The 2018-2019 Annual Report of Case Western Reserve University
At Case Western Reserve University, we’re conducting life-changing research. We’re transforming the educational experience. We’re challenging the status quo.

And we’re doing it all—together.

Learn how our campus is breaking down boundaries, forging cross-campus connections...and thinking *beyond* the possible.
To the Case Western Reserve Community:

I look back on the 2018-2019 academic year with a sense of awe. From the remarkable generosity of our capital campaign’s 60,000 donors… to a Top 10 Medical Breakthrough by a biomedical engineering professor… to the stunning space that is our new Health Education Campus with Cleveland Clinic… we experienced so many moments that exceeded expectations.

The pages that follow feature those examples and several more. The common factor among them all? A willingness to try something new. It could be attempting what others deem impossible. Reaching outside a specific area of expertise. Or perhaps even collaborating with an unexpected partner. In short, going beyond what is to achieve something better.

As you will read, the results often surpass our greatest imaginings—which, in turn, inspire us to aim even higher next time.

With great appreciation,
Barbara R. Snyder
President

from the PRESIDENT

The pages that follow tell our students’ and faculty stories. The common factor among them all? A willingness to try something new. It could be attempting what others deem impossible. Reaching outside a specific area of expertise. Or perhaps even collaborating with an unexpected partner. In short, going beyond what is to achieve something better.

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Beyond the Goal(s)

Case Western Reserve’s supporters exceeded all expectations in the university’s Forward Thinking campaign—over and over again.

Initial thoughts centered on an effort of about $850 million—just more than double the total of the previous campaign, which closed in 1994. But years of accumulated needs, plus growing challenges ahead, demanded a more ambitious target: $1 billion.

Donors beat that total in 2014, just three years after the campaign’s public launch. So leaders set another goal, this one $1.5 billion—50 percent higher than the last. Three years later, alumni and friends took the campaign beyond that mark, too. By the time Forward Thinking closed Dec. 31, 2018, the effort had brought in $1.8 billion.

“The generosity of alumni, friends and philanthropic organizations is both extraordinary and inspiring,” President Barbara R. Snyder said at the time. “We are honored and humbled by this support, which already has made a significant positive impact on our university.”

Campaign Highlights:

- 60,000 donors
- 34,000 first-time givers
- 11 new or fully renovated buildings, thanks to $393 million in gifts
- 98 endowed professorships created
- $254 million in scholarship support
Beyond the First Act

The transformation of a historic temple into a state-of-the-art performance space in 2015 gave music students exceptional opportunities to showcase their talents.

Now, thanks to Roe Green’s $10 million commitment to help complete Phase II of the Milton and Tamar Maltz Performing Arts Center at the Temple – Tifereth Israel, theater and dance students will be able to join them—on stage and behind the curtain.

When finished in winter 2021, the center will include rehearsal studios, a costume and scene shop, and a black box theater named in honor of donors Walter and Jean Kalberer. It also will provide Case Western Reserve its first major theater space: the 250-seat Roe Green Proscenium Theater.

“Arts education can shape young people in such powerful ways,” Green said when announcing her gift. “My hope is to provide Case Western Reserve students a home where they can grow and kindle their imaginations—and collaborate with classmates on unforgettable performances.”

A Round of Applause

Nine months after Green’s big announcement, the university’s theater department made news of its own: a No. 12 global ranking from The Hollywood Reporter for its Master of Fine Arts (MFA) program with Cleveland Play House.

The MFA program—whose alumni include Tony nominee Elizabeth Davis and Mad Men star Rich Sommer—made a six-slot jump over the previous year, beating offerings from London, Los Angeles and New York City.
Beyond Professions

Health sciences students should learn as they will practice. For five years, this simple idea drove the creation of the Health Education Campus of Case Western Reserve University and Cleveland Clinic. In the spring of 2019, faculty, staff, and students finally saw the concept become a reality.

With the opening of the 477,000-square-foot Sheila and Eric Samson Pavilion and 132,000-square-foot Dental Clinic, the campus is now home to students, faculty and staff from the university’s nursing, dental, and medical schools, including the Cleveland Clinic Lerner College of Medicine.

And their space is explicitly designed to encourage interaction—in classes, labs, and even at meals. The physical and academic structure aims to give students a head start on their future careers, where team-based health care is increasingly common—in large measure because it leads to improved patient outcomes.

The new campus “makes interprofessional education, like shared classes, much easier,” said Tyler Reimschisel, Case Western Reserve’s founding associate provost for interprofessional education, research and collaborative practice. Pointing to the expansive Cosgrove Courtyard at the center of the Samson Pavilion, he added: “And that, right there, supports collaboration. You get to know people you probably wouldn’t have an ideal space to meet, working on interprofessional projects and build a unique culture of interdisciplinarity.”

“The new campus is amazing ... it’s really a launchpad for us to learn from, engage with and work in our community.”

—Tyler Reimschisel
Associate Provost for Interprofessional Education, Research and Collaborative Practice

(Opened in April, the centerpiece of the Health Education Campus is Samson Pavilion, where nursing, medicine and dental students join together during and in between classes. Across the street, dental students provide high-quality care to the greater Cleveland community in a brand-new clinic.)
Beyond Disciplines

Stay William came to Case Western Reserve more than a decade ago with an idea: creating an expertise to teach language pathology students to learn how to observe, assess, diagnose and interact with patients.

With a PhD in communication sciences and disorders, William knew what it was like to be a patient. His challenge was finding someone willing to help with the how to teach. Her challenge was finding someone willing to help with the how to observe, assess, diagnose and interact with patients.

With a PhD in communication sciences. When Williams professor of electrical engineering entered Marc Buchner, associate professor specializing in communication sciences. “I relied on subject matter experts like Marc for assistance in developing the inner workings of the technology itself,” Williams replied.

The Virtual Immersion Center for Simulation Research proved to be just the beginning. Williams went on to found Simucase, a global company offering clinical simulations for speech-language pathology, audiology and occupational therapy.

My success developing computer-based simulations was due to my ability to collaborate with colleagues in different fields at the university,” explained Williams, now an adjunct associate professor of communication sciences. “I relied on subject matter experts like Marc for assistance in developing the inner workings of the technology itself.”

The Virtual Immersion Center for Simulation Research proved to be just the beginning. Williams went on to found Simucase, a global company offering clinical simulations for speech-language pathology, audiology and occupational therapy.

“Collaborations like this one are incredibly successful,” she added, “and that legacy of interdisciplinary work has been incredibly rewarding.” Buchner received in 2018.*

This patent is indicative of a trend at Case Western Reserve in 2018, the National Academy of Inventors and Intellectual Property Owners Association ranked the university #17 in the “Top 100 Worldwide Universities Granted U.S. Utility Patents.”


Beyond Siloed Care

Patients with more than one disease face myriad battles. Not only do their own bodies have to fight multiple ailments, but their health care providers need to go outside their respective fields to coordinate successful care.

Thanks to a $3.5 million federal grant, School of Medicine and Tanenbaum-Roehr Bolton School of Nursing Faculty have taken a strong first step to address the latter issue.

In collaboration with colleagues at Duke University, medicine’s Chris Conner and nursing’s Allison Weald are examining interventions to assist patients with HIV and AIDS are at higher risk for cardiovascular disease.

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Specifically, they’re looking at how patients think about cardiovascular risk, as well as the impact of a number of interventions to help people living with HIV reach cholesterol and blood pressure goals.

HIV care has a strong history of health care professionals from different disciplines joining forces, Weald said. While physicians’ core focus may be on the disease, she explained, nurses try to understand the full context surrounding a patient’s health.

“Beyond Our Borders

After leading successful efforts to ensure Case Western Reserve’s nurses are trained in treating medical conditions, graduate Magnum sought a larger challenge. She found it in Sierra Leone—and then again, in Senegal.

While Magnum’s on-campus efforts continue on ensuring access to resources important to women’s health, her subsequent research revealed that in some places, women surrounding menstruation contributed not only to illness, but fundamental inequalities.

In collaboration with Lauren Hannah Magnus, Magnum developed an educational program to provide girls in western Africa basic information about their own bodies have to fight multiple ailments, but their health care providers need to go outside their respective fields to coordinate successful care.

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Beyond the Senses

One key to a successful invention is to solve a nagging problem. For students in the law school’s interdisciplinary entrepreneurship program known as Fusion, the irritant was barking dogs. Their solution? A relaxing scent.

Open to graduate and professional students in law, management, engineering and science, Fusion aims to give students the knowledge and skills needed to evaluate and develop potential commercial ventures based on complex technologies. In the 2018–19 academic year, the program included time in the Larry Sears and Sally Zlotnick Sears think[box], where students could learn technical fundamentals and design prototypes to accompany their pitches.

For the team trying to calm howling hounds, Sears think[box] provided the space and technology necessary to turn a popular at-home diffuser into a dual-chamber system with sensors and a microcontroller. Their creation, Lavender Retriever, releases lavender oil, known for reducing stress, and dog-soothing pheromones when its sensors detect barking. Just as important as the free access to top tech, team member Rebecca Lindhorst (LAW ’18) explained, was the group’s disparate expertise, united by the Fusion program.

“Because we all had different backgrounds,” she said, “we were able to pick up ideas from disciplines that we wouldn’t have thought of before.”

As adjunct law faculty and Fusion co-founder Ted Theofrastous explained: “Our hope is that the students take these analytical tools with them and apply them in their careers in the broader ecosystem of innovation and entrepreneurship.”

“Students typically learn how to be professionals in ‘their lane.’ Their value is extremely limited unless they take those blinders off.”

—Ted Theofrastous
Fusion co-founder

Inside Sears think[box], the university’s 50,000-square-foot innovation space, students and the public use technology—from 3D printers to laser cutters and more—to create the next big thing, or simply their next passion.
Beyond the Map

A scholar and a journalist happened to be sitting next to one another, each with a laptop open to what looked like identical maps. But the two greater Cleveland images tracked entirely different factors: the scholar’s highlighted sexual assault frequency, while the journalist’s looked at child lead poisoning rates.

For Rachel Lovell, a research assistant professor at the Jack, Joseph and Morton Mandel School of Applied Social Sciences, the coincidence became an “aha” moment. It prompted Lovell, also a member of the school’s Begun Center for Violence Prevention Research and Education, and center senior research associate Misty Luminais to discover that both highlighted areas corresponded to those that nearly a century earlier had been redlined. Redlining is a practice in which federal agencies designated residents of certain largely minority areas to be poor credit risks for mortgage loans and other services. Working with Case Western Reserve’s Freedman Center for Digital Scholarship, the researchers found that Cleveland’s redlined areas not only consistently overlapped with neighborhoods that today had high numbers of unsubmitted sexual assault kits and child lead-poisoning rates, but also low levels of internet access. This connection, Luminais said, “helped us to start thinking about sexual assault in a holistic manner”—and better understand how seemingly unrelated problems, and their solutions, ultimately may be connected.

“When you look at the data in text form, you suspect there’s some sort of pattern.”

—Rachel Lovell
Research Assistant Professor at the Jack, Joseph and Morton Mandel School of Applied Social Sciences

Analyzing looking and lending maps of Cleveland from the 1930s, researchers layered data sets related to sexual assault kits, lead levels and internet access via global information systems (GIS) mapping.
Beyond Better Health

Anant Madabhushi believes artificial intelligence can quickly determine the best approaches to defeat cancer—and it also can spare patients the physical and financial pain of interventions unlikely to help them.

A prime example can be found in Madabhushi's findings relating to lung cancer—work that Prevention magazine deemed one of 2018’s “13 Most Incredible Medical Breakthroughs.”

Using biopsy images, he and his team trained computers to be able to tell which lung cancer patients would benefit from chemotherapy and which would not. The Center for Computational Imaging and Personalized Diagnostics, led by Madabhushi, has seen similar success with head and neck cancers, as well as breast cancers in their early stages.

With research showing that roughly 40 percent of cancer patients deplete their life savings within two years of diagnosis, such findings give reason for hope across multiple fronts—so much so that Madabhushi has begun conversations with Weatherhead School of Management faculty regarding potential implications for health care costs.

"Being a very curious person, I'm always interested in gaining multiple different perspectives," he said, "and every so often, you have this eureka moment and you're able to really move the needle forward in a way that doesn't just result in another paper, another algorithm. You find something that just might reach that patient who needs it.”

"Being interdisciplinary, to me, is more than a buzzword. It embodies how biomedical engineering needs to be done.”

—Anant Madabhushi
F. Alex Nason Professor II of Biomedical Engineering
Beyond the Law

Jonathan Adler sees the law as a major lever in addressing today’s environmental challenges. And, as of last spring, he has a new platform to prove his thesis. Adler, the Johan Verheij Memorial Professor of Law and prominent environmental law scholar, is the inaugural director of the Coleman P. Burke Center for Environmental Law. Burke (LAW ’70), a prominent environmental conservationist, established the center with a commitment of $10 million, the largest gift in the school’s history.

The center aims to expand students’ learning opportunities in environmental law, and also establish the school as an intellectual hub of interdisciplinary research and thought leadership.

The center’s first major event was a symposium marking the 50th anniversary of the founding of the Environmental Protection Agency. Next is a conference on environmental health with the university’s Law-Medicine Center—the nation’s first center on health law.

“Today’s environmental problems require a willingness to work outside and across disciplines boundaries,” Adler said. “It is our hope that this center will foster productive dialogue and analysis of these issues and propose a new generation of environmental lawyers.”

Beyond Medical Solutions

Michael Konstan knows the opioid crisis is much more than a medical problem. So as a leader in a nearly $350 million federal effort to address it, he has engaged faculty from across the College of Arts and Sciences and the Jack, Joseph and Morton Mandel School of Applied Social Sciences—as well as his own colleagues in the School of Medicine.

The federal HEALing* Communities Study aims to reduce opioid deaths by 40 percent across 67 communities in four states—Kentucky, Massachusetts, New York and Ohio—within three years. The challenge for Ohio is enormous: In 2017, the most recent year for which statistics are available, the state ranked second in the country for opioid deaths, with a rate 2.5 times higher than the national average.

Konstan is leading a team to work with eight highly impacted northern Ohio counties designated for the project—including the university’s own Cuyahoga County. The $66 million Ohio grant calls for data-driven approaches across disciplines including health, behavioral health, justice systems and community engagement.

“Successfully combating the opioid crisis requires a strong collaborative effort,” Konstan said, the medical school’s vice dean for translational research.

Fifty years ago, Cleveland’s Cuyahoga River fire sparked a focus on pollution in the area and around the country—and the creation of the Environmental Protection Agency.
For many, a therapy dog can be calming. But how does the animal’s presence actually achieve this effect?

That’s the question Aviva Vincent tackled as a doctoral candidate in the Jack, Joseph and Morton Mandel School of Applied Social Sciences. Now a Mandel School instructor and researcher, Vincent found enthusiastic partners in Case Western Reserve’s School of Dental Medicine and the Irving and Jeanne Tapper Dental Clinic at University Hospitals Rainbow Babies & Children’s Hospital.

With support from Salimetrics, a southern California company that analyzes saliva samples for research, Vincent assessed biological reactions such as changes in levels of oxytocin—a hormone associated with stress reduction—in 8- to 12-year-olds who had reported fear or anxiety in dental settings. In measures taken at various points before and after interacting with a therapy dog, oxytocin levels were shown to increase.

“Most dentists say the majority of their job is behavior management,” said Vincent, explaining how professors such as Gerald Ferretti, chair of pediatric dentistry at the School of Dental Medicine and chief of pediatric dentistry at UH Rainbow Babies & Children’s Hospital, supported her vision. “It’s been a really positive experience working with faculty in the dental school to help answer this problem.”

“Many children fear going to the dentist. What if we could change that?”

—Aviva Vincent

Instructor in the Jack, Joseph and Morton Mandel School of Applied Social Sciences

Part of the Health Education Campus (see p. 6), the new 132,000-square-foot Dental Clinic expands opportunities for education and research while enhancing the experience for all patients—from children to seniors.
DEGREES + CAMPUS STATISTICS
JULY 1, 2018 - JUNE 30, 2019

3,536
DEGREES AWARDED
(2018-19)

1,157
BACHELOR’S

1,682
MASTER’S

207
PHD

460
OTHER DOCTORATE
(EdD, ND, MD, DVM, DLA, DMD, DMA, SJD)

30
CERTIFICATE

CAMPUS
3,550
FACULTY (full-time)

3,202
STAFF (full- and part-time)

ENROLLMENT (Fall 2018)
5,383
UNDERGRADUATE

6,491
GRADUATE + PROFESSIONAL

DEGREES BY SCHOOL
(Undergraduate, Graduate and Professional)

713
Case School of Engineering

658
College of Arts and Sciences

247
Frances Payne Bolton School of Nursing

275
Jack, Joseph and Morton Mandel School of Applied Social Sciences

188
School of Dental Medicine

261
School of Law

676
School of Medicine

618
Weatherhead School of Management

RESEARCH + TECHNOLOGY HIGHLIGHTS

COMPETITIVE SPONSORED RESEARCH PROJECTS*

National Institutes of Health
Department of Defense
National Science Foundation
Department of Energy
NASA
Other Federal
Industry
Nonprofit, Foundations, Associations, Societies
Other Government

Projects Awarded
369
27
40
11
9
101
102
582
46

Awarded, in Millions**
$196.9
$10.6
$7.4
$7.6
$1.6
$16.4
$12.7
$71.1
$7.4

Total
1,287
$331.7

TECHNOLOGY TRANSFER

66
New Intellectual Property Deals with Industry

174
New Inventions

$4.16M
Licensing Revenues

* Does not include awards to Case Western Reserve faculty at Cleveland Clinic Lerner College of Medicine.
** Numbers have been rounded.

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## FINANCIAL HIGHLIGHTS

### JULY 1, 2018 - JUNE 30, 2019

### TOTAL OPERATING SURPLUS*

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<td>6.4</td>
<td>8.4</td>
<td>7.2</td>
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<td>10.1</td>
<td>7.1</td>
<td>8.97</td>
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*Surplus includes revenue less expenses as well as uses of retained surplus.

### TOTAL OPERATING REVENUES AND EXPENSES

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### GIFTS AND PLEDGES

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<td>126.2</td>
<td>138.4</td>
<td>145.9</td>
<td>151.6</td>
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<td>174.1</td>
<td>181.2</td>
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### 2018-19 GIVING HIGHLIGHTS

- **941** undergraduates receiving scholarship support from gifts
- **16,849** donors, **14,382** of whom are alumni
- **$31.8M** raised for scholarships, fellowships, and student aid
- **$11.4M** to the annual fund, which provides immediate student-focused support
The Health Education Campus of Case Western Reserve University and Cleveland Clinic opened in spring 2019, providing a brand-new space for health sciences students to learn, study and hang out—together.