonstrations of robots, robot sensors, and its motion-capture system. The new Technology Office Innovation Laboratory (TOIL) featured a 3D-printed city, a clear casting of the city, a variety of aeronautical wing designs, and 3D-printed RF components. Throughout Lincoln Laboratory, demonstrations were available on 3D imaging, fiber optics, water waveguiding, streetwise and cyber safety, laser communications, vibrometers, and computer-aided design.

Presentations were given by Catherine Cabrera, Christy Cull, and Kyle Ingols. They respectively spoke about biological solutions to engineering challenges, optical illusions in audio and film, and what happens when you click a website.



AFCEA intern Caitlin Kwan (right) receives guidance from her mentor, Karen Gettings, in aligning a photodiode to the path of a laser.

AFCEA International

The Armed Forces Communications and Electronics Association (AFCEA) arranges summer internship opportunities for graduating high-school seniors interested in STEM careers.

Each summer, two to four students are offered a Laboratory internship and at least 40 students tour the Laboratory facilities, learning about the latest research and career options in math and science. In 2014, three AFCEA interns were accepted to work at Lincoln Laboratory.

Michael Woods of East Bridgewater High School worked with Franz Busse and Dennis Burianek of the Systems Engineering Group. Woods began at MIT in the fall.

Caitlin Kwan was mentored in the Embedded and Open Systems Group by Karen Gettings and Francesca Lettang. Kwan attended Newton North High School and now attends Boston University. Lettang, who found hosting an intern very helpful, said, "Caitlin is very enthusiastic and willing to dive in and learn as she goes along."

Stephen Kender graduated from Chelmsford High School and worked at the Katahdin Hill site for the Advanced Sensor Systems and Test Beds Group with John Orthmann serving as his mentor. Stephen learned about precision drilling and cutting machining equipment and became familiar with the variety of tools used in a machine shop.

John Orthmann (left) looks on as Stephen Kender, AFCEA intern, practices using a precision drilling machine.

More than
100
scientists and engineers act as tour guides and speakers for groups visiting the Laboratory

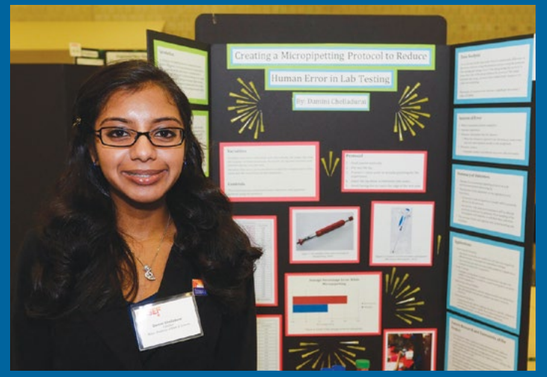
Stephen felt lucky to be chosen to work at Lincoln Laboratory and was very happy with his experience: "The internship program at Lincoln Laboratory is extremely well organized, and it has really helped me to develop new skills and solidify existing skills so that I can be more prepared for college and beyond." Stephen now attends UMass–Lowell.

SPOTLIGHT: Massachusetts State Science and Engineering Fair

Lincoln Laboratory has supported the Massachusetts State Science and Engineering Fair (MSSEF) for 14 years, serving as a bronze donor to the event by awarding $500 scholarships from the John Welch Memorial Fund to the second-place winners in the physics and engineering competitions. This fund, among others, is part of the MIT Lincoln Laboratory Giving Program.

In 2014, Damini Chelladurai of Shrewsbury, Massachusetts, won the MIT Lincoln Laboratory Award and placed as an alternate for the 2014 Regis College $40,000 scholarship for her project in behavioral science, "Creating a Micropipetting Protocol to Reduce Human Error in Lab Testing." She is now an 11th grader at the Massachusetts Academy of Math and Science. Bianca Edozie and Christine Barthelemy of Brockton, Massachusetts, won the MIT Lincoln Laboratory Award for their environmental science project, "How Gassy Is BHS?" BHS stands for Brockton High School, where they are now 12th graders.

"My favorite part of judging was being present in a space filled with young people who are really enthusiastic about STEM," said Denise Maurais-Galejs of the Embedded and Open Systems Group, who served as a judge for mathematics projects. "I was excited to talk to the participants about how they leveraged their classroom experiences to put their projects together."



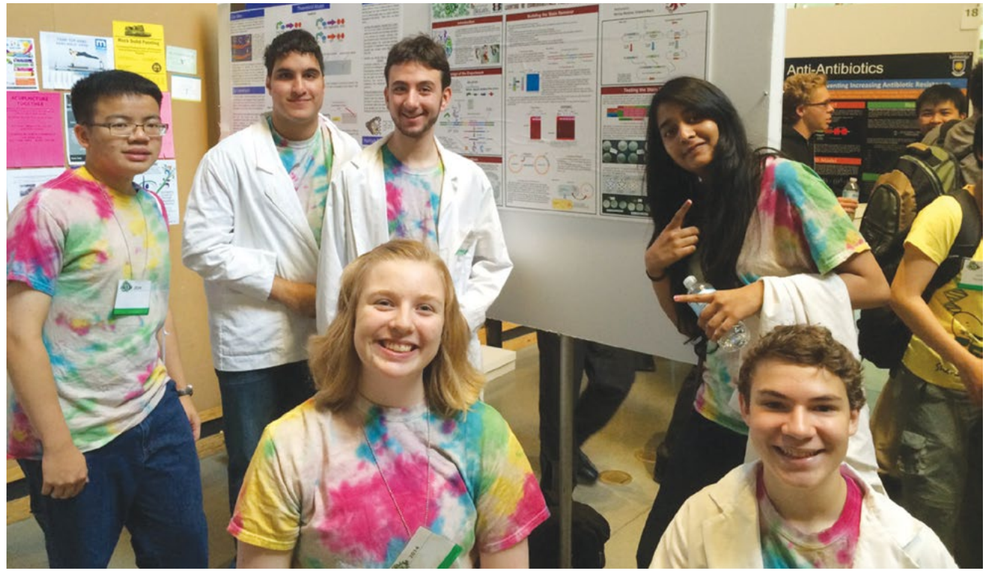
Damini Chelladurai (above), second-place winner in the engineering category, and Christine Barthelemy and Bianca Edozie (left and right respectively, right photo), second-place winners in the physics category, display their research posters at the MSSEF.

Since 2000, Lincoln Laboratory technical staff have been volunteering as judges for the MSSEF, held on MIT campus in the Johnson Athletic Center. This year, sixteen staff members assisted in judging science fair projects: Eric Austin, David Brown, Shourov Chatterji, Phillip Evans, Claude French, Christopher Lloyd, Denise Maurais-Galejs, Sean O'Melia, Jean Piou, Scott Pudlewski, Paul Ryu, Frank Schiavone, Peter Shao, Brady Tello, Eric Tollefson, and Sivasubramaniam Yegnanarayanan.

Local School Science Fairs

Technical staff members from Lincoln Laboratory support Lexington High School by volunteering as judges for the school's Science and Engineering Fair. Laboratory staff also serve as judges for the Carlisle Middle School Science Fair. Volunteers include Leonard Johnson of the Quantum Information and Integrated Nanosystems Group, Kenneth Cole of the Advanced Sensor Systems and Test Beds Group, and Vyshnavi Suntharalingam of the Advanced Imager Technology Group.

Countless other schools are supported by Laboratory employees contributing to their children's school science fairs or career days without deliberately representing Lincoln Laboratory. Their participation supports community outreach and STEM education on a local level.

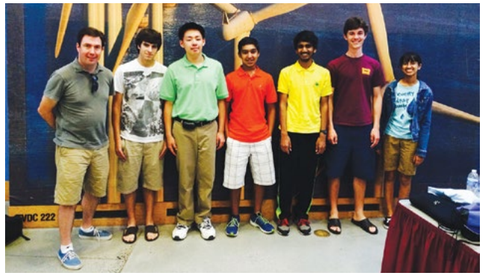


The Waltham High School iGEM team was mentored by the Laboratory's Edward Wack, not shown in photo.

International Genetically Engineered Machine Competition

The International Genetically Engineered Machine (iGEM) Foundation is dedicated to education and competition and the advancement of synthetic biology. In 2012, iGEM spun out of MIT and became an independent nonprofit organization located in Cambridge, Massachusetts. The iGEM Foundation fosters scientific research and education through organizing and operating the iGEM competition, the premier undergraduate student synthetic biology competition.

The iGEM High School Division enables high-school students and instructors to learn about and engage in synthetic biology, bringing synthetic biology from the world of academia into local communities. The iGEM high-school season runs from October to May and culminates in the High School Jamboree in June. Teams spend the fall semester learning about synthetic biology, gaining laboratory experience, and developing their project ideas. The teams perform the bulk of the work necessary for their projects during the spring semester, ending with presentations of their projects to a panel of judges at the Jamboree.



The Acton-Boxborough iGEM team was assisted by Maria Kuffner, not shown in photo.

Edward Wack of the Bioengineering Systems and Technologies Group, an advisor for the Waltham High School "BioHawks" team, spent more than 40 hours helping the team over a nine-month period. Maria Kuffner of the Surveillance Systems Group assisted the Acton-Boxborough Regional High School team. Peter Carr of the Bioengineering Systems and Technologies Group served as a judge for the competition.

Even though 2014 marked the Laboratory's inaugural participation with this event, David Kusinsky of the Sensor Technology and System Applications Group has been volunteering at iGEM for several years in various roles, including as a photographer for the High School Jamboree. Kuffner said, "Hopefully this program can grow at the Laboratory. I think the students learned a great deal on many levels."

Other Science-Related Community Outreach

- **Carlos Aguilar** of the Bioengineering Systems and Technologies Group spoke to 80 high-school students participating in the Research Science Institute program that combines on-campus coursework in scientific theory with off-campus work in science and technology research. Aguilar discussed engineering with nanopore technology and what influenced him to pursue a technical career.
- **Francesca Lettang** of the Active Optical Systems Group provided a physics demonstration for a Boy Scout Troop.
- **Jessica Kesner** of the Mechanical Engineering Group coordinated and scheduled mentors to help MIT students in a design competition course for mechanical engineers. Mentors aided students in the design process during three-hour labs held throughout the four-month course.
- **Charles Wynn** of the Chemical, Microsystem, and Nanoscale Technologies Group presented an optics program to students in Wellesley, Massachusetts, in February.
- **Frank Robey** of the RF Technology Group assisted students at Lexington High School in building a pendulum that will be submitted to the state science fair in 2015.
- **James Landry** of the Advanced Capabilities and Systems Group coached a non–Lincoln Laboratory robotics team.

Cambridge Science Festival

Each April, Lincoln Laboratory takes part in the Cambridge Science Festival, a citywide event that offers hundreds of science-based demonstrations and activities to the Greater Boston area. This year, Laboratory volunteers showed the 15,000 festival attendees a "zoo" of interactive robots and invited them to measure the changing speed of objects by using coffee-can radars built by high-school students in the Lincoln Laboratory Radar Introduction for Student Engineers (LLRISE) program.

In addition, MIT Lincoln Laboratory Beaver Works opened its doors for tours and activities. Here, visitors viewed prototypes developed to extend the endurance of a power system for a mid-sized autonomous undersea vehicle, including an internal combustion engine that drives a generator and an aluminum-water reactor.

Lawrence Candell, assistant division head of the Aerospace Division, served as a speaker in the "Big Ideas for Busy People" seminar.

Young and old alike visit the Laboratory's robot zoo to manipulate custom-built and commercial robots.

At Beaver Works in Cambridge, Massachusetts, a student explains the workings of a power supply source for an autonomous undersea vehicle.

Group Tours

As part of the Lincoln Laboratory Community Outreach initiative, tours of Laboratory facilities, such as the Microelectronics Laboratory, the Air Traffic Management Laboratory, the Rapid Hardware Integration Facility, RF System Test Facility, and Flight Test Facility, are given annually to a number of groups. In 2014, tours were given to

- Students participating in the AFCEA Diversity Career Day at Hanscom Air Force Base
- UMass–Lowell U.S. Air Force Reserve Officer Training Corps (ROTC) students
- Research Science Institute program students
- U.S. Air Force cadets
- U.S. Association of Former Members of Congress
- ROTC students
- U.S. Army Test and Evaluation Command
- U.S. Army Soldier Systems Center
- U.S. Military Academy at West Point
- National Reconnaissance Office fellows
- Congressional and executive branch staffers
- Electronic Systems Center at Hanscom Air Force Base

A UMass–Lowell student in the U.S. Air Force Reserve Officer Training Corps thanks Robert Maynard for an informative tour of the Flight Test Facility. Each year, Maynard provides countless tours of the Laboratory's fleet of research and development aircraft.

More than **3000** middle- and high-school students tour the Laboratory's facilities each year

Educational Collaborations

Inspired by employee desires to connect with the community and to motivate student interest in science, technology, engineering, and mathematics, our outreach initiatives include

- Technical Staff Programs
- Military Student Programs
- Student Programs
- MIT Student Programs

Students collaborate during a Lincoln Laboratory–led course on how to build a small radar system.

Technical seminars at Lincoln Laboratory are well attended and provide a broad overview of critical technologies and national problems.

Technical Seminars

Seminar series motivate and inspire staff while facilitating working relationships. Seminars reflect leading-edge trends in technology. The Technology Office Seminar Series invites nationally known experts to the Laboratory. Each seminar is designed to offer specific technology insights, provide a forum to develop technology applications, and foster future collaborative efforts. The seminars offered in 2014 include

- **Prof. Eduardo Torres-Jara**, WPI — *Sensitive Robotics*
- **Prof. Susan Solomon**, MIT — *A Tale for Our Times: Climate Change and the Reasons for Climate Gridlock*
- **Prof. Markus Buehler**, MIT — *Bioinspired Materials: Hierarchies from Nano to Macro and Analogies between Materials and Music*
- **Dr. Eric Swanson**, Entrepreneur — *Optical Coherence Tomography: MIT LL History, Current Status, and Future Opportunities*
- **Prof. Jeremiah Johnson**, MIT — *New Synthetic Tools for the Fabrication of Functional Metal/Organic Interfaces and Networks*
- **Prof. Yaneer Bar-Yam**, New England Complex Systems Institute — *Complex Systems Science and the Challenges of Engineering for and of a Complex World*
- **Dr. Randol Aikin**, Lincoln Laboratory — *Chasing the Echoes of the Big Bang with BICEP2*
- **Marc Levy**, Center for International Earth Science Information Network — *National Security Implications of Climate Change*

Continued Learning Programs

Lincoln Laboratory is committed to the professional growth of its staff members in the interests of enhanced knowledge of staff and the Laboratory enterprise, and benefit to its sponsors. This goal is partially achieved through special educational opportunities. Graduate studies are strongly encouraged as one means of continued learning; continued professional technical education is another means.

Distance Learning Program

Distance learning programs coordinated by the Graduate Education Committee enable technical staff to earn master's degrees while continuing to work full time at the Laboratory. Carnegie Mellon University offers degrees in information technology and information assurance; Pennsylvania State University offers a master's program in information sciences. Currently, three staff members are enrolled at Carnegie Mellon and one at Pennsylvania State.

Boston University Program

In response to Laboratory interest and in collaboration with the Training and Education Office, Boston University is offering core and elective courses from their master's program in computer science onsite at Hanscom Air Force Base. These courses can be taken independently or as part of a certificate or master's degree program through Boston University. Courses have included Computer Networks, Cryptography, Advanced Cryptography, and Software Engineering. Since the program started in 2013, 33 staff members have completed one or more of the eight course offerings held during the spring, summer, and fall semesters.

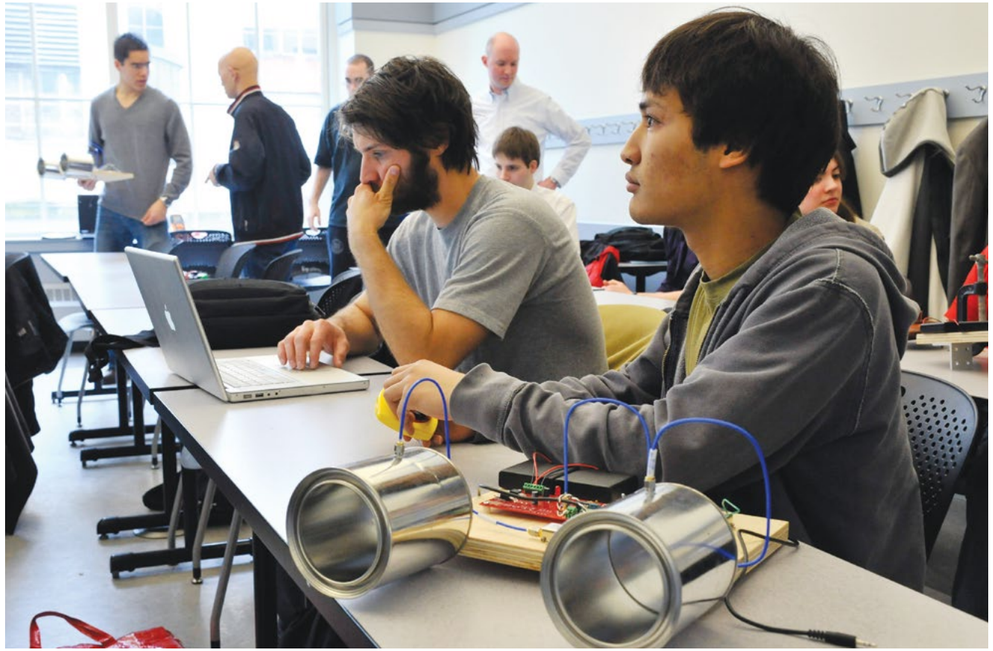
In-House Learning

Continued education, required training, and professional development are important parts of Lincoln Laboratory's commitment to maintaining and enhancing technical excellence and regulatory compliance. A variety of resources and services are available to assist individuals in acquiring new skills and knowledge.

Lincoln Laboratory's in-house education program presents courses in professional and leadership development, business operations, mission assurance, fabrication engineering, security awareness, and software applications.

Technical education expands the Laboratory's technical knowledge, versatility, and effectiveness. One-day technical seminars, workshops, and short courses are offered in many different subject areas such as Fourier optics on the computer, statistical signal processing, programming topics, Apache Accumulo for developers, and fundamentals of flight. Monthly seminar series are given in the areas of biomedical signal and image processing; imaging sciences; and processing, exploitation, and dissemination. These seminars feature guest lecturers who are distinguished in their fields. There are annual offerings such as networking and communications, introduction to radar systems, and ballistic missile defense technology hosted by technical groups and divisions.

Lincoln Laboratory also teaches courses through MIT Professional Education. Weeklong MIT courses are geared to mid-career technical, scientific, business, and government professionals in their 20s through 50s who wish to advance their careers. Students learn from expert MIT faculty and Lincoln Laboratory technical staff. Courses differ from year to year, but typically include repeat courses such as Build a Small Radar System, Build a Small Phased Array Radar Sensor, and Rapid Robotics: Autonomous Systems with Open-Source Software.



As they build their own radar systems, students in the MIT Professional Education program review the basics of radar with Lincoln Laboratory experts.

Lincoln Scholars Program

The Lincoln Scholars Program (LSP) is designed to enhance the technical excellence of Lincoln Laboratory by affording technical staff opportunities for continuous learning and exposure to developing technologies in an academic environment. Staff participation in the program jointly benefits the Laboratory, its sponsors, and the employee.

Lincoln Scholars can pursue full-time graduate work at either the master's or doctoral level at Boston-area academic institutions. During their studies, Lincoln Scholars continue to work at the Laboratory under terms arranged with the Graduate Education Committee. A compensation and tuition support plan substantially mitigates the financial cost to the individual.

During his work at Lincoln Laboratory, Lincoln Scholar Michael Stern investigates additive manufacturing's potential to rapidly create custom parts for prototype systems fabricated in the Engineering Division's Rapid Hardware Integration Facility.

The LSP is managed by the Lincoln Scholars Committee, a standing committee appointed by the Director, with administrative coordination and support provided by Human Resources. The committee's responsibilities include evaluating applications and selecting Lincoln Scholars through a competitive process, monitoring the progress of Lincoln Scholars, assuring their ongoing technical contributions to the Laboratory, and providing assistance and support, as appropriate. Applications are accepted on an annual basis, with two reviews for eligibility.

There are currently 26 staff members enrolled in the Lincoln Scholars Program.

Michael Radoslovich and William Delaney (far right, left and right respectively) explain how the Laboratory's technological upgrades to research and development aircraft benefit the warfighter.

Cadets and midshipmen from the U.S. Air Force, Military, and Naval Academies arrive at Lincoln Laboratory for the 2014 summer research program.

Summer Internships for Service Academy Students

Lincoln Laboratory offers summer internships to students from the U.S. Air Force, Military, Naval, Coast Guard, and Merchant Marine service academies. Service Academy students are assigned to a Laboratory technical group for a three- to five-week span. Participation in this summer research program, which has been offered for decades at a small-scale level, has grown in recent years. This past summer, the Laboratory hosted its largest group to date—9 U.S. Air Force Academy cadets, 10 U.S. Military Academy cadets, and 30 U.S. Naval Academy midshipmen. The 49 cadets and midshipmen pursued a wide variety of research efforts, including the demonstration of a low-cost, high-performance airborne lasercom terminal; the design of laser communications interoperability standards; the design of a microsatellite payload; and the determination of mechanical load on spacecraft.

"The military fellows that come to Lincoln Laboratory are intelligent and highly motivated. They have strong desires to learn what we do at the Laboratory and how this work can be applied in their education and military careers. Staff members enjoy the unique perspectives the fellows bring to our group each summer."

— Dennis Burianek,
Systems Engineering Group

Military Fellows Program

Lincoln Laboratory awards fellowships to active-duty military officers who are fulfilling requirements for the U.S. military's Senior Service Schools, to senior officers participating in the Army's Training with Industry Program, and to officers pursuing graduate-degree work on Laboratory-sponsored programs. Fellows pursuing graduate degrees spend two or more days a week at the Laboratory and are assigned an advisor from among the technical staff to supervise their work. During summers and their final semester, these fellows contribute full time to a Laboratory program. The Military Fellows Program helps the Laboratory establish cooperative relationships with military officers. In 2014, the Laboratory hosted 28 officers.

In addition, Lincoln Laboratory hosts a variety of military personnel and groups for conferences, technical seminars, and tours of the Laboratory's Flight Test Facility and RF System Test Facility.

West Point Collaboration

Lincoln Laboratory partners with the U.S. Military Academy at West Point to build two satellite payloads. Christopher Semisch of the Optical Engineering Group leads a project in which cadets build a payload to perform an on-orbit experiment of a passive attitude control and a friction-based damping system composed of low-cost components.

Bruce Bray of the Intelligence, Test, and Evaluation Group and Joshua Wilson of the Air and Missile Defense Assessments Group worked with West Point faculty advisor LTC Sam Amber to lead Cadet Tyler Rauenzahn in developing a radar calibration satellite for important radar assets. On the basis of initial work previously conducted by cadets, measurements of a prototype design were made in the Laboratory's RF anechoic chamber as part an elective course on essential features of independent research in physics. This work is sponsored by the U.S. Army Space and Missile Defense Command.

Military University Electives

Along with William Martel, associate professor of International Security Studies, Tufts University, Laboratory staff teach electives to the O-4 and O-5 level officers attending the Naval War College in Newport, Rhode Island. The courses prepare the students to think analytically about the technology and policy challenges they will face.

The Ballistic Missile Defense (BMD) course has been taught annually by Claude Noiseux of the BMD System Integration Group since 2002. This course explores the critical technologies, capabilities, operational concepts, and policies that will influence how ballistic missile defense affects the military capabilities of the United States.

Space Technology and Policy has recently been taught by Robert Guerriero of the Space Control Systems Group and William Martel. This seminar explores the critical space technologies, capabilities, and policies that shape how the United States uses space for military and government purposes.

The Cyber Security course is taught by Jeffrey Gottschalk and Joshua Haines of the Cyber Systems and Operations Group and William Martel. This course provides an overview of cyber operations and cyber threats, emphasizes enhanced information superiority through increased data sharing, and enhances one's understanding of how to defend critical information. A similar elective is offered at the Air University at Maxwell Air Force Base in Montgomery, Alabama, because of the popularity of the course at the Naval War College.

"The exposure to people working on difficult national security problems has opened my mind to new ways of thinking and inspired a deeper appreciation for the work that civilians do to support the Department of Defense."

— Ensign Erica Leinmiller

ENS Leinmiller is a military fellow in the Cyber Systems and Operations Group and a graduate student in the public policy program at the John F. Kennedy School of Government. Her knowledge and understanding of policies and human-computer interaction provides unique perspectives that inform the group's approach to devising effective network defense strategies.

Students from across the country converge at Lincoln Laboratory for specifically chosen internships offered by the 2014 Summer Research Program.

Summer Research Program

Since 1975, the Summer Research Program has offered students the opportunity to interface with national experts and work with state-of-the-art equipment on real-world challenges. This summer, the Laboratory welcomed 181 student interns from 75 different schools across the country.

The three colleges most represented by the interns at the Laboratory have been MIT, Worcester Polytechnic Institute, and the Georgia Institute of Technology. Gary Hackett, Human Resources Department, has been the manager of the Summer Research Program since 2007. Describing the program, Hackett said, "Each year I continue to be amazed by the students' curiosity, passion, and drive for their work and interest in continuing to learn to start their careers."

Fayetteville State University Internship Program

Fayetteville State University (FSU) students Malik Oliver and Kyndreshia Stroman joined the Laboratory for the summer in the Chemical and Biological Defense Systems Group and the Airborne Networks Group, respectively. Both students are FSU Center for Defense and Homeland Security STEM scholars.

"Programs like this one provide students access to experiences and research they may not be aware of," said Christina Rudzinski, a mentor to Oliver, "while giving our institution access to individuals who are motivated, academically strong, and interested in broadening their expertise in defense research."

Whitney Young, a mentor to Oliver, described her appreciation for the summer research program: "This type of program is instrumental in encouraging future generations to become involved in technical fields. Allowing students to work on real problems helps get them excited about what they can do with their degrees and how much of an impact they can have."

Malik Oliver, FSU student intern, loads a centrifuge with test samples.

"The wide range of tasks to be completed and problems to be solved has helped build my engineering intuition and confidence in my ability to excel in engineering."

— Jamal Grant, summer intern, Mechanical Engineering Group

As a teaching assistant for the 2013 Lincoln Laboratory Radar Introduction for Student Engineers program, Grant explains to Laboratory Director Eric Evans some of the challenges the students faced as they populated their circuit boards.

SPOTLIGHT: Guiding a student to a technical career

Each summer, more than 170 students become interns at Lincoln Laboratory. For Jamal Grant, being an intern is only one of several experiences with the Laboratory.

Jamal Grant, mentored by Bryan Reid of the Systems Engineering Group, works as an intern in the Mechanical Engineering Group. For his internship, he works on the Deployable In-Space Coherent Imaging Telescope program.

However, he was first introduced to engineering when he was a student at John D. O'Bryant High School of Mathematics and Science in Roxbury, Massachusetts. It was there that he met Chiamaka Agbasi-Porter, who, at the time, supervised after-school science and engineering programs. One program took students on field trips to companies and showed them the types of jobs available in technical fields. "When I came to Lincoln Laboratory," says Grant, "I was impressed and intrigued not only by the complex nature of the work but also by the newfound knowledge I had of the applications, significance, and variety of work that fell under the umbrella of engineering. That day solidified my decision to study engineering in college and made working at Lincoln Laboratory my dream job."

After high school, Grant was accepted at University of Massachusetts–Lowell, where he majored in mechanical engineering. Meanwhile, Agbasi-Porter began working at Lincoln Laboratory as an outreach coordinator in the Communications and Community Outreach Office. Then, in 2013, when Agbasi-Porter needed a teacher's assistant (TA) for a two-week-long outreach program she was developing, she of course thought of Grant. "I remember Jamal as a responsible young man who showed enthusiasm for engineering. When I asked him to help me on an outreach project for Lincoln Laboratory, he couldn't wait to start."

Grant's willingness to help with an outreach program paid off, leading to increased involvement with the Laboratory and its outreach activities. Grant explains, "After serving as a TA, I assisted in recruiting and interviewing TAs for the 2014 program and volunteered as a judge at a regional robotics competition through Lincoln Laboratory. I visited the Lab during school breaks and continued to meet people and learn more about the facility and its history; these visits helped me build a network and discover other forms of engineering."

Now that Grant is interning at Lincoln Laboratory, he pays a weekly visit to Agbasi-Porter just to discuss how much he enjoys his internship. Of the work he has done this summer, Grant says, "The wide range of tasks to be completed and problems to be solved has helped build my engineering intuition and confidence in my ability to excel in engineering." Grant's tasks include modeling fixtures for repeatability tests of a telescope's composite deployment arms; designing assembly fixtures and engineering drawings for fabrication; researching laser displacement sensors for deployment tests; using data acquisition instrumentation to acquire and analyze laser sensor signals; processing and manipulating interferometer images; and testing piezo actuators, air-pressured wire cutters, and electromagnets.

Mark Silver, Grant's supervisor in the Mechanical Engineering Group, says, "Jamal came up to speed quickly on understanding the variety of problems he'd been given and made an impact on the program. He worked well independently, yet asked good questions when he needed help. Because of his ability to work independently and his eagerness to assist, we asked him to extend his summer internship into the fall to help perform the tests that he developed."

Regarding his internship at the Laboratory, Grant adds, "Since I have been here this summer, I have continued to learn and gain new interests from the work I am doing. Being at the Laboratory has made me want to pursue a master's degree in aerospace or mechanical engineering. The work here has expanded my engineering skillset and motivated me to continue my education in this field." With these words, it seems that Grant's dream job is very well within his reach, and Lincoln Laboratory is fulfilling its outreach goal of guiding students to technical careers.

Graham Fortier-Dube, (right) a senior at Minuteman Technical High School, works with **Ryan Lewis** (left) in the Airborne Radar Systems and Techniques Group. Graham organized code to ensure smooth operation of multiple mobile units working together in the field. His work, which requires hours in the lab and in the field, provides him with a first-hand, in-depth understanding of what is needed for thorough testing of code. Graham, like many of our technical school interns, gains industry experience while still attending school by working every other week at Lincoln Laboratory during the spring semester.

Technical School Internships

Each year, Lincoln Laboratory offers internships for one or two students from Minuteman Technical High School and Wentworth Institute of Technology. Through their work at the Laboratory, the interns receive a behind-the-scenes look at an engineering career while being mentored by a Laboratory staff member.

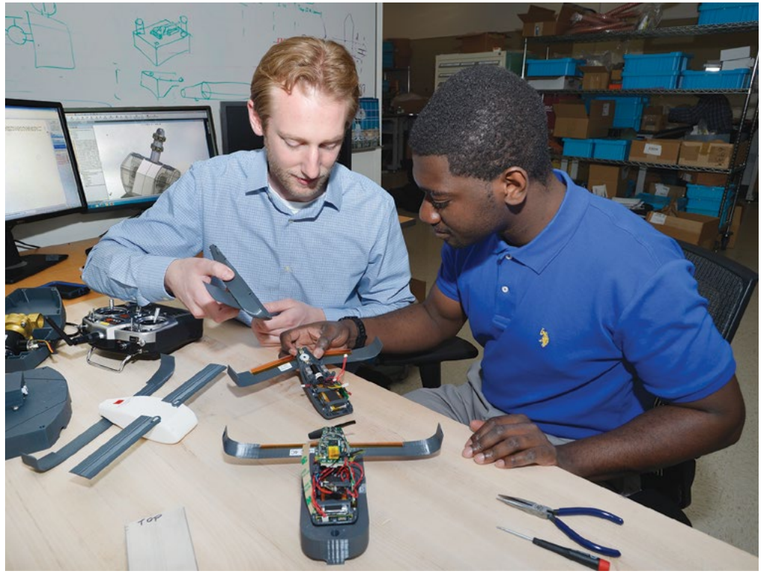
Graduate Fellowship Program

In 2013–14, three students were awarded grants through this program that offers graduate fellowships to science and engineering students pursuing master's or doctoral degrees at partner universities. Funds support a fellow's stipend, supplement an assistantship, or subsidize other direct research expenses.

WPI Major Qualifying Project Program

In summer 2014, seven students were accepted as Laboratory interns under the Worcester Polytechnic Institute's Major Qualifying Project Program, which requires students to complete an undergraduate project equivalent to a senior thesis. Students demonstrate the application of skills, methods, and knowledge to problems typical of those encountered in industry. WPI capstone projects, reflecting nine weeks of work at Lincoln Laboratory, include

- Threat Rating and Assessment Collaboration Tool
- Effects of Process Parameters on Additive Materials
- Sensor Turret Target Tracking for Small Unmanned Air Vehicles
- Handheld Transceiver Tester
- Radar Receiver Calibration Toolkit



"I feel fortunate to work at Lincoln Laboratory. I don't believe I could have such a valuable internship and interesting work elsewhere, and the staff have been very helpful every step of the way."

— Jackson Wirekoh, Carnegie Mellon University student intern

As an intern in the Rapid Prototyping Group, Jackson Wirekoh (right) conducts preflight checkout of micro–unmanned aerial vehicles with the help of staff member Brian Day (left).

University Cooperative Education Program

Lincoln Laboratory employs students from area colleges for full-time co-ops during the summer or work/study semesters and part-time co-ops during academic terms. Highly qualified students selected for co-ops become significant contributors to project teams.

During the spring semester of 2014, 47 students worked in divisions and departments at the Laboratory. Colleges and universities that regularly partner with Lincoln Laboratory are Northeastern University, Wentworth Institute of Technology, University of Massachusetts–Lowell, Boston Architectural College, and Rochester Institute of Technology.

300 Laboratory scientists and engineers mentor student interns each year

SPOTLIGHT: Wentworth student explores 3D printing in Technology Office Innovation Laboratory

Andrew Volpe plunged into the world of machining and 3D printing as the first student to participate in a co-op in the Technology Office Innovation Laboratory (TOIL). Under the mentorship of David Scott, TOIL manager, Volpe, a junior in Wentworth Institute of Technology's Mechanical Engineering Technology program, approached his co-op with particular interest in rapid prototyping and related innovative technologies, which drew him to apply to the TOIL position. "Just by reading the description, I knew this opportunity would give me a wealth of experience," Volpe said. In TOIL, Volpe's duties encompass everything from repairing machinery to working with new software to researching 3D-printing materials.

Using designs created in SolidWorks software, he used 3D printers to create objects with both practical and creative purposes. The most memorable staff project he worked on was LuminoCity, a model of the MIT campus area, created using lidar data and a 3D-printed mold and rendered in optical-grade resin.

This co-op in TOIL has inspired Volpe to pursue further work in the field. "I have always wanted to invent things, and exposure to 3D printing has helped me understand the development process," Volpe said.

Andrew Volpe holds one of his 3D-printed objects created in the TOIL.

Volpe is currently assisting Scott with another TOIL effort, the construction of a 3D printer that is itself manufactured with 3D-printed parts. "Such creativity in pursuit of innovation represents the vision behind the workspace," said Scott. "The new co-op role has only enhanced the Laboratory's ability to meet objectives, as it brings additional curiosity to the experimental atmosphere. It is a pleasure to watch an enthusiastic co-op student assist staff with their projects."

National GEM Consortium

The Laboratory continues to support the National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM). By offering partnerships with universities and industries, GEM provides support to students from underrepresented groups who are seeking advanced degrees in science and engineering fields. "One of the Laboratory's goals is to find the best talent nationally," said William Kindred, manager, Diversity and Inclusion Office, Human Resources Department. "Connecting with GEM has given us the ability to reach exceptional engineers and scientists who may not have otherwise considered the Laboratory."

For the 10 GEM fellows pursuing summer research at Lincoln Laboratory in 2014, their efforts have already offered numerous returns, from networking to high-level hands-on research opportunities. Jose Oyola, a master's student who worked with the Computing and Analytics Group, said, "My research at the Laboratory focused on groundbreaking techniques and technologies that I couldn't have imagined. The work I've done has made me want to further advance the definition of what it means to be 'cutting edge.'"

Johnny Worthy, Space Systems Analysis Group, agreed: "The internship not only allowed me to develop skills as a researcher but also enabled me to make connections with other professionals in the field." Worthy is currently working on intercept scenarios for geosynchronous satellites. His work at the Laboratory last summer inspired him to pursue master's and doctoral degrees.

2014 National GEM Consortium leaders and summer research students gather outside the Laboratory.

Oyola commented on the lasting effects of funding: "GEM provides individuals who wouldn't have been able to afford graduate school with a brighter future than they thought possible."

Lincoln Laboratory Director and 2012–2014 GEM President Eric Evans attended the 2014 GEM Annual Board Meeting and Conference to engage GEM officers and partnering organizations in discussions on strategies for transforming how the United States educates and prepares the next generation of engineers and scientists.

MIT Research Assistantships

Lincoln Laboratory currently employs 32 research assistants from MIT. Working with engineers and scientists, these assistants contribute to sponsored programs while investigating the questions that evolve into their doctoral theses. The facilities, research thrusts, and reputations of staff members are prime inducements behind the graduate students' decision to spend three to five years as research assistants in a Laboratory group.

MIT VI-A Master of Engineering Thesis Program

Three students in the MIT VI-A Master of Engineering Thesis Program were hired in 2014. These students work with Laboratory mentors while gaining experience in testing, design, development, research, and programming. Students in the VI-A program spend two summers as paid interns, participating in projects related to their fields of study. Then, the students work as research assistants while developing their master of engineering theses under the supervision of both Laboratory engineers and MIT faculty.

MIT Undergraduate Research Opportunities Program (UROP)

In 2014, ten undergraduates were hired in the summer as part of the MIT UROP, which allows students to participate in every aspect of onsite research—developing research proposals, performing experiments, analyzing data, and presenting research results. Most UROP participants at the Laboratory are interns working under the direct supervision of technical staff members. Through this program, the Laboratory often identifies highly capable, promising engineers who are potential candidates for employment.

Brad Perry (left) helps a student aim his self-built radar at traffic during a field test.

MIT Undergraduate Practice Opportunities Program (UPOP)

Lincoln Laboratory participates in the UPOP, a full-year program that introduces MIT sophomores to the workplace skills they will need to thrive in their future careers. An important facet of the program is a 10- to 12-week summer internship. In summer 2014, six UPOP students worked at the Laboratory.

Capture the Flag

Each fall, MIT and Lincoln Laboratory host the Cyber Capture the Flag (CTF) competition. The event launches with seminars focused on attacks and defenses in the web environment, and culminates in a weekend-long competition. The Cyber Systems and Technology and Cyber System Assessments Groups organize the event in collaboration with MIT and Northeastern University. The CTF format ranges from linear puzzle-like challenges to team-based offensive and defensive "hacking" competitions.

During the exercise, teams square off to prove who has the most successful offensive and defensive computer security skills. This year, the CTF competitors represented a company operating a web portal and a cyber threat. Each team's virtual machine was accessed by a system that deposited sensitive information (flags). Teams earned money by maintaining service functionality despite attacks and by selling stolen flags on the "black market."

This third annual competition in 2013 drew 150 college students from 10 area universities: MIT, Boston University, UMass–Boston, Northeastern, Brandeis, Wellesley, WPI, RPI, NYU Polytechnic, and Dartmouth. Cyber Security and Information Sciences Division staff members assisted in supporting the 40-hour event around the clock.

Laboratory staff members Timothy Leek, Andrew Davis, Kyle Gwinnup, and William Leonard run mini-events during the year to acquaint students with the CTF format. Held at the MIT Lincoln Laboratory Beaver Works Center in Cambridge, Massachusetts, the events are part practice, part strategy critique.

The number of students participating in the Capture the Flag competition more than doubled in one year

A team works through the night to either infiltrate or impair opponents' applications and protect their own from unwanted intrusions.

MIT Lincoln Laboratory Beaver Works

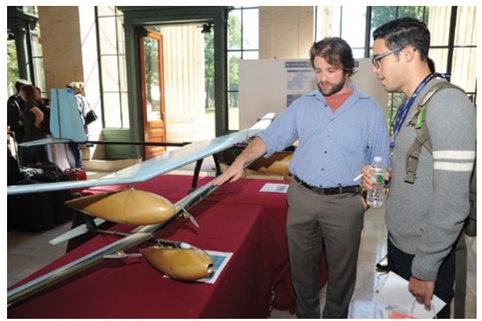
The Beaver Works initiative began in 2009 through a series of Lincoln Laboratory–led capstone research projects in the MIT School of Engineering. In 2013, Beaver Works opened its doors as a new, dedicated facility designed to facilitate research, workshops, and classwork through the creative fusion of collaborative spaces and prototyping facilities.

MIT Lincoln Laboratory Beaver Works, a joint center chartered by MIT School of Engineering and Lincoln Laboratory and operated by the Laboratory, provides a nexus for innovation, collaboration, and hands-on development. At Beaver Works, research and educational programs strengthen and expand collaborative efforts between Lincoln Laboratory and MIT campus, exposing a new generation of students to opportunities in engineering, research, and service to the nation.

Students have been making use of Beaver Works for both collaborative projects and individual research in areas as diverse as energy systems, autonomy and robotics, cyber security, and biotechnology. Workshops on 3D printing, humanitarian-aid technologies, and disaster-response techniques were held at Beaver Works.

74 outreach-related events were supported by Beaver Works in its first year of operation

Students in MIT's Civil and Environmental Engineering Department work on wiring nodes to be used in air quality sensors.

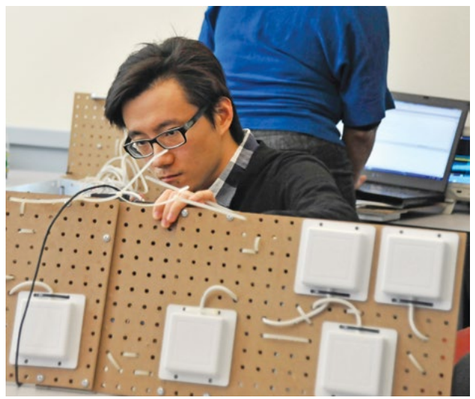


Sam Stambler (left) of the Tactical Defense Systems Group explains the flexible aircraft systems built at Beaver Works during a capstone design course.

MIT Independent Activities Period

Lincoln Laboratory technical staff lead activities offered during the MIT Independent Activities Period (IAP). Offerings range from academic seminars to hands-on engineering projects to artistic pursuits. During the 2014 IAP, Lincoln Laboratory staff members organized and led five activities:

- Hands-on Holography — led by Robert Freking, Christy Cull, and Evan Cull
- Hands-on Computational Imaging and Spectroscopy — led by Christy Cull, Evan Cull, and Robert Freking
- Open-Source Microfluidics for Synthetic Biology — led by David Kong
- Build a Small Phased Array Radar System and Build a Small Radar System — led by Bradley Perry, Patrick Bell, Shakti Davis, Alan Fenn, Jeffrey Herd, Kenneth Kolodziej, Todd Levy, Joseph McMichael, John Meklenburg, Nicholas O'Donoughue, Raoul Ouedraogo, and Gordon Wichern



An IAP student makes adjustments to his phased array radar.

MIT Professional Education—Short Programs

Lincoln Laboratory collaborates with MIT faculty to offer courses through MIT's Professional Education Short Programs. Short Programs bring participants from industry, government, and business to the campus for intensive, weeklong courses designed to expand familiarity with emerging technologies. Lincoln Laboratory staff led the following professional education courses in 2014.

- Build a Small Phased Array Radar Sensor
- Build a Small Radar System
- Build a Multi-Channel Search and Track Radar
- Rapid Robotics: Autonomous Systems with Open-Source Software
- Radar Systems and Signal Processing

Community Giving

Laboratory employees are engaged in many activities supporting worthy causes within and outside our community:

- Helping Those In Need
- Helping Those Who Help Others
- Feeding Body and Soul

The Laboratory's Heart Walk Outreach Team hosts a "Wear Red Day" in February to raise awareness of heart disease.

SPOTLIGHT: Boston Strong

The purpose of the MIT Strong team is not only to run the 26.2 miles of the Boston Marathon but also to raise money for the Sean A. Collier Memorial Fund, established to carry forward fallen MIT Police Officer Sean Collier's legacy of support for the MIT community. The team has raised more than $207,000 for the fund, which is being used to build a permanent memorial to Officer Collier on campus, to annually recognize individuals who demonstrate the values and character of Officer Collier by awarding them the Collier Medal, and to support other causes.

Lincoln Laboratory's Sarah Lewis, project manager in the Information Services Department, applied to be one of the 40 members of the MIT Strong team because she was near the finish line hours before the April 2013 bombing. Lewis, who regularly passes by Sean Collier's temporary memorial on Vassar Street on her way to work, shared photographs of the memorial on Instagram, with the hashtag "#MITStrong," a few days following his passing. The 2014 Boston Marathon was Lewis' second run in memory of Sean Collier; she proudly participated in the Run to Remember Half Marathon in May 2013. "MIT needed to be part of the 2014 marathon," says Lewis. "We want to remember Sean, and show that MIT Strong is part of Boston Strong."

The MIT Strong team consists of runners from all parts of the MIT community: graduate and undergraduate students, alumni from last year and from 50 years ago, faculty from several departments, and staff. "#MITStrong" has a whole new meaning for Lewis now. She is excited to have been part of the MIT Strong team and continues to train in the Boston and Cambridge areas.

The Laboratory helped Boston Marathon runner Sarah Lewis (pictured left) raise money for the Sean A. Collier Memorial Fund during a bake sale at the Laboratory in February. Lewis raised more than $6000, surpassing her fundraising goal of $4000.

In May 2013, the Laboratory community declared a Boston Strong Day as a show of support for the victims of the April Boston Marathon bombing. That September, "Boston Strong" was the theme for the Community Outreach Fair, during which $600 was raised for the Sean A. Collier Memorial Fund. Lincoln Laboratory partnered with the American Red Cross to coordinate a special blood drive in honor of Officer Collier to commemorate his sacrifice and service.

TeamWalk for CancerCare

Julie Arloro-Mehta of the Optical Systems Technology Group formed a team for Lowell General Hospital's TeamWalk for CancerCare in memory of her father, who played a major role in establishing the walk.

The eight-member Lincoln Laboratory Team has met increasing fundraising goals every year for four years, partially by holding annual 14-day drawings for prizes and gift baskets. In 2014, the team raised $5450, exceeding their $5000 goal, to better the lives of those being treated for cancer at Lowell General Hospital. TeamWalk funds make a difference in the lives of cancer patients by paying for medications, nutritional supplements, wigs and prostheses, support groups, skilled-nursing visits, transportation, mini-grants, and supportive services to patients with all cancer types. Funds raised enable Lowell General Hospital to provide support and services to help people feel better, build confidence, and instill hope throughout their battle with cancer.

Since its inception in 2000, TeamWalk has raised more than $7 million to help more than 20,000 patients through their journey to battle cancer.

The 15th annual 3- to 6-mile walk in Lowell, Massachusetts, was attended by more than 5000 participants.

American Heart Association Heart Walk

Lincoln Laboratory's Heart Walk Outreach Team, formed in 2012, strives to raise awareness and prevention of cardiovascular disease and stroke among the Laboratory community. The team works throughout the year to raise donations for the American Heart Association's Heart Walk in Boston.

Team captains Susan Curry of the Advanced Satcom Systems and Operations Group and Sandra McLellan of the Advanced Sensor Systems and Test Beds Group encouraged the Laboratory community to join in on a "Wear Red" day to raise awareness that heart disease often goes undetected. The team also hosted a booth with information on protecting oneself against heart disease and stroke, a "Go Red" pins fundraiser, and a drawing for goods and local services. This year, the team raised $5438 and promoted physical activity as part of a heart-healthy lifestyle.

25 local charities benefit from annual Laboratory giving programs

The Laboratory community joins in the fight to end Alzheimer's by observing a "Purple for a Purpose" day at the Laboratory.

The Alzheimer's Awareness and Outreach Team has raised more than

$150,000

over six years

Walk to End Alzheimer's

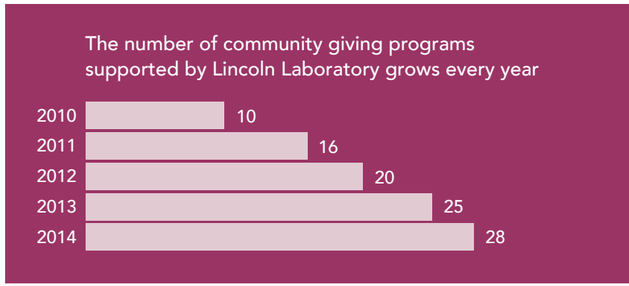
The MIT Lincoln Laboratory Alzheimer's Awareness and Outreach Team, led by Catherine Holland of the Wideband Tactical Networking Group, is dedicated to providing support and information to those in the Laboratory community who have been impacted by Alzheimer's.

The 58-member team raised $36,562 in the Greater Boston Walk to End Alzheimer's in 2014, ranking them the 2nd out of 1950 teams in the region and 37th in the nation for fundraising.

In a separate event, several cyclists in the Alzheimer's Awareness and Outreach Team participated in the Ride to End Alzheimer's in Devens, Massachusetts. Bruce Bray and Matthew Willis completed the 100-mile course; John Kaufmann, Bruce Bray, and David Caplan and his 14-year old son did the 30-mile route. The Lincoln Laboratory team ranked 7th in dollars raised for this event, contributing more than $9,000 to Alzheimer's research.

Half Way to St. Patrick's Day Road Race

The Brian Higgins Foundation's Annual Half Way to St. Patrick's Day 4.2–Mile Road Race takes place each September in Somerville, Massachusetts. Laboratory employees John Kruszkowski, Albert Traniello, Corrie Smeaton, Zachary Darling, Hamilton Shepard, and Renee Gylfphe participated as a team to help improve the quality of life of special needs children by assisting them in summer camps and youth sports. The foundation also offers scholarships and medical equipment to families with special needs children.



AIDS Walk and 5K Run

Lincoln Laboratory continued its participation in the AIDS Walk and 5K Run for a second year at the DCR Hatch Memorial Shell in Boston, Massachusetts. Thomas Zugibe of the Airborne Radar Systems and Techniques Group said, "The table for the AIDS Walk and Run ended up being a big success! We had 15 people join the team this year and we raised over 35% more than last year with a grand total of $1012."

Members and allies of Lincoln Laboratory's Out Professional Employee Network (OPEN) formed a 15-member team for this event that raises money for the AIDS Action Committee of Massachusetts. The committee is a leading, local organization that works to prevent new HIV infections, support those affected by HIV/AIDS, and tackle the root causes of HIV/AIDS through education as well as to advocate for fair and effective policies at the city, state, and federal levels.

Members and allies of OPEN gather at Hatch Memorial Shell just prior to the 5K run.

Walk for Hunger

Seth Trotz, Space Control Systems, invited Laboratory personnel to join him in the fight against hunger in Massachusetts as part of Project Bread's Walk for Hunger. The annual event, a Boston institution since 1969, gathers more than 40,000 walkers seeking to make a difference in the lives of their neighbors. The money raised helps Project Bread provide immediate and long-term relief to families for whom hunger is a constant part of life.

Participating in the Walk for Hunger since 2007, Trotz was inspired to join the cause by concerns about the impact of hunger on long-term health and development. "The Walk for Hunger is a great opportunity to support a deserving cause, and to enjoy Boston," said Trotz. "The physical activity of the walk raises one's consciousness of the problem of hunger." Trotz's three sons have accompanied him on the 20-mile walk each year.

"The Walk for Hunger drives home that it is really unacceptable to have members of our own communities worrying on a daily basis about how they will feed themselves or their kids."

— Seth Trotz,
Space Control Systems

Autumn Escape Bike Trek

Over three days in September, the Lincoln Laboratory team, called the Mechanix, rode 160 miles from Plymouth to Provincetown, Massachusetts, to support the American Lung Association (ALA). The team set a fundraising goal of $2500 for this year's ride and raised $6920. The Mechanix cycling team, grown from its inaugural four members to nine riders and two volunteers, is committed to helping ALA fight all forms of lung disease.

Harbor to the Bay Bike Ride

Team Lincoln participated for a second time in the Harbor to the Bay. Team Lincoln rode together in this one-day bike ride, cycling 125 miles from Boston to Provincetown, Massachusetts, in September to raise awareness of HIV/AIDS care and services. Massachusetts alone sees 6000 new diagnoses each year, and a large percentage of people receiving these diagnoses lack primary care.

The three-member team raised $3165 to support the AIDS Action Committee of Massachusetts, the state's leading provider of HIV/AIDS prevention and wellness services. The Harbor to the Bay General Fund distributes the donations raised from the event directly to the committee and its other beneficiaries.

Cyclists wait at the starting line, ready to begin day two of the Pan-Mass Challenge.

Pan-Mass Challenge

In August, Marc Burke, Kim Hebert, Craig Perini, Robert Schulein, and Joseph Scozzafava completed the 35th annual Pan-Mass Challenge by biking 190 miles over two days from Sturbridge to Provincetown, Massachusetts. The Lincoln Laboratory community helped this team raise $41,879 for lifesaving cancer research and treatment at Dana-Farber Cancer Institute.

The Pan-Mass Challenge donates 100% of every rider-raised dollar directly to the Jimmy Fund. This annual bike-a-thon across Massachusetts offers 12 routes of varying lengths and fundraising requirements. This event generates half of the Jimmy Fund's annual revenue and it is Dana-Farber's single largest contributor.

Each Lincoln Laboratory participant rides for varying reasons: a child in treatment, family members lost to cancer, or to honor and memorialize the many people affected. Hebert thanked Laboratory employees for their support: "I know we could not fundraise or be motivated to keep going without the community here at the Laboratory."

Laboratory members of the Bike and Hike team pause with friends before they hike to the summit of Mt. Greylock.

Bike and Hike the Berkshires

For the eighth year in a row, Team MIT Lincoln Laboratory supported the National Multiple Sclerosis Society by hiking and biking in the Berkshires in September. Co-captains David Granchelli and John Kuconis led the seven-member team in raising $7420 to help people in the community who are affected by multiple sclerosis and to advance research and treatments. The Laboratory team included staff members Paul Smith, Christine Cambrils, and Robert Seidel.

Marshallese Island Outreach

Lincoln Laboratory operates a field site on Kwajalein Atoll in the Marshall Islands, where 20 staff members serve two- to three-year tours of duty. The amiable relationship enjoyed by the Laboratory staff and the local community prompted the initiation of this outreach program, developed to enrich the educational experiences of Marshallese students.

Each summer, two Marshallese college students are supported as interns at a Laboratory facility. Bredalynn Jatios and Clann Clament participated in the 2014 internship program to improve their computer and network skills. They learned about computer hardware and software, building networks, managing servers, and troubleshooting a variety of computer and network problems.

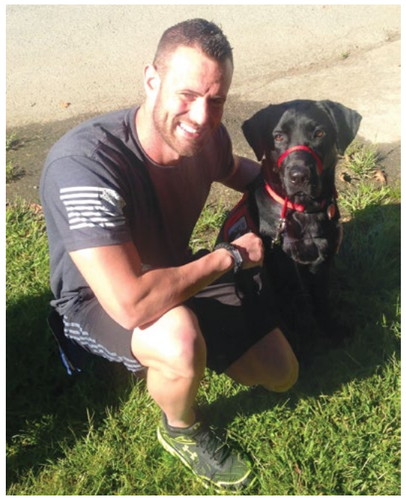
Each fall, a scholarship is awarded to a local student choosing a STEM career. This year's scholarship recipient was John Sholar, Kwajalein High School valedictorian. Born and raised on Kwajalein, John headed to Stanford University this fall as a Presidential Scholar and National Merit Scholar. He is firm about majoring in a STEM field, but says he wants to "minor in everything" before he chooses his specific field of interest.

Using skills gained through his Laboratory internship, Clann Clament (far left) will be returning to Ebeye Hospital to improve its computer network. Bredalynn Jatios (left) will take classes at the University of the South Pacific.

Scholarship recipient John Sholar (center) receives congratulatory leis at his graduation.

Marshallese Handicrafts Sale

The Marshallese Outreach Program held a sale of items crafted by indigenous people from the Marshall Islands, raising almost $800. The most popular items were ornaments woven from pandanus and coconut palm. Woven baskets, ivory nut necklaces, wall hangings, and intricately carved wooden turtles were also sold. Profits from the sale of these items are then distributed back to the communities in the form of educational grants for schools throughout the Marshall Islands and Micronesia.



Marine Corps combat veteran Sean Clossey served in both Iraq and Afghanistan and now owns trauma-assistance dog, Lincoln, sponsored by Lincoln Laboratory through the NEADS program.

National Education for Assistance Dog Services

Last year, Lincoln Laboratory's Veterans Network supported the National Education for Assistance Dog Services (NEADS), which provides assistance dogs for deaf and disabled Americans and combat veterans. NEADS trains assistance dogs and offers them at no cost to qualified disabled veterans. Colleen Palmer of the Cyber Systems and Operations Group led a fundraising effort to sponsor and name an assistance dog. Laboratory employees donated $2000, which was more than enough to sponsor Lincoln, a labrador retriever, through the training program. Lincoln and his brother, Dexxter, routinely visited outreach events at the Laboratory to become more socially adept.

Lincoln was so responsive to training that he qualified for a special program in which dogs are trained to assist veterans diagnosed with combat-related post-traumatic stress disorder. Lincoln's success in the program resulted in his being matched with a veteran in September 2014, graduating with honors, and beginning his life as an assistance dog.

Laboratory Troop Support has sent

2000

care packages to soldiers since 2006

Troop Support Program

Lincoln Laboratory runs an ongoing campaign to support deployed U.S. troops. Donations of food, books, games, and toiletries are collected daily, boxed by volunteers, and mailed weekly to military personnel serving in Iraq and Afghanistan.

Each year, Laboratory Security Officer Kathleen Hart coordinates packing and shipping more than 200 care packages for approximately 35 troops overseas. Lincoln Laboratory Troop Support also sends special care packages each December, filled with seasonal items and holiday cards signed by Laboratory employees.

Troop Support hosts several packing parties throughout the year to ensure that there are plenty of boxes ready to send overseas.

Families pack boxes for soldiers during a "packing party" held at the Laboratory one weekend.

Veterans Network Outreach

Lincoln Laboratory's Veterans Network (LLVETS) strives to find ways to honor those who have served our country. The group, made up of veterans who work at the Laboratory, totals almost 10 percent of the Laboratory workforce.

This year, the LLVETS hosted Fisher House Boston at the Laboratory for an informational seminar and sponsored a bake sale to benefit the Fisher House program. The Fisher House Foundation donates "comfort homes" built on the grounds of Veterans Health Administration medical centers to enable family members to be close to a loved one during hospitalization for an illness, disease, or injury. Jen DeLuca, executive director of Fisher House Boston, shared the history and mission of the local organization, while retired U.S. Army SSG William Kleinedler and retired U.S. Air Force SSG Nic Van Landeghem explained how they have benefited from the program.

Aside from coordinating the annual Memorial Day picnic for all veterans employed by Lincoln Laboratory, LLVETs hosted Team Rubicon cofounder Jacob Wood in late 2013. Wood talked about veterans providing immediate emergency response at disaster sites, including those outside the scope of traditional aid groups, to restore their sense of purpose. (See more about Team Rubicon in the Spotlight at right).

In August, LLVETS member Daniel O'Gorman of the Security Services Department raised $1935 and participated in Run to Home Base, a fundraising event that serves veterans with combat stress and traumatic brain injury. O'Gorman ran 9K through Boston, finishing at Fenway Park across home plate.

LLVETS members participate in the annual Veterans Fun Run to support deployed soldiers and their families in the local community. The event is held on Veterans Day weekend at the Edith Nourse Rogers Memorial Veterans Hospital in Bedford, Massachusetts, and is sponsored by the Air Force Association.

To benefit the Wounded Warrior Project, LLVETS supported two events: the Soldier Ride Boston in which cyclists rode 30 to 60 miles through Lexington and Concord, Massachusetts, and a Disc Golf Tournament on Hanscom Air Force Base. Norman Peterson of the Security Services Department, coordinated the Laboratory's participation in both events.

SPOTLIGHT: Laboratory veteran goes beyond the call of duty with Team Rubicon

Following Typhoon Haiyan in the Philippines, Stephen Hunt temporarily left his Lincoln Laboratory team in order to assist a team with a mission of a different sort: Team Rubicon's Operation Seabird. With a staff of military veterans, first responders, and medical professionals, Team Rubicon (TR) provides immediate emergency response to all disaster victims, including those outside the scope of traditional aid groups. Since joining the organization's effort in 2010, Hunt has worked with populations inside and outside the United States, and has acted as an advisor to organizations such as the National Red Cross and other U.S.-based nongovernmental organizations. TR founders William McNulty and Jacob Wood, both retired U.S. Marine Corps veterans, describe the organization's second aim as engaging veterans, many of whom have served on battlefields that required the same kinds of invaluable skills needed in disaster zones.

Hunt and his 12-person team, one of three taking part in Operation Seabird, landed in the Philippines to assist with the critical aid and relief efforts. A wide range of expertise and experience placed Hunt on the short list for deployment with TR operations. "As a person who is part hands-on electrical engineer, part knuckle-dragger as a former U.S. Army paratrooper, part construction worker, and trained to work in field medicine, I have a cross section of skills to apply in many environments," Hunt said.

In his two weeks on the ground, Hunt and the Operation Seabird team spent much of their time searching for and treating victims, often transporting the injured over rough terrain to better-equipped aid stations. The staff provided construction services to bring local hospitals back online, and worked with the World Health Organization, U.S. military, and the local health department to facilitate the efficient use of medical resources and to monitor for outbreaks of diseases like cholera.

Background image credit: Andrew Herrold

Stephen Hunt, formerly of Lincoln Laboratory, shares his story of supporting the Typhoon Haiyan relief effort.

Hunt's work with TR outside of the Laboratory has had a strong effect on his work inside: "This effort has helped me to better recognize the difference between something that can be fixed and something that cannot," Hunt explained. He noted the value in assisting distressed populations: "Saving lives, bringing comfort to those injured in the Philippines or to those under constant stress, such as refugees from Myanmar, provides clarity of purpose."

Laboratory employees browse the offerings at the annual used-book sale, which helps support educational outreach programs.

Used-Book Drive and Sale

In coordination with MIT, Lincoln Laboratory holds an annual used-book drive for one week each year. Employees are asked to donate all kinds of used media (books of all genres and reading levels, CDs, DVDs, and VHS tapes) for the sale. The book drive is followed by a weeklong used-book sale of all the donated materials. Proceeds from the sale are given to Community Giving at MIT and Lincoln Laboratory Community Outreach to support educational outreach programs. In 2014, the book sale raised $1180 and provided a wealth of new reading material for all patrons.

Food Drives

Lincoln Laboratory Community Outreach promotes food donation drives to support local food pantries, responding to both food waste and local hunger by rescuing fresh food and distributing it within the emergency food system. Each year, Laboratory employee resource groups such as the African American, Out Professional Employee, and Hispanic/Latino Networks volunteer their time at the Greater Boston Food Bank to assemble boxes of food to be distributed.

Yari Rodriguez of the Systems Engineering Group and fellow Lincoln Employees' African American Network members pack nonperishables to be distributed to needy families.

"This outreach opportunity gives back to families who may have fallen on difficult times and gives kids access to much-needed school supplies for the upcoming year."

— Chiamaka Agbasi-Porter, LEAN member

LEAN members pause before packing school supplies for needy children in Massachusetts.

Cradles to Crayons School Supply Drive

This summer, members of Lincoln Employees' African American Network (LEAN) held a donation drive for school supplies to help low-income and homeless children in Massachusetts. Collected supplies were given to Cradles to Crayons, an organization that provides low-income or homeless children up to age 12 with the essential items they need to thrive at home, at school, and at play. Last year, Cradles to Crayons provided packages of clothes, shoes, books, toys, baby safety equipment, and school supplies—all free of charge—to 87,000 children in both Massachusetts and the greater Philadelphia area. Sharon Clarke, Human Resources Department, expressed her gratitude for the generous donations of Laboratory personnel: "This year was the first time that the Laboratory participated in the Cradles to Crayons Ready for School drive and we could not have asked for a better response from our community."

Members of the LL Pi Team sold 252 pies and raised $7051 for Community Servings.

Pie in the Sky

The LL Pi Team was created to participate in the Pie in the Sky fundraiser supporting Community Servings, which delivers meals to the critically ill and their families and caregivers. Community Servings recruits bakeries, restaurants, hotels, and caterers to donate pies for Thanksgiving. Each pie sold provides for a week's worth of meals to a homebound client. The 19 LL Pi members can sell pies or donate their own homemade pies. The LL Pi Team, led by Dinara Doyle and Kathleen Mulligan, both of the Cyber Systems and Technology Group, has been successful enough in fundraising to qualify the Laboratory as a pick-up location for Thanksgiving pies.

Coats for Kids

Once the cold weather sets in and winter is apparent in New England, Lincoln Laboratory staff know it is time for the annual Coats for Kids drive, organized by Anton's Cleaners. Warm coats are collected for all ages and delivered to a local Anton's Cleaners, where they are cleaned free of charge and given to those in need through an extensive distribution partnership. The Coats for Kids program, now in its 20th year, provides 60,000 coats to the greater Boston community each winter; the Laboratory contributes approximately 500 of these coats.

Other Community Outreach Events

The Laboratory encourages its staff to support a variety of causes on their own and to join colleagues in their charitable efforts. In the past year, Lincoln Laboratory staff members have supported several charities or events:

- Annual Earth Day Charles River Cleanup
- American Red Cross
- Avon Walk for Breast Cancer
- AFCEA Golf Tournament
- Bedford Special Education Parents Advisory Council (SEPAC) 5K and Fun Run
- Emily Letourneau Memorial Volleyball Tournament
- American Diabetes Association's Tour de Cure
- National Multiple Sclerosis Society's MuckFest

The Laboratory has supported these causes for more than 20 years

Giving Tree

TOYS FOR TOTS

United Way

American Red Cross

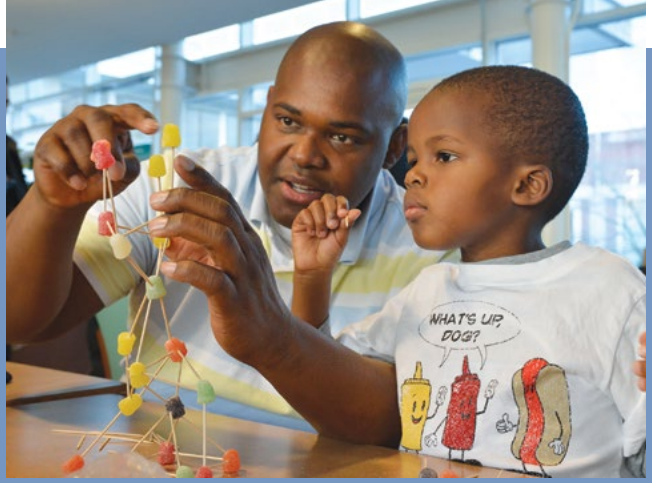
United Way

In coordination with MIT, Lincoln Laboratory sponsors an annual campaign to donate to United Way through payroll deduction or a direct one-time contribution to the United Way charity of the employee's choice.

The focus of United Way is identifying and resolving pressing community issues, as well as making measurable changes in communities through partnerships with schools, government agencies, businesses, organized labor, financial institutions, community development corporations, voluntary and neighborhood associations, the faith community, and others. The issues United Way offices focus on are determined locally because of the diversity of the communities served. However, the main focus areas include education, income, and health. Some common themes emerge:

- Helping children and youth succeed through engagement
- Strengthening and supporting families
- Improving access to health care
- Promoting financial stability

The United Way helps human service agencies respond to urgent needs in the community and builds a brighter future for those in need through learning collaboratives, homelessness prevention, employment training, utilities assistance, and emergency food/shelter.



About Our Volunteers

The Laboratory thanks those who have offered their time, talents, and support this past year. Volunteerism among Laboratory employees has grown steadily every year. The involvement of the entire Lincoln Laboratory community is encouraged. The Lincoln Laboratory Community Outreach Committee will continue to offer many opportunities to participate in educational and community giving outreach events. If you engage in outreach on behalf of Lincoln Laboratory, please contact the Communications and Community Outreach Office and let them know.

About Our Programs

The MIT Lincoln Laboratory Giving Program supports initiatives in STEM education for students in kindergarten through high school. The program provides support for activities directed by the Laboratory's Communications and Community Outreach Office, funding for special STEM events and workshops offered at the Laboratory, and grants to participants in programs run by MIT.

If you would like to support STEM outreach, visit the Give to MIT Lincoln Laboratory website, found on the Support STEM Programs link under the Outreach tab on the Laboratory's external home page. You can contribute to funds such as the Roger W. Sudbury Memorial Fund for community outreach, the John Welch Memorial Fund for educational outreach, the Barbara P. James Fund for general support, or the Lincoln Laboratory Director's Fund for STEM education. New this year is the Carl E. Nielsen Family Fund for MIT graduate students in electrical engineering and computer science. These endowed and expendable funds enable the Laboratory to support programs that complement its mission of developing technology in support of national security by helping ensure that the U.S. workforce remains preeminent in technology.

All contributions, in all forms, are important to sustaining efforts to motivate and prepare students to become the next generation of scientists and engineers.

Lincoln Laboratory's outreach activities are funded in part through the endowments listed on the plaque above, now permanently hanging in our lobby. Donations to these funds provide ongoing support to educational programs.

LINCOLN LABORATORY
COMMUNITY OUTREACH

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