Boston University College of Engineering

Growth. Excellence. Impact.

2016-17 Academic Year Summary







mat f70

Seizing the present. Shaping the future.

The past year has seen many bold investments pay dividends at the Boston University College of Engineering. New facilities and research centers proliferate, offering our engineering community endless opportunities to make discoveries that move society forward.

The College celebrated the opening of the \$150 million Center for Integrated Life Sciences & Engineering, a 170,000-square-foot facility dedicated to research at the intersection of medicine, biology, and bioengineering.

ENG launches three groundbreaking research centers backed by nearly \$180 million in funding

The new **Biological Design Center (BDC)** at Boston University performs interdisciplinary research to rigorously understand life's design principles and re-engineer them to create revolutionary approaches to advance human health and the environment. The BDC is led by founding director Christopher Chen (BME).

> Led by founding director **David Boas** (BME) The **Neurophotonics Center** aims to develop and apply novel approaches to measuring human brain function with light, using wearable functional near-infrared spectroscopy devices to observe blood flow and oxygenation changes in the brain in real time at low cost.

> > Led by Professor **Catherine Klapperich** (BME, ME, MSE) the new **Precision Diagnostics Center (PDC)** brings the talents of medical, dental, engineering and public health researchers to bear on Precision Medicine, innovating diagnostic devices and bringing them to the marketplace.

15th among private graduate programs.

ENG

ranks

Source: US News & World Report

Creating a Biofabrication Industry

The College has been named a key partner in a Department Of Defensefunded \$80 million Advanced Tissue Biofabrication Manufacturing USA Institute. The nationwide consortium of government, academia and industry stakeholders known as the Advanced Regenerative Manufacturing Institute (ARMI), is part of a broader US government initiative to create new manufacturing industries – and jobs – suited to the needs of the 21st century.

Another year of eager applicants and increased recognition

Boston University continues to distinguish itself as a world-class destination for engineers at all levels. Applications for undergraduate enrollment increased 4%, and applications to graduate programs increased 8%.





BU Institutional research Fall Mid-Semester I reports corresponding AY.





New MS in Electrical & Computer Engineering

Combining two long-established programs, this integrated degree provides training, skills, and expertise across two traditionally separate domains. Students benefit from increased flexibility, and the ability to fully customize their experience.

New MS in Product Design and Manufacture

Developed in consultation with industry leaders, this graduate program integrates product design and manufacturing processes and leverages facilities like the Engineering Product Design Center (EPIC) to give students experience taking a product from conception to completion.

Faculty Highlights

- Two leaders in biophotonics joined the faculty in 2017. Professor **David A. Boas** is well-known for his use of near-infrared spectroscopy to determine the metabolic origins of the ubiquitous fMRI BOLD signal. He is the founding director of the BU Neurophotonics Center. Professor **Ji-Xin Cheng** is a world leader in molecular spectroscopic imaging and his group first developed systems for CARS microscopy that allow imaging at depths greater than 1 cm.
- Dean Kenneth R. Lutchen began his term on National Science Foundation's Engineering Advisory Panel. He is one of a dozen leaders from academia and industry who provide advice and recommendations on support for research, education and related activities to the NSF's Directorate for Engineering.
- Professor Xin Zhang (ME, MSE) was named a fellow of the American Association for the Advancement of Science (AAAS) for her distinguished contributions to the field of micro/nanoelectromechanical systems. She was also the recipient of the 2016 Institute of Electrical and Electronics Engineers (IEEE) Sensors Council Technical Achievement Award.
- Assistant Professor Ahmad "Mo" Khalil (BME) won several major awards in the 2016-17 year. He received the Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed by the United States government on early-career science and engineering professionals. He was also awarded a New Innovator Award under the High-Risk, High-Reward program sponsored by the National Institutes of Health (NIH).
- Assistant Professor Chuanhua Duan (ME, MSE) netted a National Science Foundation (NSF) Faculty Early Career Development (CAREER) award. Duan's research focuses on developing an understanding of the fundamental mechanisms that affect the flow of water and ions through nanoscale graphene conduits.
- Professor Stephen Grossberg (BME) was the recipient of the Frank Rosenblatt Award from the Institute of Electrical and Electronics Engineers (IEEE).
- Assistant Professor Mary Dunlop (BME) won the American Chemical Society (ACS) Synthetic Biology 2017 Young Investigator Award.

Another Year of Record Philanthropic Support

Alumni, parents, students and friends gave more than \$6 million to the College of Engineering in 2016-17. Donations to the College's Annual Fund and its Societal Engineering Fund – which support expanded opportunities for students – saw increases in both donor numbers and dollars given. These funds support numerous outside-the-classroom programs like the Technology Innovation Scholars Program, research opportunities for undergraduates and many others.

In addition, the College of Engineering's portion of Boston University's Choose to be Great Campaign continues to experience robust giving levels. Having surpassed its original goal of \$60 million two years ago, it passed the \$80 million mark last year, ahead of schedule to reach its new, elevated goal of \$100 million.





A cutting-edge donation for EPIC

The Engineering Product Innovation Center has another valuable tool in its rapidly evolving additive manufacturing arsenal, thanks to the General Electric Additive Education program. GE awarded a state-of-the-art 3D metals printer to BU, one of only 8 universities GE selected from 250 applicants worldwide. This donation further expands the College's additive manufacturing education capabilities, and will greatly benefit the new Product Design and Manufacture graduate program.

Grants Boost College's K-12 STEM program

Grants from several foundations, corporations, and alumni have provided nearly a guarter of a million dollars to the Technology Innovation Scholars Program (TISP), a unique K-12 STEM program that inspires middle- and highschool students to pursue careers in technology and engineering. The program's Inspiration Ambassadors, specially selected and trained undergraduates, have reached more than 20,000 students across the country since the program's inception in 2011. This generous donation will enable TISP to fund additional Inspiration Ambassadors, who have visited students in 100 cities across the globe.



- Professor Catherine Klapperich (BME, MSE), associate dean for Research and Technology Development, joined the Board of Directors of the Biomedical Engineering Society.
- Professor John A. White, chair of BME, was elected secretary of the Biomedical Engineering Society.
- Assistant Professor Stormy Attaway (ME) was the recipient of a 2017 Textbook Excellence Award for MATLAB: A Practical Introduction to Programming and Problem Solving, 4th ed. by the Textbook and Academic Authors Association.
- Assistant Professor Michelle Sander (ECE, MSE) has won a prestigious Young Investigator Research Award from the Air Force Office of Scientific Research (AFOSR).
- Research Assistant Professor Jillian Goldfarb (ME, MSE) is the recipient of a Fulbright award for teaching and research for her project "Global Insights into Sustainable Energy Engineering and Sustainable Solutions for Municipal Solid Waste Management."
- Colleagues from around the world came to campus this past December to honor the career of Professor Emeritus Theodore Moustakas (ECE, MSE) at a symposium focused on his signature innovation, a process that makes the glowing screens on today's ubiquitous electronic devices possible.

- 8 National Academy of **Engineering or National Academy of Sciences Members**
- 3 National Academy of **Inventors Charter Fellows**





25 AIMBE Fellows



41 NSF Career Award Winners

Campaign Goal

\$100M



Professor Edward Damiano (BME)

\$95.6 MILLION total amount of engineering-related expenditures*

*most recent available figure, as reported to US News & World Report

Research Highlights

- Interdisciplinary research that uses light to understand how the brain functions will receive a major boost under a new \$2.9 million **National Science Foundation PhD Student Research Traineeship grant**. The five-year grant will allow the establishment of a new graduate-level program of study that focuses on understanding and influencing brain function using light. Professor **Thomas Bifano** (ME, MSE) is the grant's principal investigator.
- On the heels of winning \$12 million in funding from the National Institutes of Health (NIH) to conduct a major, multi-center, national clinical trial of his iLet[™] bionic pancreas, Professor **Edward Damiano** (BME) has co-authored a study in The Lancet that affirms the technology's effectiveness in managing type 1 diabetes (T1D) better than current conventional methods.
- BME Assistant Professor **Darren Roblyer** (BME) has been awarded a St. Baldrick's Research Grant for his work on childhood osteosarcoma. His Biomedical Optical Technologies Lab is also developing technology to improve breast cancer therapies.
- Professor **Christos Cassandras** (SE, ECE) is part of a research group aiming to ease commuting and the resulting air pollution by developing efficient, smart vehicle technology under a \$4.4 million grant from the Energy Department's Advanced Research Projects Agency-Energy NEXTCAR program.
- The Harvard Business Review published an article by Professor **Yannis Paschalidis** (ECE, BME, SE) highlighting research by Boston University's Center for Information and Systems Engineering, which is using the power of machine-learning algorithms to help cut unnecessary hospitalizations while improving outcomes for patients.
- Assistant Professor **Michelle Sander** (ECE, MSE) has won a prestigious Young Investigator Research Award from the Air Force Office of Scientific Research (AFOSR). Fewer than one in four of the 230 applicants were awarded funding under the program this year.
- Assistant Professor **Chuanhua Duan** (ME, MSE) netted a National Science Foundation (NSF) Faculty Early Career Development (CAREER) award in recognition of his outstanding research and teaching capabilities. Duan's research focuses on developing an understanding of the fundamental mechanisms that affect the flow of water and ions through nanoscale graphene conduits.
- A new study published by Assistant Professor **Wilson Wong** (BME) in Nature Biotechnology outlines a new simplified platform to target and program mammalian cells as genetic circuits, even complex ones, more quickly and efficiently.
- Professor **Mark Grinstaff** (BME, MSE, Chemistry, Medicine) led a collaborative team of chemists and biomedical engineers in the development of a novel hydrogel burn dressing that may ease burn patients' pain.
- Associate Professor Vivek Goyal (ECE) collaborated with researchers at MIT and Politecnico di Milano on a study titled "Photon-Efficient Imaging with a Single-Photon Camera," combining new image formation algorithms with the use of a single-photon camera to produce images from about one photon per pixel. The study was published in the journal Nature Communications.
- A study by Assistant Professor James Bird (ME, MSE), recently featured on the cover of Langmuir, revisits the relationship between gravity and surface tension and explores its underlying effects on capillary displacement of viscous liquids.
- Professor **Thomas Little** (ECE, SE) is working with the Lighting Enabled Systems & Applications Engineering Research Center (LESA ERC) on responsive sensors to improve lighting efficiency.



BU

Boston University College of Engineering

44 Cummington Mall Boston, MA 02215

bu.edu/eng

An equal opportunity, affirmative action institution.

ENG At A Glance

Students in 2016-17

Undergraduate **1,662** Master's **518** Doctoral **389**

Degrees Granted

Bachelor's **395** Master's **288** Doctoral **55**

Faculty

Tenure/Tenure Track 127 Non-Tenure Track 18 Research 12

Alumni

Living Alumni 17,968

Academic Degrees

Biomedical Engineering Computer Engineering Electrical and Computer Engineering Electrical Engineering Global Manufacturing Materials Science and Engineering Product Design and Manufacture Systems Engineering

Undergraduate Concentrations

Aerospace Engineering Energy Technologies Manufacturing Engineering Nanotechnology Technology Innovation

Graduate Specializations

Data Analytics Cybersecurity Robotics

Graduate Certificates

Engineering Innovation Energy & Sustainability Micro-Electro Mechanical Systems Product Design

Dual Degrees

Doctor of Philosophy and Doctor of Medicine (MD/Ph.D.) MS in Product Design and Manufacture and MBA in Management Dual Degree Program STEM Educator-Engineer Program Dual Degree Program (BS/MAT) Modular Medical Integrated Curriculum

Interdisciplinary Research Centers & Institutes

Biological Design Center Center for Computational Science Center for Future Technologies in Cancer Care Center for Information and Systems Engineering Center for Space Physics Center for Subsurface Sensing & Imaging Systems Fraunhofer Center for Manufacturing Innovation Rafik B. Hariri Institute for Computing and Computational Science & Engineering Hearing Research Center Institute for Sustainable Energy Institute for Health System Innovation and Policy Nanotechnology Innovation Center **Neurophotonics** Center **Photonics Center** Precision Diagnostics Center Smart Lighting Engineering Research Center