



BREAKING NEW GROUND FOR WOMEN'S HEALTH

MORGAN STANTON, PHD '14, ACCELERATES THE DEVELOPMENT
OF NEW TREATMENTS FOR GYNECOLOGICAL DISEASES.



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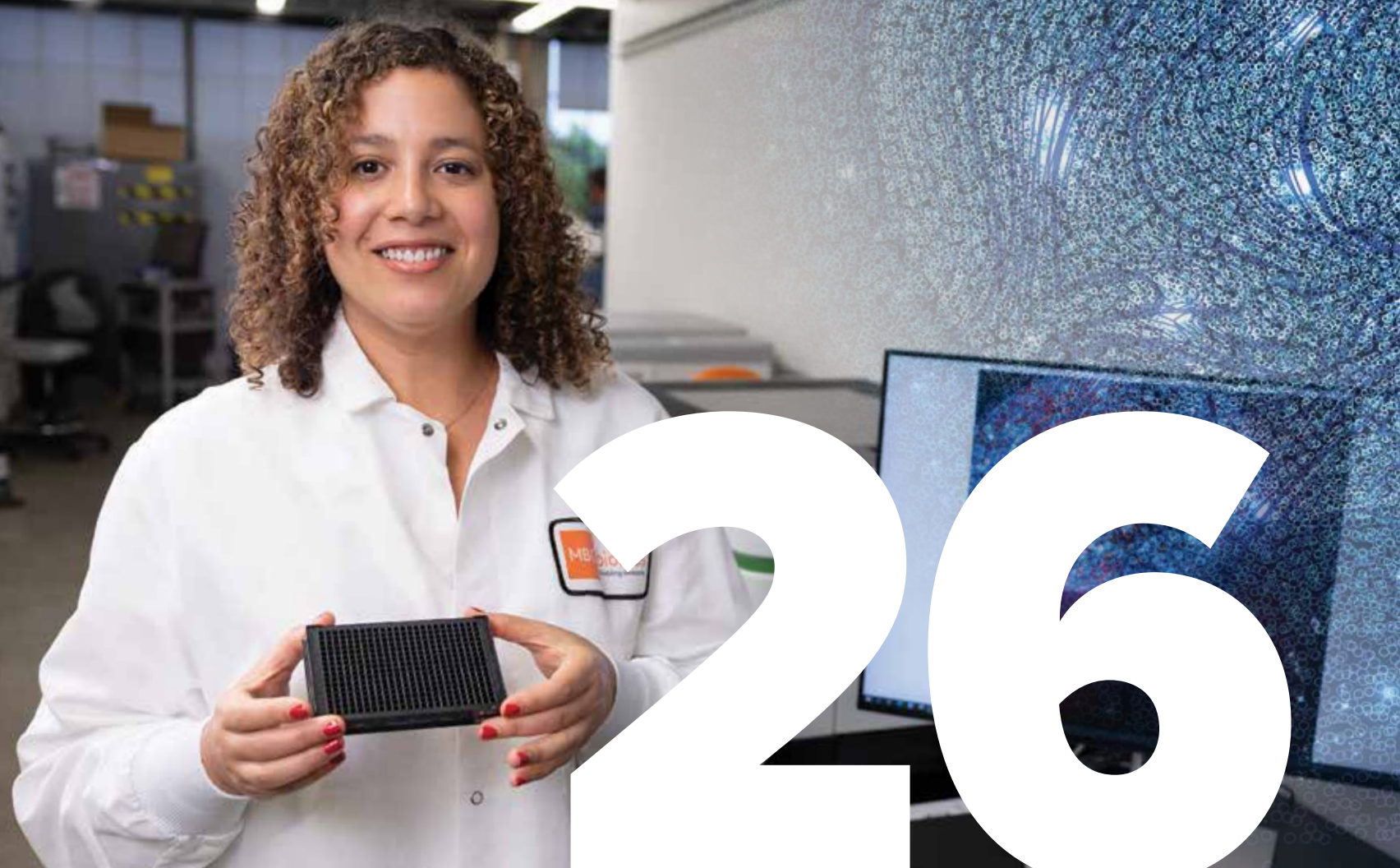
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BREAKING NEW GROUND FOR WOMEN'S HEALTH

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LETTER

from the Editor

READER SURVEY REMAINS OPEN

Thank you to the more than 80 people who have already completed the five-minute *WPI Journal* reader survey. A few interesting preliminary results: 48% of those who receive the print version of the magazine say they keep it around for a month or more and almost half spend up to 30 minutes reading each issue. These stats show the advantage of a print magazine over a digital presentation—the ability to pick it up, read whatever catches your eye, and then set it aside for future attention.

I'm also encouraged that 81% of respondents judge the quality to be very good or excellent. Of digital readers, 57% say they have shared a link to a story via email or on social media—exactly what we hope will happen to get *Journal* content seen by more eyes.

Most of the respondents identified as alumni (39%) and staff (34%), but some students also gave their opinions (19%). In fact, congratulations to student Alice Trujillo for winning the reader survey raffle. She received a \$100 gift card to the WPI bookstore.

Although the raffle is over, we hope you will still take the survey, which will be open until the end of February. Visit wpi.edu/+journalsurvey or scan the QR code at right to add your thoughts on your university magazine.



SHARING IS CARING

The survey has already generated some great ideas, including one from Director of Program and Business Development **Kristen Keane**, who shared that at a recent conference she met a man who told her he knows what's going on at WPI because he reads the *WPI Journal* at his local library. Apparently, instead of sending the magazine directly to the recycling bin after reading it, the original recipient donates it to the library in case others are interested. Kristen asked, wouldn't it be a great idea to encourage others to show their crimson pride in the same way?

Sounds like a fabulous idea to me so I'm bringing the suggestion to you, dear readers of the print magazine. If your library has a similar donation basket, how about extending the life of your *WPI Journal*? To put my money where my mouth is, I located such a basket at my own public library and dropped in a recent issue. Another option is to bring one to your doctor's or dentist's office and discreetly add it to the offerings in the waiting room. It's a small way you can help spread the word about the great things happening at this institution.



IN GRATITUDE FOR 50 YEARS

Fifty years is a long time to work for one institution. That's how long intrepid proofreader, copy editor, graphic designer, and institutional-knowledge keeper Peggy Isaacson worked at WPI, using her sharp eyes and good humor to hold everything coming out of our office to the highest standards. Her devotion to WPI was rivaled only by her devotion to the rules of style and grammar.

Ever the humble servant, she wanted no great fanfare to mark her milestone work anniversary, nor any celebratory event to send her off on a well-earned retirement. She simply expressed that she has loved her job and the WPI community tremendously. As a representative of that community, I can confidently say that love is returned in equal measure. Best wishes to Peggy for a joyful and peaceful retirement.

—**Kristen O'Reilly**, Editor

“Today, as technologies rapidly advance and the nature of jobs and workplaces continues to evolve, WPI provides a learning experience that not only builds careers but also enables personal growth.”



DEAR WPI COMMUNITY,

Everywhere I go, alumni talk with me about their WPI education with pride, and employers tell me how much they value WPI graduates. They stress how well prepared WPI students are, not just for starting a career, but for navigating change and undertaking leadership.

That makes WPI stand out, particularly when the higher education sector is at an inflection point and a nationwide discussion about the return on investment of a college education is ongoing.

So, what makes a WPI education not just distinct, but distinctly valuable?

Our high job placement rates, first-year salaries, and the lifetime value of a WPI degree speak volumes about how desirable WPI graduates are. Yet, a WPI education is much more than a pathway to jobs and salaries.

Today, as technologies rapidly advance and the nature of jobs and workplaces continues to evolve, WPI provides a learning experience that not only builds careers but also enables personal growth.

That is what makes a WPI education distinctly valuable. WPI focuses on each student as an individual. WPI educates tomorrow's dreamers, doers, and leaders—intentionally and systematically.

For more than 50 years, we have placed project-based learning at the center of our curriculum. Our students learn by exploring and designing solutions to real-world problems together. They master how to learn, think critically, communicate effectively, work as a team, pivot when needed, and iterate and adapt.

Our Global Projects Program celebrated its 50th anniversary in 2024. From a single center in Washington, D.C., the program has grown to more than 50 locations in 31 countries on six continents.

More than 85% of WPI undergraduate students leave campus for at least one term to work on their Interactive Qualifying Project or Major Qualifying Project, or complete their Humanities and Arts Requirement at one of these sites.

Working as a team while immersed in a culturally and intellectually stimulating—yet unfamiliar—environment builds empathy, teamwork, communication skills, and a deep motivation to work on critical issues impacting society.

When we recently surveyed our alumni about project-based learning, 94% said it enhanced their ability to develop ideas, 93% said it improved how they function on a team, and 88% said their projects helped them build a stronger personal character.

WPI is turning 160 years old in 2025 and has seen multiple industrial revolutions. While technological change is constant, what remains unchanged is our commitment to an excellent STEM education. Our faculty and staff continue to update curriculum, create new degree programs, innovate in pedagogy, and motivate our students to explore, to learn, and to grow.

A distinctly valuable WPI education provides leading-edge knowledge and skills, opens exciting career pathways, and, most importantly, builds character.

Sincerely,
Grace

Using Light and AI to Improve Stroke Treatment

Researcher **Yihao Zheng** is shining a light on blood clots to improve treatment for strokes caused by blockages in the brain.

Zheng, an assistant professor in the Department of Mechanical and Materials Engineering, and a team of researchers with expertise across science and engineering are developing a fiber-optic probe that will use light and advanced calculations to determine in real time whether a blood clot in the brain is soft, stiff, sturdy, or weak. The technology will give doctors information to guide decisions about how best to remove the blockages during clot-removal procedures.

“Physicians typically treat blockages in the brain by inserting a long, flexible tube into a patient’s leg, guiding it through arteries to the site of a clot, and then using suction or mesh tools to capture and remove the clot,” Zheng says. “Too often, these procedures, known as thrombectomies, fail on the first attempt and may even cause complications if clots shatter and send pieces further into the brain. Our research suggests that better information about clots and how they react to mechanical forces would provide critical insights to doctors and streamline these procedures.”

This four-year project is being funded with a \$1.1 million grant from the National Science Foundation. Zheng will serve as principal investigator (PI), and **Yuxiang Liu**, associate professor of mechanical and materials engineering, will be a co-PI. Researchers at the University of California San Francisco, the University of Georgia, and UMass Chan Medical School will collaborate on the project.

The researchers will develop a slender fiber-optic probe that can be guided through a catheter to a blood clot in a patient’s brain. Their prototype probe measures about 1 millimeter in diameter and is much thinner than current commercial products that deploy similar technology. The probe will emit light and gather data on the clot’s chemical fingerprint, using a method called Raman spectroscopy. Specifically, the probe will gather data on blood components involved in clot formation—fibrin, platelets, and red blood cells.

A type of artificial intelligence known as a convolutional neural network will read the light signals to model how the clot would respond to mechanical forces such as compression and tension. Those predictions could help physicians determine the best way to capture and remove the clot. To validate their device, the researchers will test it in laboratory experiments and models.

“Stroke is the third-leading cause of death worldwide and a leading cause of disability, and it poses a serious problem as our population ages,” Zheng says. “By bringing together researchers with expertise in engineering, physics, data science, and medicine, we are developing a technology that can address the urgent need for a solution.”

—Lisa Eckelbecker

QUANTUM CLOUD RESEARCH, EDUCATION TO LEAP FORWARD

To prepare her students for the future of computer science, WPI researcher **Tian Guo** is launching a project that will put the power of quantum computing in their hands. Guo, an associate professor in the Department of Computer Science, will use a \$799,995 award from the National Science Foundation to develop computer science techniques and tools, as well as course modules with hands-on activities, that will prepare college students for careers in the emerging field of quantum cloud computing.

“Quantum computing can leverage vast computational power to solve incredibly complex problems in areas such as cryptography and scientific simulations of chemical reactions,” Guo says. “At the same time, quantum computing is a very challenging field and is only beginning to move into distributed quantum computing. This project will play a role in advancing the field of quantum cloud computing, educating future workers, and providing resources or services that can bring quantum computing to many more people.”

Quantum computing harnesses the laws of quantum mechanics and specialized hardware to process more information and solve problems faster than classical computers. Classical computing encodes data onto bits as zeros or ones, but quantum computing expands computing capacity by encoding data onto qubits, which can be in a superposition of zero and one. When users submit jobs to quantum computers, the jobs typically run multiple times to produce the most likely solution.

Quantum cloud computing allows users to access scarce quantum resources over the internet, much in the way that traditional cloud computing offers classical computing services to users. Some companies have begun making quantum resources available to users, but the field is still relatively new. As more users seek out quantum cloud services and more quantum jobs need to be executed using quantum resources, it will become important to develop algorithms to efficiently manage quantum computers.

As principal investigator (PI) on the three-year project, Guo will collaborate with co-PI Chen Qian, professor of computer science and engineering at the University of California Santa Cruz. The project brings together Guo’s research in cloud computing and computer networking and Qian’s work on quantum networks, computers, and simulators.

—Lisa Eckelbecker

Teng Leads Team Exploring New Battery Storage Technologies



The world is rapidly transitioning to renewable power, but there are shortcomings. Solar power falls at night, and wind power recedes and ascends irregularly. New technologies need to be developed that can store energy from the electrical grid when there's a surplus and deploy it when there's not enough.

Rechargeable lithium-ion batteries play a crucial role in everyday life, powering devices from smartphones to electric vehicles. However, they rely on limited resources like lithium, nickel, and cobalt, raising concerns about sustainability and cost.

Xiaowei Teng, the James H. Manning Professor of Chemical Engineering, is leading a team to explore new battery technologies for grid energy storage. The team's recent results, published in the European scientific journal *ChemSusChem*, suggest that iron, when treated with the electrolyte additive silicate, could create a high-performance alkaline battery anode. The second-most abundant metal in the Earth's crust after aluminum, iron is far more sustainable than nickel and cobalt. The United States alone recycles approximately 40 million metric tons of iron and steel from scrap each year.

Teng notes that iron is already used as an alkaline battery anode in iron-nickel alkaline batteries—invented by Thomas Edison in the 1900s—but it has low energy efficiency and storage capacity due to the formation of hydrogen gas during charging and inert iron oxide during discharging.

"You don't want hydrogen gas formation when charging a battery," says Teng. "It impairs the energy efficiency of the battery system considerably. Without addressing these technical challenges, iron alkaline batteries are less attractive for modern energy storage systems to be coupled with electric grids."

In an Oct. 7 cover story featured in *ChemSusChem*, the team reported that adding silicate to the electrolytes allowed them to charge a battery without producing hydrogen.

A chemical compound of silicon and oxygen, silicate has long been used as an inexpensive and simple agent in glass, cement, insulation, and detergents, says **Sathya Jagadeesan**, PhD '24, student at WPI and lead author on the paper. The team discovered that silicate also strongly interacts with battery electrodes and suppresses hydrogen gas generation. Teng said this new process could improve the alkaline iron redox chemistries in iron-air and iron-nickel batteries for energy storage applications, such as microgrids or individual solar or wind farms.

—Steve Foscett

FIRST-OF-ITS-KIND

MS IN EXPLOSION PROTECTION ENGINEERING

WPI recently launched a groundbreaking Master of Science in Explosion Protection Engineering, the first program of its kind in the United States. Designed amid growing concerns about fire and explosion risk posed by manufacturing facilities and advancing technologies like electric vehicles and hydrogen fuel cells, the program builds on WPI's esteemed legacy in fire protection engineering, which has been at the forefront of fire safety education and research since its inception in 1978.

"The demand for leaders with advanced expertise in explosion protection engineering is more critical than ever," says **John McNeill**, Bernard M. Gordon Dean of Engineering. "These leaders will be essential in driving systemic changes in infrastructure, process safety, regulations, and public awareness."

Explosions, whether related to battery and energy production and storage, accidental industrial incidents, unintended combustion of manufacturing materials, or intentional bombings, have led to catastrophic consequences. Notable examples include the BP Deepwater Horizon explosion (2010), the Merrimack Valley gas explosions in Massachusetts (2018), and the Surprise, Arizona, energy storage system explosion (2019).

The Explosion Protection Engineering program addresses the fragmented nature of explosion safety education, offering a comprehensive curriculum that incorporates current standards, modern theories, and cutting-edge research to address risks that come with some types of batteries, chemicals, and even food dust. The program expects to attract high-caliber students with undergraduate degrees in chemical engineering, aerospace engineering, mechanical and materials engineering, fire protection engineering, and civil, environmental, and architectural engineering, among others.



Support for the Next Generation of Researchers and Educators

A US Department of Education fellowship grant will help WPI train the next generation of researchers and educators in molecular biology, cell biology, and microbiology.

The Graduate Assistance in Areas of National Need (GAANN) program provides fellowships to assist U.S. citizens pursuing doctoral degrees in fields deemed "areas of national need." Over the next three years, WPI will receive nearly \$900,000 in GAANN funding, which, when combined with a university match, will fund eight doctoral students in the Department of Biology and Biotechnology—two existing doctoral students and six new students. The program will represent a total investment of around \$1.2 million.

The need-based fellowships, which will focus on recruiting doctoral candidates from underserved areas and backgrounds, will increase both the footprint and the diversity of the department.

U.S. Sen. Elizabeth Warren, who helped secure the funding for the program, said the fellowships will allow WPI to create new career paths to the life sciences.



REETA RAO AND AMITY MANNING, CENTER FRONT, WITH PHD STUDENTS IN THE DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY.

"WPI has opened so many doors for Massachusetts students interested in science and technology, and this grant will enable them to build on their powerfully important work," Warren said. "I will continue fighting for more federal investments for colleges and universities in the Commonwealth to support all our students becoming future leaders."

Amity Manning, associate professor of biology and biotechnology, will oversee the GAANN fellowship program at WPI. She said the university is uniquely suited to leverage the fellowships.

"We're set up to have a great balance of research and exposure to teaching," Manning says. "WPI encourages students to interact with and engage faculty while they gain hands-on training in teaching approaches."

—Steve Foscett

Lighting the Way to Better Drying Technologies

In manufacturing plants where porous products start out as wet mixtures, the best way to dry things out might just be to light them up. The Center for Advanced Research in Drying (CARD), a National Science Foundation Industry-University Cooperative Research Center led by WPI and the University of Illinois at Urbana-Champaign (UIUC, a co-site in CARD), will test that idea over the next three years by developing laser-based drying technologies for food, pulp, and paper production.

The researchers will determine how to cut greenhouse gas emissions from manufacturing facilities that dry moist, porous mixtures to produce cookies, potato chips, packaging materials, and more. It is an area ripe for innovation, because an estimated 12 percent of energy used in U.S. manufacturing goes to industrial-scale drying processes.

Researchers at WPI will focus on experimental work and the development of physics-based models, while UIUC researchers will focus on artificial intelligence for determining real-time optimal operation. When developed, laser-based drying technology may be useful in additional industries, such as the chemical and pharmaceutical industries.

The \$3.5 million project is largely funded with a \$2.75 million award from the U.S. Department of Energy, which is providing \$38 million to 16 projects across the country to address decarbonization issues in industry. Additional support includes a \$300,000 award from the Massachusetts Clean Energy Center plus financial and in-kind support from partners.

Partners in CARD's three-year project include IPG Photonics, Reading Bakery Systems, the Electric Power Research Institute, the Alliance for Pulp and Paper Technology Innovation, and the Rapid Advancement in Process Intensification



CENTER FOR ADVANCED RESEARCH IN DRYING FOUNDING DIRECTOR JAMAL YAGOOBI, RIGHT, IN HIS SAGAMORE ROAD LAB.

Deployment Institute, which is an institute in the Manufacturing USA network.

The work builds on previous research from CARD, which was founded in 2016 and has pioneered the development of various drying technologies, such as convection slot jet reattachment nozzles, ultrasound-assisted radial jet atomizers, and a fiber optic moisture sensor developed by Mechanical and Materials Engineering Associate Professor **Yuxiang Liu** and his team.

CARD Founding Director **Jamal Yagoobi**, George F. Fuller Professor of Mechanical and Materials Engineering, is the principal investigator of the DOE award.

Early-Career Researchers Launch Projects to Advance Health and Work

Four researchers who are in the early stages of their careers have received grants totaling \$3.7 million for projects that will help establish their laboratories and produce breakthroughs in biology, robotics, and women's healthcare.

The grants from the National Science Foundation (NSF) and the National Institutes of Health (NIH) will support research into the basic workings of cells in placenta, algorithms that could help robots grasp objects, the genetics behind egg cell division in tiny worms, and mechanisms that allow cells to communicate with each other and their environment.

Over the past 10 years, WPI's faculty has included 27 recipients of NSF CAREER Awards, one of the most prestigious honors for junior faculty members who have the potential to become leaders at their research institutions.

Inna Nechipurenko, assistant professor in the Department of Biology and Biotechnology, has been awarded a \$1.9 million grant through the NIH's Maximizing Investigators Research Award for Early Stage Investigators. Her lab studies the assembly of tiny cellular antennae called primary cilia, which mediate communication between cells and their environment. Defective cilia cause a myriad of genetic disorders that have no cure. Nechipurenko's five-year project will delve into mapping the signaling networks that regulate cilia assembly, remodeling, and function in nerve cells to better understand how cilia dysfunction contributes to human neurodevelopmental disorders.

Karl-Frédéric Vieux, assistant professor in the Department of Biology and Biotechnology, has been awarded \$747,000 through the NIH's Maximizing Opportunities for Scientific and Academic Independent Careers program that supports diverse researchers transitioning from postdoctoral programs to careers.

Vieux received his PhD from McGill University, was a postdoctoral fellow at NIH, and joined the WPI faculty in July 2024. His research focuses on transcribed copies of genes, known as RNA, and the molecular modifications that regulate their expression and stability in the context of reproduction. His project, which began during his fellowship at NIH and will continue for up to three more years, focuses on understanding the role of these genes during the process in which an egg transitions into an embryo.

Christina Bailey-Hytholt, assistant professor in the Department of Chemical Engineering, has been awarded \$502,999 from the NSF's Building Research Capacity of New Faculty in Biology program. Her three-year project will focus on the relationship between placental cells known as trophoblasts and the structures they secrete, called exosomes, that are important in a mother's immune regulation and implantation of an embryo. The project reflects her concentration on research that addresses critical unmet needs for women's health.

Berk Calli, associate professor in the Department of Robotics Engineering, has been awarded a \$599,559 CAREER Award from the NSF. His research focuses on the object manipulation capabilities of robots and is geared toward enabling robots to operate in human environments such as homes, offices, and hospitals. During his five-year CAREER project, he will also collaborate with faculty members in the Environmental Engineering Program to establish an environmental robotics track for undergraduates. His other research projects have been supported by multiple NSF grants, including a four-year award from the NSF Future of Work program to develop robotics technology for waste recycling centers.

—Lisa Eckelbecker



NECHIPURENKO



VIEUX



BAILEY-HYTHOLT



CALLI

Three new members were recently elected to the WPI Board of Trustees.

Natalia Pavlova is a director of the VPG Foundation, a family foundation supporting the philanthropic endeavors of Valentin P. Gapontsev, founder of IPG Photonics and a pioneer in the fiber laser industry. Gapontsev, who passed away in 2021, built his legacy in Central Massachusetts, growing IPG into a world leader in laser technology.

Jim Polewaczyk '85 is the recently retired executive vice president and chief commercial officer of IDEXX, an S&P 500 company and global leader in pet healthcare innovation. He served as a corporate officer at IDEXX for over 17 years.

Greg Tucker '92 is the founder, vice chairman and CEO of ProAmpac, a global leader in sustainable flexible packaging with over \$2.5 billion in annual revenues. Previously, he held CEO and executive roles at BE Aerospace, TSI Group, Thermo Fisher Scientific, Praxair, and GE. He will start serving on the board on May 1.

AWARDS, HONORS, AND RECOGNITIONS

Tuler Named to U.S. Nuclear Waste Technical Review Board

Seth Tuler, associate professor in the Department of Integrative and Global Studies, was recently appointed to serve as a member of the U.S. Nuclear Waste Technical Review Board. The board is an independent federal agency that performs technical and scientific peer reviews of nuclear waste management and disposal activities in the United States. It also issues reports and recommendations to the U.S. Secretary of Energy and Congress regarding the U.S. Department of Energy's activities concerning high-level radioactive waste and spent nuclear fuel. Tuler has conducted research focused on the clean-up of sites in the U.S. nuclear weapons complex, nuclear waste management, and community climate change adaptation planning.

Minerals, Metals, and Materials Society Names Hyers as Fellow

Robert W. Hyers, the George I. Alden Chair in Engineering, professor and head of the Department of Mechanical and Materials Engineering, has been named to the 2025 class of fellows of The Minerals, Metals, and Materials Society (TMS), a professional organization with more than 11,000 members. The award, the highest honor given by TMS, recognizes members who are leading authorities and contributors to the practice of metallurgy, materials science, and technology. Honorees are noted for their scholarship, patents, research or engineering work, advances in their fields, and service to TMS. Hyers is one of seven TMS members named to the 2025 class of fellows.

Hoffman Appointed as CMCO

President Grace Wang has appointed **Bryce Hoffman** as the university's new vice president, chief marketing and communications officer. A seasoned professional, Hoffman brings over 19 years of experience in higher education marketing and communications and proven strengths in institutional branding, enrollment marketing, advancement communications, data-informed strategy, and creative development to his new role. He is responsible for all strategic marketing and communications efforts and will provide leadership and strategic direction to the division.

New Teaching Professors on Tenure Track

WPI has added five teaching professors to the university's pioneering tenure track that recognizes and rewards excellence in teaching: **Melissa Kagen**, assistant professor of teaching in the Interactive Media and Game Development Program; **Svetlana Nikitina**, professor of teaching in the Department of Humanities and Arts; **Raul Orduna Picon**, assistant professor of teaching in the Department of Chemistry and Biochemistry; **William Sanguinet**, assistant professor of teaching in the Department of Mathematical Sciences; and **Wilson Wong**, associate professor of teaching in the Department of Computer Science. Including these new appointments, a total of 48 teaching faculty members have been named to the innovative tenure track since 2021 and nine have been awarded tenure.

President Wang Receives Prestigious National Honor for Inventors

The National Academy of Inventors (NAI), an esteemed organization dedicated to recognizing and honoring academic innovation, has named President **Grace Wang** as an NAI Fellow. This distinction, the highest professional honor awarded exclusively to academic inventors, highlights her exceptional contributions to pioneering research and innovation. An accomplished materials scientist and esteemed leader in higher education, government, and industry, Wang holds seven U.S. patents. Her inventions have focused on materials, design, and manufacturing process improvements for magnetic recording media, such as hard disk drives.



SETH TULER



ROBERT HYERS



BRYCE HOFFMAN



GRACE WANG

NEW BOARD OF TRUSTEES MEMBERS ELECTED

Alumni Survey Confirms Value of Project-Based Learning

Data from a recent alumni survey prove that working on multiple hands-on projects throughout a college career equips students with valuable skills that contribute to their personal and professional success and resilience for years to come. The results provide further evidence to support WPI's unparalleled approach to project-based learning.

Responses from more than 2,200 alumni who graduated from WPI between 1980 and 2019 confirm that required experiential learning opportunities, whether completed on or off campus, prime students to develop the leadership, teamwork, communication, and problem-solving skills that are in high demand in today's workplaces, communities, and everyday life.

"WPI's transformative project-based learning model provides an experience that prepares students to work as a team, think critically, communicate, collaborate, see the world from different cultural perspectives, and be motivated to address problems that truly matter to society," says President **Grace Wang**. "Technological advances, in many ways, have elevated the importance of these skills. WPI's unique education equips students to be knowledge-ready, job-ready, and future career-ready."

Ninety-four percent of survey respondents said their formal project experience at WPI enhanced their ability to develop ideas. In addition, 93 percent said it enhanced their ability to effectively function on a team, and 88 percent said their projects contributed to the development of a stronger personal character.

"Projects give students experience dealing with ambiguity, learning how to

learn, and developing a sense of agency to handle open-ended challenging situations. In today's world, that may be the best thing higher ed can provide students," says **Kris Wobbe**, director of the Center for Project-Based Learning.

These benefits from project-based learning position students well for success in the current job market. According to the American Association of Colleges and Universities, employers today are looking to hire candidates who excel in skills such as teamwork, critical thinking, problem solving, ethical judgment, and applying knowledge in real-world settings.

These are exactly the skills that WPI alumni say they learned through the hands-on projects they participated in as undergraduate students. A full 95 percent of respondents said their project experience at WPI prepared them for their current career and nearly all respondents also reported feeling a sense of professional satisfaction.

Project-based learning has been woven into the fabric of WPI's curriculum since 1970. That's when the university's leaders threw out the traditional lecture-heavy curriculum and replaced it with a model, known as the WPI Plan, prioritizing active, hands-on learning.

While alumni in every demographic category reported personal and professional gains resulting from project-based learning, data show that women in particular benefit from WPI's approach: 87 percent of survey respondents who identify as women reported that project work helped them feel that their own ideas were valuable.

—Mia Lumsden

94%

Said their formal project experience enhanced their ability to develop ideas.



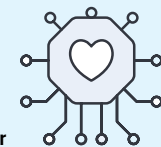
93%

Said project experience enhanced their ability to effectively function on a team.



88%

Said their projects contributed to the development of a stronger personal character.



87%

Of women reported that project work helped them feel that their own ideas were valuable.



LONG LINGO: TOO MUCH DIGITALIZATION THREATENS CREATIVITY

Elizabeth Long Lingo's fly-on-the-wall observations of people at work in the music studios of Nashville have yielded insights into leading innovation and the intricacies of negotiation in entrepreneurial settings. But there's another surprising lesson from Long Lingo's research in the rooms where music is made: Digital technologies designed to supercharge productivity can actually threaten creativity.

In a paper published in 2024 in the business and management journal *Administrative Science Quarterly*, Long Lingo and co-author Hille C. Bruns of Vrije Universiteit Amsterdam reported that digitalization and an explosion of data in two very different fields—music production and systems biology cancer research—posed a risk to the creativity of workers if not managed correctly.

"Digitalization has made it possible for music producers to record multiple versions of songs and for labs to rapidly screen thousands of biological samples," says Long Lingo, an associate professor in The Business School. "That wealth of data can positively impact creativity by inspiring new ideas that lead to novel outcomes. Yet managing the repetitive, detailed, and expertise-based work generated by digitalization can also drain workers' energy, harm their mental focus, and even hijack creativity."

The research offers an alternative view of digital technologies at a time when rapidly evolving artificial intelligence technologies are being marketed as low-cost tools with unlimited potential to generate and refine the creative work traditionally done by humans.

Long Lingo and Bruns, who met at a conference and recognized parallels in their research, based their findings on years of observation in workplaces where new technologies were changing the rhythm of creativity in both the arts and the sciences. Long Lingo spent seven years studying the music production industry as digital technologies expanded opportunities to record, isolate, and micro-edit music. Bruns spent a year and a half in U.S. systems biology labs at two universities and a pharmaceutical company as high-throughput technologies such as gene sequencing and

mass spectrometry enabled scientists to more precisely analyze bigger and bigger datasets in the hunt for answers about cancer.

As part of their research, Long Lingo and Bruns observed workers in the music industry, where the goal was to produce a hit song, and in labs, where the goal was to find health care solutions. They also conducted formal interviews and even tried their hands at the jobs they were observing. Long Lingo co-wrote and co-produced a song; Bruns shadowed scientists in their lab.

"In Nashville, it was clear that music production was evolving as digital technology was coming into play," Long Lingo says. "The technologies created opportunities, enabled new ways of doing things, and made some tasks easier. The technologies also created a lot of new work that people had not anticipated."

Long Lingo and Bruns discovered that across the arts and sciences, digital technologies amplified tedious work—repetitive, detail-oriented tasks requiring significant focus and expertise. While a certain level of tedious work was needed to achieve novel outcomes, they found too much could hijack creativity.

With so much time and energy spent on tedious tasks, the researchers found workers were at risk of wasting time, feeling disengaged, and experiencing information overload. To cope, leaders and workers would strategically "curb" the use of technology to meet deadlines and reduce tedious work. They also automated tasks, when possible, and practiced "sustaining" rituals such as focusing for blocks of time and taking breaks to reset. When overwhelmed by details, leaders and workers "zoomed out" to consider an entire song or modeling project and regain perspective.

Long Lingo says that although she had researched information overload and digitalization previously, she was surprised at the "cognitive, emotional, and physical exhaustion" that workers in creative fields were experiencing as digital technologies transformed their work.

—Lisa Eckelbecker



SMOOTHING THE PATH FROM COMMUNITY COLLEGE TO WPI



MANCHESTER
COMMUNITY COLLEGE



MIDDLESEX
COMMUNITY COLLEGE



QUINSIGAMOND
COMMUNITY COLLEGE



MOUNT WACHUSETT
COMMUNITY COLLEGE

Despite their best intentions, the overwhelming majority of community college students in the United States never transfer to a four-year school and complete their bachelor's degree. But WPI is working hard to improve those prospects for transfer students interested in STEM.

The university has developed a robust and holistic support system in recent years for students who transfer here, and new agreements with four community colleges in the region offer a seamless admission path to WPI for many New England students.

"Students who earn a bachelor's degree from WPI are in a good position to contribute to the local, national, and global economies, especially in STEM and business fields," says President **Grace Wang**. "By developing a strong network of support for transfer students, WPI is not only offering great opportunities to students but also helping to strengthen the regional economy for many years to come."

WPI's current undergraduate student body includes 211 students (just under 4 percent) who have transferred at some point during their college experience. An increasing number of those transfer students each year come from community colleges.

The memoranda of understanding that Wang signed earlier this year with community college presidents in Massachusetts and New Hampshire guarantee admission for students who have completed their associate's degree with at least a 3.3 GPA—and for those who have not yet completed their associate's degree but have a minimum 3.0 GPA—and have passed both a college-level laboratory science course and a college-level precalculus or calculus 1 course. Agreements are now in effect with Manchester Community College, Middlesex Community College, Mount Wachusett Community College, and Quinsigamond Community College.

But smoothing the admissions process is only one of many critical supports WPI offers students at these community colleges.

"There is now a dedicated group of people here at WPI who holistically are involved with the entire student life cycle for these transfer students—from the first day we make contact with them at the community colleges

all the way through to their graduating from WPI and getting a job," says **Arne Gericke**, interim dean of undergraduate studies.

Details Matter

One of the biggest considerations for students weighing any college transfer is always whether the new school will accept coursework from the other institution. WPI's recent agreements streamline the process, communicating clearly which previously completed credits will count toward WPI's graduation requirements.

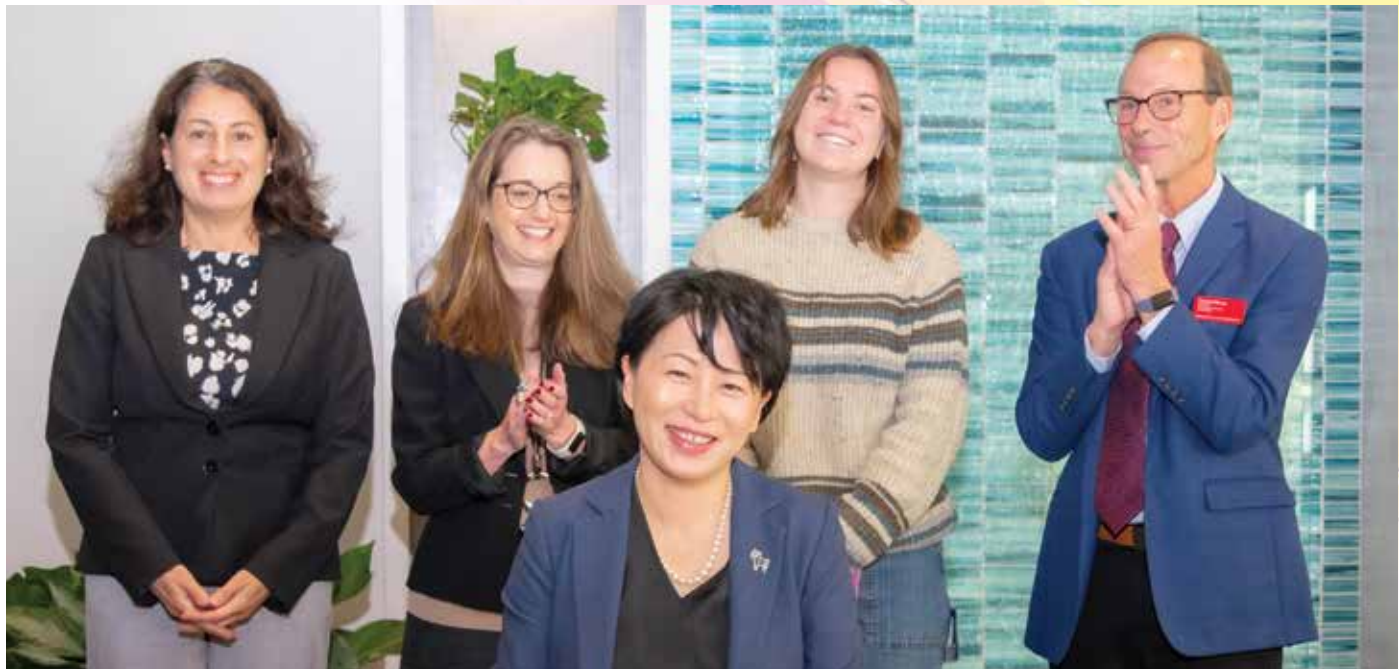
"That's important because—although course credits may transfer—they sometimes only count as electives rather than toward the student's major. This may result in longer times to complete a degree than necessary," Gericke says. "Our team collaborates with colleagues at partner institutions to create clearly defined transfer pathways for each major, ensuring that the maximum number of transferred courses count toward graduation."

WPI has developed additional supports that benefit all transfer students, not only those from the four partner community colleges. These include reserving spaces in some required classes and Interactive Qualifying Projects, since transfer students often learn that they have been accepted to WPI only after course registration ends for continuing students. The university also offers transfer students two summer course tuition waivers, which can help speed their path toward graduation.

In addition, WPI guarantees housing for all transfer students who want to live on campus and provides dedicated orientation sessions distinct from those for new first-year students. The idea is to help transfer students—many of whom are older or may work off campus, commute to Worcester, or are the first in their family to attend college—develop connections and a sense of community at WPI.

"For many of us at WPI, it's our aspiration to make education available and accessible to students from all walks of life and socioeconomic groups," says Gericke. "Of course this helps the university, and at the same time it's the right thing to do."

—Mia Lumsden



PRESIDENT GRACE WANG SIGNS THE OKANAGAN CHARTER, REPRESENTING WPI'S CONTINUED FOCUS ON CAMPUS WELL-BEING. STANDING FROM LEFT, DEAN OF THE GLOBAL SCHOOL MIMI SELLER, DIRECTOR OF THE CENTER FOR WELL-BEING PAULA FITZPATRICK, GRADUATE STUDENT BRYNNE MACWILLIAMS, AND DEAN OF STUDENT WELLNESS CHARLIE MORSE.

An Ongoing Commitment to the Well-being of People, Places, and the Planet

WPI recently adopted the Okanagan Charter, formally joining an international cohort of health-promoting universities and colleges that pledge to center on the sustainable well-being of people, places, and the planet. Adopting the charter represents WPI's continuing focus on campus well-being and its ongoing work both internally and externally to promote holistic wellness.

"WPI is proud to adopt the Okanagan Charter and recognizes that an individual's well-being is critically connected with their communities and environments," says President **Grace Wang**. "Adopting the Charter reflects holistically our long-held commitment to prioritizing health, well-being, and belonging, and supporting the mental, physical, emotional, and environmental health of our campus community. The Charter also aligns with WPI's Campus Framework plan that emphasizes accessibility, placemaking, and environmental sustainability."

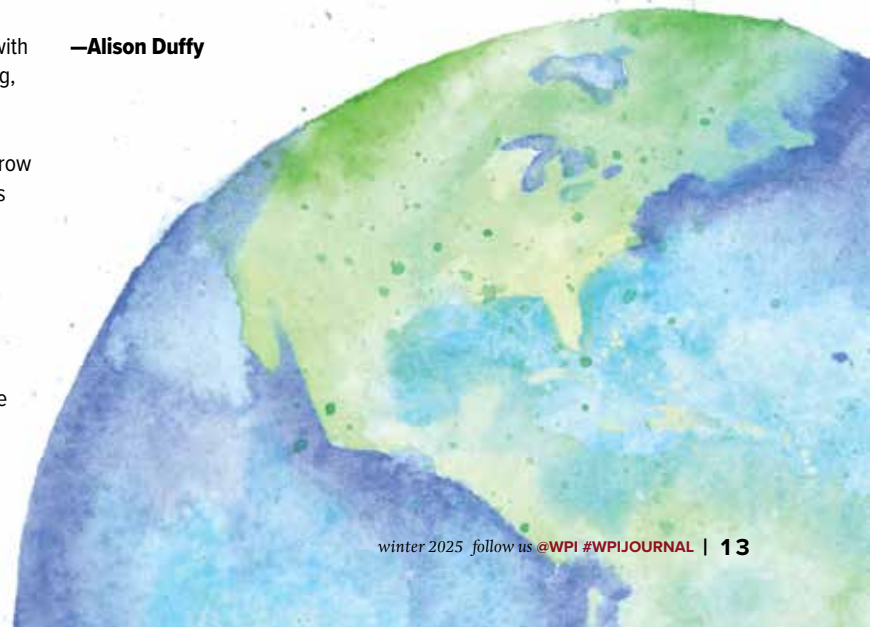
"WPI has long taken a holistic approach, providing an education and environment that not only gives students, faculty, and staff the space to grow and find their passion, but also to develop the skills needed to help others and solve some of the world's greatest challenges," says **Charlie Morse**, Dean of Student Wellness. "WPI formally recognizes the essential interdependence between people, places, and the planet in elevating community health and well-being on the campus and in its environs, both now and into the future."

In adopting the Charter, WPI joins the US Health Promoting Campus Network, which includes more than 180 participating campuses across the

United States. Rather than providing directives or templates, the Okanagan Charter offers an aspirational framework to encourage comprehensive and campuswide systems and settings approaches to create cultures of compassion, well-being, and equity. Each campus then develops its own strategic plan for how it lives out and implements health promotion.

According to the Okanagan Charter, "Health-promoting universities and colleges transform the health and sustainability of our current and future societies, strengthen communities, and contribute to the well-being of people, places, and the planet."

—Alison Duffy





SANFORD RILEY HALL, SHOWN HERE WHEN IT OPENED IN 1927, WAS NAMED FOR R. SANFORD RILEY, CLASS OF 1896, TO HONOR HIS SUPPORT FOR THE INSTITUTE.

THE ARCHIVIST

A HOME ON THE HILL: WPI'S FIRST RESIDENCE HALL OPENS

Founded to support Worcester's local population and industry, WPI quickly expanded its enrollment base as the importance and value of its unique educational model gained popularity. Students came to campus from out of state and other countries to learn the most modern scientific and engineering principles.

Those arriving from afar rented rooms from local families, joined fraternities that had limited housing, or found lodging in area boarding houses with the assistance of the WPI YMCA chapter. As the school continued to grow, campus administrators realized that the issue of student housing would become a barrier to growth.

On Feb. 16, 1926, the front page of *Tech News* reported that the Board of Trustees had approved the construction of a new dormitory; \$250,000 (now about \$4 million adjusted for inflation) was budgeted for the project. Groundbreaking was scheduled to begin that May on the southern side of campus. The building, which would house

115 students and feature a common room for socialization and laundry facilities, would serve as the border of the Quadrangle.

The trustees announced at the groundbreaking that the new dormitory would be named in honor of R. Sanford Riley, Class of 1896, to honor his contributions and continued support of the Institute. Riley came to WPI after working for the railroad industry in his native Canada. He married Katherine Higgins and lived for a brief time in Higgins House with his in-law family.

The new dorm quickly became the social hub of campus, as students would gather to listen to the two Atwater Kent radios. In October 1927, Hughie Connor and the Hotel Bancroft Orchestra performed for more than 200 students and guests after a meal in the new dining facility.

The dormitory quickly helped foster the close friendships and increase the general college spirit the trustees and alumni hoped the new dorm would provide. Today, Sanford Riley still houses students, in addition to WPI's Little Theatre and Riley Commons, which continue to provide a haven of comfort and fellowship for the WPI community.

—Arthur Carlson

Editor's Note: In November 2024, *University Archivist* (and popular WPI Journal columnist) Arthur Carlson left WPI to take on a new professional adventure in Florida. We wished him well and invited him to offer a final message to WPI Journal readers.

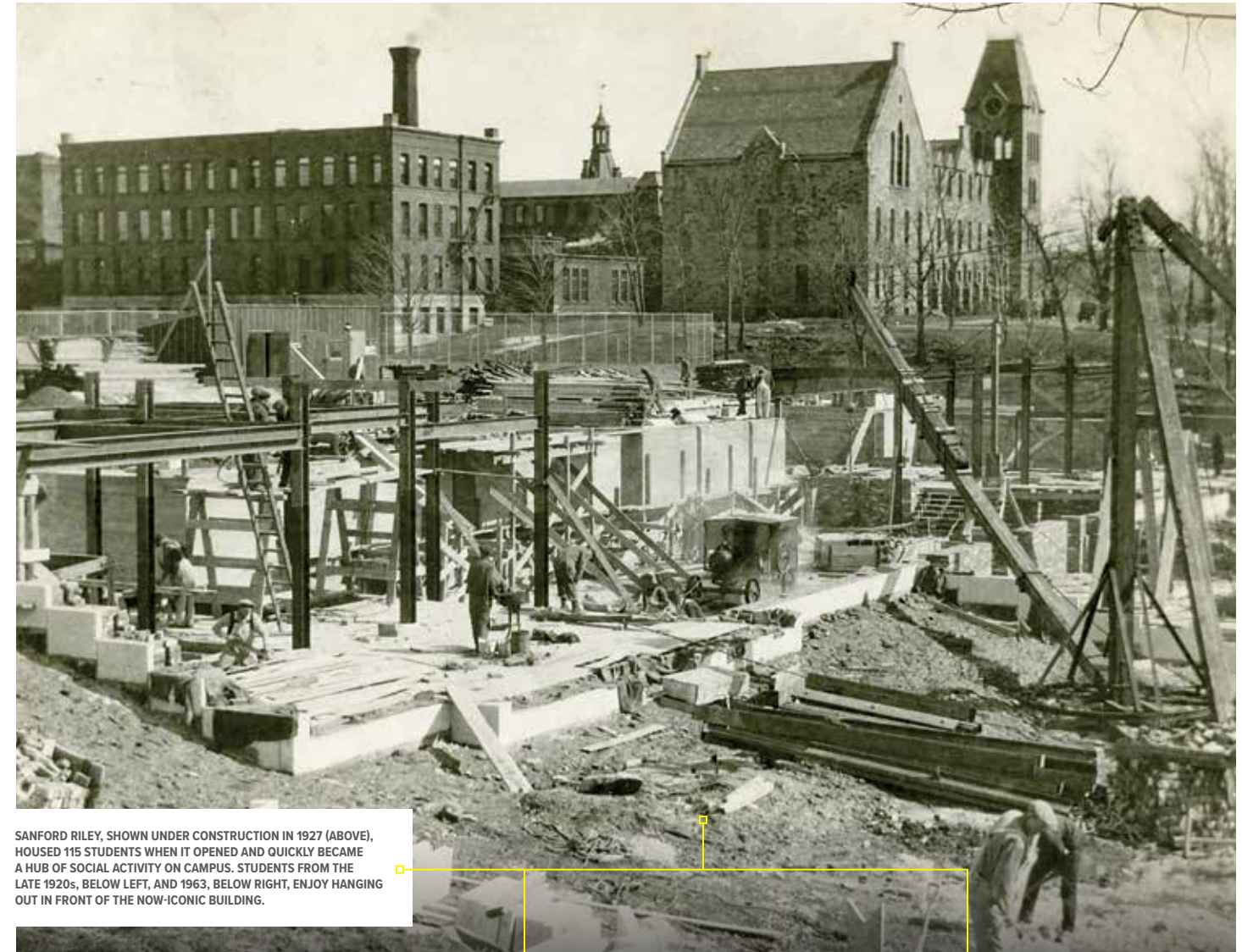
FAREWELL AND THANK YOU!

When I arrived in New England from North Carolina almost seven years ago, I could not find the entrance of my driveway owing to more snow than I had ever seen in my entire life. I aimed for a clearing between the trees and hoped for the best. Thankfully the trailer burst through the snowbank and so began my new life in a place that has become special to me, like it has for generations of our WPI community for more than 150 years.

In that time, I have had the great fortune to not only support our students, faculty, and staff here on campus, but also to travel around the country and across the ocean to help share the rich culture and academic resources that support our unique educational model. Our shared efforts have transformed learning opportunities and fostered a more inclusive institutional memory.

I have never felt more welcome at any job and the sorrow I feel at leaving is necessary to balance all the wonder and joy I experienced. I'll spend the remainder of my days cheering on WPI and passing forward the important knowledge of how to properly pronounce Worcester. The heart of Massachusetts will always be in mine. Farewell and thank you!

—Arthur Carlson



SANFORD RILEY, SHOWN UNDER CONSTRUCTION IN 1927 (ABOVE), HOUSED 115 STUDENTS WHEN IT OPENED AND QUICKLY BECAME A HUB OF SOCIAL ACTIVITY ON CAMPUS. STUDENTS FROM THE LATE 1920s, BELOW LEFT, AND 1963, BELOW RIGHT, ENJOY HANGING OUT IN FRONT OF THE NOW-ICONIC BUILDING.





CULTURAL BUDDY SYSTEM CONNECTS STUDENTS IN TAIWAN

Located 100 miles from China’s coast, Taiwan has a history that is multi-layered. With a wave of Chinese migration in the 1600s, a 50-year Japanese colonial period, and migration from China in the 1940s, Taiwan is home to many customs from all over China. The island is also home to 16 Austronesian indigenous groups, each with their own language and cultural practices. In other words, the island is a lively mix of foods, languages, and customs.

Taiwan is also a center for biotech, clean energy, ecotourism, and more. The combination makes it ideal for a WPI project center, where students tackle Interactive Qualifying Projects connecting society and technology. And with Mandarin Chinese the official language, Taiwan serves students studying Chinese for their Humanities and Arts Requirement and the increasing number of Chinese Studies minors.

When **Wen-Hua Du** and **Jennifer Rudolph** (both of the Department of Humanities and Arts) established a project center there in 2019, locating it primarily in Taipei, they wanted to offer great projects and great cultural experiences, whether or not students studied Chinese. They developed a cultural buddy program in partnership with Soochow University; each WPI student is paired with a Soochow student based on mutual interests. With contact between the buddies beginning the term before travel, students already have a cultural exchange partner and potential friend upon arrival.

Much to Du and Rudolph’s delight, the system works. “Students told me they were overwhelmed by the friendly environment,” says Du, who hails from Taiwan. “People in Taiwan are very willing to help. They’re always willing to go the extra mile.”

Going the extra mile is literally what happened when computer science major and cycling enthusiast **Tim Stecko ’24** met Simon, his Soochow cultural buddy.

“Simon introduced me to his friends on a cycling team, and we went on a nighttime bike ride to the top of a nearby mountain and looked over the skyline,” says Stecko. Laughing, he adds, “They all had fancy racing bikes, and I had one of the city rental bikes, like the Bluebikes you see in Boston.”

Together Stecko and Simon explored Taipei’s vibrant night markets and street food vendors. They sometimes ate lunch with Simon’s friends.



The prospect of having a rich cultural experience was a priority for Stecko when considering where to do his IQP. Because he’d traveled to China during high school and minored in Chinese Studies at WPI, he was eager to go somewhere he could practice his Mandarin and participate in life outside the project center.

Starting in spring 2025, WPI students will also have the opportunity to participate in an HUA project center in Taiwan. It’s the only one of the five off-campus HUA centers offering back-to-back IQP and HUA experiences in the same location, providing students with a longer in-country experience.

“If students want to stay for the HUA center after they complete their D-Term IQP, they can,” says Rudolph. “This allows our students, whether or not they are studying Chinese, to engage in the culture and society at a much deeper level.” The Taiwan HUA center is open to all students, not just those conducting their IQPs in Taiwan. No knowledge of Chinese is necessary; the only requirements are enthusiasm and curiosity.

Strong cultural exchanges are reciprocal, so Du and Rudolph were eager to help when they learned that Soochow University wanted to adapt WPI’s project-based learning model to help undergraduate students connect to each other and be more prepared for the future.

In 2024, Rudolph advised a team of Soochow students and their faculty advisor who spent the month of July at WPI interviewing faculty, staff, and students to learn about the Great Problems Seminar. “It was a mini IQP,” she says, “and the first time the Soochow students had experienced project-based learning.”

A few WPI students who spent D-Term 2024 or D-Term 2023 in Taiwan connected with the visiting Soochow students to serve as cultural buddies. And when the Soochow students presented their findings, WPI students brought gifts and cheered them on.

“Even though this might be a very small thing, it’s very Taiwanese,” says Du. Gift giving is a part of the culture. WPI’s students reciprocating the custom showed they had developed cultural awareness.

—Mia Lumsden

WINTER CLIMATE ADAPTATION IN WORCESTER

THE STUDENTS: Muhammad Hassan Dajana and Camila Gomez Gutierrez, candidates for MS in Community Climate Adaptation

THE ADVISORS: Associate Professor of Teaching Stephen McCauley and Professor Sarah Strauss, The Global School

STUDY OVERVIEW

The study explored the impacts of climate change on Worcester during the winter season, focusing on the vulnerability of critical infrastructure and populations. The City of Worcester identified winter/ice storms as one of the climate hazards that the city needs to prepare for to increase its resiliency. Anticipated winter climate change risks include winter flooding, freezing rain, and shifting precipitation patterns from snow to rain. Vulnerabilities identified are disruptions to internet connectivity, school closures, and overflowed drainage systems. At-risk populations include the elderly, homeless, disabled, and non-English speaking residents.

METHODOLOGY

Dajana and Gomez Gutierrez incorporated archival research on winter storms that the city has experienced. They also surveyed 565 City residents on their perceptions of winter storms and conducted 38 semi-structured interviews with other stakeholders, including city officials, National Grid representatives, climate experts, representatives from community organizations and residents. This research was conducted in collaboration with the City of Worcester’s Department of Sustainability and Resilience.

RECOMMENDATIONS

Infrastructure:

- Review the stormwater and combined sewer systems to manage the expected increased winter rainfall.
- Investigate incorporating permeable surfaces in areas prone to flooding.
- Evaluate incorporating bioretention systems for stormwater flooding.
- Assess the incorporation of eco-friendly de-icing agents.
- Determine the possibility of implementing permeable pavement design in future infrastructure projects.
- Consider employing roadway materials that can support rapid temperature fluctuations.
- Evaluate expanding broadband internet options.
- Explore the feasibility of having a backup satellite internet service.
- Conduct a cost-benefit analysis of targeted modernizations in areas at high risk.
- Select tree species that are resistant to ice and heavy snow.
- Continue existing coordination on tree trimming with National Grid.

Social Vulnerabilities:

- Make multilingual emergency information for winter storms more accessible.
- Update the Emergency Communications website for disaster preparedness.
- Develop and implement education programs on emergency preparedness before, during, and after winter storms.
- Build partnerships with college campuses and organizations to increase the number of available volunteers.
- Leverage multi-channel communication strategies to share services.
- Expand warming centers.
- Evaluate students’ food insecurity and partner with community organizations for short-term relief during extended closures.
- Partner with local day care centers for temporary childcare.

CONCLUSION

Worcester has the knowledge, plan, and commitment needed to adapt to the challenges of a changing winter climate. By transforming its strategies into action, the city can emerge as a leader in climate resilience among mid-sized U.S. cities, ensuring its residents a safer, more sustainable future.

PROJECTS

See how WPI students put theory into practice through projects.

INSIDER

PHOTO BY MATTHEW BURGOS

In Search of Potable Water on Mars

LYDIA ELLEN TONANI-PENHA '23, MS '25, HOPES TO TAKE THE FICTION OUT OF SCIENCE FICTION.

Extracting drinkable water from the subsurface of Mars may seem like an audacious quest, one more suited to science fiction than reality. But that's the very real challenge PhD student **Lydia Ellen Tonani-Penha** will be tackling for the next four years as a NASA Space Technology Graduate Research Opportunity fellow, hoping to solve a critical issue for future Mars explorers.

"This will be a taste of my dream job—to work at NASA," Tonani-Penha says. As part of the program, she'll be paired with NASA research collaborators each summer, contributing to their lab groups' experiments and using their equipment. For at least the first summer, she'll be heading to the Jet Propulsion Laboratory in California, and she looks forward to connecting with its director, former WPI president Laurie Leshin.

Her interest in purifying water on Mars was born out of an environmental disaster she experienced as a teenager, an obsession with science fiction—"The Martian," in particular—and an intrinsic need to understand how things work. And while her stellar academic journey hasn't been completely easy, the first-generation college student and self-described nerd is excited to embark on her next ambitious adventure.

A Traumatic Start

Tonani-Penha was just 13 years old and living in Linhares, Brazil, when the Samarco Mariana Mining Complex dam burst, sending 43 million tons of toxic waste down the Doce River, an environmental disaster that killed 19 people and dumped mercury, lead, and other chemicals into the drinking water. Although her coastal town at the mouth of the river had other nearby water sources, she was dismayed at the suffering of others living farther up the river who had no alternatives, as well as the lack of urgency to fix the problem.

"I didn't see people trying to clean the water, which made me angry. So I said to myself, 'You know what, let me try to do it.'" Tapping into an abundance of youthful energy, curiosity, and imagination, and with the enthusiastic support of her parents and her high school physics teacher, she proposed a surprisingly effective solution, surmising that running electricity through the water—a process she now knows is called electrokinetic dewatering—would make metal bond around an anode, "creating a nasty clump of mud and metal."

The prototype, which filtered 90 percent of the metal from her river water samples, won multiple awards at international science fairs. She graduated from her Brazilian high school at age 16 and prepared to continue her promising academic journey—until her family moved back to the United States and she encountered a daunting roadblock.

"I didn't know about FAFSA, or the Common App, or anything like that," she says. "When I started applying to U.S. colleges, I got a lot of rejections. My application wasn't the sharpest because I didn't know how it worked. I was just winging it."

An educational advisor recommended she study at a community college for a year or two and transfer to a four-year college. "I didn't even know about U.S. community colleges. My advisor said, 'There is

another door. Take it.'" She studied for a year at MassBay Community College, where she served as president of the engineering club and boosted her GPA (and, as an added bonus, even met her now-husband) and then transferred to WPI in the fall of 2020 as a sophomore.

IQP at Thrive

Despite early pandemic restrictions, Tonani-Penha quickly found her stride as an undergraduate, serving as a senior fellow at the SWEET (Supporting WPI through Effective and Equitable Teamwork) Center. In graduate school, she served as communications director in the Central Massachusetts chapter of the Association of Women in Science and joined the Women in STEM Book Club, among many other activities.

Her Interactive Qualifying Project team created an inclusive plan for the Thrive Support & Advocacy food pantry that serves youths and adults with intellectual and developmental disabilities and their families in Central Massachusetts. In addition to recommending possible diets for different populations—including those with food allergies and dietary restrictions—the plan also showed respect for diverse cultural cuisines. When the food pantry at Thrive officially opened in 2022, she and her teammates were able to see some of their recommendations come to life, including the installation of an ADA-compliant ramp.

For her master's thesis, she worked with advisor **Robert W. Hyers**, the George I. Alden Chair in Engineering, professor and head of the Department of Mechanical and Materials Engineering, to model electromagnetic levitation experiments conducted on the International Space Station to improve the accuracy of thermal conductivity measurements. The experiments used electromagnetic fields to levitate and heat a metallic sphere in reduced gravity to measure the sample's thermophysical properties.

The NASA Space Technology Graduate Research Opportunity fellowship required Tonani-Penha to focus on her own original research, so she shifted her focus back to the Martian water purification "proof of concept" she completed for her Major Qualifying Project. Her idea is to convert subsurface Martian ice, or frozen brine, into potable water using freeze crystallization. "In every one of our experiments, we reduced the concentration of brine. It was a very simple prototype, but it showed it had promise." Freezing, rather than distilling, requires less energy, and the technique is already used for purification in other industries—for instance, it's called "progressive freeze concentration" in the food industry and "layer melt separation" in metal product manufacturing.

With the tangible goal of allowing real-life astronauts to live on Mars (rather than just fictional astronauts like Matt Damon), Tonani-Penha is excited to be exploring the red planet.

"I think we could learn a lot more about our planet if we study Mars. We can see what went right with our planet that didn't happen with Mars or what changed along the way because the geological history is there," she says. "Mars tells a story. We should see what that story is."

—Kristen O'Reilly

ELIZABETH LONG LINGO
ASSOCIATE PROFESSOR, THE BUSINESS SCHOOL

MONKEY/PUZZLE PIECE
These are props from a group creativity exercise where we explore this fundamental question: How do you approach creative problem solving—as a given puzzle to be solved or an emergent process to be navigated?

HARMONICA
I spent years immersed in Nashville's music industry, studying how music producers negotiated and facilitated collective creativity in high-ambiguity contexts. I tried my hand at playing cowbell and harmonica on a songwriter's demo record.

WHEEL
I help managers and students take a broad view of creativity that goes well beyond the arts. This wheel is from a creative practice workshop where we rebuilt and customized bicycles for local kids.

BUTTON
I was co-principal investigator on two National Science Foundation ADVANCE grants exploring the lived experience of faculty in navigating promotion systems and the potentially transformative role of department heads in fostering innovation among all faculty.

PAPERS
My research has been published in top-tier academic and executive-oriented journals. In a recent one, co-author Hille C. Bruns and I find that digital technologies designed to supercharge productivity can threaten creativity and innovation.

PHOTO BY JAMES CASEY



ROCK
I found this rock shard with my brother, a geologist, near the Black Hills of South Dakota. The plain exterior hiding the crystal beneath is a reminder of the hidden gems that await when we bring mindfulness and curiosity to our leadership and work.

FACULTY SNAPSHOT

Get to know faculty through items they have in their offices.



PHOTO BY MATTHEW BURGOS

Q&A with **Erica Brozovsky**, assistant teaching professor in the Department of Humanities and Arts, on exploring language, linguistics, and the backstory of common tech words.

A lot of us fly through our lives not thinking about words and how we say them and what that says about us. Why did you decide to research and teach about these topics?

I've always been a big fan of words and language in general—I was a voracious reader as a child and still enjoy reading in my limited free time. I was a linguistics major in college, and it gave me a way to explain and understand the differences in the way people talk. When the opportunity came to go to grad school, I jumped on it. In my experience, the best way to learn something thoroughly is through teaching it. Students will ask questions that make you, as the instructor, really think critically and that will challenge your views or interpretations, and it's such a fun and intellectually engaging way to get deeper. I'm also really excited about language and linguistics and want to share that with everyone.

Can you tell us about the backstory on some common tech terms? For instance, where did the term *browser* and phrase *surfing the web* come from?

The word *browser* in the computational internet context goes back to the 1960s, which seems pretty early, given that the first actual web browser wasn't created until 1990. The internet was around at that time, just not accessible to the general public. But the term itself originated as an acronym. It stands for "BRowsing On-Line With SElective Retrieval."

Surfing dates back to the early '90s. It's usually attributed to librarian Jean Armour Polly, who wrote an article in 1992 for fellow librarians explaining the internet and how to use it—she wanted a pithy metaphor for the fun and chaos of navigating the online world. As it turns out, her mouse pad happened to have a surfer with the words "information surfer" on it. It sparked an idea, and *surfing the internet* was born. Around the same time, a comic book called *The Adventures of Captain Internet and CERF Boy* came out. CERF is an acronym for the California Education and Research Federation. Captain Internet and her sidekick CERF Boy surfed around, on an actual surfboard, answering internet cries for help.

How did deceptive online attacks come to be known as *phishing*?

Phishing with a 'ph' is allegedly based on the homophone *fish*ing. Think: trawling for sensitive information from a sea of internet users.

It's attributed to hacker Khan C. Smith sometime in the mid-1990s. The 'ph' is a nod to *phreaking*, which was a way of hacking telephones to avoid paying long-distance phone charges.

How about *spam*?

Spam is one of those annoying, ubiquitous parts of internet life. The word comes from an iconic *Monty Python's Flying Circus* sketch where a horde of Vikings enters a café, and they repeat the menu item "Spam" over and over, drowning out any other sound in the café, much like spam pops up in our inboxes.

How do you incorporate sociolinguistic concepts—and your research experience—into the writing and rhetoric courses you teach?

I think it's impossible for any instructor not to include their pet interests and research areas in their teaching. When I come up with off-the-cuff examples, they're based on what I know and what I am interested in. Also, a lot of effective research lies in observing, so I like to let my students do a lot of the talking and we, as a class, get to analyze what comes next.

Specifically, in my courses at WPI, I'm focused on letting the students' voices come through in their writing, which is a very descriptivist choice (as opposed to prescriptivism, where there's one right way to do something). I need to make sure they know the so-called rules or standards per se when it comes to formal academic writing, but I also encourage them to speak from their own experience and worldview, because it's unique. I don't want to read the same essay written the same way 20 times. I want 20 unique essays that only each of those specific students could have written.

Also, once you learn the rules, you get to break them. That's paraphrasing Picasso. He actually said something like, "Learn the rules like a pro, so you can break them like an artist."

To hear more about Brozovsky's research and teaching, listen to an extended version of this conversation, available at www.wpi.edu/listen. Brozovsky also hosts the PBS web series Otherwords.

—Jonathan Cain

FLAME OUT

Students in the Fire Protection Engineering Department's undergraduate course Fire Laboratory, taught by Assistant Professor James Urban, set fire to miniature model wildland urban interface communities to understand how wildfires spread when the flames enter populated areas.

The class, which is focused on the fundamentals of fire behavior measurement and research testing, requires four teams of five students to develop and perform experiments that study these damaging fires. Their design involves running multiple tests using a wind tunnel and a burn table to see the variability of wildfire spread under changing scenarios.

The students used cardboard and paper to build miniature trees and scale models of houses—some with heat-resistant tape on them—and used twigs, sand, and soil to create their environments, which they set ablaze for their experiments.

Research into wildland urban interface fires has gained added importance after an increase in unprecedented and devastating fires, such as those in Los Angeles in January 2025, and in Lahaina, Hawaii, in 2023.

PHOTO BY MATTHEW BURGOS



BREAKING NEW GROUND FOR WOMEN'S HEALTH

WITH OPAL THERAPEUTICS, MORGAN STANTON, PHD '14, ACCELERATES THE DEVELOPMENT OF NEW TREATMENTS FOR GYNECOLOGICAL DISEASES AND DISORDERS.

BY AMY CRAWFORD

PHOTOGRAPHY BY JIM GENSHEIMER

he working days of any tech company founder are guaranteed to be busy and unpredictable. But even by the standards of the San Francisco Bay Area’s dynamic start-up scene, **Morgan Stanton’s** routine is a bit unusual.

Stanton, PhD ’14, is the CEO of Opal Therapeutics, a biotechnology company pioneering a new approach to women’s reproductive health. Despite a flood of recent advances in biotech, this field is understudied and underfunded, and Stanton has had to get creative to find the biological materials she needs to perfect and prove her groundbreaking technology.

“There are very few biobanks that exist of female tissue,” she explains. While biotechnology researchers can order samples of many different human tissues, provided by donors and shipped around the country, the myriad cells found in the human uterus are frustratingly hard to come by. “We do collect surgical samples—I work with some clinics that actually ship me tissue patients have donated,” she says. “But I also collect menstrual effluent from women in the Bay Area that contains many cell types we can use.”

It’s an intimate request, but Stanton has found that many women are eager to volunteer if it means advancing research that could one day impact their own health, or that of their friends, mothers, sisters, and daughters. And the method she developed for collecting the samples makes it easy for them to do so—even if it has Stanton herself rushing around San Francisco to pick them up while they’re fresh.

“We’ve made a little kit,” she says. “It includes a menstrual cup made of silicone, some instructions, and then collection tubes, a little cooler, and an ice pack. When a woman has her period, she can use a menstrual cup and then transfer it to one of these sterile tubes—and I’m the courier service. I take it to the lab and separate out the cells we want.”

Bold, unusual, and elegant in its simplicity, the solution is also characteristic of Stanton, who brought the same unconventional problem solving to her investigations as a graduate student at WPI, as a postdoctoral researcher in Germany, and in the fast-paced world of Bay Area biotech. Her innovative approach and unique way of

looking at the world are now aimed at a healthcare revolution—one that stands to benefit half the human population.

A QUEST FOR BETTER TREATMENTS

Officially launched in September 2023, Opal Therapeutics’s main offering is what Stanton calls “a uterus in a dish,” an *in vitro* model of the womb integrated with artificial intelligence analysis, which can accelerate the discovery and development of new drugs targeting gynecological diseases and disorders, such as uterine fibroids and endometriosis. These conditions, which can be very painful and may make it difficult for women to bear children, are now often treated with surgery. Opal Therapeutics aims to make it easier to develop more effective and less invasive treatments.

“Right now, people do drug testing in rodents, and guess what ... rodents don’t have a menstrual cycle,” Stanton says. “I won’t go into the details, because it can get kind of gross, but to think that a drug tested in a mouse’s uterus is going to translate perfectly to a woman in the clinic is just crazy.”

Indeed, rodents are an imperfect substitute for humans in general, and in recent years scientists in search of better options have made great strides in creating so-called “organoids” to serve as models of everything from the intestines to the brain. These miniature three-dimensional organs, which are created by culturing human cells and growing them in a bioreactor, are used in basic research to better understand developmental processes, and they also prove to be superior models for testing new drugs. Opal’s microscopic uterine organoids, which the company grows by the tens of thousands, can be used to screen many different compounds at once. They can even be personalized to individual patients to account for variabilities among women.

“There hasn’t been a lot of innovation in women’s health,” Stanton says. “And drugs that are developed have a 90 percent fail



OPAL THERAPEUTICS, FOUNDED BY MORGAN STANTON, PHD ’14, OFFERS RESEARCHERS A “UTERUS IN A DISH,” AN *IN VITRO* MODEL OF THE WOMB, TO MAKE IT EASIER TO DEVELOP MORE EFFECTIVE AND LESS INVASIVE TREATMENTS FOR COMMON GYNECOLOGICAL DISEASES.

rate when they get to patients. We want to try to reduce that by starting at the research and development level.”

Opal got a vital boost when it was selected for the Fall 2024 cohort of the Techstars Accelerator program in downtown San Francisco. Participation in the three-month session comes with a sizable investment, hands-on mentorship, shared office space, and access to a wide network of other entrepreneurs. It’s been an intensive learning experience, and that puts Stanton right in her comfort zone.

“The other founders are in very different fields—health tech, but also gaming and finance—but we can riff on ideas with each other,” she says. “I feel like I’m an eternal student, so I love hearing about what they’re building and the challenges they’re solving.”

Stanton, whose PhD is in chemistry, arrived with a strong hard-science background. But Techstars has helped her brush up on the business side of entrepreneurship. “I had never taken a business course before,” she says, “so coming into this I was a bit nervous about how to translate my research into a business proposal and plan. Techstars has really helped me to accelerate that process, and

to improve sales outreach and my value add as the company grows. It’s been a game changer.”

A MULTIDISCIPLINARY APPROACH

While she may not have taken business courses here, Stanton’s interest in entrepreneurship dates to her time at WPI. But her affection for WPI itself, like her love of chemistry, goes even further back. Although her family’s finances may have dictated that she attend the public in-state college (University of New Hampshire) at the undergraduate level, Stanton fulfilled a long-standing ambition when she enrolled in a PhD program at WPI immediately after earning her bachelor’s degree. It turned out to be an ideal place to pursue her passion for research.

“The chemistry department is very intimate, and I really enjoyed that quite a bit,” she recalls. “I had a lot of freedom. We were a small team, but I got to interact with the whole department all the time. Everyone’s door was always open. I could walk down the hall to a different lab. The biology department was above us, bioengineering

There hasn't been a lot of innovation in women's health. And drugs that are developed have a 90 percent fail rate when they get to patients. We want to try to reduce that by starting at the research and development level. —Morgan Stanton

was on the third floor, and I would go in between. My research now is a lot of the same thing—a combination of chemistry, tissue engineering, molecular biology. So I think having that experience of multidisciplinary work definitely shaped my approach to the complicated problems we're trying to solve at Opal. One discipline isn't going to cut it."

Stanton's eagerness to collaborate, as well as her dedication to asking and answering tough questions, stood out to her advisors.

"She was certainly one of the best graduate students I ever had," says Professor **Christopher Lambert**. "She's a true scientist." With Lambert, Stanton was working on a project to create superhydrophobic surfaces—that is, surfaces that are extremely resistant to water. At the same time, they were growing mammalian cells for another experiment, and Stanton got to wondering what would happen if the two projects were combined. What if they grew the cells on a superhydrophobic surface?

Lambert was dubious, but he said she could give it a try.

"And the cells did grow, in an entirely different way," he says.

When cultured in the lab on a typical medium, fibroblasts—the cells that build and maintain connective tissue—become round rather than long and spindly, as they appear in the body. When grown on a superhydrophobic surface, however, they take on their normal shape. It was a discovery with implications for medical research, and it led to published papers and a grant from the Department of Defense.

"This was entirely driven by Morgan," Lambert says. "I expect great things from her—well, she's already doing great things."

Stanton began exploring start-ups at WPI, where she participated in pitch competitions based on her surface chemistry work. While nothing came of those ideas, her interest stuck with her through her postdoctoral work in Germany, and in 2018 she moved to San Francisco to work at the biotech start-up VitroLabs, Inc.

"I was their second employee," she remembers. "I just had fun. It was such a good time! And then I moved on to another, and although I really enjoyed that work environment, it was always in the back of my mind to start my own."

In 2023, Stanton was working as director of discovery biology at Herophilus, a company working on neurotherapeutics via brain organoids, when the company was acquired by the biotech titan Genentech. The moment suddenly seemed right to take a leap.

"I was like, what else is holding me back? Why not now?" she remembers.

MAKING THE PITCH

Stanton built Opal Therapeutics from experience gained over five years at VitroLabs and Herophilus, and on research skills she honed at WPI. But she also brought to it a sense of purpose derived from personal experience.

In Germany, Stanton was diagnosed with uterine fibroids, noncancerous growths that can cause pain and complications, including anemia and infertility. As common as uterine fibroids are, many women have difficulty getting the condition diagnosed and treated. For Stanton, it was a five-year saga before she ever entered an operating room.

"The surgery went fine," she says. "I had a great surgeon, and the fibroids haven't come back, but it caused complications with my pregnancy. And then there's always the possibility they *could* come back, and no one knows why. That lack of insight—and the fact that no one wanted to find out why—always bothered me."

The lack of progress when it came to women's health—contrasted with the flourishing of innovation in other segments of biotech—convinced Stanton that there was a market for a new approach.

"Medical research mostly has had male leaders, and male health has been top of mind," she says, bluntly. "Fifty years, and it's been the same. People just get used to the status quo. But we need to break out of that cycle and get a fresh start in industry. Oncology doesn't have this issue. Neurobiology doesn't have this issue. So why are we keeping women's health in the past? It too needs to modernize. And, meanwhile, the patient population is there and there's money to be made."

That's part of the case Stanton has been making to early investors—venture capitalists, or "VCs" in the lingo of the industry, who are mostly men.

"One part of my pitch that I think other founders don't have to worry about quite so much is education," she remarks. "Everyone knows what Alzheimer's is. But even with increased public awareness, many people don't know what endometriosis is, or uterine fibroids. That means I have to go into detail, explaining how these conditions impact women's lives. So that's always a bit of education for the VCs."

But simply raising awareness is not enough—Stanton also has to convince her audiences that her start-up offers a sure path to profitable drug development. For that, she relies on her own experience in the industry, and on the proven concept that underlies Opal Therapeutics.



"We're not just starting with some kind of vague research idea, this is a specific path we can follow over five years to make sure patients get therapeutics," she explains. "This idea has been done before in other areas, even if I am breaking new ground for women's health."

Stanton's clear-eyed vision has already convinced many in the Bay Area biotech scene, including Alexia Krispin, a strategic advisor at the entrepreneurship hub Berkeley SkyDeck, who joined Opal's board of advisors.

"She had clearly thought through not just the science, but how to build a company that could translate that science into real-world impact," says Krispin. "This isn't just incremental innovation—it's a transformative approach to studying women's health conditions in ways that weren't previously possible."

FULFILLING FROM THE GROUND UP

Stanton's stint at Techstars ended in December, and she was looking forward to a well-earned vacation. With January would come the

JP Morgan Healthcare Conference, a massive convention that would bring biotech companies, pharmaceutical corporations, and investors from around the world to San Francisco. It would be a chance to forge relationships across the industry, and to position Opal for growth in 2025.

Before that big event, though, Stanton took a little time to reflect. What sort of advice would she give a younger version of herself, perhaps a graduate student working in a lab at WPI, who dreamed of creating a company that could change people's lives?

"Go for it!" she says. "It is scary, but I found this whole past year so rewarding. It's really fulfilling to work on your own project, to build from the ground up—and knowing that my work, one day, will be helping people. I'm proud of what we did so far, and even if all I can say is that I've helped women in the field, or I've helped female scientists, I will see that as a success."

"But I am hoping Opal will keep going for the next five, 10 years, and beyond." ❶





COMMERCIALIZING INNOVATIVE **AI**

BY SARAH WELLS | PHOTOGRAPHY BY TONY RINALDO

At their heart, AI technologies are driven by the training and modeling of trillions of data points.

In many industries this kind of data is readily available. However, for some industries not known for embracing technological innovations, this essential well of data can be harder to come by. Two start-ups that first found their footing on WPI's campus are tackling this problem by introducing AI solutions to two industries that have traditionally relied on outdated and time-consuming data collection processes: public infrastructure and agriculture.

FARBLOX FOUNDERS MARC PRINTZ '19,
JOHN DYER '19, AND NATHAN ROSENBERG '19
AT THE WALTHAM FIELDS COMMUNITY FARM.



Year Founded: 2022
Founders: Nathan Rosenberg '19, Marc Printz '19,
John Dyer '19
Money Raised to Date: \$2.5 million



FARMBLOX

A farm automation system, connecting equipment and in-field sensors to the internet so farmers can see everything and take action fast.

The lack of data is a challenge, but it’s also a crucial opportunity, says **Nathan Rosenberg ’19**, CEO and co-founder of Farmblox, which describes itself as “a farm automation system, connecting equipment and in-field sensors to the internet so farmers can see everything and take action fast.” Rosenberg founded Farmblox in 2022, alongside his friends and business partners **Marc Printz ’19** and **John Dyer ’19**.

“Farming is a multitrillion-dollar industry that’s stuck in the 1950s,” says Rosenberg. “It affects literally everyone on the planet, and it’s also one of the biggest causes for greenhouse emissions. We can make a huge impact, both as a business, but also socially and environmentally.”

Making a positive impact on society was also a driving force for the founders of Cyvl.ai, which has innovated the use of roadway mapping sensors for municipal governments.

“We’re making things easier using lots of different technology to help these governments manage critical assets that are super important for running everyday life,” says the company’s CEO **Daniel Pelaez ’20**, who co-founded Cyvl.ai (formerly Roadgnar) alongside friends **Noah Parker ’20** and **Noah Budris ’20** in 2021.

In the past few years, Cyvl and Farmblox have raised \$10 million and \$2.5 million, respectively. From college students tinkering in off-campus apartments to business owners tackling big challenges, the founders of Farmblox and Cyvl know what it takes to learn from the WPI community, as well as how to give back to it.

FINDING A PROBLEM

For Daniel Pelaez, the opportunity to use AI to improve the upkeep of public roadways and infrastructure became clear after a summer spent working for the public works department in Southbury, Conn. “I saw major needs and problems with managing all the physical infrastructure,” Pelaez says. “They really had no easy way to do that. Instead, they were just using manual surveys.”

As part of the road crew, Pelaez was tasked with manually logging infrastructure issues, such as potholes and damaged signs. He then realized that there were no good digital records of the town’s current infrastructure, and historic records were even harder to identify.

“Noah and I were studying LiDAR sensors for robotics and self-driving cars at WPI,” Pelaez says, referring to a remote sensing technology that uses lasers to accurately measure distances. “We started workshopping the idea of using that to help the public works departments automatically map physical infrastructure to make this very outdated process much more efficient. That’s how the idea started and evolved.”

For Farmblox, the founders were looking for an industry that created a lot of value for society but was lacking mainstream attention, especially when it came to digitizing its workflow. The team originally focused on indoor container farms but pivoted in 2022 to help established farmers combat ongoing issues, such as monitoring water usage when labor is in short supply.

“It seems like a simple problem, but actually it’s quite severe,” Rosenberg says. “The question of ‘Oh, hey, do I have a leak and where is it?’ can be pretty extreme given the labor shortage these days.” Using Farmblox tools, farmers can remotely monitor the status of their crops and equipment without the need to send their limited number of workers around the fields looking for the problem.

While both industries have a lot to gain from introducing AI technology, it hasn’t always been easy to sell these solutions. In the case of Cyvl, the team has learned how to communicate the benefits of their technology with local municipal governments.

“Selling to government agencies is extremely difficult,” Pelaez says. “Any industry where you’re going to be truly disruptive is going to have some of that pushback. Governments are also a very conservative customer base; they want to see lots of proven successes and no one really wants to be the guinea pig.”

With time and examples of success with their technology, Cyvl has begun to break through these barriers, he says. “At the end of this year, we’re going to be publicly announcing some really large cities in the U.S. that have signed on for our services. We’re opening up the front gates for companies like us who also recognize this massive opportunity in digitizing a nation’s infrastructure.”

While Farmblox’s clientele are private individuals instead of government agencies, Rosenberg says they’ve also had to overcome skepticism and gain trust when working with farmers.

TOP CITIES IN THE U.S. ARE STARTING TO IMPLEMENT OUR TECHNOLOGY, AND WE’RE EXPECTING A HUGE SNOWBALL EFFECT IN 2025. –Daniel Pelaez



FROM LEFT, CYVL.AI FOUNDERS NOAH PARKER '20, NOAH BUDRIS '20, AND DANIEL PELAEZ '20 AT THE COMPANY'S SOMERVILLE, MASS., HEADQUARTERS.



AT LEFT, FARMBLOX TECHNOLOGY IS USED TO TRACK SAP OUTPUT FROM MAPLE TREES; AT RIGHT THE CYVL.AI TEAM WORKS TO REFINE ITS INFRASTRUCTURE SENSOR FOR USE ON ANY VEHICLE.



PHOTOS COURTESY OF FARMBLOX AND CYVL.AI

“I can’t think of a more conservative market than farming agriculture,” he says. “The reason for that is if you go through one or two bad seasons where you lose a majority of your crop, you’re done. You’re out of business.”

Because of this fragility, farmers are unlikely to introduce anything “new or weird” into their farms for fear of disturbing their existing processes, Rosenberg says. Part of convincing farmers to try their technology is making it intuitive for them to use, especially in potentially challenging environments.

“Farmers’ hands are exposed to the cold air in the winter, so making a user interface that works for them when their fingers are freezing is also a challenge,” Rosenberg says. “But it’s a fun one and it’s very rewarding. They call you up—they don’t text, they don’t email—and say, ‘Oh, this is amazing.’”

DEVELOPING AI

Today, Cyvl’s technology can fit neatly on top of a municipal vehicle to capture LiDAR, camera, and sensor data about roadways and infrastructure. But when the company first got its start at WPI in 2019, using \$1,500 in prize money the team had won during WPI’s Strage Innovation Awards, the technology was configured to fit onto a car’s bike rack. This design won the team first place and \$10,000 in the second annual SICK Challenge.

Since then, Cyvl’s technology has come a long way. Parker, the company’s head of engineering, explains that their “secret sauce” lies in merging together datasets captured by imagery sensors and LiDAR.

“Ultimately what we’re doing is detecting various assets and pavement conditions in the imagery and the LiDAR space,” Parker explains. “Then we’re able to assign locations and measurements to all these things that we’re identifying.” This data is then run through a geospatial AI pipeline to create an actionable final product for government clients, he says. The AI is doing what the team calls “forward detection” by taking imagery and LiDAR data and running it through their pipeline to identify classes of assets, such as all streetlights or all potholes.

“We’re ultimately presenting this data on the geospatial level that can be integrated into all of our clients’ existing software or existing programs that they’re using,” Parker says.

Since the company was formally founded as Cyvl in 2021, the team has worked with more than 300 towns and cities across the world.

At Farmblox, the company is focused on designing solar-powered sensors that can continuously monitor crops and provide remote data to farmers on metrics like soil moisture and pressure drops caused by leaks along collection lines, such as those involved in collecting maple sap. Right now, Farmblox focuses on applying its technology to “permanent crops,” such as vineyards or maple tree farms that don’t completely remove the crop at the end of each harvest season. This allows farmers to install the system once and leave it to collect data season after season.

This data is then aggregated and presented intuitively to farmers using an AI-powered automation platform. However, Rosenberg says, collecting data is half the battle when using AI in an industry like agriculture.

“The problem with AI in agriculture is that there’s no data to work off of,” he says. “We’re starting in an area where the raw data itself is the most valuable.”

Collecting this data now will help the team apply its model to more complex problems in the future, including finding leaks in an irrigation system. This can be more difficult, Rosenberg says, because, in many ways, irrigation systems are “one big leak.” Pinpointing exactly where a larger leak or problem is occurring requires a lot of data and advanced AI models. “We’re working on that now,” he says. “And we’re really excited about it.”

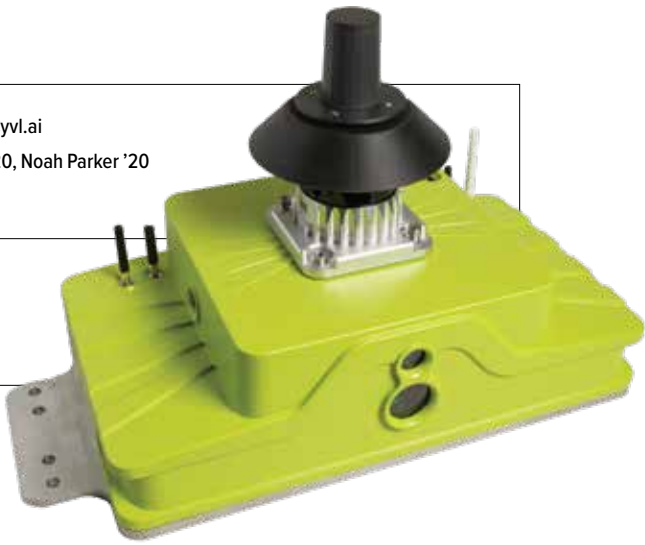
Developing more advanced AI models for agriculture based on this data collection will also help Farmblox track trends related to water usage and carbon sequestration, helping make this industry more environmentally conscious. To collect the data to train their AI model, Farmblox is currently working with 55 farms across the country.



Year Founded: 2019 as Roadgnar; 2021 as Cyvl.ai
Founders: Daniel Pelaez ’20, Noah Budris ’20, Noah Parker ’20
Money Raised to Date: \$10 million

CYVL.AI

Connecting the physical and digital worlds, making it easier to build, maintain, and manage large-scale transportation infrastructure.



STAYING CONNECTED

While these companies work in different spaces today, they agree that the support they received at WPI was an essential part of their journeys.

“Honestly, the programs that WPI offered really helped us hit the ground running,” Parker says. “It was a much smaller scale back then, but they really helped us direct our focus.”

After participating in the Strage Innovation Awards, the Cyvl team also participated in the National Science Foundation-funded I-Corps program, a seven-week entrepreneurial training experience, and Tinkerbox, which provide seed money, mentorship opportunities, and educational workshops to further develop their ideas. In addition to winning some funding through these programs, Parker says that I-Corps, in particular, was extremely useful in helping them understand the broader problems start-ups face.

“I-Corps really drove home that before you start building anything serious, you need to understand the customer problem,” Parker says. “Dan came into this with a good broad picture of what we wanted to solve, but once we actually tried to put something into the market, we realized there are a lot of nuances. I-Corps helped us get more insight into what, specifically, our customers actually needed.”

Farmblox founders went through these WPI programs as well, including completing the I-Corps program twice for different ideas, Rosenberg says. The founding trio took ID 2050 together, which teaches students about research design methods and analysis for social science research.

The team also worked closely with Gina Betti, WPI’s former longtime associate director of the Collaborative for Entrepreneurship & Innovation.

“She was a key piece of our mentorship and learning over the years,” Rosenberg says. “She taught us about storytelling and getting to the meat of what you want to say, which is very important for investors and funding. It’s probably one of the most valuable things we learned.”

Marc Printz, Farmblox’s co-founder, also recalls working closely with WPI’s former Executive Director of Innovation & Entrepreneurship Donna Levin, who taught him to focus on the smallest package of whatever product you’re providing when launching a business. “Ultimately, what she said is what we’re doing now by just offering sensors and controls,” Printz says. “That lesson has been quite instrumental.”

Farmblox has hired WPI alumni and received its first angel investment from a WPI alum, as well.

Despite their busy schedules, the Cyvl and Farmblox teams are happy to give back to the WPI community. Pelaez says he’s always happy to talk with alumni working on similar projects to share his experience. “We stay engaged and feel supported by the WPI community.”

The Farmblox team has made virtual appearances recently at WPI as well, including as guest speakers for the graduate entrepreneurship courses of **Rosanna Garcia**, the Paul R. Beswick Endowed Chair of Entrepreneurship.

Big things are on the horizon for both companies as they look toward a new year. Farmblox is looking to expand its team and its impact by working with larger farms on the West Coast with a focus on monitoring water conservation. Cyvl is also expanding its team and is expecting big growth in 2025.

“Top cities in the U.S. are starting to implement our technology, and we’re expecting a huge snowball effect in 2025,” Pelaez says. “We’re going to be hiring like crazy over the next few months.”

While AI may be on every business owner’s mind right now, Farmblox and Cyvl are showing firsthand how it can be just one part of a sustainable and impactful business. “AI has become a new hot thing across every industry, but when we talk about our solutions and services, we don’t even really focus on the AI aspect,” Pelaez says. “We’re not building another widget,” he says. “We’re building a technology to solve real problems in this country.”





THE BURNING QUESTIONS

A WPI research team has created its own niche by finding new ideas in unexplored places. Their results are toppling convention and opening new doors in the field of combustion and explosion science.

BY MICHAEL DORSEY | ILLUSTRATIONS BY CINTA FROSCH

PEERING INTO NOOKS AND CORNERS NO ONE ELSE HAS YET EXPLORED CAN YIELD SIGNIFICANT RETURNS FOR RESEARCHERS.

After all, says **Jagannath Jayachandran**, assistant professor of aerospace engineering, “That’s where you see new and potentially unexplained phenomena, which makes it exciting.”

Since joining the WPI faculty six years ago, Jayachandran has focused his attention on what he calls “relatively less explored combustion phenomena.” That work, which has ranged across such topics as refrigeration, explosions, and aircraft propulsion, has produced often unexpected and sometimes paradigm-challenging results, with implications for safety, sustainability, and climate change.

Through a combination of laboratory experiments and computational modelling, he and his team of graduate students and undergraduates (the Flamelets, as they call themselves) have crafted a host of innovative ways to view complex combustion phenomena through new eyes. In the process, they’ve shown that commonly held beliefs about how things burn and explode can sometimes be wrong, opening the door to potential new breakthroughs and technologies.

CLIMATE-FRIENDLY REFRIGERANTS

One area where this has proven to be true is the study of the combustion behavior of refrigerants.

When modern mechanical refrigeration technology emerged in the 1920s, a surprising variety of chemicals (everything from ammonia to methyl chloride) were put to use as refrigerants, the working fluid in a refrigerator or air conditioner that pulls heat from the air as it changes from a liquid to a gas. But most of these compounds were highly flammable, highly toxic, or both. In the 1930s, chemists developed a new class of refrigerants, called chlorofluorocarbons, or CFCs, that were non-toxic and non-flammable. CFCs were the workhorses of the refrigeration industry (and were also used as fire suppressants and aerosol propellants) for about half a century.

By the late 1970s, though, it became clear that CFCs were migrating to the stratosphere, where they were slowly breaking down to produce chlorine, which destroys ozone. As research revealed the rapid thinning of the stratospheric ozone layer, which shields the planet from harmful ultraviolet radiation, the United States and many other nations signed onto an international treaty, the Montreal Protocol on Substances that Deplete the Ozone Layer, which ultimately led to the phase-out of CFCs in virtually all applications.

Fortunately, there was another group of chemicals, called hydrofluorocarbons, or HFCs, that made perfectly fine refrigerants and didn’t harm the ozone layer. But by the law of unintended consequences, HFCs would prove to have their own serious drawback: They are greenhouse gases, and because they linger in the atmosphere for years, they are several times more potent than carbon dioxide. So, while the ozone layer slowly recovered, this new class of chemicals was threatening to accelerate climate change.

But not all HFCs are greenhouse gases. A small group are more reactive, chemically, so they break down more quickly in the air. But their reactivity may also make them more flammable. Just how flammable is a question Jayachandran is working to determine with a four-year, \$450,000 award from the National Science Foundation.



AT THE SPEED OF FLAMES

One key measure of flammability is flame speed: the rate at which a flame expands after ignition. Measuring flame speed has been an interest of Jayachandran’s since he was pursuing his PhD in mechanical engineering at the University of Southern California, where he also served as a postdoctoral scholar and research associate in the Combustion and Fuels Research Laboratory.

Flame speed is determined by putting a sample of a substance in a chamber, igniting it, and measuring how quickly the ball of flame fills the chamber. Hydrocarbons, like methane or gasoline, are highly reactive, and therefore more flammable, so their flames move rapidly. HFCs are far less reactive, so their flames move so slowly their shape and movement are significantly affected by gravity. “In fact,” Jayachandran says, “it is difficult to measure their flame speed accurately, because the flame gets distorted by gravity, and can even float away due to buoyancy.”

Because HFC flames move so slowly, they also lose heat to the surrounding air, he notes. “The ball radiates heat, which means the flame temperature will decrease and the ball will shrink.”

To account for heat loss, Jayachandran and his team turned to computer models. When existing models seemed unable to handle the complexity of the HFC flame behavior, they developed their own radiation heat loss model that can accurately predict the inward movement of the cooling ball of flame in most cases.

To get around the effects of gravity, Jayachandran simply took gravity out of the picture. Most methods of studying physical phenomena in the absence of gravity (like sending experiments to the International Space Station or booking flights on special airplanes that create brief periods of gravity by flying in parabolic

arcs) are expensive. The Jayachandran lab found a way to produce the brief period of weightlessness they needed with a homemade device that cost just \$5,000.

The device is a benchtop drop tower, initially designed by a team of undergraduates and refined and put into action by PhD candidate **Joel Mathew**. A small platform with a combustion chamber and a high-speed camera is held at the top of the tower by electromagnets. At the same instant, the HFC in the chamber is ignited and the magnets are turned off. The platform falls just over four feet into a layer of cushioning foam, producing a half second of zero gravity—enough time for the flame to expand to the edges of the chamber.

“We think this is the most accurate method for measuring HFC flame speed,” Jayachandran says. “What we saw is that if you do the experiment using a static set-up the results are quite different from what we observed with the drop tower. Still, compared to traditional fuels, the flame speed is still quite low, even without gravity.”

ACCOUNTING FOR NEW WRINKLES

By confirming the slow flame speed of the more reactive HFCs, the Jayachandran team would seem to have confirmed that these compounds do not pose a serious flammability risk. Therefore, it should be possible to safely substitute them for HFCs with low reactivity but high greenhouse gas potential. But is that really the case? Earlier large-scale experiments at the Raytheon Research Center in Virginia found that even the less reactive compounds were problematic. “When they filled a chamber with a mixture of air and these compounds, which are non-reactive, by design,” Jayachandran says, “they found that they posed a significant explosion, or overpressure, risk.”

How can a gas that should be difficult to burn cause an explosion? The answer, Jayachandran says, may lie in a type of instability seen in such violent events as volcanic eruptions and supernovae. “It’s called the Rayleigh-Taylor instability and it’s been explored a lot for liquids,” he says. “If you place a layer of a dense fluid, like salt water, on top of a less dense liquid, like fresh water, the denser liquid wants to end up on the bottom because it is heavier. When this happens, you will see perturbations grow at the interface.”

These Rayleigh-Taylor instabilities can also affect a flame as it moves through the more-dense air in its path, against gravity, he notes. It doesn’t happen with a highly flammable liquid like natural gas, because the flame moves too fast to be affected by the instability. “But when the velocities are slower, these instabilities start to grow,” he says. “We’ve done simulations that show that as these flames propagate, they form shapes at their boundaries that look like wrinkles.”

Like fingers reaching out from the body of the flame, the wrinkles stretch out and extend its influence. “The takeaway,” he says, “is that even though these flames are not explosive at the small scale, at large scales, the flame can become severely distorted because of these



wrinkles and it is going to propagate at speeds close to those for hydrocarbons.”

This counterintuitive result may explain the explosions the Raytheon lab documented, Jayachandran says. “What we have learned points out that turbulence will be very important in understanding the behavior of flames.”

While he and his team explore ways to test their ideas about instability experimentally, PhD candidate **Justin Tavares** is completing an internship at the U.S. Department of Energy’s National Renewable Energy Laboratory in Colorado, where he is conducting advanced turbulence simulations using the supercomputer facilities there.

Surprisingly, instability-caused explosions are more likely to be of concern for non-reactive HFCs already in widespread use, rather than the more-reactive compounds that will likely replace them, Jayachandran says. “But it is likely that even the more reactive HFCs will prove to be more explosive than would be expected,” he says.

That is information he would like to share with regulators, he says. “Right now, there are no safety regulations that account for instabilities. It is important for these folks to know about these effects.”

WHY DO GASES EXPLODE?

Turbulence may lie at the heart of another common phenomenon: explosions. Since the invention of gunpowder in the 9th century, people have been blowing things up. But when it comes to gases, like hydrogen, the factors that lead to the transition from flames to a detonation are not well understood. “Understanding how these detonations form is a 100-year-old mystery,” Jayachandran says. “This is something I took up as a challenge when I joined WPI.”

He says his particular focus is hydrogen, a gas that could play a key role in a sustainable future because it can be combined with oxygen or burned to produce energy, with water as the only byproduct. A better understanding of how hydrogen explodes should point to safer ways to store, transport, and use hydrogen. “Historically, we know that hydrogen has a tendency to detonate,” he says, “but we still don’t know the fundamental physics behind the formation of detonations.”

To learn more, Jayachandran and PhD candidate **Nolan Dexter-Brown** fill a long polycarbonate tube with a combustible mixture. They ignite the gas at one end of the tube and watch as the flame propagates toward the other end at about 1 kilometer per second. At some point, the flame suddenly transitions to a detonation, which propagates at 3-to-4 kilometers per second.

The current understanding is that the shock wave created by a rapidly moving flame compresses the gas into superheated hot spots that spontaneously detonate even before the flame reaches them. But that’s not what Jayachandran and Dexter-Brown observed.

“We varied the mixture composition in our experiment to see if hot spots were activating the detonation,” Jayachandran says. “When we changed the ignition behavior of the gas, it didn’t result in the detonation formation getting delayed, as you would expect. So, either hot spots are not forming or they are not rate-controlling. This goes against the general understanding of the explosion community. Our results show that instability and turbulence play a big role.”

Other researchers have shown that an expanding hydrogen flame forms wrinkles similar to what the Jayachandran lab observed in HFC flames. These wrinkles lead to turbulence. “And we believe that turbulence may play a huge role in why hydrogen detonates so easily.”

As a faculty member in WPI’s new master’s program in explosion protection engineering, which includes researchers from five engineering programs, including fire protection engineering, Jayachandran says he hopes to continue to uncover the causes of—and potential ways to prevent—hydrogen detonations.

BURSTING INTO FLAMES

The study of how and why things detonate has taken Jayachandran’s team to interesting places, perhaps none more exotic than the interior of scramjet (supersonic ramjet) engines, which are designed to propel aircraft many times the speed of sound. These engines operate by compressing a supersonic stream of air until it achieves high temperatures. When fuel is sprayed into this superheated air, it bursts into flames.

Since the air is moving so quickly, it spends very little time inside the combustion chamber. In fact, Jayachandran says, “its residence time scales are comparable to the reaction time scales. If the reaction times scales are too long, combustion won’t be complete and the flames will be blown out the back of the engine before they can do any work.”

With a fellowship from the Department of Defense, which would like to use scramjets in future military planes, PhD candidate **Amelia Kokernak** is seeking to quantify just how flames work in this unusual environment. She and Jayachandran believe the first step is making better measurements of the flame speeds of these volatile mixtures. But achieving flames as hot as those inside a scramjet (2,800 degrees Kelvin, or 4,580 Fahrenheit) in the lab is nearly impossible. To get around this challenge, they removed the nitrogen, an inert gas that

“WHAT WE HAVE LEARNED POINTS OUT THAT TURBULENCE WILL BE VERY IMPORTANT IN UNDERSTANDING THE BEHAVIOR OF FLAMES.”

—JAGANNATH JAYACHANDRAN



merely soaks up heat, from the air and achieved the proper temperatures without changing the chemistry of the flames.

The flame speeds they measured did not agree with the results of conventional models. To help understand why, they collaborated with quantum chemists at Argonne National Laboratory. “With their help, we figured out that there is some very interesting, exotic chemistry happening in these flames. Unless you take that chemistry into account, you can’t predict the reactivity correctly,” Jayachandran says.

Once again, by taking on a difficult, little-explored challenge, Jayachandran and his research team have emerged with unexpected results that may topple the status quo and ignite new thinking and new technologies. But that’s what comes from a burning desire to take the research road less traveled. **1**



Interested in guaranteed income for life?

If you are interested in receiving income for life and supporting WPI at the same time, a **charitable gift annuity** (CGA) may be right for you. For more than 30 years, WPI has managed a successful CGA program and now is a great time to consider participating in this program.

Here’s how it works:

A CGA is a simple gift arrangement between you and WPI whereby you make a gift of cash, stock, or a qualified charitable distribution from your IRA to the university. In return, you receive guaranteed income for life regardless of market fluctuations, in addition to a tax deduction. The income is based on the amount of the gift and your age, and you have the confidence of knowing your payments are backed by the university’s endowment. The time is right for considering WPI’s CGA program as a way to support your alma mater and supplement your income for life.

GIFT ANNUITY RATES			
Age	Annuity Rates	Annuity Amount	Charitable Deduction
65	5.7%	\$1,425	\$9,335
70	6.3%	\$1,575	\$9,825
75	7.0%	\$1,750	\$10,734
80	8.1%	\$2,025	\$11,626
85	9.1%	\$2,275	\$13,434

Please note that this information is based on a \$25,000 gift. This information is for illustrative purposes and is not intended as tax or legal advice. Rates are subject to change and are based on rates suggested by the American Council on Gift Annuities. Gift annuities are not available in all states.

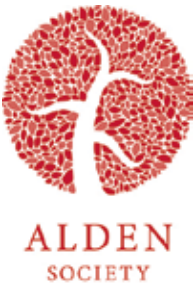
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Maria Torres-Reyes
Director of Estates, Trusts, and Planned Giving Operations
508-831-6001 or mtorresreyes@wpi.edu

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ALUMNI NEWS

From the Desk of

ALUMNI ASSOCIATION PRESIDENT **PAMELA (GIASSON) LYNCH '05**

Dear Alumni,

As we experience the long, dark days of winter in Worcester, there’s no shortage of bright and exciting goings on taking place on The Hill.

Of particular note is *Beyond These Towers: The Campaign for Worcester Polytechnic Institute*, which recently helped WPI achieve the milestone fundraising goal of \$42 million last fiscal year, exceeding the goal by \$2 million. It is currently only \$70 million away from achieving the overall campaign goal. Thank you to the many alumni who support this great university so generously.

Some of you may have heard the exciting news that Reunion Weekend is moving. After an extensive review of feedback from alumni and the campus community, WPI’s own data, and examples of successful approaches from our peer institutions, WPI is combining its class reunion celebrations with Homecoming, beginning in fall 2025. Please hold the dates of September 26–28, 2025.

In other exciting news, A-Term saw WPI launch its new master’s degree programs in artificial intelligence, financial technology, and global health. And major milestones were reached for the Global Projects Program and the Social Science & Policy Studies Department, which each celebrated 50th anniversaries, as well as the Interactive Media and Game Development Program, which celebrated its 20th anniversary.

President Wang joined a distinguished panel of experts at the *Boston Globe*’s Globe Summit, which celebrated individuals and organizations driving forward-thinking solutions and transformative advancements across all areas of expertise. Her session explored how universities can empower students from all disciplines to thrive in an AI-driven future.

WPI earned the Award for Undergraduate Research Accomplishments, which celebrates WPI’s culture of innovation, inquiry, and academic excellence, and the NASFA Senator Paul Simon Spotlight Award for Campus Internationalization for the university’s ongoing efforts to infuse international, intercultural, and global dimensions into its ethos.

The WPI Alumni Association Board of Directors continues its work with strategic priorities: Value of WPI, Students-to-Alumni Journey, Alumni-Driven Events, and Strategic Volunteer Stewardship.



I’d like to thank the Board for their servant leadership and time, talent, and treasure! We couldn’t do it without each of you. We are proud to offer regional alumni-driven events. So far, the events have been in Los Angeles, Tucson, Ariz., Chicago, Seattle, Portland, Ore., Washington, D.C., Denver, Boston, Portsmouth, N.H., and New York City. If you are interested in hosting one, please email: alumni-office@wpi.edu.

To all alumni: We are as strong as our relationships with one another and the impact we have on the world. Please get involved! wpi.edu/+volunteer

Pamela



WOMEN OF WPI EVENTS FOSTER A SENSE OF COMMUNITY AND CREATE A STRONG CONNECTION TO THE UNIVERSITY.

“For me, the Women of WPI felt like a perfect way to get involved, meet new people, and have some fun.” —Susan Sontgerath ’88, Women of WPI Chair



Women of WPI: One of WPI’s Great Alumni Affinity Groups

WPI’s affinity groups are a perfect way for alumni to stay connected to the university. A quick glance at the Alumni Affinity Groups web page (wpi.edu/+alumnigroups) shows how the Alumni Association, in partnership with the Office of Lifetime Engagement, meets the engagement interests and needs of our alumni community.

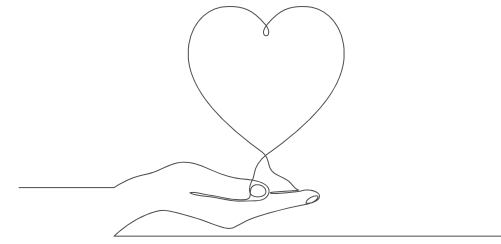
Among the groups, you’ll find the Women of WPI, a group that helps alumnae foster strong connections with the university and each other through events and online communities. Group activities promote personal and professional growth, celebrate member successes and achievements, and provide opportunities for women to share ideas and inspire one another.

Reflecting on why she maintains her membership in the group, Women of WPI Chair **Susan Sontgerath ’88** says, “In one word: connection—to other women who also experienced WPI. For those of us in the earlier decades especially, there is a shared experience of being one of the few. But it is also wonderful to interact with the women from later decades and learn about their experiences.”

She adds, “In the group, we have women in class years ranging from the 1970s to the 2000s, and it makes for such a rich member experience. Everyone is at a different stage of life—from retirees and grandmothers to mid-career professionals, new moms, and women in their first jobs. But we all have WPI in common and can connect on so many levels. That diversity of experience is especially important when we plan events that will be interesting to the widest group of other alumnae.”

Female students automatically become Women of WPI members upon graduation. “Attending Women of WPI events is a wonderful way to stay engaged with WPI and get to know fellow alumnae,” says Sontgerath.

Women of WPI usually plans two or three events per year and meets virtually or in person about once a quarter. The group also tries to plan at least one hybrid event per year so members who are not local to Worcester can still participate. To learn more, contact womenofwpi@gmail.com.



HOW DO YOU ENGAGE WITH YOUR ALMA MATER?

Of the many ways alumni engage with WPI, philanthropic giving is one of the most meaningful and powerful. Giving back to their alma mater allows alumni to demonstrate gratitude for their collegiate experience and supports future students in impactful ways.

Management engineering major and star athlete **Ama Biney ’18** made her first gift to WPI in 2018 as part of the Class Giving program (formerly Senior Class Gift) and has continually supported the university with gifts to multiple funds, from scholarships and Areas of Greatest Need to WPI’s softball and basketball programs, which are especially near and dear to her heart.

When asked why it is important for her to engage with the university in this way, she says, “My four years at WPI shaped me into a young woman that was able to take on the real world. I will always root for WPI. A volunteer event? I’m there. Donation time? Rightfully within my means. An interview? No problem. Again, I can only hope that others can have the special time at WPI that I had. Any way that I can assist with that, I always will. The WPI community has supported me in my academic/athletic endeavors and even in my outside endeavors after graduating. They have my back, and I will always have theirs!”

She reminds fellow alumni that just because they have graduated, that doesn’t mean their connection to WPI has ended. “There are always ways to stay involved with the school and students who share your interests, whether it is volunteering, donating, visiting, or all of the above. There is a reason you chose to come to WPI at just 18 years old. Please never lose sight of that.”

For information on supporting WPI please visit wpi.edu/+give. For information on alumni engagement opportunities, please visit wpi.edu/+volunteer.



“I try to play my part by giving back because I want the WPI experience to be even better for the next person.” —Ama Biney ’18



THE GENERALIST WITH A TASTE FOR CIDER DONUTS AND MULTIMILLION DOLLAR START-UPS

TURNING POINT

Alex Schwartz '09 (they/them) considers themselves to be—and prefers to be in the company of—a generalist. As opposed to getting into one lane and becoming a specialist on a given topic, generalists think more broadly and approach challenges from a higher level. Plus, Schwartz says, generalists are more interesting, as they “contain multitudes.”

And Schwartz contains multitudes. The graduate of WPI's computer science and interactive media and game development programs is a renowned connoisseur of cider donuts who created a searchable directory of hundreds of New England farms that sell this tasty fall treat. Their Instagram page

@ciderdonuteur has thousands of rabid followers. Schwartz also dabbles in music, woodworking, and building small electronics—and just so happens to have built a wildly successful video game start-up that was acquired by Google.

“The trajectory of determining your optimal career, getting a specialized degree, entering that field, and working your way up to more and more senior positions in that field—that's the globally identified way to approach career and life,” says Schwartz, who lives on an island off the coast of Maine. “I feel like I reject the whole idea of that path.”

The Absurdity of Work Culture

Schwartz grew up working in their parents' computer repair store, so it's only natural that they were always technically inclined. When it came time for college, they were attracted to WPI because it was one of the first universities to offer a four-year degree in game development.

They were part of the inaugural undergraduate class (the program launched in 2005) and credit Professor **Joshua Rosenstock** for supporting their non-standard approach to learning. “A lot of places force you down a singular path,” says Schwartz. “WPI really allowed me to embrace the generalist path and absorb lessons from both the tech and creative worlds.”

A year after graduation, Schwartz founded video game development company Owlchemy Labs. The start-up built video games for mobile and PC, but for about five years had no real hits in a largely hit-driven industry. The company almost went out of business a half dozen times, Schwartz says. “We were running on savings and releasing video games that weren't taking off.”

But in 2015, their team got the opportunity to work with virtual reality company Oculus (owned by Meta, formerly Facebook) and Valve Corporation. The companies wanted Owlchemy to design and build a game for virtual reality headsets that couldn't possibly be built for any other platform. “I knew it was going to be either the worst or the best decision of my career to go into this unproven market of VR,” Schwartz says.

But their team set to work and soon came up with “Job Simulator,” in which robots perform comical simulated jobs, such as auto mechanic, store clerk, or gourmet chef, in a job museum set in the year 2050. Schwartz says the VR game captures “the absurdity of work culture,” and is the “Wii Sports of VR” because it requires whole-body movement and encourages silly and embodied play.

It quickly became a megahit, with millions of downloads, and it has been rolled out on the Oculus Quest (aka Meta Quest), Steam VR headsets, PlayStation VR headsets, and was even packed inside the box with many of these platforms as a showcase for the intuitive power of VR.

In 2017, Schwartz negotiated a deal to be acquired by Google. As founder and CEO, they remained with Google for a year until deciding to pivot away to pursue “small, original, weird endeavors.” They continue to be deeply proud of “Job Simulator,” noting that “people still play it to this day and it brings joy and delight to millions.”

A Love of Cider Donuts

One such weird endeavor was their cider donut exploration. Schwartz has always been into quirky experimentations, and in 2020, they were looking for something silly and lighthearted amidst the somber backdrop of COVID-19. Living in Boston at the time, they were regularly driving out of the city “to anywhere that was more remote.” Hiking and being out in nature provided healing during the pandemic. And, of course, after all that fresh air and exercise, it's always nice to have a treat. Schwartz got into the habit of visiting local farms to sample their take on the cider donut.

The cider donut map that Schwartz created and shared publicly online quickly earned a following. “People latched onto it immediately,” Alex says. “They were so passionate about where to find the best cider donuts, sharing vehemently about their favorite local farms where they had fond childhood memories of cider donuts.”

Schwartz also adopted a tongue-in-cheek persona, always wearing an orange plaid button-down shirt when out sampling. The look was inspired by the classic *Onion* article “Mr. Autumn Man Walking Down Street With Cup Of Coffee, Wearing Sweater Over Plaid Collared Shirt.” On their Instagram, they offer irreverent reviews, noting, in one instance, “the structure of the crumb is dense and moist, yet airy and delightful on the palate.”

“It was this idea of adopting a wine connoisseur mentality, but for donuts,” they explain.

Quickly, the bit began to take off, with various news outlets considering Schwartz “the cider donut king.” They've been interviewed by the likes of NPR and *Boston Magazine* on their top picks. (For the record, their 2024 favorite is Thompson's Orchards in New Gloucester, Maine.) They see it as a public service, of sorts, and they're also “unintentionally drumming up business for small farms.”

So what's next? Schwartz isn't entirely sure. They're taking time off to explore, whether that happens to lead them to technology, donuts, or some other quirky endeavor. “I'm living life fully and re-remembering what sparks joy for me,” they say. “I'm keeping my mind and my heart open to anything that draws me in and following that intuition fiercely.”

—Taryn Plumb

PHOTO BY NATE GABEL

Anonymous Donors Contribute \$6.1 Million to Support Students

GIFTS CREATE OPPORTUNITIES, BUILD COMMUNITIES.

“Today the Institute stands solidly atop its rounded hill, still overlooking the city and reaching toward the sky. It stands there for more than any other reason because—by some strange and wonderful supply—there have always been enough people who cared.” Although Mildred McClary Tymeson penned these words almost 60 years ago for the epilogue of her book *Two Towers*, the statement holds steadfast.

Launched in October 2021 with the university’s most ambitious goal, *Beyond These Towers: The Campaign for WPI* is not only a powerful opportunity for alumni and friends to support the university, it also serves as undeniable proof there are still many people who care for the Institute atop The Hill.

Most times, WPI enjoys the honor of publicly recognizing and celebrating its transformational-level donors. But, on occasion, philanthropists prefer to remain anonymous. This is the case for several donors who last year contributed to \$6.1 million in gift commitments to undergraduate scholarships.

Although these generous donors have chosen to remain anonymous, the impact their gifts make on The Hill and beyond are clear and present.

When asked how donor support impacts her university experience, robotics engineering major **Sydney Miller ’27** says, “Donor philanthropy creates real opportunities for students from all backgrounds, and without it, many of us simply wouldn’t have the chance to attend WPI. In addition to boosting our education, donor support also helps build a welcoming and diverse community for everyone.”

Alesia LeSane, assistant director for multicultural education and student success, agrees that transformational gifts have a direct impact on students from many walks of life. “These initiatives not only alleviate financial barriers for underrepresented students through scholarships and financial aid,” she says, “but also cultivate an environment where students can develop their identities, build resilience, and form meaningful connections with their peers.”

Chemistry major **Sara Hancock ’26** shares, “WPI’s generous donor support provides me the opportunity to study abroad, which I would not have had otherwise. This year I am going to Prague, Czech Republic. Through this experience I have been learning all about another culture and hopefully will help my Prague sponsor achieve its goal. Without donor support, I would not have the ability to make a difference in the world.”

From an admissions standpoint, Dean of Admissions **Jennifer Cluett** has an especially compelling perspective on donor philanthropy. “I meet prospective students from around the world who are excited to learn about WPI’s distinctive, project-based approach to learning,” she says, “and it is through donor support that many of these students are allowed to realize their dreams of enrolling at WPI. The impact multiplies as these students contribute in and out of the classroom and engage in research and project experiences that take them places—both down the road and across the globe.”

Biology and biotechnology major and biochemistry minor **Jane Tucker ’25** is grateful for donor support as it allowed her to more fully embrace her course work. “My major requires me to be in the laboratory frequently, where lab equipment and instruments grant me hands-on learning like I never could have imagined. Using these learning spaces that are supported by generous donors has encouraged me to explore my interests more deeply and ultimately to be better prepared for my future.”

The university offers its deepest gratitude to the anonymous donors who collectively gave \$6.1 million in commitments of financial support. Because alumni and friends still care, WPI maintains the ability to fund strategic initiatives that support undergraduate and graduate students, faculty, world-changing research, global programs, facilities, and a thriving campus community.

Tucker shares this message to all WPI donors: “Thank you for contributing to the success of this amazing university and all of its students. I am very grateful for your generous support and your direct impact on my fellow students, my friends, and me.”

—Sira Naras Frongillo



“When I received my scholarship package, I knew attending this prestigious university was within my reach, and I could now earn the education I never thought was possible.” —Lily Bromberger ’25

“The WIN grant not only provides Girls Talk Math student-staff the opportunity to work with bright young minds, but it also provides us the opportunity to try new things and explore a variety of our skills and passions.”

—Ivy Bixler '25



Women’s Impact Network Supports Girls Talk Math Program



HIGH SCHOOL GIRLS INTERESTED IN STEM PARTICIPATED IN A FREE TWO-WEEK SUMMER CAMP STAFFED BY WPI STUDENTS, A PROGRAM SUPPORTED BY THE WOMEN'S IMPACT NETWORK.



WPI’s Women’s Impact Network (WIN) is a dynamic organization made up of diverse women who share a passion for education, leadership, and philanthropy and the advancement of women in STEM. Working to ensure WIN has the greatest impact on the women of WPI and beyond is no easy feat, but through pooling philanthropic gifts, WIN has awarded a total of \$1.6 million to deserving WPI students, faculty, and staff since its inception in 2016.

Girls Talk Math co-founder **Francesca Bernardi**, professor of mathematical sciences, was thrilled to receive a 2024 grant for her program “Girls Talk Math at WPI: Expanding a free math and media camp to engage local girls and non-binary high school students.”

Girls Talk Math is a free two-week mathematics and media day camp hosted on campus for rising 9th to 12th grade girls and non-binary students who are interested in STEM, with priority admission is given to Worcester Public School students. Lunch and snacks are provided, as well as transportation when needed. Attendees explore challenging STEM problems that go beyond the high school curriculum as they work in groups on problem sets and research the life and work of a scientist from a marginalized group. Program activities include short lectures, panels with STEM professionals, and several hands-on workshops, including “How to Make a Podcast” and “How to Get into College.”

“It is amazing to see the network of alumnae and friends that feel so passionately about the success of WPI and its programs, as so many aspects of the school’s programming would not be possible without donor contributions,” says Bernardi.

When asked about the Girls Talk Math program, Grace, a Worcester Technical High School 11th grade attendee says, “I enjoyed meeting other girls who were interested in STEM just as much as I was. It was also really nice that I got to meet university students who were studying things I was interested in.” Doherty Memorial High School 12th grader Serwah echoes the sentiment, saying, “What I enjoyed most was the opportunity to meet professionals from companies and learn about their work, which inspired me to explore those fields further.” Ninth grader Mackenzie, says of the program, “Meeting women from all

over the state was a ‘Wow, this is really happening’ moment for me. To be able to connect to them and hear their personal stories was phenomenal.”

Obinyim, a 10th grader at Worcester’s Abby Kelley Foster Charter Public High School, shares a powerful lesson learned that is directly in line with WPI’s curriculum: “A benefit I gained from the program is feeling comfortable making mistakes and asking for help when I need it.”

Beyond the positive impact the WIN grant makes on program attendees, it also supports wages for the students who are hired as staff. “Without WIN, all camp staff would have to work as volunteers,” says Bernardi. “This would limit the student pool of staff applicants significantly, as only those who can afford to work for free in the summer would be able to participate.”

Of staffing the program, computer science major **Ivy Bixler ’25** says, “Working for Girls Talk Math the past two summers gave me the opportunity to learn about how to work with and engage bright young minds as well as meet other WPI students I might not have otherwise interacted with.” Biomedical engineering major **Sarah Roberge ’26** says, “I love that even as a staff member, I learn so many new things about STEM by going through the problem sets myself.”

Timory Goggin ’25, a mathematical sciences and computer science major, adds, “I loved interacting with the campers and fellow staff during the program, and I appreciate how the program fosters an environment of learning and encourages curiosity. WPI as a leading institution in Worcester has a responsibility to foster community relations and support local youth. I urge anyone who is able, to contribute donations in support of precollegiate opportunities for young students.”

As *Beyond These Towers: The Campaign for Worcester Polytechnic Institute* continues, the breadth and depth of donor impact, highlighted by WIN grants, inspires continued philanthropic support of the university.

—Sira Naras Frongillo



THE HERD COMES HOME

Including our Reunion Herd!



SAVE THE DATE

FOR HOMECOMING 2025: SEPTEMBER 26-28,

when our entire herd will return to its home on The Hill to revisit favorite spots, reunite with friends, and relive the WPI experience. Classes ending in 0 and 5 will celebrate reunions.

For more information, visit

wpi.edu/+homecoming

CLASSNOTES

submit yours to CLASSNOTES@WPI.EDU





Share Your News!

We want to hear from you and your WPI classmates do, too!

Tell us your latest news and it may appear in Class Notes—it's a great way to reconnect with your fellow alumni: classnotes@wpi.edu.

1957

Elliott Heith reminisced about his time at WPI: “My last human connection with WPI ended with the death of Professor Romeo Moruzzi. Our required EE class, Classical Mechanics, had long been taught by Professor McCulloch and now had a new assistant professor, Dr. Moruzzi. Some of the first words we heard from him were ‘vector analysis.’ We all looked around at each other until someone in the class raised a hand and said, ‘We haven’t a clue as to what you are talking about.’ Apparently, Professor Moruzzi was trying to teach us a new way to do classical mechanics, which we eventually learned.”

1964

David Laananen was presented with a lifetime achievement award by Marquis Who's Who, an organization that highlights accomplished individuals across many industries. He has over 40 years of experience in engineering and is the owner of Laananen Consulting, where he advises on aircraft crash safety, including “design, analysis, and testing of aircraft seats equipped with energy-absorbing capabilities to protect occupants in the event of an accident,” according to the announcement. He is also a professor emeritus of mechani-

cal and aerospace engineering at Arizona State University's School for Engineering of Matter, Transport, and Energy and has been published in several prominent industry journals.

1968

Cary Palulis writes, “**Bob Pleines '68, Dave Hopkinson '68, John Foley '70**, and I got together for our annual fishing trip on my boat on Congamond Lakes in Southwick, Mass. Fols (John) caught the winner—a beautiful, fat 18-inch rainbow trout. We really had the best time together—as usual.”

1974

Glenn Yee was interviewed by CNN's “Living Golf” this past August due to his membership in Hong Kong's Clearwater Bay Golf & Country Club. This golf course and country club recently celebrated its 40th anniversary and is one of the most exclusive clubs in Hong Kong.

1978

Wesley Wheeler was appointed chief executive officer and director of LabConnect, a global lab services partner and service provider for clinical trials. He has 20 years of leadership experience in the pharmaceutical services industry and served as



▶ CARY PALULIS '68

CEO/president of five different companies and on several industry boards. “I have worked with LabConnect for many years and am excited to join the company at this pivotal time,” he said. “The company's unique service offerings and business model position it perfectly to meet the evolving needs of the industry. I look forward to working with our team and partners to accelerate LabConnect's growth both domestically and internationally.”

1980

Richard Whalen writes, “In December of 2023, I completed the Alpine (downhill) ski instructor course at Wachusett Mountain and I taught skiing there two evenings a week for the ski season. Since my job has been fully remote since March of 2019, I found it a great way to get out of the house and interact with others. My plans for the upcoming ski season are to get my PSIA level 1 certification.”



▶ WALLY TOWNER '83 AND CAROLYN KACHANIS '83

1983

Wally Towner writes, “**Carolyn Kachanis '83** didn't like me very much during our first weeks on Daniels 2. We celebrated our 40th wedding anniversary on Sept. 1, 2024. I am so happy she changed her mind!”

1985

Susan Woods writes, “I have been living in the Netherlands for 10 years as of this past summer and I recently completed the 4 Daagse/4 Days Walk where distances ranging from 30-50 km (about 31.07 miles) are walked each day for four consecutive days. The event has been taking place for over 100 years and draws 45,000+ participants from about 30 countries. It is the world's largest walking event. I have completed the 40 km (about 24.85 miles) distance per day for the third year in a row. If you follow travel vloggers, Nate and Kara, they participated this year and have an excellent version on YouTube of the walk and all that it entails.”

Henry Skinner was appointed to the Board of Directors for F2G, a biopharmaceutical company focused on treating life-threatening fungal infections. He is the chief executive officer of AMR Action Fund, a public-private partnership that develops antimicrobial therapeutics. “Fungal infections are a growing threat to patients around the world and have a disproportionate impact on vulnerable populations, yet there has been a paucity of innovation in the field of antifungals,” he says. “For decades, clinicians have relied on a handful of antifungal classes, with few mechanisms of action and significant limitations due to spectrum of activity, drug toxicities, or drug-drug interactions. These therapies are increasingly failing in patients. We are thrilled to support F2G's team as they develop this urgently needed therapy and seek regulatory approval.”



▶ SUSAN WOODS '85

1986

Susan Loconto Penta was included in the *Boston Business Journal's* “People on the Move in Boston” series. She is the co-founder and managing partner of MIDIOR, a management consulting and technology services provider, and a board member of The Possible Zone, a Boston youth organization. Her 35-year career spans work in entrepreneurship, career diversity and equity, engineering, and technology education.

1990

Michelle Gass is the CEO of Levi Strauss & Co and was interviewed for an article by *Vogue Business* about her ambitions to turn Levi's into a \$10 billion business through various sales and marketing strategies. This past September, Levi's opened its fifth Haus of Strauss retail concept in Paris.

1994

David Grenache was presented with the Outstanding Contributions Through Service to the Profession of Clinical Chemistry award at the Association for Diagnostics and Laboratory



“One of the bigger equipment purchases made with Goat Nation Giving Challenge funds includes a vision-training program. Other colleges in our division, and MLB teams have seen huge gains with this equipment and we are eager to begin using it this off-season. Your contributions make our team better!” —**Heather Ross**, Head Softball Coach



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From softball equipment to leadership programming and everything in between, the items supported by your gifts to WPI athletics enhance experiences for all WPI student-athletes. Each year, the Goat Nation Giving Challenge gets bigger and better. This year, the goal is \$200,000 in support of varsity athletics and WPI's student-athletes.

Show your team pride with a gift during the Goat Nation Giving Challenge. Look for more details and ways to give in the coming weeks!



Medicine (ADLM) 2024 international conference. The award “recognizes individuals who have worked throughout their careers to advance the professional status of clinical chemists and the professional objectives of ADLM,” according to the announcement. He is the chief scientific officer for TriCore, a not-for-profit clinical laboratory. His career was also the focus on a story in the *Albuquerque Journal*.

Stephen Zamarro became the chief revenue officer for COTSWORKS, an electronics manufacturer for optical components and subsystems that operate in harsh environments. In his role, he manages the sales team to support customer engagement, development, and support worldwide. “I’m excited about joining COTSWORKS and look forward to helping Mil/Aero OEMs make the move from copper to fiber optic networks and advanced sensing applications,” he says. He served as a pilot in the U.S. Army and Air Force, including three combat tours, and held multiple leadership roles in program management, sales, and business development, according to the announcement.

1995

John Coyle was appointed managing director for the management consulting firm Alvarez & Marsal's health systems practice. He leads the development of new strategies and practices to improve the customer experience, maximize growth, and initiate process changes. In previous roles, he led major mergers in the health industry and

developed new strategies for large-scale health systems and hospitals.

Tricia Fitzmaurice was appointed chief growth officer for Nightwing, an intelligence solutions company with a focus on national security. In this role, she works to expand Nightwing's products and services for the intelligence community, Department of Defense, and federal civilian and commercial markets. She has many years of experience in U.S. government and national security programs and was featured in the “Top 20 National Security Executives to Watch” in 2022 and “Top Intelligence Executives to Watch” in 2023 by Washington-Exec. “I’m excited to join Nightwing at such a pivotal time for the company as the national security landscape continues to evolve,” she said.

1996

Dwalin DeBoer was promoted to vice president of sales & engineering with the northern division of Mack Molding, a custom plastics molder and supplier of contract manufacturing services. He has almost 30 years of plastics experience—24 of them with Mack.

1997

Roman Fayerberg was recognized in the 2024 edition of *IAM Patent 1000*, a publication that identifies top patent professionals in various regions around the world. He is a patent attorney with Greenberg Traurig in Boston and previously worked as a research and development engineer.

Alison Faye (Possas) Johnson writes, “I’m excited to announce that I’ve taken on a new role as the chief of military engines, global trade, DT strategy and pillars with aviation and aerospace component manufacturing company Pratt & Whitney. It’s an incredible opportunity to lead in these areas, and I’m looking forward to the challenges and growth this role will bring. In addition, I’m honored to have been elected as the chair of the RTX ADAPT (Able and Disabled Associates Partnering Together) Employee Resource Group.”

1998

Richard Resnick was appointed CEO and board member of The Pacific Institute (TPI), a “global leader in mental technology and behavioral transformation,” according to the announcement. He has over 20 years of leadership experience in venture capital, healthcare, and technology. “I am thrilled to join The Pacific Institute and lead this incredible team into the next phase of growth,” he says. “Our mission—to unlock human and team potential and drive positive change so that our clients can confront the world’s most important global challenges—is more important than ever.”

1999

Linda Grelotti joined Suisman Shapiro Attorneys-at-Law as chief operating officer and practices civil litigation in New London, Conn. She served for 12 years as deputy chief clerk for New London's judicial district and is also a registered patent attorney. **Jeffrey Gross** joined Accordant Investments as executive director. In his role, he works

with financial advisors across the country to further Accordant's private real estate investment solutions for clients. He has more than 20 years of experience in the real estate financial industry, most recently serving as senior vice president at Bluerock, a capital marketing company.

2000

William “Bernie” Till (MS) was named a fellow for Boston Government Services, an engineering, technology, and security firm specializing in advancing the missions of government and national organizations and projects. He has over 30 years of experience at the U.S. Department of Energy as a fire protection engineering expert and is an active member of several prominent national technical committees for fire safety.

2003

Bryan Ruoff is the city engineer for Keene, N.H. He has nearly 20 years of experience in various engineering fields, including civil design, flood mitigation, and road rehabilitation. He is responsible for “overseeing public infrastructure projects,” including managing the planning, design, construction, and technical support for public projects, such as water system and road improvements, according to the announcement.

2004

Jeremy Hitchcock was appointed to the Board of Directors for Business Executives for National Security (BENS), helping it form strategic partnerships and

share best practices. He is the co-founder and partner at New North Ventures, a venture capital firm that focuses on using dual-use technology to solve “national security and commercial market problems,” according to the company’s profile.

2008

Jillian Kaplan is a contributing author to Dell’s company blog. She is a senior product marketing manager for artificial intelligence and infrastructure product marketing at Dell Technologies with 20 years of experience in network engineering, product management, and marketing operations.

2011

Alan Lazaros was a guest speaker on the *Should Have Listened to My Mother* podcast, a platform to discuss female role models and the roles they play in people’s lives. In the episode, he discussed his family background, formative years, and how that influenced his educational and professional endeavors. He is the CEO, founder, co-host, and peak performance business coach for Next Level University, a life-coaching and podcast solutions organization.

2012

Alfredo Barragan, MBA, was a presenter at the International Manufacturing Technology Show with the presentation “Cutting Edge Innovations: Maximizing Productivity and Best Practices with Superabrasives.” He has held several prominent positions

with Saint-Gobain Abrasives, including senior application engineer and product engineer.

Codie Keene was honored by Marquis Who’s Who for his expertise in construction and entrepreneurship. Those chosen for Marquis Who’s Who are considered based on “position, noteworthy accomplishments, visibility,” according to the announcement. He has over 15 years of experience in high-end residential and commercial construction. He owns Summit Homes construction company in Rangeley, Maine, and co-owns of The True North Lifestyle community forum for hunting and fishing.

2013

Wesley Ripley is the head of technology and co-founder of Weven, a venue management system aimed at increasing efficiency in company operations and increasing customer satisfaction. He is an expert in web and software engineering and leads Weven’s technology team in platform development.

2015

Jonathan Arnone was appointed CEO of Kismet Commerce, a service and workspace provider for small businesses and e-commerce entrepreneurs based in Newton, Mass.

2016

Judy Zhang was a featured author on PubsOnLine. She is a doctoral candidate in marketing at Fisher College of Business at The Ohio State University. Her research “focuses on creating empirical

models to analyze consumer decision making and to identify the underlying drivers of consumer choices, as well as advancing methodologies in the field,” according to her author description.

2017

Daniel Braconnier was featured in Northeastern University’s PhD spotlight news series for his project work and for a paper published by the Royal Society of Chemistry. He received a Mechanical and Industrial Engineering Chair’s Fellowship upon commencing his PhD program in 2019 and is a member of Northeastern’s Directed Assembly of Particles and Suspensions Laboratory. He also received the inaugural Student Innovator of the Year Award in 2024 from Northeastern’s National Academy of Inventors for his patent-pending thermally conductive polymer composites.

Charles Hill spoke at the BioProcess International 2024 conference in Boston this past September with a session titled “Letting the Past Pave the Future –Looking Back at Monoclonal Antibodies Production Journey to Transform the Manufacturing of Advanced Therapeutics.” He is the senior field application scientist at Repligen Corporation, where he helps companies implement upstream filtration technologies. He has seven years of experience in therapeutics, gene therapy, and cell theory applications.

2019

Nathan Rosenberg and **Marc Printz** were featured in an article by *TechCrunch* that discussed their

start-up Farmblox, a farm automation platform. Nathan was also interviewed by *Pulse 2.0* about the company. Farmblox is a solar-powered monitoring company that allows farmers to track soil moisture and water waste more efficiently, reducing the amount of labor needed on a farm. (Read more on page 32.)

Emily Molstad, the co-founder and CEO of VALIS Insights, a metal recycling software platform, received a \$20,000 grant from the Boundless Futures Foundation. This grant funds female-owned businesses that impact society, and recognized her work in using artificial intelligence and software to improve recycling and sorting efforts of scrap metals. She was also named to the *Worcester Business Journal*’s “Forty Under Forty 2024” list for her sustainability work with VALIS.

Sathwik Bharadwaj, MS ’19, PhD ’20 was mentioned in an article by Phys.org titled “Researchers unlock light-matter interactions on sub-nanometer scales, leading to ‘picophotonics.’” He is a member of a research team focused on atomic matter. “Natural materials themselves have rich intrinsic crystal lattice symmetries and light is strongly influenced by these symmetries,” he says. “The immediate next goal is to apply our theory to the plethora of quantum and topological materials and also verify the existence of these new waves experimentally.”

2024

Mira Plante, one of the first young women to become an Eagle Scout, was the keynote speaker at Boston’s Salute to Scouting Gala last July.

By Michael Dorsey

Ron Biederman, Materials Engineering Professor Who Helped Solve a 9/11 Mystery



Ronald R. Biederman, a longtime professor of mechanical engineering at WPI and head of the university’s materials engineering group, passed away on Nov. 14, 2024. He was 86.

Biederman earned three degrees at the University of Connecticut (BS in mechanical engineering and MS and

PhD in materials science) and began his career—and his fascination with materials—as an instructor of metallurgy at UConn. He joined WPI in 1968, helping build a modern materials engineering program with state-of-the-art laboratories in the Washburn Shops that included an electron microscope facility, which he directed.

His research included studies of the properties and performance of metal alloys, including the behavior of zirconium used in nuclear reactors. He was also interested

in how and why metals fail, expertise that was put to the test in 2001 when WPI received samples of steel from the collapsed World Trade Center towers to analyze.

The fires in the towers on 9/11 were not hot enough to melt the buildings’ structural steel, but an analysis by Biederman and materials engineering professor **Richard Sisson** showed that the steel had undergone eutectic reactions on its surface, which can cause “intergranular melting capable of turning a solid steel girder into Swiss cheese,” WPI’s *Transformations* magazine reported in its Spring 2002 issue.

In 1982, Biederman, who often consulted for industry, was selected as George F. Fuller Professor of Mechanical Engineering at WPI, named for the former chairman of Worcester’s Wyman-Gordon Co., a maker of metal forgings. He was also a fellow of ASM International and was named to UConn’s Academy of Distinguished Engineers.

Biederman is survived by his wife, Patrica, sons Brian and Scott, stepdaughters Gina and Christina, two grandchildren, a brother, and numerous nieces and nephews.

Bob Norton, Mechanical Engineering Professor, Authority on Machine Design



Robert L. Norton, emeritus professor of mechanical engineering and a noted authority on machine design, died June 22, 2024. He was 85.

Norton earned undergraduate degrees in mechanical engineering and industrial technology at Northeastern University and a master’s in engineering design at Tufts

University. Before joining WPI in 1981, he spent two decades solving complex challenges for organizations like Polaroid (where he designed cameras and high-speed automated production machinery) and Tufts New England Medical Center and Boston City Hospital (where he helped develop an artificial heart).

With expertise in kinematics, dynamics of machinery, and cam design, he was active for many years as a consultant to industry. He sought to give WPI students the opportunity to gain practical experience by establishing the Gillette Project Center, where mechanical engineering

majors worked on real-world manufacturing projects at the company’s state-of-the-art manufacturing center in Boston.

His innovations resulted in 13 patents. Among his many honors, he was a fellow of the American Society of Mechanical Engineers (ASME) and received ASME’s prestigious Machine Design Award. He was the author of three textbooks on machine and cam design and manufacturing, as well as several engineering design software packages.

A talented and dedicated educator, Norton held WPI’s Russell M. Searle and Morgan Distinguished Instructorships in mechanical engineering, and was the first faculty member to hold the Milton Prince Higgins II Distinguished Professorship. WPI honored him with its Board of Trustees Award for Outstanding Teaching and an honorary doctorate in engineering. In 2007 he was named Professor of the Year for Massachusetts by the national Council for the Advancement and Support of Education.

Norton is survived by Nancy, his wife of 63 years, sons Robert Jr. and Thomas, daughter Mary, five grandchildren, one great grandson, and many nieces and nephews.

By Michael Dorsey

Kaveh Pahlavan, ECE Professor, Pioneer in Indoor Wireless Communication



Kaveh Pahlavan, whose pioneering work in indoor wireless communication as a professor of electrical and computer engineering at WPI helped pave the way for today's ubiquitous Wi-Fi networks, died Nov. 2, 2024, at the age of 73.

After earning an MS in electrical engineering at the University of Tehran and a PhD in electrical engineering at WPI, he taught at Northeastern University and worked in industry. He began working on the challenges of wireless networking while consulting for GTE Laboratories in the early 1980s.

When he joined the WPI faculty in 1985, indoor wireless data communication was in its infancy. Pahlavan established the nation's first university research laboratory in the field (the Center for Wireless Information Network Studies) and received the first National Science Foundation grant for indoor wireless network research.

His early work focused on the challenges of the indoor

environment, where radio signals bounce off walls and furniture and arrive at a receiver along multiple paths. His lab developed numerical models that helped scientists understand and overcome multipath distortion, and built technology testbeds to demonstrate wireless networking innovations. He later conducted research in other areas of wireless communication, including indoor geolocation and body-area networks.

Pahlavan also brought the international wireless community together for pioneering conferences and workshops he organized in conjunction with the Institute of Electrical and Electronics Engineers (IEEE). The founding editor-in-chief of the first international journal on wireless information networks, he also published four textbooks.

His many honors included being named the Weston Hadden Professor of Electrical and Computer Engineering at WPI and a fellow of IEEE; receiving WPI's Board of Trustees Award for Outstanding Research and Creative Scholarship; and receiving the first Fulbright-Nokia Fellowship.

He leaves his wife, Farzaneh, son Nima, daughter Nasim, three grandchildren, two brothers, and two nieces.

Jim Pavlik, Accomplished Researcher in Photochemistry, Former Department Head



James W. Pavlik, professor emeritus of chemistry and biochemistry at WPI and former head of the Chemistry Department, died Nov. 21, 2024, at the age of 87.

Pavlik received an undergraduate degree in chemistry from Carthage College and an MS in chemistry from Virginia Polytech-

nic Institute. He spent several years in Africa, where he taught chemistry at Prempeh College in Ghana and Addis Ababa University in Ethiopia, and then worked as a research chemist with the FDA in the United States. After receiving a PhD in organic chemistry from George Washington University, he accepted a position at the University of Wisconsin, River Falls, where he attained the rank of associate professor. He joined the WPI faculty in 1974.

With 70 publications in international chemistry journals and more than 100 presentations at national and international conferences, he made significant contributions to photochemistry, a field that explores how light initiates and changes chemical reactions. Using tools like lasers and spectrometers, he and his research team sought to unravel complex interactions that might transpire in less than a trillionth of a second. The goal was to follow complex chemical and biochemical pathways that might help in the synthesis of medically and industrially useful compounds.

Pavlik was named head of the Department of Chemistry (now the Department of Chemistry and Biochemistry) in 1980 and served in that post for 17 years. His accomplishments as an educator were recognized by the university in 1981 when he received the Board of Trustees Award for Outstanding Teaching. He retired in 2019 after 45 years on the faculty.

He is survived by his wife, Maryann, daughters Claire and Anne, son David, a stepson, James Fuller, 11 grandchildren, and six great-grandchildren.

A Meaningful Life

CONTINUED FROM PAGE 64

fulfilling process by which we are *more likely to actually meet those needs*. There could be many reasons behind why we take these shortcuts, but psychology research has identified a fascinating phenomenon called the “liking gap,” which describes how we underestimate how much others will like us after conversing with them. We also tend to underestimate how much we enjoy having conversations with others. As a result, we can be anxious and avoidant when it comes to face-to-face interactions. This avoidant posture is understandable, but when defining and developing meaning throughout one's life, there are no “hacks” and no shortcuts; (repeated) failure, confusion, and hard-won self-insights are the rule, not the exception, when it comes to meaning making. The seductive convenience of AI and other innovative technologies can short-circuit this process by offering us quick answers and a sense of control over our lives that we never had to begin with.

To avoid these pitfalls, we would do well to carve out time and space *without* this technology and replace it with intentional, slower-paced activities that can nourish us and bolster our well-being: going on a walk outside, calling (not texting) a friend or family member, journaling, or just curling up with a book by a favorite author.

AI tools promise much, and in some respects they can and do deliver on those promises. But, we must take care to preserve and enhance ways of being that make us human in the first place. One of those things is simply having ample space and opportunity to reflect, question, learn, and simply be—whether in our own heads, or when interacting with others.

Ernest Kretzmer '45 EE, ALPHA EPSILON PI, Sarasota, Fla.
Albert Soloway '48 CH, ALPHA EPSILON PI, Columbus, Ohio
Stanley Jorczak '54, PHI KAPPA THETA, Rockport, Maine
William Griffiths '58 CE, MS CE, SIGMA PHI EPSILON, Everett, Pa.
Richard Kingsley '59 CH, LAMBDA CHI ALPHA, Lynchburg, Va.
Armand Ruby '59 CH, Hingham, Mass.
Richard Long '60 EE, Houston, Texas
Joseph Little '61 ME, Gainesville, Fla.
A. Otis '63 CHE, SIGMA ALPHA EPSILON, Carmel, Ind.
Charles Knothe '66 ME, Wilmington, Del.
Ronald Tata '66 CE, PHI KAPPA THETA, Bristol, Conn.
Charles Diman '67 CHE, TAU KAPPA EPSILON, Charlotte, N.C.
Raymond Rogers '67 MG, SIGMA PHI EPSILON, Westminster, Mass.
Peter Lalor '70 ME, Englewood, Fla.
Joseph Ausanka '71, ALPHA TAU OMEGA, Shrewsbury, Mass.
Mark Fritz '72 MA, Epping, N.H.
Lester Couture '73 EE, Feeding Hills, Mass.
Frederick Kulas '73 ME, Framingham, Mass.
Nikito Baker '75 MA, MS MA, SIGMA ALPHA EPSILON, Shrewsbury, Mass.
Kenneth Fox '77 ME, PHI KAPPA THETA, Buckeye, Ariz.
Jeffrey Roberts '92 ME, Ludlow, Mass.
Anthony Iannotti '00 CE, East Falmouth, Mass.
Anthony Catalfomo '07 EE, Williamston, S.C.
Eamon Kerrigan '12 PSM, Pembroke, Mass.
Elizabeth Scott '24 BE, Tyngsboro, Mass.

The WPI community also notes the passing of these friends of the university: Betty Hale and Claire Gaudiani.

Complete obituaries can usually be found online by searching *legacy.com* or newspaper websites. The Alumni Office will assist classmates in locating additional information. *Contact alumni-office@wpi.edu*.

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A Meaningful Life in the Age of AI

BY RICHARD LOPEZ, ASSISTANT PROFESSOR OF PSYCHOLOGY AND NEUROSCIENCE

This essay was originally published on the John Templeton Foundation website *Templeton Ideas*.

At one point in the unnervingly prophetic film *Her*, Theodore Twombly’s wife, Catherine, remarks, “You always wanted to have a wife without the challenges of actually dealing with anything real.” Catherine makes this cutting proclamation as the couple are undergoing a divorce. At the same time, Theodore has been developing an increasingly intimate relationship with his AI-powered virtual assistant, Samantha.

Catherine is right. Today, we are like Twombly, trying to navigate a technological revolution that is as dazzling as it is disorienting. *Her* imagines a fragmented and lonely future in which advanced AI agents learn and evolve. This is not unlike our world in 2024. With generative AI tools that leverage seemingly godlike powers of large language models (LLMs), we have vast amounts of knowledge at our (literal) fingertips. With simple prompts, AI agents can instantly create the mundane-but-useful (e.g., boilerplate emails) as well as the ethically fraught (e.g., writing sermons or legal documents).

As impressive as these capabilities are, I wonder if, like Twombly, we are effectively bypassing the demanding but necessary work involved in how we think, reason, and relate to one another that would otherwise shape us into more thoughtful, humble, and compassionate human beings. Underneath Twombly’s arguably misplaced affections for Samantha is a fundamental human need for connection and belonging. At some level, who can blame him for trying to meet that need in a non-human agent? However, there are non-trivial aspects of current AI tools that can severely undermine how we satisfy essential human needs.

ANSWERS INSTEAD OF UNDERSTANDING

For starters, spending five minutes conversing with ChatGPT is no substitute for what the late Richard Feynman called, “the pleasure of finding things out.” In a now-famous video interview, Feynman says, “there is a difference between knowing the name of something and really knowing something.”

To deeply know and understand something, whether it be a law of physics, literary criticism, or how people are prone to follow groupthink, there must be *gradual grappling with the matter at hand*. There is no way the human brain can properly sort and grapple with information in a few minutes time, especially if that information is novel, and form a deep and nuanced understanding of the subject matter.

The rapid responses that spill out of AI-powered chatbots are convenient and convincing, but they can give the user false

assurance that they sufficiently grasp an idea or concept they just queried. Not only does this potentially mislead or misinform, but it robs us of a more gradual, rewarding process marked by wonder, frustration, and ultimate gratification when we deepen our understanding, or reach a point at which we humbly admit we *don’t know* something! People have a deep and real need to find purpose and meaning in their lives, but the frenzied pace of an AI-infused culture is not conducive to meeting that need.

DISPLACING SOCIAL INTERACTION

Another concerning aspect of current AI tools and technology is that they are an inherently transactional medium that can easily supplant in-the-flesh human interactions. Most folks come to ChatGPT and other generative AI agents for answers: “I make my query, now you give me what I want,” which has led some to call ChatGPT “Wikipedia on steroids.” That approach is not inherently problematic, but it can discourage people from taking pains to converse with others—with all the banter, awkwardness, and joyful unpredictability that human interactions often entail.

For example, in college classes I have noticed that students will sometimes sit in silence and open ChatGPT instead of discussing a question with their classmates. Whether they are experiencing social anxiety or motivated to quickly arrive at “the right answer,” students choose to interact with AI agents over their peers. Will ChatGPT sometimes provide useful responses to discussion prompts? Sure, but students end up missing out on all that class discussions can be: confusing, exciting, exasperating, boring, illuminating, and everything in between. This is reminiscent of the “displacement hypothesis” with regard to excessive social media use: the real harms from social media—or overreliance on AI in this case—may not primarily arise from technology itself, but rather the time suck that it can impose on us, displacing activities that give us greater joy, purpose, and meaning.

STUNTING PERSONAL GROWTH

This ties into a third consideration regarding the science of human flourishing. Researchers in this field are identifying universal dimensions of health and well-being across cultures and their work has shown that in addition to physical and mental health, strong social connections and a well-defined sense of meaning and purpose are essential pillars of well-being. With respect to social connection, we have seen how AI can crowd out opportunities to interact with others. With respect to meaning and purpose, we can lose opportunities for self-growth and discovery by completely throwing ourselves into the arms of AI, as Twombly does in *Her*.

Indeed, as human beings, we often attempt to satisfy our deep desires and needs without confronting the hard, messy, yet more

CONTINUED ON PAGE 63 <<<

“I believe that providing spaces for WPI students and faculty to meet and work is a meaningful way to give back to the next generation at WPI.”

—Ed Scherer ’63



Ed Scherer ’63 created the A. Edward Scherer ’63 Video Recording Suite at the Innovation Studio’s Global Lab with generous financial support.

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