

Our Quest

**ions change
the way
we think.**

**Our answers
change the
way you live.**

Dear Friends and Colleagues,

I'm pleased to share with you Boston University's 2024 Annual Report and to reflect on a year of many successes.

Our scholars are asking challenging questions and pursuing answers with creativity and zeal. Our groundbreaking science is rooted in a deep commitment to impact. For example, under the leadership of Mark Grinstaff, a National Science Foundation Trailblazer, a team of scientists is investigating self-amplifying RNA, which could revolutionize vaccines. Ioannis Paschalidis and Rhoda Au, in collaboration with the Framingham Heart Study, are developing a promising new artificial intelligence model that could help predict the onset of Alzheimer's disease.

At Boston University, our community members care about each other and the world in which we live. In 2024, we examined ways to increase investment in climate-vulnerable and debt-laden countries. We served our local Boston community, through scholarship advocating for the homeless and by mentoring children battling serious illnesses. We addressed misinformation in the media, and we explored the power of the arts to promote mental health. With the seminal research of our Black Women's Health Study, we have almost 30 years of data on this understudied population.

Boston University was founded to be academically rigorous and open to all people regardless of their background. We continue that tradition to this day. We boast an outstanding student body: This year we had 78,769 applications with an 11.1% admission rate. One in five members of the Class of 2028 is the first in their family to attend college. Our students in this class hail from 49 states and 70 countries and regions.

My optimism for where we are headed is buoyed by the strong support that I've seen from our community. Over the past year, we benefited from new and continuing generosity from alumni and friends of the University. They are connecting to campus life by contributing to everything from scholarships to train more primary care physicians to the hiring of faculty who teach art history and appreciation.

In the year ahead, we will continue to build on our existing strengths. Working together, our community will keep transforming Boston University into something even greater than it is today.

Sincerely,



Melissa Gilliam
President, Boston University

“Our community members care about each other and the world in which we live.”



Can we change faster than the climate?



BU research is uncovering new forms of environmental adaptability, and our initiatives are prioritizing sustainability, so we can protect our planet now and into the future.



Kevin Gallagher leads the Global Development Policy Center, which is helping financially vulnerable countries preserve and advance climate initiatives.

Helping Climate-Vulnerable Nations

A professor at the head of BU's **Global Development Policy (GDP) Center** has an eye to a growing climate (and financial) crisis and how to help. Developing countries need to accelerate investment in climate adaptation and improvement, but dozens spend more paying down interest on their loans than they do on health and education.

Kevin Gallagher and the GDP Center he directs have a robust plan to address this crisis. The professor of global development policy at the Frederick S. Pardee School of Global Studies is part of an international collaboration advancing debt relief to aid these countries in a green and inclusive recovery. As the international community works to dig out of this crisis and avoid future ones, the research group proposes steps to help struggling countries recover financially while continuing to invest in climate and development. By granting significant debt reductions, loans can be restructured to help countries transition

to sustainable, low-carbon economies.

There is, in fact, an existing framework to restructure overloaded debt burdens, but it has flaws. For example, middle-income countries cannot participate, it does not suggest a way to bring all creditors to the table, and the debt relief it provides is not forward-thinking enough to produce sustainable change.

In contrast, the plan from the GDP Center is “really about letting everybody in, creating incentives for all creditors, and linking the debt relief to social and environmental goals,” says Gallagher. “[It’s] not just turning the lights back on.”

Individual countries—despite their financial struggles—can do their part in achieving environmental and sustainability goals. Gallagher believes this plan truly lives up to the mandate of the GDP Center: “What is a nonpartisan, empirically based, theoretically driven way of dealing with this, that doesn’t take a side with bondholders or governments? Hopefully, it can help the policy discourse and turn into policy change.” ♦

GOING GREEN, GETTING GOLD



BU’s portfolio of LEED-certified spaces now exceeds 1.85 million square feet, due to recent renovations to the Sargent College of Health & Rehabilitation Sciences lobby and classrooms and the 9th floor of Kilachand Hall. Both have received Leadership in Energy and Environmental Design (LEED) Gold certification from the **US Green Building Council**, another notable step in our ongoing commitment to be net carbon neutral by 2040.

Mechanical and materials science engineer **Emily Ryan** uses computer models to test alternative battery materials.



Batteries, Reinvented

Boston University researchers are investigating ways to reinvent batteries, which need to be better, and safer, to efficiently store energy derived from renewable sources. As the world's focus on clean energy continues, it's essential that we find ways to improve what we use—especially the lithium-ion batteries in phones, laptops, and many other consumer electronics, which have presented the world with new and complex challenges.

These include the mining of raw materials, which is dangerous to the environment and the workers mining the materials, along with the inability to recycle these batteries, creating unprecedented waste.

To address this growing problem, **Emily Ryan**, associate professor of mechanical engineering, is using complex computer models to test alternative battery materials, like lithium metal instead of lithium ion. "If we started using lithium-metal batteries in your cell

phone, instead of charging it every day, you would charge it once a week. Or in a car with the same size battery as we have now, you might get 600 miles instead of 300 miles," says Ryan, who is associate director of BU's **Institute for Global Sustainability**.

This new level of thinking and research joins other battery initiatives, which include finding alternative (and less hazardous) component materials and developing ceramic-based materials capable of storing energy that can be released as heat or electricity.

As this momentum continues, researchers anticipate that we will see better and more efficient battery design, stricter industry standards, and more affordable solutions for both the purchase and recycling of renewable batteries. As we look toward a future of electric cars and solar-powered homes, this is promising news for the planet that we are working hard to protect and preserve. ♦

THE POWER OF THE PEDAL



The Campus Climate Lab brings students and faculty together to conduct research designed to make campus more sustainable. This year, a project at the College of Engineering hit on a creative way to get real-time data about air pollution in neighborhoods across Boston: riding a bike.

The project team developed an air-quality sensor attached to the front of a bike from Bluebikes, Boston's bike-share system. As air passes through the device, it measures levels of carbon dioxide, methane, particulate matter, and nitrous oxide, while recording temperature and humidity. A GPS tracks where data is collected.

Early testing indicates enormous potential for identifying where gas pipes may be leaking methane or urban heat islands could use more trees and shade.

The team was awarded the 2024 **Anthony Janetos Climate Action Prize**, given to the Campus Climate Lab project judged to have the greatest impact on BU's Climate Action Plan. Their invention emphasizes environmental health and neighborhood equity—paving the way for a better future for us all.

Coral Reef Insight, Coral Reef Survival

Rising ocean temperatures are taking a toll on marine environments—especially on the Caribbean coast of Panama, where BU researchers have discovered a coral reef in jeopardy.

Only a year ago, Associate Professor of Biology **Sarah Davies**, an expert on coral, studied the Panamanian reef. Upon hearing reports of coral "bleaching"—a loss of color due to warming temperatures—Davies sent her lab team back to see what was happening. The answer was disturbing, showing a stark before-and-after comparison that demonstrated how much bleaching had occurred in one year's time.

Despite these findings, Davies and her team are also learning that certain corals can survive extreme conditions. In the western Pacific Ocean, the team discovered some that can withstand higher water temperatures, which may suggest how corals can adapt. And they are further encouraged by their recent discovery of multiple healthy Panamanian corals that are over 60 feet in circumference, indicating that these corals have survived for hundreds of years and remain healthy even after the hot 2023 summer.

Scientists, including Davies, think the organisms doing well in the face of climate change are able to adjust

to varying conditions and reproduce consistently. Further study is needed, but even this can be challenging due to a lack of consensus on how to analyze reef health. Davies led 60 other scientists in authoring a paper to initiate agreement on symbiont assessment and genetic sequencing.

"We put forward these types of experiments and hope this paper is a framework for moving the field forward," Davies says. As she and her team look ahead, they are intent on discovering more about coral adaptation and how this beautiful species can survive and thrive during climate change. ♦



Doctoral student **Maria Valadez Ingersoll** (GRS'27,'27), Associate Professor **Sarah Davies**, and postdoctoral researcher **Hannah Aichelman** (GRS'23,'23) study the resilience of coral.

What if the next outbreak never broke out?



Our researchers are at the forefront of tackling infectious diseases, anticipating the next possible pandemic and fighting back against drug-resistant bacteria.



NEIDL researchers **Shivraj M. Yabaji** and **Igor Kramnik** have found a way to influence immune cells to fight T

Rethinking How We Tackle TB

“It’s a way of treating the host, the patient, rather than focusing on the pathogen.”

—IGOR KRAMNIK

A team of BU researchers had a major breakthrough in discovering an effective way to fight tuberculosis, a deadly disease that still kills more than a million people each year in spite of all the safety measures modern medicine has developed to control it.

Igor Kramnik, associate professor of medicine, and **Shivraj M. Yabaji**, postdoctoral researcher at BU’s **National Emerging Infectious Diseases Laboratories** (NEIDL), have found a way to influence the body’s immune cells to make them better at fighting TB. By isolating a type of white blood cell vulnerable to TB, and making that cell resistant to TB, they are pioneering a whole new approach to treatment.

Like other research being done at BU, this work is using the body’s own systems to fight infection and disease. “It’s a way of treating the host, the patient,

rather than focusing on the pathogen,” explains Kramnik. The discovery is crucial at this moment, because TB is becoming resistant to the traditional means modern medicine has been using to fight it.

A recent BU study showed that the standard TB vaccine was only about 37% effective in children under five years of age and offered no protection for adolescents and adults. And for those who have been infected, antibiotics are losing their power: according to the World Health Organization, annually, about 500,000 people become ill from drug-resistant TB globally.

This transformative new treatment could be in clinical trials soon. “We hope that our research will contribute to the development of more effective treatments for TB by better understanding how to fine-tune the activation states of immune cells,” says Yabaji. ♦

A Force to Stop Deadly Bacteria

BU-based CARB-X recently reached a major milestone, funding its 100th project to create new antimicrobials. A nonprofit global partnership, CARB-X (Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator) directs funding and expertise to companies and researchers around the world to spur the creation of innovative antibiotics, vaccines, and rapid diagnostics.

“CARB-X has become one of the key global initiatives to save the future of antibiotics,” says **Kevin Outterson**,

CARB-X’s executive director and BU’s Austin B. Fletcher Professor of Law. The partnership is funded by a consortium that includes the US, German, UK, and Canadian governments as well as the global charitable organizations the Wellcome Trust, Bill & Melinda Gates Foundation, and Novo Nordisk Foundation. It also receives in-kind services from the US National Institutes of Health. CARB-X has given out more than \$470 million in funding awards, helping push 18 projects into first-in-human clinical trials.

When the United Nations General Assembly met in 2024 for a High-Level Meeting on antimicrobial resistance, CARB-X and its success was particularly mentioned in the Political Declaration. Similar statements supporting CARB-X are now commonplace at the G7 as well. “Evolution pushes bacteria to resist antibiotics....” says Outterson. “We can never take our foot off the gas of discovery and development of new products to prevent, diagnose, and treat bacterial infections.” ♦

“CARB-X has become one of the key global initiatives to save the future of antibiotics.”

—KEVIN OUTTERSON



Kevin Outterson is the executive director of CARB-X, which has invested more than \$470 million to combat antibiotic resistance.



GOING ALL-IN ON ANSWERS

From tackling incurable diseases to saliva tests for performance, BU faculty received millions in funding in FY2024.

The **National Institute on Aging** awarded a \$45 million grant to **David T. Felson** (SPH’84) and **Tuhina Neogi** (SPH’08,’09), professors of medicine and epidemiology, to help identify treatments that reduce the need for knee- and hip-replacement surgeries.

Alexander A. Green, an associate professor of biomedical engineering, is leading a **Defense Advanced Research Projects Agency** study, supported by up to \$12.5 million, to analyze biomarkers that assess readiness for physically and mentally challenging tasks, with the goal of developing a rapid, portable saliva test that can help predict performance.

A BU team has won a \$3 million **National Science Foundation Research Traineeship** award. **Elise Morgan**, College of Engineering dean ad interim and Maysarah K. Sukkar Professor of Engineering Design & Innovation; **Mary Dunlop**, associate professor of biomedical engineering; **Christopher Chen**, William Fairfield Warren Distinguished Professor and director of

the **Biological Design Center**; and **Ahmad (Mo) Khalil**, professor of biomedical engineering, will train a diverse, interdisciplinary group of PhD students over the next five years in the area of biological control, which focuses on understanding and replicating the abilities of living systems to self-regulate and adapt to environmental changes.

A team of researchers led by **Darrell Kotton**, David C. Seldin Professor of Medicine and director of the **Center for Regenerative Medicine**, has been awarded a \$14.3 million grant from the National Institutes of Health’s **National Heart, Lung, and Blood Institute** to develop stem cell-based therapies for currently incurable genetic lung diseases affecting children and adults, including an inherited form of emphysema, cystic fibrosis, and primary ciliary dyskinesia.

Professor of Psychiatry **Casey Taft** has been approved for a \$2.9 million funding award from the **Patient-Centered Outcomes Research Institute** to conduct a trial of a trauma-informed partner violence intervention program that has proven effective for military veteran populations. Taft will examine its effectiveness for civilian populations. ♦

Vaccines, Supercharged

Two BU doctoral students investigating RNA may have found more exciting results than they expected.

Joshua McGee (ENG'24,'24) and **Jack Kirsch** (ENG'23,'23) were tinkering with RNA sequences—strands of ribonucleic acid—to see if small tweaks to their nucleotides could lead to improved drugs and vaccines.

Instead, they found a way to advance vaccines, gene therapy, and cancer treatments using self-amplifying RNA (saRNA), a type of RNA that repeatedly replicates its programmed instructions, producing more proteins than normal.

Working with chemist and biomedical engineer **Mark Grinstaff**, who is a William Fairfield Warren Distinguished Professor, and **Wilson Wong**, an

associate professor of biomedical engineering, McGee and Kirsch identified a way to alter the chemical structure of saRNA that makes it a more powerful, efficient vaccine.

This development kicked off a year-long, multidisciplinary project that spanned Grinstaff's chemistry lab and Wong's genetics engineering lab; it also enlisted **Florian Douam**, a Peter Paul Career Development Professor and assistant professor of virology, immunology, and microbiology at BU's National Emerging Infectious Diseases Laboratories.

While standard mRNA COVID vaccines tell cells to produce a spike protein that mimics the real virus, saRNA keeps going, repeating instructions to the cell, multiplying its effect (with less

medicine), and prompting the immune system to remember how to fight the virus for a longer period of time.

There's more testing to be done, but results are promising. It's possible that saRNA could be programmed to produce a missing gene or replace a defective one. It could also be used in treating lung, breast, and other cancers by compounding the effects of an anticancer drug with a lower, less harmful dose.

The **National Science Foundation** (NSF) awarded Grinstaff a \$3 million Trailblazer Engineering Impact Award to continue exploring saRNA technology. It is a discovery that could, as the NSF abstract puts it, “fundamentally change the genetic engineering paradigm.” ♦



The research team—(top row, from left) **Wilson Wong**, **Mark Grinstaff**, **Joshua McGee** (bottom row, from left) **Florian Douam**, and **Jack Kirsch**—is working on more powerful and efficient vaccines using self-amplifying RN



CEID researchers **Kayoko Shioda** and **Laura White** use data to inform predictive models of disease outbreaks.

Outbreaks: Predicting the Unpredictable

The human and economic costs of infectious disease outbreaks are almost incalculable. At BU's Center on Emerging Infectious Diseases (CEID), two researchers are playing a key role in a global initiative focused on detecting and preparing for future outbreaks.

The initiative, Epistorm: Center for Advanced Epidemic Analytics and Predictive Modeling Technology, is a multi-institution collaboration funded by a \$17.5 million grant from the Centers for Disease Control and Prevention (CDC).

Laura White, professor of biostatistics, and **Kayoko Shioda**, assistant professor of global health, who head the data science and surveillance research core at CEID, are the lead collaborators from BU, which will receive \$1.9 million from the award.

Using wastewater surveillance, artificial intelligence, and other tools, these researchers are developing predictive models that gather data on outbreaks before they occur. This will allow hospitals and other community services to prepare and can help inform decision-making and policy during health emergencies. In particular, the research will emphasize disease development and spread in rural communities.

“This CDC initiative is an exciting and important step in preparing for pandemic threats,” White says. “I am pleased to be a part of such an innovative and diverse team of scientists from across the country.” Shioda concurs, calling the project “a vital initiative dedicated to enhancing outbreak response capabilities in the US.” ♦

“This CDC initiative is an exciting and important step in preparing for pandemic threats.”

—LAURA WHITE

Can the ivory tower become a town square?



We are making higher learning more accessible, building a community of thinkers and doers that fully represents society, and advancing ideas that matter for all.



Education researcher **Mary Churchill** studies the value of standardized tests in college admission.

A Testing Future for Admissions

“We must have the will and tenacity to do the work to close our society’s opportunity and equity gaps.”

—MARY CHURCHILL

Today, about 80% of four-year colleges don’t require standardized tests. That’s good news for the future of education access, according to associate dean at BU’s Wheelock College of Education & Human Development **Mary Churchill.**

In recent years, standardized tests were found to be poor predictors of a student’s aptitude. More importantly, they have proven to be a serious barrier to equitable access to education. This led the majority of colleges and universities to stop using standardized test scores during the COVID-19 pandemic, already a trend that many experts predict will continue.

Churchill’s research echoes advocates who have argued against using standardized tests for admission. Studies show that a student’s high school GPA is a better predictor of college success. These studies also show that other factors related to student experiences are better determinants of college success, indi-

cating that the SAT or ACT may simply be too narrow in predicting academic achievement.

What’s more troubling is that standardized tests—with origins in the eugenics movement—can be a tool of discrimination to privilege the already-privileged. Despite this bias, some elite institutions have begun to reinstate the requirement, purportedly to help identify otherwise overlooked students—a choice Churchill considers to be a mistake.

Because, ultimately, eliminating the barrier of required standardized tests is only the first step in creating a more equitable admissions process. Many admissions directors already view test scores as one optional component in a portfolio of activities, awards, and other material. Churchill hopes this continues. If education is to be accessible for all, then “we must have the will and tenacity to do the work to close our society’s opportunity and equity gaps.” ♦

RANKINGS: COUNTING UP OUR IMPACT

#41 in national universities
U.S. News & World Report

#25 in best value schools
U.S. News & World Report

#10 in the US for employability
Times Higher Education

#17 in undergraduate
business schools
Poets & Quants

#1 in Occupational Therapy*

#3 in Online Master's in
Criminal Justice*

#3 in Healthcare Law*

#4 in Project Management*

#7 in Public Health*

#7 in Epidemiology*

#12 in Social Work*

*Graduate Program Rankings,
U.S. News & World Report



Yadira Cabrera is the first college graduate in her family, thanks to BU's efforts to improve educational access—and her mother.

The First to Graduate

Yadira Cabrera (COM'24) is one of a growing number of first-generation college students at Boston University.

When she graduated, her mother Maricarmen was sitting in the audience. But Cabrera also carried her mother onstage, deep in her heart, knowing that her mom's sacrifices were instrumental in making the journey possible.

Students like Cabrera are increasingly experiencing a strong sense of well-being, belonging, self-efficacy, and academic accomplishment, thanks to University initiatives like the **Newbury Center** for first-generation students, creative and ambitious financial aid programs like affordableBU, and the hiring of faculty experts such as Associate Professor of Higher Education

Leadership **Anthony Abraham Jack**, whose scholarship is bringing new understanding of the first-gen experience.

Growing up in a Dominican American community near Inwood Hill Park in New York City's upper Manhattan, Cabrera was raised by her single mom and older sister. Her mother worked seven days a week, year-round, rising at 5 am to make Dominican dishes that she would sell at construction sites around Manhattan. Workers would wait to take lunch until Maricarmen showed up. In the summer, she would also make pastelitos, a Dominican snack, which she sold to visitors enjoying the local park. When Cabrera entered high school, her mother drove a cab to better support her family. It was

a tough job and another sacrifice, one made to ensure Cabrera got her education.

As soon as she arrived at BU, Cabrera started giving back to the community, joining Students of Caribbean Ancestry, the Association of Latino Professionals for America, and AdClub. She served as copresident of PRLab, president of the BU chapter of the Public Relations Student Society of America, and cochair of the Class Gift campaign. In addition, she held down two to three jobs every semester, including stints working the late-night shift at the West Campus dining hall, covering the front desk at the Fitness & Recreation Center and Howard Thurman Center for Common Ground, and interning with BU Productions.

In recognition of her academic success and contributions to the University, Cabrera received a coveted **College of Communication Blue Chip Award**, given to only a handful of graduates each year. She was also inducted into BU's **Scarlet Key Honor Society**. And, above all, she became the first in her family to graduate from college.

Cabrera hopes to start her own PR agency serving entrepreneurs from various backgrounds. Her mother will never be far from her mind. "Commencement was full-circle for my mother," Cabrera says. "This is what she's been working toward her whole life. I still have a lot to learn. But it just feels like the biggest step of my life is going to be everything that I do from here on out." ♦

BRIMMING WITH BRILLIANCE



What do Netflix's *Cobra Kai*, the *New York Times* Crossword, the Barcelona Music Festival, NASA, the Chinese restaurant chain Mankousu, and the Italian national rowing team have in common? The Boston University Class of 2028, that's what. This class is full of actors, puzzlers, artists, researchers, entrepreneurs, athletes, coders, and every other variety of high-achiever, go-getter, and self-starter.

- **78,769** applications received
- **3,268** enrolled first-year students
- **56%** admitted Early Decision
- **11.1%** admit rate, compared with 10.85% in 2023
- **1469** average SAT*
- **33** average ACT*
- **49** states represented, plus the District of Columbia and Puerto Rico
- **70** countries and regions represented
- **22.7%** are international students
- **3.9** grade point average of entering first-year students
- **21%** of entering first-years are first-generation college students
- **26.6%** of domestic first-year students self-identify as being from traditionally underrepresented racial and ethnic groups**
- **30%** of domestic first-years are Pell Grant-eligible

*Average among those who submitted scores; not required for admission

**Includes students identifying themselves as two or more races

Can we hardwire happiness?



BU researchers aren't chasing happiness, they're reverse-engineering it—by studying addiction, the effects of social media, loneliness, and other mental health challenges we all may face.



“Harnessing social media as a tool that can empower us, rather than mislead us, can help us nurture the health of our society online and offline.”

—MONICA WANG

School of Public Health researcher **Monica Wang** investigates the benefits and dangers of social media

The Positive Side of Social Media

Monica Wang, associate professor of community health sciences at BU's School of Public Health, is examining the challenges and benefits of social media and the balance we all need to seek. While social media can facilitate positive social connections and raise awareness of important issues such as mental health and well-being, it also does the opposite, often spreading health misinformation.

In a commentary published in *JAMA Pediatrics*, Wang and research fellow **Katherine Togher** (SPH'23) investigate the benefits and dangers of social media. Their findings show younger generations demonstrating remarkable resilience, creativity, and empathy in their online interactions. Many use social media as a tool for

positive change, advocating for social justice, mental health awareness, and community support.

“Harnessing social media as a tool that can empower us, rather than mislead us, can help us nurture the health of our society online and offline,” says Wang. And, while acknowledging this positive impact on mental health, she points out the damage that occurs from online content that spreads false health information.

This includes articles and images related to restricted dieting, excessive exercising, and unsafe eating practices—which, when added to the onslaught of flawless, manipulated images that create unrealistic beauty standards, can lead to eating disorders, low self-esteem, and other physical and emotional issues.

What can be done? Wang and Togher say that parents and caregivers can help children by engaging in nonjudgmental conversations about taking proactive health-protective measures, such as using privacy controls and balancing online and offline activities. On a broader level, they urge health experts, researchers, educators, and parents to advocate for policies that regulate misleading or harmful information on social media.

The positive and negative aspects of social media will always be with us, and researchers like Wang hope the good will prevail. “Social media is like fire,” she says. “When used with recklessness, it can burn our house down. But when used for good, it can keep us warm and cook our food.” ♦

Lonely at Work? You're Not Alone

A BU researcher is exploring questions about loneliness on the job, such as how does it impact the workplace and what can employers do to counteract it. **Constance Hadley**, a

Questrom School of Business research associate professor in management and organizations, studies a problem the US surgeon general has declared a lethal pandemic, saying a lack of social connection can be as dangerous as smoking 15 cigarettes a day.

It's natural to assume that loneliness at work started during the pandemic. But Hadley's research began before that. In a study of nearly 500 global executives and other managers, most respondents struggled to connect with teammates at work, and feelings of lone-

liness correlated with aspects of how modern teams are designed.

This lack of connection was a significant problem, Hadley realized. What's more, these feelings of isolation have a severe economic impact, with employers losing an estimated \$154 billion annually due to stress-related absenteeism.

Fortunately, Hadley sees a way forward but offers some caution for our postpandemic world: "Just skipping to in-person and hoping that somehow people re-bond is wrong," she says. "A forced return to the office with tremendous employee resistance can create that alienation that will increase loneliness."

Instead, Hadley recommends changes that start with leadership. This means strategically creating an environment

in which people are expected to care for each other, and encouraging managers to prioritize that environment.

Employers can lead by example, taking a personal interest in employees and showing them their individual situations and contributions are valued. Tactical thinking about the workspace may also facilitate connection: open-concept floor plans designed for collaboration and socializing have adversely resulted in people putting on headphones to block each other out. Instead, employers might dedicate spaces for people to interact.

As Hadley explains, employers can't just say to workers, "Go out and make friends." There needs to be a structure and mind-set in place to avoid workplace loneliness. ♦



Business professor **Constance Hadley** studies how loneliness affects the workplace and what employers can do about it.



Student artist **Emily Taylor Rice** invokes her struggles in her work, hoping to inspire others.

The Art of a Journey

One of the first graduates of BU's new print media and photography program, Emily Taylor Rice (CFA'21,'24) hopes to inspire others who face difficulties on their own journeys. A truly passionate artist who brings her life's challenges and experience to her craft, Rice's work emphasizes empowerment, expressing her belief that facing fears and taking positive action can lead to positive change.

"As a woman in long-term recovery from alcoholism, the complicated narratives and often serious realities surrounding mental health and substance-use disorders are what lie at the heart of my work," says Rice, in an interview with Vicente Cayuela at the **Griffin Museum of Photography**. "There is beauty in damage, so I create visual metaphors that illustrate emotional complexity, struggle, growth, and strength." To show the emotional turmoil of substance-use disorders, she uses found textiles and colored pigments to reflect the chaos of alcohol dependence.

A close look at her work reveals

embossing techniques Rice applies to replicate emotional scars and ripped-and-torn sections that represent deconstruction and rebirth. "The processes of embossing and printing leave behind evidence, much like emotional upheavals leave scars that cannot be erased," she explains. "In my prints, pigments can act as a collision on the paper, but they can also delicately caress the paper's surface, emulating feelings of both desperation and relief."

You can see her convictions reflected in the titles of some of her most arresting pieces: *Something Must Give* (2023, monotype), *The Gift of Desperation II* (2023, monotype), and *Standing Smack in the Middle of the Truth about Myself* (2023, silkscreen on found fabric).

Rice firmly believes that "mental health disorders do not discriminate" and wants her printmaking to be seen as an artistic means of communication and activism. "I hope that my work might be impactful in reducing the stigma surrounding these topics as they become a part of a larger discussion." ♦



We Are Recovering (2023, monotype), Emily Taylor Rice

"I hope that my work might be impactful in reducing the stigma surrounding these topics as they become a part of a larger discussion."

—EMILY TAYLOR RICE

Can AI teach us more than we think?



Our researchers and faculty are leveraging artificial intelligence and machine learning to better understand ourselves and improve how society functions.



Engineering professor **Irving J. Bigio** developed technology for a skin cancer-detection device.

This Device Could Save Your Life

A new handheld cancer-detection device could help identify potentially cancerous growths, possibly slashing the number of misidentifications in half, thanks to technology pioneered by a College of Engineering researcher.

Spotting signs of skin cancer too late may spell serious trouble, but primary care physicians can struggle to diagnose if a growth requires further examination by a dermatologist.

Enter **DermaSensor**, a noninvasive instrument using light and artificial intelligence to examine skin lesions and assess whether a patient should be referred to a specialist. It was recently cleared for US markets by the Food and Drug Administration, a crucial step toward widespread adoption of this

potentially lifesaving device.

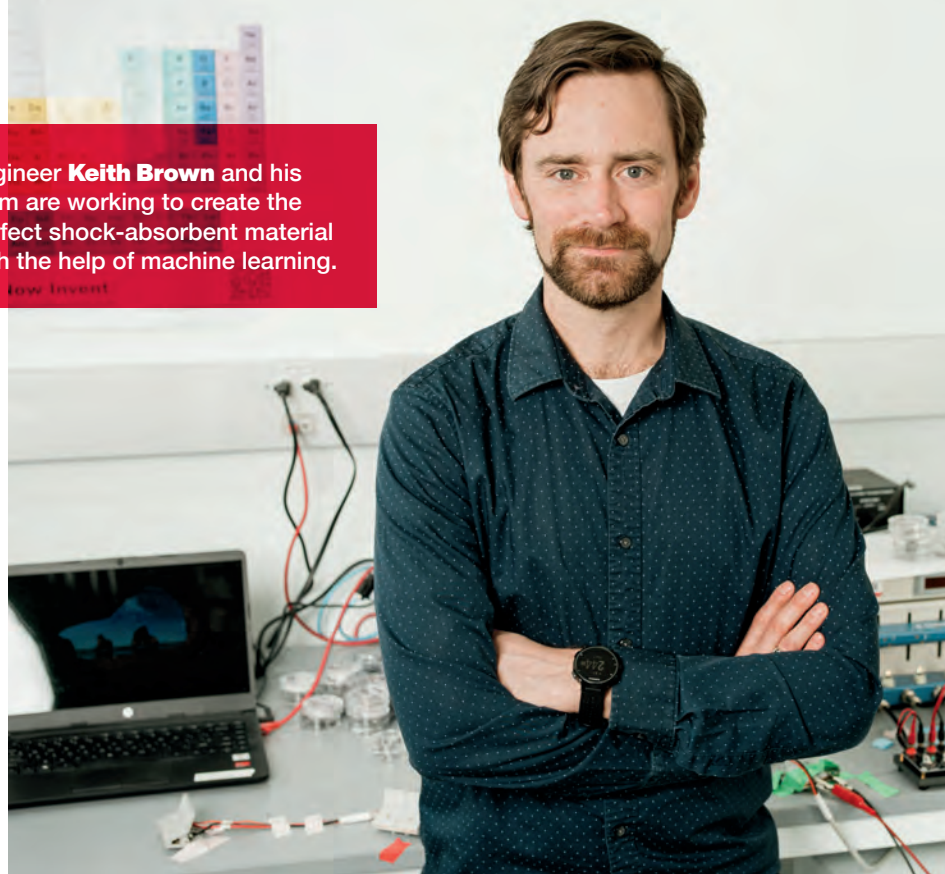
Irving J. Bigio, professor of biomedical engineering and electrical and computer engineering, developed and refined DermaSensor's underlying technology: elastic scattering spectroscopy. He also serves as scientific advisor to the eponymous company behind the device, which licensed patents from Bigio and Boston University.

Bigio, who also holds positions in the Chobanian & Avedisian School of Medicine and College of Arts & Sciences, says DermaSensor's clearance reflects well on the College of Engineering and on University culture too: "It's a positive statement about BU's commitment to interdisciplinary research that involves the engineering and physical sciences, as well as the medical school." ♦



DermaSensor was recently cleared by the FDA for US markets.

Engineer **Keith Brown** and his team are working to create the perfect shock-absorbent material with the help of machine learning.



A Self-Driving Lab

An autonomous robot in BU's College of Engineering is teaching itself to create the world's most shock-absorbent shape. Meet **MAMA BEAR**. If it succeeds, the product could revolutionize helmets, packaging, car bumpers, and more.

MAMA BEAR is short for Mechanics of Additively Manufactured Architectures Bayesian Experimental Autonomous Researcher. For the past three years, MAMA BEAR has been repeatedly creating and crushing 3D-printed plastic structures and recording resulting details in a vast database.

First conceptualized in 2018 by **Keith Brown**, an associate professor of mechanical engineering, and his team in the **KABlab**, MAMA BEAR has been running continuously since 2021. Learning as it goes, the robot creates a structure, compresses it, and measures how much energy it absorbs and how its shape changes—these determine what's known as its mechanical energy-absorption efficiency. Each iteration is a tweaked version of its

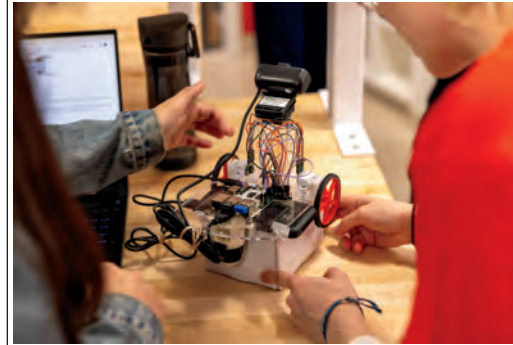
predecessor, the design and dimensions adjusted by the robot's computer algorithm based on all past experiments. To date, this "self-driving lab" has filled dozens of boxes with more than 25,000 shapes.

It's all about finding the sweet spot. The ideal structure can't be so strong that it damages whatever it's supposed to protect, but it should be strong enough to absorb impact.

Before MAMA BEAR, the best structure anyone observed was about 71% efficient at absorbing energy, says Brown. But one January afternoon in 2023, Brown and his team saw their robot hit 75% efficiency, breaking the known record. The results were published in *Nature Communications* in May 2024 and have already attracted the attention of the US military as it seeks to design new helmet padding for soldiers.

"We're excited that there's so much mechanical data here and we're using this to learn lessons about design more generally," Brown says. ♦

BU'S NEW ROBOT PLAYGROUND



BU's **Robotics & Autonomous Systems Teaching and Innovation Center** (RASTIC) is two things: a hands-on playground for engineering students, and a global hub for spawning societal applications of robotics and autonomous systems. Opened in March 2024, the center provides a state-of-the-art space for engineering students to experiment with ground and air robots, develop algorithms for AI-based autonomous systems, test self-driving vehicles, and custom-mold silicon for robots with medical applications.

According to College of Engineering Dean Emeritus and former Provost Ad Interim Kenneth Lutchen, RASTIC is designed to operate "in partnership with industry, graduating a workforce that is ready to make an impact right away." The Massachusetts Technology Collaborative awarded \$4.4 million to help build the space, and researchers from companies including Amazon Robotics, Boston Scientific, DEKA, MassRobotics, Medtronic, and more are placing BU's **Master of Science in Robotics & Autonomous Systems** students in full-time, paid internships, a component of the program.

Taking a Scalpel to AI

A first-of-its-kind program is helping Boston University computer scientist **Mark Crovella** investigate AI—asking, can we trust it? Should we trust it? Is it safe? Is it perpetrating biases and spreading misinformation?

The National Artificial Intelligence Research Resource (NAIRR) Pilot, backed by the National Science Foundation and Department of Energy, aims to bring a new level of scrutiny to AI's promise and peril by giving 35 projects, including Crovella's, access to advanced supercomputing resources and data at top national laboratories.

A professor of computer science and chair of academic affairs in the Faculty of Computing & Data Sciences, Crovella

will audit a type of AI known as large language models (LLMs). These software tools help drive everything from ChatGPT to automated chatbots to smart speaker assistants. **Evimaria Terzi**, professor in the Department of Computer Science, will join Crovella on the project.

The use of LLMs is spreading rapidly, Crovella says, finding uses in education, social settings, and research, among many other areas. Apple, Microsoft, and Meta have all announced integrations of LLMs into their product lines. In the near future, Crovella predicts, we will each have our own personalized LLM that will know a lot about us and help with tasks on a minute-to-minute basis. Therefore, it's critical to understand whether such models incorporate biases

against protected groups, tendencies to propagate extreme or hateful views, or conversational patterns that steer users toward unreliable information.

The NAIRR grant means Crovella and Terzi can start analyzing the internals of modern LLMs, which contain a huge amount of knowledge, obtained from vast training data. They also possess an enormously complex system for generating output based on billions of parameters. As a result, the internal representations used in LLMs have been referred to as "giant and inscrutable."

"How will we know that these 'giant and inscrutable' systems are trustworthy and safe?" Crovella says. "In essence, we want to study an LLM the way a neuroscientist studies a brain in an fMRI machine." ♦

"How will we know that these 'giant and inscrutable' systems are trustworthy and safe?"

—MARK CROVELLA



Computer scientist **Mark Crovella** received a novel federal grant to audit a type of AI known as large language models.

Are social ills making us sick?



BU researchers are facing down discrimination and inequity—and discovering how they may be hazardous to our health.

Public health researchers **Mary Willis** and **Jonathan Buonocore** explore the connection between the location of energy infrastructure and public health.



A Database for Environmental Justice

Facilities that process fossil fuels pose a health risk to the people who live nearby. A new database, launched by Boston University's **Institute for Global Sustainability and School of Public Health**, reveals that in the United States these plants are five times more likely to be located in areas predominantly populated by people of color.

Assistant Professor of Environmental Health **Jonathan Buonocore** and Assistant Professor of Epidemiology **Mary Willis** at the School of Public Health, who led this project, are core faculty at the Institute for Global Sustainability. They collected and organized disparate sources of federal information about the location of energy infrastructure into a first-of-its-kind

database. According to Buonocore, this new database enables a comprehensive examination of how energy infrastructure impacts health.

This database allows advocates, decisionmakers, and academicians to investigate the correlation between the location of energy production facilities and human health and will inform conversations regarding infrastructure planning, environmental justice, and public health at a critical time for generations of residents. In East Boston, for example, neighbors fought for years the location of a substation near a playground and park (but suffered a recent setback when the Massachusetts Supreme Judicial Court ruled against them). And in nearby Chelsea, community activists oppose storage facilities for petroleum

products, which in addition to being close to housing and recreational areas, sit dangerously close to Belle Isle Marsh Reservation, a fragile coastal wetland important to wildlife and the area's ongoing resilience to storms. In the 1970s and 1980s, neighbors in Boston's Mission Hill community (unsuccessfully) opposed construction of the Medical Area Total Energy Plant, which powers hospitals in the Longwood Medical Area as well as Harvard's medical and public health schools.

These fights will continue, of course. But now, through the efforts of Buonocore and Willis, communities will have a great deal more of substantive, detailed information to work with, and the idea of environmental justice might not be just an idea but a reality. ♦

SPACE TO SUCCEED



Announced in March 2024, the **Academic Testing Center** is BU's latest effort to provide crucial support for students. At 930 Comm Ave, the pilot program provides a comfortable and quiet environment for students with approved exam accommodations from Disability & Access Services to take tests, encouraging academic success while considering the individual needs and learning styles of all students.

The Signature Study of Black Women's Health

Operating nearly 30 years, Boston University's **Black Women's Health Study (BWHS)** is a landmark achievement focused on how racism and other factors affect the health of Black women. With more than 59,000 participants, this inter-sectional study is the largest and longest-running US examination into the health of Black women.

Yvette C. Cozier (SPH'94,'04), one of the BWHS lead investigators and School of Public Health associate dean for diversity, equity, inclusion, and justice, emphasizes the vital need for this ongoing study. "We've come to realize how much one's neighborhood environment and social structures, rather than genes, prescribe health outcomes," says Cozier, an associate professor of epidemiology. "We all have the same genes, but those genes are expressed differently across different groups of people, particularly in hyperstressful or low-resource environments."

Founded in 1995 at BU's **Slone Epidemiology Center**, the BWHS seeks to identify the underlying causes of poor health—and good health—among Black women. The study launched with participants ranging in age from 21 to 69, with an average age of 38, from across the US. Every few years, the participants complete questionnaires about their demographics, health conditions, and lifestyle, as well as the impact of events such as COVID-19.

What are the significant findings of this study? Black women are more likely than other racial and ethnic groups to die from cardiovascular disease, hypertension, stroke, lupus, and several types of cancers. They are twice as likely as white women to develop diabetes over the age of 55 or have uncontrolled blood pressure. They also face greater challenges related to affordable and quality healthcare, including higher medical debt, longer travel times to hospitals, and residence in lower-resourced

neighborhoods despite high levels of education.

A recent finding from the BWHS indicates that perceived experiences of interpersonal racism in employment, housing, and interactions with the police were linked to a higher risk of coronary heart disease among Black women.

The BWHS has published more than 350 papers, some in collaboration with external researchers from other cohort studies, such as the BU-affiliated **Framingham Heart Study**, the longest-running heart disease study in the US.

BWHS researchers credit the success of the study to the women who continue to share updates about their health. "Our work would not be possible without their contributions," Cozier says. "I hope they feel more vested and more seen as we work to understand with them the health issues that they experience." ♦



Epidemiologist **Yvette C. Cozier** is a lead investigator for the Black Women's Health Study, which launched nearly 30 years ago.

"There is hope that we can achieve the 'caring city,' looking at what the city does to care for the people who live in it."

—LORETTA LEES



Sociology professor **Loretta Lees** is internationally known for her research on gentrification

A CENTER FOR THRIVING



In fall 2023, the professionally staffed LGBTQIA+ Student Resource Center opened on the second floor of 808 Comm Ave, following years of student advocacy for such a space on campus. The center, led by Director **Katy Collins**, will provide leadership and career workshops for LGBTQIA+ students, alumni outreach, and mentorship opportunities. And it will serve as a community hub for LGBTQIA+ students, where they can build connections and enjoy new opportunities for engagement and reflection.

Seeking a Solution for Gentrification

As the widening wealth gap leads to increasing gentrification in US cities, BU is committed to finding answers to stop this inequitable destruction of communities. Leading this charge is **Loretta Lees**, faculty director of BU's **Initiative on Cities**. The Initiative on Cities is a hub for urban-related research and teaching across the University, engaging policymakers, academics, and students to work toward sustainable and just urban transformation.

A professor of sociology, Lees is internationally known for her research on gentrification and urban regeneration, urban policy, and more. She served as an expert witness to the demolition of the largest public housing project in Europe, providing her insights on the displacement of a low-income, multiracial, and multiethnic community.

She brings that global expertise to BU, where gentrification is taking place outside her window. "Boston is what you might call a hypergentrified city," says Lees. "It's nigh impossible for a regular professional to buy a property anywhere

in the vicinity of downtown Boston at all—myself included."

To help cities like Boston, Lees and her colleagues initiated "Gentrification & Displacement: What Can We Do About It? An International Dialogue," the first major international academic conference on the topic since 2002. Lees organized the conference with Professor of Sociology **Japonica Brown-Saracino**, a faculty fellow at the Initiative on Cities and an ethnographer who has researched the social preservation of longstanding urban communities in relation to gentrification.

Gentrification is about more than housing. It impacts underrepresented populations, directly and indirectly, in many areas of life, including mental and physical health, maternal and infant mortality, addiction, cultural identity, stability of social networks, general quality of life, and of course, economic opportunity.

As progress is made, Lees says, "There is hope that we can achieve the 'caring city,' looking at what the city does to care for the people who live in it." ♦

What's the matter with our gray matter?



BU researchers are at the forefront of neurological research, documenting the ravages of Alzheimer's disease, diagnosing cognitive impairment, and coming closer to diagnosing brain trauma during life.

Predicting Alzheimer's Disease Using AI

From brain imaging to blood tests and cognitive assessments, the tools available to detect Alzheimer's disease generally catch this disease too late. But now, Boston University researchers are exploring the power of AI to predict Alzheimer's by analyzing a patient's speech.

Funded by the National Science Foundation, National Institute on Aging, and BU's **Rajen Kilachand Fund for Integrated Life Sciences and Engineering**, the model they designed can predict, with an accuracy rate of 78.5%, whether someone with mild cognitive impairment is likely to remain stable or fall into the dementia associated with Alzheimer's disease. The multidisciplinary team of engineers, neuropsychologists, and computer and data scientists published their findings in *Alzheimer's & Dementia: the Journal of the Alzheimer's Association*.

"We can reasonably make that prediction with relatively good confidence and accuracy," says **Ioannis Paschalidis**, coauthor of the paper and director of the BU **Rafik B. Hariri Institute for Computing and Computational Science & Engineering**. "It shows the power of AI."

The model was developed using data from the **Framingham Heart Study**, of which BU has been a longstanding partner. Using audio recordings of interviews with a group of study participants diagnosed with mild cognitive impairment, Paschalidis and his colleagues used speech recognition tools and machine learning to train their model to spot connections among speech, demographics (e.g., age, gender, etc.), diagnosis, and disease progression. Then, they tested the model's predictive capabilities on the rest of the study's participants. The results were impressive.

Their model may have the added benefit of providing healthcare equity for underserved populations. "Technology can overcome the bias of work that can only be done by those with resources, or care that has relied on specialized expertise that is not available to everyone," says **Rhoda Au**, a professor of anatomy and neurobiology, and an investigator with the Framingham Heart Study, who coauthored the paper. With the hope to eventually eliminate expensive lab tests, imaging exams, or office visits, Au and Paschalidis see tremendous potential for diagnosing dementia from home, using a smartphone app.

"If you can predict what will happen, you have more of an opportunity and time window to intervene with drugs," says Paschalidis. "We hope, as everyone does, that there will be more and more Alzheimer's treatments made available." ♦

Professors **Ioannis Paschalidis** and **Rhoda Au** are exploring the power of AI to predict Alzheimer's by analyzing speech.





Neurologists **Michael Alosco** and **Jesse Mez**'s study brings us closer to diagnosing CTE while a patient is still alive.

“These findings provide a clear step forward toward diagnosing CTE in life.”

—JESSE MEZ

Advancing CTE Diagnosis

A new study from BU's Chronic Traumatic Encephalopathy (CTE) Center offers insight into diagnosing CTE while a person is still living.

CTE is commonly found during autopsies on athletes like football and soccer players who endure frequent blows to the head. But how is it connected to a range of cognitive, behavioral, and neurological symptoms—or is it connected at all? The BU study is helping to answer these questions. “For the first time, we were able to show a clear dose-response relationship between the amount of CTE pathology and the severity of cognitive and functional symptoms, including problems with memory and executive function,” says

Jesse Mez, CTE Center codirector of clinical research, associate professor of neurology, and coauthor of the study.

The research team measured a protein called p-tau across 10 different brain regions in 364 brains with CTE that were donated to BU's **UNITE Brain Bank**. They asked family and friends of the brain donors for insights on their loved one's cognitive, functional, mood, and behavioral symptoms.

These symptoms had a direct correlation to the presence of the p-tau protein, the study found. And p-tau in the frontal lobe was associated with some neurobehavioral symptoms—like the reduced ability to control impulses and self-monitor behavior—but overall,

there was a higher correlation between cognition than neurobehavior.

The team understands the vast importance of these findings, along with the need to create a more robust analysis. “This can offer valuable information,” says study coauthor **Michael Alosco**, CTE Center codirector of clinical research and associate professor of neurology. “But we need to move toward a model where we objectively assess individuals during life and follow them until brain donation.”

As the research continues, there is new hope for potential therapies to help CTE patients before it's too late. “These findings provide a clear step forward toward diagnosing CTE in life,” says Mez. ♦

EMERGING RESEARCH. AND RESEARCHERS.

Whether investigating radicalization or climate disinformation, student-researchers are pushing their fields forward, expounding on professors' hypotheses, and making the most of the Undergraduate Research Opportunities Program (UROP).

Shreyas Puducheri (CAS'26, CAMED'26) is working with Associate Professor of Medicine Vijaya B. Kolachalama to develop an AI tool that helps diagnose dementia. Using patient health data, the platform can diagnose 10 different types of dementia and also evaluate its prediction with a confidence score.

Ranran (Angela) Zhang (CAS'24) analyzed charcoal

samples from 5,000 years ago to better understand how ancient communities along the Nile lived. Identifying various types of wood used for fuel reveals a clearer picture of how ancient peoples found solutions for sustainable living. What's old is new again.

Jack Martin (CAS'25) and **Jasmin Tagijeva (CAS'25)** are studying the roots of radicalization, especially online. The first stage of their research involves analyzing hundreds of interview transcripts, exploring how and why individuals become extremists. Overseen by Jessica Stern, a research professor at the Frederick S. Pardee School of Global Studies, their work is part of a broader study of the roots of radicalization, by Stern

and Harvard colleagues, which recently received a Harry Frank Guggenheim Distinguished Scholar award.

Emma Longo (COM'24) wrote a paper on climate disinformation and what's known as “native advertising,” industry-sponsored content dressed up to look like other informative articles in mainstream publications. Her research led to a rare honor for an undergraduate: a chance to present at the Association for Education in Journalism and Mass Communication. In the paper, Longo argues that the media, especially those publishing native advertising from fossil fuel companies and the like, are complicit in misleading the public. ♦



Angela Zhang (CAS'24) conducted UROP research on wood charcoal fragments from two archaeological sites in the Nile Valley of Egypt.

Can compassion be cutting edge?



BU researchers are studying today's societal challenges to uncover new aspects of human behavior and bring about positive change.



Media studies researchers **Maria Elizabeth Grabe** and **Joan Donovan** are leading experts in emerging media and communication.

Battling Misinformation, Protecting Truth

The truth matters, it always will, and Boston University added new voices last year that will make this powerfully clear.

The College of Communication welcomed media scholar **Maria Elizabeth Grabe** as its inaugural Dalton Family Professor and second-ever director of Emerging Media Studies. She joins **Joan Donovan**, one of the foremost experts in online misinformation and disinformation, who was hired by the College of Communication as an assistant professor of journalism and emerging media studies.

Grabe built her journalism career in South Africa where she regularly bucked up against government censorship. “I cannot think of a more acute threat to the democratic way of life than doubt about the integrity of

information that flows through media platforms,” says Grabe, who is an International Communication Association Fellow as well as a former editor of the journal *Communication Theory*.

Donovan’s research and teaching explore media manipulation, effects of disinformation campaigns, and adversarial media movements, with a particular focus on how political parties, governments, corporations, social movements, and other networked groups engage in efforts to shape media narratives and disrupt social institutions. She has testified before Congress about manipulation and deception online and is a coauthor of *Meme Wars: The Untold Story of the Online Battles Upending Democracy in America*.

“It can feel a little like trying to hold back a tidal wave with your own

two hands,” says Donovan, who is on the faculty of BU’s **Communication Research Center**. But that hasn’t stopped her yet. She places herself at the crossroads of a dark web of online vitriol, exploring cynical—and sometimes violent—posts by extremists and conspiracy theorists, often picking up on nascent movements and bad actors before they gain mainstream attention.

One of her priority initiatives at BU is to build out an internet observatory of everything nationally elected politicians post online.

“Journalists are more and more becoming the front lines of the information war,” Donovan says. “And my hope is to help them design and develop new digital methods for investigative journalism.” ♦



Economics professor **Tarek Hassan**'s research focuses on the impact of immigration on the economy.

Knowing the Facts about Immigration

The research of Professor of Economics **Tarek Hassan** is shedding light on the truth about immigration and our economy.

In the US, rhetoric about immigrants stealing jobs and hurting the economy goes back more than 100 years.

To find the truth, Hassan and his colleagues examined decades of US migration data to look at the impact of new arrivals on economic growth, wage levels, and innovation, which they measured through the number of new patents filed in a particular area. More new ideas generally mean more new businesses and products: "We find that when you have 10,000 immigrants arriving in a given US county, the number of patents filed per capita in that county dramatically increases, by something like 25%."

The team also estimated that, since 1965, migration of foreign nationals to the US may have contributed to an

additional 5% growth in wages. "More immigrants create more economic growth," says Hassan. "And because it creates more economic growth locally, it raises the wages of the people who are already there."

But it's not a perfect picture. Hassan's research, published in the *American Economic Review*, has shown that not everyone benefits the same way from a rush of migration, and that may strike a chord with some of the millions of voters who want to stem the tide. For instance, despite the overall positive effects to a community, the flow of new residents does nothing to boost the wages of existing workers without a high school diploma.

Hassan believes people need to understand the nuanced information regarding immigration. And with his research, he hopes to foster a more informed conversation. ♦

ATHLETES WITH AN IMPACT



BU Athletics celebrated 12 years of partnership with **Team IMPACT**, a local nonprofit that pairs collegiate sports teams with children who are battling serious and chronic illnesses. The benefits are mutual: student-athletes get leadership, advocacy, and professional development opportunities, while children facing enormous personal adversity feel the joy of competition and team camaraderie.

Since 2012, a number of BU squads have routinely welcomed a Team IMPACT child onto their rosters. **Sumi Cameron (Questrom'24)**, Patriot League one-meter diving champion and BU Athletics' Woman of the Year, is cocaptain of the Terriers Swim and Dive Team IMPACT participation. Depending on a child's needs, student-athletes like Cameron will help them with homework, spend time with them, and—often the overwhelming favorite—invite them to the sidelines for games, matches, and meets.

An Advocate for the Homeless

Everyone should have a safe, stable, and decent place to live. This is the core belief of **Thomas Byrne**, associate professor at the School of Social Work, who leverages the University's extensive research capabilities to seek solutions for those who are homeless, who deserve a life of dignity.

Byrne's research focuses broadly on the causes and consequences of, and policy solutions to, homelessness and housing insecurity. His work has been published in journals including the *American Journal of Public Health*, *Health Affairs*, and *Housing Policy Debate*. Outside of BU, he serves as an investigator for the **US Department of Veterans Affairs Center for Health-care Organization & Implementation Research** and at the **National Center on Homelessness Among Veterans**.

With the number of people experiencing homelessness in the United States at an all-time high, Byrne remains a leading voice in the national conversation on the topic. For example, a recent case before the US Supreme Court focused on criminalizing people who sleep

outside, giving them a ticket or jail time even when they had no place else to go. Byrne made the case that this is "cruel and unusual" punishment under the Eighth Amendment and that there are better alternatives. Ultimately, the court decided to leave such decisions in the hands of local authorities who may not be equipped to see to the nuanced needs of vulnerable people.

Another related issue demanding attention is the risk to our aging population. Byrne says, "There is clear evidence that we are in the midst of a growing crisis of homelessness and housing insecurity among older adults." This looming threat is partly driven by the high cost of housing, which means a rent hike can jeopardize older adults who have been stably housed their entire lives. Byrne's research, highlighted in the *New York Times*, brings awareness to this emerging problem as it seeks answers and action.

The issue of homelessness is not going away, but through the socially minded research of Thomas Byrne, there is hope that everyone can feel the dignity and security a home provides. ♦

"There is clear evidence that we are in the midst of a growing crisis of homelessness and housing insecurity among older adults."

—THOMAS BYRNE

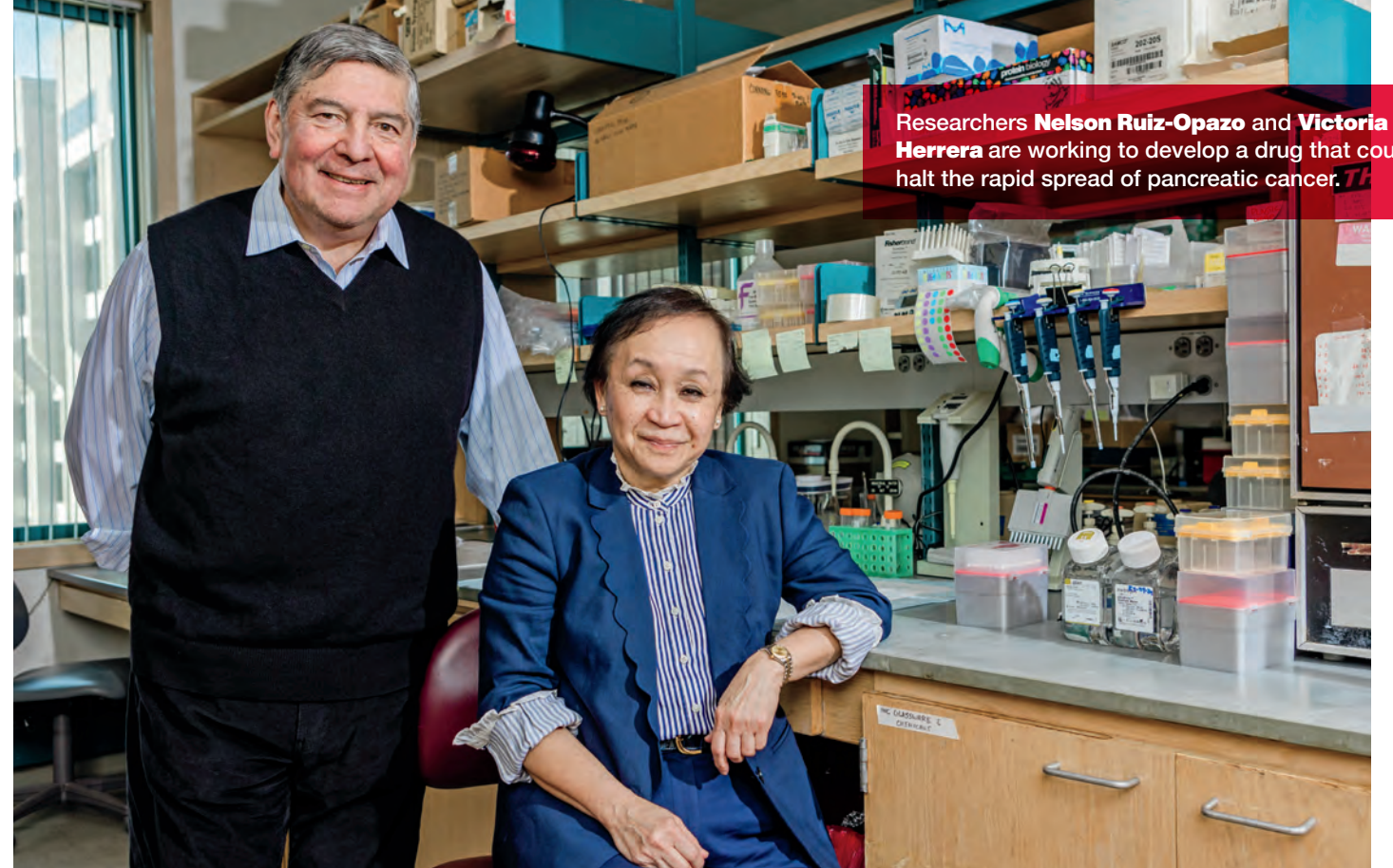


School of Social Work Associate Professor **Thomas Byrne** is seeking solutions, and dignity, for people who are homeless.

Do our bodies need a reboot?



BU researchers are harnessing the complexities of the human body to offer new therapies, identify diseases, and find effective defenses against them.



Researchers **Nelson Ruiz-Opazo** and **Victoria Herrera** are working to develop a drug that could halt the rapid spread of pancreatic cancer.

Outsmarting Pancreatic Cancer

BU researchers are developing an antibody drug they hope will help halt the rapid spread of pancreatic cancer.

Anyone who's watched a loved one die of pancreatic cancer knows that it's a fast-moving and cruel disease. By the time symptoms appear, it has often spread to other organs. Prognoses are grim—rarely more than a few years, sometimes less than a month.

One contributing factor to the low survival rate may be the disease's resistance to drugs called checkpoint inhibitors that have been effective in more than a dozen different cancers. These drugs block proteins that cancer cells use to hide from the immune system, but not in pancreatic cancer.

The disease's evasive maneuvering may be coming to an end, however, if BU medical researchers **Victoria Herrera** and **Nelson Ruiz-Opazo** have their

way. They hope their drug will work in concert with immune checkpoint inhibitors to keep cancer cells from escaping the immune system and, in turn, halt the spread of microtumors already on the move by the time a patient is diagnosed.

In consultation with **Matthew Kulke**, BU's Zoltan Kohn Professor of Medicine and chief of hematology and oncology at Boston Medical Center, the University's primary teaching hospital, their research was one of six projects supported by a 2024 BU Ignition Award, designed to accelerate the advancement of promising new science and technology and ultimately identify a viable pathway to bring a new product to market. Herrera and Ruiz-Opazo will work with Kulke to test the antibody drug.

Professors of medicine at BU's **Whitaker Cardiovascular Institute**, Herrera

and Ruiz-Opazo are targeting a gene called DEspR, which is not present on normal adult pancreatic cells but is seen on tumor cells and at elevated levels on cancer stem cells. The gene is also expressed on certain immune cells that, paradoxically, help cancer evade the immune system.

By simultaneously shutting off these "culprit" cells that express DEspR, while leaving normal cells with no DEspR intact, their goal is to inhibit DEspR's collaborative roles in metastasis and immune evasion. If successful, this dual action outsmarts pancreatic cancer and could mean reducing or eliminating the use of chemotherapy, with its debilitating side effects.

"We scientifically project, and genuinely hope," Herrera says, "that anti-DEspR will prolong life and reduce the hardship of pancreatic cancer as a disease." ♦

Biomedical engineer **Hadi Nia** helped develop a system that allows the lungs of a mouse to be studied outside the body.



A Revealing Look at the Lungs

A Boston University researcher's innovation has opened a new realm for discovery: real-time observation of our bodies' most fundamental systems—starting with the lungs.

Collaborating with colleagues across the University, **Hadi Nia**, assistant professor of biomedical engineering, developed a system that allows the lungs of a mouse to be studied outside the body.

As crucial as they are to our existence, lungs—especially those affected by disease—still hold many mysteries for scientists. Even advanced technologies such as MRI and CT scans don't adequately support detailed analysis. Nia's "crystal rib cage," more formally known as LungEx, uses a ventilator and perfusion pump to keep the lungs working and a transparent container around the lungs to allow for immediate observation.

This lets Nia study the lungs at the molecular level, closely observing and monitoring the air sacs and capillary vessels in mouse lungs at work. And this, in turn, creates a better understanding of lung resilience against diseases like cancer and pneumonia. "As

these diseases progress, there comes a critical point where the progression becomes irreversible, leading the lung toward collapse rather than resolution," says Nia. "Our goal is to predict these critical points at which the entire lung is at risk of collapse."

Along with its valuable insight into lung disease, the crystal rib cage has applications for other studies of the human body. It's been used to image the heart in conjunction with the lungs, offering greater understanding of pulmonary hypertension or arrhythmia. Similar studies are anticipated to visualize a functioning brain. And the crystal rib cage can advance research efforts related to regenerative medicine and organ transplants.

In early 2024, Nia was awarded an esteemed **Sloan Research Fellowship** for this innovation. He and his collaborators are looking forward to a promising future: "[We] are thrilled and energized, ready to channel this recognition into pivotal discoveries in the fields of cancer and pulmonary diseases." ♦

UNQUESTIONABLY GREAT MINDS

Our best questions and answers come from our faculty, who have earned quite a few plaudits this year. Here are a few highlights from the past year:

Distinguished Professor and Chair of the Department of Earth & Environment **Lucy Hutyra** was recently named a MacArthur Fellow. Hutyra won a so-called "genius grant" for her work to understand the effect of urbanization on climate and ecosystems.

Vivek Goyal, professor of electrical and computer engineering, was selected as a 2024 Guggenheim Fellow. His predictive algorithms and computational imaging discoveries have made it possible to photograph objects hidden by walls.

Astronomer **Chuanfei Dong**, biomedical engineer **Hadi Nia**, and neurobiologist **Meg Younger** were named 2024 Sloan Research Fellows. The fellowships will help these winners study, respectively, solar storms, lung disease, and how mosquitoes detect humans.

Biologist **Ana Fiszbein**, mechanical engineer **Michael Albro**, data scientist **Jonathan Huggins**, computer engineer **Rabia Yazicigil**, mechanical engineer **Andrew Sabelhaus**, computer engineer **Wenchao Li**, and global development policy expert **Rachel Brulé** won National Science Foundation Faculty Early Career Development Program (CAREER) awards to support their research, which has applications ranging from curing cancer to safer self-driving cars.

New Answers for Autistic Children

Simone Gill, an associate professor of occupational therapy, is conducting vital research that explores a possible connection between an autistic child's motor skills and verbal skills.

She wants to help answer the difficult questions that parents of very young autistic children ask, like How soon will my child talk? Will my child ever talk?

Gill, who also directs the **Motor Development Laboratory** at Sargent College of Health & Rehabilitation Sciences, collaborated with **Helen Tagger-Flusberg**, professor of psychological and brain sciences and director of BU's **Center for Autism Research Excellence** (CARE), and speech therapists

at Massachusetts General Hospital, to closely observe how many steps an autistic child took as they calculated balance, velocity, and other motor skills. In studies conducted at CARE, autistic children were asked to walk on a special mat embedded with sensors to measure the distance of their steps, and they also completed other physical movements that were compared to those of children without autism.

The preliminary results suggest autistic children's gross motor skills and the ability to speak may be more closely related than previously thought. Many of the minimally verbal autistic children she has observed display other move-

ment challenges or inconsistencies. Developmental psychologists at Boston Children's Hospital are conducting brain imaging to further understand these findings, and researchers at UCLA are analyzing two play-based interventions for movement and language deficits.

"Hope remains that we can create interventions that will be more impactful for [autistic] children and their families," Gill says. "The hope is maybe they won't have to go to five different specialists to receive help. Maybe they could just go to a few because we are able to put our resources together and find out how to help them in the most efficient way." ♦

"Hope remains that we can create interventions that will be more impactful for [autistic] children and their families."

—SIMONE GILL



Occupational therapy researcher **Simone Gill** is examining the connection between an autistic child's motor and verbal skills.

Can collective change pay dividends?



In partnership with our community of alumni and friends, we are stepping up our commitment to research and education, opening doors for the next generation of leaders.



President **Melissa Gilliam** (center) closed out the celebration of her inauguration as Boston University's 11th president with BU Night at Fenway Park.

Improving the World One Donor at a Time

“We are receiving extraordinary and broad-based support. This will enable us to support the strategic priorities of President Gilliam as she begins her tenure at BU.”

—KAREN ENGELBOURG

We are thrilled to report that our dedicated and passionate alumni and friends have once again given generously, providing far-reaching support for scholarships, research, student life, athletics, and many other activities across the University. As the University seeks to address societal challenges ranging from climate change to AI to infectious diseases, these funds will help us discover solutions, initiate action, and open the door to the next generation of leaders and changemakers.

What's more, our donor base is very broad, with gifts in a variety of forms from alumni, parents, foundations, and friends. Speaking of alumni, we're pleased to report a robust expansion of alumni engagement on a national and international scale, connecting with proud Terriers through regional network events, alumni summits, podcasts, and more.

As always, we see the results of our donor generosity providing long-term benefit for the world. A new gift from James (Questrom'81) and Eileen Rullo will continue their generous support of the **Center on Forced Displacement**, which helps further the center's vital mission of finding ethical interventions for millions who have fled their homes due to war, persecution, and other disasters. And the PI Sustainability Research Endowment Fund, established at our **Institute for Global Sustainability**, will help build a future focused on sustainable policies and initiatives, thanks to the gift from Mayank Singhal via PI Industries Ltd.

Some of our past gifts continue to bear fruit. The transformational \$100 million gift from the late Edward Avedisian (CFA'59,'61, Hon.'22) and his wife, Pamela (Hon.'23), a milestone donation in 2022 that renamed our

When it comes to BU's annual **Giving Day**, the scarlet-and-white school spirit of student-volunteers is our secret ingredient.



medical school the Aram V. Chobanian & Edward Avedisian School of Medicine, also provided professorships, seven of which have been awarded to BU faculty. In FY2024, those professors continued to guide and inspire students in the areas of virology, ophthalmology, biochemistry, and more.

Many FY2024 gifts supported several scholarships, furthering our mission to expand access to education for a wider range of deserving students. A \$200,000 pledge from David Fasciano (CAS'88) established a Century Challenge scholarship at the College of Arts & Sciences in memory of his late brother, Paul. The scholarships awarded from Century Challenge funds are matched by BU for 100 years after the fund is activated. Another noteworthy gift was a \$100,000 pledge from Matthew (CAS'85) and Isabel Zisk, establishing the Betty H. Zisk Trailblazer Endowed Scholarship Fund in

memory of Matthew's mother, Professor Emerita Betty H. Zisk, a pioneering activist who taught political science at Boston University for 46 years.

Finally, this year's **Giving Day** did not disappoint. More than 11,500 donors, supporting over 800 causes, made gifts in excess of \$3.88 million. That was a record amount, with a record number of matching challenges, and further proof that the Terrier spirit is alive and well across the country and around the world.

"We are receiving extraordinary and broad-based support," says Senior Vice President for Development & Alumni Relations **Karen Engelbourg**. "This will enable us to support the strategic priorities of President Gilliam as she begins her tenure at BU with a focus on empowering the school's research and expertise to meet the needs of today's complex world." ♦



Boston University garners crucial support from a global network of alumni.

TERRIER ATHLETES PERFORM AMAZING FEATS OF COMMUNITY



First-year student phenom **Macklin Celebrini** was the top overall pick in the 2024 NHL draft. The men's hockey team made it to the Frozen Four for the second year running. And a dominant women's softball team went undefeated in conference play, winning its fifth Patriot League title in six seasons.

But the prowess of our athletes isn't limited to face-offs and strike zones. They are crushing it in the classroom and the community.

Women's golf earned the highest grade point average (3.72), leading all 24 BU programs. Beyond the classroom, our athlete-scholars performed more than 2,000 hours of community service, from Thanksgiving meal packaging at the Salvation Army's Kroc Center to the annual Holiday Reading Program with Boston schools to volunteering at the Making Strides Against Breast Cancer Walk through the American Cancer Society. And track standout **Sonja Dommen (Sargent'24)** mentored students at Boston and Newton Public Schools, helped organize a clinic for women in sports, and promoted Sexual Violence Awareness programming on BU's campus.

From feats of athleticism to academic achievement to community awareness and activism, BU Athletics has shown it is at the core of campus life—and beyond.

TURNING DOLLARS INTO IMPACT

Contributing to art and architecture, medicine, education, and more, this year's donors empowered yet another generation of students. Here are a few highlights:

Larisa Connors (CAMED'98) established the Larisa E. and John M. Connors III Endowed Scholarship Fund to assist medical students interested in pursuing primary care medicine.

Alexander and Alexandra Classen (Parents CAS'26) established the Classen Family Endowed Scholarship Fund, which will provide annual awards to College of Arts & Sciences undergraduates.

Numerous donors endowed the Lucy Wheelock Fellowship Fund, which will provide tuition assistance to early childhood graduate students at Wheelock College of Education & Human Development. The fund honors Lucy Wheelock, a pioneer in early childhood development, and Dean Emeritus David Chard.

Lisa (CAS'03) and Mitchell Green's \$1 million gift created the Lisa and Mitchell Green Endowment for Humanities Faculty, which especially benefits instructors in the history of art and architecture department.

The American & New England Studies Program received an anonymous \$1 million gift, which will help create a new Public Humanities Fund to support PhD students with research projects beyond campus.

Innovate@BU received a \$1.5 million gift from the Enlight Foundation to support fellowships for students with local not-for-profits. The gift also funds training for students to lead their own mission-based ventures.

Albert Tapper (Questrom'64) pledged \$1 million to establish the Tapper Charitable Foundation Endowment for Advancing Jewish History Fund. This gift will support the development of new courses and programs in Jewish history offered through the College of Arts & Sciences. ♦

A Foundation for New Heights

The financial story for Boston University was one of stability in FY2024.

Amidst global uncertainties and national economic challenges, our institution has remained steadfast, guided by a clear and comprehensive strategic plan and supported by an enthusiastic community. We welcomed new leadership, including our next president, while staying true to our mission to educate, create knowledge, and empower all segments of society.

This year, our total net assets grew to \$5.96 billion, a 5.4% increase. This growth reflects the remarkable—and record-breaking—generosity of our alumni and friends, with fundraising totaling \$349 million. Our endowment also saw significant growth, exceeding \$3.5 billion, which enables improvements that benefit our operations, the student experience, and the professional life of our faculty. Research remains a top priority, with sponsored awards totaling \$579.5 million and helping facilitate breakthroughs in areas as varied as pancreatic cancer, Alzheimer's,

and machine learning.

We also achieved another year of positive operating results in FY2024, with gains of over \$84 million. While lower than previous years, the marginal decrease was principally due to an increase in student financial aid, a planned initiative to expand access and keep us competitive in the higher ed landscape. We've been intentionally increasing aid by roughly \$50 million over each of the last four fiscal years, resulting in nearly \$200 million across all classes during this period.

With more than 78,000 applicants, an 11.1% admit rate, our recently opened Center for Computing & Data Sciences, and our robust presence in the online education space, BU's future looks bright. Moody's affirmed the University's credit rating at Aa3 and Standard & Poor's affirmed their AA- rating while revising the long-term outlook from neutral to positive.

With a new leader at the helm, the University is well-positioned financially for our next chapter of innovation, inclusivity, and academic excellence. ♦

Financial Summary

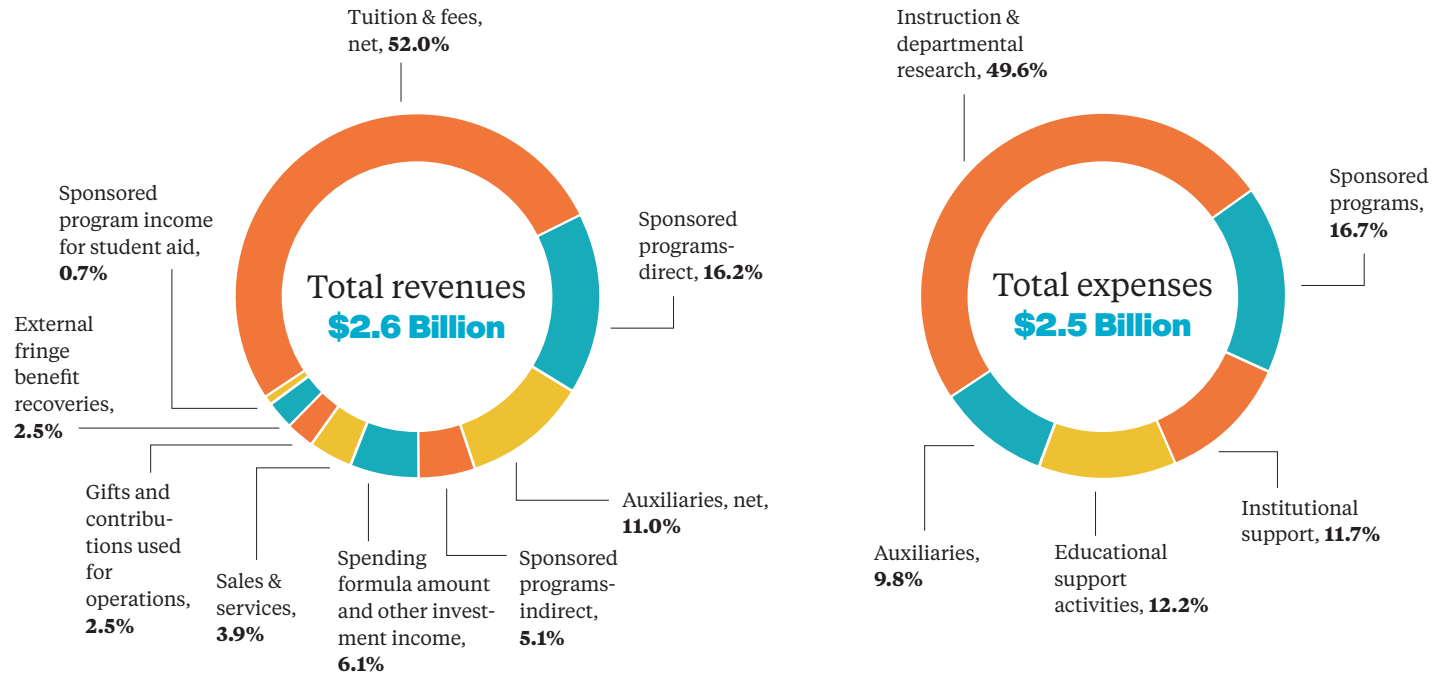
\$ THOUSANDS

	2020	2021	2022	2023	2024
Operating revenues					
Student tuition and fees, net	\$ 1,168,192	\$ 1,152,579	\$ 1,297,659	\$ 1,343,938	\$ 1,357,339
Auxiliaries, net	224,480	153,911	261,044	279,255	288,590
Sponsored programs-direct	333,773	411,472	457,280	422,844	424,710
Sponsored programs-indirect	105,695	108,054	118,689	130,157	134,478
External fringe benefit recoveries	44,457	32,511	52,077	53,764	66,024
Sales and services	89,399	76,848	89,394	99,282	102,344
Endowment spending formula amount & other investment income	92,044	80,607	85,114	130,324	158,633
Gifts and contributions used for operations	59,767	68,822	61,187	77,229	65,374
Sponsored program income for student aid	31,038	28,163	38,912	19,051	17,812
Total operating revenues	\$ 2,148,845	\$ 2,112,967	\$ 2,461,356	\$ 2,555,844	\$ 2,615,304
Operating expenses					
Instruction and departmental research	\$ 1,040,427	\$ 942,859	\$ 1,110,347	\$ 1,199,891	\$ 1,257,318
Educational support activities	213,724	204,947	246,337	271,150	309,336
Sponsored programs	337,926	414,621	461,077	420,978	422,100
Auxiliaries	209,701	181,964	220,869	236,208	246,822
Institutional support	248,510	225,087	246,539	275,250	295,305
Total operating expenses	\$ 2,050,288	\$ 1,969,478	\$ 2,285,169	\$ 2,403,477	\$ 2,530,881
Change in net assets from operating activities	\$ 98,557	\$ 143,489	\$ 176,187	\$ 152,367	\$ 84,423
Nonoperating activities					
Contributions, net	\$ 21,165	\$ 42,141	\$ 46,574	\$ 159,710	\$ 21,998
Reinvested endowment and other investment income	31,688	27,209	30,167	34,642	46,362
Net realized and unrealized gains (losses) on investment and other assets	144,960	959,240	(397,688)	136,191	250,862
Spending formula amount	(84,918)	(91,151)	(96,145)	(106,531)	(118,390)
Other	(147,055)	68,045	130,104	38,225	19,271
Total nonoperating activities	\$ (34,160)	\$ 1,005,484	\$ (286,988)	\$ 262,237	\$ 220,103
Change in net assets	\$ 64,397	\$ 1,148,973	\$ (110,801)	\$ 414,604	\$ 304,526

Read more about our financials at bu.edu/ar/2024

Our Financials

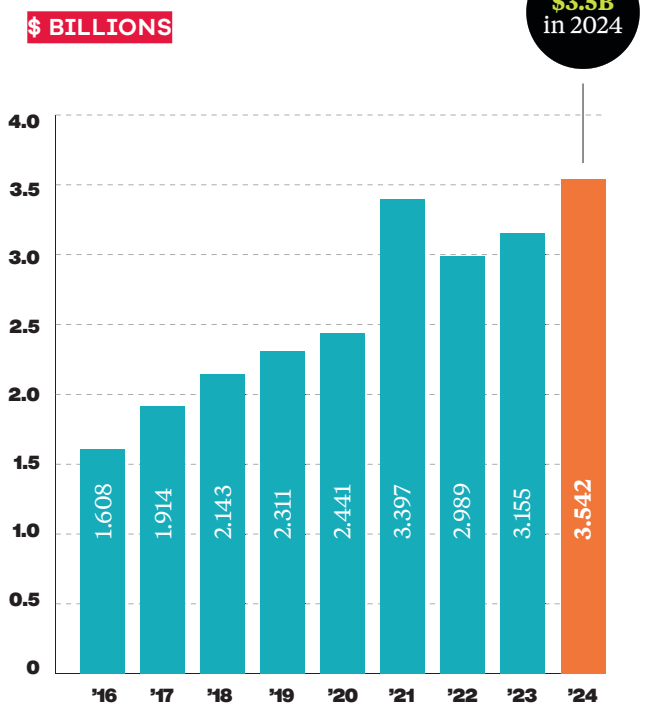
Operating Revenues & Expenses FY2024



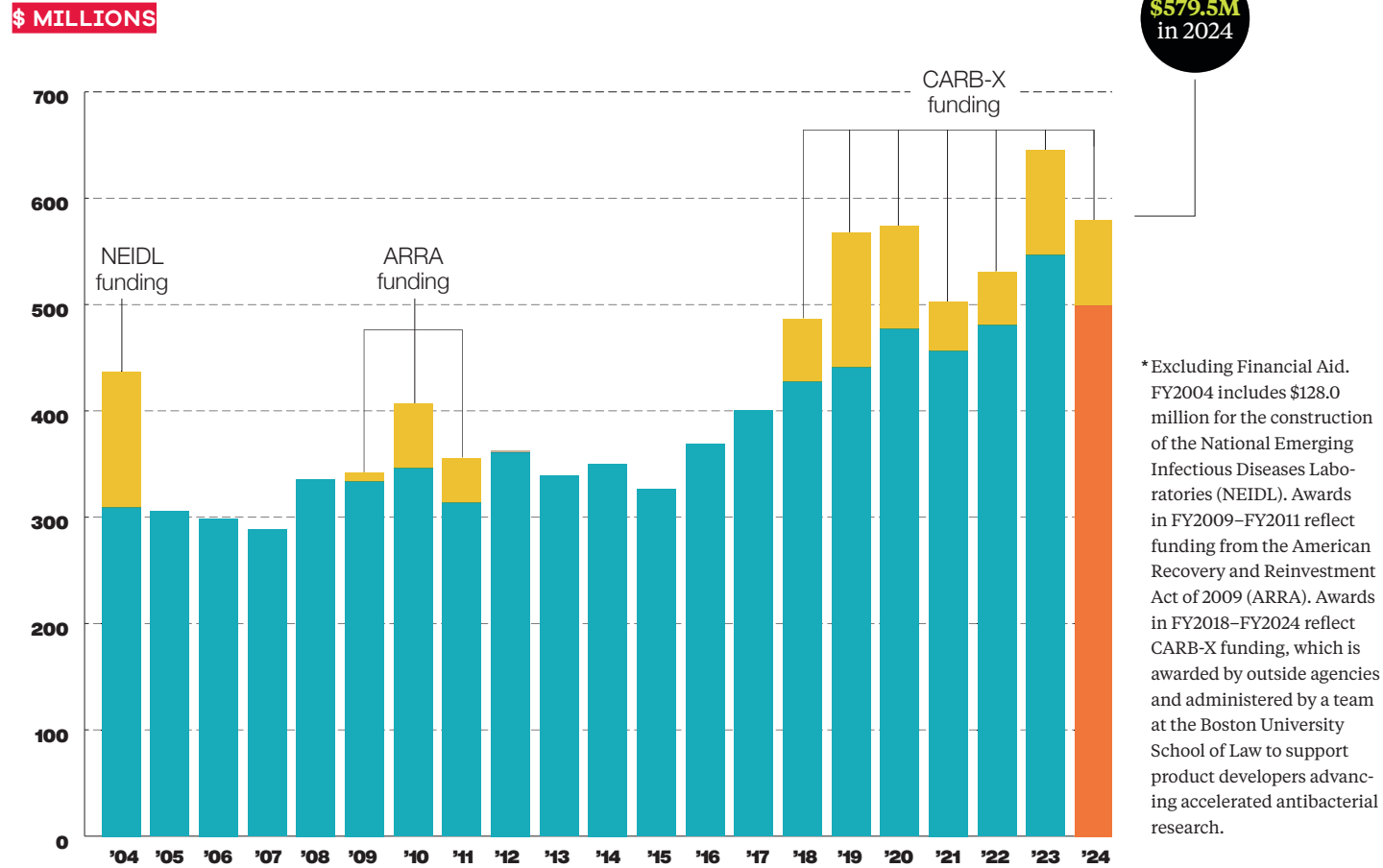
Total Assets



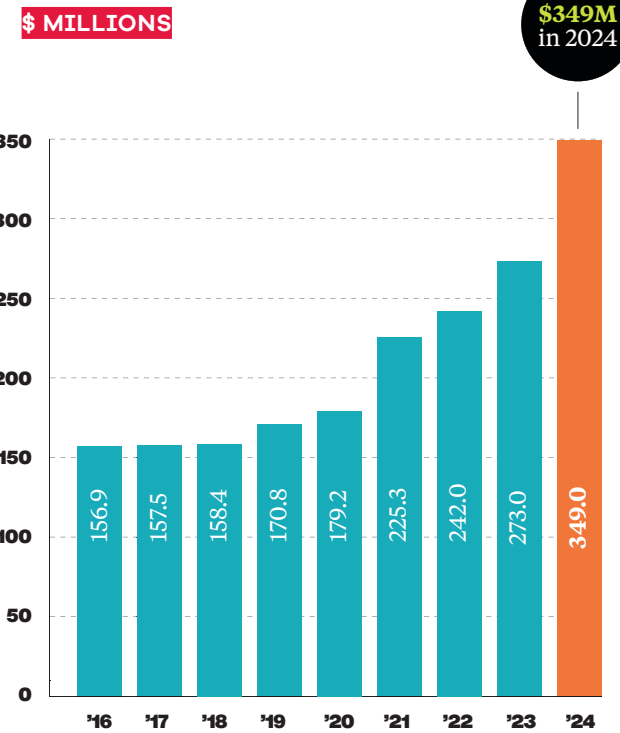
Total Endowment



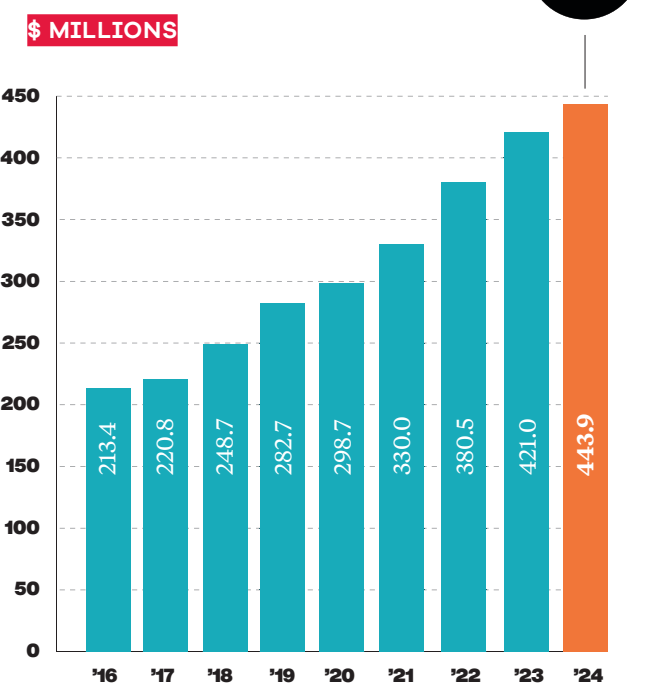
Sponsored Program Awards FY2004-FY2024*



Cash Giving



Undergraduate Financial Aid



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