BOSTON UNIVERSITY ANNUAL REPORT 2017

BOUNDLESS

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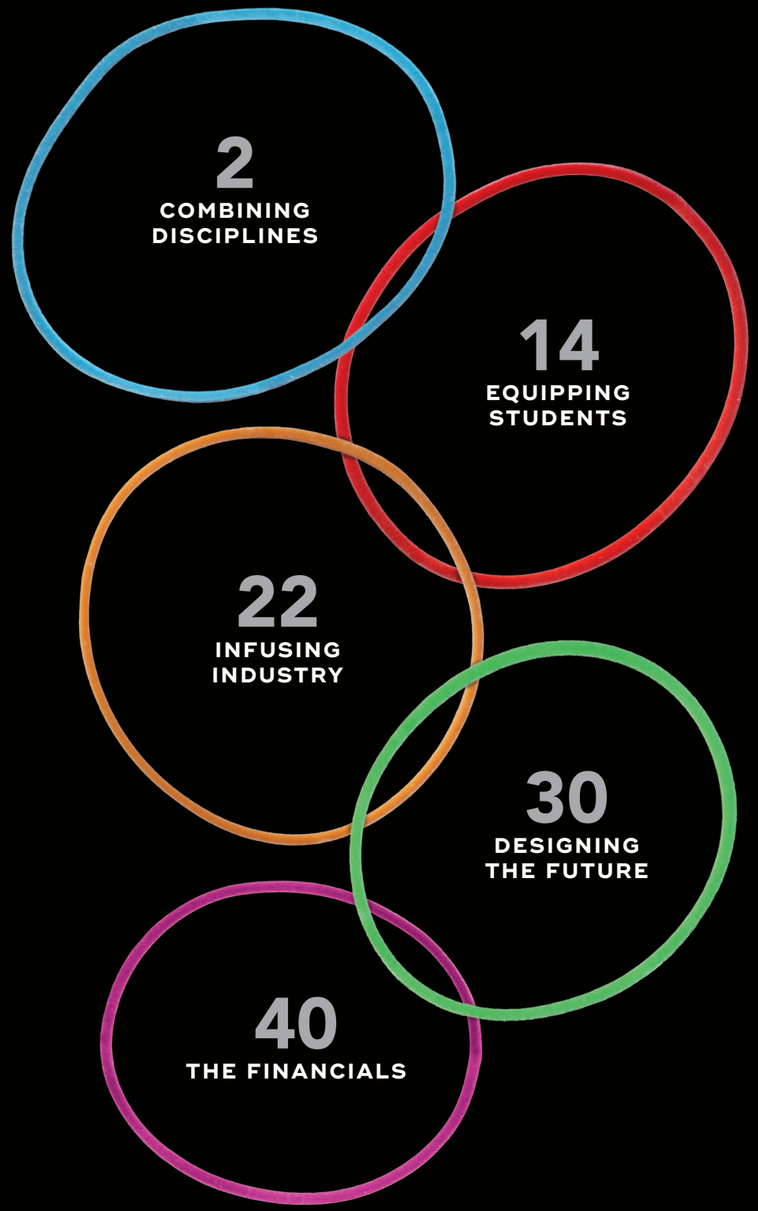


ONE CULTURE, INTERTWINED

Any self-respecting research university embraces interdisciplinary collaboration. That's how many important discoveries are made. We are no different at Boston University. We have dissolved barriers, built bridges, and stoked a broad spectrum of intellectual passions.

But where we diverge is in our culture.

Ours is very much informed by scale. With 17 schools and colleges, we are unleashing a flood of knowledge from which we are surfacing countless ideas and solutions, even entirely new fields. At the same time, our schools and colleges have remained vibrant and distinct, each powered by a pool of talented faculty scholars and researchers, inspiring thousands of curious young minds. Over the years, these strands of intellectual prowess have become intertwined, working both independently and together, moving us ever forward.

As you'll see in the pages of this year's annual report, our unique interwoven culture has led to a $450 million BU-based global partnership to combat superbugs, prompted a record-shattering donation for life sciences and engineering research, seen the opening of a new science center that mixes cutting-edge disciplines, and is bringing about a new undergraduate curriculum that facilitates collaboration, equipping students for the ever-shifting world that awaits.

The bottom line is this: when we connect people who motivate, challenge, and inspire us, the distance we can travel is truly boundless. I hope you like where we're headed.

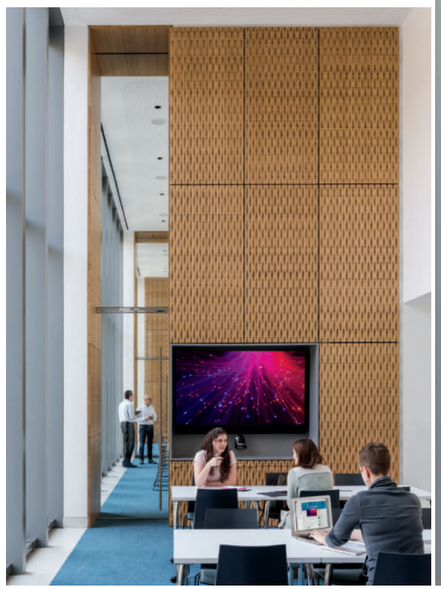
Sincerely,

Robert A. Brown
President, Boston University

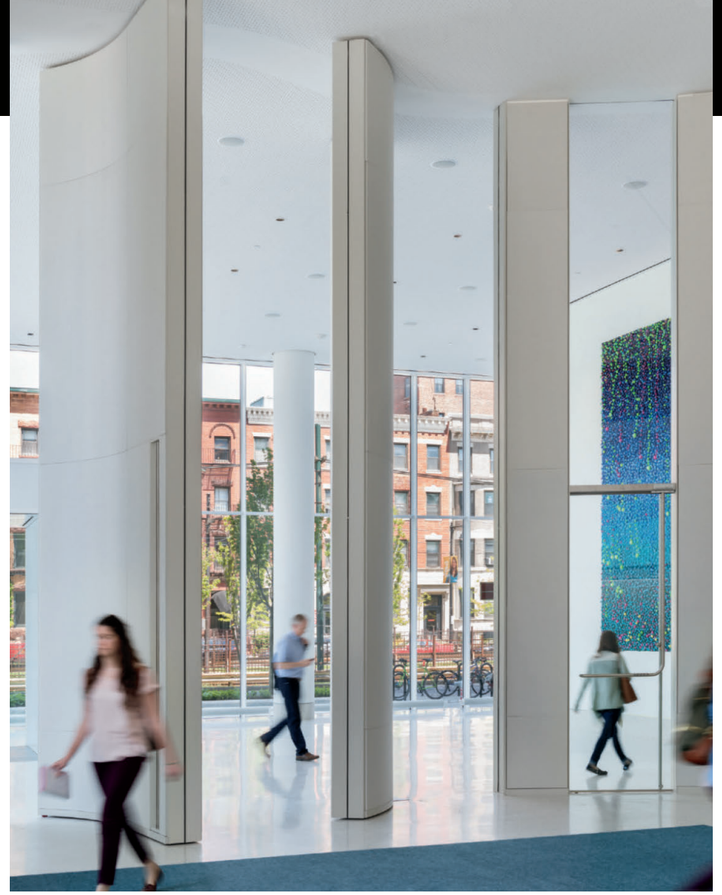
COMBINING DISCIPLINES

The new Rajen Kilachand Center for Integrated Life Sciences & Engineering brings together biomedical engineers, life scientists, and neuroscientists who will tackle some of humanity's most vexing problems.

With flexible labs, ample common spaces, and a distinctive lack of corner offices, the Kilachand Center was designed with collaboration and scientific serendipity in mind.



It's not just about replacing walls with bridges. It's about unlocking unique combinations of thought and creativity. It's about starting conversations between philosophers and journalists, between painters and doctors, between biologists and engineers. What sets us apart from other research institutions is our size, the sheer volume of knowledge humming up, down, and across both our campuses. We're convinced that exploring the uncharted spaces between our myriad disciplines will yield surprising, powerful, and life-altering results.



The nine-story, 170,000-square-foot Kilachand Center gives science a prominent presence on campus.

HEY, YOU GOT YOUR ENGINEERING IN MY NEUROSCIENCE!

This year saw the official opening of the $150 million Rajen Kilachand Center for Integrated Life Sciences & Engineering in the heart of our Charles River Campus.

As much mixing bowl as research facility, the state-of-the-art Kilachand Center exemplifies the University's research philosophy of combination and collaboration, bringing together interdisciplinary research centers in an effort to tackle some of humanity's most vexing problems in such critical areas as human health, energy, and the environment.

The 170,000-square-foot building is home to the Biological Design Center, focused on understanding and reengineering life's design principles; the Center for Systems Neuroscience, studying how the interactions of neurons in brain circuits underlie behavior; the Center for Research in Sensory Communication & Emerging Neural Technology, fostering research on neural computation mechanisms; and the Cognitive Neuroimaging Center, featuring a cutting-edge fMRI facility.

Helping to fuel the center's work is a record-shattering $115 million gift from **Rajen Kilachand** (Questrom'74, Hon.'14), a visionary BU alumnus and trustee (see story beginning on page 32). His donation supported construction of the center and creates a $100 million endowment called the Rajen Kilachand Fund for Integrated Life Sciences and Engineering that will advance, in perpetuity, groundbreaking research at the intersection of the life sciences and engineering.

In all, the nine-story Kilachand Center will welcome about 160 researchers, postdoctoral students, and staff, as well as 270 graduate students from the Medical and Charles River Campuses—sure to give the building a busy, hive-like feel.

On one floor, you'll encounter engineers, computer programmers, and synthetic biologists making new molecules, tissues, and entire organisms through DNA sequencing and synthesis, 3-D printing, and robotics. They are establishing a powerful platform for solving a host of challenges, from energy shortages and environmental dangers to infectious diseases and cancer.

Take the stairs up a floor and you'll bump into neuroscientists, psychologists, and mathematicians researching sensory processing, perception, and neural coding, to develop innovative technologies that could lead to remedies for such issues as aphasia, attention deficit hyperactivity disorder, autism, and age-related hearing loss.

Pop down a few levels and you'll come across biomedical engineers teaming up with neuroscientists to decipher how the neurons in brain circuits work to code information and guide behavior; their research has staggering implications for conditions such as Parkinson's and Alzheimer's, depression, and bipolar disorder.

With glass walls, lab space that can change to suit research needs, strategic communal areas, and a so-called communicating staircase that connects individual floors and labs, the Kilachand Center was designed with collaboration, transparency, and scientific serendipity in mind.

"Physical spaces are intimately linked to the discovery process," says **Christopher Chen**, director of the Biological Design Center and one of the world's leading experts in regenerative medicine. "Chatting over coffee and realizing that between you, there's a new idea—that's where those 'aha!' moments happen."

Gloria Waters, vice president and associate provost for research, says the Kilachand Center is a vivid illustration of BU's research philosophy. "What we were trying to accomplish was to create a space that would allow for the kind of collaborative science that we want to have happen, and also to design a building that was flexible and that was for the future, because we don't know where science is going to go at any given time."

ILLUMINATING THE BRAIN

Boston University has been a leader in the emerging field of neurophotonics, a noninvasive, light-based technology that allows scientists to study the brain's functioning in real time. Last year, we capitalized on our expertise in neuroscience and photonics to create the Neurophotonics Center, and we recruited one of the world's preeminent researchers in the field to lead it.

David Boas joined us from Massachusetts General Hospital, where he pioneered new technologies to see deep into the brain. His work has improved our understanding of the organ's healthy functioning and offers new pathways to understand how strokes, migraines, Alzheimer's disease, and other neurologic maladies affect it. Boas, the center's director and a professor of biomedical engineering, is already recruiting faculty from the College of Engineering and across the University >

DAVID BOAS
The director of the Neurophotonics Center has pioneered new technologies to see deep into the brain.

"There are tremendous advantages to biomedical and photonics engineers working with neuroscientists. Neuroscientists have questions and problems that engineers want to solve. Those solutions advance the field and lead to new questions and new solutions."

DAVID BOAS

to pool expertise and further accelerate neurophotonics technologies.

"There are tremendous advantages to biomedical and photonics engineers working with neuroscientists," Boas says. "Neuroscientists have questions and problems that engineers want to solve. Those solutions advance the field and lead to new questions and new solutions."

IN-HOUSE TECH

Whether it's helping collect data on word associations in British and Danish literature, assessing functional abilities of people with spinal cord injuries, or illuminating wage gaps through code, a group of campus technologists is putting programming expertise at the fingertips of faculty members, allowing them to see their research with new eyes and convey the results in ever more engaging ways.

We're talking about the Software & Application Innovation Lab (SAIL), at the Rafik B. Hariri Institute for Computing and Computational Science & Engineering. SAIL is part start-up, part collaborator, part high-tech consulting firm. And it's all in-house.

Recognizing the critical role that professional software development plays in advancing research across the landscape of academic disciplines, **Azer Bestavros**, founding director of the Hariri Institute, William Fairfield Warren Distinguished Professor, and professor of computer science, created SAIL. He says the lab "acts as a flexible, widely connected hub that supports the Hariri Institute's mission of encouraging and enabling computational and data-driven collaborations that are unique to BU, provides a competitive edge for BU faculty as they envision, >

Mind Melds

THE RAFIK B. HARIRI Institute for Computing and Computational Science & Engineering is synonymous with collaboration. Here are just a few recent projects:

● **SOCIAL DETECTION** Professors from the Colleges of Communication, Engineering, and Arts & Sciences tapped Hariri Institute expertise to analyze large-scale social data and the efficacy of machine-learning techniques for detecting topics in tweets and YouTube videos collected during the 2016 US presidential campaign.

ANDREI LAPETS
At SAIL, Lapets oversees an in-house technology group that collaborates with researchers.

FIONA WHITTINGTON (COM'19)
As the head of student innovation at BU Spark!, she helps students realize their entrepreneurial potential.

AZER BESTAVROS
The founding director of the Rafik B. Hariri Institute for Computing and Computational Science & Engineering is the creator of SAIL.

● **BU SPARK!** Funded by a $1 million gift from the Mullen Family Foundation and housed at the Hariri Institute, the new BU Spark! is a supportive community for student-centered entrepreneurship in computing and helps them pursue next-stage development of their ideas, concepts, and creations for innovative computing and data-driven technology.

● **MOBILE AID** A group of BU undergrads partnered with the Hariri Institute to create Urban Refuge, an app to help urban-bound Syrian refugees in Jordan find services and aid.

● **HOW IKEA DECIDES** A Hariri research grant and computing power is helping **Marianne Baxter**, a professor of economics, and **Margrit Betke**, a professor of computer science, decode how furniture retail giant Ikea makes decisions about product creation and price setting. Their findings could give economists vital information to help governments regulate businesses and respond to economic fluctuations.

● **BETWEEN GREEK SANCTUARIES AND THE ENVIRONMENT** With funding from a Hariri research award, **Andrea Berlin**, a professor of archaeology, and PhD candidate **Natalie Susmann** are developing an online, interactive platform that analyzes the visual and spatial relationships between Greek sanctuaries and the natural landscape.

● **KIDNEY BIOPSY IMAGES UNPACKED** A group of professors at the School of Medicine, with the help of Hariri Institute expertise, is using artificial intelligence to derive quantitative information from kidney biopsy images that can then be used to develop treatments.

ANDREA BERLIN
The professor of archaeology uses modern tools to bring antiquity to life.

JONATHAN WOODSON
The former head of the Military Health System leads the University's Institute for Health System Innovation & Policy.

propose, and execute new research efforts, and allows the BU community to invest in skills and personnel that stay in-house over the long term."

The growing team currently includes five software engineers and a research development and consulting manager, as well as several interns. The crew generally works on half a dozen projects at a time, from both the Medical Campus and the Charles River Campus, and has applied its know-how to some 40 projects since forming in 2015.

"We see every project as an opportunity to learn something new," says **Andrei Lapets**, the Hariri Institute's director of research development and associate professor of the practice in computer science. "We might look at something and say, 'we don't actually know the technology for this project, but we know that we can learn it,' because that's the culture we encourage at SAIL."

CULTIVATING HEALTHCARE LEADERSHIP

Jonathan Woodson, a vascular surgeon and former assistant secretary for health affairs for the US Department of Defense, was tapped to lead the new University-wide Institute for Health System Innovation & Policy, based in the Questrom School of Business.

A collaborative endeavor, the new institute will focus on expanding health system research initiatives across both the Charles River Campus and the Medical Campus, deepening connections between scholars, policymakers, and corporations and advancing curricular initiatives across the University's schools and >

Fueling the Funding: Our Grants & Awards

FROM ANALYZING refugee population flows to decoding brain function to diabetes interventions, our researchers brought home some notable funding this year. Leading the list was a **$20 million**, five-year award from the National Science Foundation (NSF) to create a multi-institution **Engineering Research Center**, with the goal of synthesizing personalized heart tissue for clinical use. The grant, which is renewable for a total of 10 years and $40 million, is designed to accelerate an area of engineering research—in this case, bioengineering functional heart tissue—that is likely to spur societal change and economic growth within a decade. In other news:

- **Neuroscientist Michael Hasselmo** is the principal investigator on a five-year, **$7.5 million** Office of Naval Research grant to investigate how human brains learn rules, and how this might be translated into computer programs, especially for autonomous systems.

- **Kathleen Corriveau**, an associate professor of human development at the School of Education, was awarded a **$1 million** NSF CAREER grant to explore how adults can best support early childhood development of scientific inquiry.

- **Nathan Jones**, an assistant professor of special education, received a four-year, **$1.6 million** grant from the Institute of Education Sciences to measure how teachers spend their time in and out of the classroom and how they respond emotionally to aspects of their work.

- **Richard Saitz**, chair and professor of community health sciences at the School of Public Health, and colleagues received a **$658,000** grant from the National Institute on Alcohol Abuse and Alcoholism to study the role that alcohol and drug use plays in the elevated incidence of falls, fractures, and other physical impairments among people with HIV.

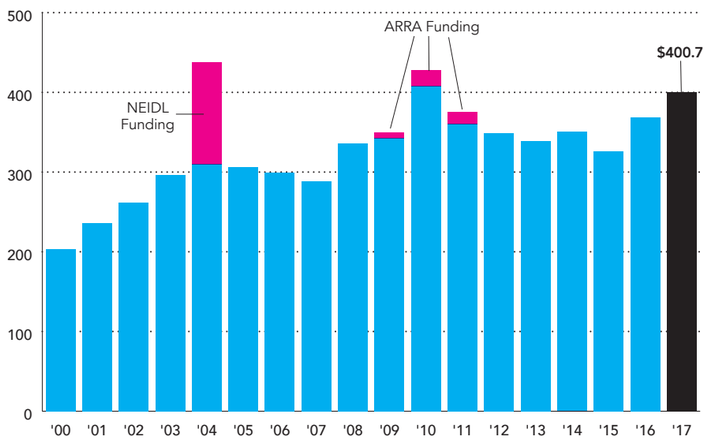
- **The Center for Regenerative Medicine** at the School of Medicine and Boston Medical Center received three awards totaling **$9 million** from the National Institutes of Health (NIH) to advance its induced pluripotent stem cell research and education.

- **Arturo Vegas**, a College of Arts & Sciences assistant professor of chemistry, was awarded a **$2 million** NIH grant to develop therapies that intervene at the early stages of type 1 diabetes.

- **Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator (CARB-X)**, the BU School of Law–based public-private partnership created to spur the development of new antimicrobials, awarded **$24 million** to 11 biotech companies and research teams in the United States and the United Kingdom this past spring for their work on urgently needed new antibiotics and diagnostics aimed at drug-resistant superbugs. CARB-X plans to award **$450 million** over the next four years, with the goal of accelerating the preclinical discovery and development of at least 20 antibacterial products—and advancing at least two new products into human trials.

BU's Sponsored Program Awards FY2000–2017*

$ millions



*Excluding Financial Aid. FY2004 includes $128.0 million for the construction of the National Emerging Infectious Diseases Laboratories (NEIDL). Awards in FY2009–FY2011 reflect funding from the American Recovery and Reinvestment Act of 2009 (ARRA).

colleges. With Woodson at the helm, the institute plans to bring together world-class academic, industry, and regulatory resources to address important national and global healthcare challenges.

Woodson, who joins the Questrom faculty as Larz Anderson Professor in Management and professor of the practice and also holds appointments at the Schools of Medicine and Public Health, commends the work Questrom has already done toward improving intelligent practices and operation, as well as in training future leaders in healthcare. "In the 21st century," he says, "these leaders need to be equipped with new skills to utilize data and organize multidisciplinary teams to solve complex problems."

SPEEDING THE TOOLS

Commercializing medical technology is no walk in the park. It takes the work of basic scientists, clinical researchers, engineers, and, eventually, industry partners. It also takes time, with one group passing on knowledge to the next like a baton until a marketable version of the technology takes shape. At least that's the traditional playbook.

Catherine Klapperich aims to change all that. Her solution? Bring together all the groups on the development spectrum so they're doing their work, and sharing intelligence, at the same time. Welcome to the new Precision Diagnostics Center, where researchers from the College of Engineering and the Schools of Medicine, Dental Medicine, and Public Health are creating smarter and more portable diagnostics—and, more importantly, getting them to the patient faster.

"The center will play to BU's unique strengths as a research university, including expertise in the areas of infectious disease, healthcare disparities in underserved communities, and photonics," she says. "We're excited to make a global impact where it is most needed."

ALL HANDS ON DECK

Ever since the wave of "fake news" that roiled the 2016 presidential campaign, pundits and journalists have been debating how bogus information may have influenced the election, and how to combat this disturbing trend. But understanding, contextualizing, and finding fixes will take more than just the efforts of the Fourth Estate and its social media cousins.

James Katz, Feld Professor of Emerging Media and director of the College of Communication's Division of Emerging Media and its Center for Mobile Communication Studies, and **Juliet Floyd**, a philosophy professor and historian of logic, mathematics, and science, recently teamed up to tackle the topic. As principal investigators on a yearlong Mellon Foundation Sawyer Seminar grant, the pair are bringing together humanists, social scientists, computer scientists, and experts on big data to discuss humans, values, and society in transition. They kicked things off with an international symposium, Journalism and the Search for Truth in an Age of Social Media, hosted by BU.

"The Mellon Foundation supported our initiative, I believe, because they wanted to help us give the humanities a voice in this rapidly evolving arena of computational technologies," Floyd says.

Props to Our Profs!

OUR WORK is never about the accolades, but it's always nice when they come in. Last year, faculty activity outside the classroom garnered attention on campus and beyond. Meet a few of our movers and shakers:

Dana Robert, Truman Collins Professor of World Christianity and History of Mission, was elected to the American Academy of Arts & Sciences, the first School of Theology faculty member to be chosen.

The Society for Neuroscience awarded the Swartz Prize for Theoretical and Computational Neuroscience to **Nancy Kopell**, a William Fairfield Warren Distinguished Professor and College of Arts & Sciences professor of mathematics and statistics, "for her pioneering and influential role in the field of computational neuroscience, as well as the strength of her collaborations and mentoring."

Kenneth Rothschild, College of Arts & Sciences professor of physics, was named a fellow of the National Academy of Inventors.

To help combat the global threat of treatment-resistant bacteria, **Ahmad (Mo) Khalil**, a College of Engineering assistant professor of biomedical engineering, won a New Innovator Award under the High-Risk, High-Reward Research program sponsored by the National Institutes of Health.

Assistant Professor of Economics **Samuel Bazzi** received an Excellence Award in Global Economic Affairs for 2017 from the Kiel Institute for the World Economy.

DANA ROBERT
The theology professor was named to the American Academy of Arts & Sciences.

Thomas T. Perls, a School of Medicine professor, was honored by the Gerontological Society of America with the 2016 Joseph T. Freeman Award for his stewardship of the New England Centenarian Study.

Xin Zhang, a professor of mechanical engineering and materials science and engineering, has been named a fellow of the American Association for the Advancement of Science for her "distinguished contributions to the field of micro/nanoelectromechanical systems, addressing a wide range of important problems in advanced materials, biophotonics, and energy."

School of Public Health Dean and Robert A. Knox Professor **Sandro Galea** was elected chair of the Association of Schools & Programs of Public Health, an international organization representing accredited public health schools and programs worldwide.

David Felson, a professor of medicine and epidemiology at the School of Medicine and School of Public Health, won the 2017 Carol Nachman Prize for Rheumatology, the most prestigious international award for research in rheumatology.

EQUIPPING

STUDENTS

Peter Dazeley/Getty Images

ELIZABETH LOIZEAUX
The associate provost for undergraduate affairs helped lead an overhaul of the undergraduate curriculum.

Today, the world spins fast, changing constantly. It's an exhilarating, tumultuous, and radically different place from even five years ago. Media, politics, communications, education, and the economy have all been transformed. Students can expect to change jobs, even fields, multiple times during their professional lives. That means learning to pivot—mastering a diverse skill set, an intellectual range, and an experiential track record. So BU is leveraging the collective brainpower of our 17 schools and colleges. We are offering a unique education to develop new kinds of graduates, prepared to succeed no matter what the world throws at them.

ANUSH SWAMINATHAN (CAS'18, KILACHAND'18)
A member of BU's Student Advisory Board, he describes the new approach to undergraduate education at BU as a "bold embodiment of liberal arts."

MARI FLETCHER (CGS'16, COM'18)
Another member of BU's Student Advisory Board says the BU Hub "is fundamental in building well-rounded individuals by giving students knowledge that transcends a purely academic setting."

BRUCE SCHULMAN
The history professor is cochair of the task force that helped develop the new BU Hub over the past three years.

HOW TO AUTHOR YOUR OWN STORY

Producing educated, well-informed students who are attractive to employers is merely the baseline. Sending effective, civically minded, globally engaged, lifelong learners into the world is our mission. Clearly, post-collegiate life is as complex and challenging as ever. Today, careers and entire industries can emerge and disappear within a few years, a phenomenon only expected to accelerate in the future. Life after college is no longer about what you are, but how you are. It's about your ability to think, create, adapt, and collaborate, not the title listed on your business card. It's about knowledge and know-how.

To confront this reality head-on, we spent the past three years researching, analyzing, and discussing the ways our students learn and what today's world will demand from them. With the help of more than 100 faculty spread over 12 committees, along with substantial input from students, parents, alumni, and employers, we set about redefining our undergraduate learning experience by creating our first-ever University-wide general education program. The result is the BU Hub: a comprehensive agenda of curricular, extracurricular, and lifelong learning.

"Traditionally, general education has been thought of as foundational—the first two years and then you choose your major and move on," says task force cochair **Elizabeth Loizeaux**, associate provost for undergraduate affairs and a College of Arts & Sciences professor of English. "This new curriculum is explicitly not that. It will be integrated across all four years. And it will be not just courses, but cocurricular experiences as well."

Drawing on the vast range of courses from our 10 undergraduate schools and colleges, all of which are now open to the entire undergraduate student body, the new BU Hub might see engineering students studying the arts, business majors investigating religious thought, aspiring educators exploring computer science. To facilitate such cross-disciplinary exploration, students will master a variety of capacities: communication; philosophical, aesthetic, and historical interpretation; social and scientific inquiry; and quantitative reasoning. Another capacity—diversity, civic engagement, and global citizenship—was designed to go beyond the classroom and workplace, facilitating graduates' ability to contribute to the good of society throughout their lifetimes.

"Our students will gain the skills and knowledge they need to thrive in the world at the same time as they're developing their professional and intellectual specialization," says **Bruce Schulman**, task force cochair and a professor of history at the College of Arts & Sciences. "Maybe you're going to be an engineer, but now you're also going to learn how to present and sell your design, and how to write an effective proposal to get it funded."

> "Traditionally, general education has been thought of as foundational—the first two years and then you choose your major and move on. This new curriculum is explicitly not that. It will be integrated across all four years."
>
> ELIZABETH LOIZEAUX

Another distinguishing feature of the BU Hub is a cross-college challenge. Students from different schools and majors will collaborate on a semester-long project. Along the way, they will develop team-building, research acumen, and conceptual and communications skills—attributes vital to any workplace.

University Provost and Chief Academic Officer **Jean Morrison** says the new curriculum not only represents the latest phase in BU's maturation as one of the nation's leading research universities, but aims to deliver on the value proposition. "We are a research university, but we're also deeply engaged in education. Our mission is to educate and help undergraduates develop the skills and capacities necessary to compete in a global, interconnected world."

CITIZENRY 101

Civic engagement at home, and around the world, builds on a long-standing tradition on campus, dating back to our founding in 1839. From bringing philosophy into homeless shelters to crafting sustainability plans for the University to logging miles for autism awareness, below is a sampling of ways our student community gave back last year:

- BU's annual Global Days of Service saw community members from Atlanta to Kyrgyzstan to Shanghai volunteer 10,752 hours over the course of one month. >

ADELA CEJNAROVA (CAS'17, COM'19)
A three-time Patriot League Golfer of the Year and owner of a 3.70 GPA, she won this year's Gretchen Schuyler Award, given to the top female scholar-athlete senior.

JUSTIN FLYNN (CGS'15, QUESTROM'18)
The Track & Field standout received the Boston University Student Service Award for his impact across the BU community, especially in his efforts to unify men of color on campus.

How We Stacked Up

AS THEY DO every year, education experts around the globe put our offerings under their rankings microscope. The latest numbers:

U.S. News & World Report
#37
Nationally
#32
Globally

For graduate programs:
#3 Healthcare Law
#8 Tax Law
#9 Intellectual Property Law
#12 Biomedical Engineering

Wall Street Journal
#40
Nationally

Times Higher Education
#34
Among US universities
#70
Globally

For employability of graduates:
#11 globally
#6 nationally

QS
#27
Nationally
#81
Globally (in top 1% worldwide)

Coming in Hot! The Class of 2021

By the numbers:

60,825
Applications to the Class of 2021

25%
Admitted to the Class of 2021

3,498
Students Enrolled in the Class of 2021

22%
International

3.69
Average GPA (4-year programs)

1406
Average Best Composite Score (4-year programs)

61%
Received Financial Aid*

23%
Pell Grant Recipients*

24%
Underrepresented Minority*

**Domestic students*

HAILING FROM 74 countries and 47 states, a particularly diverse and talented group of freshmen landed on campus in fall 2017.

Members of the Class of 2021 come from the top 10 percent of their high school class, boast a 3.69 grade point average, and clocked an average Best Composite Score of 1406. More than a third are minority students.

About 18 percent of this year's entire incoming class come from low-income families, compared to 14 percent last year—thanks, in part, to the University's increasing financial assistance to students receiving Pell Grants.

And diversity also extended to experience. One student is an aspiring neurobiologist who appeared on Brazil's version of *The Voice*. Another completed an internship at a wildlife sanctuary in Namibia, while a third received the President's Volunteer Service Award from President Barack Obama for her work at the Ghanaian Women's Association of Georgia.

Whether from near or far, this year the BU mosaic only grew more vibrant.

● The Community Service Center, which provides opportunities for students to make a difference in the lives of residents in the Greater Boston area, fielded 4,000+ volunteers in over 70 yearlong programs and one-time events, completing more than 100,000 hours of service.

● Thanks to a $2,000 grant from the University, philosophy major **Clarinda Blais** (CAS'17) created the Free Philosophy Project, which brings discussions of free will and happiness and moral responsibility to homeless shelters across the city. Her initiative has since spread to 11 shelters for women, men, and families in Boston and Cambridge, Mass.

JOHN HUNTER (CAS'19)
Teaming up with astronomy faculty, he studied the plasma jets associated with black holes.

VICTORIA SMITH (CAS'18, PARDEE'18)
The economics major won a UROP Outstanding Student Researchers Award for her research on gun violence.

● Over in the athletics department, our student-athletes took up a variety of causes last year. More than 20 athletes and coaches volunteered at the 14th annual Greater Boston Walk Now for Autism Speaks fundraising and awareness event at the Xfinity Center in Mansfield, Mass. In October, some 100 BU student-athletes laced up for the American Cancer Society's walk on the Charles River Esplanade. And in April, the women's soccer team and spirit squad took part in the Walk MS Boston for the National Multiple Sclerosis Society.

● **Katie Jane Mossburg** (ENG'20) and **Raymond Rosenbloom** (CGS'16, Sargent'18) were awarded the Santander Urban Impact Microgrant, which offers funding to students to pursue community-centered projects. The pair put the grant toward the Gavin Foundation, a treatment house in South Boston where they both volunteer, helping residents with their résumés and sharpening their professional skills.

● **Andrea Somoza** (COM'17) spent BU's Alternative Service Breaks working at Iniciativa Comunitaria in Puerto Rico, a community-based nonprofit that promotes health, education, and prevention services to special populations that have been marginalized by the traditional health system.

● Two environmental leaders on campus, **Rachel Eckles** (CAS'17) and **Ryan Peters** (ENG'17), were recognized this year by the University's sustainability department. Eckles' work with the City of Boston and the University's Climate Action Plan Task Force helped both groups understand the challenges of measuring climate impacts from the waste stream of BU and the city. Peters has been a vocal advocate for clean energy on and off campus and a driving force in building a more sustainable culture and infrastructure at BU.

STUDENT THINKUBATOR

The Undergraduate Research Opportunities Program was created at Boston University 20 years ago to nurture student curiosity, spark their imaginations, and cultivate relationships with faculty beyond the classroom. Last year, our undergraduates collaborated on innovative projects in a variety of places, from outer space to inner space, and everything in between.

● **Phillip Teng** (ENG'19) helped construct magnetic sensors to study the phenomenon of the auroras for a NASA-funded satellite research mission. Working with Joshua Semeter, an electrical and computer engineering professor, Teng was part of ANDESITE, an interdisciplinary project funded by NASA and run by students to study changes in Earth's magnetic field caused by interactions with space, such as the aurora.

● **Victoria Smith** (CAS'18, Pardee'18), an economics major, spent last summer researching gun violence and the firearm industry under the guidance of Michael Siegel, a professor of community health sciences at the School of Public Health. Smith won a UROP Outstanding Student Researchers Award for her work.

● **Varnica Bajaj** (ENG'19) worked in the lab of regenerative medicine pioneer Christopher Chen. Her project focused on building an in vitro cell-culture–based device that can mimic the complex kidney filtration function. This technology would allow researchers to study a variety of diseases in a controlled, cost-effective environment without live animal testing.

● **Lena Huang** (Sargent'17) researched the risk of falls at home after bariatric surgery. She gathered data that could lead to more targeted therapies and a reduced risk of falling. Huang worked with Simone V. Gill, an assistant professor of occupational therapy and director of the Sargent Motor Development Lab.

● **David Baylies** (ENG'17), a mechanical engineering major and music lover, created an electronic trumpet that does a better job mimicking the real thing than current electronic versions. He was guided by R. Glynn Holt, an associate professor of mechanical engineering at the College of Engineering.

● **John Hunter** (CAS'19), an astronomy major, worked with Professor Alan Marscher in studying blazars, the extremely energetic plasma jets that emanate from supermassive black holes in the centers of active galactic nuclei. ●

INFUSING INDUSTRY

The "bionic pancreas," developed in Professor Ed Damiano's lab in the biomedical engineering department, is approaching final clinical trials and illustrates the proactive stance BU takes in moving ideas and inventions from campus into the marketplace.

MICHAEL PRATT
The managing director of the Technology Development office works with faculty to develop their products and help move them to market.

SWATHI KIRAN
The professor of speech, language, and hearing sciences created a company that designs mobile applications for customizable therapy.

On most college campuses, the traditional road to market saw federally funded researchers toiling until their work reached the point of viability before courting potential corporate partners. Today, the approach is radically—and necessarily—different. The world is far more complex, with new problems and challenges cropping up with unprecedented speed. At the same time, there is greater competition for a smaller pool of federal research dollars. In response, our researchers have been collaborating with industry backers much earlier in the development process, greatly accelerating research progress and bringing real-world benefits into the marketplace faster than ever before.

> “It’s an important responsibility to try and commercialize these technologies so more people can benefit from all the hard work that goes into research and discovery.”
>
> **MICHAEL PRATT**

GOING THE DISTANCE

Even before taking the helm at the Technology Development office last year, **Michael Pratt** served in its technology transfer and business development sections, and he has been all-in when it comes to moving the innovative work of BU researchers into the hands of the public. And if it meant getting himself hooked up to IVs for 27 hours for one of his researchers’ clinical trials, well, that’s what he was going to do.

“I believed in Ed’s work,” Pratt says.

In 2015, Technology Development helped **Ed Damiano**, a professor of biomedical engineering at the College of Engineering, navigate a mountain of licensing and intellectual property agreements to start Beta Bionics, Inc., as a public benefit corporation. The company’s mission is to serve the type 1 diabetes community by getting Damiano’s bionic pancreas through final clinical trials and the regulatory process and into commercialization. Damiano credits Pratt’s office with guiding him and his Beta Bionics partners through “an incredibly complex licensing deal involving many stakeholders, under an absurdly short timeline, and through the 2015 holiday season.”

Pratt’s job is to connect people from two different worlds—academia and industry. “It’s an important responsibility to try and commercialize these technologies so more people can benefit from all the hard work that goes into research and discovery,” he says.

Getting a discovery to market can take years—if it gets there at all—and Pratt says Technology Development’s goal is to help faculty navigate the paperwork, and the inevitable obstacles, as smoothly as possible, while at the same time protecting their interests. “We’re not a gatekeeper,” he says. “We’re an enabler. We want people to view tech transfer not as an administrative burden, but as an office that helped them through this difficult process and didn’t hold them back.”

Other faculty endeavors Technology Development helped facilitate last year:

- Pulmonary physician-scientist **Avrum Spira** teamed up with Janssen Research & Development, one of the Janssen Pharmaceutical Companies of Johnson & Johnson, as well as the company’s venture capital subsidiary, Johnson & Johnson Innovation. Janssen is investing more than $10 million in Spira’s research into biomarkers for the early detection of COPD and lung cancer. “Janssen is becoming involved in the process as a partner from the very beginning,” says Spira, a professor of medicine, pathology, and bioinformatics at the School of Medicine. “It’s science done with application in mind at the earliest stages—not science for science’s sake.”
- **Carmela Abraham**, a School of Medicine professor of biochemistry and of pharmacology and experimental therapeutics, founded Klogene Therapeutics, Inc., to develop novel treatments for Alzheimer’s disease, based on boosting the levels of the protein Klotho in the brain. Last year, Klogene won a $1.49 million Small Business Innovation Research grant from the National Institute on Aging of the National Institutes of Health to help move the research forward. >

GUSTAVO MOSTOSLAVSKY

An associate professor of medicine and microbiology and codirector of BU’s Center for Regenerative Medicine, Mostoslavsky was named the 2017 Innovator of the Year by BU and the Technology Development office. He was recognized for his work in developing STEMCCA, licensed to Millipore/Merck and adopted by more than 700 laboratories worldwide, a tool that makes it simpler and more efficient to generate induced pluripotent stem cells, which can develop into gut, liver, lung, muscles, skin, nerves, and almost any other cell type.

Dropping Knowledge

TAPPING INTO the knowledge base beyond campus paid dividends last year as our faculty and students partnered with a variety of prominent companies, sharing ideas inside and outside of the classroom.

Most notably, Red Hat, the world’s leading provider of open source enterprise software, joined us in a five-year partnership aimed at advancing research into emerging and translational technologies, such as cloud computing and big data platforms. The collaboration will involve researchers from both Red Hat and BU, and will provide opportunities for students, staff, and faculty to drive new ideas and new technologies. The plan includes support for two research labs, one at Red Hat’s new corporate space in Boston’s Seaport District and one on the Charles River Campus.

In other partnerships:

- Schlumberger, a leader in oil field technology and reservoir characterization, launched the Schlumberger/Boston University Fellowship program. Grants pair BU graduate students with Schlumberger researchers to pursue early-stage research in areas of technical interest to the company.
- The Honda Research Institute, a Honda R&D subsidiary, signed a multiyear agreement with the Hariri Institute for Computing and Computational Science & Engineering to research privacy-preserving methods so that consumers can trust that assistance systems for human operators protect their data while executing their wishes.
- We also saw an uptick in corporate engagement in the classroom. A few examples include GE teaming up with computer science students on an app development project; Novartis Institutes for Biomedical Research holding a course on Drug Discovery & Development (D3) for our PhD students and postdocs; and Fidelity serving as a collaborative partner for students in the Questrom Master of Science in Management Studies program.

When the World Is Your Lab: Our Year in Global Research

MANY OF OUR professors, researchers, and scholars cast their eyes beyond Boston, across oceans and borders. From South America to sub-Saharan Africa, our thinkers and doers are making a difference on all seven continents. Below are a few examples:

● **Muhammad Zaman**, professor of biomedical engineering, developed an inexpensive, reliable, and portable drug-screening device to tackle counterfeit pharmaceuticals, which are a particular problem in developing countries.

● **Madeleine K. Scammell**, an associate professor of environmental health at the School of Public Health, has been tackling El Salvador's kidney disease epidemic, particularly among agricultural workers; in 2017 her research won a prestigious Outstanding New Environmental Scientist Award, given by the National Institute of Environmental Health Sciences at the National Institutes of Health.

● **Karen Warkentin**, a biology professor with the College of Arts & Sciences, is studying glassfrog eggs in Colombia to shed light on how parental sex roles evolve, particularly those of the father.

● **Davidson Hamer**, a professor at the School of Public Health and School of Medicine, is PI for GeoSentinel, a system of clinics and hospitals that links travel and tropical medicine centers around the world; his group was among the first to recognize Zika's pregnancy complications and GeoSentinel mapped the epidemic in real time.

● **Peter Blake**, assistant professor in the department of psychological and brain sciences, studied how Boston-area children's sharing habits compared with those in rural India, to gain insight into whether children's behavior patterns are hardwired or a product of culture.

● **Christopher Schmitt**, an anthropology assistant professor, studied vervet monkeys from the Caribbean to Africa to understand the genetics of obesity in primates.

MADELEINE K. SCAMMELL
The associate professor of environmental health won an Outstanding New Environmental Scientist Award, given by the National Institute of Environmental Health Sciences, NIH.

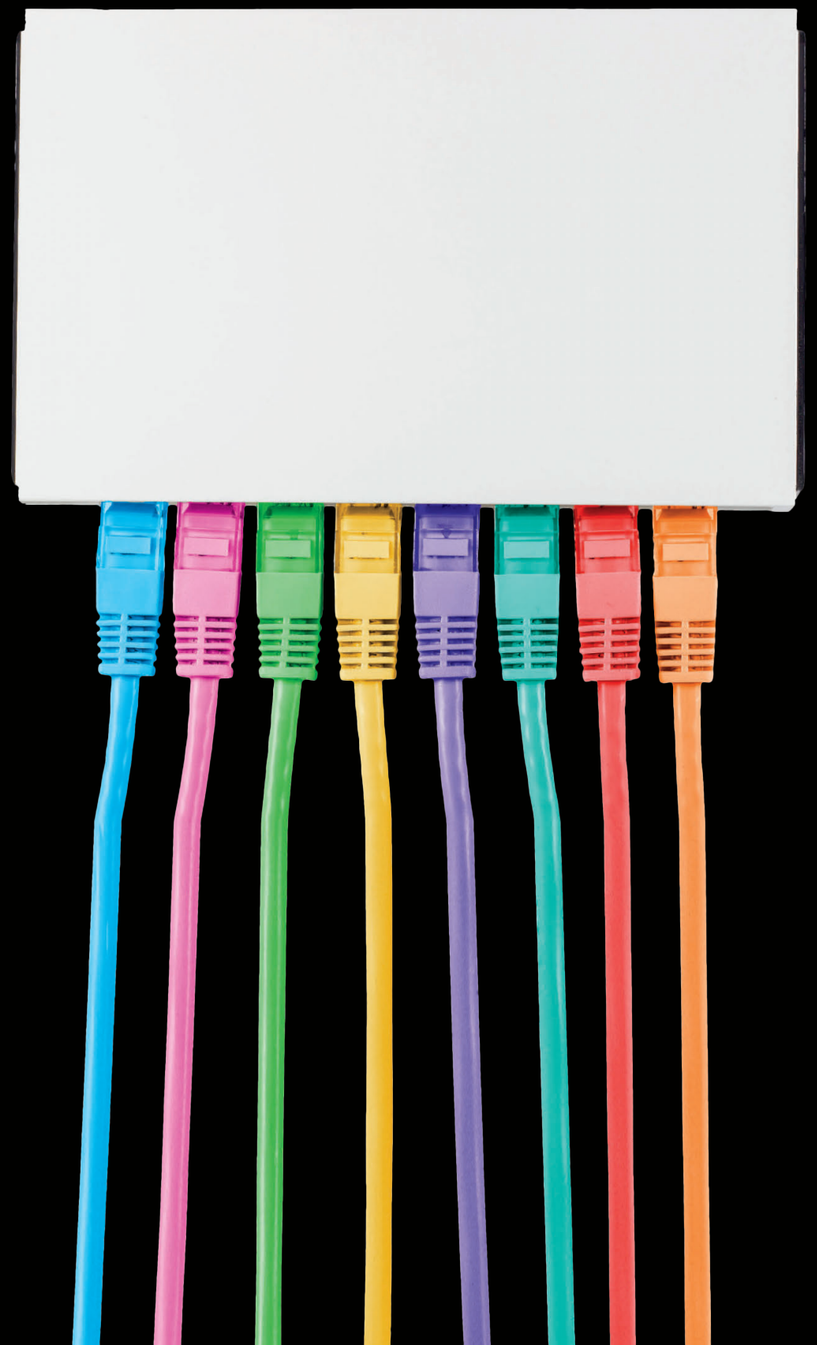
CARMELA ABRAHAM
The professor of biochemistry and of pharmacology and experimental therapeutics landed a $1.49 million grant for Klogene Therapeutics from the National Institute on Aging, NIH.

● Digital Health Corp, a healthcare company focused on developing affordable, at-home therapy solutions, this summer acquired the BU-born Constant Therapy. The company grew out of groundbreaking research at the lab of **Swathi Kiran**, a College of Health & Rehabilitation Sciences: Sargent College professor of speech, language, and hearing sciences. Constant Therapy designs mobile applications for customizable therapy for people with speech, language, cognition, memory, and learning disorders caused by traumatic brain injury, stroke, aphasia, and learning disorders.

● Guavus, Inc., a BU-born pioneer in big data analytics platforms, signed a merger agreement last spring with Thales, a global technology leader for the aerospace, transport, defense, and security markets. Founded in 2006 by BU grad **Anukool Lakhina** (CAS'01, GRS'01,'07) not long after receiving his doctorate in computer science, Guavus enables businesses to use their own data the instant it's captured, in order to become more efficient and profitable. Its suite of offerings is built upon a technique developed by Professor of Computer Science **Mark Crovella** with funding from the National Science Foundation and licensed from BU.

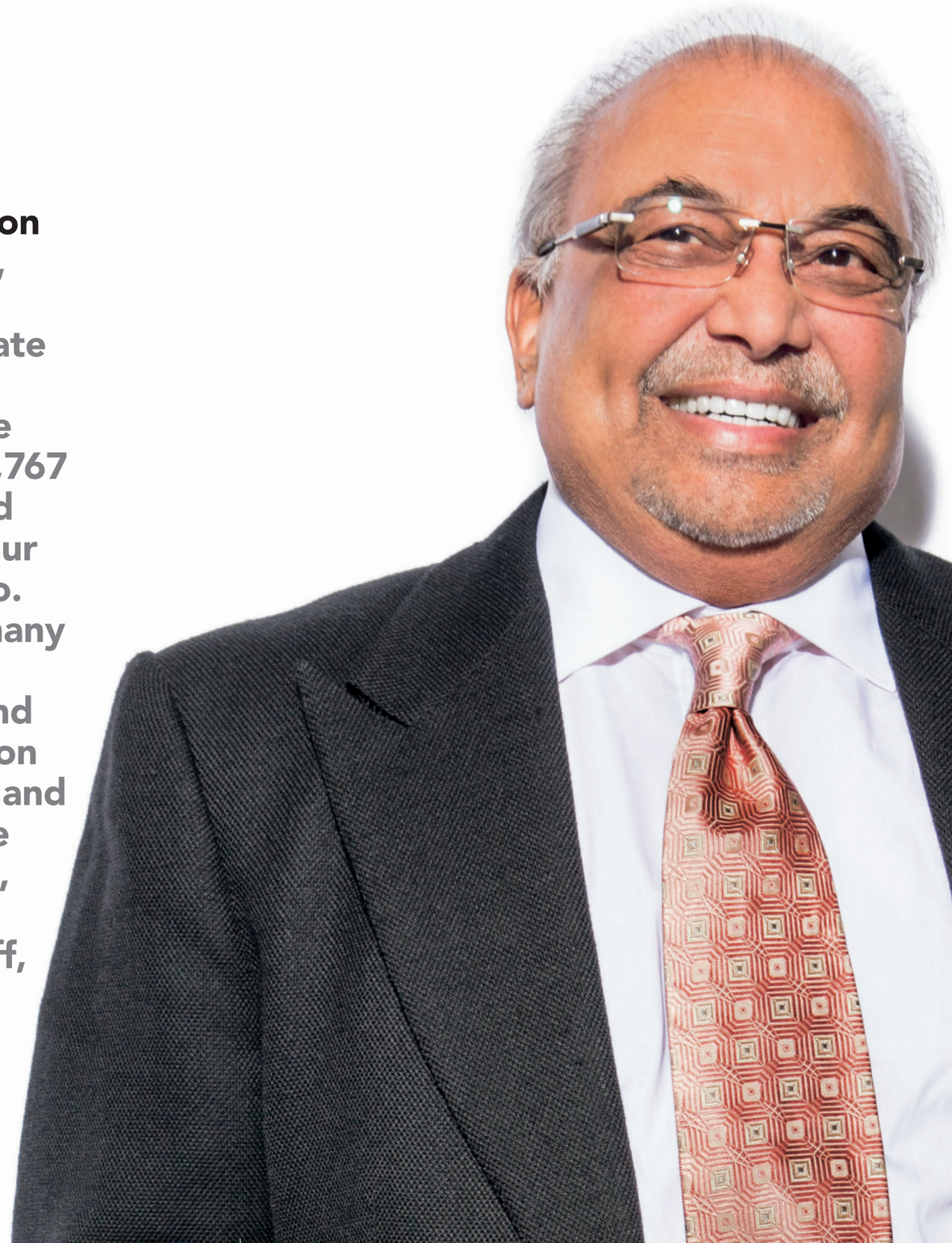
● Faculty spin-out companies report they've raised more than $100 million in capital investments during the past fiscal year, including $10 million (and another $7 million in 2016) for Aquinnah Pharmaceuticals, a firm focused on neurodegenerative diseases, cofounded by **Ben Wolozin**, a professor of pharmacology, experimental therapeutics, and neurology at the School of Medicine. ●

DESIGNING THE FUTURE



The new theater complex includes the 250-seat Boston University Joan & Edgar Booth Theatre, a landscaped plaza, and the College of Fine Arts Production Center, with design labs, classrooms, and costume and production shops.

Connection, collaboration, and combination not only underlie our research endeavors, they are the very foundation of our community. We learned just how passionate and committed that community is when we launched our first-ever comprehensive fundraising campaign in 2012. So far, 141,767 people have connected, collaborated, and combined for nearly $1.3 billion toward our $1.5 billion goal, with two years still to go. Gifts ranging from a couple of bucks to many millions are bolstering research, faculty, financial aid, and campus construction. And we shattered all records with a $115 million gift from a visionary alumnus. But dollars and bottom lines merely outline the story. The true, full narrative of Boston University is, and always will be, written by the heart and faith of our professors, students, staff, friends, and alumni.



RAJEN KILACHAND (QUESTROM'74, HON.'14)
An international business leader and visionary alumnus, his gift makes him the largest donor in Boston University history.

THE GENIUS OF GENEROSITY

"My great-grandfather was one of the great philanthropists of his time," says **Rajen Kilachand**, a BU trustee and chair of the Dodsal Group, a global development company based in Dubai. "He gave practically his entire fortune to the village from which his ancestors came. This was an example handed down generation to generation of what philanthropy was about—it was our duty in life to support those less fortunate than ourselves."

Fulfilling that family duty, Kilachand (Questrom'74, Hon.'14) became the largest donor in Boston University history, with a $115 million gift for life sciences and engineering research that promises to accelerate discoveries to solve some of humanity's most vexing problems.

The first part of Kilachand's astounding contribution directs $15 million toward the new, state-of-the-art Rajen Kilachand Center for Integrated Life Sciences & Engineering (see story on page 6), which brings together life scientists, biomedical engineers, and neuroscientists from across the University. Standing at the heart of the Charles River Campus, the $150 million center will be home to some 160 researchers, postdoctoral students, and staff, as well as 270 graduate students.

Helping fuel their efforts will be the second part of Kilachand's donation—a $100 million endowment called the Rajen Kilachand Fund for Integrated Life Sciences and Engineering, which will support, in perpetuity, pioneering research at the intersection of the life sciences and engineering. All told, these commitments represent a quarter-billion-dollar investment in interdisciplinary basic science research that could help rewrite the story lines for patients suffering from Alzheimer's and Parkinson's diseases, accelerate our understanding of memory and speech, and deliver on the promise of synthetic biology to make molecules and tissues that mimic natural function and improve our lives.

"This magnificent and visionary new gift from Rajen Kilachand is the capstone of our efforts to generate philanthropic support for the University," says BU President **Robert A. Brown**. "A center like the Kilachand Center and the resources from the fund will have enormous impact, because they fund the very best people, who have the very best ideas and create the very best outcomes."

The Rajen Kilachand Center for Integrated Life Sciences & Engineering was officially opened September 14 by (from left) Vice President and Associate Provost for Research Gloria Waters, President Robert A. Brown, benefactor and Trustee Rajen Kilachand, Boston Mayor Martin J. Walsh, and Board of Trustees Chairman Kenneth J. Feld.

> "I give to BU and to education in the United States because I am a firm believer that there is no country like the United States for higher education and research."
>
> **RAJEN KILACHAND**

Kilachand has shown generosity to the University before. In 2011, he gave $25 million to establish the Arvind & Chandan Nandlal Kilachand Honors College. One year later, he gave $10 million for a facelift of Kilachand Hall. Those gifts, plus his latest, constitute one of the 50 largest gifts to higher education in the United States.

"I give to BU and to education in the United States because I am a firm believer that there is no country like the United States for higher education and research," Kilachand says. "No place does it with such integrity and honesty. I really believe that in the coming century, leaders at all levels of society must have a very strong sense of the importance of ensuring that some seven billion people have an opportunity to have a good education and quality healthcare. Maybe I'm asking for utopia, but unless you at least dream about it, it's not going to happen. It's not even going to get close."

TURBO-CHARGING THE TALENT

From the get-go, the Campaign for Boston University has set its sights high to cultivate our promising young faculty. Thanks to the generosity of distinguished donors, alumni, and BU's Technology Development office, nine Career Development Professorships were awarded last year to faculty recognized as future leaders within their fields. Meet them all below:

● **Jerry Chen**, a College of Arts & Sciences (CAS) assistant professor of biology, is the winner of the Stuart & Elizabeth Pratt Career Development Professorship. A neuroscientist who uses the sensory input from the whiskers of mice to study the relationship between local circuits and long-range networks in the brain's neocortex, Chen says he hopes his research will further our knowledge of the central nervous system in mammals. >

ARTURO VEGAS
The assistant professor of chemistry was one of several Peter Paul Career Development Professorship recipients.

Opening Doors

IN FY2017, undergraduate students were awarded $226.2 million in need-based and merit-based assistance from the University, with $216.2 million coming directly from the University and another $10 million from the University's endowment and comprehensive fundraising campaign. Our financial aid numbers for University grant funds for the freshmen entering in FY2017 reflect our growing commitment to and support of socioeconomic diversity.

3,552
Matriculated freshmen

2,717
Domestic students (76.5% of class)

69.9%
Students who applied for BU aid*

75%
Aid applicants who received BU aid*

25.6%
Aid applicants who received Pell Grants*

$42,770
Average need of applicants who received BU grants*

$32,105
Average BU grant to applicants who received BU grants*

**Domestic students*

Facts & Figures

$157.5M
Total cash giving for the year set a new record.

$21M
Annual Fund revenue (up 8%)

51,862
Total donors in FY2017

32,336
Alumni donors in FY2017

$1.281B
Total gifts and pledges to the campaign, with $236.2M raised in FY2017

141,767
Number of individual donors over the course of the campaign, including 67,549 alumni donors

$34.9M
Total faculty & staff commitments in the campaign

114
Number of cities reached by Global Days of Service (up 52%), with 210 service projects

135,276
BU Alumni Association social media followers (up 6% across Facebook, LinkedIn, Twitter, and Instagram)

MARCUS BELLAMY
The assistant professor of operations and technology management received the Isabel Anderson Career Development Professorship.

● **Charles Chang**, a CAS assistant professor of linguistics, was one of three recipients of a Peter Paul Career Development Professorship. Chang's research explores the dynamics of language acquisition and development, focusing on the ways individuals' native languages influence, and are influenced by, the phonological systems of heritage or later-learned languages.

● **Daniel Cifuentes**, an assistant professor of biochemistry at the School of Medicine (MED), was also awarded a Peter Paul Career Development Professorship. Cifuentes examines the early stages of embryo formation and the role RNA plays during this period, with a "long-term goal of understanding how we develop from a single egg into a whole new organism," he says.

● **Arturo Vegas**, a CAS assistant professor of chemistry, was the third Peter Paul Career Development Professorship recipient. Vegas uses his research in synthetic biology to develop novel chemical tools, materials, and approaches for targeting therapeutics to diseased tissues, with a focus on cancer and diabetes.

● **John Ngo**, an assistant professor of biomedical engineering, was the recipient of the Reidy Family Career Development Professorship, which recognizes College of Engineering (ENG) and Questrom School of Business faculty. Ngo's research applies principles of evolution, chemistry, and engineering to develop new tools for visualizing, measuring, and controlling biomolecules in cells and organisms.

● **Joshua Campbell** (ENG'12,'12), a MED assistant professor of computational biomedicine, received the Ralph Edwards Career Development Professorship, given to MED junior faculty. Using bioinformatics, Campbell's research in DNA and RNA sequencing works to help detect and treat lung cancer and chronic obstructive pulmonary disease at an earlier stage by identifying unique genomic mutations and then targeting them with novel therapies.

● **Keith Brown**, an ENG assistant professor of mechanical engineering and a CAS assistant professor of physics, received the first Moorman-Simon Interdisciplinary Career Development Professorship, funded by a gift from BU Overseer Ruth Moorman (CAS'88, SED'89,'09) and her husband, Sheldon Simon. Brown's research focuses on how the nanostructure—between the microscopic and molecular levels—of materials affects the way light, heat, electrons, and molecules move through systems.

● **Jessica Simes**, a CAS assistant professor of sociology, has been awarded the first University Provost's Career Development Professorship, funded by a $2.5 million anonymous gift to support junior faculty working in academic areas with "the greatest potential for impacting the quality and stature of the University, as determined by the provost." Simes' research merges studies of urban inequality and poverty with computational techniques, using innovative data analysis to better interpret the concentration of mass incarceration in disadvantaged communities.

● **Marcus Bellamy**, a Questrom assistant professor of operations and technology management, received the Isabel Anderson Career Development Professorship, funded by the estate of longtime Boston philanthropists Isabel and Larz Anderson. Bellamy's research specializes in innovation and management of global supply chains, using analytics and visualization techniques to help businesses identify and understand clusters, patterns, and trends. ●

JESSICA SIMES
The assistant professor of sociology was awarded the first University Provost's Career Development Professorship.

Profiles in Giving

FROM THE NEW theater complex taking shape to an incubator for student entrepreneurs to the Senior Class Gift, unparalleled generosity is touching all areas of campus. Continue reading for a few highlights from our year in gifts, big and small:

The Joan & Edgar Booth Theatre will stage its first production in 2018.

● Global financier and BU Trustee **Stephen Zide** (LAW'86) donated $10 million to name a new BU theater, which is part of a 75,000-square-foot artistic complex on the Charles River Campus. The gift is a tribute to his theater-loving wife, Janet Zide, and is named after his in-laws, Joan and Edgar Booth, who brought the joy of stage performance into his family's life.

● Alumni will soon have a new home on campus, thanks to a $2 million gift from BU Trustee **Shamim Dahod** (CGS'76, CAS'78, MED'87) and her husband, **Ashraf Dahod**. The Dahod Family Alumni Center will be housed on the second and third floors of the BU Castle, along with the Alumni Relations office. The gift bolsters a $9 million top-to-bottom restoration project of the Castle, preserving its distinctive architecture and décor.

● Over the course of a single day in early April, BU's **Annual Giving Day** raised $2.3 million, almost half of which was generated for Athletics. Some 11,600 gifts were made and 57 different challenges met, breaking previous records.

● Thanks to a generous gift from BU Trustee **Richard D. Cohen**, we launched a new no-loan initiative to cover the financial needs of academically gifted but economically challenged first-year students. The Cohen Scholarships helped boost the socioeconomic diversity of the fall 2017 incoming class to 18 percent, a 4 percent increase over last year.

● **Susan Jaffe Tane** (SED'64) continued her generous annual support of Professor Robert Pinsky's Summer Poetry Institute, which is committed to celebrating and documenting poetry's place in American culture and improving its place in American classrooms.

● The Corinne Mudarri Arab Civilization Fund at the Frederick S. Pardee School of Global Studies received a new substantial gift from the original donor, **Corinne Mudarri** (DGE'51), that will more than double the activities the fund can support each year. The fund encourages innovative, wide-reaching programming that explores and promotes the many contributions of Arab civilization, culture, and society.

● A corporate lawyer and former associate general counsel at Occidental Petroleum Corp., **Linda Peterson** (LAW'76) has set aside $2.5 million in her will for LAW students to be used at a future dean's discretion. Rather than establishing a named scholarship, Peterson left her estate gift unrestricted for the needs of future students.

● Founder and CEO of Zimmerman Advertising, **Jordan Zimmerman**, funded the transformation of a tiered classroom at the College of Communication (COM) into the new Zimmerman Family Social Activation Center. The ad guru wanted COM to build a room for students that would reflect how advertising agencies, public relations agencies, and newsrooms curate information. The room will include screens that display world maps, track social media activity, and show wire news services.

VICTORIA OLAKOJO (QUESTROM'17)
The Class Gift cochair says "Giving Day gives me the opportunity to fundraise for clubs and organizations so that future Terriers can enjoy their time here at BU."

LOUIS VITTI (QUESTROM'17)
The Class Gift cochair helped oversee the fourth Annual Giving Day, which netted $2.3 million in a single day.

A BANNER YEAR

AS EVIDENT from the preceding pages, the culture at the University is always evolving and maturing. Our financial operations are no exception. In fact, FY2017 was an outstanding year, thanks in part to our multicylinder revenue model and our commitment to operational excellence.

For starters, our endowment reached new heights. When we closed the books, the fund attained a level of $1.957 billion, an 18% increase from $1.655 billion in FY2016. And the monetization of our properties in Kenmore Square, originally purchased over many years to revitalize a neglected section of the city at our eastern gateway, yielded more than $100 million for the benefit of the endowment.

But we don't live by endowment alone. The fund only provided 3% of our revenue support in FY2017. And while we continue to reduce the size of our freshman class, we matriculated 3,552 first-year students, slightly above our target goal of 3,500, while our master's programs saw a 7% increase in enrollments. Taken together, tuition and fees made up 55% of our revenue, net of $344.1 million in financial aid from the University, and auxiliary enterprises were 14.1% of our revenue, net of $11.4 million in University financial aid for room and board.

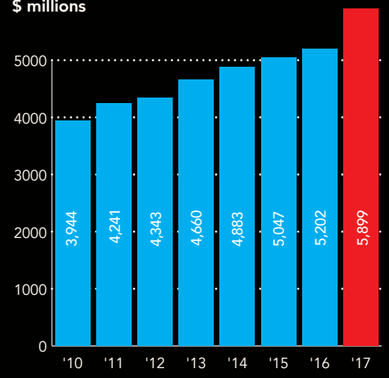
Sponsored program awards totaled $400.7 million in FY2017, and cash and in-kind giving totaled $157.5 million. All told, our operating revenues of $1.895 billion increased by $78 million over last year, while our expenses rose by $56 million.

At the end of the day, the University's net assets increased $507 million, a historic 18% increase, from $2.9 billion to $3.4 billion. This type of healthy outcome is consistent with Moody's Investors Service decision last year to elevate our A1 rating from Stable to Positive.

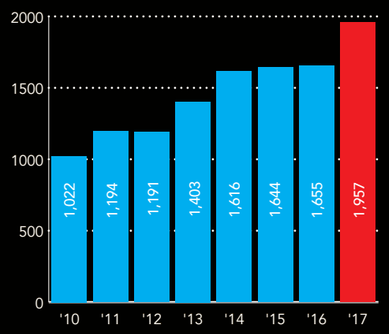
And if you're looking for even more financial details, we've supplied some helpful charts and graphs.

Performance Benchmarks

Total assets
$ millions

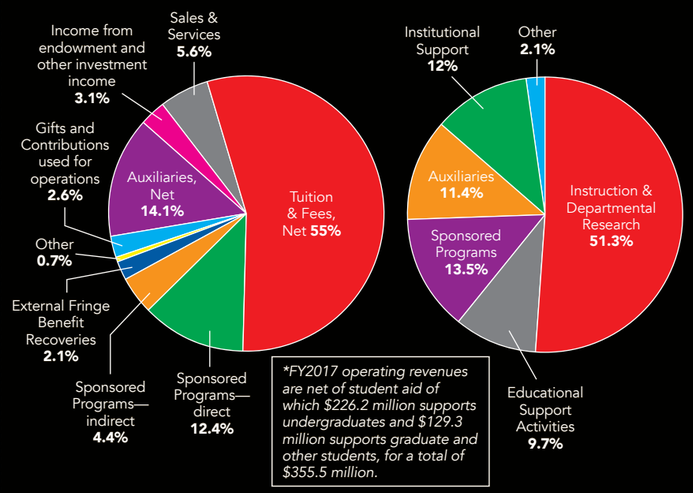


Total endowment assets
$ millions



Operating Revenues & Expenses FY2017

Total Revenues: $1.9 billion*

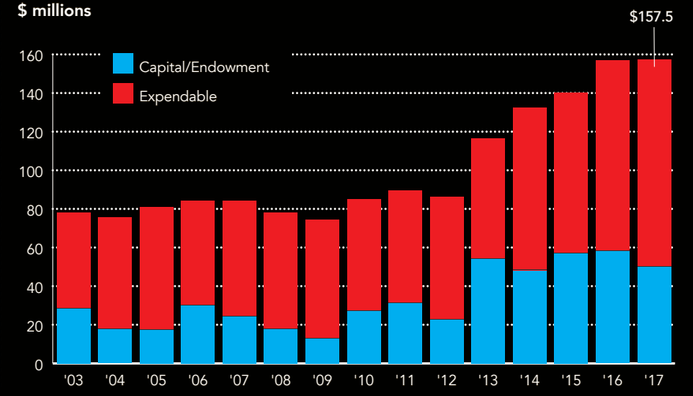


Total Expenses: $1.7 billion

**FY2017 operating revenues are net of student aid of which $226.2 million supports undergraduates and $129.3 million supports graduate and other students, for a total of $355.5 million.*

Cash and In-Kind Giving to the University FY2003–2017

$ millions



Audited Financial Summary

$ thousands

	2013	2014	2015	2016	2017
Operating revenues					
Student tuition and fees, net	$ 869,954	$ 904,808	$ 944,832	$ 994,069	$ 1,046,018
Auxiliaries, net	260,662	256,572	263,715	263,739	266,419
Sponsored programs-direct	240,763	236,952	224,360	228,327	234,665
Sponsored programs-indirect	81,678	78,779	79,763	78,792	82,737
External fringe benefit recoveries	41,388	44,768	42,820	42,929	39,542
Sales and services	95,110	108,528	96,070	96,621	105,320
Endowment spending formula amount & other investment income	40,643	44,528	49,251	50,318	58,226
Gifts and contributions used for operations	37,656	37,989	46,379	47,985	48,401
Other income	15,790	14,684	14,957	14,589	13,707
Total operating revenues	**$ 1,683,644**	**$ 1,727,608**	**$ 1,762,147**	**$ 1,817,369**	**$ 1,895,035**
Operating expenses					
Instruction and departmental research	$ 777,646	$ 789,807	$ 822,314	$ 859,377	$ 894,771
Educational support activities	137,628	145,757	156,500	163,567	169,756
Sponsored programs	237,408	235,702	224,673	227,349	235,449
Auxiliaries	207,269	196,514	203,038	191,905	199,267
Institutional support	216,969	210,311	200,353	209,660	209,303
Other expenses	39,597	37,889	35,700	36,956	36,557
Total operating expenses	**$ 1,616,517**	**$ 1,615,980**	**$ 1,642,578**	**$ 1,688,814**	**$ 1,745,103**
Net operating gain	**$ 67,127**	**$ 111,628**	**$ 119,569**	**$ 128,555**	**$ 149,932**
Nonoperating Activity					
Contributions	$ 55,000	$ 40,321	$ 80,714	$ 33,926	$ 137,428
Reinvested endowment and other investment income	19,629	19,176	19,617	22,289	34,958
Net realized and unrealized gains (losses) on investment and other assets	75,603	204,600	23,153	68,846	195,396
Spending formula amount	(43,753)	(47,979)	(51,429)	(55,967)	(64,464)
Other	113,617	(44,204)	(82,595)	(139,849)	54,099
Total nonoperating gain (loss)	**$ 220,096**	**$ 171,914**	**$ (10,540)**	**$ (70,755)**	**$ 357,417**
Total Results	**$ 287,223**	**$ 283,542**	**$ 109,029**	**$ 57,800**	**$ 507,349**

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Boston University's policies provide for equal opportunity and affirmative action in employment and admission to all programs of the University.

In keeping with Boston University's commitment to sustainability, this publication is printed on FSC-certified paper containing 10% postconsumer waste.

BOSTON
UNIVERSITY