IMPACT

THE 2018 REPORT

Worcester Polytechnic Institute
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.

Laurie Leshin
President
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
No matter what they are 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.
At WPI, I found my people — people that share the same drive to succeed, morals, creativity, and knowledge that I know will help me immensely in my future.”

Jennifer D. ’18, mechanical engineering
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
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.
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.
From Ideas to Impact

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

Foisie Innovation Studio
Completion of the Foisie 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.

“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

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

**6th**
fastest growing private doctoral institution in the U.S.  
- *Chronicle of Higher Education Almanac*

**65**
PhD degrees awarded—the most in WPI’s history

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
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.
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

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
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

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.
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.

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

CAREER Award

$7 million+
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 Resourcers—is commercializing that innovation.

Combating Human Trafficking

Foisie 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.
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.
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
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.

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
12 days × 544 alumni athletes = $30,000 raised in the Goat Nation Giving Challenge

$522m+
endowment, up nearly $100m in five years
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, 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

Diana Lados
Fellow of ASM International

Diran Apelian
Fellow of the National Academy of Inventors

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

Reeta Rao
Fellow of the American Academy of Microbiology

Homer Walker
Fellow of the Society for Industrial and Applied Mathematics

Martha Cyr
Lifetime Achievement Award for K-12 educational outreach

Aaron Sakulich
Council on Undergraduate Research

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

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Net tuition &amp; fees</td>
<td>63%</td>
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<tr>
<td>Auxiliary enterprises</td>
<td>11%</td>
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<tr>
<td>Grants/contracts</td>
<td>10%</td>
</tr>
<tr>
<td>Endowment support</td>
<td>10%</td>
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<tr>
<td>Other</td>
<td>6%</td>
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**Breakdown of Expenses**

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<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Instruction</td>
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<tr>
<td>Institutional/academic support</td>
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<tr>
<td>Auxiliary enterprises</td>
<td>11%</td>
</tr>
<tr>
<td>Research</td>
<td>10%</td>
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<tr>
<td>Student services</td>
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<tr>
<td>External relations</td>
<td>5%</td>
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</tbody>
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**Endowment Market Value (in $ millions)**

- FY14: 433
- FY15: 436
- FY16: 466
- FY17: 503
- FY18: 522

**Financial Aid (in $ thousands)**

- FY14: 62,000
- FY15: 66,000
- FY16: 70,000
- FY17: 74,000
- FY18: 78,000
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