Department of Electrical Engineering and Computer Science

The department leadership has remained stable over the past year, with Eric Grimson serving as department head, Duane Boning and Srinivas Devadas serving as associate department heads, George Verghese serving as education officer, and Agnes Chow serving as administrative officer. Professor Arthur Smith is stepping down as graduate officer, but he will remain as undergraduate officer. Professor Terry Orlando has assumed the duties of graduate officer for the department.

Departmental activities over the past year, in addition to traditional foci on research, teaching, and student supervision, include a range of efforts in outreach and globalization and a continuing major initiative in undergraduate curriculum reform.

We continue to reach outside the department in a variety of ways. Our Women's Technology Program (http://wtp.mit.edu/) for high school women from across the country just completed its sixth summer. A remarkably large number of the young women who pass through this program choose to pursue engineering careers. Of the 187 students who participated in the program from 2002 to 2006, 157 applied to MIT, 123 were accepted, and 85 have attended. We expect to see similar numbers for the class of 2007, who will be applying to colleges in the fall. Of the 102 students who did not attend MIT, most have selected career paths in science and engineering.

The department continues to support several very active student groups at both the graduate and undergraduate levels; many are actively involved in outreach endeavors. These student groups include Eta Kappa Nu at the undergraduate level (see http://hkn.mit.edu/), GSA (Graduate Students Association) for graduate students (see http://web.mit.edu/eecsgsa/www/), and GW6 for graduate women students (see http://scripts.mit.edu/~gw6/www/). These groups initiate a range of activities, many focused on mentoring and community building within the department, as well as outreach programs. Recent student surveys indicate a marked increase in student approval of the atmosphere within the department. In a related vein, we have established the EECSREFS program (see http://projects.csail.mit.edu/eecsrefs/index.php), a student-run mediation system for helping students deal with conflicts and other difficulties in their professional and personal lives. The department also sponsors a wide selection of student-initiated outreach programs, including the Women's Initiative, a program in which some of our women undergraduates speak at middle schools around the country about the excitement and opportunity in the Department of Electrical Engineering and Computer Science (EECS).

The department is also actively engaged in developing opportunities for global experiences by our students and faculty; a committee chaired by Victor Zue has completed a careful study of options for student exchanges and outreach efforts around the globe. Ongoing activities include our students teaching EECS courses in China during the summer; student exchanges with Cambridge, Singapore, and Taiwan; and curricular outreach through OpenCourseWare. We are also working to expand our VI-A program to include an international element, and the first pilot effort has placed a select number of students in internships in Asia. We are in the planning stages for several

initiatives, including a broader set of opportunities for student internships abroad, based on the report from the Zue committee.

The department continues to pursue several major initiatives. Our Curriculum Innovation Committee, chaired by Tomás Lozano-Pérez, completed a three-year effort on reexamining and reinventing our undergraduate curriculum. This curriculum will be in place for students entering as freshmen in fall 2007. Two introductory courses have already been successfully piloted, and four foundational courses are under development and evaluation.

Graduate fellowships remain an area of concern for the department. Through a series of fund-raising efforts, we have created several new fellowships. The first, expendable, fellowship is named in honor of Marilyn Pierce, who is retiring after 35 years of service as our graduate administrator. We have also established two endowed graduate fellowships, the Emanuel E. Landsman Graduate Fellowships, with focus on power electronics and affiliated fields. We are in the final stages of establishing the Irwin Mark Jacobs and Joan Klein Jacobs Presidential Fellowships, which will create 15 endowed fellowships for EECS students interested in communications, networks, and affiliated fields. The department continues to seek other opportunities for creating graduate fellowships to support its graduate program.

After 35 years of dedicated service as EECS graduate administrator, Marilyn A. Pierce retired from MIT. Considered to be the heart of the graduate office, she was able to meet the administrative needs of the department and the Institute, while working within the system to find the best ways to meet the needs of her students. Marilyn has been and is a friend and advisor to all the department's graduate students and virtually every graduate student feels that he or she has benefited from Marilyn's activities. Please see the link to the extended article: Celebrating Marilyn Pierce, EECS Graduate Administrator, at http://www.eecs.mit.edu/cgi-bin/announcements.cgi?page=2007/data/205.dat.

EECS research is carried out in the set of affiliated laboratories: Computer Science and Artificial Intelligence Laboratory (CSAIL), Research Laboratory of Electronics (RLE), Microsystems Technology Laboratories (MTL), Laboratory for Information and Decision Systems (LIDS), and Laboratory for Electromagnetic and Electronic Systems (LEES). Details of research achievements within these units are described in their separate reports. EECS graduate students working in one of these labs are further assigned to a departmental research area, which is responsible for monitoring their academic progress:

I Systems, Communication, Control and Signal Processing, Munther Dahleh, chair
II Computer Science, Seth Teller, chair
III Electronics, Computers and Systems, Harry Lee, chair
IV Energy and Electromagnetic Systems, Leslie Kolodziejski, chair
V Materials and Devices, Leslie Kolodziejski, chair
VII Bioelectrical Engineering, Louis Braida, chair

Service Awards

School of Engineering Infinite Mile Awards were presented to four EECS staff members: Claire Benoit and Vicky Palay for sustained excellence, Cheryl Charles for diversity and community, and Rhonda Maynard for excellence. Cynthia Skier received the EECS Department Head's Special Recognition Award at the Annual EECS Awards ceremony for her efforts that make the Women's Technology Program (WTP) a major outreach success.

Women's Technology Program

This summer marked the sixth year of the WTP in EECS. Forty students were selected from an applicant pool of 223 female 11th-grade high school students from across the country; participants hail from 15 states. For four weeks, these young women explore topics in electrical engineering and computer science, focusing on engaging in hands-on projects. Dedicated MIT graduate and undergraduate women teach the WTP courses in electrical engineering, computer science, and discrete math, where the high school students work hard to advance their knowledge of this complex college-level subject matter. WTP students are top math and science performers who are not yet committed to pursuing engineering or computer science; WTP gives them an opportunity to learn more about their aptitude for these fields, shows them some of the exciting research being done here at MIT, and allows them to explore the MIT community. Collaboration with the Department of Mechanical Engineering continued this year with the 20-student WTP-ME program. Four of the MIT students working this summer in WTP-EECS and another four in WTP-ME are alumnae of WTP-EECS who attended as high school students from 2002 to 2005. Of the 187 WTP-EECS college-age alumnae from 2002 to 2006, six graduated from MIT in June 2007 and another 79 will be enrolled as MIT students in September 2007; others are pursuing engineering and science majors at top colleges around the country. The summer 2007 WTP students are rising high school seniors and will apply to colleges in fall 2007.

VI-A Internship

The department's VI-A Internship Program is in its 90th year. The VI-A International Internship Program is in its second year, with one student each at participating corporate partner companies this past year: Google in Beijing, China, and Schlumberger in Paris, France. Forty students applied to VI-A for summer 2007 positions at 16 participating companies. Twenty-three students were selected as members of the incoming VI-A class. Currently, there are 27 undergraduates and 21 MEng students in the program. Starting in summer 2006, VI-A has provided leading-edge technology thesis opportunities with a full calendar year of tuition support for all VI-A MEng students that is company-funded by the VI-A Fellowship Program. Since the last report, approximately 11 students have withdrawn from the VI-A Internship Program, as they thought their needs were better matched with the opportunities available on campus. However, most VI-A students continue to find the program professionally rewarding. Participating companies continue to offer challenging and well-mentored assignments with leading-edge technology MEng thesis topics. We hope these improved thesis opportunities and funding will result in an increase in EECS student applicants to the VI-A Internship Program.

Through the generosity of Professor Emeritus J. Francis Reintjes, the J. Francis Reintjes Excellence in VI-A Industrial Practice Award has been established. This award was presented at the EECS Spring Awards Ceremony in May 2007 to Masood Qazi, a VI-A student who demonstrated outstanding performance in a VI-A work assignment. Masood completed his MEng thesis at the IBM Microelectronics Laboratory in Burlington, Vermont, and is continuing his research at MIT in the PhD program.

During the past year, four new companies joined the VI-A Program. Autodesk in Manchester, New Hampshire, has one student on his first assignment; BAE Systems in Burlington, Maine, has two students on their first assignments; Google in Mountain View, California, has four students on their first assignments and Google, Beijing, has one student on his first assignment; and NextWave Broadband in San Diego, California, has one student on his first assignment. There have been numerous inquiries from companies interested in the VI-A Program, and we hope we can obtain new members in the near future as well as increase the number of applicants, positions, and participants in the VI-A Internship Program.

Graduate Program

In September 2006, 820 graduate students were enrolled in the department. About 35 percent of them were foreign nationals. The department supported 532 research assistants and 110 teaching assistants (TAs). In addition, there were 140 fellowships including 34 National Science Foundation Fellows and 24 Department of Defense Fellows. The remaining students had industrial or foreign support or were using their own funds.

During 2006, the department awarded 77 master of science degrees and 112 doctoral degrees.

The department received 2,559 applications for the 2006–2007 year, a slight increase from 2005; 158 were admitted for the year, which resulted in 105 new graduate students registering in September.

Undergraduate Program

Enrollment of undergraduates averaged 709 in 2006–2007, down 6% from 2005–2006, with 17% in the Electrical Engineering Program (6-1), 38% in the Computer Science Program (6-3), and 45% in the Electrical Engineering and Computer Science Program (6-2). From the Class of 2009, 210 students enrolled in Course 6. So far, about 215 students from the Class of 2010 have selected Course 6, an increase of 2.5%.

The Master of Engineering (MEng) program entered its 13th year, with an average of 166 students.

Faculty Notes

Faculty on sabbatical:

Hari Balakrishnan	9/06–1/07
Dmitri Bertsekas	9/06–1/07
Charles Leiserson	9/06–5/07
John Tsitsiklis	9/06–1/07
Greg Wornell	9/06–5/07

Faculty on leave:

Anant Agarwal	9/06–1/07
Shafrira Goldwasser	9/06–5/07

Faculty on junior research leave:

David Perreault	9/06–1/07
Polina Golland	9/06–1/07
Asuman Ozdaglar	9/06–1/07

The department notes with sadness the passing of Henry J. Zimmermann, professor emeritus of electrical engineering and fourth director of RLE.

Since July 2006, two new members have joined the department:

Scott Aaronson is an assistant professor of electrical engineering and computer science and a member of the Theory of Computation and Complexity Theory groups. He holds a PhD in computer science from the University of California, Berkeley, and a bachelor's degree from Cornell University. Before coming to MIT, Scott worked as a postdoctoral researcher at the Institute for Advanced Study in Princeton, New Jersey, from 2004 to 2005, and at the Institute for Quantum Computing at the University of Waterloo in Ontario, Canada, from 2005 to 2007. He received the Danny Lewin Best Student Paper Award at the 2004 ACM Symposium on Theory of Computing, the Best Student Paper Award at the IEEE Conference on Computational Complexity two years in a row (2003 and 2004), the David J. Sakrison Memorial Prize for his PhD thesis (given for a "truly outstanding piece of research as documented in written form"), and the CV Ramamoorthy Distinguished Research Award for his paper "Quantum Lower Bound for the Collision Problem."

Scott's research interests are computational complexity, quantum computing, and the foundations of quantum mechanics.

Antonio Torralba is an assistant professor of electrical engineering and computer science and a member of the Computer Science and Artificial Intelligence Lab. He earned the telecommunication engineer degree at the Technical University of Catalonia (Spain) in 1995 and the PhD from Grenoble Institute of Technology (France) in 2000. His research interests span computer and human vision, computer graphics, and machine learning. His areas of interest include object and scene recognition, large image databases, applied machine learning, and the role of context in visual perception.

Before joining the faculty at MIT, Antonio was a lecturer at University Joseph Fourier, Grenoble, France (1996–1998), and then he was a postdoctoral associate (2000–2005) and a research scientist (2005–2007), both at MIT.

The department hosted one visiting faculty this year: José M. F. Moura, professor of electrical and computer engineering at Carnegie Mellon University (CMU), with a courtesy appointment with the BioMedical Engineering Department. He is also codirector of CenSCIR, CMU's Center for Sensed Critical Infrastructures Research.

Faculty Honors

2006–2007 was a stellar time for honors given to faculty and to graduate and undergraduate students. Below is a list of the awards (internal and external):

- Arvind, John V. Guttag, and Charles E. Leiserson were elected fellows of the Association for Computing Machinery (ACM) for "their contributions to both the practical and theoretical aspects of computing and information technology."
- Krste Asanovic was one of the winners of the 44th Design Automation Conference of the 2007 DAC/ISSCC Student Design Contest.
- Tim Berners-Lee was elected to membership in the National Academy of Engineering as one of nine foreign associates.
- Tim Berners-Lee was the 2007 recipient of the Charles Stark Draper Prize.
- Rodney Brooks was elected a 2007 fellow of the American Academy of Arts and Sciences.
- Mildred Dresselhaus was awarded the doctor of science, honoris causa, at the 251st commencement ceremony of the University of Pennsylvania.
- Mildred Dresselhaus was awarded the honorary doctorate of engineering science degree from the University of Arkansas at Little Rock Donaghey College of Information Science and Systems Engineering.
- Mildred Dresselhaus was awarded a 2007 L'Oréal-UNESCO Award for Women in Science.
- Michael Ernst was awarded the Sun Microsystems - Most Innovative JSR of the Year Award.
- Michael Ernst was the winner of the ACM - Distinguished Paper Award, ICSE 2007.

- Michel Goemans was elected a fellow of the John Simon Guggenheim Memorial Foundation.
- Shafi Goldwasser and Silvio Micali were elected as 2007 fellows of the International Association for Cryptologic Research.
- Polina Golland received a National Science Foundation Career Award.
- Qing Hu was named a 2006 fellow of the American Physical Society.
- James L. Kirtley, Silvio Micali, and John N. Tsitsiklis were elected to membership in the National Academy of Engineering.
- Charles Leiserson was named a MacVicar Faculty Fellow.
- Nancy Lynch was the first woman to be awarded the ACM Special Interest Group on Algorithms and Computation Theory (SIGACT) Knuth Prize.
- Samuel Madden was a recipient of a Sloan Research Fellowship award for 2007.
- Silvio Micali was elected to the National Academy of Sciences.
- Sanjoy Mitter was the 2007 winner of the Richard E. Bellman Control Heritage Award as determined by the board of the American Automatic Control Council.
- Alan V. Oppenheim was recipient of the 2007 IEEE Jack S. Kilby Signal Processing Medal.

The following faculty awards were presented at the annual EECS spring awards ceremony:

- Anantha Chandrakasan: the Eta Kappa Nu award for teaching
- Frédo Durand: the Ruth and Joel Spira Award
- Dennis Freeman: the IEEE/ACM Award for undergraduate advising
- Frederick C. Hennie III: EECS Department Head's Special Recognition Award
- Robert Miller: the Louis D. Smullin Award
- Leslie Kolodziejski: The GSA Graduate Counselor Award
- Jeffrey Lang: the Jamieson Prize for Excellence in Teaching
- Tomás Lozano-Pérez: the Jamieson Prize for Excellence in Teaching

Student Awards

The following awards were presented to EECS students at the annual EECS spring awards ceremony held on May 20, 2007:

Award	Recipient	Citation/Date
Carlton E. Tucker Teaching Award	Shawn Staker	Repeated exceptional terms as TA and head TA in 6.041 and for outstanding teaching of 6.041 recitations.
Ernst A. Guillemin Thesis Award	Noah Stein Vanessa Wood	Outstanding electrical engineering SM thesis—1st place
Ernst A. Guillemin Thesis Award	Leonardo Gomez Anthony Sagneri	Outstanding electrical engineering SM thesis—2nd place
Harold L. Hazen Teaching Award	Melanie Rudoy	Outstanding work as TA and recitation instructor in 6.011 and for help in 6.262.
Harold L. Hazen Teaching Award	Chris Laughman	Unusual distinction as a TA in 6.002 and 6.302.
Frederick C. Hennie III Teaching Award	Zahi Karam	Superb initiative and reliability as TA and head TA in 6.011
Frederick C. Hennie III Teaching Award	Tiffany Dohzen	All-around excellence and dedication as a TA in 6.01 and for taking responsibility for its 6.188 Introduction to Scheme Programming companion
Frederick C. Hennie III Teaching Award	Chung Chen	Amazing work as a TA in 6.441, where all 15 students who filled out evaluations gave him a 7/7
Licklider UROP Prize	Sean Liu	UROP Award
Morais and Rosenblum UROP Award	Matthew Papi	UROP Award
J. Francis Reintjes Excellence in VI-A Industrial Practice Award	Masood Qazi	For outstanding performance in a VI-A work assignment
School of Engineering Graduate Student Award for Extraordinary Teaching and Mentoring	Hubert Pham	Extraordinary teaching and mentoring
George M. Sprowls Scholarship Fund	Michael Coen Yael Tauman Kalai	Outstanding PhD thesis in computer science (2006)

George M. Sprowls Scholarship Fund	Nicholas G. Feamster Erik B. Sudderth Robert W. Sumner	Outstanding PhD thesis in computer science—honorable mention (2006)
Northern Telecom/BNR Project Award—Spring 2006	Igor Ginzburg	For the best 6.111 laboratory project: "3D Pong"
Northern Telecom/BNR Project Award—Fall 2006	Jonathan Burnham Christopher Hoffman Kevin Miu	For the best 6.111 laboratory project: "Full Motion Dance Machine"
Northern Telecom/BNR Project Award—Fall 2006	Maura Cordial Irene Zhang	For the best 6.111 laboratory project: "A Theater Lighting Board"
Morris Joseph Levin Award—MasterWorks	John J. Cooley Eitan Reich Robert Pilawa Arvind Thiagarajan Archana Venkataraman	For outstanding oral thesis presentation
George C. Newton UG Lab Prize, 1st place	Hyeyoun Chung	Three-dimensional > Tomographic Scans of Solid Objects
George C. Newton UG Lab Prize, 2nd place	Charles S. Fisher Mariela Buchin Won Ron Cho	Have a Safe Flight: Bon Voyage!
David A. Chanen Writing Award	Alexander V. Valys	Tagged Data System
Charles & Jennifer Johnson MEng Prize	Pawan Deshpande Matthew S. Tschantz Joshua Grochow Eitan Reich	Best MEng thesis in computer science
David Adler Memorial MEng Thesis Prize	John J. Cooley	Outstanding electrical engineering MEng thesis
David Adler Memorial MEng Thesis Prize	Jaime Lien	Outstanding electrical engineering MEng thesis
Robert M. Fano UROP Award	Ryan Bavetta Zachary Remscrim Sara L. Campbell	Outstanding UROP in EECS
Anna Pogosyants UROP Award	Bo Zhu	Outstanding UROP in CSAIL
Nylander Undergraduate Advanced Project Award	Stephan Green	Best advanced undergraduate project in EECS
Department Head's Special Recognition Award	Max van Kleek	Development, maintenance, and extension of the department's information kiosk
Department Head's Special Recognition Award	Sourav Dey Mario Valenti Keith Santarelli	Founders of EECSREFS program, which provides mediation services to graduate students in the department

The following non–EECS awards were presented to EECS students:

Award	Recipient	Citation/Date
Award for Excellence in Foreign Languages and Literatures—1st Prize	Scot Frank	To an undergraduate who achieves proficiency in a foreign language, cultural understanding, and enthusiasm for foreign language learning
Lufthansa Award	Yaa-Lirng Tu (Biology and EECS) Ernest Ngaruiya	For excellence in German studies 1st prize 2nd prize
The 67th William Lowell Putnam Mathematical Competition	The MIT Putnam team included Kuat Yessenov	3rd place
Todd Anderson Award	Raja Bobbili	For excellence in seminar development and teaching
Barry M. Goldwater Scholarship	Lucian T. Tian	For a junior or senior who exhibits outstanding potential and intends to pursue a career in mathematics, the natural sciences, or engineering disciplines that contribute significantly to the technological advances of the United States
MEMOCODE 2007—HW/SW Codesign Contest	Nirav Dave Myron King Michael Pellauer Muralidaran Vijayaraghavan	Hardware Acceleration of Matrix Multiplication on a Xilinx FPGA

W. Eric L. Grimson
Department Head
Bernard Gordon Chair of Medical Engineering
Professor of Computer Science and Engineering

More information about the Department of Electrical Engineering and Computer Science can be found at http://www.eecs.mit.edu/.