

# IMPACT

THE 2018 REPORT



Worcester Polytechnic Institute

## FROM THE PRESIDENT



### A Distinctive Approach to STEM Education and Research

WPI, a global leader in project-based learning, is a distinctive, top-tier technological university, where our approach to STEM gives our students the tools to change the world.

Our faculty and students pursue groundbreaking research that is critical to the future prosperity of our country and to the health and well-being of people worldwide.

I am so proud to lead this distinctive technological university. The impact our students, alumni, faculty, and staff are making across the globe multiplies every day. We are now in the third year of Elevate Impact, our strategic plan, and we will finish strong on our aspirational initiatives: raising the bar on our undergraduate and graduate experience; growing our research enterprise; expanding our global activities; and making our community a more diverse, equitable, and inclusive place where all can thrive.

Demand for a WPI education has never been greater. This fall we welcomed our largest incoming undergraduate class, with women comprising over 40 percent of the class for the second year in a row. For the first time, every enrolled first-year student received a scholarship to remove financial barriers to participating in WPI's signature Global Projects Program. Off-campus projects positively impact students' lives and the communities where they work.

WPI faculty, acclaimed for how well they balance research and teaching, are integral to another milestone—\$33 million in research funding, a 43 percent increase over the past three years. At the same time, WPI faculty are making the time to share our proven pedagogy with higher education institutions of all sizes and specialties through our Center for Project-Based Learning.

Diligent fiscal responsibility, upgrades to business systems and processes, and thoughtful planning around the spaces, people, and technology that shape our campus ensure that our business is strong. We continue to lay the foundation to secure our future.

In the pages that follow, you'll learn more about the impact we've made over the past year—and just as important—what our future holds.

A handwritten signature in black ink, which appears to read "Laurie Leshin". The signature is fluid and cursive.

Laurie Leshin  
President

# LOCAL FOCUS, GLOBAL REACH LIFELONG IMPACT

Throughout their four years at WPI, students work closely with faculty—and each other—on projects both within their own communities and in communities around the globe. Their acquired skills, knowledge, and abilities lead them to develop solutions for authentic, open-ended, real-world problems. They conduct original research, evaluate approaches, and implement solutions. Along the way, they build an understanding of other cultures and their own potential to impact the world for the better.

*“The impact of the students’ project certainly will affect us here in Acadia but will also go well beyond the boundaries of the park and throughout the country.”*

Abe Miller-Rushing, Acadia National Park  
WPI Project Sponsor – Bar Harbor, Maine Project Center

## Meeting Real-World Challenges as Scientists and Engineers

Global experiences are essential to a WPI education, and as such, all undergraduates starting with the entering Class of 2022 receive a **\$5,000 Global Scholarship** to complete project work. Regardless of whether students complete their work in large international cities, remote mountainside villages, or our home city of Worcester, they collaborate to create profound, tangible impact that will last for years to come, transforming their worldview—and themselves—in the process.

**Bar Harbor, Maine**  
preserving the night sky  
in Acadia National Park



**Tirana, Albania**  
shedding light on  
pharmaceutical waste  
management



**Rabat, Morocco**  
developing a greywater  
recycling system to support  
a fog harvesting initiative



**Melbourne, Australia**  
implementing a  
methodology to monitor  
microplastics on  
beach environments



**>45**

global project  
centers on  
six continents

**100%**

of students receive a  
Global Projects Scholarship

**Top 10**

most popular study  
abroad programs

-Princeton Review

# AN INSPIRATIONAL COMMUNITY DREAMING BIG. WORKING HARD.

No matter what they're doing, WPI students are all in. Whether it's studying for finals, giving all they've got on the field, staying late in the lab, taking command of the stage, building a robot, jamming with the band, or launching a student club, the passions and talents of WPI students can't be underestimated. As they excel with each new challenge and explore diverse interests, students have the freedom to be themselves at WPI. Their spirit creates an invigorating atmosphere filled with teamwork, energy, and possibility.



## A New Dog on Campus

In keeping with WPI Greek Life's commitment to community service and the greater good, in 2018 the brothers of Phi Kappa Theta began raising and training Guide Dog puppy Diesel as he starts his journey toward working with the Guide Dog Foundation. He immediately became part of the brotherhood—even if he's the only one in the house who's not allowed to sit on the couch.



## The Form of a Question

Biology and biotechnology major Alli Ross '20 represented WPI in the 2018 College Championship of *Jeopardy!* After returning from Los Angeles, Ross joined 300 other WPI students, faculty, and staff engaging the next generation at TouchTomorrow, WPI's annual family-friendly festival dedicated to all things science and technology.



## A Whole-Hearted Effort

In an unforgettable year, women's rowing captured third place at the NCAA championships, with the football team earning the first postseason victory in the program's 128-year history. Men's soccer won the NEWMAC Championship, and women's basketball finished the regular season tied for first place.

*"At WPI, I found my people – people who share the same morals, creativity, knowledge, and drive to succeed that I know will help me immensely in my future."*

Jennifer D. '18, mechanical engineering

12

NCAA individual qualifiers

5

Academic All-Americans

Volleyball, Softball, Men's Swimming and Diving, Women's Track and Field/Cross Country



20+ performing arts ensembles

225+

student organizations

10,000+

attendees at the 7th annual TouchTomorrow, a festival of science, technology, and robots

29,000+

community service hours completed by students

# TRANSFORMING HIGHER EDUCATION

Since the launch of the university's landmark project-based educational model nearly 50 years ago, WPI has established itself as a pioneer and leader in experiential learning. Armed with that experience, expertise, and passion, WPI—through the Center for Project-Based Learning—is changing the face of higher education by helping other institutions implement facets of project-based learning on their campuses.



## Advancing a Proven Pedagogy for Project-Based Learning

WPI's Institute on Project-Based Learning, the flagship offering of the Center for Project-Based Learning, is an intensive workshop over multiple days on the WPI campus. Teams from large public universities, private universities, community colleges, and international institutions work with experienced faculty, creating action plans to advance project-based learning in their own curricula. Attendance has more than doubled since the inaugural offering in 2015.

26

colleges and universities attended

*2018 Institute on Project-Based Learning*

143

professionals participated

110+

academic institutions across the world served through the Center for Project-Based Learning (2016-2018)

*“This has been one of the most well-run, highly impactful, and transformative workshops I’ve experienced. We came in as a group of disjointed faculty who wanted to improve our individual courses. We left as a team of people excited and dedicated to championing project-based learning on our campus.”*

Jen Townsend, Associate Professor, Bellevue College

## Connecticut College Partners with WPI

A dual-degree program in environmental engineering will expose students at this premier liberal arts college to WPI's distinctive project-based curriculum. Essentially, Connecticut College students join the WPI student body in their junior year to gain hands-on experience in tackling real problems and develop an understanding of other cultures. They will see how their lives and work can make a real impact.



# MAKING SPACE TO CREATE IMPACT IN THE WORLD

WPI has long been ahead of the curve in making space in the curriculum for real-world problem solving (7-week terms assure that our students do more, not less, across their four years). In 2018, we've made great strides in creating physical space on our campus and beyond for the making and collaborating, discovery and partnership, that leads to creating value for the larger world.

## Launching Bold Ideas

From the pioneering vision that established the WPI Plan to the “what if” thinking that created beating heart cells on spinach leaves, bold ideas and daring to experiment form the foundation for everything we do at WPI. It’s paramount that we give our community the tools, connections, time, and space it needs to thrive.



1

new executive director of innovation and entrepreneurship

80+

Tech Advisors Network mentors guiding and encouraging new ventures

42

students inducted as honorary members of the National Academy of Inventors

16

patents issued

350+

events at WPI Seaport

## Foiese Innovation Studio

Completion of the Foiese Innovation Studio opens the door to a tangible home for the distinctive hands-on component of a WPI undergraduate education. With makerspaces, rapid prototyping labs, and opportunities for active learning, our students and faculty have the space to design, collaborate, and build on ideas to change humanity for the better.



*The Foiese Innovation Studio*

*“WPI does a wonderful job putting students first. WPI goes the extra mile and recognizes innovation.”*

Drew Hirshfeld, Commissioner for Patents, U.S. Patent and Trademark Office

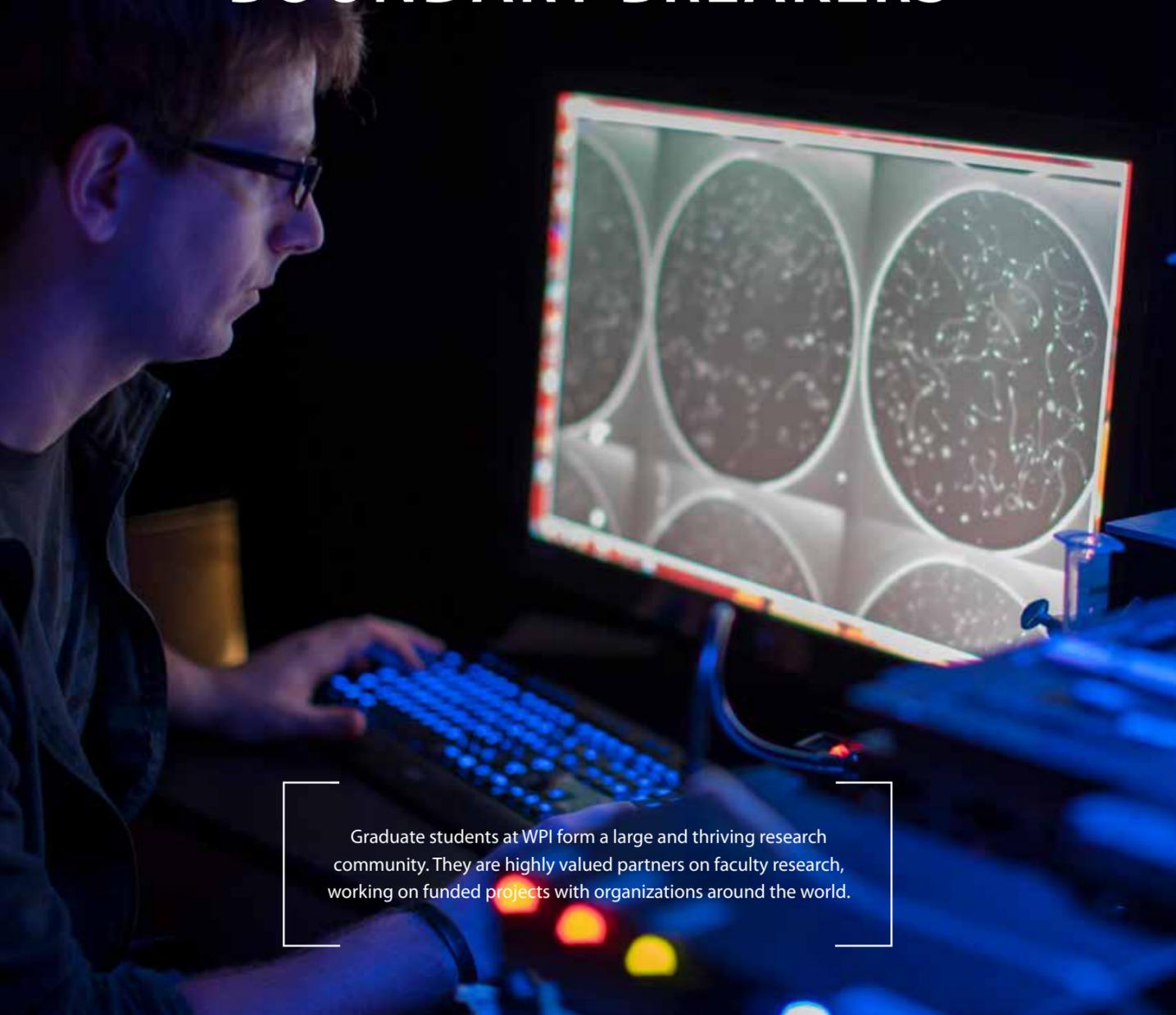


*Collaboration and innovation at WPI Seaport, situated in Boston’s Innovation District.*

## WPI Seaport

The first and only higher education presence in the neighborhood, WPI Seaport connects our students and faculty to multiple industries, including fintech, life sciences and bioengineering, robotics, systems engineering, and construction.

# A VIBRANT COMMUNITY OF BOUNDARY BREAKERS



Graduate students at WPI form a large and thriving research community. They are highly valued partners on faculty research, working on funded projects with organizations around the world.

## Elevating the Research Enterprise

A new research milestone was achieved in 2018 as WPI advanced its strategic goal to elevate the research enterprise. The continuing growth is attributed to a number of factors, including the recently launched Research Solutions Institute and talented young researchers joining new and established labs.

**\$33 million**

in research funding

**43%**

increase in research funding over the past three years

**164%**

increase in research funding from the U.S. Department of Education

*“WPI has a great focus on solving real-world problems. I’m working on using spinach and other plants as the framework to build new tissues on. In an ideal world, we would be able to grow a large piece of heart muscle and then transplant that into the damaged area of the heart. That would allow for normal heart function to come back to that patient so they can enjoy life to its fullest again.”*

Joshua Gershlak  
PhD candidate in biomedical engineering

**200%**

increase in graduate professional development programs

**6<sup>th</sup>**

fastest growing private doctoral institution in the U.S.

- Chronicle of Higher Education Almanac

**65**

PhD degrees awarded—the most in WPI’s history

## Inaugural Presidential Fellows



The award includes a year of tuition, a stipend, and opportunities for professional development to allow underrepresented women and minority doctoral students flexibility in research.



## DISCOVERY AND INNOVATION WITH PURPOSE



health and  
biotech



### Building a Patch That Will Strengthen Damaged Hearts

Biomedical engineer **George Pins** is leading a research team seeking to create a contracting heart muscle patch using microthreads seeded with genetically engineered cardiac cells.

**\$450,000**



advanced materials  
and manufacturing



### Launching an Integrated Photonics Facility

WPI and Quinsigamond Community College are working together to launch a comprehensive joint laboratory to support the burgeoning photonics industry in the Northeast and educate a skilled photonics workforce.

**\$4 million**  
Commonwealth of Massachusetts

cybersecurity, data,  
and security

### Securing Home Networks

Computer scientist **Craig Shue** is working on a novel way to secure the nation's 54 million home computer networks and shield homeowners from fraud, compromise, and even property damage by outsourcing security to the cloud.



**\$500,000**



### Bringing Lithium-Ion Battery Recycling Process to Market

Materials engineer **Yan Wang** and his groundbreaking research makes it possible, for the first time, to easily recycle the energy cells that power most electronics and electric and hybrid vehicles. Now a company founded by Wang and colleagues at WPI—Battery Resources—is commercializing that innovation.



robotics and  
the internet of things



### Using Tissue Engineering to Build Replacement Tracheas

Biomedical engineer **Marsha Rolle** is using methods she developed to engineer blood vessels to make replacements for damaged windpipes.

**Research Partner:**  
Case Western Reserve University



### Making Autonomous Cars Safer

Robotics engineer **Raghvendra Cowlagi** and electrical and computer engineer **Alex Wyglinski** are focusing their interests in decision making and wireless communication on driverless cars.



learning sciences



### Studying the Impact of Online Math Homework Programs

Created by computer scientist **Neil Heffernan**, ASSISTments, a free web-based learning platform, has been shown to boost student scores on standardized math tests. The impact will be further studied through two multi-million dollar grants from a division of the U.S. Department of Education and the American Institutes for Research.

**\$7 million+**

impacting society

### Combating Human Trafficking

Foiese Business School's **Renata Konrad**, working with co-principal investigator **Andrew Trapp**, is using her expertise in operations research and math to develop best practices in the worldwide fight to end this exploitation of human life for monetary gain.



# WHERE GREAT MINDS BELONG AND THRIVE

Research at WPI is exciting, cutting-edge, and transformative. Multidisciplinary collaborations enable new perspectives and boundary-advancing possibilities within our labs and classrooms. Building on the university's current and historical strengths and seizing emerging opportunities currently in some of the most important multidisciplinary areas, WPI has developed five cross-cutting research areas as part of the strategic plan.

Diversity at WPI involves the whole community and touches everything we do. From our outreach to prospective students to how we fill a professional development gap for future STEM educators, we are invested in change for the better. When our differences are regarded as essential to idea generation and collaboration, people are freer to create their best work—and we *all* thrive.

## “Doing the right thing *is* your job.”

When 2018 Undergraduate Commencement speaker Margot Lee Shetterly gave graduates that spot-on advice, she summed up WPI's approach to making our community more diverse, inclusive, and equitable. We are all working to create a welcoming and accepting culture.



### A campus-wide commitment: Project Inclusion

Now in its second year, WPI's community-wide strategic initiative, Project Inclusion, challenges our community to look inward, learn from each other, and think critically about what we must do to make the university culture more welcoming to all. Change like this takes work, but it's happening with ongoing efforts.



### Test-optional for 10 years

In 2018 WPI marked 10 years as a test-optional school, making the university more accessible to underrepresented populations whose scores often don't accurately reflect their capabilities. WPI was the first nationally ranked science and engineering university to adopt a test-optional admissions policy and provide an alternative to submitting SAT or ACT scores.



### STEM Faculty Launch

2018 marks year three of our efforts to advise traditionally underrepresented or women graduate and postdoctoral STEM students to launch their careers. WPI faculty, who know the rigors of the student-to-faculty path, offer mentorship and immediately useful tips during the intense two-day workshop. Since the program's inception, 135 people have benefited.



### Preparing graduates for a diverse workforce

A Davis Educational Foundation Grant will fund researchers teaching students to identify and address unconscious bias and promote equity in teamwork situations, preparing them for an increasingly diverse workforce.



# LAUNCHED FOR LIFE PREPARED TO MAKE THEIR MARK



WPI produces globally aware problem solvers who work effectively in teams, think creatively, and have the skills and confidence to dive right in. With opportunities for co-ops, internships, hands-on research, and project work both locally and abroad, our students gain meaningful, career-launching professional experiences that complement their academic knowledge and technical skills—and prepare them to excel beyond WPI.



When **David D'Antonio** left WPI in 1980, he didn't imagine he would receive his bachelor's degree in computer science almost 40 years later. In 2018 he marked that off his to-do list and opened up opportunities in his career as a software engineer.



Class of 2018 student-athlete standout **Ama Biney** accepted a position at United Technologies in Palm Beach, Florida, where she is participating in the company's premier Operations Leadership Program.



Chemical engineering PhD graduate **Lindsay Lozeau '18** discovered two new peptides that could revolutionize antimicrobial materials. On the basis of that research, she and her research partner formed AMProtection, which they plan to elevate to a standout R&D company.

## \$67,000

average starting salary  
(bachelor's degree)

## 98%

of master's and PhD recipients  
are employed or continuing their  
studies shortly after graduation

## 700

different organizations now  
employ recent WPI graduates

## #5

Best  
Career Services

## #15

Best Career  
Placement

## #25

Best Schools  
for Internships

*WPI is the only university to appear in all three Princeton Review rankings*

# GIVING BACK TO BUILD FUTURES

Support from our alumni, parents, faculty, staff, students, and friends takes many forms at WPI. From monetary gifts to the hours of mentoring by the Tech Advisors Network, ours is a community committed to giving for impact. There is a powerful story behind each gift, and every one makes our university stronger.

# FOISIE INNOVATION STUDIO

*On the donor wall inside the Foisie Innovation Studio, WPI honors the people who helped make the building—and the opportunities it holds for our students—a reality.*

## \$12m

This pledge, **one of the largest single gifts in WPI's history**, will support the university's endowment and is unrestricted, allowing WPI to direct the funds to its highest priorities and areas of impact.

## \$500,000

In its first two years (2017 and 2018), the **Women's Impact Network** awarded 18 grants to faculty, staff, and students.

## \$500,000

From an alumnus to **renovate Higgins House** as an Alumni Center

## >50% participation

The **Class of 2018's Senior Class Gift** supports WPI's commitment to Global Projects for All, funding for a new project center in Montana's Glacier National Park, and a new scholarship.

## 12 × 544 = \$30,000

days

alumni  
athletes

raised in the  
Goat Nation  
Giving Challenge

## \$522m+

endowment,  
up nearly \$100m in five years

# WORLD CLASS SCIENTISTS, ENGINEERS, LEADERS



President Laurie Leshin was one of 12 women scientists and engineers honored by GE with iconic stars on the ceiling of Grand Central Terminal in New York. The stars were configured into constellations depicting each of the honorees.

## Faculty Early Career Award Winners, 2015–2018



**Kyumin Lee**  
*Computer Science*



**Lyubov Titova**  
*Physics*



**Cagdas Onal**  
*Mechanical Engineering*



**Scarlet Shell**  
*Biology and Biotechnology*



**Craig Shue**  
*Computer Science*



**Sarah Olson**  
*Mathematical Sciences*



**Michael Timko**  
*Chemical Engineering*



**Ivon Arroyo**  
*Social Science  
and Policy Studies*



**Raghvendra Cowlagi\***  
*Aerospace Engineering*

Recipients of NSF CAREER Award and \*Air Force Young Investigator Award



**Jean King**  
Dean, Arts and Sciences

Jean King, a renowned neuroscientist, joined WPI as the Peterson Family Dean of Arts and Sciences, after concluding her service as vice provost for biomedical research at the University of Massachusetts Medical School.

Her research has been consistently funded for over two decades by such organizations as the National Institute of Mental Health, the National Science Foundation, the Centers for Disease Control, the National Institute of Drug Abuse, the American Association of University Women, and the National Center for Complementary and Integrative Health. She also holds several patents, has over 90 peer reviewed publications, and has been a collaborative partner to many WPI faculty members in the past.

She earned a doctorate in neurophysiology at New York University and pursued postdoctoral training in translational neuroscience at Emory University.

## Faculty Honors

**Peter Hansen**  
*Fulbright Scholar*

**Homer Walker**  
*Fellow of the Society for  
Industrial and Applied Mathematics*

**Diana Lados**  
*Fellow of ASM International*

**Martha Cyr**  
*Lifetime Achievement Award  
for K-12 educational outreach*

**Diran Apelian**  
*Fellow of the National  
Academy of Inventors*

**Aaron Sakulich**  
*Council on  
Undergraduate Research*

**Glenn Gaudette**  
*Fellow of the American Institute for  
Medical and Biological Engineering*

**Beth Wilson**  
*Exemplary Teaching Award  
from the University Professional &  
Continuing Education Association*

**Reeta Rao**  
*Fellow of the  
American Academy of Microbiology*



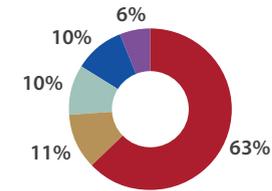
# OUR BUSINESS IS STRONG

Demand for a WPI undergraduate education continues to be strong, with 2018 marking five consecutive years of more than 10,000 applicants. Our prudent financial management includes strategic, consistent investment in our academic enterprise—faculty, facilities, and services—assuring our value proposition remains strong.



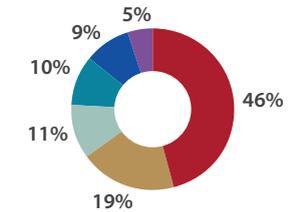
## Sources of Revenue

Net tuition & fees	63%
Auxiliary enterprises	11%
Grants/contracts	10%
Endowment support	10%
Other	6%



## Breakdown of Expenses

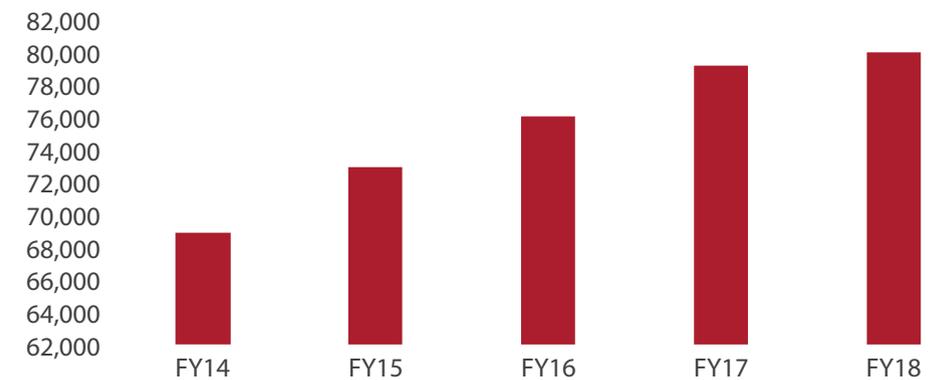
Instruction	46%
Institutional/academic support	19%
Auxiliary enterprises	11%
Research	10%
Student services	9%
External relations	5%



## Endowment Market Value (in \$ millions)



## Financial Aid (in \$ thousands)



# MOVING FORWARD

In this foundational year, several initiatives launched will grow in impact for the university and for our students. The Foisie Innovation Studio is now open. This physical embodiment of the modern WPI Plan—the cornerstone of our distinctive undergraduate curriculum—serves as the front door and hub for innovation and entrepreneurship, active learning, and open collaboration.

As we embark on the leadership phase for our next comprehensive campaign, significant work is under way to articulate priorities for investment and secure major gifts. At the same time, we are on the cusp of a five-year capital plan to provide the resources and spaces needed to educate our students.

Our research enterprise is on track to continue to reach new heights. After a record fiscal 2018 year, over \$14 million in research funding was secured in the first weeks of fiscal 2019 alone.

Next fall we will welcome our first Great Minds Scholars—a scholarship program to recruit, retain, and graduate high-achieving, Pell-eligible students from Worcester Public Schools. This is just one of the tangible initiatives that promote diversity, inclusion, and equity within our campus community and in the STEM workforce.

The Princeton Review has named WPI #5 on its list of Best-Run Colleges. It's our faculty, staff, partners, friends, and supporters who make this possible. We're very proud of how far we've come, but we will never cease moving forward to elevate the impact of this special place, WPI.

**#5**

Best-Run Colleges  
-Princeton Review



**WPI**

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[wpi.edu/+impact](http://wpi.edu/+impact)