Letter from the President

To the Case Western Reserve community:

The spirit and pace that I experienced at this university during my initial year as president is captured perfectly in the title of this year’s annual report: Fast Forward.

On my very first day in July 2021, I felt an urgency from faculty, staff and students. A new normal was emerging, and our campus community was energized to move ahead in innovative ways. They were ready to define the next chapter of our university.

And that’s precisely what we’ve been doing ever since.

Guided by our three priorities—to elevate academic excellence, expand research and enhance community engagement—we are, indeed, moving both fast and forward.

The following pages share our exciting progress.

You’ll learn how our research enterprise is advancing toward our goal to grow annual expenditures from $400 million to $600 million. Key to this effort will be increasing our funded research, student and faculty startups, and translational successes.

You’ll also read about our commitment to further diversify our faculty, staff and students through targeted initiatives. Our campus community works every day to cultivate a culture of inclusion and belonging.

And finally, you’ll see that we are engaging with our Cleveland neighbors in ways that matter to them.

We are building relationships with local communities, and we are aligning our research to improve the lives of those who live within them.

I’m proud for all that we’ve accomplished—and I’m confident that, together, we’ll continue to do even more.

Eric W. Kaler  
President
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</tbody>
</table>
At Case Western Reserve University, we continually make progress—from seemingly small steps to immediately transformative changes. No matter what, each decision is a move toward a better future—for our campus, our community and society as a whole.
$220M
NSF initiative that funds 11 AI institutes, including the $20M initiative CWRU co-leads
“Whether it be the medical school or the sociology department or any of the other engineering programs, everyone is going to be influenced by [AI].”

—Alumnus Kevin Kranzusch, whose most recent $5 million gift aims to expand the computer and data sciences department through endowed professorships, interdisciplinary collaborations and improved facilities

**SUPER POWER**

Last summer, researchers gained access to data-processing power 10 times greater than ever before seen at Case Western Reserve. The arrival of the nearly $1 million Artificial Intelligence (AI) SuperComputer—funded by the National Science Foundation (NSF), the Ohio Department of Education and the university—is propelling big-data and machine-learning research across the entire campus.

Within the Department of Computer and Data Sciences, Chair Vipin Chaudhary helps lead a $20 million, multi-institutional NSF project to democratize artificial intelligence, notably building AI systems for agriculture and wildlife management. Meanwhile, the materials science and engineering department, for one, is co-leading a $3 million NSF-supported Center for Materials Data Science for Reliability and Degradation to help companies make more durable and dependable products, while the university has licensed CWRU-developed AI technology that can identify which lung cancer patients would benefit from chemotherapy.

“From advancing cancer detection to analyzing the deterioration of nuclear materials,” said Case School of Engineering Dean Venkataramanan “Ragu” Balakrishnan, “AI and supercomputing are at the core of our most innovative initiatives.”
MAKING RESIDENCE HALL DREAMS RESTAURANT REALITIES

College students know well the difficulties of eating healthy on a budget. Luckily, Michael Zhou and Daniel Lee were up for the challenge. With support from the university’s Veale Institute for Entrepreneurship and a pitch competition in Florida, the duo launched Redheart, a startup aiming to create easy access to affordable, healthy food.

After researching their audience and finding their nutritious-nosh niche during a semester-long partnership with on-campus restaurant Jolly Scholar, Zhou and Lee grew the business. They now operate new restaurant concepts out of a ghost kitchen—a rented space in Cleveland where they prepare food for customers—and are launching their first consumer product: a protein cookie expected to hit shelves this year.

$197M and counting for student startups
STROKE OF GENIUS

Imagine if looking at a brushstroke on a painting could identify its artist. A team of engineers, physicists and art historians at Case Western Reserve University and partner institutions have made the idea a reality using 3D topography, a new way for artificial intelligence to “see” the smallest structures on surfaces such as paintings.

It’s a technique that could lead to giant strides in the art world, whether identifying forgeries or uncovering unknown contributors to masterpieces.

Those masters didn’t leave notes from their workshops: ‘Hey, art historians 500 years from now, here’s how we did it.’ So being able to scan a painting and learn which areas were painted by different hands could be extremely valuable information to connoisseurs.”

—Art History and Art Department Chair Betsy Bolman

Eyes on an ethical future

If the possibilities of artificial intelligence (AI) leave you wary, you’re not alone. As a scholar of ethics and AI/emerging technology at Case Western Reserve, Daniel Rosiak is working to answer the question: “What do we want the AI to want?”

For Rosiak, the goal is a future in which technology acts with human interests in mind—and, through his role in the university’s Inamori International Center for Ethics and Excellence, he hopes to raise ethical issues before they become problematic.
Bringing breakthroughs to market

A device smaller than a vitamin pill could be key to catching a lethal cancer early.

And, thanks to an agreement with Lucid Diagnostics, it has the chance to deliver on that promise.

The researchers responsible for the breakthrough—Sanford “Sandy” Markowitz, Amitabh Chak and Joseph Willis—marked Lucid’s $70 million initial public offering by ringing the Nasdaq Stock Market’s closing bell in the fall of 2021.

Esophageal cancer is the world’s sixth-leading cause of death from cancer. The researchers’ test can be performed at a doctor’s office within minutes.

“This is a wonderful milestone on a path aimed at preventing death from a miserable cancer through enabling simple early detection,” said Markowitz, who—like Chak and Willis—holds appointments at Case Western Reserve and University Hospitals.

This example is just one of many that explain why Case Western Reserve ranks 21st in the world among universities receiving U.S. utility patents.

And it can be found in other headline-making translational successes from the past year, such as:

- a promising therapeutic approach to a rare childhood degenerative disorder;
- an imaging agent with potential to guide neurosurgeons to more precise surgical procedures; and
- a partnership to connect people receiving food assistance benefits with fresh produce at farmers markets.

“The continued research accomplishments... brought by Sandy Markowitz and his team are not only unparalleled, but bring a scientific impact halo to this school and the university that will remain a shining star for a very long period to come.”

—School of Medicine Dean Stan Gerson
DATA MINING
The ubiquity of electronic health records offer extraordinary opportunities for researchers to gain insights about disease and wellness. But without the knowledge needed to sift through nearly endless reams of data, the most valuable information remains untapped. That’s where Rong Xu comes in. The bioinformatics professor uses artificial intelligence (AI) techniques such as machine learning and natural language processing to uncover critical trends on everything from Alzheimer’s disease to cancer. Xu, former School of Medicine Deans Pamela B. Davis and Nathan Berger, and other colleagues’ COVID-19-related work made international headlines last year—and shaped understanding of a constantly changing pandemic. Among their published findings: COVID-19 patients with substance use disorders had higher infection, hospitalization and mortality rates; people with dementia were twice as likely to get COVID-19; young children were more likely to contract the virus’s omicron variant but less likely to suffer severe symptoms; and Moderna’s vaccine was less likely than Pfizer’s to lead to “breakthrough infections.” The prolific academic wants to ensure she can take these big data findings to the next level. “It’s not just ‘publish a paper and that’s it,’” said Xu, director of the university’s Center for AI in Drug Discovery. “I really want to bring [drugs] to patients.”
“When we put people first and when we create opportunities that have the power to transform, then we achieve excellence.”

—President Eric W. Kaler in his inauguration address

A RUNNING START

As his first academic year as the 11th president of Case Western Reserve neared its close, Eric W. Kaler gathered with hundreds of students and alumni on the quad for the university’s longest-running tradition: Hudson Relays.

The 26-mile relay race—commemorating the distance between Western Reserve University’s first location in Hudson, Ohio, and today’s campus in Cleveland’s University Circle neighborhood—pits classes of students and alumni against each other for the ultimate bragging rights.

It capped off an action-packed year for the former president of the University of Minnesota, from welcoming members of the Class of 2025 (13% of whom are first-generation college students, like the president himself) at move-in to celebrating the university’s newest alumni at the first indoor, in-person commencement ceremonies since 2019—and many milestones in between.
A YEAR OF ACTION
President Eric W. Kaler made significant progress in his first year on the job. Here are a few key highlights:

July 1 Eric W. Kaler’s first day as president of Case Western Reserve

Aug. 16 University Welcome for the Class of 2025—the largest undergraduate class in history, with 1,600 students from 76 countries and across the U.S.

Aug. 25 President Kaler’s first fall convocation, featuring a keynote address by Pulitzer Prize-winning poet Tracy K. Smith and the honoring of four Distinguished University Professors

Sept. 10 Grand reopening of Fribley Commons following a $19 million renovation to the dining hall and student gathering spot

Oct. 13 Debut of phase two of the university’s Milton and Tamar Maltz Performing Arts Center—a culmination of more than a decade of efforts to convert a historic temple into a space for music, theater and dance students

10 new deans and senior administrators
new residence halls approved to begin construction

Oct. 15 The inauguration and installation of Eric W. Kaler as Case Western Reserve’s 11th president

Oct. 21–24 Homecoming and Reunion Weekend—featuring an in-person commencement ceremony for the Class of 2020, celebrations for the 10th anniversary of the LGBT Center and the announcement of a $10 million anonymous gift

Dec. 1 Beginning of a staff compensation study to assess salary structure and help recruit and retain top employees

Dec. 17 Announcement of a COVID-19 booster requirement—part of a series of successful efforts to protect the campus community while continuing education and research

March 16 Proclamation of Juneteenth as an official university holiday

April 8 Kaler named to the President’s Council of All In Campus Democracy Challenge, a nationwide, nonpartisan effort to increase student voter registration and turnout

April 25 Launch of the university’s first employee engagement survey to assess overall satisfaction of faculty and staff members

May 15 Commencement 2022—the first indoor ceremonies since 2019 and Kaler’s first full-fledged graduation celebration

May 26 Showcasing an increased emphasis on research, President Kaler named social epidemiologist Michael Oakes as the university’s inaugural senior vice president for research and technology management

June 28 Creation of a reproductive health task force to review the far-ranging implications of the Supreme Court’s reversal of Roe v. Wade
$5.5M scholarship gift from an alumna to support aspiring CRNAs

A LEAP ahead

Mya Williams applied to half a dozen highly competitive nurse anesthesia doctoral programs, but despite impressive credentials, she was denied admission to them all.

“You start to believe it’s a sign to not pursue this career,” she recalled.

Today she’s enrolled in one of those top programs, and confident she’s ready to excel in class—not to mention the operating room. The difference is LEAP, an innovative one-year program launched in 2021 at Frances Payne Bolton School of Nursing.

The Leadership Excel and Achievement Program provides intensive curricular preparation and guaranteed admission to one of nearly a dozen partner certified registered nurse anesthetist (CNRA) programs.

LEAP, plus a separate $5.5 million scholarship gift from alumna Cheryl E. McRae-Bergeron to support aspiring CRNAs, are just two of the ways the university is expanding student access—and advancing healthcare.
“My overall career goal is to help underserved communities in any way I can.”
—Caitlyn Gillespie, Master of Public Health student

CATALYSTS FOR CHANGE

More than a decade ago, Caitlyn Gillespie underwent a spinal fusion to address scoliosis.

While recovering, she encountered a nurse who not only cared for her health, but also inspired Gillespie’s career choice. Today, she’s a CWRU Master of Public Health student, with hopes of becoming a physician assistant.

Gillespie’s pursuit of these dreams became possible through the university’s new North Star Award program, which covers at least 30% of tuition to qualifying students from Historically Black Colleges and Universities or Minority-Serving Institution partners.

Established fall 2021, the scholarship program is just one of several initiatives designed to help diversify the university’s student body and faculty. The North Star Faculty Opportunity Hires Initiative, for example, aims to spur the hiring of interdisciplinary faculty members committed to diversity, while an expanded partnership with The Posse Foundation and a new one with Questbridge will further increase the proportion of underrepresented students on campus.

Increasing educational opportunities, in turn, can create new ones for others. “My overall career goal,” Gillespie said, “is to help underserved communities in any way I can.”
“Collaboration, communication and trust are keys to building the open and responsive and transparent City Hall that we promised you. ... Cleveland, this is just the beginning.”

—Alumnus and Cleveland Mayor Justin Bibb at his first State of the City address, held on campus

FROM CWRU TO CITY HALL

By the time Justin Bibb began graduate study at Case Western Reserve, he’d already worked in the private and public sectors—and even launched a nonprofit. He saw CWRU’s joint JD/MBA program as an opportunity to prepare for a position that touched on them all.

Nearly four years after earning the two degrees, Bibb came to campus to provide an update on his new job. Elected Cleveland’s second-youngest mayor with 63% of the vote, he opted to present his first State of the City address from the same stage where he received his JD diploma in 2018.

The following month, he returned as the university’s commencement speaker. “This is the time,” he told thousands seated in the audience and viewing via livestream, “to be bold. To challenge the status quo. To be fearless.”
COMMUNITY
Black Americans are 40% more likely to have high blood pressure and 30% more likely to die from heart disease than non-Hispanic white Americans.

Now, through an $18.2 million National Institutes of Health grant, researchers in Cleveland and Detroit are studying the impact of interventions involving a community health worker-led, personalized, adaptable approach to lifestyle and life circumstances.

Their ultimate goal?
Improving Black Americans’ cardiovascular health—and closing the “seismic gaps ... that continue to result in disproportionate and disappointingly poor outcomes” for the Black community, said School of Medicine Professor Sanjay Rajagopalan, also the division chief of cardiovascular medicine at University Hospitals.
A shot of hope

After nearly 18 months of the COVID-19 pandemic, many parents finally breathed sighs of relief when vaccines were approved for children ages 5 and up in fall 2021. Within days of approval, nursing and medical school faculty and students brought the shots into Cleveland elementary schools, administering vaccines to more than 200 people in one day.

“
It’s really satisfying that I could actually make a difference, and build that relationship with our community members.”

—Nursing student Hannah Han

SPREADING SMILES

Decades of trauma—related to fear, judgment, misunderstandings of identities and more—have led many LGBTQ+ individuals to avoid healthcare. School of Dental Medicine Assistant Professor Suparna Mahalaha wanted to create a better experience for these patients, so they would be more likely to seek the care they need.

The faculty member and alumna provided oral health education, tobacco cessation counseling and cancer screenings at an LGBT Community of Center of Greater Cleveland pop-up health clinic last spring.

The impact? Increased trust among her patients—and healthier smiles all around.
Paving the way for a lead-safe city

Nearly four years ago, data from Case Western Reserve helped persuade Cleveland officials to require landlords to secure lead-safe certifications by 2023.

Today, university researchers are highlighting landlords’ progress with an online dashboard.

Lead exposure poses tremendous risk to children’s neurological development, and Cleveland’s rates far exceed national averages.

The dashboard is part of the Lead-Safe Cleveland Coalition, a public-private partnership emerging as a model for other municipalities.

“[It’s] now at a place where it becomes a major transparency mechanism for this vital community initiative.”

—Rob Fischer, co-director of the Center on Urban Poverty and Community Development and associate professor at the Jack, Joseph and Morton Mandel School of Applied Social Sciences
A push toward justice

After fleeing torture in his native El Salvador, a man was detained by U.S. immigration officials for more than two years.

As deportation loomed, he found himself with unexpected allies: law students and faculty who argued his case in federal court—and prevailed.

It’s just one example of transformative legal experiences made possible through the school’s 10 pro-bono law clinics—and it’s among the reasons preLaw magazine ranked CWRU No. 5 in the country for practical training.

MANUFACTURING REVITALIZED NEIGHBORHOODS

In the wake of Northeast Ohio’s industrial decline, small- and medium-sized manufacturers have struggled to adapt to advanced technologies.

With support from a three-year, $1.5 million National Science Foundation grant, faculty from regional institutions are working to catalyze a comeback.

Led by Robert Gao at Case School of Engineering, the team—composed of researchers from Case Western Reserve, Cleveland State University and Lorain County Community College—aims to position these manufacturers to compete with larger companies.

By teaching concepts related to the “Internet of Things” and helping to update machinery, they hope to help modernize manufacturing, assist with workforce development and keep more talented workers in the area.

1 of 4

Smart Manufacturing Innovation Centers in the U.S., including one at CWRU that opened last spring with support from the U.S. Department of Energy and partners
DEGREES AND CAMPUS STATISTICS
JULY 1, 2021-JUNE 30, 2022

DEGREES AWARDED (2021–22)

- Bachelor’s: 1,297
- Master’s: 1,560
- PhD: 211
- Other Doctorate: 401
- Certificate: 113

ENROLLMENT (FALL 2022)
- Undergraduate: 6,017
- Graduate and professional: 6,184
- States represented: 50
- Countries represented: 69

CAMPUS
- Faculty (full-time): 1,110
- Staff (full- and part-time): 3,047

DEGREES BY SCHOOL
(Undergraduate, Graduate and Professional)

<table>
<thead>
<tr>
<th>School</th>
<th>Degrees Awarded</th>
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<td>Case School of Engineering</td>
<td>680</td>
</tr>
<tr>
<td>College of Arts and Sciences</td>
<td>772</td>
</tr>
<tr>
<td>Frances Payne Bolton School of Nursing</td>
<td>245</td>
</tr>
<tr>
<td>School of Dental Medicine</td>
<td>74</td>
</tr>
<tr>
<td>School of Law</td>
<td>264</td>
</tr>
<tr>
<td>School of Medicine</td>
<td>791</td>
</tr>
<tr>
<td>Weatherhead School of Management</td>
<td>460</td>
</tr>
</tbody>
</table>
29% undergraduate enrollment growth since 2013
$14M

budget surplus—
$1.3M more
than budgeted

**AA3**

Case Western Reserve’s new investment rating, according to Moody’s
OPERATIONAL AND FINANCIAL STATISTICS*

JULY 1, 2021-JUNE 30, 2022

TOTAL OPERATING REVENUES AND EXPENSES

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Expense</th>
<th>Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$8.97M</td>
<td>$1.14B</td>
<td>$7.83B</td>
</tr>
<tr>
<td>2019</td>
<td>$7.7M</td>
<td>$1.15B</td>
<td>$6.55B</td>
</tr>
<tr>
<td>2020</td>
<td>$2.1M</td>
<td>$1.195B</td>
<td>$0.905B</td>
</tr>
<tr>
<td>2021</td>
<td>$11.7M</td>
<td>$1.14B</td>
<td>$10.56B</td>
</tr>
<tr>
<td>2022</td>
<td>$14.4M</td>
<td>$1.26B</td>
<td>$13.14B</td>
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TOTAL ENDOWMENT BALANCE FOR THE PAST 5 YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>Balance</th>
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</thead>
<tbody>
<tr>
<td>2018</td>
<td>$1.84B</td>
</tr>
<tr>
<td>2019</td>
<td>$1.87B</td>
</tr>
<tr>
<td>2020</td>
<td>$1.85B</td>
</tr>
<tr>
<td>2021</td>
<td>$2.35B</td>
</tr>
<tr>
<td>2022</td>
<td>$2.19B</td>
</tr>
</tbody>
</table>

GIFTS AND PLEDGES FROM PRIVATE SOURCES

- 2022: $174.8 million
- 2021: $171.8 million
- 2020: $168 million
- 2019: $182.1 million
- 2018: $208 million

*Numbers are rounded.
RESEARCH AND TECHNOLOGY HIGHLIGHTS
JULY 1, 2021–JUNE 30, 2022

TECHNOLOGY TRANSFER
License revenues: $4.84M
Patents filed: 233
Patents issued: 109
Invention disclosures: 150
Intellectual property deals with industry: 77
Licenses issued: 63

COMPETITIVE SPONSORED RESEARCH PROJECTS
2021 > 1,447 AWARDS > $390.1M
2022 > 1,443 AWARDS > $373.5M

AGENCIES

<table>
<thead>
<tr>
<th>AGENCIES</th>
<th>AMOUNT AWARDED IN MILLIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Institutes of Health</td>
<td>469 AWARDS &gt; $226.6m</td>
</tr>
<tr>
<td>Department of Defense</td>
<td>27 AWARDS &gt; $15.0m</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>44 AWARDS &gt; $13.7m</td>
</tr>
<tr>
<td>Department of Energy</td>
<td>11 AWARDS &gt; $6.0m</td>
</tr>
<tr>
<td>NASA</td>
<td>12 AWARDS &gt; $7.4m</td>
</tr>
<tr>
<td>Other Federal</td>
<td>111 AWARDS &gt; $8.0m</td>
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<tr>
<td>Industry</td>
<td>104 AWARDS &gt; $8.6m</td>
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<tr>
<td>Nonprofits, Foundations,</td>
<td>584 AWARDS &gt; $70.3m</td>
</tr>
<tr>
<td>Associations, Societies</td>
<td>89 AWARDS &gt; $17.0m</td>
</tr>
<tr>
<td>Other Government</td>
<td>617 AWARDS &gt; $92.9m</td>
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<td>80 AWARDS &gt; $10.4m</td>
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<tr>
<td></td>
<td>62 AWARDS &gt; $15.4m</td>
</tr>
<tr>
<td></td>
<td>64 AWARDS &gt; $15.1m</td>
</tr>
</tbody>
</table>
$450M in investments in faculty startups over the past 5 years

#21 university globally for U.S. utility patents
### UNIVERSITY TRUSTEES

- Virginia Nord Barbato
- W. Craig Bashein
- Colleen R. Batcheler
- David M. Carr
- Aarti Chandna
- Scott S. Cowen
- Fredrick D. DiSanto
- Geoffrey M. Duyk
- Charles D. Fowler
- Vincent A. Gaudiani
- Julie Gerberding
- Susie Gharib
- Roe Green
- Charles E. Hallberg
- Daniel P. Harrington
- J. David Heller
- Eric W. Kaler
- John D. Kobs II
- Charles “Bud” Koch
- William H. Lewis
- Frank N. Linsalata
- Kathy E. Magliato
- Joseph M. Mandato
- Thomas A. Mandel
- Milton A. Marquis
- Thomas F. McKee
- Sara H. Moll
- Susan P. Mucciaroni
- Richard M. Mueller
- Jacquelyn Nance
- Dominic Ozanne
- Robert D. Pavey
- Donald J. Richards
- James “Great Neck” Richman
- Joseph A. Sabatini
- Lawrence M. Sears
- Anand Swaminathan
- Rexford J. Tibbens
- Celia Scott Weatherhead
- Mark A. Weinberger
- Debra L. Wilfong

### UNIVERSITY ADMINISTRATION as of Jan. 1, 2023

- Eric W. Kaler  
  President
- Ben Vinson III  
  Provost and Executive Vice President
- Venkataramanan “Ragu” Balakrishnan  
  Dean of Case School of Engineering
- Jessica Berg  
  Co-Dean of the School of Law
- Richard W. Bischoff  
  Vice President for Enrollment
- Katie Brancato  
  Vice President, Chief of Staff, Strategic Advisor to the President, Office of the President
- Lisa Camp  
  Chief of Staff and Vice Provost for Strategic Initiatives, Office of the Provost
- Jonathan S. Carlson  
  Vice President for Financial Planning
- Kenneth B. Chance  
  Dean of the School of Dental Medicine
- Yolanda Cooper  
  Vice Provost and Lindseth Family University Librarian
- Donald L. Feke  
  Vice Provost for Undergraduate Education and Academic and Faculty Affairs
- David Fleshler  
  Vice Provost for International Affairs
- Stanton L. Gerson  
  Senior Vice President for Medical Affairs and Dean of the School of Medicine
- Carolyn Gregory  
  Vice President for Human Resources
- Miroslav Humer  
  Vice President for University Technology and Chief Information Officer
- Richard J. Jamieson  
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  Dean of the Frances Payne Bolton School of Nursing
- J. Michael Oakes  
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  Co-Dean of the School of Law
- Chris Sheridan  
  Vice President for University Marketing and Communications
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  Executive Vice President and Chief Financial Officer
- J.B. Silvers  
  Interim Co-Dean of the Weatherhead School of Management
- Robert L. Solomon  
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- Louis W. Stark  
  Vice President for Student Affairs
- Dean Tufts  
  Vice President for Campus Planning and Facilities Management
- Joy K. Ward  
  Dean of the College of Arts and Sciences
- Jeffrey Wolcowitz  
  Dean of Undergraduate Studies
- Dexter Voisin  
  Dean of the Jack, Joseph and Morton Mandel School of Applied Social Sciences
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Daniel Milner (12–13, 15)
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