Dean’s Message

This is an exciting time at Tufts, especially in the School of Engineering. Our graduate programs are thriving, with the number of master’s applications rising 12% from last year. The upward trend in our level of undergraduate selectivity continued to increase, with our acceptance rate reaching an all-time low of 11.1%. In addition, I am pleased to report that the Class of 2021 has a record number of women, with female engineers making up 44% of the incoming class. Overall, women constitute 32% of our undergraduate population, far above the national average of 20%.

We continue to expand our footprint on the Medford campus and to plan and build spaces that will provide innovative research and learning environments. After three years of design and construction, our newest campus building, the Science and Engineering Complex (SEC), opened in the fall of 2017. This state-of-the-art complex, which Engineering shares with the School of Arts and Sciences, was designed to support cross-departmental collaborations and will be the first campus building in which students and faculty from different disciplines share lab space.

Our faculty are world-class researchers as well as dedicated teachers, and they continue to stand out in our three strategic research areas: human health, the human-technology interface, and sustainability. This year, Tufts researchers developed a new non-invasive technique to differentiate healthy skin from melanoma and basal cell carcinoma. They invented a chip-sized, high-speed modulator that operates at terahertz frequencies, which could download a thousand high-definition videos in a fraction of a second. They took a lead role in
increasing innovation in and reducing the costs of wind energy projects in Massachusetts. Three faculty members received prestigious National Science Foundation CAREER Awards for their pioneering work.

These are only a few examples of the life-changing teaching and research happening in labs and classrooms across campus. Read on to learn more about the last year of forward momentum in the School of Engineering.

Sincerely,

Jianmin Qu
Dean, Tufts School of Engineering
Karol Family Professor
This year, our faculty carried on a long tradition of excellence in research and teaching. Three faculty members received early career awards from the National Science Foundation (NSF): Assistant Professors Xiaocheng Jiang in the Department of Biomedical Engineering (BME), Robert Viesca in the Department of Civil and Environmental Engineering (CEE), and Iryna Zenyuk in the Department of Mechanical Engineering (ME). Assistant Professor Nikhil Nair in the Department of Chemical and Biological Engineering (ChBE) received an NIH Director’s New Innovator Award for his work on engineering safe, naturally occurring gut bacteria.

Dean and Karol Family Professor Jianmin Qu (ME) was honored with the Non-Destructive Evaluation Lifetime Achievement Award from SPIE, the international society for optics and photonics. Professor Shafiqul Islam (CEE) received the Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW) Creativity Award for his work developing and testing a model that uses chlorophyll information from satellite data to predict cholera outbreaks. Professor of the Practice Mike Zimmerman (ME) was profiled in media outlets that included the New York Times and the Washington Post for his development...
of a new lithium-ion battery that stores energy more efficiently and won’t explode.

Four faculty members were named fellows or senior members of their respective professional societies. Diane Souvaine, professor in the Department of Computer Science (CS), was elected to fellow of the American Association for the Advancement of Science (AAAS). Professor Robert Jacob (CS) was named a fellow of the Association for Computing Machinery. Professor Sergio Fantini (BME) was named a fellow of SPIE and Associate Professor Irene Georgakoudi (BME) was elected to the grade of senior member.

Ayse Asatekin (ChBE) was named the John A. and Dorothy M. Adams Faculty Development Assistant Professor, and Kristen Wendell (ME) was named the McDonnell Family Assistant Professor in Engineering Education. This year also marked the completion of four successful tenure and promotion cases. Irene Georgakoudi (BME) was promoted to full professor. Shuchin Aeron and Usman Khan in the Department of Electrical and Computer Engineering (ECE) and Daniele Lantagne (CEE) were tenured and promoted to associate professor.
Selected Student Achievements

Tufts engineering students are interdisciplinary entrepreneurs, innovators, and makers, who received recognition on the local and national levels this year. Ph.D. student Nishanth Krishnamurthy designed and built a new instrument for dynamic optical mammography, now located in the Breast Health Center at Tufts Medical Center. A team of five Tufts engineering students won first place in the MakeMIT hackathon with their project Sphnx, a battery-operated sensor system to track a cyclist’s posture and provide real-time cycling position capture. Another five-person team of engineering undergraduate students won first place in the Healthcare/Life Science track of the Gordon Institute’s 2017 $100k New Ventures Competition; their product, Tarsier, is a headset that can aid in the diagnosis and monitoring of glaucoma. A mechanical engineering
team won first place in the Airport Operation and Maintenance design challenge category of the Airport Cooperative Research Program (ACRP) University Design Competition for Addressing Airport Needs. Their proposal, **Baggage Hygiene Monitoring System**, was selected by a panel of experts from the Federal Aviation Administration, industry, and academia. Finally, the Tufts chapter of the **Society of Women Engineers (SWE)** was recognized nationally with the organization’s Outstanding Collegiate Section Gold Award—the highest-level SWE award for a collegiate section.

SWE members and Tufts alums at SWE’s annual alumni brunch in April 2016.

Students pose with their faculty advisor, Lecturer Gary Leisk, after winning first place in their design challenge category of the ACRP University Design Competition for Addressing Airport Needs.
The 2016–17 academic year was a stellar year for Tufts Engineering undergraduate admissions. The pool of engineering applications reached a record high of 4,047, up 46% in the last five years. The engineering acceptance rate was 11.1% (as compared to 11.5% last year, and 21.6% in 2012). The Class of 2021 is comprised of 44% women (another record high), 32% Americans of color, 15% foreign citizens, and 17% first-generation college students. The student pool continues to excel; one member of the Class of 2021, Korri Lampedusa (ME), was the first-ever U.S. Presidential Scholar in the Arts to be selected for work in industrial design. Overall, the Class of 2021 includes students from 29 states and 16 countries; 65 percent are from public high schools. Need-based financial aid remains an integral factor in the school’s undergraduate admissions outcomes, with 44 percent of the admitted class receiving a Tufts grant.

Our graduate programs have sustained their forward momentum, with master’s applications up by 12 percent. This year, we announced FAST-TRAC, a program—funded by a $1 million National Science Foundation grant—that provides financial, academic, and social support to economically disadvantaged students who enroll in our five-year B.S./M.S. program. The first group of nine FAST-TRAC scholars was selected and will be seniors in the 2017–18 academic year.
year. At Commencement, we hosted our inaugural School of Engineering Graduate Programs Ceremony for both master’s and Ph.D. students, hooding 26 new Ph.D.s and celebrating 158 master’s degree recipients.

This year, the Center for Engineering Education and Outreach (CEEO) celebrated its twentieth anniversary. Established in 1996, the CEEO works to bring engineering into K–12 classrooms to give students a fundamental understanding of what engineering is and to support teachers in enacting engineering curricula in their classrooms. The CEEO recently rebranded its online K–12 engineering education program as the Teacher Engineering Education Program (TEEP). In fiscal
year 2017, 23 teachers graduated from the program with engineering education certificates.

Tufts Gordon Institute implemented its new one-year M.S. program in innovation and management this year, built around fast-paced, intensive team projects that solve real-world problems. Led by former Board of Advisors member Kevin Oye, E79, the MSIM program welcomed 14 students to its first cohort in September 2016.

Doctoral student Diogenes Nunez, Remy Wang, A17, and Professor and Chair Kathleen Fisher created a Haskell program called AUTOBAHN.
### Fall 2016 Enrollment

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<thead>
<tr>
<th>Engineering Program</th>
<th>BS²</th>
<th>ME</th>
<th>MS</th>
<th>PhD</th>
<th>BS⁴</th>
<th>ME</th>
<th>MS</th>
<th>PhD</th>
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<td>Bioengineering</td>
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<td>37</td>
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<td>Biotechnology Engineering</td>
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<td>252</td>
<td>225</td>
<td>17</td>
<td>141</td>
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*Engineering degree programs accredited by the Engineering Accreditation Commission (EAC) or the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET).

# Includes Civil Engineering degrees in Architectural Studies and Environmental Health

** Includes 9 Computer Science Ph.D. students enrolled in the joint Ph.D. program in Computer Science and Cognitive Science in fall 2016, and 1 who received a Ph.D. in May 2017.

1 August 2016 to May 2017

2 Enrollment of first majors as of May 2017

3 Computer Engineering degrees under Electrical Engineering

4 In May 2017, 8 students completed the BS/MS program
INTERDISCIPLINARY RESEARCH
AND EDUCATION

Total annual research expenditures this year reached $26.5 million, a 5.6% increase over last year. The faculty submitted 316 proposals, with 54 new and supplemental awards. In the seventh annual round of Tufts’ collaborative teaching and research grants, SOE faculty members had representation on more than one-third of the funded proposals, garnering one Tufts Innovates and eight Tufts Collaborates awards.

The Tufts Office for Technology Transfer and Industry Collaboration reported 61 invention disclosures from across the University in FY17, with the SOE leading all Tufts schools, accounting for 56 percent. This is the ninth consecutive year in which the SOE has led all schools in invention disclosures. The sections below highlight other significant achievements in research and education.
Engineering the Human-Technology Interface

A research team that included Professor Sameer Sonkusale (ECE) and Associate Professor Qiaobing Xu (BME) integrated nano-scale sensors, electronics, and microfluidics into “smart” threads that can be sutured through multiple layers of tissue to gather diagnostic data wirelessly in real time. Associate Professor Remco Chang (CS) received a four-year, $2.7 million DARPA award for his work creating visualization systems that enable subject matter experts to construct, curate, evaluate, and assess data-centric models. McDonnell Family Assistant Professor Kristen Wendell (ME) received a $987,300 NSF award to better understand and promote practices that increase student motivation and capacity to pursue careers in STEM fields.

Hydro-responsive thread to be used with a sensor and a microfluidic circuit in Professor Sameer Sonkusale’s lab.
Engineering for Human Health

Associate Professor Lauren Black (BME) led an effort to create a novel hybrid graft that has the potential to grow with a pediatric patient’s heart. The patch was designed to combine the mutability of silk, in terms of mechanics and structure, with the binding sites and signaling peptides from the cardiac extracellular matrix. Professor Irene Georgakoudi and a BME team developed a new non-invasive technique that allows researchers to make near real-time assessments of mitochondrial organization and differentiate healthy skin from melanoma and basal cell carcinoma. Assistant Professor Xiaocheng Jiang (BME) received an NSF CAREER award to study bio-derived conductive protein nanowires for minimally invasive cellular interfacing.

Tufts research demonstrated that signs of mitochondrial dysfunction can be seen in living human skin by monitoring the mitochondrial metabolic coenzyme NADH.
Engineering for Sustainability

Assistant Professor Iryna Zenyuk (ME) received an NSF CAREER award to study the mechanisms of ion transport in ionomer-free electrodes, which has applications in the polymer electrolyte fuel cells used in electric vehicles. Led by Professor Dan Kuchma and Professor of the Practice Eric Hines (CEE), Tufts was a founding member of the Massachusetts Research Partnership for Offshore Wind, a collaborative that seeks to increase innovation in and reduce the costs of wind energy projects in the Commonwealth. Assistant Professor Robert Viesca (CEE) received a $474,000 NSF CAREER grant to gain insight into the nature of fault operation, with a particular focus on slow, aseismic slip.

Partnering with institutions like Northeastern University and Woods Hole Oceanographic Institution, Tufts is helping to lead wind energy efforts in Massachusetts.
Faculty recruitment has brought Tufts Engineering’s number of tenure-track faculty to 92. Four new tenure-track faculty members joined the School of Engineering in the 2016–17 academic year, and we recruited five more in 2017. New hires include:

**Jonathan Lamontagne**
*Assistant Professor, Civil and Environmental Engineering*
Jonathan Lamontagne received his M.S. and Ph.D. in environmental water resources systems analysis from Cornell University in 2014 and 2015, respectively. Following his graduate studies on flood frequency analysis and the incorporation of uncertainty in hydropower systems planning, Lamontagne worked as a postdoctoral research associate at Cornell University, studying uncertainty and robustness issues for models of the integrated human-climate system.

**Susan Landau**
*Bridge Professor in Cybersecurity, Computer Science and The Fletcher School of Law and Diplomacy*
Susan Landau works at the intersection of cybersecurity, national security, law, and policy. She has testified before Congress, written for the *Washington Post, Science, and Scientific American*, and frequently appears on NPR and the BBC. With a Ph.D. from MIT, her previous positions include senior staff privacy analyst at Google, distinguished engineer at Sun Microsystems, and faculty member at Worcester Polytechnic Institute, the University of Massachusetts Amherst, and Wesleyan University.

**Liping Liu**
*Schwartz Family Assistant Professor in Computer Science*
Liping Liu, who earned his doctorate at Oregon State University, is interested in probabilistic modeling, classification, and clustering within machine learning. He applies these machine learning techniques to ecology studies such as bird migration modeling. Liu previously held the position of postdoctoral associate at Columbia University, studying representation learning. He also has experience in commercial data analysis for IBM T.J. Watson Research and web search at Alibaba.

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1 This number includes two faculty members who signed contracts in 2017 and will join the School of Engineering in 2018.
Megan Monroe  
*Lecturer, Computer Science*

Megan Monroe joined Tufts from IBM Research, where she designed and developed visual analytics tools for a wide range of Watson technologies. Monroe’s doctoral work at the University of Maryland focused on the analysis of temporal, event-based records, such as electronic health records and transaction logs. Her interests cover not only a wide range of computation, but also the application of computational thinking as a general problem-solving technique.

Jivko Sinapov  
*James Schmolze Assistant Professor in Computer Science*

Jivko Sinapov received his Ph.D. in computer science and human-computer interaction from Iowa State University. He went on to be a clinical assistant professor with the Texas Institute for Discovery, Education, and Science at UT Austin and a postdoctoral associate at the Artificial Intelligence Lab. Sinapov’s research interests include developmental robotics, computational perception, autonomous manipulation, and human-robot interaction.
ADVANCEMENT AND OUTREACH

Development

The School of Engineering is grateful for the exceptional support provided by our alumni, friends, and other supporters. With the help of the Engineering Advancement team, $19.9 million was raised for endowment, capital, and current use, surpassing a goal of $7.75 million. This is an increase of 134% over last year’s fundraising. New gifts and pledges added $12.4 million for endowment. Roughly 3,400 donors made gifts to the Tufts Fund for Engineering, totaling more than $1.8 million. This was 4% over our goal and 9% more than last year. The total number of donors increased by 3%, and new donors increased by 7%. Notable gifts included $8 million ($4 million to the School of Engineering) pledged by the James. S. McDonnell Family Foundation and John and Anne McDonnell for a new Institute for Research on Learning and Instruction.

Corporate and Foundation Relations

In FY17, corporate and foundation achievement for the School of Engineering comprised $637,593 of the $19.9 million total raised. Notable among these awards, the Center for Engineering Education and Outreach—which celebrated its twentieth anniversary this year—received $100,000 to support its LEGO collaborative learning program, and $88,000 from the United Engineering Foundation to administer three challenges for the Novel Engineering program, which integrates engineering literacy in elementary school curricula. Corporate donors to the School of Engineering included National Instruments, PTC, and Access Business Group.

The CEEO partners with LEGO to generate and support educators’ interest in STEM education.
Alumni Outreach

The alumni outreach program continued to bring events and networking opportunities to alumni and students both on and off campus. Many of these programs highlighted the School of Engineering’s commitment to entrepreneurship. For the spring Lyon & Bendheim Lecture, Bobby Dutton, E04 and founder of GrooveBoston, spoke about his Tufts experience and how it shaped his career as a start-up founder. In April, last year’s winners of the $100k New Ventures Competition traveled to New York City, where they presented micro-pitches on their start-ups at an event with nearly 80 alumni, parents, and friends. The reception was generously hosted by Ruth and Itzhak Fisher, A04P, A08P, of Pereg Ventures.

Engineering Career Services

Advisors in the Tufts Career Center provided more than 1,305 in-person consultations to engineering, computer science, and engineering psychology students, which is an increase of 41% over last year. Of those consultations, 252 were with graduate students—double the number of last year’s graduate student consultations. The Career Center organized a number of opportunities for students to connect with employers, including on-campus career fairs where engineering and technology companies accounted for 31% of participating companies. The Class of 2017 reported acceptances at top graduate schools and full-time positions with companies such as Amazon, Sensata, SpaceX, MITRE, and Bose.

Bobby Dutton, founder and director of GrooveBoston.
DIVERSITY

The Bridge to Engineering Success at Tufts (BEST) program provides programming and support to under-represented students at Tufts. Seven BEST scholars from the program’s fourth cohort graduated this past year, and the Center for STEM Diversity (CSD) welcomed 11 scholars to the eighth cohort in the summer of 2017. This year, for the first time ever, two BEST students were selected as Summer Scholars, and, thanks to a generous gift from a donor, the CSD was able to expand summer supports for BEST scholars. The CSD also had another successful year of running the STEM Ambassadors program in partnership with the Jonathan M. Tisch College of Civic Life, and was pleased to join the Northeast Louis Stokes Alliance of Minority Participation (LSAMP). Ten Tufts students were selected as LSAMP scholars and are now conducting research in labs at Tufts and abroad.

For his Summer Scholars project, BEST student Greg Berumen studied the role of enzymes in the proliferation of cancer cells.
INFRASTRUCTURE DEVELOPMENT

FY17 was another busy year for facilities planning and construction in the SOE, including, most notably, the completion of the Science and Engineering Complex (SEC). This Gold LEED-certified building provides 177,000 square feet of office, classroom, and research space.

In addition, planning for the construction of the new Joyce Cummings Center on the corner of Boston and College Avenues is now underway. This 140,000 square-foot multifunctional facility will include classrooms, event space, and offices for units including the Department of Computer Science and Tufts Gordon Institute. The Cummings Center is planned for completion in late 2020.
NOTABLE GIFTS

• $4 million pledged by a family foundation for a new Institute for Research on Learning and Instruction. This was a total gift of $8 million, divided between the Schools of Engineering and Arts & Sciences.

• $4 million pledged by an emeritus trustee from the Class of 1972 for a named, endowed professorship in data science and for term scholarships.

• $2.5 million pledge from a member of the Class of 1979 to add to an endowed fellowship fund in computer science.

• $2.25 million pledge from the estate of a Class of 1923 member for an endowed scholarship fund.

• $2 million gift from the estate of Keith Nolop for the creation of the Nolop Fabrication, Analysis, Simulation and Testing (FAST) Facility, a new university makerspace.

• $890,000 pledged by a trustee from the Class of 1984 to add to an endowed scholarship fund, and $140,000 for expendable support of the Center for Engineering Education and Outreach.

• $500,000 from parents of students in the Classes of 2018 and 2020 for an endowed scholarship and for current use in financial aid. This was a total gift of $1 million, divided between the Schools of Engineering and Arts & Sciences.

• $500,000 contributed by an anonymous donor to recruit and retain new faculty members at any level in the Department of Computer Science.

• $250,000 pledged by a member of the Class of 1989 to establish an endowed scholarship fund for entrepreneurial engagement.

• $250,000 pledged for a term professorship from parents of a member of the Class of 2017 to recruit and retain junior faculty in the Department of Computer Science.

• $125,000 from the estate of a dental school alumnus for an endowed scholarship fund. This was a total gift of $250,000, divided between the Schools of Engineering and Arts & Sciences.

• $122,000 from a Class of 1989 board of advisors member and parents of a Tufts student, for the CEEO’s STOMP program, the dean’s discretionary fund, the Department of Mechanical Engineering, and Tufts Racing.

• $110,000 pledged by a Center for STEM Diversity board member from the Class of 1957 for support of summer programs for BEST students.

• $100,000 from an anonymous engineering alumnus for the Tufts Ultimate Frisbee Teams Fund.

• $100,000 contributed by a board of advisors member and spouse, both from the Class of 1971, to the Professor Kentaro Tsutsumi Faculty Development Fund in the Department of Civil and Environmental Engineering.
SCHOOL OF ENGINEERING CONNECTIONS

Tufts University School of Engineering
Science & Engineering Complex
Anderson Hall, Room 105
Medford, MA 02155
Phone: 617-627-3237
Fax: 617-627-3819

Learn about the School of Engineering:
engineering.tufts.edu

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engineering.tufts.edu/alumni and tuftsalumni.org

Connect for recruiting, education, and research:
engineering.tufts.edu/industry

Support future Jumbos:
giving.tufts.edu

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