

Department of Electrical Engineering and Computer Science

The [Department of Electrical Engineering and Computer Science](#) (EECS) is MIT's largest department, with 126 faculty conducting research in four major labs: the Computer Science and Artificial Intelligence Laboratory (CSAIL), the Laboratory for Information and Decision Systems (LIDS), the Microsystems Technology Laboratories (MTL), and the Research Laboratory of Electronics (RLE). EECS is also home to a growing portion of MIT's student body: in AY2015, approximately 1,200 undergraduate students and more than 800 graduate students were enrolled in the department.

New Leadership Roles at MIT

During the past year, several members of the EECS faculty assumed new or expanded leadership roles at MIT. In June 2015, Ronald Rivest was named Institute Professor, MIT's highest faculty honor. Rivest is one of a group of three faculty members who are the first new Institute Professors to be named since 2008. In April 2015, Engineering Systems Division (ESD) director Munther Dahleh was named the director of a new cross-disciplinary entity at MIT, the Institute for Data, Systems, and Society (IDSS). Silvio Micali was appointed EECS associate department head in January 2015, succeeding William Freeman, who had held the role since July 2011. In October, Asu Ozdaglar became the director of LIDS.

Educational and Outreach Initiatives

EECS launched several key initiatives over the past four years aimed at enhancing the student and postdoc experience and strengthening the department's outreach activities. Now moving past their launch period, these well-received programs are growing beyond EECS, with new participation in other departments, in the School of Engineering, at the Institute level, and outside of MIT.

SuperUROP at MIT

The SuperUROP program is designed to give EECS juniors and seniors who have already completed the traditional Undergraduate Research Opportunities Program (UROP) a deeper research experience, as well as credit for work commensurate with graduate-level research. One of the goals is to produce publication-worthy results. The SuperUROP program provides a jump-start on graduate school, acts as a startup accelerator, and serves as an industry-training boot camp, all rolled into one. The program grew to include 105 students in 2014–2015, an increase from the 86 students who participated in the inaugural year (2012–2013).



Photo 1. More than 100 SuperUROP students presented their research to guests at the December research review.

SuperUROP students engage in a yearlong research experience and participate in the 6.UAR Preparation for Undergraduate Research subject, which covers topics ranging from selecting projects and research topics in EECS to entrepreneurship and ethics in engineering. Students learn how to present a poster, give an oral presentation, and write a technical paper. At the end of the academic year, students receive a certificate in advanced undergraduate research with a designated focus area.



Photo 2. Mihika Prabhu, a member of the 2014–2015 SuperUROP class. Prabhu completed a research project titled “Development of an Optical Field-Programmable Gate Array for Classical and Quantum Information Processing” with advisor Dirk Englund.

SuperUROP is supported by the Research and Innovation Scholars Program (RISP), a named scholars program that funds students taking part in SuperUROP and provides some associated discretionary funding for the host research group. RISP is made possible by the generous support we receive from corporate and individual sponsors, all of whom are committed to growing the SuperUROP program and enhancing the student experience at MIT.

In the upcoming academic year (AY2016), the SuperUROP program will expand to support students from other departments within the School of Engineering.

Start6

In response to feedback from the EECS Visiting Committee, the department launched an expansion of our curriculum over MIT’s Independent Activities Period (IAP) in January. Start6: A Boot Camp for EECS Entrepreneurs and Innovators offered opportunities for our students and postdocs to learn more about the nuts and bolts of building a successful company. The inaugural 2014 workshop brought together roughly 60 students, while the 2015 workshop hosted 70 participants.

Start6 participants spent IAP covering topics such as equity division, funding models, marketing, scalability, and team building. The workshop featured more than 60 speakers, including some of MIT’s most successful and prolific entrepreneurs, and highlighted several of the campus resources already available to students. At the end of the course, each student team was asked to make a pitch presentation.

During the 2015 spring break, more than 30 Start6 students traveled to northern California for phase two of the program. This trip provided students the opportunity to visit startups and meet MIT alumni. A select group of students gave pitches to venture capitalists and alumni and received feedback on their ideas and presentations. These kinds of activities have encouraged the participating students and teams to continue exploring their opportunities and move their ideas and prototypes forward.

Rising Stars Workshop

As part of the department's strategic plan, EECS launched the Rising Stars program in 2012 to build and strengthen the academic pipeline for top recent women graduates in electrical engineering and computer science. Each year, the Rising Stars workshop has brought together 40 or more of these exceptional young electrical engineers and computer scientists for two days of scientific discussion and informal sessions aimed at building confidence in navigating the early stages of a career in academia. The workshop was held at the University of California, Berkeley, in 2014 and will be held at MIT once again in 2015. The Rising Stars program has built a vibrant and growing community of participants, several of whom have joined the faculty at top universities. Two of the rising stars, Vivienne Sze and Tamara Broderick, have joined the EECS faculty.

Postdoc6

The department created the EECS postdocs group, now called Postdoc6, in fall 2013 with the goal of providing a supportive community for this group of EECS researchers. Each January a full-day workshop has been held at the end of IAP, and in 2015 the event attracted more than 70 participants. The workshop has included panels and talks on topics such as employment options, how to teach effectively, how to get a faculty job and give a job talk, and how to develop a research mission statement. A series of lunch sessions address topics suggested by postdoc attendees: how to give a chalk talk and a general public talk, how to build a professional social portfolio, how to construct an academic curriculum vitae for industry, advice on leadership and interpersonal skills, and how to create a patent or a startup.

Undergraduate Student Advisory Group

One of the earliest initiatives of the new department leadership in 2011 was the formation of the Undergraduate Student Advisory Group in EECS (USAGE), a standing committee whose members provide critical student input guiding curriculum development and enhancements. Over the course of the group's first three years, its members have assumed an advisory role that has resulted in the development of initiatives such as SuperUROP, the EECS undergraduate research conference (EECScon), and the new Undergraduate Student Lounge. USAGE has also highlighted the importance of participation and leadership in the department's large undergraduate student population. Members of the inaugural USAGE serving 2011-12.

Photo 3. The EECS Undergraduate Student Lounge opened in fall 2014. The lounge is a space where EECS undergraduate students can meet, socialize, study, and hang out. The space includes two conference rooms available for small student groups.



The 2014–2015 USAGE group, comprising 36 members, focused on enhancing the undergraduate experience for fellow and future EECS undergraduates. The group provided feedback to the EECS leadership on three main topics: the proposed new curriculum, the workload in EECS classes, and gender imbalances. Meeting every other week with the department head, the EECS undergraduate officer, and the EECS undergraduate administrator, the students reported on data collection and analysis supporting their recommendations on best approaches for further action.

EECS Contributions to MITx

MITx, which offers MIT subjects online through the edX platform, started strong with 6.002x Circuits & Electronics, a high-quality massive open online course (MOOC) produced in record time thanks to the efforts of Anant Agarwal, Gerald Sussman, Christopher Terman, and Piotr Mitros. The 6.00x Introduction to Computer Science subject, created by Eric Grimson and John Guttag, focuses on fundamental principles of programming and computational thinking and supports a diverse range of approaches to learning basic computer science. John Tsitsiklis and Patrick Jaillet led the development of 6.041x Probabilistic Systems Analysis, offered during spring 2014 and spring 2015 as a valuable basic reference for students enrolled in a wide range of more advanced subjects. Russell Tedrake created and offered 6.832x Underarticulated Robotics in fall 2014. Alan Oppenheim and Thomas Baran led the offering of 6.341x Discrete-Time Signal Processing in spring 2015. Finally, Steven Ward and Christopher Terman launched 6.004.1x Computation Structures Part 1: Digital Circuits in spring 2015.

Online MITx classes have also become the mechanism for EECS faculty to experiment with the flipped classroom approach: offering online lectures followed by in-person class experience or office hours for problem solving and discussion. The continued development of online teaching and learning is becoming a major part of the activity of several EECS faculty members who view edX as an opportunity to explore how to enhance their teaching.

Seven unique EECS subjects account for 22 MITx subject runs on edX. Since the platform's inception, these subjects have drawn 584,192 participants who have earned 37,404 certificates (73% outside of the United States). Participants in the EECS professional education courses on edX have earned 6,282 certificates. The third year of edX is currently in progress, and we expect a similarly successful outcome.

Undergraduate Program

In June, Christopher Terman assumed the role of EECS undergraduate officer, succeeding Albert Meyer, who held the role since 2011. Terman has been a member of EECS for 32 of the last 42 years, starting as a graduate student, and presently as a senior lecturer.

Enrollment

Undergraduate enrollment in EECS was 1,184 as of October 10, 2014. The MEng program, which is open only to EECS undergraduates, entered its 21st year with 169 students enrolled as of October 10.

Curriculum Revisions

The Education and Curriculum Committee undertook a revision of the overall curriculum and degree requirements for the 6-1, 6-2, and 6-3 degrees. The revision was motivated by several independent opportunities for innovation and refinement. The primary objectives were to enable students to have earlier engagement with core EECS material, to appeal to and serve a broader range of students, to allow more flexibility within the curriculum, and to provide a platform that would more easily enable future incremental changes to the curriculum. The proposed curriculum has been approved by the departmental leadership, and we plan to submit a proposal to the Committee on Curricula in AY2016.

Streamlined Double Major Degree

There is a long history of MIT students pursuing double degrees in physics and electrical engineering and computer science. Between 2004 and 2013, 121 students obtained both degrees, with an increasing trend in enrollment over the period. The combination of Course 6 and Course 8 provides students with excellent preparation for graduate school and careers in applied physics, integrating training in devices and systems with a strong fundamental background in physics. To eliminate duplication and thereby reduce student course loads, dual majors in Course 6 and Course 8 have traditionally been facilitated by substitutions.

Last fall, an EECS working group met to outline a path to a Course 6/Course 8 double major degree with a particular desire to match Course 6 policies to the popular “flexible” option in Course 8. The proposed substitution policy reduces the Course 6 requirement by up to three classes, substituting three introductory EECS subjects with coherent training in quantum mechanics and statistical physics.

The EECS undergraduate laboratories provide invaluable resources for both faculty and students across the department. The labs comprise 25,378 square feet in Buildings 34 and 38 and regularly house teaching activities for at least 14 EECS subjects, including 1,431 student credit hours per week of activity in fall 2014. In addition to facilitating specific teaching activities, the undergraduate labs serve as student study areas and computer laboratories for all levels of undergraduate and graduate subjects.

The major renovation of the undergraduate teaching lab space was completed in April 2014 and culminated in the launch of the new Engineering Design Studio (EDS), which includes practical classroom space where lectures and hands-on work can be combined, a full suite of state-of-the-art electronic rework and test equipment, and mechanical prototyping tools such as machining tools and 3D printers. The 3D printers include numerous small printers ideal for in-classroom teaching as well as a newer higher-end tool for project-based learning.



Photo 4 .The Engineering Design Studio provides seating and work space for up to 36 students (right) and includes a full range of professional prototyping equipment (left). The studio is used as both a machine shop and a classroom for a range of hands-on educational activities.

The new space has enabled a variety of exciting classroom activities that were not previously possible, including in-classroom teaching related to oscilloscopes, function generators, and other measurement and test equipment for 6.169 Theory and Application of Circuits and Electronics; in-classroom experiments on computer-enabled design with 3D modeling and printing in 6.S079 Computational Fabrication; and vastly expanded student fabrication resources for independent final projects in laboratory classes such as 6.111 Introductory Digital Systems Laboratory and 6.115 Microcomputer Project Laboratory.

The space is also heavily used by UROP students and increasingly available for occasional use by graduate students. As a result, a small but growing and vibrant community of highly skilled “makers” is developing around this space. Example projects were highlighted in the recent EECS Visiting Committee visit. EDS has also been used as a campus-wide resource, facilitating student project fabrication during competitions and “hackathons” such as MakeMIT. Although only preliminary data are available, we estimate that currently there are at least 30 unique EDS users per month. This number is expected to increase greatly as we promote awareness of the studio within the department and on campus.

In the summer, EDS supports departmental and School of Engineering outreach activities; for instance, the facility is used by the Women’s Technology Program and the STEM Summer Institute. During IAP, the studio is used by student organizations as well as for EECS subjects such as 6.117 Introduction to Electrical Engineering Lab Skills and 6.270 Autonomous Robot Design Competition.



Photo 5. Eta Kappa Nu, MIT’s Course 6 honor society, ran a popular IAP study break session in the Engineering Design Studio in which undergraduates could learn to solder and build a range of electrical projects.

VI-A MEng Thesis Program

The department's VI-A Master of Engineering Thesis Program is in its 98th year. The VI-A International Internship Program is in its 10th year, with one student completing her MEng degree this year in Beijing at Microsoft Research Asia. Twenty-one students applied to VI-A for summer 2015 positions at eight participating companies. Ten students were selected as members of the incoming VI-A class. Currently, there are five undergraduates and 10 MEng students in the program. The program provides leading-edge technology thesis opportunities with a full calendar year of tuition support for all VI-A MEng students who are company funded by the VI-A Fellowship Program. Participating companies continue to offer challenging and well-mentored assignments and associated MEng thesis topics, and there have been numerous inquiries from companies interested in the program. Effective July 1, 2015, Tomás Palacios will take over as the program's director. Palacios succeeds Markus Zahn, who stepped down as director after more than 20 years of leadership.

Graduate Program

The EECS graduate program offers high-quality academics with a broad range of advanced subject offerings. Moreover, our graduate students make leading contributions to an extremely wide range of research activities in all areas of science and nanoscience, health care and medical instrumentation and imaging, energy and energy efficiency, manufacturing, robotics, computer science, management of big data, and advances in technology. The exciting research opportunities for our graduate students continue to attract excellent applicants striving to change the world in collaboration with their student peers and our faculty and research staff supervisors.

The 2015 admissions season resulted in 2,779 applications (a 36% increase relative to 2014) from all parts of the world. From these applications, 193 students were admitted into our graduate program (approximately 7% of applications). Once again, EECS visit days (described below) occurred jointly across the department, with all of the admitted students in EECS invited to visit the campus in early March. In the fall semester, 101 new students will join our graduate program (including joint graduate programs). Our incoming class of graduate students comprises 15% women and 10% underrepresented minorities. Approximately 57% of the new students will be funded by prestigious fellowships, including MIT Presidential Fellowships, departmental fellowships sponsored by EECS alumni, and externally awarded fellowships. These fellowships, while being important for financial support, also provide incoming graduate students with flexibility in selecting their desired research groups and projects in accordance with their interests and career goals. For the third consecutive year, all admitted students were guaranteed full financial support for their first year in the form of a fellowship, a research or teaching assistantship, or financial support provided by EECS. This support includes tuition, a monthly living allowance or stipend, and medical insurance for the first year of students' graduate education; their remaining years are typically funded by the research supervisor.

At present, there are 619 active SM and PhD students in the EECS graduate student population, with 129 women students (21% overall); 59% of these students have an international citizenship. The graduate student body is 55% electrical engineering (33%

women) and 45% computer science (19% women). Our graduate student body is highly accomplished, receiving a wide assortment of fellowship awards; more than 230 current students are supported by fellowships, training grants, or internships. In addition to the fellowships awarded at the time of admission, our students have received fellowships from the US government (33%), from US industry (14%), from industrial internships (8%), from foundations (13%), and from foreign countries (38%). Our graduate students have won a number of scholarship awards, including the Hertz Fellowship, the Fulbright Scholarship, the Hugh Hampton Young Fellowship, the William Asbjornsen Albert Memorial Fellowship, five Siebel Scholarships, and two Dimitris N. Chorafas Foundation Awards. EECS graduate students also have received highly competitive industrial fellowships from Qualcomm, Canon, Microsoft, and Google, as well as the Texas Instruments Fellowship for Women in Microelectronics.

In AY2015, EECS graduated students in September, February, and June. Total numbers of advanced degrees awarded were as follows: 116 master of engineering degrees, 82 master of science degrees, 100 doctor of philosophy degrees, one doctor of science degree, and five electrical engineering degrees. EECS awarded joint master of science degrees with the Technology and Policy Program (three degrees), Leaders for Global Operations (three degrees), Civil and Environmental Engineering (two degrees), Systems Design and Management (one degree), Mechanical Engineering (one degree), and Health Sciences and Technology (one degree). In summary, 304 students obtained an advanced degree from EECS in AY2015.

Along with an internationally diverse graduate student body, EECS strives to achieve a graduate student community that is diverse in gender, ethnicity, and race. To make inroads in supporting the diversity of applicants, the graduate office staff and faculty regularly participate in MIT's Institute-wide recruiting efforts. In addition to supporting MIT's Minority Summer Research Program (MSRP), EECS supports the National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM) Getting Ready for Advanced Degrees (GRAD) Lab and the CONVERGE graduate preview weekend held in the fall. Also, graduate office staff represented the department at the annual meeting of the Society of Hispanic Professional Engineers held in Detroit. Networking and mentoring seminars are offered each fall (with reunions in the spring) for women as well as for individuals who may benefit from weekly group meetings and discussions. Four different networking seminars are currently offered for various groups of incoming graduate students.

EECS Visit Days for Newly Admitted Graduate Students

For the third consecutive year, EECS organized a visit weekend for newly admitted graduate applicants. The goal of the visit weekend is to provide an opportunity for admitted applicants to envision their lives as graduate students and to view firsthand the opportunities provided by the MIT environment and the Boston metropolitan area. Most importantly, the event allows admitted applicants the chance to meet and interact with potential research supervisors, view laboratories, chat with research groups and potential classmates, and visit graduate dormitories and living spaces.

Graduate Student Associations

The EECS graduate student body organizes itself within two active groups: the EECS Graduate Student Association (GSA) and Graduate Women in Course VI (GW6). This year GSA offered a variety of activities open to all current EECS graduate students to promote social, professional, and academic development. GSA hosted a regular department coffee hour as well as other events throughout the year to help students navigate graduate life at MIT (e.g., a panel discussing preparation of thesis proposals and a workshop aimed at helping students manage the stresses of graduate school). GSA also offered mixers with the Department of Chemical Engineering, the Center for Materials Science and Engineering, the Sloan School of Management, and Harvard Law School. GW6 complements GSA's work with numerous opportunities for socializing, networking, and intellectual enlightenment. This past year GW6 welcomed EECS alumnae to share their experiences as professionals in the workforce. The various social activities organized and offered by GW6 include paint night, bowling night, jewelry-making night, a lunch honoring graduating women, and a visit day breakfast to welcome newly admitted women graduate students.

EECS International

The department is actively engaged in developing opportunities for global experiences for our students and faculty. This year a record number of EECS students participated in MIT International Science and Technology Initiatives (MISTI) activities thanks to the extensive efforts of Sean Gilbert and others at MISTI. In addition, 198 EECS students are engaged in summer MISTI internships, up from last year's previous record of 182 students. Most of these internships are with corporate research and development labs, universities, and government research labs in 24 countries, allowing our students to put their education into practice globally.



Photo 6. Michael McGraw (EECS '17) interned at Universität Regensburg in Germany as part of the MISTI Global Teaching Labs program. McGraw taught physics, biology, and chemistry to German high school students.

The Hong Kong University of Science and Technology (HKUST)-MIT Research Alliance Consortium launched a second cluster in the area of data science and e-learning in January 2015. The sponsoring companies are NTT Communications (the organization's Hong Kong location) and Trumpteck, a local Hong Kong company. Each company provides funding of approximately \$100,000 a year, and this amount is matched ninefold by the Hong Kong Innovation and Technology Commission (ITC). Of the nine proposals submitted to the consortium, three were selected, and MIT investigators were involved in all three. In addition, funding was received to initiate the three projects selected

last year in the areas of information and communication technology and smart green buildings. It is expected that companies will be added to these two clusters and that there will be another call for proposals in October 2015.

The Masdar Institute (MI) is a private independent graduate research university in Abu Dhabi (United Arab Emirates) focused on alternative energy, sustainability, and advanced technology. Under the MIT and MI Cooperative Program, MIT is helping MI develop its education, research, and innovation programs. Duane Boning, an EECS faculty member, is the program's director. Several of the nine large MIT-MI flagship projects engage EECS faculty in joint research with MI faculty, including work on high-efficiency multi-junction solar cells; information and decision architecture robustness, resilience, and risk mitigation in power grids; and sensing for adaptation of urban infrastructure. Individual research projects pairing EECS and MI faculty members include work on mitigating inter-area oscillations in power grids. In 2014–2015, two new translational research projects involving joint MI and EECS faculty teams were launched, one on nanowire filtration for wastewater treatment and another on GaN high-efficiency wireless transmitters. In addition, EECS faculty have hosted MI PhD students in their labs. Finally, EECS faculty provide guidance and oversight related to the evolution of a number of MI master's degree programs, including electrical and power engineering and microsystems and its interdisciplinary PhD degree program.

The Madrid-MIT M+Visión Consortium is an international collaboration designed to catalyze change in Spain's health care technology innovation ecosystem. Since its launch in 2010, it has built a 3,000-strong community of innovators integrating academia, industry, medical centers, entrepreneurs, and the public sector. The flagship Catalyst program has attracted 34 fellows, and these individuals have launched 20 projects (with approximately 130 collaborators from 31 organizations) that show potential for significant health care impact. In 2016, M+Visión will expand its international partnerships to achieve greater health care impact.

Women's Technology Program

2015 marks the 14th summer of the Women's Technology Program (WTP), which was founded by EECS in 2002. The WTP mission is to encourage high school girls with demonstrated math and science talent to pursue engineering and computer science by introducing them to these subjects in a hands-on, team-based format. WTP runs each year from the last week in June through the third week in July.

WTP added a mechanical engineering curriculum track in 2006. The two tracks have separate classes, staff, and budgets but operate as one interdepartmental program. WTP Director Cynthia Skier SB '74, SM '81, who is based in EECS, manages the many administrative operations shared by the two tracks, including the hiring of the teaching staff.

For summer 2015, 60 students (40 for WTP-EECS and 20 for WTP-ME) were selected from an applicant pool of 387 female 11th-grade high school students from across the

country. The WTP high school students will all apply to colleges in fall 2015 and have not yet had opportunities to explore engineering or computer science. WTP allows them to learn more about their aptitude in these fields and shows them some of the exciting research being done here at MIT.

The WTP-EECS curriculum includes hands-on lab-based, college-level classes introducing topics in electrical engineering, computer science, and discrete mathematics, all designed and taught by a dedicated female staff of MIT graduate and undergraduate students. This provides a unique professional development experience for these MIT women students, encouraging them to pursue academic careers, and connects the high school students with female mentors.

In total, 546 students have attended WTP-EECS since it began. The 40 summer 2015 EECS students are still finishing high school, and the 506 others are college age or older. Of the 431 who have declared college majors or earned undergraduate degrees, more than 64% are in a field of engineering or computer science. Another 21% are in math or science fields, and 75 students have not yet declared majors (in a few cases, fields and majors are unknown).

WTP-EECS students also develop an interest in MIT (although this is not a stated goal). Of the 506 college-age WTP-EECS alumnae, 209 (41%) have chosen to attend MIT; of the 40 summer 2014 students, 13 will enter as MIT freshmen in fall 2015. WTP-EECS alumnae often pursue UROP or MEng thesis projects with MIT faculty they first met as WTP guest speakers. Six were students in the first two years of the SuperUROP program. They also return to work on the WTP staff; in summer 2015, five of the 16 WTP-EECS staff and two of the WTP-ME staff were WTP-EECS alumnae. One alumna from WTP's initial 2002 program, Tamara Broderick, joined the EECS faculty this year as an assistant professor.

Entrance and exit surveys administered to WTP-EECS students also show short-term impact over the program's four weeks. One comment from the 2014 exit survey typifies the students' feedback: "One of the most enduring things I will take away from WTP is a stronger sense of self-confidence and certainty in my ability to solve problems, understand challenging concepts, and collaborate with my peers. WTP also gave me great insight into what it is like to be an engineer/computer scientist, and these careers now don't seem as inaccessible as they once were."

Faculty Notes

Faculty promotions (effective July 1, 2014):

Associate professor without tenure: Timothy Lu

Associate professor with tenure: Nickolai Zeldovich

Full professor: Manolis Kellis, Collin Stultz, Ron Weiss

Faculty on sabbatical leave:

Hari Balakrishnan	Fall 2014
Duane Boning	Fall 2014/spring 2015
Shafi Goldwasser	Fall 2014/spring 2015
Leslie Kaelbling	Spring 2015
Alex Megretski	Fall 2014/spring 2015

Faculty on junior research leave:

Wojciech Matusik	Fall 2014
Yury Polyanskiy	Spring 2015

Faculty on family release:

Robert Morris	Fall 2014
Tomás Palacios	Fall 2014
Devavrat Shah	Spring 2015

Faculty on leave:

Ronitt Rubinfeld	Fall 2014/spring 2015
Nir Shavit	Fall 2014/spring 2015
Charles Sodini	Spring 2015

Retired faculty:

Terry Orlando
John Wyatt
Markus Zahn

Tamara Broderick joined the EECS faculty as an assistant professor of electrical engineering and computer science in January 2015. She received a BA in mathematics from Princeton in 2007, a master of advanced study from the University of Cambridge in 2008, an MPhil in physics from the University of Cambridge in 2009, and an MS in computer science and a PhD in statistics from the University of California, Berkeley, in 2013 and 2014, respectively. Her recent research has focused on developing and analyzing models for scalable, unsupervised learning using Bayesian nonparametrics. She has been awarded the Evelyn Fix Memorial Medal and Citation (for the PhD student on the Berkeley campus showing the greatest promise in statistical research), the Berkeley Fellowship, a National Science Foundation (NSF) Graduate Research Fellowship, and a Marshall Scholarship.

Ruonan Han joined EECS in September 2014 as an assistant professor. He is also a core member of MTL. He earned a BSc from Fudan University in 2007, an MS in electrical engineering from the University of Florida in 2009, and a PhD in electrical and computer engineering from Cornell University in 2014. Han's research group aims to explore microelectronic circuit and system technologies to bridge the terahertz gap between microwave and infrared domains. They focus on high-power generation, sensitive detection, and energy-efficient systems. Han is the recipient of the Electrical and Computer Engineering Director's Best Thesis Research Award and Innovation Award from Cornell, the Pre-Doctoral Achievement Award from the Solid-State Circuits Society, and the Microwave Theory Techniques Society Graduate Fellowship Award from the Institute of Electrical and Electronics Engineers (IEEE).

Stefanie Jegelka joined the department as an assistant professor in January 2015. Formerly a postdoctoral researcher in the Department of Electrical Engineering and Computer Science at the University of California, Berkeley, she received a PhD in computer science from the Swiss Federal Institute of Technology in Zurich and a diploma in bioinformatics with distinction from the University of Tuebingen in Germany. Her research interests lie in algorithmic machine learning. In particular, she is interested in modeling and solving machine learning problems that involve discrete and combinatorial structures. She has also worked on distributed machine learning, kernel methods, clustering, and applications in computer vision. She has been a fellow of the German National Academic Foundation and received a Google Anita Borg Fellowship and a Best Paper Award at the International Conference on Machine Learning. This year, she will be the first female recipient of the German Pattern Recognition Award, the highest honor bestowed by the German Pattern Recognition Society.

Aleksander Madry started as an assistant professor of electrical engineering and computer science in February 2015; he is a former assistant professor at the Swiss Federal Institute of Technology in Lausanne (EPFL). His research centers on tackling fundamental algorithmic problems that are motivated by real-world optimization. Most of his work is concerned with developing new ideas and tools for algorithmic graph theory, with a particular focus on approaching central questions in that area with a mix of combinatorial and linear-algebraic techniques. He is also interested in understanding uncertainty in the context of optimization. Madry received his PhD in computer science from MIT in 2011 and, prior to joining EPFL, spent a year as a postdoctoral researcher at Microsoft Research New England. His work has been recognized with a variety of awards, including the George M. Sprowls Doctoral Dissertation Award and a number of best paper awards at the IEEE Symposium on Foundations of Computer Science, the Symposium on Discrete Algorithms, and the Symposium on Theory of Computing.

The department hosted Mehmet Fatih Yanik as a visiting faculty member this year.

AY2015 also marked the loss of four beloved faculty members.

Shaoul Ezekiel, 1935–2015, was an MIT alumnus who spent 46 years at the Institute as a professor in EECS and the Department of Aeronautics and Astronautics. A principal investigator in RLE, Ezekiel's research interests were in the fields of lasers and optics

and their applications in atom-field interactions, ultra-high-resolution spectroscopy, optical frequency/wavelength standards, and sensors.

Frederic Morgenthaler, 1933–2015, led the Microwave and Quantum Magnetics Group in RLE, where his research focused on the theory underpinning the propagation of electromagnetic waves and its numerous practical applications. Earning his SB, SM, and PhD at MIT, Morgenthaler was a dedicated educator, teaching electrical engineering core curriculum subjects in electromagnetic field theory, circuit theory, and semiconductor electronics. He joined the MIT faculty in 1960, retired in 1996, and continued to serve as a senior lecturer through 2000.

Jack Ruina, 1923–2015, served as the director of the Advanced Research Projects Agency (now the Defense Advanced Research Projects Agency) under President John F. Kennedy and Secretary of Defense Robert McNamara before joining the MIT faculty in 1963. He was a participant in the Pugwash Conferences on Science and World Affairs. He is credited with suggesting the need for an antiballistic missile treaty at the Pugwash Conferences, an idea that ultimately helped motivate the 1972 SALT I Anti-Ballistic Missile Treaty. From 1966 to 1970, Ruina was MIT vice president for special laboratories (Lincoln and Draper).

Seth Teller, 1964–2014, was well known for his efforts to advance human-robot interactions. He led CSAIL's Robotics, Vision, and Sensor Networks Group, whose work aims to enable machines to become aware of their surroundings and interact naturally with people in health care, military, civilian, and disaster-relief settings. Teller joined the MIT faculty in 1994. He received his BA in physics from Wesleyan University in 1985; his MS in computer science from the University of California, Berkeley, in 1990; and his PhD in computer science from Berkeley in 1992.

Faculty Appointments

Career Development Chair Appointments

Tamara Broderick was named the ITT Career Development Assistant Professor in Computer Technology.

Ruonan Han was appointed as the E.E. Landsman (1958) Career Development Assistant Professor.

Stefanie Jegelka was named the X-Window Consortium Career Development Assistant Professor.

Faculty Chair Appointments

Qing Hu was selected as EECS distinguished professor.

Dina Katabi was named the Andrew (1956) and Erna Viterbi Professor.

Charles Leiserson was appointed as the Edwin Sibley Webster Professor.

Muriel Medard was named the Cecil H. Green Professor.

Faculty Awards and Honors

Jesús del Alamo received a Bose research grant and was named a fellow of the American Physical Society.

Dimitri Antoniadis was awarded the 2015 IEEE Jun-ichi Nishizawa Medal for contributions to metal oxide semiconductor field-effect transistor physics, technology, and modeling. He also received the 2014 Semiconductor Research Corporation Aristotle Award.

Arvind was elected as a foreign fellow of the Indian National Academy of Sciences.

Hari Balakrishnan was elected to the National Academy of Engineering.

Dimitri Bertsekas received the 2014 Institute for Operations Research and the Management Sciences (INFORMS) Optimization Society's Khachiyan Prize.

Sangeeta Bhatia received the 2014 Lemelson-MIT Prize and the 2015 Heinz Award for Technology, the Economy, and Employment. Also, she was elected to the National Academy of Engineering and was cited as one of *Foreign Policy* magazine's 100 Leading Global Thinkers for her work in developing accessible diagnostics for colon cancer that would enable earlier detection.

Rodney Brooks received the 2014 Engelberger Robotics Award for Leadership and the 2015 IEEE Robotics and Automation Award.

Anantha Chandrakasan was elected to the National Academy of Engineering.

Srini Devadas was selected as a 2014 Association of Computing Machinery Fellow, received the NSF Frontier Award, and won the A. Richard Newton Technical Impact Award in Electronic Design Automation.

Mildred Dresselhaus was awarded the Presidential Medal of Freedom and received the 2015 IEEE Medal of Honor for leadership and contributions across many fields of science and engineering.

James G. Fujimoto received the 2015 Frederic Ives Medal from the Optical Society and was awarded an honorary doctorate from Copernicus University.

Martha Gray was recognized by the Fundacion Tecnologia y Salud for accelerating health technology innovation.

Eric Grimson was selected as a 2014 Association of Computing Machinery Fellow.

Qing Hu received the Optical Society's 2015 Nick Holonyak Jr. Award.

Charles Leiserson was named a 2015 Society for Industrial and Applied Mathematics Fellow for his enduring influence on parallel computing systems and their adoption

into mainstream use through scholarly research and development. Also, he received the Association for Computing Machinery (ACM)/IEEE Computer Society 2014 Ken Kennedy Award.

Timothy Lu won the 2015 American Chemical Society Synthetic Biology Young Investigator Award and the 2015 *Biochemical Engineering Journal* Young Investigator Award.

Silvio Micali received the Cryptography Test of Time Award for a paper coauthored with former student and current Boston University professor Leo Reyzin.

Rob Miller received the 2014–2015 Peter Levine Faculty Research Innovation Fellowship.

Sanjoy Mitter won the 2015 IEEE Eric E. Sumner Award.

Robert Morris was selected as a 2014 Association of Computing Machinery Fellow.

Rajeev Ram received a Bose research grant and was selected as a 2014 Optical Society Fellow.

L. Rafael Reif was elected to the National Academy of Engineering.

Ron Rivest was named an MIT Institute Professor.

Ronitt Rubinfeld was selected as a 2014 Association of Computing Machinery Fellow.

Daniela Rus was named a 2014 Association of Computing Machinery Fellow and was elected to the National Academy of Engineering.

Daniel Sanchez received the NSF 2015 Faculty Early Career Development Award.

Michael Stonebraker won the 2014 ACM A.M. Turing Award for inventing core database concepts.

Collin Stultz received the 2014–2015 Steven and Renée Finn Faculty Research Innovation Fellowship.

Madhu Sudan received the 2014 Infosys Prize in Mathematical Sciences.

Vivienne Sze won the 2014 Defense Advanced Research Projects Agency Young Faculty Award.

Joel Voldman received the 2014–2015 MIT/EECS Frank Quick Faculty Research Innovation Fellowship.

Matei Zaharia won the 2014 ACM Doctoral Dissertation Award for “An Architecture for Fast and General Data Processing on Large Clusters.”

Nickolai Zeldovich received the 2014 Harold E. Edgerton Faculty Achievement Award.

Teaching Awards

The following faculty received awards at the annual EECS spring awards ceremony held in May.

Dorothy Curtis was presented the Best Advisor Award by MIT's ACM/IEEE student group.

Srini Devadas received the Ruth and Joel Spira Award for distinguished teaching.

Adam Hartz was presented the Best Instructor Award by Eta Kappa Nu.

Tommi Jaakkola received the Burgess ('52) and Elizabeth Jamieson Prize for excellence in teaching.

Leslie Kaelbling received the Bose Award for Excellence in Teaching.

Dina Katabi won the Jerome Saltzer Award for outstanding recitation teaching in undergraduate core subjects.

Tomás Palacios won the Ruth and Joel Spira Award for distinguished teaching.

John Tsitsiklis was presented the Louis D. Smullin ('39) Award for excellence in departmental teaching.

Joel Voldman received the Burgess ('52) and Elizabeth Jamieson Prize for excellence in teaching.

Student Awards

Taibo Li received the School of Engineering's Henry Ford II Award, which is presented to a senior engineering student who has maintained a cumulative average of 5.0 through the end of his or her seventh term and who has exceptional potential for leadership in the profession of engineering and society.

The following awards were presented to EECS students at the spring awards ceremony in May.

2015 SuperUROP Outstanding Research Presentation Award: Srinidhi Viswanathan

2015 SuperUROP Outstanding Research Project Award: Ava P. Soleimany and Kaustav A. Gopinathan

David Adler Memorial EE MEng Thesis Prize: Kang Zhang for "A Quantitative Trading Strategy for Bitcoin Using Pattern Recognition" (Devavrat Shah, supervisor)

David A. Chanen Writing Award for the best paper in the subject 6.033: Sarah E. Vente

EECScon Oral Presentation Awards: Jason Yang and Ben Eysenbach

EECScon Poster Presentation Awards: Kris Frey, Anubhav Jain, and William Qian; Beth Hadley for "crowd favorite" poster

Robert A. Fano UROP Award for outstanding UROP in EECS: Qiurui He

Harold L. Hazen Teaching Award: Leighton P. Barnes

Frederick C. Hennie III Teaching Awards: Ciara L. Kamahele-Sanfratello, Anurag Kashyap, and Andrew C. Wright

Morris Joseph Levin Award for Best Master Works Thesis Presentation: Antonia Feffer for “Comprehensive Security Strategy for All-Optical Networks” (Vincent Chan, supervisor) and Bianca S. Homberg for “Haptic Identification of Objects Using a Modular Soft Robotic Gripper” (Daniela Rus, Robert Katzschmann, and Mehmet Dogar, supervisors)

Charles and Jennifer Johnson CS MEng Thesis Prize: Adam B. Yedidia for “A Relatively Small Turing Machine Whose Behavior Is Independent of Set Theory” (Scott Aaronson, supervisor)

Morais (1986) and Rosenblum (1986) UROP Award: Alyssa Cartwright

George C. Newton UG Lab Prize: Bradley Gross, Jonathan Matthews, and Nathaniel Rodman for their project “Live-action RC Mario”

Paul L. Penfield Student Service Award: Neerja Aggarwal and Jean Yang

J. Francis Reintjes Excellence in VI-A Industrial Practice Award: Anders Lee and Linear Technology for “The Design of a High Precision, Wide Common Mode Range Auto-Zero Comparator”

Northern Telecom/BNR Project Award for Outstanding 6.111 Laboratory Project: Ganesh Ajanagadde, Shantanu Jain, and James J. Thomas for their project “Automatic Projector Tilt Compensation System” and Lee Gross and Benjamin Schreck for their project “Gesture Controlled Drone”

Anna Pogoyants UROP Prize: Daniel Ziegler

Carlton E. Tucker Teaching Award: Shomesh E. Chaudhuri

Undergraduate Teaching Award: Jessica M. Anderson and Lily Seropian

Staff Awards

The 2015 Richard J. Caloggero Award was presented to William Tilden.

Anantha P. Chandrakasan

Department Head

Joseph F. and Nancy P. Keithley Professor of Electrical Engineering