Looking to the Future of Engineering

2013-14 ACADEMIC YEAR SUMMARY
Celebrating its 50th anniversary in 2014, the College enjoyed another banner year of success and development, with record enrollment and healthy research funding numbers, as well as a large increase in philanthropic support.

Bringing life-changing engineering innovations to the marketplace was top of mind for the College, augmented by the opening of the Engineering Product Innovation Center (ePic), a 15,000-square-foot facility educating a new generation engineers on how to design, manufacture and deploy new products. BU’s Center of Synthetic Biology (CoSBi) was established to position the College at the forefront of this groundbreaking field, and our STEM outreach initiatives, such as the Technology Innovation Scholars Program (TISP) and the STEM Educator-Engineer Program (STEEP), thrived.

Number of places the College has risen in the U.S. News & World Report graduate rankings since 2006. BU is now ranked among the top 20% of graduate engineering programs nationally.
Enrollment Continues to Rise

Increasingly, the College is the first-choice destination for top students. In recent years the College has become more selective, offering admission to approximately 3 in 10 undergraduate applicants, but yield continues to rise. Undergraduate enrollment has increased by approximately 25% over the last five years.

College Celebrates 50 Years of Success

In 1964, the College started with just three undergraduate degree programs and no research portfolio. Just 50 years later, it is a world-class institution with core faculty garnering nearly $50 million in annual sponsored research and ranking in the top 20 percent of US engineering graduate programs. This forward momentum continues with an eye to the future, with plans to integrate digital technologies into the undergraduate educational experience, and build nearly 400,000 square feet of research, lab and classroom space over the next several years.

DID YOU KNOW?

36

Number of primary Biomedical Engineering tenure-track faculty, most among the Top 10 ranked BME departments nationally.

Total Undergraduate Enrollment

The positive trend continued this year with 6,507 applications received – an increase of 15% over the previous year’s record.

Applications Received
Faculty Highlights

The College’s award-winning faculty is consistently recognized for excellence in research and teaching with competitive national and international honors, awards, grants and fellowships:

- Dean and Professor of Biomedical Engineering Kenneth R. Lutchen received the American Institute for Medical and Biological Engineering’s highest honor, the Pierre Galletti Award.
- Professor Siddharth Ramachandran (ECE) received the IEEE Photonics Society Distinguished Lecturer Award.
- Professor James J. Collins (BME, MSE, SE) was elected to the National Academy of Sciences.
- Assistant Professor Xue Han (BME) was named a recipient of the Presidential Early Career Award for Scientists and Engineers.
- Assistant Professor Wilson W. Wong (BME) received 2013 National Institutes of Health Director’s New Innovator Award.
- Associate Professor Muhammad Zaman (BME, MSE) was named a Howard Hughes Medical Institute Professor and was elected to the Board of Directors for the Consortium of Universities of Global Health, the field’s most prestigious professional organization. Zaman’s PharmaChk, a fast, portable detector for screening counterfeit and substandard medicines, was named by Scientific American as one of its “Ten World Changing Ideas.”
- Professors W. Clem Karl (ECE, BME, SE), Theodore Moustakas (ECE, MSE) and Yannis Paschalidis (ECE, SE) were each named as 2014 IEEE Fellows.
- Assistant Professor Ayse Coskun (ECE) was named the first female columnist for Circuit Cellar magazine.
- Professor Joyce Wong (BME, MSE) was elected as a Fellow of the Biomedical Engineering Society.
- Assistant professors James C. Bird (ME, MSE), Ahmad (“Mo”) Khalil (BME) and Mac Schwager (ME, SE) each received NSF CAREER awards.
- Professors Jerome Mertz, Barbara Shinn-Cunningham and Sandor Vajda (all BME, SE) and Associate Professor Catherine Klapperich (BME, MSE) were elected to the American Institute for Medical and Biological Engineering’s College of Fellows.
- Assistant Professor Ahmad Khalil (BME) was named a Top 20 Young Investigator by GenomeWeb, a leading publication in the field.
- Professor Emeritus Charles Cantor (BME, MED) was named a Charter Fellow of the National Academy of Inventors.

Sponsored Research Stays Strong

$47.3 Million

Amount of research grant and contract funding by primary engineering faculty alone, a near-record amount, despite the most competitive grant environment in recent years.

93%

Engineering undergraduates retained at Boston University.

DID YOU KNOW?

Muhammad Zaman

Theodore Moustakas

Kenneth R. Lutchen
Total Graduate Enrollment

The college’s graduate programs continued their pattern of steady growth, with enrollment totaling 779 graduate students, including 431 master’s students and 348 doctoral students.

EPIC Opens

The Engineering Product Innovation Center (EPIC) is a pioneering 15,000-square-foot facility that opened in early 2014 to help address a critical need in the US: the training of prospective engineers who can develop and manufacture innovative new products. With the help of industry sponsors GE Aviation, Procter & Gamble, PTC and Schlumberger, EPIC uses flexible teaching space, a state-of-the-art fabrication facility and advanced design software to give students hands-on design, prototyping and small-scale manufacturing experience as an integral part of their engineering curriculum. All engineering undergraduates will be exposed to advanced manufacturing principles through EPIC.

DID YOU KNOW?

Exciting and Retaining Engineers

20%: Proportion of sophomores participating in study-abroad programs designed exclusively for second-year engineering undergrads. Offered in Dresden, Germany; Tel Aviv, Israel; Grenoble, France; and Madrid, Spain, these programs are designed to incorporate specialized courses taught in English that mirror the sophomore engineering curriculum so students keep pace with their classmates.
Philanthropic Giving Continues to Grow

Despite the national and global economic situation, philanthropic support for the College of Engineering showed tremendous growth this year.

- The Engineering Annual Fund **grew dramatically by 43%**, marking the **seventh consecutive year of record revenue**.

- The College **received more than $11 million** in total philanthropy in 2013-14.

- The number of **donors who gave $1,000 or more** has increased **156%** over the past five years.

STEM Initiatives

Several developments allowed the College to continue to grow its STEM efforts to inspire the next generation of engineers.

- **$1.2 million NSF grant** to expand the STEM Educator Engineer Program, one of the nation’s first programs to grant students with an accredited BS in Engineering and an MA in Teaching in five years.

- Named a partner with 100Kin10, a multi-sector network with the goal of training 100,000 STEM teachers by 2021.

- **Technology Innovation Scholars Program**, undergraduates who visit middle and high schools around the country to excite younger students about engineering, has reached a total of nearly 9,000 students since 2011.

New Center for Synthetic Biology Opens

One of the birthplaces of synthetic biology, Boston University opened the new Center of Synthetic Biology (CoSBI) this year. It unites core engineering faculty with leading biologists and life science researchers and serves as focal point to help advance the field toward applications in biomedical research, healthcare, materials, energy and more. CoSBI expects to continue to attract substantial government funding and major industrial collaborators, as well as organize an annual symposium featuring prominent researchers from around the world.

**DID YOU KNOW?**

Proportion of women in the freshman class.

31%
The college’s faculty is comprised of highly successful and internationally recognized professors and researchers:

8 National Academy of Engineering or National Academy of Sciences members

4 National Academy of Inventors Charter Fellows

2 MacArthur Award winners

19 IEEE Fellows

29 AIMBE Fellows

11 Acoustical Society of America Fellows

37 NSF CAREER Award winners

2 NIH PhD training grants

2 National Science Foundation Engineering Research Centers

Student Highlights

- A student team of Austen Schmidt, Vinny DeGenova, Nandheesh Prasad, Charlie Vincent and Stuart Minshull (all EE’14) won the GizmoSphere contest with their vehicle-mounted pothole detection system called Autoscan.

- Reno (Tao) Wang (SE, PhD’13) was selected as one of the New Faces of Engineering by DiscoverE (formerly the National Engineers Week Foundation) recognizing outstanding engineers age 30 or under who have contributed to projects that significantly impact society.

- Prakash Iyer, Aditya Sengupta, Harvin Vallabhaneni (all BME’14) and Sangeeta Satish (BME’16) were part of the team that won BIOMOD, an international student biomolecular design competition, with terriergami, a novel approach to fabricating nanoscale objects made of folded DNA to reach brain cells efficiently.

Research Highlights

- Smart Cities

Faculty throughout the college are laying the technological foundations for the smart cities of the future, supported with about $4 million from the National Science Foundation and other agencies in 2013-14:

- Supported by a $2 million NSF grant, Professor Michael Caramanis (ME, SE) and Professor John Baillieul (ME, SE) are collaborating with other researchers on creating a smarter electricity grid.

- Professor Janusz Konrad (ECE) and Venkatesh Saligrama (ECE, SE) developed specially designed security cameras with embedded algorithms that could help quickly spot unusual events.

- Professor Christos Cassandras (ECE, SE) and Professor Yannis Paschalidis (ECE, SE) are using a $1 million NSF grant to test a miniature sensor network aimed at enhancing the functionality of cyber-physical systems.

- Professor Mark Grinstaff’s (BME, Chemistry, MSE) has developed a highly absorbent hydrogel that not only seals wounds, but can later be dissolved and gently removed to be reopened for more extensive treatment.

- Assistant Professor James C. Bird (ME, MSE) published a paper in Nature which detailed his advancement in waterproofing by augmenting micro- or nanostructured surfaces with periodic ridges, reducing contact time between water drops and treated surfaces by about 37 percent.

- Associate Professor Catherine Klapperich (BME, MSE), director of the $9 million Center for Future Technologies in Cancer Care, has developed an inexpensive, portable, power-free system for extracting RNA from whole blood samples and storing them on detachable cartridges for up to one week below 98.6 degrees Fahrenheit.
At A Glance

Students in 2013-2014

Undergraduate 1,488
Master's 431
Doctoral 348

Degrees Granted in 2013-2014

Bachelor's 368
Master's 227
Doctoral 53

Faculty

Tenured/Tenure-Track Faculty Positions 130
Research Faculty 15

Alumni

Living Alumni 14,521

Academic Degrees

Biomedical Engineering (BS, MEng, MS, PhD)
Computer Engineering (BS, MEng, MS, PhD)
Electrical Engineering (BS, MEng, MS, PhD)
Global Manufacturing (MS)
Manufacturing Engineering (MEng, MS)
Materials Science & Engineering (MEng, MS, PhD)
Mechanical Engineering (BS, MEng, MS, PhD)
Photonics (MEng, MS)
Systems Engineering (MEng, MS, PhD)

Undergraduate Concentrations

Aerospace Engineering
Energy Technologies
Manufacturing Engineering
Nanotechnology
Technology Innovation

Dual Degrees

Doctor of Philosophy and Doctor of Medicine (MD/PhD)
MS in Manufacturing Engineering and MBA in Management Dual Degree Program (MS/MBA)
STEM Educator-Engineer Program Dual Degree Program (BS/MAT)

Other Programs

Cooperative Education Program
Graduate Cooperative Education Program
Intercollegiate Program in Bioinformatics
Late Entry Accelerated Program (MEng/MS)
Study Abroad for Engineering Students
Modular Medical Integrated Curriculum (MMEDIC)

Engineering Research Centers

Bimolecular Engineering Research Center
Center for Future Technologies in Cancer Care
Center for Information and Systems Engineering
Center of Synthetic Biology
Hearing Research Center
NeuroMuscular Research Center
Smart Lighting Engineering Research Center

Interdisciplinary Research Centers

Center for Adaptive Systems
Center for Computational Neuroscience and Neural Technology
Center for Computational Science
Center for Memory and Brain
Center for Nanoscience and Nanobiotechnology
Center for Remote Sensing
Center for Space Physics
Fraunhofer Center for Manufacturing Innovation
NSF Center for Excellence for Learning in Education, Science and Technology (CELEST)
Photonics Center
Rafik Hariri Institute for Computing and Computational Science & Engineering