

BOSTON UNIVERSITY ANNUAL REPORT 2019

*The Campaign for
Boston University
Circa 2012*



SEVEN YEARS, 175,000+ DONORS,

THE PERFECT ENDING IS JUST THE BEGINNING

This year marks a historic milestone for Boston University—the conclusion of our first-ever comprehensive fundraising campaign. And I'm thrilled to announce it shattered all expectations. We launched in 2012 with an audacious goal for an inaugural campaign: \$1 billion. We not only hit that mark but nearly doubled it, with \$1.85 billion coming from a staggering 175,000+ donors. **Gifts ranged from a few dollars to \$150 million, and all 17 schools and colleges received at least one \$1 million gift or pledge.** This philanthropy was unprecedented here and our gratitude is immeasurable.

But the story is more than numbers. The Campaign for Boston University transformed our culture, revealing a passionate community of family and friends who, in concert with the University, enabled our students, faculty, and staff to surpass expectations. Together, we broadened the scope of our research, elevated the learning experience, and opened more doors to highly qualified students. In short, the campaign widened our margin of excellence.

Here are just a few examples: A \$20 million initiative to support student innovation was funded by a group of alumni together with the University; we also supplied the physical space for an innovation center on campus.

\$1.85B

The \$10 million donation that created the world-class Joan & Edgar Booth Theatre dovetailed with an ongoing University initiative to enhance and unite the arts community on campus. And we invited donors to participate in the Century Challenge, in which the University matches the income generated by each endowed \$100,000 scholarship gift for 100 years.

The success of the campaign also freed up internal University resources to support other foundational initia-

tives outlined in our Strategic Plan, such as adding research centers, reinventing the undergraduate curriculum, increasing our global programs, and growing our professional graduate education.

But the most significant outcome of the campaign is an undeniable momentum upon which to build. While much was accomplished over the past seven years, we look at the results as a down payment on the future, the beginning of something truly great.

Sincerely,



ROBERT A. BROWN
President, Boston University



*The Campaign for
Boston University
Circa 2019*

A TRANSFORMATIONAL CAMPAIGN

MORE THAN 175,000 DONORS GAVE \$1.85 BILLION. That's the big headline from Boston University's first-ever comprehensive fundraising campaign, which wrapped up in September 2019.

Since we launched the Campaign for Boston University in 2012 with an ambitious goal of \$1 billion, over 250 alumni and friends made commitments of \$1 million or more, while 1,300+ others committed \$100,000 or more. And history was made with our largest-ever commitment—\$150 million.

Also inspiring is that **MORE THAN 94,000 PEOPLE JOINED THE CAUSE WITH GIFTS OF \$100 OR LESS**, collectively contributing \$4 million. On campus, faculty and staff generously gave \$57 million, while our students dedicated more than **1.8 MILLION HOURS OF VOLUNTEER SERVICE**. A decidedly community affair.

While we're proud of these numbers and what's behind them, we should also talk impact.

This combined generosity has yielded new and renovated campus buildings to benefit scholarship and student life, the addition of interdisciplinary research centers, the remaking of entire schools, and a significant boost in financial aid with the goal of increasing the diversity of our student population.

One need only stroll down Comm Ave to witness the transformation: the nine-story, cutting-edge Rajen Kilachand Center for Integrated Life Sciences & Engineering; the buzzing BUild Lab IDG Capital Student

Innovation Center; the glass-fronted Joan & Edgar Booth Theatre; the inviting new home of the Howard Thurman Center for Common Ground; and, coming soon, the dramatic 19-story Center for Computing & Data Sciences.

But a top driver in the campaign was elevating the lives of first-generation attending college and underserved-minority students through new or expanded scholarships and grants. To that end, the campaign added 267 new scholarships and fellowships.

Donors have also given generously to support our faculty, endowing 58 chairs for professors who are leaders in their research and teaching fields, and awarding 54 three-year career development professorships from 2012 to 2019.

"How do you become a leading research university? How do you hire the great faculty? How do you give access to highly qualified students? How do you undertake the big initiatives?" President Robert A. Brown asks. "That's where philanthropy really matters."

But the campaign's success reaches beyond upgrading facilities, expanding research, increasing named professorships, and growing student financial aid.

"It has changed the culture by showing the alumni and the Boston University community that their support of and investment in the University makes a real difference," says Board of Trustees Chairman Kenneth J. Feld (Questrom'70), who chaired the campaign. "That has instilled a sense of pride in being involved with Boston University that bodes well for the future of the institution."

\$1.85B
in gifts and donations

175,000+
individual donors

267
new scholarships and fellowships

\$57M
in faculty and staff donations

1.8M
hours of volunteer service performed by BU students

1,300+
commitments of \$100,000 or more

79,360
alumni donors, up 109%

54
three-year career development professorships awarded

\$3.27M
raised by 11,886 alumni, students, faculty, staff, and friends over a 24-hour period during BU's sixth annual Giving Day

58
new full professorships

A MEMORABLE NIGHT FOR AN UNFORGETTABLE CAMPAIGN



To mark the conclusion of the seven-year **CAMPAIGN FOR BOSTON UNIVERSITY**, a host of friends and special guests gathered at Agganis Arena for a celebratory public extravaganza, replete with dramatic displays of light, music, and history. The event was underwritten with generous support from BU's trustees and overseers.

Contributing to the revelry were the **BOSTON POPS** (studded with BU alums and faculty), professional figure skaters and aerialists, celebrated alumni, faculty speakers, marching bands, and student athletes and musical ensembles.

The University's first-ever comprehensive campaign launched in 2012 to support financial aid, faculty and research, and facility improvements. Along the way, the \$1 billion goal was surpassed, raised, and surpassed again. BU students got in on the act, too, performing 1.8 million hours of volunteer service.



KENNETH J. FELD (Questrom'70), chairman of the Board of Trustees, directed the **Campaign for Boston University**. A generous donor in his own right, his family's foundation pledged \$10 million to establish endowed professorships at three different schools and colleges and his family's philanthropy has helped boost career services at Questrom School of Business. He was also the founding contributor to the Lu Lingzi Scholarship Fund, in honor of the BU student killed at the Boston Marathon bombings.





BURSTING WITH GENEROSITY

Over the course of the **Campaign for Boston University**, we witnessed many instances of next-level philanthropy. Some of our donors not only gave millions of dollars, but they gave millions of dollars multiple times.

STUDENT VOLUNTEERISM: A WEALTH OF EFFORT

If time is indeed money, BU's student body has reached millionaire status. The Campaign for Boston University wasn't just about activating alumni; it also engaged our students. And they rose to the challenge, pledging to log one million hours of service before the close of the campaign. By the end of the campaign, they were at **1.8 MILLION HOURS**. They're nothing if not overachievers. They also put their money where their hands and hearts are. Together with alumni, faculty, and staff, our students helped raise over \$3.27

million during our sixth annual Giving Day. Some 1,700 gifts totaling \$90,000 were donated to student organizations. And for the third straight year, BU varsity athletics broke the \$1 million mark on **GIVING DAY**, closing the 24-hour fundraising drive with more than \$1.3 million in gifts. "Giving Day is such an important day because every person can make a difference for the cause at BU that matters most to them," says Class Gift Cochair Polen Ural (Sargent'19). "It's been so rewarding to be part of the effort and see our collective impact."



RAJEN KILACHAND
(QUESTROM'74,
HON.'14)

\$15M
to construct the Rajen Kilachand Center for Integrated Life Sciences & Engineering

\$100M
endowment to advance, in perpetuity, groundbreaking research at the intersection of the life sciences and engineering

\$35M
to establish Kilachand Honors College (\$25 million) and its home, Kilachand Hall



SHAMIM (CGS'76, CAS'78, MED'87) AND ASHRAF DAHOD

\$10.5M
to the School of Medicine to establish the Shamim & Ashraf Dahod Breast Cancer Research Center and endow assistant professor and international scholar positions there

\$2M
to help renovate the former BU Castle and create the Dahod Family Alumni Center



JACK SPIVACK

\$15M
to establish the Spivack Center for Clinical & Translational Neuroscience at the School of Medicine



ALLEN (QUESTROM '64, HON.'15) AND KELLI QUESTROM (HON.'15)

\$50M
to endow 12 faculty chairs, establish a new graduate program facility, and rename the School of Management the Questrom School of Business



SUMNER M. REDSTONE (HON.'94)

\$18M
to name the addition to LAW's main tower at the center of the Charles River Campus

\$2.5M
to endow the Sumner M. Redstone Professorship in Narrative Studies at COM



SHERRY AND ALAN LEVENTHAL (HON.'09)

\$10M
for a "1:2 challenge grant." The Leventhals donated one dollar for every two from another donor. The gift led to 23 student scholarships, 13 endowed professorships, and a range of initiatives at the School of Medicine.

\$1M
to establish the Leventhal Family Scholarship Fund at the School of Medicine



STEVE (LAW'86) AND JANET ZIDE

\$10M
to name CFA's new Joan & Edgar Booth Theatre



RICHARD C. SHIPLEY
(QUESTROM'68,'72)

\$10.5M
to create the Shipley Prostate Cancer Research Center on the Medical Campus

\$4M
to create the Beverly Brown Professorship, given to a faculty member whose research will be directed at eliminating public health disparities in urban areas

\$2.5M
to endow the Richard C. Shipley Professorship in Management at the Questrom School of Business

BUILDING TOMORROW'S GLOBAL LEADERS

During the Campaign for Boston University, **FREDERICK S. PARDEE** (Questrom '54, '54, Hon.'06) donated **\$50 MILLION** to endow the Frederick S. Pardee School of Global Studies and advance the next generation of global leaders. Prior to the fund-raising effort, he donated almost \$15 million, making him one of the University's staunchest supporters.

Pardee says his passion and determination to help build a more just and peaceful society was born when he was a child during World War II. He was able



stitutes: the Center for the Study of Asia; Center for the Study of Europe; Center for Latin American Studies; African Studies Center; Institute on Culture,

“Very few universities can invest in having a separate school of international affairs—it is a mark of a major university. That’s one transformation right there.”

—DEAN ADIL NAJAM

to attend BU on scholarship and says that opportunity became a driving force in his desire to better the world.

Today, the Pardee School has over 800 undergraduate students, 150 graduate students, five undergraduate majors, six graduate degrees, more than 40 full-time faculty, and another 150 affiliated faculty from across the University. A major reflection of the school's commitment to global studies can be seen in its six affiliated centers and in-

Religion & World Affairs (CURA); and Global Development Policy Center.

“Having a school of international and global affairs is not a common thing,” says Pardee School Dean Adil Najam. “Very few universities can invest in having a separate school of international affairs—it is a mark of a major university. That’s one transformation right there. This gift allows us to do things we could not have imagined doing; to aspire to become a leading institution in our field.”



Professor of International Relations and of Earth & Environment **ADIL NAJAM** is the inaugural dean of the Frederick S. Pardee School of Global Studies, which opened in 2014 thanks to a generous gift from Frederick S. Pardee (Questrom '54, '54, Hon.'06).

BU'S GOT TALENT: CAREER DEVELOPMENT PROFESSORSHIPS

Each year, the University recognizes a handful of promising junior educators who are seen as future leaders within their respective fields. Made possible by the generous support of donors, alumni, and BU's Technology Development office, the Career Development Professorships come with funding awards to support the scholarly and creative endeavors of these up-and-coming professors:

- Five junior faculty received **PETER PAUL CAREER DEVELOPMENT PROFESSORSHIPS**, given to outstanding junior faculty to support research and scholarly or creative work for three years:
 - LAW Associate Professor **PORTIA PEDRO** explores how judicial incentives and the design of the court system affect marginalized groups.
 - SPH Assistant Professor **MEGAN COLE** studies healthcare coverage for Medicaid and safety-net populations.
 - LAW Associate Professor **AHMED GHAPPOUR** is an expert in the modern surveillance state and cybersecurity.
 - CAS Assistant Professor **VICTOR KUMAR** researches ethics, moral philosophy, and psychology.
 - MED Assistant Professor **CHARLENE ONG** is using artificial intelligence to create a personalized risk assessment for stroke patients.

- **APRIL HUGHES**, CAS assistant professor of religion, was awarded the **EAST ASIA STUDIES CAREER DEVELOPMENT PROFESSORSHIP**. Hughes explores Buddhism and its relationship to rulership in medieval China.
- **HUGO APARICIO**, MED assistant professor of neurology who researches the impact of lifestyle factors on stroke survival, received the **ARAM V. CHOBANIAN ASSISTANT PROFESSORSHIP**.
- **WENCHAO LI**, ENG assistant professor of electrical and computer engineering, was awarded the **PETER J. LEVINE CAREER DEVELOPMENT PROFESSORSHIP**. Li studies safety and reliability in driverless cars and manufacturing robots.



In September 2018, **PORTIA PEDRO**, an associate professor at BU's School of Law, was named a Peter Paul Career Development Professor. BU's Career Development Professorships, awarded annually to support the work of promising young academics, are made possible by the support of a group of distinguished donors and alumni and BU's Technology Development office. Pedro is one of eight junior faculty to be recognized this past year.



Thanks to a gift from James (Questrom'81) and Eileen Rullo and the Schooner Foundation, engineering major **MOHAMMAD AHSAN FUZAIL** (ENG'20) and 13 other students traveled to Uganda to study the complex humanitarian crisis it faces—and to help generate ethical solutions. The students, drawn from majors as diverse as journalism and chemistry, were part of BU's interdisciplinary

Program for Humanitarian Engineering & Refugee Studies, a three-week travel opportunity mixing classes with field visits to refugee camps. The program is headed up by Kilachand Honors College director and professor of English and women's, gender, and sexuality studies **CARRIE PRESTON** and Howard Hughes Medical Institute professor and biomedical engineering professor **MUHAMMAD ZAMAN**.

WHEN SERVICE BEGETS SERVICE



ALEXIS GITUNGANO (SPH'19) graduated from the School of Public Health thanks to the Lamstein Family/JSI Scholarship.

When **ALEXIS GITUNGANO** (SPH'19) received his master's degree in public health from BU this past May, he knew the achievement was a shared one.

By his side, dressed in identical cap and gown, was an energetic third-grader named Leo, whom Gitungano had brought to the United States from war-torn Burundi for lifesaving medical treatment in 2014. And in his heart were thanks for Joel Lamstein, whose scholarship covered Gitungano's tuition and kindled his passion for public health. Diploma in hand, Gitungano has accepted a job in the field while continuing to learn how to transition from volunteer medical guardian to de facto parent.



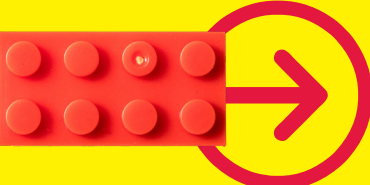
Last May, nine-year-old **Leo Ikoribitangaza** walked across the stage with his legal guardian, **Alexis Gitungano**, as he received his degree from the School of Public Health.

Lamstein, an SPH adjunct associate professor of global health, who serves on the school's advisory board and founded the public health consultancy John Snow, Inc. (JSI), said his gift was inspired by John F. Kennedy's call to service in 1960. "It was a life-changing moment for me."

One that has clearly been paid forward.

"It's as if I were walking, and Joel Lamstein stopped and put me in his car," says Gitungano, whose studies at BU focused on program management and global health. "He is giving me a ride to get to my destination."

EXPANDING AID. AND OPPORTUNITIES.



During the course of **the campaign**, the University raised some \$161 million to grow aid for deserving students. Whether through the Century Challenge, which created 150+ scholarship funds for financial aid, or the Cohen Scholarships, which meet the full need of Pell Grant recipients without loans, we believe a quality education should not be out of reach for talented minds.

Some of our other strategic enrollment initiatives:

- Last year we joined the **AMERICAN TALENT INITIATIVE (ATI)**, an alliance of colleges and universities committed to improve opportunities for students from low- and moderate-income households. BU is already making progress toward ATI's primary goal, as the percentage of low-income students in our freshman class increased from 15.7 percent in fall 2016 to 19.6 percent in fall 2019.
- The **THOMAS M. MENINO SCHOLARSHIP** program supports exemplary incoming students from Boston Public Schools (BPS) each year with full tuition for four years. Since its inception in 1973, we've awarded more than \$176 million in scholarships to nearly 2,000 BPS students.
- The **COMMUNITY SERVICE AWARD** program meets the full financial need (without loans) of any BPS graduate admitted to BU. Since 2009, more than 500 BPS students have received close to \$75 million in scholarship funding.
- Our partnership with the **COLLEGE ADVISING CORPS** has seen BU mentors prepare more than 11,000 city students for college.
- BU's alliance with the **POSSE FOUNDATION** brings groups of deserving urban students from around the country to campus for four years of study tuition-free.

FINANCING THE CLASS OF 2022

MATRICULATED FRESHMEN

3,611



DOMESTIC FRESHMEN

76.6%



FRESHMEN APPLIED FOR FINANCIAL AID*

53.4%



FRESHMEN AID APPLICANTS

RECEIVED BU AID*

77.6%

AVERAGE NEED OF FRESHMEN WHO RECEIVED BU GRANTS*

\$51,445

AVERAGE BU GRANT TO FRESHMEN WHO RECEIVED BU GRANTS*

\$44,891

(including athletics; excluding tuition remission)

IN FY2019, BOSTON UNIVERSITY SAW A

9.5%

INCREASE IN TOTAL FINANCIAL AID OVER THE PREVIOUS YEAR, AND A

14%

RISE SINCE 2010.

AID APPLICANTS RECEIVED FEDERAL PELL GRANTS*

22.7%

BREAKING RANKS: HOW THE REST OF THE WORLD SAW BU IN 2019

AMONG NATIONAL UNIVERSITIES

#40

U.S. News & World Report

SCHOOL OF PUBLIC HEALTH

#8

U.S. News & World Report

MOST EMPLOYABLE GRADUATES IN THE US

#21

Times Higher Education

AMONG GLOBAL UNIVERSITIES

#51

U.S. News & World Report

MEDICAL RESEARCH SCHOOL OF MEDICINE

#30

U.S. News & World Report

MOST INNOVATIVE SCHOOLS

#27

U.S. News & World Report

AMONG BEST US COLLEGES

#44

Wall Street Journal/Times Higher Education

BIOMEDICAL ENGINEERING

#9

U.S. News & World Report

*DOMESTIC STUDENTS

A SCHOLARSHIP THAT'S BUILT TO LAST

A top priority in the University's comprehensive fundraising campaign was increasing access for talented students no matter their circumstances or background. And to date, the campaign has raised some \$161 million for financial aid. Almost half that amount arrived via the Century Challenge.

"We need and want to work alongside our generous donors," says President Robert A. Brown, "to make a BU education attainable for all of the accomplished young people we admit."

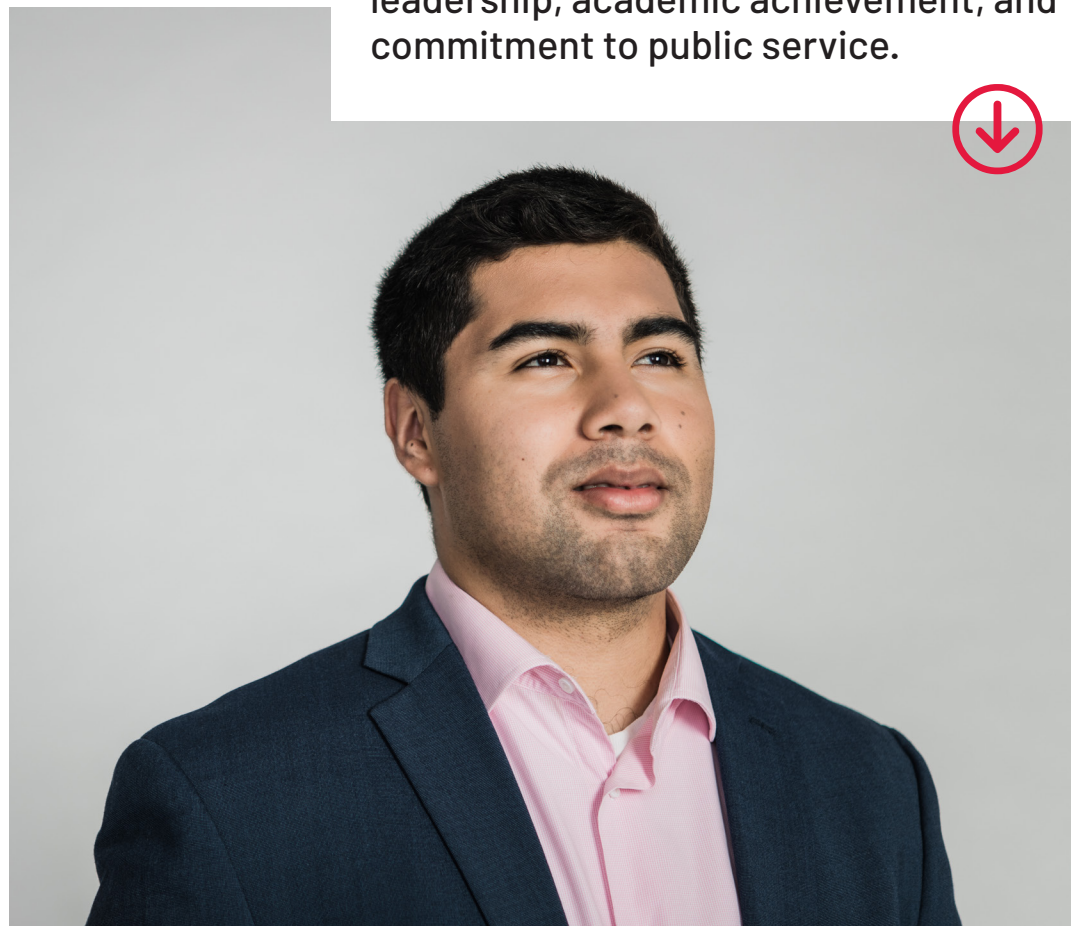
As of the close of the campaign, 150+ Century Challenge scholarships have been created, expanding the pool of opportunity for years to come.

"We need and want to work alongside our generous donors to make a BU education attainable for all of the accomplished young people we admit."

—ROBERT A. BROWN

The challenge was straightforward: donors give at least \$100,000 to endow an undergraduate scholarship. The donor names that endowment and designates eligibility criteria. "For example," says Senior Vice President for Development & Alumni Relations Scott Nichols, "you could say that you want it to go to center-city urban kids or you want it to go to students who are interested in communications."

But here's the twist: the University has pledged to match the funds generated by each endowment for one hundred years, doubling the good done in the donor's name. For example: if a donor gives \$100,000 and the fund pays out \$4,000 the first year, the student will receive \$8,000 in scholarship support.



SCHOLARSHIP HAT TRICK

First-generation college student **AUGUSTINE JIMENEZ** (CAS'20) is on a roll. In high school, he won a Posse Foundation Scholarship that allowed him to attend BU tuition-free for four years. As a sophomore, he won an Initiative on Cities–National League of Cities Menino Fellowship for future leaders, an honor bestowed on one BU student a year. And last April, he hit the trifecta, when he was honored with a Truman Scholarship, an award given to a small number of college juniors across the nation based on their leadership, academic achievement, and commitment to public service.



OPENING TWICE AS MANY DOORS

In November 2018, Boston University Trustee **RICHARD D. COHEN** (CGS'67, Questrom'69) issued a challenge: he would match new or increased gifts to support undergraduate need-based financial aid, dollar for dollar, up to \$1 million.

Donors who took the **COHEN CHALLENGE** helped the University make undergraduate education affordable for all students and their families—regardless of means—and those donors saw their gifts' impact doubled.

Cohen has steadily supported scholarships for more than a decade, and in 2017 he made a gift that helped BU meet the full need of all Pell-eligible

undergraduates—meaning that today, they can complete their BU education without loans. That gift catalyzed a full-fledged University effort to increase aid across the board, including an expanded scholarship assurance program.

Thanks to Cohen's giving, support from other donors, and investments by the University, since the fall of 2017 BU has provided over \$94 million in funding to entering freshmen who are Pell Grant recipients. Nearly one in five US undergraduates at BU is eligible for a Pell Grant, a proportion that places the University among the most generous benefactors in its university peer group.



Earning a dual degree in graphic design and computer science, **CHINWE OPARAJI** (CFA'21, CAS'21) is one of the University's 1,370 currently enrolled Cohen scholars. She interned as a graphic designer and front-end developer at a Boston-area start-up.



MAXIMIZING THE STUDENT EXPERIENCE



In keeping with its holistic spirit, the **Campaign for Boston University** found a variety of ways to nurture and stimulate student life on and off campus.

The \$20 million Innovate@BU initiative means that entrepreneurial minds from across the University can take their ideas from the drawing board to the marketplace. The 267 scholarships and fellowships created by the campaign open even more doors for talented students. The modern glass-fronted Booth Theatre is already enhancing and uniting the University's arts community. For the adventurous, hundreds of study abroad and research opportunities await on six continents. And opening in 2020—the new and expanded Howard Thurman Center for Common Ground, a space for students to tackle difficult questions about who they are and how they fit in the world, all while building lasting relationships with their peers.

Yet another reminder that when donor and University priorities align, entire worlds can open up.

POISED FOR IMPACT: THE CLASS OF 2023

They hail from **42 STATES** and **53 COUNTRIES**. Their median SAT is **1430** and they rank in the **TOP 10 PERCENT** of their class, with an average GPA of **3.72**. Meet the Class of 2023.

Beyond these impressive numbers, our **3,156** incoming freshmen hold diverse interests and passions. One cofounded a nonprofit that resells goods from impoverished countries to benefit low-income families in India. Another conducted research on Paget's disease and osteosarcoma at UConn Health. And a third is the chief design officer at a teen-run start-up incubator, which works with clients to design apps and websites.

In other words, the Class of 2023 is sure to leave its mark on BU.

1430
median SAT

3,156
enrolled freshmen

62,224
applications received

32
median ACT

26%
of domestic freshmen are underrepresented minorities

18.9%
admit rate, compared with 22% in 2018

42
states represented

46%
enrolled from Early Decision

22.1%
of domestic freshmen are Pell Grant eligible

53
countries represented

3.72
grade point average of entering freshmen

A CURRICULUM FOR WHEREVER LIFE TAKES YOU

Last year marked a new academic era for the University when we launched the **BU HUB**, our University-wide undergraduate general education curriculum. Entering freshmen from the Class of 2022 were the first to embark on this new four-year academic program.

The BU Hub was created to ready students for an increasingly complex and interconnected world. It ensures that all undergraduates, regardless of major, are exposed to a broad range of knowledge and disciplines and given the tools to apply their learning and skills in diverse settings. In short, to position our graduates for success no matter what life throws at them.

To that end, students will develop six essential capacities: Philosophical, Aesthetic, and Historical Interpretation; Scientific and Social Inquiry; Quantitative Reasoning; Diversity, Civic Engagement, and Global Citizenship; Communication; and the Intellectual Toolkit, which includes skills such as Critical Thinking, Teamwork/Collaboration, and Research and Information Literacy.

For their part, our faculty have spent the past two years redesigning existing courses and developing new ones that incorporate this new approach. Some of the offerings on tap: The

Graphic Novel; Human Infectious Diseases: AIDS to Tuberculosis; History of Boston: Community and Conflict; Project Citizen: Promoting Civic Engagement.

“One thing I really like about the Hub is that it allows you to explore a variety of academic interests before committing to your major,” says **XI ZHANG** (CAS’22). “It’s been a great opportunity to expand my knowledge in different fields.”

Boston University Provost and Chief Academic Officer **JEAN MORRISON** oversaw the development of the BU Hub, the University’s new undergraduate general education curriculum. Launched in fall 2018, the BU Hub is designed to prepare students to succeed in the rapidly changing, interconnected world that awaits them.



TRAINING FOR GAME DAY, TRAINING FOR LIFE

For track and field standout **JOHNNY KEMPS**, achieving peak athletic prowess goes hand in hand with personal growth off the oval.

“I saw that the most impressive athletes were also the most disciplined, introspective, and well-rounded,” says Kemps (Questrom’19). “I knew that if I took full advantage of the opportunity to develop myself, equip myself to lead, that my team itself could achieve all it wanted.”

Enter the **BLOOM FAMILY LEADERSHIP INITIATIVE** (BFLI).

Created in 2013 through a commitment by BU Trustee and former BU rugby player William Bloom (CGS’82, Questrom’84), the initiative aims to help student-athletes explore ways to turn challenges, on and off the field, into opportunities for personal improvement and leadership development.

With the help of a BFLI mentor, BU student-athletes work on professional skills, effective communication, leading others, and preparing for the transition to life after athletics.

Kemps harnessed his leadership training last year to launch a campus chapter of Athlete Ally, an organization that provides a support community for LGBTQ athletes and allies and educates people on LGBTQ issues.

“Bloom was one of the most important things I did during my undergraduate time,” Kemps says. “I am only just beginning to realize the impact that BFLI will have in life after BU. Life outside the glorious BU bubble isn’t always sunshine and roses, so it becomes that much more imperative to be well equipped to tackle life’s challenges head on, just as I did on the track at BU.”

UNDERGRADUATE RESEARCH: UNLEASHING CURIOUS MINDS

The University’s Undergraduate Research Opportunities Program has been fostering faculty-mentored research for 22 years. Last year, the University invested \$1.2 million in UROP, allowing 677 undergraduates the chance to hone critical skills through publication, conference presentations, and awards. In addition, over the course of the campaign, UROP received more than \$106,000 in donations.



JOHNNY KEMPS

(Questrom’19) ran track and field as a Terrier and served as president of Athlete Ally, a student-led chapter that advocates for an inclusive environment for LGBTQ student-athletes and allies.



INNOVATING WITHOUT WALLS

Happy birthday, Innovate@BU!

A \$20 MILLION JOINT VENTURE between campaign donors and the University to supercharge student innovation has attracted more than 1,700 participants in its inaugural year. And not just engineering and business majors but entrepreneurial minds from all 17 schools and colleges as well as the alumni community.

Not surprisingly, projects so far have run the gamut, from a portable medical ventilator and electric boat motor to a crowdfunding platform for tuition and a mentoring program for young women of color. Positive social impact is a signature component.

Untethered to a single school or college, INNOVATE@BU seeks to instill in students a keen understanding of business innovation, cultural engagement, and social entrepreneurship so that, no matter their field of study, they graduate knowing what it takes to convert an idea into something concrete.

A central part of the vision was integration with new and existing innovation programs such as BU SPARK! at the Rafik

B. Hariri Institute for Computing and Computational Science & Engineering, the start-up clinics at the School of Law, the Engineering Product Innovation Center, and the BU Arts Initiative. Competitions were created to motivate student creativity, along with meaningful programming ranging from skill-building workshops to a summer accelerator. Modest grants were offered to worthy projects.

The Nerve Center

Anchoring Innovate@BU is a spacious new student innovation center. Located in the heart of the Charles River Campus, it's known as the BUILD LAB IDG CAPITAL STUDENT INNOVATION CENTER in recognition of generous support supplied by IDG Capital, led by alumnus and Trustee Hugo Shong (COM'87). It's a multipurpose space where student innovators can form partnerships, research, find mentors, network, hold meetings, practice pitches, learn how to manage risk and failure, and ultimately push their project across the finish line.

The upcoming agenda for Innovate@BU includes a more formal mentoring program, a University-



wide minor in innovation and entrepreneurship, further alumni outreach, additional challenges and hackathons to inspire student ideas, and increased engagement with the innovation community in Greater Boston.

"Innovation happens when we transcend disciplines and silos," says Executive Director of Innovate@BU Gerald Fine. "We want to encourage collaboration across campus and in the community."

Build Lab IDG Capital Student Innovation Center gives student innovators a place to connect with advisors, find funding sources, and collaborate with other students. They can also find help with such matters as design, prototyping, legal advice, and marketing.



GERALD FINE, professor of the practice at the College of Engineering, is executive director of Innovate@BU. Just one year after its launch, the initiative has attracted more than 1,700 participants from all 17 schools and colleges, assisting more than 100 student teams turn their concepts into reality.



FIONA WHITTINGTON (COM'19), founder of the national nonprofit TechTogether that serves gender-marginalized individuals in tech, last year launched an online platform called The Bit that is changing the way women advance their education. Her new venture grew out of the Innovate@BU Summer Accelerator program.





SHARON RYAN (Sargent'70), a member of the BU Board of Trustees, says she thinks it's important that students have a place where they can feed their souls as well as their minds. The Howard Thurman Center for Common Ground is such a place, she says. She and her husband, **ROBERT RYAN**, have made a lead gift toward the center's expansion and relocation. "We did that because we see what's happening in the country now, where people don't understand one another," says Ryan. "The Thurman Center is a place for students to go to figure out who they are, who they can become, who others are around them, and how we all fit together."



OUTER GROWTH FOR INNER GROWTH

Image courtesy of NBBJ

ADIA TURNER (CAS'19) discovered herself at the **HOWARD THURMAN CENTER FOR COMMON GROUND**, evolving from a reticent freshman observer to a rousing Commencement speaker.

"I found my voice in the walls of the Howard Thurman Center, where I sat religiously every Friday for coffee and conversation," she told her fellow graduates last spring. "We have learned to speak up and speak out about the world we dream of, but, most importantly, the world we know we deserve."

And that's just the point. The Howard Thurman Center (HTC) is a welcoming place to discuss everything from cultural and racial differences to political and cultural divides. The HTC was created more than three decades ago and named for Howard Thurman (Hon.'67), dean of Marsh Chapel from 1953 to 1965, the first black dean at a mostly white American university. A mentor to, and influence

on, many civil rights leaders, among them **MARTIN LUTHER KING, JR.** (GRS'55, Hon.'59), Thurman preached a philosophy of common ground, which taught that humans need to seek an inner spiritual happiness that would lead them to share their experience in community with others.

And soon, the center will have an even bigger presence.

In an effort to accommodate recent growth at the center and increase visibility, construction began last spring for a new and more prominent location for its headquarters, a fivefold expansion of HTC's current quarters. The center has more than doubled its full-time staff, tripled its part-time staff of graduate students in the last year, and seen the number of programs jump 20 percent.

"We're very excited," says Katherine Kennedy, HTC director. "We're going to be able to focus even more on our students' racial, ethnic, and cultural identities."

YOU WON'T RECOGNIZE THE PLACE

The transformation of our physical landscape showed no signs of slowing down in FY2019. From new buildings, renovations, and sustainability improvements to gender-neutral accommodations, bike lanes, and streetscape beautifications, the evolution continued.

- The **DAHOD FAMILY ALUMNI CENTER** opened in the restored BU Castle on Bay State Road. The center includes gathering places for alumni and new Alumni Association offices. More than 800 donors supported the restoration project, including BU Trustee Shamim Dahod (CGS'76, CAS'78, MED'87) and her husband, Ashraf Dahod, who made a \$2 million gift. In the Castle's lower level is the newly renovated **FULLER'S BU PUB**, named to recognize a lead gift from Ed (Questrom'68) and Michela Fuller.
- A makeover at the **COLLEGE OF FINE ARTS** building got underway to restore the façade and original arched street-level windows at 855 Commonwealth Avenue, renovate select spaces on the 1st floor including the Stone Gallery and movement studio, and create a new student lounge.
- Three geothermal test wells were drilled in the parking lot and alleyway adjacent to Granby Street, which confirmed the feasibility of using geothermal heating and cooling for the new **CENTER FOR COMPUTING & DATA SCIENCES**.
- The Medical Campus hosted a variety of construction and renovation projects, most notably the continued renovation and expansion of the **HENRY M. GOLDMAN SCHOOL OF DENTAL MEDICINE**. The 48,000-square-foot addition and 63,000-square-foot renovation will house new patient treatment spaces, the Simulation Learning Center, a 140-seat auditorium, as well as a new student lounge and study areas. Speaking of student spaces, the **SCHOOL OF PUBLIC HEALTH** also upgraded and refurbished its student lounges.
- **WBUR CITYSPACE AT THE LAVINE BROADCAST CENTER**, located on the ground floor of 890 Commonwealth Ave, was completed last year. The state-of-the-art, multimedia, multipurpose convening and performance space and broadcast studio was made possible thanks to Jeannie and Jonathan Lavine's \$5 million gift—the largest in WBUR's 69-year history.
- Building continues at 10 Lenox Street and surrounding grounds in preparation for the relocation and expansion of the **BU CHILDREN'S CENTER**, a daycare facility serving children of BU faculty, staff, and graduate students.



THE RELENTLESS PURSUIT OF DISCOVERY

The **Campaign for Boston University** was momentous news for our research community, supplying us greater means and flexibility to expand the scope of our research agenda.

Several significant donations went toward the pursuit of discovery, including **\$10.5 MILLION** for the Shipley Prostate Cancer Research Center, **\$10.5 MILLION** for the Dahod Breast Cancer Research Center, and **\$15 MILLION** for the Rajen Kilachand Center for Integrated Life Sciences & Engineering, along with a record-breaking **\$100 MILLION** to fund, in perpetuity, the research coming out of the Kilachand Center.

A member of the Association of American Universities, the University's enterprise spans numerous disciplines with major initiatives in neuroscience, systems biology, photonics, engineering biology, data sciences, urban health, global health and development, and emerging infectious diseases, as well as research in communications and the humanities.

Because of this breadth, BU researchers can explore new domains of inquiry at the intersection of disciplines, combining knowledge and know-how in

unique and surprising ways.

We have data scientists working with art historians, law professors tackling antibiotic resistance, computer scientists teaming up with biomedical engineers.

The breakthroughs achieved by our research teams translate into solutions to pressing challenges facing our local and global communities. Last year, their efforts were bolstered by \$579.4 million in sponsored research awards, a 19 percent increase over FY2018, and a 42 percent jump since 2010.

And it's not just funding agencies that are paying attention. Last year, six of our faculty researchers received a National Science Foundation Early Career Award and two were honored with a Presidential Early Career Award for Scientists and Engineers, while several others were invited to join prestigious national academies.

We can't wait to see where our researchers take us next.

\$579.4 Million



IN FY2019, the University saw its sponsored research awards reach **\$579.4 MILLION**, a **19% INCREASE** over FY2018, and a **42% JUMP** since 2010.

SHOUT OUT! THE YEAR IN ACCOLADES

● **DAVID BISHOP**, professor of electrical and computer engineering and of physics, and director of the NSF Engineering Research Center in Cellular Metamaterials, was invited to join the National Academy of Engineering. The NAE noted his decades of work in high-capacity optical switch technology. The honor comes on the heels of Bishop's 2018 induction into the National Academy of Inventors.

● **LEONID LEVIN**, professor of computer science and expert on a range of subjects, from complex algorithms to information theory, was elected to the National Academy of Sciences. Membership at the NAS, which recognizes distinguished and continuing achievements in original research, is considered one of the highest honors a scientist can receive.

● Dean of the College of Engineering **KENNETH R. LUTCHEN** and Professor of Engineering **JOHN WHITE** were elected fellows of the International Academy of Medical and Biological Engineering, an elite group of the world's foremost biomedical engineers.

● **CARA STEPP**, associate professor of speech, language, and hearing sciences, and **STEVE RAMIREZ**, assistant professor of psychological and brain sciences, received the Presidential Early Career Award for Scientists and Engineers. The award is the

highest honor bestowed by the US government to outstanding young scientists and engineers who show exceptional promise for leadership in science and technology.

● **JAMES TRANIELLO**, professor of biology, was elected a fellow of the American Association for the Advancement of Science for contributions to experimental behavioral ecology through the study of social insects like ants and termites.

● **VINOD SARIN**, professor of mechanical engineering and materials science engineering, was elected a fellow of the National Academy of Inventors. Sarin, an expert in surface coatings as well as other areas, holds more than 80 patents.

● The National Association of Student Personnel Administrators, a national organization of student affairs professionals, named Dean of Students **KENNETH ELMORE** (Wheelock'87) a Pillar of the Profession.

● **SAHAR SHARIFZADEH**, physicist and engineering assistant professor, was named one of 11 Rising Stars of Science in the prestigious *Scientific American* rankings.

● **MALIKA JEFFRIES-EL**, associate professor of chemistry, was named an American Chemical Society fellow, an honor extended to just two percent of the ACS' 163,000 members.

In 2019, professor of English and award-winning author **XUEFEI JIN** (GRS'94), who writes under the name Ha Jin, was named one of four new William Fairfield Warren Distinguished Professorship winners, BU's highest faculty honor. The other recipients include: Ann McKee, professor of neurology and pathology; Christopher Chen, professor of biomedical engineering and of materials science and engineering; and Michael Hasselmo, professor of psychological and brain sciences.



ANN MCKEE, professor of neurology and pathology, and director of the Chronic Traumatic Encephalopathy Center, was elected to the National Academy of Medicine last year. McKee was cited for her pioneering research on the links between head trauma and brain disease, particularly among athletes and military personnel.



CHRISTOPHER CHEN, director of the Biological Design Center and a professor of biomedical engineering and of materials science and engineering, received the 2019 Robert A. Pritzker Distinguished Lecture Award, the premier recognition by the Biomedical Engineering Society for outstanding achievements and leadership in the science and practice of biomedical engineering.



Last spring, the world saw its first-ever image of a black hole, a cosmic feature scientists have been certain existed but were never able to detect against the darkness of space.

The historic, years-long, multinational effort required a large team of scientists, including two from BU's Institute for

Their findings and the first black hole image from the EHT were published in a series of six papers in the *Astrophysical Journal Letters* in April 2019. The EHT collaboration was awarded the inaugural Diamond Achievement Award by the National Science Foundation in May 2019.

For their part, Marscher and Jorstad worked for

BU researchers Alan Marscher and Svetlana Jorstad worked at Harvard's Black Hole Initiative Center to make high-quality pictures of the hot gas surrounding the supermassive black hole.

Astrophysical Research: **ALAN MARSCHER**, professor of astronomy, and **SVETLANA JORSTAD**, senior research scientist.

"This is confirmation that black holes with event horizons exist," says Jorstad.

The team of Marscher, Jorstad, and more than 200 other scientists—known as the Event Horizon Telescope (EHT) collaboration—had to analyze a wealth of data collected from multiple high-precision radio dishes around the world.

two years with about 30 other scientists, including two week-long sessions at Harvard's Black Hole Initiative Center. They developed imaging techniques to make high-quality pictures with data from the EHT of the bright, hot gas surrounding the supermassive black hole at the center of the galaxy M87.

Marscher and Jorstad plan to continue working on EHT data, with hopes of imaging the region farther from the black hole, where jets of high-energy particles originate.



DOUGLAS DENSMORE, associate professor of electrical and computer engineering, focuses on the development of tools for the specification, design, and assembly of synthetic biological systems. Last year he stepped up his advocacy for the democratization of research. Densmore envisions creating a dedicated facility other scientists can use in a manner similar to how e-commerce uses cloud computing services. "We have all this unused biomanufacturing capacity, particularly in academic labs. My lab isn't doing anything today, or over Memorial Day weekend. We could connect researchers who want to experiment but don't want to have to set up a whole lab. They could submit jobs the same way you submit jobs for the cloud."

CTE: HOPE FOR THE LIVING

Today, the only way to detect chronic traumatic encephalopathy in a person is by examining their brain tissue after death. A confirmation could help explain cognitive impairments and mood disorders the person may have exhibited in life.

But what if you could make a diagnosis while the person was alive, before the onset of serious problems?

ROBERT STERN, professor of neurology, neurosurgery, and anatomy and neurobiology, and a team of researchers may be close to an answer.

Stern directs clinical research at the **BOSTON UNIVERSITY CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE) CENTER**. In a partnership of industry, academia, and healthcare, he and his colleagues discovered that an experimental PET (positron-emission tomography) scan on living people is able to detect abnormal brain tissue—called tau protein—in patterns similar to those found in the brains of deceased people diagnosed with CTE after death.

Tau protein is a hallmark of several neurodegenerative diseases including Alzheimer's, certain types of dementia, and CTE, which has appeared notably in dozens of former National Football League players.

Stern, along with collaborators from Avid Radiopharmaceuticals, Banner Alzheimer's Institute, Brigham and Women's Hospital, the Mayo Clinic, and the University of Arizona, published their findings this past spring in the *New England Journal of Medicine*.

"It can't yet be used for individual diagnosis," Stern cautions. "We analyzed group data, not individual findings."

But by the end of 2019, Stern and collaborators expect to complete tau and amyloid scans of up to 240 additional people and move closer to their ultimate goal. "In the next five years or so, we will be able to diagnose and detect [CTE] during life."

DIVERSIFYING THE CLASSROOM

For **STEPHANIE M. CURENTON**, an education and human development associate professor at BU's **WHEELLOCK COLLEGE OF EDUCATION & HUMAN DEVELOPMENT**, studying the strengths and needs of children of color has always been at the heart of her research agenda.

That agenda got a boost last year with a Policy Fellowship from the National Black Child Development Institute. The inaugural, two-year fellowship will give Curenton the opportunity to further her research developing culturally competent teaching practices.

"The fellowship will really help me craft my policy skills, which will...prepare me to be an even stronger leader within BU and nationally." —STEPHANIE M. CURENTON

Curenton studies the social, cognitive, and language development of low-income and racially minoritized children within various ecological contexts, such as parent-child interactions, early childhood education programs, early childhood workforce programs, and related state and federal policies.

For the fellowship, Curenton will work specifically on expanding the Assessing Classroom Sociocultural Equity Scale project (ACES), which centers around the development of a classroom observation tool that can measure and provide feedback to teachers about how to deliver equitable sociocultural instruction.

"The fellowship will really help me craft my policy skills, which will bring even greater real-world policy knowledge to my BU classes and prepare me to be an even stronger leader within BU and nationally."

STOPPING DISEASE BEFORE IT STARTS

WHAT IF YOU COULD DETECT SIGNS OF LUNG CANCER EVEN BEFORE THE APPEARANCE OF PRE-CANCEROUS ACTIVITY?

One BU researcher may have found a way.

AVRUM SPIRA, professor of medicine, pathology, and bioinformatics, says that newly identified genomic differences related to the immune system may play a key role in the early development of lung cancer, and that those differences can be detected in normal airway tissue.

That finding, published in April 2019 in *Nature Communications*, reveals potential for developing new therapeutics that could boost immune activity to prevent or halt progression of the disease, says Spira (ENG'02), the study's senior author. In the United States alone, lung cancer kills more than 160,000 people each year.

Spira, director of the **JOHNSON & JOHNSON INNOVATION LUNG CANCER CENTER** at Boston University on the Medical Campus and the global head of the Johnson & Johnson Lung Cancer Initiative, has been working for several years with collaborators on a Precancer Genomic Atlas project to identify early cellular and molecular changes



"This is an example where academia does the very basic discovery science. ...Industry can look at the data and figure out how to develop a therapeutic that will leverage that insight."

—AVRUM SPIRA

that lead to invasive lung cancer.

The new paper is the first produced from the translational research alliance, launched in June 2018, between BU and Johnson & Johnson Innovation LLC.

"This is an example where academia does the very basic discovery science—finding patients who have these early precancer lesions, biopsying them, and doing very deep molecular profiling, and the bioinformatics analysis," says Spira. Then, from those academic findings, "industry can look at the data and figure out how to develop a therapeutic that will leverage that insight."

CAN YOU HEAR ME NOW?



Let's face it, life in the city is noisy. Car horns, the rumble of trains, air conditioners, sirens. Blocking out the din, however, typically requires barricades that restrict air flow.

But mechanical engineering professor **XIN ZHANG** and her colleagues have come up with a solution.

Leaning on their mathematical prowess and the technology of 3-D printing, the researchers argue it's possible to silence noise using an open, ring-like structure, created to mathematically perfect specifications, for cutting out sounds while maintaining airflow.

In a January 2019 *Physical Review B* paper, they demonstrated that such a feat was possible by developing a material with unusual and unnatural properties (known as a metamaterial),

in this case with the ability to exert an isolated influence on sounds—an acoustic metamaterial. In fact, their experimental "sound baffles" canceled 94 percent of noise.

This has huge implications for the commercial sector. Companies like Amazon could mute their future delivery drones, keeping their customers—and neighbors—happy. Fans and HVAC systems could run silently yet allow hot or cold air to circulate unfettered throughout a building.

It's no surprise that Zhang's pioneering work has attracted attention from numerous private companies and also earned her BU's Innovator of the Year award in 2018.

"If you ask me and my colleagues, acoustic metamaterials are the future," Zhang says.



XIN ZHANG, professor of mechanical engineering, has developed an acoustic metamaterial that can cancel 94 percent of sounds. Last year, she was named BU Innovator of the Year, the first woman to receive that honor.



STUDENT RESEARCH: WANT SOME FRIES WITH YOUR PLASTIC?

RANDI ROTJAN, research assistant professor of biology, is a staunch advocate for jump-starting young scientists' careers by involving them directly in her research.

Recently, two of her students came away with more than they bargained for. It all started when **HAYLEY GOSS** (CAS'19) and **JACOB JASKIEL** (CAS'19) joined Rotjan in Belize to collect seagrass blades from underwater meadows. They wanted to determine why sea-dwelling vegetarians like parrotfish preferred particular blades.

Back in Rotjan's lab on campus, Goss and Jaskiel's research took a sharp turn. They discovered that 75 percent of the seagrasses they had collected contained microplastics.

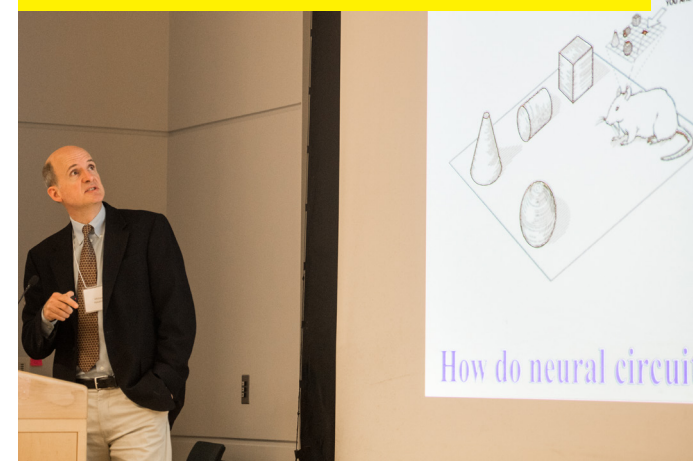
They dug through all the scientific literature for related research but came up empty. Their work appears to be the first discovery of microplastics on aquatic vascular plants, revealing an entirely new vehicle for microplastics to enter the food chain, leading all the way up to humans. Their findings were published in *Marine Pollution Bulletin* in the fall of 2018.

"This was not a fun, cool discovery; it's describing a human impact that we've never really considered," Goss says. "Of course, that being said, it's better to know now and try to address what's happening in our world."

While working with BU marine biologist **RANDI ROTJAN**, undergraduate researchers **HAYLEY GOSS** (CAS'19) and **JACOB JASKIEL** (CAS'19) discovered an entirely new vehicle for microplastics to travel into the food chain.



THE FUTURE OF SELF-DRIVING CARS HAS A LONG TAIL AND SHARP TEETH



Do we have a built-in version of Google Maps in our brains?

Based on recent research with rats, BU scientists believe the answer is yes. And that knowledge could have groundbreaking implications for autonomous navigation.

In a study published in *Nature Communications* last summer, **MICHAEL HASSELMO**, director of BU's Center for Systems Neuroscience and professor of psychological and brain sciences, along with BU researchers **JAKE HINMAN** and **WILLIAM CHAPMAN**,

confirmed the presence of specialized brain cells that provide rats with personal maps of their surroundings, allowing them to consider boundaries and obstacles in relation to themselves. Researchers believe that human brains likely have these

neurons too, although further research is needed.

The study was partially funded by a \$7.5 million multidisciplinary grant from the Department of Defense to explore bioinspired control systems. Hasselmo, the rat study's principal investigator, says the spatial knowledge derived from rodent behavior could ultimately be leveraged to create smarter autonomous vehicles and robots that could find their way around obstacles as well as living organisms.

"It's easier to have robots working in warehouses that have empty floors . . . It's all very predictable," he says. "But it's much harder for a robot to go across uneven terrain . . . One [application for this research] would be for rescue-type operations or salvage-type operations."

A WORLD OF DIFFERENCE: GLOBAL RESEARCH

From Mexico to Asia to South Africa, our faculty and student researchers made impacts around the globe. Below are but a few examples:

- Several **LAW SCHOOL FACULTY**, along with three law students studying immigration law, traveled to Tijuana, Mexico, to provide legal assistance to migrants arriving at the US border, helping them understand the process for seeking asylum in the United States.

- FEDERICO PISANI** (GRS'20), **GEDEON LIM** (GRS'21), and **REBECCA OLSON** (SPH'19) each received a \$4,000 fellowship from the Global Development Policy Center, which operates in partnership with BU's Frederick S. Pardee School of Global Studies, to travel to Asia in summer 2018 to conduct research.

Pisani investigated how the social connections of women in India affect their access to family planning. Lim went to West Java, Indonesia's second largest metropolitan area, to study how monetary and land incentives influence the selection and performance of village leaders. Olson spent the summer in Yangon, Myanmar's largest city, working with expectant mothers as a program manager with the nonprofit Tag International Develop-

ment to create a digital health tracking platform to encourage prenatal and postnatal health.

- Drawing on his research into black identity and music, College of Fine Arts Assistant Professor **MICHAEL BIRENBAUM QUINTERO** co- led a group of undergraduates to Cuba this spring to explore African and Cuban music, art, and religion. Quintero's book, *Rites, Rights and Rhythms: A Genealogy of Musical Meaning in Colombia's Black Pacific*, was published by Oxford University Press © 2019.

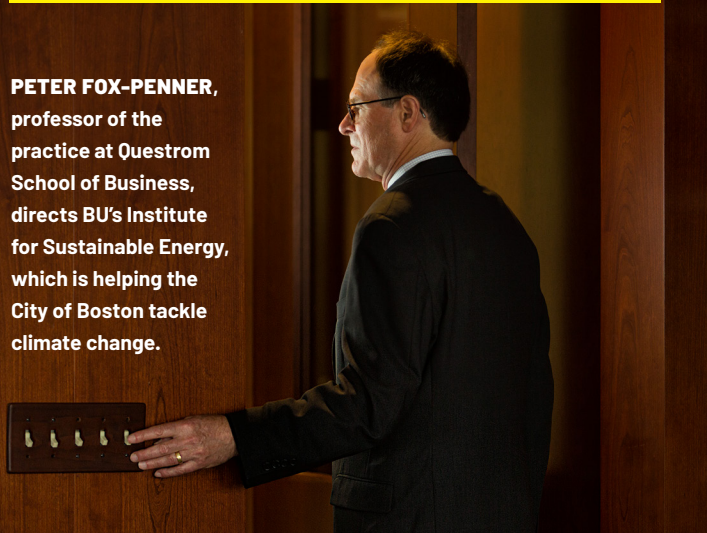
- Assistant professor of anthropology **CHRISTOPHER SCHMITT** and his UROP mentee, undergraduate biological anthropology and biology major **STACY-ANNE PARKE** (CAS'19), conducted fieldwork in South Africa during summer 2018, studying the timing of reproductive onset among vervet monkeys in wild and human-impacted populations.

- SCHOOL OF PUBLIC HEALTH RESEARCHERS** published a study detailing their decade-long research in Central America, citing new evidence that a chronic kidney disease epidemic among agricultural workers in Nicaragua and El Salvador may be linked to occupational heat exposure.

Last year, **CARB-X** (Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator), the Boston University-based global partnership, received approximately **\$50 MILLION** in new funding from the Federal Republic of Germany's Ministry of Education and Research, pushing to more than **\$500 MILLION** the total available to CARB-X for the development of products to protect people from superbug bacterial infections. Some of that money will go toward funding such initiatives as the development of a unique monoclonal antibody to prevent and treat hypervirulent multidrug-resistant *E. coli* infections, and the development of a new class of antibiotics to treat drug-resistant Gram-negative infections.

A BLUEPRINT FOR CARBON NEUTRALITY

PETER FOX-PENNER, professor of the practice at Questrom School of Business, directs BU's Institute for Sustainable Energy, which is helping the City of Boston tackle climate change.



The City of Boston wants to go carbon-neutral by 2050. And BU researchers have figured out a path to get them there.

A January 2019 report based on research led by the University's **INSTITUTE FOR SUSTAINABLE ENERGY (ISE)** reveals the massive efforts required for Boston to reach its goal of carbon neutrality, including retrofitting most of the building stock with energy-efficient features and for all vehicles on the road to be electric-powered.

ISE's recommendations serve as a blueprint to mitigate global climate change, which has noticeably impacted Boston and the Northeast's weather conditions in recent years. It's not only a bold step forward in addressing climate change in Boston, but the report could serve as a framework for other cities and regions.

Based on two years of work in close collaboration with stakeholders from the **GREEN RIBBON COMMISSION**, a group of Boston business and civic leaders focused on climate change, and the City of Boston. The ISE report contains specific options for improving energy efficiency and reducing carbon emissions across Boston's buildings, transportation, waste, and energy sectors.

"Boston University researchers have long been invested in understanding climate change and promoting sustainable energy," says President Robert A. Brown. "Their work has informed our Boston University Climate Action Plan, which was adopted by our board in December 2017. It is tremendously gratifying to see that work being strategically applied citywide."



ANGELA ONWUACHI-WILLIG, renowned legal scholar and expert in racial and gender inequality as well as civil rights law, wrapped up her first year as dean of the BU School of Law in 2019. A prolific writer and authority on employment discrimination and law as it relates to social injustice, Onwuachi-Willig has published extensively in leading law journals, including the *Yale Law Journal*, *California Law Review*, and the *Georgetown Law Journal*.

NOTABLE GRANTS: FUELING RESTLESS, INQUISITIVE MINDS

Last year, the University saw its sponsored program awards increase from \$486.8 million to \$579.4 million. The support came from such agencies and organizations as the National Science Foundation, the US Department of Defense, the National Institutes of Health, and the National Cancer Institute, to name a few. Read on to see how some of the money is being used.

- Professors of Epidemiology **ELIZABETH HATCH** and **LAUREN WISE**, and their team of researchers in the Department of Epidemiology, received two grants totaling close to \$6 million from the **NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES** of the National Institutes of Health to expand their research on fertility and miscarriage.
- Researchers from the College of Engineering and Boston Medical Center were awarded a three-year, \$900,000 **NATIONAL SCIENCE FOUNDATION GRANT** to develop and pilot a health informatics system to predict patients at risk of heart disease or diabetes, and enable early intervention and personalized treatment.
- The **AFRICAN STUDIES CENTER** was awarded National Resource Center and Foreign Language and Area Studies grants from the **UNITED**

STATES DEPARTMENT OF EDUCATION, more than \$2.2 million over four years, to support Africa-focused education, including instruction in African languages.

- A BU-led research team was selected to receive a \$7.5 million, six-year **MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE GRANT** from the US Department of Defense to create neuro-autonomous robots.
- BU School of Medicine researchers were awarded a \$4.9 million **MASSACHUSETTS LIFE SCIENCES CAPITAL GRANT** to develop new brain imaging techniques to better understand diseases like CTE and Alzheimer's.
- Health economist **RENA CONTI**, a researcher at BU's Institute for Health System Innovation & Policy and associate professor at Questrom School of Business, is conducting a \$600,000 study to better understand the range of financial difficulties experienced by patients undergoing cancer treatments, particularly in minority and/or underserved communities. The research is being funded by the **ALLIANCE FOR CLINICAL TRIALS IN ONCOLOGY**, the **LEUKEMIA & LYMPHOMA SOCIETY**, and the **NATIONAL CANCER INSTITUTE**.

AN EPIC STUDY GETS MORE EPIC

Thanks to more than \$70 million in new award funding, the **FRAMINGHAM HEART STUDY (FHS)**, run by Boston University and the National Heart, Lung, and Blood Institute (NHLBI), is undertaking two separate investigations.

Last year, the FHS was awarded up to \$38 million from the NHLBI to conduct a seven-year exploration of the changes in blood pressure, arterial stiffness, blood platelets, and liver-fat accumulation in the study's older subjects—many of whom are the children or grandchildren of the study's first participants. With every member of the massive baby boom generation achieving senior citizen status by 2030, the research will be crucial in understanding the effects of that graying of the population.

The FHS also was awarded \$33.1 million in funding from the NHLBI for 2019 through 2025 to tackle the question: What causes the high burden of heart disease, lung disease, and stroke in the rural South?

Ongoing for over 70 years, the FHS is the country's longest-running heart disease study. Harry Truman was president when it began in 1948. Starting with 5,209 residents of Framingham, Massachusetts, as its subjects, the FHS has produced more than 2,850 papers and is credited with coining the term "risk factors" as well as saving or improving the lives of countless people.

WHAT'S NEXT?



So where are we going next? Well, let's look at the data. Literally.

Because of the research potential resulting from the rapidly growing supply of raw data, machine learning, and the expansion of computational capacity, Boston University is organizing to lead in the emerging field of data sciences.

To that end, last fall we began site work for a 19-story tower in the heart of campus to house the Center for Computing & Data Sciences. The building, to be the tallest on campus, will gather the mathematics and statistics and computer science departments under one roof. It will also house the Rafik B. Hariri Institute for Computing and Computational Science & Engineering, an all-University research institute.

"This is the science that's going to change the way we behave, driving our behavior for the next 50 or 100 years," says President Robert A. Brown.

CENTER FOR COMPUTING & DATA SCIENCES

FACULTY OF COMPUTING & DATA SCIENCES

To embed computing and data sciences across the University, we established a new all-University Faculty of Computing & Data Sciences.

The new unit is designed to support faculty, students, research, and academic programs that bridge traditional disciplines with these emerging fields. The goal is to use the faculty and its programs to attract ambitious faculty and students unencumbered by traditional academic boundaries.

Azer Bestavros, a William Fairfield Warren Distinguished Professor and director of the Hariri Institute, says students across every major want to take data-related courses. The University saw a 23 percent increase in teaching credit hours for math and statistics from the 2006–2007 to the 2016–2017 academic year. And computer science saw a 266 percent increase.

And the more students are fluent in data-driven inquiry, Bestavros says, the better position they will be in as they apply for jobs.

"What field today is not reliant on data?" he says. "Computational thinking is becoming the bread and butter for every student's education. Data science is now a unifier across disciplines."





Starting construction in early 2020 and scheduled to open in 2022, the 19-story **CENTER FOR COMPUTING & DATA SCIENCES** will house the mathematics and statistics and computer science departments, the Hariri Institute for Computing, and the new Faculty of Computing & Data Sciences.



Image courtesy of KPMB Architects



AZER BESTAVROS, William Fairfield Warren Professor, professor of computer science, and director of the Rafik B. Hariri Institute for Computing and Computational Science & Engineering, and **DANIEL KLEINMAN**, associate provost for graduate affairs and professor of sociology, cochaired the Task Force to Envision Data Science at BU. Among the group's recommendations was the formation of a new interdisciplinary academic unit called the Faculty of Computing & Data Sciences, which will serve as a bridge between our traditional academic units and faculty and students interested in computing and data sciences.



ASHNI SHAH (CAS'20) interned this past summer at the Software & Application Innovation Lab (SAIL) at Boston University's Rafik B. Hariri Institute for Computing and Computational Science & Engineering. There, she worked on a framework for building web-based applications that employ secure multiparty computation, a cryptographic technique that allows for data sharing while maintaining privacy.



As a sophomore, **IAN BALLOU** (ENG'19) worked as an undergraduate researcher for Mass Open Cloud, an academic, industry, and government partnership housed at the Hariri Institute. A year later, Ballou landed a research internship with the BU Red Hat Collaboratory, an alliance between the multinational open-source software company and the University. There, Ballou's work drew notice and led to his current position as a software engineer at Red Hat.



HARNESSING A REVOLUTION: DATA SCIENCE ON CAMPUS

Fueled by the abundance of personal information on the internet—yours, ours, everyone's—data science is making business smarter, healthcare more efficient, and technology easier. At BU, our researchers are harnessing this revolutionary discipline in a variety of ways.

● **MARGRIT BETKE**, professor of computer science, and **TERRY ELLIS** (MED'05), associate professor of physical therapy and director of the Center for Neurorehabilitation, are using a camera-based AI system in Parkinson's patients' homes to track the reach and speed of patient movement and compare them to ideal parameters. Software then sends an assessment to a healthcare provider, who can advise the patient to move faster or slower or further extend their movements.

● **ELAINE NSOESIE**, assistant professor of global health and a Data Science Faculty Fellow in the Data Science Initiative at the Hariri Institute, was part of a team that mapped 80 million geotagged tweets from more than 600,000 Twitter users to census tracts and zip codes across the United States to develop indicators of happiness, food, and physical activity. She and postdoctoral associate **NINA CESARE** hope to better understand how discussions of health behaviors on social media differ across demographic groups.

● **PETER CHIN**, research professor of computer science, and **JACOB HARER**, a PhD student, worked with researchers at Draper, a Cambridge engineering not-for-profit, to develop technology to scan software systems for vulnerabilities often used by cybercriminals to gain entry. The tool, which used deep learning to train neural networks to identify patterns that indicate software flaws, can scan millions of lines of code in seconds, and will someday have the ability to fix the coding errors that it spots.

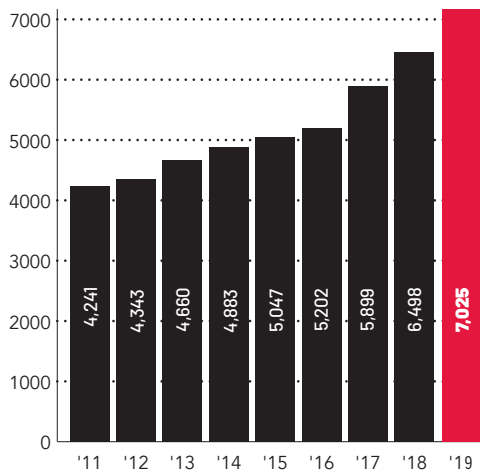
● Three BU political scientists—**KATHERINE LEVINE EINSTEIN**, **MAXWELL PALMER**, and **DAVID GLICK**—compiled a data set by coding thousands of instances of people who chose to speak about housing development at planning and zoning board meetings in 97 cities and towns in eastern Massachusetts, then matched the participants with voter and property tax data. The researchers found that speakers tended to be male, older, whiter, and more likely to be homeowners than most residents of their towns, and they overwhelmingly opposed new housing developments.

● Fueled by a three-year, \$900,000 grant from the National Science Foundation, engineering professors **IOANNIS PASCHALIDIS** and **CHRISTOS CASSANDRAS**, and **REBECCA MISHURIS** (MED'08), assistant professor of medicine, are developing a pilot health informatics system to identify patients who are at risk of heart disease or diabetes.

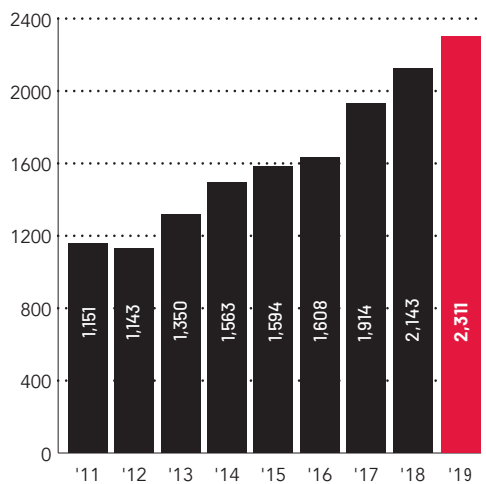
BUT DON'T TAKE OUR WORD FOR IT...

PERFORMANCE BENCHMARKS

Total Assets ● \$ millions



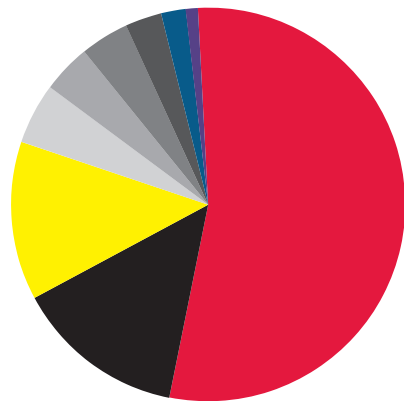
Total Endowment Assets ● \$ millions



*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).

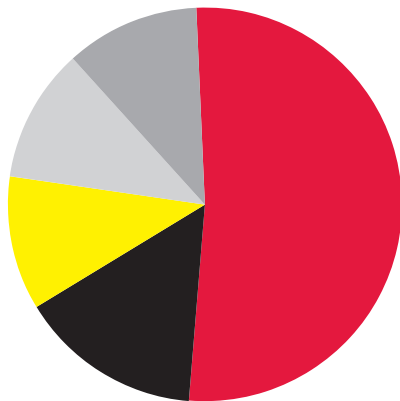
OPERATING REVENUES & EXPENSES FY2019

Total Revenues ● \$2.17 billion*



Tuition & fees, net	53.7%
Sponsored programs-direct	14.0%
Auxiliaries, net	13.3%
Sales & services	4.9%
Sponsored programs-indirect	4.5%
Spending formula amount and other investment income	4.5%
Gifts and contributions used for operations	2.5%
External fringe benefit recoveries	1.8%
Sponsored program income for student aid	0.8%

Total Expenses ● \$2.01 billion

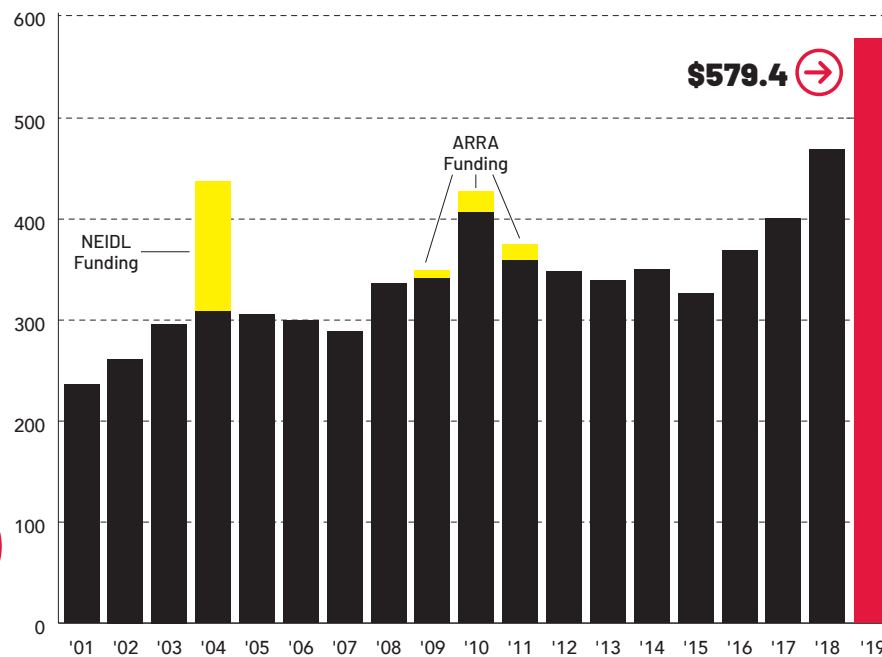


Instruction & departmental research	52.2%
Sponsored programs	14.9%
Institutional support	11.3%
Auxiliaries	11.1%
Educational support activities	10.5%

*FY2019 operating revenues are net of student aid of which \$281.4 million supports undergraduates and \$168.4 million supports graduate and other students, for a total of \$449.8 million.

SPONSORED PROGRAM AWARDS FY2001–FY2019*

● \$ millions



WE COULD GO ON ALL DAY ABOUT OUR ROBUST FINANCIAL HEALTH, BUT IT SOUNDS BETTER WHEN IT COMES FROM THIRD-PARTY EXPERTS.

In FY2019, Standard & Poor's Financial Services upgraded our credit rating to AA-. That brought us in line with the equivalent rating from Moody's of AA3. The upgrade is part of an overall trajectory of financial growth and continuous improvement at the University.

In FY2019, the University saw a net operating gain of \$157.8 million, an increase of 10.3 percent over FY2018; received \$579 million in research awards, a 19 percent jump over the previous year; and watched our endowment grow to \$2.3 billion, an 8 percent rise over FY2018. This past year also marked the conclusion of our first-ever comprehensive capital campaign, which brought in \$1.85 billion from more than 175,000 donors, well exceeding the revised \$1.5 billion goal.

"We assess the [University's] enterprise profile as extremely strong, characterized by growing applications, improving selectivity and student quality, and solid reputation, offset by a competitive landscape," according to the S&P's FY2019 ratings report.

Since FY2007, BU has seen four upgrades from S&P and three from Moody's during a period when downgrades have exceeded upgrades across higher education. Both FY2019 reports noted BU's excellent strategic positioning, strong institutional governance, and disciplined financial management and planning.

Our solid and multipronged financial model, together with extraordinary philanthropy and award-winning research and scholarship, means we can continue to not only think boldly, but to act.

It means we can undertake such initiatives as the ambitious project to build a 19-story Center for Computing & Data Sciences in the heart of campus and fill it with the field's brightest minds.

It means we can forge our own future.

AUDITED FINANCIAL SUMMARY

● \$ thousands

	2015	2016	2017	2018	2019
Operating revenues					
Student tuition and fees, net	\$ 944,832	\$ 994,069	\$ 1,046,018	\$ 1,099,682	\$ 1,164,248
Auxiliaries, net	263,715	263,739	266,419	273,623	288,576
Sponsored programs-direct	224,360	228,327	234,665	263,159	304,614
Sponsored programs-indirect	79,763	78,792	82,737	89,070	97,854
External fringe benefit recoveries	42,820	42,929	39,542	38,251	39,951
Sales and services	96,070	96,621	105,320	114,009	107,409
Endowment spending formula amount & other investment income	49,251	50,318	58,226	72,671	97,786
Gifts and contributions used for operations	46,379	47,985	48,401	53,072	53,870
Sponsored program income for student aid	14,957	14,589	13,707	14,793	16,345
Total operating revenues	\$ 1,762,147	\$ 1,817,369	\$ 1,895,035	\$ 2,018,330	\$ 2,170,653
Operating expenses					
Instruction and departmental research	\$ 848,038	\$ 886,521	\$ 922,041	\$ 997,903	\$ 1,050,772
Educational support activities	166,476	173,379	189,372	197,390	211,140
Sponsored programs	224,673	227,349	235,449	260,832	300,009
Auxiliaries	203,038	191,905	199,267	212,134	222,658
Institutional support	200,353	209,660	198,974	206,974	228,225
Total operating expenses	\$ 1,642,578	\$ 1,688,814	\$ 1,745,103	\$ 1,875,233	\$ 2,012,804
Change in net assets from operating activities	\$ 119,569	\$ 128,555	\$ 149,932	\$ 143,097	\$ 157,849
Nonoperating activities					
Contributions	\$ 80,714	\$ 33,926	\$ 137,428	\$ 72,724	\$ 33,491
Reinvested endowment and other investment income	19,617	22,289	34,958	31,166	32,863
Net realized and unrealized gains (losses) on investment and other assets	23,153	68,846	195,396	148,030	161,386
Spending formula amount	(51,429)	(55,967)	(64,464)	(71,033)	(79,333)
Other	(82,595)	(139,849)	54,099	190,610	(91,056)
Total nonoperating activities	\$ (10,540)	\$ (70,755)	\$ 357,417	\$ 371,497	\$ 57,351
Change in net assets	\$ 109,029	\$ 57,800	\$ 507,349	\$ 514,594	\$ 215,200



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**BOSTON
UNIVERSITY
ANNUAL
REPORT
2019**

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