



## OUTREACH // BY THE NUMBERS

### Lincoln Laboratory Outreach

**80**

schools are visited by Laboratory volunteers in the classroom presentations program

**125**

students participate in robotics teams sponsored by the Laboratory

**300**

Laboratory scientists and engineers work with student interns

**3000**

students tour Laboratory facilities

**4000**

children attend the Laboratory's Science on Saturday shows

**10,000**

students participate in Laboratory STEM programs

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
LINCOLN LABORATORY

## A Message from the Director

Community outreach and education programs are an important component 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 participate. The Laboratory's educational outreach initiatives offer the opportunity to provide in-classroom and Science on Saturday presentations to regional K-12 schools, to sponsor U.S. FIRST robotics programs, and to participate in mentor-based internships for college and graduate students preparing for science and technology careers. There are also opportunities to be a part of the Laboratory's volunteer base by serving 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 fund-raising 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 suggestions on how we might improve our outreach activities are welcomed.



Eric D. Evans  
Director



Eric Evans, the Director of Lincoln Laboratory, speaks with LLRISE participants as they explain their self-built radar.



Eric Evans stands with ISR and Tactical Systems Division Head Robert T.-I. Shin, MIT President Rafael Reif, and Tim, the MIT mascot, at the opening ceremony of the MIT Lincoln Laboratory Beaver Works, a joint center between Lincoln Laboratory and MIT School of Engineering, to foster innovative, impactful research through project-based learning.



*Lincoln Laboratory takes pride in promoting science and engineering education for all grade levels, and in supporting the community through giving programs.*

### Specific opportunities for making a difference

The MIT Lincoln Laboratory Giving Program supports initiatives in STEM education for students in kindergarten to high school. The program provides support for activities directed by the Laboratory's 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'd 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 for educational outreach activities, such as the Roger W. Sudbury Memorial Fund supporting community outreach, the John Welch Memorial Fund, the Barbara P. James Fund for general support, or the Lincoln Laboratory Director's Fund for STEM education. These endowed and expendable funds enable programs that complement the Laboratory's mission of support to 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.



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EDUCATIONAL OUTREACH

### Classroom Presentations

Lincoln Laboratory technical staff members 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 from Rockport, Maine, to Fitchburg, Massachusetts, and from Nashua, New Hampshire, to Dover, Delaware. Forty presentations are available in fields including biology, chemistry, physics, earth science, engineering, archaeology, and math. As an example, early this year, Laboratory scientists traveled to Estabrook Elementary School in Lexington to share "How to Do a Science Fair Project" and to McCarthy-Towne Elementary School in Acton to present a demonstration on Egyptian archaeology. The Laboratory has pre-assembled kits for hands-on activities to complement each science demonstration, facilitating the presentation process for each volunteer and ensuring a lively, interesting demonstration for each student. Laboratory employees interested in volunteering may contact David Granchelli at [granchelli@ll.mit.edu](mailto:granchelli@ll.mit.edu).

*Most classroom presentations can be adapted to different grade levels.*







### Science on Saturday

Each school year, more than 4000 local K-12 students, their parents, and teachers attend Science on Saturday free demonstrations hosted by Laboratory technical staff. Since the program's origin in 2006, attendees have enjoyed watching and volunteering to assist with demonstrations on rockets, robotics, computers, acoustics, archaeology, lasers, thermal imaging, and many other topics. Over the past school year, children attending Science on Saturday events have learned about dinosaurs, "spy science," asteroids, robotics, and radar. The 2013-2014 school year features presentations on robotics, chimpanzees, lasers/optics, and our ever-popular chemistry show.





### CyberPatriots

Six high-school students composing the Lincoln Laboratory team DoNut Hack Us competed in the national championship round of CyberPatriot's competition, inspiring teenagers to be the nation's next cyber defenders. Students learned how to defend a simulated corporate network from external hostile attacks. The team detected and corrected categories of vulnerabilities, including policy management, vulnerability management, patch management, configuration management, and third-party management. More than 1000 teams nationwide began in the first round of competitions.

Mentored by Joseph Werther (Cyber System Assessments), Robert Cunningham (Cyber Systems and Technology), Chiamaka Agbasi-Porter (Communications and Community Outreach Office), James Astle (Cyber System Assessments Group), Kevin Bauer, Kyle Ingols, and Sophia Yakubov (Cyber Systems and Technology Group), and Michael Chaplin (Facility Services Department), this second-year team became one of twelve finalists chosen for the national competition. With help from the Paul Revere Chapter of the Air Force Association, the team was able to receive an all-expenses-paid trip to the National Finals competition in Washington, D.C., for the second year in a row.



## CyberPatriots Are Open Division Finalists



The Lincoln Laboratory CyberPatriot team, DoNut Hack Us, traveled to Maryland to compete in the national high-school cyber-defense finals and was named Open Division National Finalists. The annual competition inspires students to train for careers in cyber security, science, technology, engineering, and mathematics. CyberPatriot began with more than 1200 competing teams comprising 100,000 students. In the Open Division, 12 of the 419 teams advanced to the finals in Washington, D.C.

"It's been exciting to see the students' knowledge grow and deepen. The seniors who returned to the team this year are very knowledgeable about system security," said Robert Cunningham, Cyber Systems and Technology, team mentor. Joseph Werther (Cyber System Assessments), Chiamaka Agbasi-Porter (Communications



Team DoNut Hack Us at the national competition in Washington, D.C., in March.

and Community Outreach Office), James Astle (Cyber System Assessments), Kevin Bauer, Kyle Ingols, and Sophia Yakoubov (Cyber Systems and Technology), and Michael Chaplin (Facility Services Department) also assisted in preparing the team for competition.

This year's event included a Network Security Competition designed to test

the skills against "attackers." Though the Laboratory team did not place in the top three, each member expressed how much fun it was to compete. "Not only are teams learning about cyber defense, they are learning to be leaders, and better team players and communicators, but most of all, they are having fun," said Chiamaka Agbasi-Porter.

### Scouting at Lincoln Laboratory

The Boy Scouts of America (BSA) launched a new Game Design Merit Badge created by the Laboratory's David Radue in March. Frank Schimmoller and Curtis Heisey played a vital role in the development of the badge by providing facilities, resources, and personnel for a set of crucial requirement tests. Local scouts were invited to the Laboratory to plan their own games, design a product, and have it tested with the assistance of experts in the game design industry.

The Scouting at Lincoln Laboratory (S@L) outreach team also participated in Scouting Adventures On The River which offered hands-on science demonstrations to scouts of all ages. The Laboratory's Whisper Dish was on display to help scouts understand how a parabolic reflector works. Richard Williamson performed a liquid nitrogen show, and David Radue showed the finer points of game design in preparation for the unveiling of the Game Design merit badge, while John Kuconis explained the engineering concepts of tension and compression by building a weight-bearing gumdrop bridge.

The Boy Scouts Minuteman Council partnered with Lincoln Laboratory, Draper Laboratory, and Harvard University to support



the scouts in a STEM camp, doing hands-on activities with real-world STEM professionals in an effort to earn additional merit badges. Scouts focused on earning a merit badge in inventing, robotics, or astronomy. A number of Laboratory staff provided expertise and mentoring, including Jonathan (Brent) Parham, Connor Henley, Curtis Heisey, David Radue, and David Brown.



## Team America Rocketry Challenge

Curtis Heisey of the Surveillance Systems Group and Francesca Lettang of the Active Optical Systems Group created and mentored two teams of students for the Team America Rocketry Challenge (TARC) during the 2012–13 school year. The teams were made up of middle-school students with ties to Lincoln Laboratory or the Russian School of Mathematics in Lexington. TARC, an aerospace and engineering design competition for students in grades 7–12, challenges teams to design, build, and fly rockets that can launch and recover an egg without breaking it. This year's challenge included reaching a target altitude of 750 feet and recovering an egg oriented horizontally within the rocket by using a parachute no larger than 15 inches in diameter. Both teams performed well in trials, but neither was one of 700 teams nationwide to qualify for the final challenge. Reflecting on



his teams' performance, Heisey said, "I found it exciting to see the teams assess their flights and apply engineering principles to make improvements in real time. We look forward to applying the lessons learned to next year's challenge."

### LLRISE

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 statewide to a national level.



The two-week residential, project-based enrichment program was offered to outstanding students who had recently completed their junior year in high school. Participants were challenged to build a Doppler and range radar by using creative problem-solving strategies while working in a state-of-the-art laboratory with highly talented scientists and engineers. Chiamaka Agbasi-Porter of the Communications and Community Outreach Office coordinated the program and was supported by ten technical staff members: Mabel Ramirez, Nestor Lopez, Raoul Ouedraogo, Wingyan Beverly Lykins, Alexis Prasov, Joseph McMichael, James McIntire, John Meklenburg, Bradley Perry, and Alan Fenn.



During the two-week period, the high-school seniors attended college-level classes on topics such as physics, electromagnetics, mechanics of Doppler radar, modular radio-frequency design circuitry, Matlab, pulse compression, signal processing, and antennas. In addition to a presentation about career exploration, the students were given an overview of Lincoln Laboratory and a tour of its facilities, including the Flight Facility, the Antenna Test Range, and the Haystack Observatory in Westford, Massachusetts.

In between instructional lectures and homework, the students toured MIT campus and visited MIT's Financial Aid Office to learn about the college application process. The participants also received instruction on how to stage an experiment and how to present a project, preparing them for the final technology demonstrations. LLRISE students demonstrated their self-built radar to visitors at the MIT Museum. Social activities, such as a Museum of Science visit and a festival on Boston Common, provided breaks from the rigorous workload.

### Robotics Outreach

Robotics Outreach at Lincoln Laboratory (ROLL) is an educational outreach program designed to stimulate youth interest in science and technology. ROLL uses hands-on activities to foster a sense of excitement that might drive the students towards math, science, and engineering. These activities include sponsoring robotic teams participating in regional and national competitions, hosting robotic workshops, and supporting local communities by supplying mentors to area groups. Staff volunteers mentor students at weekly sessions throughout the fall and winter. Children learn to program robots to complete challenges specified by FIRST (For Inspiration and Recognition of Science and Technology), working on a research topic, building teamwork, and developing gracious professionalism throughout the season.

Robotics Outreach at Lincoln Laboratory (ROLL) volunteers serve as coaches and mentors for 15 teams, totaling 125 students, sponsored by Lincoln Laboratory. The teams compete in local, state, and national robotic competitions designed by FIRST, whose reach extends to more than 300,000 students worldwide.



*Robotics Outreach helps students experience how interesting and rewarding the life of engineers and researchers can be.*



The FTC (FIRST Technical Challenge) game for grades 7–12 for the 2012-2013 school year was Ring It Up. The object of Ring It Up is to score more points than your opponent's alliance by placing plastic rings onto pegs on a center rack. Teams will also be challenged to detect special "weighted" rings to earn a special multiplier bonus.

This year's FRC (FIRST Robotics Competition) challenge for grades 9–12 was Ultimate Ascent. The game is played by two competing alliances. Each alliance of three robots competes to push discs into their goals. The match begins with robots operating independently of driver inputs. Then, drivers controlling robots try to score as many goals as possible. The match ends with robots attempting to climb pyramids.

The FLL (FIRST Lego League) challenge for grades 4–8 this year was Senior Solutions. During this challenge, teams build, test, and program an autonomous robot to solve a set of missions on a themed playing field. Teams also present reports on solving a real-world problem related to the challenge topic.



*ROLL ensures that teams have adequate supplies, funds, and mentorship to design, build, and program their robots for competition.*



## Laboratory FTC Level Teams

- Team MightyBots – Mentored by Alexander Divinsky of the ISR Systems and Architectures Group and Scott Griffith of the Tactical Defense Systems Group, the MightyBots won the Think Award and the Innovate Award in separate regional tournaments, and won the Promote Award at the Massachusetts Championship Tournament.
- Team Ingenium – Mentored by Joel Walker of the Tactical Defense Systems Group, Team Ingenium received the Inspire Award at the Vermont State Championship and qualified to compete in the national championship in St. Louis, Missouri.



## Laboratory FLL Level Teams

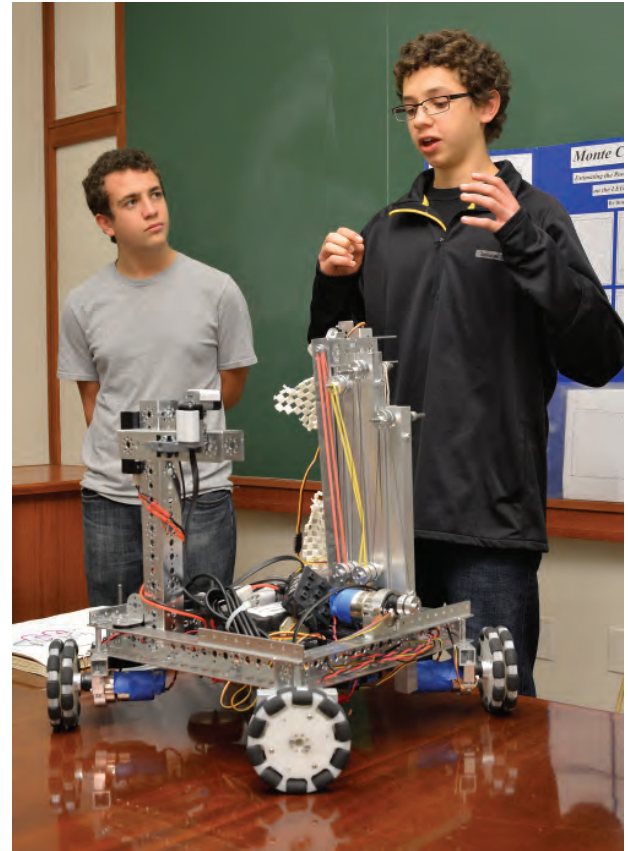
Lincoln Laboratory was represented by 11 FLL teams with a total of 90 children. The three FLL teams qualified to compete in the state competition in December 2012 were Piece of Cake, LLAMAS, and A Robot Walks Into A Bar. The Lincoln Laboratory FLL teams that competed at the regional level included Flaming Phoenix, Get Off My Bricks, Lightning Legos, Nin.droids, Nyan Cat, Razor Pickles, RoboWolves, Lego Einsteins, and The Matrix.

This year, two Jr. FLL teams made up of six- to nine-year-old children of Laboratory employees attempted the 2013 challenge, Super Seniors, that focused on helping senior citizens stay independent and connected. Jr. FLL is designed to direct children's curiosity toward ideas for improving the world. The two Laboratory teams competing this year were Green Meadow and Storm Pegasus.

### Sister Robotics Teams

ROLL has a continuing collaboration with teams from Roxbury, Waltham, Lexington, Weston, and Shrewsbury, Massachusetts, as well as 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 tour the facility.

- FTC Team Battery Powered Pickle Jar Heads from Lexington won the Inspire Award at two tournaments and at the Massachusetts Championship, which they won. They will compete in the national championship in St. Louis, Missouri, with Lincoln Laboratory's support.
- FRC Team Athena's Warriors, made up of 20 students from three high schools, began as an all-girls team and is now dedicated to creating a diverse STEM workforce. Athena's Warriors competed in regional tournaments.
- FRC Team Beantown Botz from the John D. O'Bryant School of Math and Science in Roxbury, also participated in regional tournaments.





## Massachusetts FTC

All high-school level Lincoln Laboratory robotics teams and sister teams belong to the MassFTC league, led by Loretta Bessette of the ISR Systems and Architectures Group. This group promotes the opening of the challenges and facilitates teams working cooperatively. MassFTC and ROLL work together to provide volunteers, referees, and judges for each regional qualifying event.

## Volunteering in FIRST Robotics

Some employees volunteer with FIRST robotics outside Lincoln Laboratory. Nick Mosher of the Advanced Lasercom Systems and Operations Group mentors FRC Team 4311 and plans to expand to a few more teams next year. He has recruited others within the Laboratory community to mentor with him. Mosher said robotics competitions “show students how important it is to be innovative in science and engineering and how to apply these ideas toward actually fabricating a robot.”

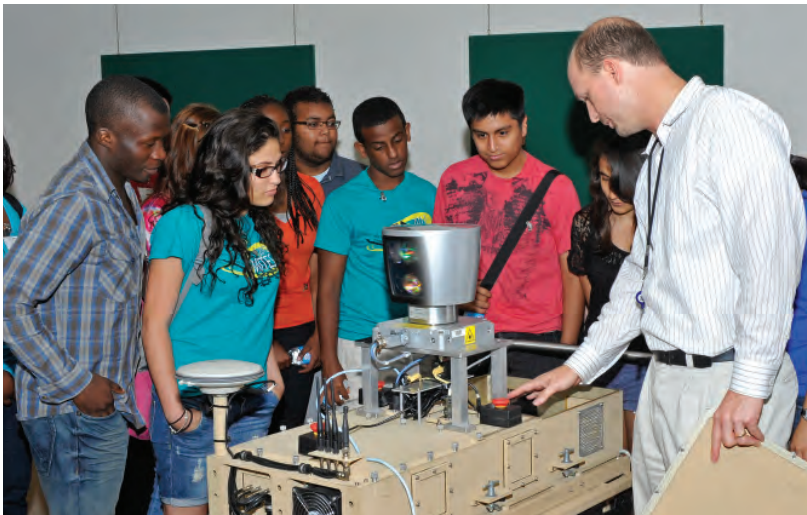
Colleen Monahan of the Airborne Radar Systems and Techniques Group founded an FLL robotics team called GEARS (girls engineering awesome robots) sponsored by the Society of Women Engineers. The ten-person team is made up of daughters of SWE members. This team found its initial funding through a NASA summer space grant instead of Lincoln Laboratory, but has enjoyed the mentorship of Laboratory employees.



*Robotics competitions show students how important it is to be innovative in science and engineering.*

### MIT Office of Engineering Outreach Programs (OEOP)

MIT's School of Engineering's OEOP offers deserving students rigorous academic experiences that provide an understanding of how technical concepts relate to their everyday lives. Not only do OEOP programs encourage the pursuit of careers in technical careers, they also provide a hands-on curriculum that strengthens foundational math, science, and communication skills in a challenging learning environment with high expectations. Lincoln Laboratory plays a part in five OEOP programs: MITES, MSBP, SEED, STEM, and Interphase EDGE.



### Minority Introduction to Engineering and Science (MITES) Program

OEOP's six-week residential summer program for top high-school students in the nation stresses the value and reward of pursuing advanced technical degrees and careers and develops the skills necessary to achieve success in science and engineering. This year, Lincoln Laboratory sponsored two students in the six-week summer program at MIT and hosted 75 students enrolled in the MITES program for facility tours and career presentations by Tamara Yu of the Cyber Systems and Operations Group and Eric Dauler of the Technology Office.



## MIT Science of Baseball Program (MSBP)

This four-week summer program for eighth-grade boys from Boston, Lawrence, and Cambridge features an integrated academic and athletic curriculum to channel the students' enthusiasm for baseball into a renewed excitement for and increased proficiency in the math, science, and culture behind the game. Lincoln Laboratory sponsored one local middle-school student, held tours of Laboratory facilities, provided lunch for the group of 35 boys visiting the Laboratory, and offered a presentation by Heriberto Garcia (shown at left) of the BMDS Integration Group. Typically, the highlight of this visit to the Laboratory is the "brains versus bats" softball game in which the students play against a team of scientists. However, in 2013, the game was cancelled due to rain. Staff helping with MSBP in 2013 included Chiamaka Porter, Dave Granchelli, Bill Kindred, James Astle, Christa Frey, Jesse Mills, Jim Caruso, Keith Ruenheck, Chris Heline, Roz Wesley, Lauren Collins, Mike Angers, Jonathan Sullivan, Kenneth Cole, Gerry Augeri, Alan Fenn, and Dorothy Ryan.

## Saturday Engineering and Enrichment Discovery (SEED) Academy

The SEED Academy is a seven-semester technical career-exploration program for promising but traditionally underserved high-school students in Boston, Lawrence, and Cambridge, Massachusetts. Lincoln Laboratory sponsored two students and an aeronautics/astrophysics course. In addition, Lisa Basile of the Tactical Defense Systems Group presented a talk on why she chose a technical career.

*The STEM Program helps middle-school students who want to get ahead in math and science.*

## Science, Technology, Engineering, and Mathematics (STEM) Program

STEM is a year-round academic enrichment program including mentoring and a summer institute for talented middle-school students from Boston, Cambridge, and Lawrence, Massachusetts, 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 for 20 students and provided tours of Laboratory facilities, including a demonstration of how radar works (shown at right) given by Raoul Ouedraogo of the Aerospace Sensor Technology Group and Alan Fenn of the RF and Quantum Systems Technology Group. Julie Arloro-Mehta of the Optical Systems Technology Group and Robert Martinez of the Space Control Systems Group presented briefings on their educational and career choices.





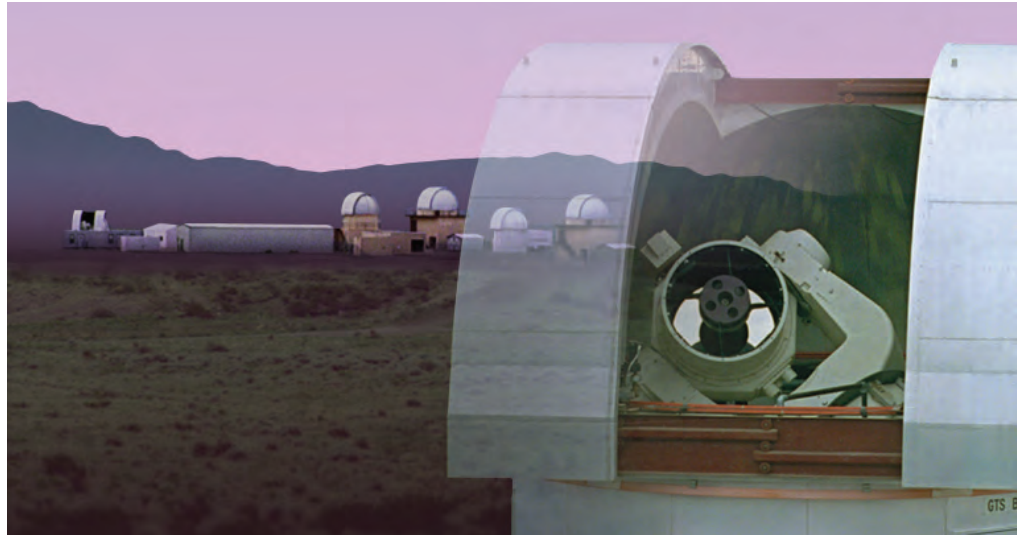
## Interphase EDGE

In August 2013, Lincoln Laboratory welcomed 47 students from the MIT Office of Minority Education's Interphase EDGE program to a day of tours and presentations. Interphase EDGE (for Empowering Discovery/Gateway to Excellence) is a two-year program designed to help MIT students, primarily from underrepresented minorities, improve the analytical and communications skills needed for success in a rigorous academic environment. In the summer before their freshman year, EDGE

students attend a seven-week session during which they take classes and become acquainted with college life. During their day at Lincoln Laboratory, the soon-to-be freshmen were briefed on some of the Laboratory's current projects; visited unique labs, such as the Technology Office Innovation Laboratory; and discussed engineering careers with technical staff members.



*The Ceres Connection  
names minor planets  
in honor of students  
and their teachers.*



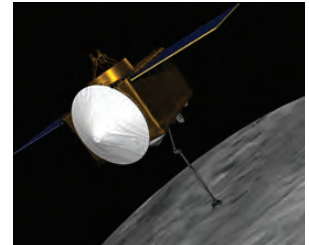
### Ceres Connection

Under the Ceres Connection program, minor planets discovered by the Lincoln Near-Earth Asteroid Research (LINEAR) program are named in honor of science students in grades 5–12 and their teachers. The honorees are selected through science competitions all over the world directed by the Science Education Department at the Society for Science and the Public. To date, approximately 3000 students and their teachers have been honored. Each year, the Ceres Connection program awards this honor to about 250 students.

## LINEAR's Name That Asteroid! Contest

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In 2013, the LINEAR program, the Planetary Society, and the University of Arizona partnered to host a Name That Asteroid! contest to provide a new name for asteroid 101955 1999 RQ36, discovered in 1999 by the electro-optical telescopes operated by Lincoln Laboratory. Today, the asteroid has an easy-to-use name—Bennu, a name submitted by nine-year-old Michael Toler Puzio of North Carolina and accepted by the International Astronomical Union (IAU), which authorizes all astronomical nomenclature. Michael's entry for the asteroid name was chosen from among approximately 8000 entries sent by students from 25 countries around the world.



The OSIRIS-REx spacecraft will rendezvous with Bennu in 2018, take a small sample of the asteroid in 2019, and return the sample to Earth in 2023. The sample's information about the composition of Bennu and its orbit will enable scientists to gain new knowledge of a carbonaceous asteroid and the solar system's past.

Michael wrote that the large OSIRIS-REx (Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer) spacecraft (shown at right) made him think of a heron. Bennu, usually depicted by Egyptians as a gray heron, was one of the symbols of the ancient Egyptian god Osiris, who reigned over resurrection and fertility.

Dr. Grant Stokes, head of the Aerospace Division and principal investigator for the LINEAR program, also knew a way to reward other worthy entries. "We were so impressed with the quality of the contest entries that we have decided to recommend the four runner-up submissions be used as names for other minor planets discovered by the LINEAR program. Muninn, Nabu, Polymatheia, and Ragnarok will be submitted to the IAU as recommended names for four main-belt asteroids."



### Daughters and Sons Days

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. The 2013 event featured eight activities designed to spark interest in science and technology, including hands-on demonstrations of robotics, space control, and flight simulation. Each day began with presentations by Jade Wang, Sonca Nguyen, Bradley Perry, and Kenneth Cole, who described their paths to their current careers and explained interesting projects on which they work.





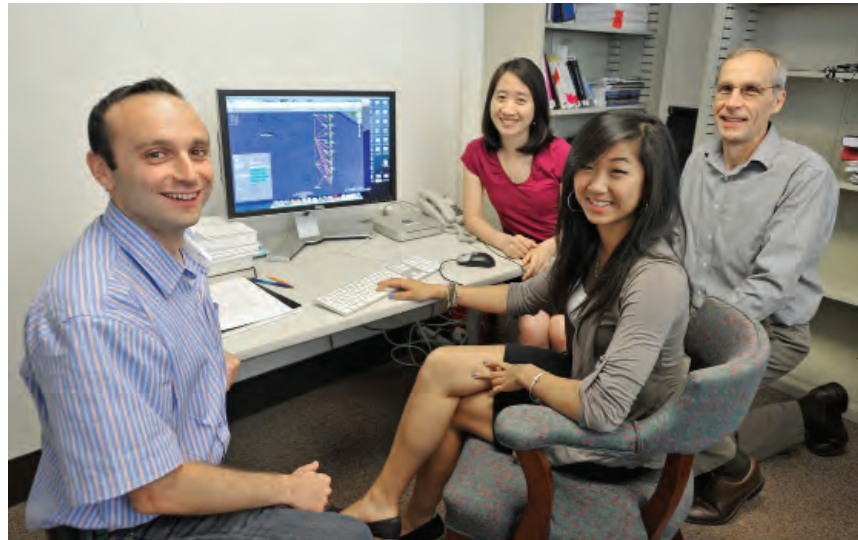
### AFCEA International Program

The Laboratory hired two AFCEA (Armed Forces Communications and Electronics Association) interns from local Massachusetts towns in 2013. These interns assisted the Chemical Sensing and Synthetic Materials Group and the Airborne Networks Group. AFCEA arranges summer internship opportunities for graduating high-school seniors interested in STEM careers. While two to four students are offered a Laboratory internship each summer, at least 40 students tour the Laboratory facilities, seeing the latest research and learning about career options in math and science.



Matt Aernecke, a mentor to Jennifer Kroon, (both shown above) said, “Hosting an AFCEA intern was a great way to enable a promising young scientist to gain hands-on experience and help make progress on a project.” Kroon, who was hired to assist with a chemical study of explosives in order to improve canine training, said, “I have learned so much about a variety of subjects that my time at the Laboratory has opened my eyes to my possible future paths in STEM fields.”

Under the mentorship of Na Wang, Leonid Veytser, and Arthur Faden, Amanda Chow assisted in software development for a network interface to manage different types of radios. Arthur Faden (shown far right) explained, "In a very short time frame, Amanda absorbed new concepts and technologies and demonstrated increasing skills in software methodologies. What we received in return were actual contributions that allowed project developers to focus on other areas, and the satisfaction of guiding someone with a promising talent early in her career."



### *Lincoln Laboratory awards scholarships to the 2nd-place winners in physics and engineering.*

#### **Massachusetts State Science and Engineering Fair**

Lincoln Laboratory technical staff have been volunteering as judges for the Massachusetts State Science and Engineering Fair since 2000, evaluating six to eight high-school projects. Lincoln Laboratory awards \$500 scholarships from the John Welch Memorial Fund to the 2nd-place winners in physics and in engineering. These funds, and others, are part of the MIT Lincoln Laboratory Giving Program.

At the 2013 Massachusetts State Science and Engineering Fair, Lincoln Laboratory continued as a bronze donor of the event. Twelve Laboratory scientists participated in the science fair as judges. This year's judges included Dennis Bechis, David Brown, Shourov Chatterji, Gregory Ciccarelli, Christopher Lloyd, Scott Pudlewski, Todd Rider, Charles Rose, Stephen Taylor, Zachary Weber, Chirag Bhatt, and Alexandra Wright.



#### **Local High 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 assist the Carlisle Public School system by serving as judges for the Carlisle Middle School Science Fair.



## Other Science-Related Programs in the Community

- Laboratory staff members Richard Marino and Yican Cao took part in the Minuteman Regional High School Freshman Career Day to discuss how they chose their careers and to explain their day-to-day work.
- Timothy Gallagher represented Lincoln Laboratory in Blanchard Middle School's Career Exploration Day in Westford, Massachusetts. He took the opportunity to describe a day in the life of an engineer and explain possible career paths with a degree in engineering.
- Forrest Hunsberger gave a talk for Career Day to the students of Curtis Middle School in Sudbury, Massachusetts, explaining the work of an engineer and manager.
- Erik Duerr spoke to the Phillips Academy Andover Physics Club about the physics-oriented work he does at the Laboratory. He also discussed the importance of pursuing a STEM-based career.
- Gerald Benitz served as a judge for the Assumption College Science Fair for middle-school students in 2013.
- David Kong volunteered as a guest juror for the Boston ArtScience Prize, a year-long after-school competition through which high-school students develop innovative art and design ideas informed by concepts at the frontiers of modern science.
- Joseph Venuti, Robert Hallowell, and Ngaire Underhill traveled to Fowler Elementary School in Maynard to present a weather/aviation demonstration to a fourth-grade class.
- The John Welch Memorial Fund supported 10 student scholarships at the Milford Area Chamber of Commerce 25th Annual Scholars Night.

### Lexington's 300th Anniversary

Lincoln Laboratory joined Lexington in celebrating the 300th anniversary of its incorporation as a Massachusetts town by participating in a weekend fair entitled LexCelebrate! Incorporation Weekend. The event, held at Lexington High School in March, featured a variety of discussions on the diverse historical backgrounds of the town.

Robert Atkins, head of the Advanced Technology Division, participated in the Military History panel, presenting an overview of the Laboratory's history and discussing its important role in the development of radar technologies and the early air defense system called Semi-Automatic Ground Environment (SAGE). He explained how Lincoln Laboratory's SAGE project was responsible for the development of technologies that gave birth to modern computing and how the Laboratory has continued to provide critical technologies for national security for more than 60 years.

Grant Stokes, head of the Aerospace Division, spoke at the From Farming to Technology panel discussion. After giving a brief summary of the range of key technologies that have been developed at Lincoln Laboratory, he discussed the Laboratory's



influence on both the local economy and the technology boom in this region.

Showcasing the Laboratory's commitment to STEM educational outreach, Todd Rider, formerly of the Bioengineering Systems and Technologies Group, presented a sampling of science exhibits and experiments similar to those available for schools to book through the Classroom Presentations program he coordinated for the Laboratory's STEM outreach initiative.



## MIT Museum Exhibit

In December 2012, the MIT Museum unveiled their newest addition to the “Sampling MIT” exhibition, a display on Lincoln Laboratory’s Air Traffic Control (ATC) programs. The exhibition’s six rotating displays feature current MIT research that addresses big questions facing the world today. On view throughout 2013, the ATC display highlights the Laboratory’s technological contributions to flight safety, including the Traffic Alert and Collision Avoidance System (TCAS), Runway Status Lights (RWSL), and Corridor Integrated Weather System (CIWS).

The Laboratory personnel assisting with the conception, research, and design for the ATC display were Mel Stone, Ann Drumm, James Eggert, Jessica Holland, and Edward Londner of the Surveillance Systems Group; Richard DeLaura, Elizabeth Ducot, and Richard Ferris of the Air Traffic Control Systems Group; and Chester Beals, Technical Communications. Deborah Douglas, Curator of Science and Technology and designer of the exhibition, remarked, “Working on this exhibition project gave me a much deeper appreciation of the Laboratory’s unique research environment. While a vital part of MIT, the Lab has many distinctive qualities, most notably an exceptional dedication to teamwork. It is clear to me that researchers at Lincoln Laboratory do extraordinary things because of this.”



### Westford Antenna Presentation

In 2012, Jeffrey Dominick of the Space Situational Awareness Group volunteered to host a presentation at the Westford Museum in Westford, Massachusetts, on the history of the Haystack Observatory and the Lincoln Space Surveillance Complex. Dominick was supported in his presentation by Colin Lonsdale, Director of the Haystack Observatory. Approximately 70 residents listened to the lecture to learn about the types of research performed at their local observatory.



### AAAS Family Science Days

The American Association for the Advancement of Science (AAAS) Family Science Days at the Hynes Convention Center drew as many as 10,000 attendees, including early-career scientists, teachers, parents, and children. Youngsters were able to excavate and date archaeological artifacts, paint with glowing bacteria, and build a solar cell. Visitors were also invited to explore the nanotechnology in everyday objects, conduct hands-on weather experiments, race hydrogen cars, drive underwater robots, and meet live animals as well as scientists and engineers. Lincoln Laboratory scientists Evan Cull and Eli Cohen showed visitors a mini-unmanned air vehicle model and took infrared “pictures” of participants.



## Cambridge Science Festival

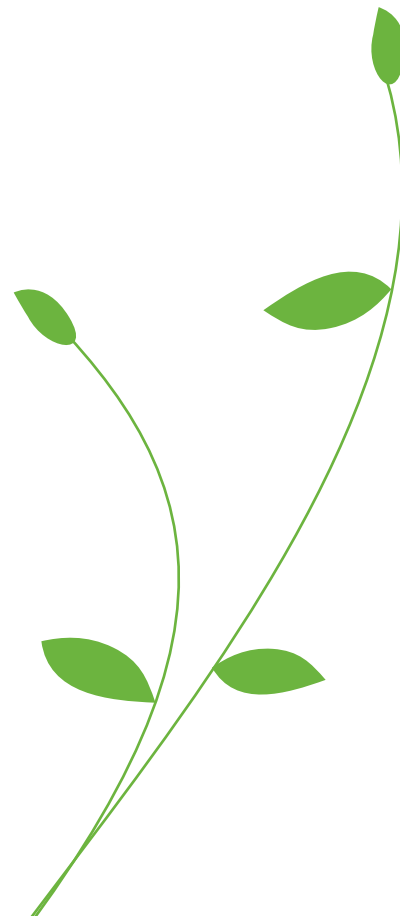
In coordination with MIT, Lincoln Laboratory Community Outreach partnered with Robotics Outreach volunteers to man a booth in the annual Cambridge Science Festival, a week-long celebration showcasing Cambridge as an internationally recognized leader in science, technology, engineering, and math.

In 2013, Lincoln Laboratory took part in the Robot Zoo featuring robotics technology and hands-on activities. Staff members Jacob Huang, Kenneth Cole (shown at right), and David Granchelli showed participants how to control their own robot as part of this citywide science festival, visited by 15,000 people from the New England region.



### Reading Outreach

Lincoln Laboratory's Outreach Volunteer Group offers opportunities to assist with different outreach events once a month with no further commitment. Their motto is "sign up, show up, and help out." Volunteers help with story time for kids in grades K–4 at the Dudley Branch of the Boston Public Library in an effort to inspire children's passion for reading. The volunteers, mainly Lincoln Laboratory's Hispanic/Latino Network members, Yari Rodriguez, Rodolfo Cuevas, Michelle Beard, Yajaira Gonzalez-Gonzalez, and Chiamaka Agbasi-Porter plan to include monthly visits to as many branches of the Boston Public Library as possible. Yari Rodriguez is the organizer and manager of the multiple story-time events occurring each year. This group intends to increase their volunteerism to other libraries and public schools in the future. Their website lists other ways to help a variety of causes and guides personnel to appropriate points of contact for other outreach efforts at the Laboratory.



## Group Tours

As part of the Lincoln Laboratory Community Outreach Program, tours of Laboratory facilities, such as the Microelectronics Laboratory, the Air Traffic Control Laboratory, the Rapid Prototyping Lab, and the Flight and Antenna Test Facility, are given annually to a number of groups.



In 2013, tours were given to

- New Jersey Institute of Technology Cadets
- Students from Newburyport High School
- Stevens Institute of Technology students
- Research Science Institute program students
- Air Force cadets
- United States Association of Former Members of Congress
- ROTC students
- Army Test and Evaluation Command
- U.S. Army Natick Laboratory
- West Point cadets
- National Reconnaissance Office Fellows
- Leader-to-Leader Group
- Congressional hill and executive branch staffers
- ESC Hanscom Air Force Base personnel



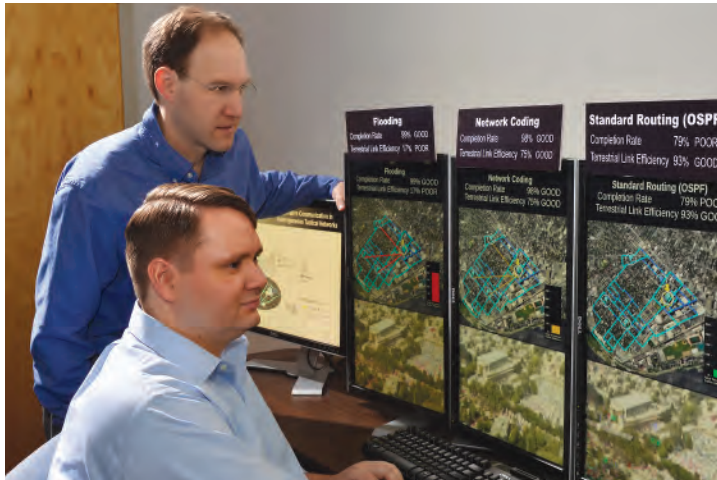
**EDUCATIONAL COLLABORATIONS**



### Technical Seminars

The technical staff stay current in their field by presenting seminars at universities and hosting seminars at the Laboratory. Seminar series motivate and inspire while facilitating working relationships. Seminars reflect leading-edge trends in technology. The Technology Office Seminar Series invites nationally known experts to the Laboratory, while the Technology in Entertainment Series provides specific technology insights. The seminars offered in 2013 were

- Chuck Pagano, Chief Technology Officer, ESPN — *Innovation in Sports and Technology*
- Eric Malafeew, Co-founder and Engineering Director, Harmonix Music Systems — *Fun and Horror from the Trenches of Game Tech*
- Prof. Sara Seager, Planetary Science and Physics, MIT — *Transiting Exoplanets: from Ground-Based Origins to Kepler Discoveries*
- Prof. Eduardo Torres-Jara, Computer Science, Worcester Polytechnic Institute — *Sensitive Robotics*
- Dr. Carl Dietrich, Terrafugia, Inc. — *The Terrafugia Transition Program*
- Prof. Vladimir Bulovic, Director of the Microsystems Technology Laboratories, MIT — *Molecules and Quantum Dots in Nanostructured Electronics*
- Dr. Stephen Wolfram, Wolfram Research — *Mathematica, Wolfram|Alpha, and the Next Steps in Computation*
- Prof. Isaac Chuang, Electrical Engineering, MIT — *The Quantum Information Systems Challenge*
- Prof. Dirk Englund, Electrical Engineering and Computer Science, MIT — *Semiconductor Quantum Technologies for Information Processing and Precision Measurements*
- Prof. Pierre Lermusiaux, Mechanical Engineering and Ocean Science and Engineering, MIT — *Multidisciplinary Simulation, Estimation and Assimilation Systems*
- Prof. Sam Madden, CSAIL, MIT — *Going Big on Big Data*
- Prof. Dina Katabi, Director of Wireless@MIT — *Advances in Wireless Technologies*
- Prof. John McDonald, Tufts University, Composer, and Ms. Elizabeth Erenberg, Flutist — *Spinning Melodies Like Silk*
- Prof. Susan Solomon, Atmospheric Chemistry and Climate Science, MIT — *Climate Change and the Reasons for Climate Gridlock*



### Lincoln Scholars Program

Currently, 24 technical staff members are enrolled in the Lincoln Scholars Program, a competitive program for which technical staff are eligible to apply and under which participants are funded by the Laboratory for full-time pursuit of an advanced degree at MIT or another local university. In 2013, one staff member earned a doctorate and four earned master's degrees through the program. Lincoln Scholar Nathan Jones (shown at top left) of the Wideband Tactical Networking Group is comparing performance of a collaborative routing protocol versus other existing protocols in a SATCOM-on-the-move scenario. Lincoln Scholar Chris Sataline of the Active Optical Systems Group (shown at top right) said, "The Lincoln Scholars Program is not just for the immediate satisfaction of earning an advanced degree. Tackling steep learning curves and problem-solving are some of the best professional development methods out there."

## Distance Learning

Distance learning programs coordinated by the Graduate Education Committee allow 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, while Pennsylvania State University offers a master's program in information sciences. Currently, three people are enrolled at each of those universities. In September 2012, one staff member was awarded a master's degree from Penn State.

## In-House Learning

Lincoln Laboratory has an in-house education program that offers courses in technical subjects such as electro-optics, classes in software applications, one-day technical seminars, and workshops in leadership and business skills.



### 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 or for the Army's Training with Industry program, or who are working toward advanced degrees. This program helps the Laboratory establish cooperative relationships with military officers. In 2013, the Laboratory hosted 23 officers in the Military Fellows program. In addition to active-duty officers, Lincoln Laboratory sponsors summer research interns from all the service academies. In 2013, 42 cadets and midshipmen participated in the summer program.

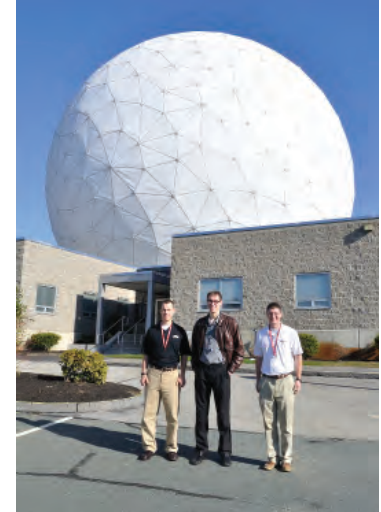


Officers enrolled in a Senior Service School work at the Laboratory and take national security management courses at the MIT campus. Senior officers in the Training with Industry program are assigned to a Laboratory technical group. For the military, the goal is to acquaint senior personnel with the process of developing technologies that directly impact national security. The Laboratory gains constructive insight from the frontline experiences of the officers.

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, the fellows contribute full time to a Laboratory program.

## West Point Collaboration

Lincoln Laboratory is partnering with the U.S. Military Academy at West Point to build two satellite payloads. Kenneth Chadwick, while in the Tactical Defense Systems Group, initiated a project giving cadets an opportunity to build a payload to perform an on-orbit experiment of a passive attitude control and friction-based damping system using low-cost components. Christopher Semisch of the Optical Engineering Systems Group currently leads the project. Bruce Bray of the Intelligence, Test, and Evaluation Group and Josh Wilson of the Air and Missile Defense Assessments Group also work with West Point faculty advisor LTC Sam Amber leading Cadets William Schmidt and Justin Vonsik in developing a radar calibration satellite to benefit important radar assets. The cadets have carried out modeling of both material properties and radar scattering as part of the design trade study and will take an elective course on essential features of independent research in physics. Wilson is shown at right with Cadets Schmidt and Vonsik on a visit to Millstone Hill.



## Military University Electives

Laboratory staff teach electives at the Naval War College. The leadership at the Naval War College view these courses and their relationship with Lincoln Laboratory as immensely critical to the mission of the college. The Cyber Security course is taught by Jeff Gottschalk of the Cyber Systems and Operations Group and William Martel of Tufts University. A similar elective is offered at the Air Force Center for Professional Military Education. Space Technology and Policy has recently been taught by Jennifer Parker of the Space Systems Analysis Group. The Ballistic Missile Defense course is taught by Dr. Claude Noiseux of the BMDS Integration Group.



### 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 applications. This summer, the Laboratory welcomed 174 student interns (shown at right) from 72 different schools across the country.

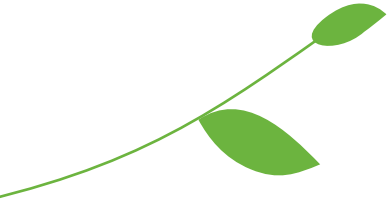
For the past three summers, the three colleges most represented by the interns at the Laboratory have been MIT, Worcester Polytechnic Institute, and the Georgia Institute of Technology. Gary Hackett, Human Resources Department, has been the manager of the Summer Research Program since 2007. Describing 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 advance their careers.”

### WPI Major Qualifying Program

In 2013, 11 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. The program allows students to 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
- GOBLIN Eyes: Sensor Turret Target Tracking for Small Unmanned Air Vehicles
- Hand-Held Transceiver Tester
- Radar Receiver Calibration Toolkit





### Graduate Fellowship Program

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



### University Cooperative Education Studies

Technical groups at Lincoln Laboratory employ students from area colleges as co-ops working full time with mentors during the summer or work/study semesters and part time during academic terms. Highly qualified students selected as co-ops become significant contributors to technical project teams. During the spring semester of 2013, 46 co-ops worked in divisions and departments at the Laboratory. Colleges and universities that regularly send co-ops to Lincoln Laboratory are Northeastern University, Wentworth Institute of Technology, University of Massachusetts at Lowell, Boston Architectural College, and Rochester Institute of Technology.

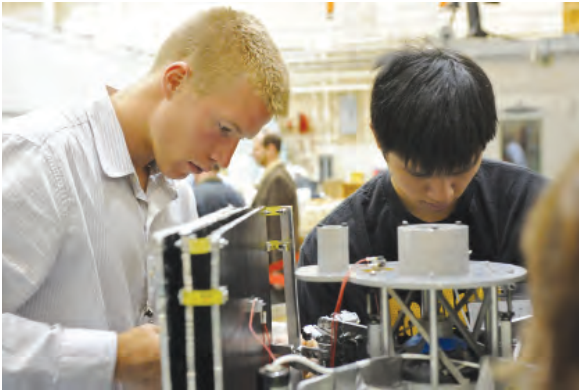
## GEM National Consortium

The Laboratory continues to support the National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM). The Laboratory hosted nine graduate research fellows over the summer. Through partnerships with universities and industry, GEM provides graduate fellowships at master's and doctoral levels to minorities from underrepresented communities. In collaboration with university and corporate partners, GEM provides students financial support and technical, paid summer internships to help promote success in competitive academic and professional environments. David Martinez, Associate Division Head, Cyber Security and Information Sciences, said, "This past winter, at the request of Eric Evans, President of the GEM Board for 2012–2014, we led a short-term study to determine how the Laboratory and, more generally, the GEM



organization could increase its influence in reaching out to a wider talent pool. The Laboratory has taken a proactive approach to increasing the number of GEM students participating in the summer intern program."

*The synergy between the campus focus on basic research and the Laboratory knowledge of defense applications has benefited both communities.*



### MIT Research Assistantships

Lincoln Laboratory is currently employing 42 research assistants from MIT. Working with engineers and scientists, these assistants contribute to sponsor programs while investigating the questions that evolve into their doctoral theses. The facilities, the research thrusts, and the reputations of staff members are prime inducements behind the graduate students' decision to spend three to five years as a research assistant in a Laboratory group.

### MIT VI-A Master of Engineering Thesis Program

One MIT student in the VI-A Master of Engineering Thesis Program was hired in summer 2013, and four VI-A students are continuing, to 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. Then, the students are paid 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

In 2013, seven undergraduates were hired in the summer as part of the MIT Undergraduate Research Opportunities Program (UROP), which allows students to participate in every aspect of onsite research—developing research proposals, performing experiments, analyzing data, and presenting research results.



## MIT Undergraduate Practice Opportunities Program

Lincoln Laboratory participates in the Undergraduate Practice Opportunities Program (UPOP). This full-year program for MIT sophomores is an introduction to the workplace skills that students will need to thrive in their future careers. An important facet of the program is a 10- to 12-week summer internship. In summer 2013, four UPOP students worked at the Laboratory.

### MIT AIAA Design/Build/Fly Club

Elizabeth Jones, a student intern at Lincoln Laboratory from MIT, initiated a team for the Design/Build/Fly Competition held by the American Institute of Aeronautics and Astronautics (AIAA). The contest provides a real-world aircraft design experience for engineering students by giving them the opportunity to validate their analytic studies.

Student teams design, fabricate, and demonstrate the flight capabilities of an unmanned, electric-powered, radio-controlled aircraft that can best meet the specified mission profile. The goal is a balanced design possessing good demonstrated flight handling qualities and practical and affordable manufacturing requirements while providing high vehicle performance. Lincoln Laboratory sponsored a 15-person team from MIT to attend the national competition in Tucson, Arizona. The team placed fourth out of 50 teams.

The photo at right shows the team's successful takeoff at the competition.



## MIT Capture the Flag

Each fall, MIT and Lincoln Laboratory host the Cyber Capture the Flag (CTF) competition. The event launched with seminars focused on attacks and defenses in the web environment, and culminated in a weekend-long competition. During the exercise, teams squared off to prove who had the most successful offensive and defensive computer security skills.

This competition drew 62 participants from six area universities. The Cyber Systems and Technology and Cyber System Assessments Groups organized the event in collaboration with MIT Professor Nickolai Zeldovich and Northeastern University Professors Engin Kirda and Wil Robertson. The CTF format ranges from linear puzzle-like challenges to team-based offensive and defensive “hacking” competitions.

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.” Lincoln Laboratory staff members assisting with CTF were Michael Zhivich, Andrew Davis, and Timothy Leek.



### MIT Beaver Works

The MIT Lincoln Laboratory Beaver Works (LLBW) Center is a joint center chartered by MIT School of Engineering and MIT Lincoln Laboratory, and is operated by the Laboratory. The facility is open to all MIT students, faculty, and collaborators, and provides a nexus for innovation, collaboration, and hands-on development. At LLBW, research and educational programs strengthen and expand collaborative efforts between Lincoln Laboratory and MIT campus. This collaboration

- Provides opportunities for both Institutions to make an impact on pressing global problems through science, research, and education
- Leverages synergies between campus research and Laboratory technology areas to generate innovative solutions
- Exposes a new generation of students to opportunities in engineering, research, and service to the nation

The technical scope of LLBW research programs bridges a wide area of common interests between Lincoln Laboratory and campus. Areas that are particularly opportune for strong collaboration include

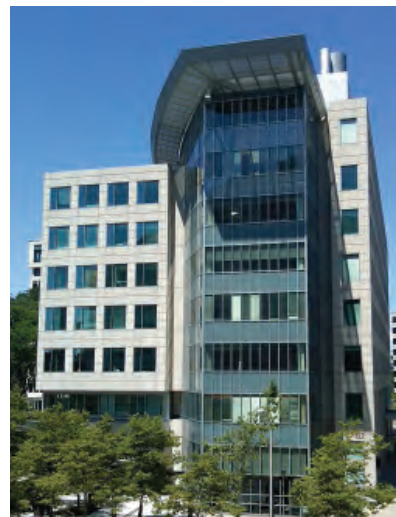
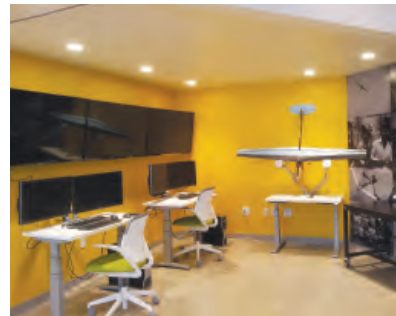
- |                                   |                               |  |
|-----------------------------------|-------------------------------|--|
| ■ Unmanned aerial vehicle systems | ■ Transportation              | ■ MIMO signal processing                 |
| ■ Autonomy and robotics           | ■ Energy systems              | ■ Earth remote sensing                   |
| ■ Cyber security                  | ■ Imaging sciences            | ■ Advanced decision support              |
| ■ Engaging supercomputing         | ■ Social Dynamics Observatory | ■ Biomedical research and bioinformatics |
|                                   | ■ System-on-a-chip            |  |







The Beaver Works initiative began in 2010 through a series of Lincoln Laboratory-funded capstone research projects in the School of Engineering. In 2013, the center opened its doors to a new, dedicated facility designed to facilitate research, workshops, and classwork through the creative fusion of collaborative spaces and prototyping facilities.

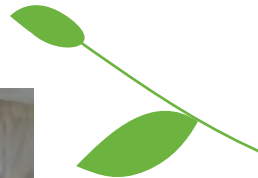




### MIT Lincoln Laboratory Beaver Works Grand Opening 12 November 2013

Lincoln Laboratory was proud to celebrate the official opening of the Beaver Works facility along with MIT and area dignitaries. Over 350 guests were present to see the ribbon being cut by (shown left to right, below) MIT School of Engineering Dean Ian Waitz, MIT President L. Rafael Reif, Lincoln Laboratory Director Dr. Eric Evans, Lincoln Laboratory ISR and Tactical Systems Division Head Dr. Robert Shin.





## EDUCATIONAL COLLABORATIONS



### MIT Professional Education—Short Programs

Lincoln Laboratory collaborates with MIT faculty to offer courses through MIT's Professional Education Short Programs. Short Programs typically run during the summer and bring participants from industry, government, and business to the campus for intensive, week-long courses designed to expand participants' familiarity with emerging technologies.

The Lincoln Laboratory staff led the following professional education courses in 2013:

- Build a Small Phased Array Radar Sensor
- Build a Small Radar System
- Build a Laser Radar: Design Principles, Technologies, and Applications
- Rapid Robotics: Autonomous Systems with Open-Source Software
- Build a Multichannel Search-and-Track Radar



## MIT Independent Activities Period

Lincoln Laboratory technical staff led activities offered during MIT's Independent Activity Period (IAP), a four-week term spanning the January semester break. Under the IAP program, for-credit classes are available for registered MIT students, and non-credit activities are open to all members of the MIT community. IAP offerings range from academic seminars to hands-on engineering projects to artistic pursuits. The activities are distinguished by their variety, innovative spirit, and fusion of fun and learning.

During the 2013 IAP, Lincoln Laboratory staff members organized and led six non-credit activities:

- *Find a Needle in a Haystack with 3D Imaging Radar* — Led by Bradley Perry, Alan Fenn, Raoul Ouedraogo, Glenn Brigham, Joseph McMichael, Daniel Rabinkin, and Gerald Benitz
- *3D Manipulation of 2D Images* — Led by Peter Cho
- *Hands-on Holography* — Led by Robert Freking, Christy Cull, and Evan Cull
- *Open Robotics Laboratory* — Led by Michael Boulet, Aaron Enes, Keith Ruenheck, Nicholas Armstrong-Crews, Kenneth Cole, Michael Carroll, and Mark Donahue
- *Build a Small Phased Array Radar System* — Led by Bradley Perry, Todd Levy, Patrick Bell, and Jeffrey Herd
- *Build a Small Radar System* — Led by Patrick Bell, Shakti Davis, Alan Fenn, and Bradley Perry





COMMUNITY **GIVING**



*Community outreach programs are an important component of the Laboratory's mission. Our community giving initiatives are inspired by employee desires to help people in need.*

Lincoln Laboratory employees are actively engaged in many activities supporting worthy causes contributing to the overall quality of life within and outside of our community. Lincoln Laboratory Community Outreach strives to raise awareness of local needs by organizing fund-raising and outreach events that support selected charitable organizations. A diverse range of opportunities is provided for employees to volunteer their time and resources.

### **Boston Strong**

In May 2013, the Laboratory community declared a Boston Strong Day (shown at left) in a show of support for the victims of the Boston Marathon bombing. Later, in September, the annual Community Outreach Fair chose "Boston Strong" as this year's theme and raised \$600 for the One Fund Foundation. Lincoln Laboratory partnered with the American Red Cross to coordinate a special blood drive in honor of MIT Officer Sean Collier to commemorate his sacrifice and service.

### American Heart Association Heart Walk

Lincoln Laboratory's Heart Walk Team was formed in 2012. The team's goal is to support the American Heart Association (AHA) in efforts to prevent, treat, and defeat cardiovascular disease and stroke. Team captains Susan Curry of the Tactical Defense Systems Group and Sandra McLellan of the Advanced Sensor Systems and Test Beds Group encouraged the Laboratory community to join in a "Wear Red" day to raise awareness of heart disease and stroke. The Laboratory's Heart Walk Team works throughout the year to raise donations for the American Heart Association's Heart Walk in Boston. This year, the Lincoln Heart Walk team raised \$4117 toward awareness and prevention of heart disease and stroke. Heart disease alone claims approximately 600,000 lives each year and is the most common cause of death of both men and women.



### Teamwalk for Cancer Care

The coordinator of the Lincoln Laboratory Team in Lowell General Hospital's TeamWalk for CancerCare is Julie Arloro-Mehta of the Optical Systems Technology Group. The nine-member Lincoln Laboratory Team has met increasing fundraising goals every year for three years, partially by holding an annual 14-day drawing for prizes and gift baskets. In 2013, the team raised \$5450, exceeding their \$5000 goal, to better the lives of those being treated for cancer at Lowell General Hospital.

## Free To Breathe 5K Run/Walk

In September, Rebecca Jacobson, Advanced Lasercom Systems and Operations, offered a lunchtime seminar, “What You Might Not Know about Lung Cancer,” to share lung cancer facts and resources with the Laboratory community. Jacobson served as the chairperson for the Free to Breathe 5K run/walk and one-mile walk on 22 September in support of the National Lung Cancer Partnership. Jacobson notes that last year’s event brought together over 700 participants and volunteers who raised more than \$105,000 for the cause.



## Fitness Center 5K Fun Run

Eighty-five Laboratory employees participated in this annual charitable race hosted by the MIT Fitness Center at Lincoln Laboratory in the springtime. This 5K Fun Run begins and ends at Lincoln Laboratory and takes place over the course of a regular lunch hour. A total of \$915 was raised for the benefit of the Veterans Hospital in Bedford, Massachusetts.

## AIDS Walk and 5K Run

Lincoln Laboratory’s first year of participation in Boston’s AIDS Walk and 5K Run was coordinated by Thomas Zugibe of the Airborne Radar Systems and Techniques Group. Members of the Hispanic/Latino Network and the newly formed employee resource group, OPEN, Out Professionals and Employees Network, formed a 12-member running team that raised \$755 for services essential to maintain the health of individuals living with AIDS and to prevent its spread.

### Support the Troops Program

Lincoln Laboratory runs an ongoing campaign of support for 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 Guard Katie Hart (shown second from left) coordinates packing and shipping more than 200 care packages for approximately 35 troops overseas. Lincoln Laboratory Troop Support provides extra support to the soldiers around the holidays by hosting a “Crafting for a Cause” event. Profits from the craft sales go toward holiday items to be sent to the troops to lift their spirits. Troop Support hosted a packing party in the summer (shown at right), resulting in 150 boxes ready to send overseas. One of the recipients, CPT Philip McBroom, replied, “The care packages from Lincoln Laboratory have been a real encouragement to our soldiers. It is always nice to get mail from back home, but especially when it meets some particular need. It is amazing how much we take for granted back in the States, and we are realizing it now!”



## Veterans Network

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 ten percent of the Laboratory work force. This year, LLVETS joined 100 supporters on Valentine's Day during the 2013 National Salute to Hospitalized Veterans at a local veterans hospital. Dan O'Shea (shown at far right in photo), Infrastructure and Operations, and organizer of the volunteer group, said, "When participating in an event like this, one hopes to make a small difference in the lives of these veterans."



## Homes for Our Troops

The Information Services Department (ISD) hosted a charity dunk tank to raise money for Homes for Our Troops, an organization that builds adapted homes for veterans who have returned home with disabilities and injuries. The event raised \$1100 to provide housing support to wounded veterans. Michael Crones, Assistant Department Head, said, "The event was an awesome opportunity for both department team-building and support of a very worthy cause."

## National Education for Assistance Dog Services



In July, Lincoln Laboratory's Veterans Network hosted the National Education for Assistance Dog Services (NEADS) which provides 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 fund-raising effort to sponsor and name an assistance dog. Lab employees donated \$2000, which was more than enough to sponsor "Lincoln," a lab, who will be assigned to a combat veteran in early 2015 if he meets the standards of the training program.



*This year's Walk to End Alzheimer's team raised almost \$31,000, ranking them as the #1 top fund-raising team in the Boston area.*

### Walk to End Alzheimer's

The MIT Lincoln Laboratory Alzheimer's Awareness and Outreach Team, led by Kit 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. In September 2013, the outreach team participated in the Greater Boston Walk to End Alzheimer's for the fourth year in a row. This year featured a mystery matcher who met donations dollar for dollar during the last two weeks before the Walk,

several bake sales, and a silent auction of autographed Bruins items. The team increased from 30 to 52 members and raised \$30,924, surpassing their \$25,000 goal and ranking the team as the #1 top fund-raising team in the Boston area.



In July, a team of Laboratory cyclists (shown on the inside back cover) participated in the Ride to End Alzheimer's, departing and finishing at Devens, Massachusetts. Bruce Bray and Robert Schulein completed the 100-mile course; and Kim Hebert rode the 62-mile course, while Carolyn Hutchinson, Kenneth Cole, Xiao Wang, and John Kaufmann did the 30-mile route. Out of more than 80 teams participating, the Lincoln Laboratory team ranked fourth in dollars raised, contributing more than \$10,000 to Alzheimer's research.

## Multiple Sclerosis Society Bike and Hike

For the seventh year in a row, Team MIT Lincoln Laboratory supported the Multiple Sclerosis Society by hiking and biking in the Berkshires in September. Co-captains David Granchelli and John Kuconis led the 13-member team in raising \$7528 to help people in the community who are affected by multiple sclerosis and help advance research and treatments. The Hike and Bike team included Laboratory staff members Christine Cambrils, Alan Gee, Robert Seidel, Paul Smith, David Tyo, and Leslie Watkins.



## Harbor to the Bay Bike Ride

New to Lincoln Laboratory's outreach roster in 2013 is the Harbor to the Bay Bike Ride for AIDS. Team Lincoln participated in this one-day bike ride from Boston to Provincetown in September. The three-member team, led by R. Jordan Crouser of the Computing and Analytics Group and Ariel Hamlin of the Cyber Systems and Technology Group, raised \$2437 to support the AIDS Action Committee of Massachusetts, the state's leading provider of prevention and wellness services for people vulnerable to HIV infection.



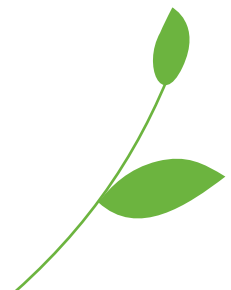
### LEAN

Lincoln Laboratory Employees African-American Network (LEAN), the newest employee resource group at the Laboratory, debuted in late 2013 to support recruitment of top African-American talent in all staff categories, and increase diversity and awareness within the Laboratory community. LEAN members volunteered at the Greater Boston Food Bank in September and assembled boxes of food to be distributed. The group, led by Kevin Carter of the Cyber Systems and Technology Group and Larry Robinson of the Cyber Systems and Operations Group, plans to host a Martin Luther King Jr. breakfast and a traveling Science on Saturday demonstration for students in nearby urban areas who may not be able to easily travel to Lexington for the Laboratory's regular Science on Saturday shows.



### Pie in the Sky

In 2012, the LL Pi Team was created to participate in the Pie in the Sky fund-raiser supporting Community Servings, which delivers meals for the critically ill. 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. LL Pi members can sell pies or donate their own homemade pies. The LL Pi Team is led by Dinara Doyle and Kathleen Silveri of the Cyber Systems and Technology Group.



## Giving Tree

Paula Mason of the Advanced Concepts and Technologies Group organizes a “giving tree” during the holidays each year to respond to specific holiday wishes from local families in need. This program is paired with a food drive, so that each recipient receives a requested gift and a food item for the holidays. The giving tree items are given to a different charity each year. Laboratory participants donating gifts for this program generously contribute holiday cheer for approximately 350 people from the local community.

*Laboratory participation in the Giving Tree collects gifts annually for more than 350 people who have no other source of gifts in the holiday season.*



## Used-Book Drive

In coordination with the MIT Community Giving Fund, 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, young adult books, children's books, CDs, DVDs, and VHS tapes) for the sale. The book drive is followed by a week-long 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 2013, the book drive raised \$1200 and provided a wealth of new reading material for all patrons.

### JUMP

Just Understand My Potential (JUMP), a youth leadership training through outdoor experiential education, was developed by Bill Spacciapoli, formerly of Lincoln Laboratory. Hiking and backpacking are used as tools to teach and apply leadership and teamwork skills. The mentors in JUMP model, teach, and inspire participants to be goal-directed, embrace commitment, be empathetic, and demonstrate integrity. Boys and girls, ages 11 and up, learn technical outdoor, leadership, and team-building skills, all within the context of respect for the environment and each other. In late 2012,

Weston Marlow, Kevin Newman, and Spacciapoli participated in JUMP's "Flags on the 48" event, a September 11 Memorial Hike, hiking to the top of Wildcat Mountain and flying an American flag in remembrance of the victims of September 11th. Newman and Kenneth Cole were certified by SOLO Wilderness Medicine as part of their required leadership training, and both served as volunteer leaders on hikes to the White Mountains with youth from the Fitchburg and Leominster Boys and Girls Club.

### 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 the following charities or events:

- The Charles River Cleanup
- American Red Cross
- Avon Breast Cancer Walk
- AFCEA Golf Tournament
- Bedford Special Education's Fun Run
- Emily Letourneau Volleyball Tournament
- American Diabetes Association's Tour de Cure
- The Jimmy Fund's PanMass Challenge
- Multiple Sclerosis Society's Muckfest
- American Lung Association's Autumn Escape Bike Trek
- National Lung Cancer Partnership's Free to Breathe 5K





## Marshallese Island Outreach

Lincoln Laboratory operates a field site at the U.S. Army Reagan Test Site on Kwajalein Atoll, located 2500 miles WSW of Hawaii. Twenty staff members work at this site, serving two- to three-year tours of duty. The amiable relationship enjoyed by the Laboratory staff and the local community prompted the initiation of the Marshallese Outreach program, developed to enrich educational and life experiences of the Marshallese people.

Each summer, two Marshallese college students are supported as interns at a Lab facility. The internship provides mentoring and resources to encourage interns to pursue further education while they contribute to the Reagan Test Site information technology needs. Nover Juria and Lebon Joash, two students from the College of the Marshall Islands in Majuro, participated in the 2013 internship program to improve their computer and network skills. Juria is now taking additional classes at the University of the South Pacific, and Joash is finalizing plans to attend a university in the United States to focus on information technology.

Other forms of outreach at Kwajalein include the selling of wooden and woven Marshallese handcrafts, the profits from



*Marshallese student interns are mentored at a Laboratory facility and encouraged to pursue further education.*

which are returned to the Islanders to help provide lunch funds for schoolchildren on the island. Each fall, a scholarship is awarded to a local student choosing a career in science, technology, engineering, or math. This year's scholarship recipient was Talbot Westhoff (shown above), who was homeschooled on Kwajalein during his family's assignment from Lincoln Laboratory.



### United Way

In coordination with MIT, Lincoln Laboratory sponsors an annual campaign to donate to United Way through paycheck donation or a direct one-time contribution to the United Way charity of the employee's choice. The United Way helps human service agencies respond to urgent needs in the community and builds a brighter future for those in need. United Way helps through learning collaboratives, homelessness prevention, employment training, utilities assistance, and emergency food/shelter.

### Coats for Kids

Lincoln Laboratory participates each winter in the Coats for Kids drive. The Laboratory collects warm coats for all ages and delivers them to Anton's Cleaners. All coats are cleaned free of charge and given to those in need through an extensive distribution partnership. The Coats for Kids program provides 60,000 coats to needy families in the greater Boston area. Lincoln Laboratory employees generously donate approximately 500 coats each December.



### Toys for Tots

The MIT Credit Union at Lincoln Laboratory serves as a drop-off point for Toys for Tots holiday toy drive, providing toys for needy families. Each December, more than 300 toys are generously donated by Laboratory employees. The Toys for Tots drive has been an annual event at Lincoln Laboratory for well over 20 years. The Laboratory is proud to support the United States Marines in their effort to distribute new toys to less fortunate children in our community.

## About Our Volunteers

The Laboratory congratulates 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, as Lincoln Laboratory Community Outreach Committee will continue to offer many opportunities to participate in educational and giving outreach events.





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