WPI JOURNAL

THE MAGAZINE OF WORCESTER POLYTECHNIC INSTITUTE | ***WINTER 2023***

MUSIC & SCIENCE in Harmony

For jazz pianist Sergio Salvatore '02, coding is just a form of composing.

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MUSIC & SCIENCE IN HARMONY

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EDITOR
Kristen O’Reilly
wpijournal@wpi.edu

EXECUTIVE EDITOR
Jessica Grimes

CONTRIBUTING EDITORS
Ashley Dill
Peggy Isaacson
Judith Jaeger
Julia Quinn-Szcesuil
Allison Racicot

DESIGN & CREATIVE
Lynn Saunders
Todd Verlander

PRODUCTION MANAGER
Brian O’Connell

CONTRIBUTORS
Arthur Carlson
Amy Crawford
Alison Duffy
Lisa Eckelbecker
Steve Foskett
Sira Naras Frongillo
Jessica Grimes
Judith Jaeger
Jack Levy
Tim Loew
Eileen Brangan Mell
Julia Quinn-Szcesuil
Allison Racicot
Colleen Bamford Wamback
Scott Whitney

ILLUSTRATORS
Albert Espí
Helena Perez Garcia
Jon Krause
Jonathan D. Reinfurt
Meel Tamphanon

PHOTOGRAPHY
Matthew Burgos
Nicole Mago
Jeff Mauritzen
Cole Parks ’24
Todd Verlander

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CONTACT US
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100 Institute Road–Boynton Hall
Worcester, MA 01609

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LETTERS

Letters to the editor may be altered for length, clarity, and accuracy. We ask that letters offer the reader's opinion without rancor. Letters that mock or insult will not be published. Opinions expressed do not necessarily reflect the views of WPI. Send your letters to wpijournal@wpi.edu.

PRINT VS. DIGITAL

For years we've heard that print is dead, or nearly dead, or soon to be dead, depending on the hyperbolic nature of the source. The prediction does make sense from an economic and sustainable point of view—paper and mailing costs keep going up, and trees might better be used for soaking up carbon dioxide to keep the planet from dying. We also increasingly consume information online, where words can be enhanced with multimedia to create a more visually engaging package.

Interestingly, magazines such as the *WPI Journal* are an exception to the digital trend. Industry surveys show that many readers—young and old—prefer reading university magazines the old-fashioned way, in print form sent through snail mail. There's something to be said for physically flipping through the pages of a well-designed publication, reading stories that catch your eye through clever headlines or striking visuals, without the need of an electronic device. And, yes, editors are fully aware which quiet room you might be in when reading.

On the other hand, the digital presentation does allow us to tell stories in a more engaging way, especially when we can feature the work of our talented multimedia team. We also can offer links to related information and—coming soon—a way to comment on a story for added reader engagement.

Another huge digital benefit is the ability to easily share a story you might find interesting—by quickly sending off a link in an email or text, or sharing via social media. At the suggestion of a reader, we're trying an experiment in this print version in an attempt to combine the best of both worlds. You'll see a now-ubiquitous QR code at the end of the three main features in this edition that will take you to the digital version of the story, allowing you to share if you are so inclined. Let us know if you find this helpful or simply a distraction.

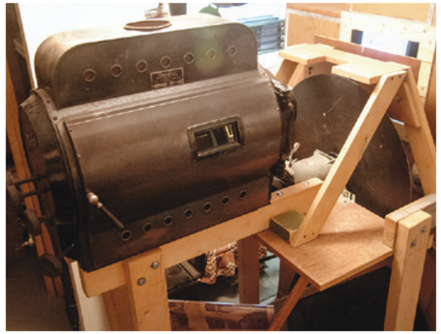
May you find peace and happiness in the new year.

—Kristen O'Reilly, Editor

P.S. Some readers received an email survey back in 2020 that asked their preferred way of receiving this publication. Based partly on the results of that survey, and as a cost-saving measure during the uncertain times of the pandemic, the print run of the *Journal* was decreased. As we work on future distribution plans, let us know if you missed the survey or want to change the way you receive the *Journal*: infoupdate@wpi.edu.

Erratum

The Global Impact story in the Fall 2022 *WPI Journal* omitted the name of the co-founder of the Melbourne Project Center, Matt Ward '77, late professor of computer science. Also, Jonathan Barnett '74 is professor and co-founder of the Department of Fire Protection Engineering and professor of mechanical engineering. The story has been updated online. The *Journal* regrets these omissions.



TO THE EDITOR,

I found the Lens and Lights comment in the Fall 2022 *WPI Journal* [Letter to the Editor] interesting, especially since I am well acquainted with "ancient" carbon arc projectors. The problem with operating them is that they need to be vented due to the very toxic fumes generated by the carbon arc.

I built a reproduction of a 1930 vintage TV camera using a vintage Peerless arc projector, producing an intense spot of light that passed through a rotating disc having a peripheral ring of holes.

The resulting spot of light passed through a lens and produced a rudimentary "raster," which scanned the subject with the reflection picked up by photocells.

Thus, the first TV camera!

—Richard Brewster '60

WINSTON "WOLE" SOBOYEJO

"Sometimes it's easy to forget how precious access to education and teaching tools is in other parts of the world, but Geneva provided some indelible reminders. Upon receiving their XRP and learning that these robots will cost less than $50, will be just as programmable as far more expensive robots, and will come with built-in educational and software support, some of the teachers and mentors actually wept."

This university is experiencing some incredible developments that won't just make WPI stronger; they will also make the world better.

This was stunningly evident in Geneva, Switzerland, in October 2022, when WPI and DEKA Research & Development Corp.—established and led by Dean Kamen '73, one of the nation's most prolific inventors and the founder of FIRST and FIRST Global robotics competitions—introduced the game-changingly affordable and easy-to-build XRP (Experiential Robotics Platform) robots. Over the next few days, beta versions of the robot were given to the 185 teams of high-school-aged roboticists from 180 nations who were competing at the 2022 FIRST Global Challenge.

The experience was unforgettable due to a profound mixture of inspiration, excitement, pride, and humility. The international diversity within the Palexpo arena showed itself through different languages and cultures. But those differences were small when compared to the overwhelming spirit of collaboration and support shown by the nearly 2,000 students, mentors, teachers, and guests who were helping and cheering on new friends from other countries, sometimes from nations often at odds with one another. It was also humbling and heartening to learn about the teachers and mentors who had spent their time—and often their own resources—to engage kids in robotics in order to make STEM less intimidating because they know it will help create a better future for their students, communities, and the world.

Sometimes it's easy to forget how precious access to education and teaching tools is in other parts of the world, but Geneva provided some indelible reminders. Upon receiving their XRP and learning that these robots will cost less than $50, will be just as programmable as far more expensive robots, and will come with built-in educational and software support, some of the teachers and mentors actually wept. They immediately saw the potential and told us they needed to get more of these robots—and fast. Within three days it was clear the demand would surpass a million units. Now we are busy working with DEKA and others to make this vision a reality.

As part of a larger global STEM education initiative, WPI will support these teams and work in new and profound ways to leverage WPI's expertise to help communities around the world. Although these are early days, we are already seeing exciting signs of progress and can look forward to great developments on that front.

Then, in November, the Board of Trustees named Grace Wang as our 17th president. Hundreds of community members helped define what was most needed in WPI's next leader, and a dedicated team of trustees, administrators, faculty, staff, and students reviewed more than a hundred candidates and interviewed an impressive slate of national contenders. Their efforts paid off. Grace is an accomplished and impressive academic, researcher, and professional—and a warm and charismatic person. When she takes up the mantle on April 3, 2023, she will make a wonderful leader and a tremendous addition to our community.

During the course of our conversations, it has become increasingly clear that Grace and I share not only many similarities in our professional backgrounds, but also a common vision for the future. I look forward to working with her, and I'm certain you will share those sentiments when you have the chance to get to know her.

Cheers,

Wole

WIT

The latest in university news, research, and commendations

ILLUSTRATION BY MEEL TAMPHANON

A RECIPE FOR NET-ZERO AVIATION FUEL

An interdisciplinary team of WPI researchers has developed a potential breakthrough in green aviation: a recipe for a net-zero fuel for planes that will pull carbon dioxide (CO_2) out of the air. The research, which used sophisticated computational modeling and analysis, was recently published in the journal *Fuel*.

Led by **Jagan Jayachandran,** assistant professor of aerospace engineering, and **Adam Powell,** associate professor of mechanical and materials engineering, the work helps address an urgent climate change problem. Aviation accounts for approximately 2.5 percent of all global greenhouse emissions, according to the International Council on Clean Transportation (ICCT), and that number is only expected to increase.

"As aviation continues to grow, so will the industry's emissions," says Powell. "We need to think out of the box and look at sustainable materials that will contribute to a long-term solution toward reducing the transportation sector's carbon footprint."

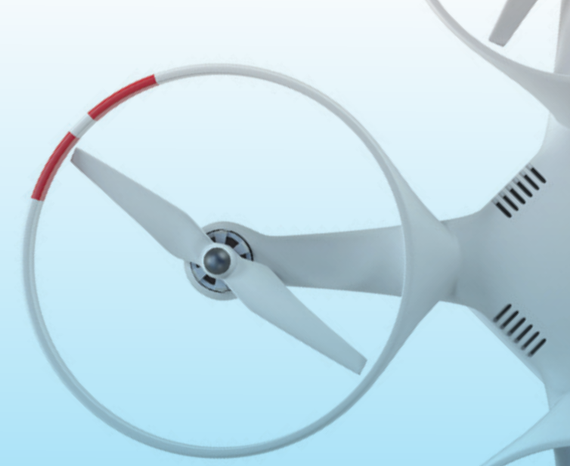
Through modeling and computation analysis, Jayachandran and Powell developed a formula for a fuel that consists of magnesium, a mineral that is found all over the globe, most abundantly in the world's oceans. A slurry of magnesium hydride—a chemical compound made up of magnesium and hydrogen—mixed with hydrocarbon fuel would burn to produce CO_2, water vapor, and magnesium oxide (MgO) nanoparticles. The magnesium hydride fuel would also give planes the range for long-haul flights, something that has been a challenge for other sustainable aviation fuels to provide. That longer range is achieved, in part, due to the chemical properties of the slurry—a lower volume is needed for combustion than a typical aviation fuel.

"We found this fuel would have up to 8 percent more range than today's jet fuel, and more than two to three times longer range than liquid hydrogen or ammonia, which other researchers have proposed as sustainable fuels," says Jayachandran.

The Department of Energy describes a sustainable aviation fuel as a "biofuel used to power aircraft that has similar properties to conventional jet fuel but with a smaller carbon footprint." These biofuels have been made from resources including corn grain, algae, forestry, and agricultural residues, among others. Using a biofuel as the hydrocarbon in this slurry with magnesium hydride could potentially lead to net negative emissions.

The research was supported by a WPI TRIAD Seed Grant, a university award intended to encourage and promote interdisciplinary collaboration and innovation.

—Jack Levy



USING DRONES, RADAR, AND AI, RESEARCHERS AIM TO IMPROVE IRRIGATION

Seyed (Reza) Zekavat and a team of researchers are bringing together drones, ground-penetrating radar, and artificial intelligence algorithms to develop a low-cost system that will rapidly map root-zone soil moisture levels on large farms and help farmers irrigate more efficiently.

The $1,172,896 project has launched with outdoor soil-mapping experiments at Gateway Park and will run for three years, funded by a grant from the U.S. Department of Agriculture (USDA). The early work at WPI will lead to field trials at farms in Michigan.

"Current irrigation technology needs improvement," says Zekavat, principal investigator of the project and a professor in the Department of Physics and data sciences program. "Farmers can use probes to measure moisture at specific sites in a field, but it's impractical to install probes to determine root-zone moisture levels across large farms—for example, those that are bigger than 500 acres. Satellite-based microwave systems can cover large areas, but the resolution is low and only provides information about surface moisture. Mega farms need root-zone moisture information to determine where to irrigate, how much to irrigate, and how to reduce runoff that strips minerals from the soil."

Water use has become a critical issue for agriculture in recent years as droughts have parched U.S. regions and states have grappled with questions about who can tap into rivers and aquifers. At the same time, farms have been growing larger and expanding irrigation. About 56 million acres of U.S. farmland were irrigated in 2018, according to the most recent USDA Census of Agriculture.

The project's goal is to produce technology that can prescribe optimal irrigation techniques for farmers with large acreages that have complex soil features. Researchers will initially work with Michigan farmers and then disseminate information to farmers nationwide through education and training.

Collaborators on the project include co-PI **Douglas Petkie** (professor and head of WPI's Physics Department), researchers at Michigan Technological University and Michigan Tech Research Institute (MTRI), Michigan state agriculture officials, and Michigan farmers.

—Lisa Eckelbecker

PROMOTING INSPIRATION THROUGH 3D PRINTED ROBOTS

Pretty much since he stepped off the Commencement stage, **Ezekiel "Zeke" Andreassen '22** has been busy in a lab in WPI's Unity Hall, 3D printing inspiration.

He was deeply involved in the design and manufacture of the XRP (Experiential Robotics Platform) unveiled by WPI and DEKA Research & Development Corp. at the 2022 FIRST Global Challenge in Geneva, Switzerland. (See related story.) The kits include everything needed to make a robot: the robot parts (3D printed on campus), wire harness, battery compartment, wheels, and manipulator.

Each of the 185 FIRST Global teams returned to their 180 nations with the challenge of using the XRP kit (or giving it) to help other students with fewer resources be able to engage in robotics. WPI will provide virtual support for teachers and high school students in basic robotics education through online courses, and will guide them through the new system, which gives them the ability to scale up using the same hardware with free software updates. Andreassen credits WPI's Manufacturing Engineering Department, the Rho Beta Epsilon robotics engineering honor society, and the prototyping lab with helping make the kits a reality.

But the kits go beyond simply making and programming a robot. "The first mission is to inspire," Andreassen says, "with the teacher as the catalyst behind the inspiration."

He was offered the opportunity to work on the XRP kits by Brad Miller, former director of the WPI Robotics Resource Center and senior fellow for WPI's new Global STEM Education Initiative. Describing what he's learned from Miller, he notes that "kids learn when they see a robot move and it makes them hungry to learn more." That's the real idea behind the kits—to fuel that hunger not only for robotics, but for STEM in general, around the world.

Andreassen, who came to WPI from Florida, was drawn to "the unhindered access to make stuff" that WPI students enjoy. He visited other universities where labs and maker spaces were available to students only during class and lab times, but that was never his experience at WPI.

"WPI can really enable you, and I've not been disappointed with how I've been enabled," he says.

From running the bouldering wall in Harrington Auditorium to participating on the Ribbot BattleBots team and competing on the popular TV show, to working as a robotics lab assistant, Andreassen says he's been able to grow and also learn where he wants to direct his time now.

"I care deeply about robotics education," he says. "One of the things I'm learning is I'm an engineer. I want an engineering project I can sink my teeth into."

—Judith Jaeger

INEXPENSIVE ROBOTS A GAME CHANGER FOR GLOBAL STEM EDUCATION

Hours before the opening ceremonies of the 2022 FIRST Global Challenge robotics competition in Geneva, Switzerland, a deceptively small, inexpensive, new robot made its global debut. Although the game-changing XRP (Experiential Robotics Platform) robot, developed by WPI and DEKA Research and Development Corp., is still in beta form, its powerful potential was clear—as was the international demand for it.

"We gave XRP beta kits to every competing team and asked them to share with other schools or organizations in their home countries who are looking to implement or expand robotics programs," says **Joseph Doiron,** director of WPI's new Global STEM Education Initiative, assistant teaching professor in The Global School, and co-director of the Global Lab.

"Within three days we discovered that the need for these kits already surpasses a million robots. We left Switzerland with a long list of global partners—from grassroots organizers to top officials of various nations, and even an ambassador—all of whom see the tremendous potential of the XRPs and the great benefit of having WPI's guidance and support. Not only that, but we've attracted interest from musician and philanthropist will.i.am, whose foundation helps transform lives through education."

XRP robots have simple, inexpensive, easy-to-build platforms that are just as programmable as far more expensive robots. They also come with built-in educational and software support, are designed to operate autonomously, perform basic tasks, navigate on their own, sense distance, and manipulate their environment. The XRP's tool-free assembly allows for a quick build, and parts can be replaced easily by a 3D printer. When they come to market, they will measure 7x5 inches, weigh less than one pound—about the size of a box of chocolates—and cost less than $50. With the kits, educators and students also get access to free online courses, created and supported by WPI, on how to build, program, and control the robot, which they can scale up using the same hardware with free software updates.

"Based on the overwhelmingly positive feedback that we received in Geneva, we know that STEM educators, mentors, and trainers recognize the potential these XRP kits have for introducing young people to STEM—and to the power it unleashes within them," says WPI Interim President **Winston "Wole" Soboyejo.** "The global appeal of the XRP is important because we cannot solve the world's great problems without a diversity of STEM professionals with different insights and experiences working together. WPI and our long-term partners at DEKA created the XRP to address that critical diversity gap. The XRP will help address the lack of access to hands-on STEM education opportunities among less well-off populations, thereby expanding and filling the global STEM education pipeline so that we can spark more imaginations and ignite more flames of curiosity that will help with the important work of addressing global needs."

"Unveiling the XRPs and sharing them with the teams and their mentors was a validating experience," says **Brad Miller,** former director of the WPI Robotics Resource Center and senior fellow of WPI's Global STEM Education Initiative. "A lot of thought and consideration went into creating every aspect of that platform, and what we heard was almost like a collective sigh of relief. This is not like anything else that exists, and you can't go online to order something similar at this price point. We heard expressions of gratitude, and requests for speed. People were telling us they needed thousands more of these made—and fast—which was only surprising in the sense of magnitude; we knew educators and mentors wanted an affordable, high-quality STEM education tool, but we didn't realize just how much."

During the trip to Switzerland, Soboyejo also joined **Dean Kamen '73,** founder of DEKA and FIRST Global, for the XPRIZE ESG Leadership Summit—along with other global innovators, including CEOs and chief sustainability officers, who are committed to actively working on environmental, social, and governance issues, especially in the areas of climate, energy, biodiversity, and conservation. At this elite two-day gathering, leaders came together to discuss their sustainability efforts, share best practices, learn, and collaborate.

—Eileen Brangan Mell

AUGMENTED REALITY PROJECT ALLOWED MUSEUM VISITORS TO TRY ON ANCIENT JEWELRY

Thanks to WPI students, visitors to the Worcester Art Museum (WAM) were able to view ancient rings, necklaces, and amulets, and then try them on—at least virtually.

The augmented reality project began in 2021, months before the exhibit "Jewels of the Nile: Egyptian Treasures from the Worcester Art Museum" opened. The students spent weeks processing and importing 3D scans of the real jewelry into a virtual environment; they ultimately created an AR app that allowed museum visitors to "wear" various pieces of jewelry, take pictures to share with friends, learn about the jewels' backgrounds, and find the real pieces on display using the museum's map.

"Being involved in such an important project that connects us to our past in the most modern of ways was a once-in-a-lifetime opportunity," says Claire Li, an IMGD PhD student in computational media. "The experience gave our team the chance to take what we've learned and put it into practice and into people's hands."

The team also included Skye Pritchard '23 IMGD, Madeline Perry '22 CS, and Tian Dai '23 (MS) IMGD. The project is the result of a collaboration between WAM and WPI's Intentional Design Studio (IDeaS) that brings students together with institutional, corporate, and nonprofit partners to work on creative projects using emerging technologies.

"This collaboration with WPI is just one way we are working to fulfill our commitment to engage visitors in new ways, both in the museum and in the digital realm," says Matthias Waschek, the Jean and Myles McDonough Director of the Worcester Art Museum.

IDeaS also worked with the museum on the exhibit "The Iconic Jersey: Baseball x Fashion." The team developed a mobile app to let users design a baseball jersey for (cartoon dog) Helmutt, the WAM's mascot.

—Tim Loew

STUDENT CLUB SPOTLIGHT

GREEN TEAM

Established in 2009, Green Team is all about adding a little green to WPI's crimson and gray.

"We're the main environmental organization on campus," says public relations chair Paige Agostini '25, who has been part of Green Team since her first term at WPI in August 2021. From the Climate Action Fair and Project Zero Waste to their free thrift store/clothing swap event, Green Team members emphasize sustainability, action, and justice in their work, all with the goal of creating a greener, more sustainable WPI—and world.

"It's given me a sense of purpose at WPI," says Agostini. "It's given me so much agency over my major and my career, and it has opened countless doors for my future."

—Allison Racicot

QUOTABLE

"We have an idea of what the problem is and the right solution, but until you get to know the community, you don't really know. The only way you can really solve the problem is if we work with the community."

—Art Heinricher, interim senior vice president and provost, quoted in an Oct. 17, 2022, *Worcester Telegram & Gazette* article about the opening of Flourish at Thrive, a food pantry on Grove Street in Worcester. Created with help from WPI students, the Thrive Support & Advocacy pantry offers healthy and culturally inclusive food in a space designed to meet the needs of people with developmental disabilities.

USING TECHNOLOGY TO MAKE RESOURCE SHARING EASIER FOR NONPROFITS

Nonprofit organizations regularly face challenges such as budget cuts, limited resources, and political instability. Now, according to a survey conducted by the National Council of Nonprofits, the increasingly tight labor market, exacerbated by the COVID pandemic, is also hampering nonprofits' ability to hire and retain employees as well as to attract volunteers—both key resources.

Seeking to support the efforts of nonprofit organizations to match resources and assets with client demand and operational needs, an interdisciplinary team of researchers at WPI and Rensselaer Polytechnic Institute has received a four-year, $1,849,994 award from the National Science Foundation to design and implement a new algorithm-based community "collective ecosystem" tool that nonprofits can use to find and share resources—such as event space, transportation for supplies, donations for clients, or even a staff member experienced in grant writing or a volunteer lawyer to review documents.

WPI will receive $1,153,934 for the project, which is one of 14 the NSF is funding through its Future of Work at the Human-Technology Frontier program for the purpose of "leveraging science and engineering to shape a safer, more equitable future of work with opportunities for all."

Unlike a traditional job board or barter exchange, the digital tool being developed will allow multiple exchanges to happen simultaneously. Each organization can set values for the resources it posts on the site and bid on resources others make available, so that the platform will be driven by the needs and assets of the participating nonprofits. The goal is to incentivize organizations to be part of a collective ecosystem where they can not only lend out and borrow resources, but also foster long-term collaboration that equitably benefits every participating nonprofit.

Associate Professor **Andrew Trapp** of The Business School at WPI is leading the university's team and noted, "we are using technology to not only impact the world, but to shape and transform it. Major social media and e-commerce companies have transformed profit-maximizing applications; we are designing cutting-edge technologies for nonprofit organizations that are devoted to increasing social value and human welfare." Trapp has previously developed matching algorithms to help humanitarian organizations match refugees to appropriate services to settle into communities.

Right now, the new tool is in the early stages of development and will undergo multiple iterations over the next four years. The team is partnering with nonprofit organizations in the Baltimore area for an initial pilot study. WPI faculty members **Yunus Telliel** and **Sarah Stanlick,** social scientists who are also major contributors to the project, will conduct fieldwork in Maryland twice a year, gathering information and feedback to make improvements to the platform.

—Jack Levy

A GOLDEN TARGET FOR BREAST CANCER TREATMENTS

Although Interim President **Wole Soboyejo** suspended his duties as provost when he took over his new leadership role in May 2022, he continued to make time for research—something he considers critical to his academic role.

He and an interdisciplinary team of undergraduate and graduate students, postdoctoral researchers, and research faculty members recently reported in the journal *Biomaterials Advances* that gold nanoparticles coated with a polymer and linked to an anti-cancer agent can bind to breast cancer cells that are difficult to target.

The researchers reported that targeted tiny gold particles adhered better to triple-negative breast cancer cells than they did to normal breast cells, making the particles possible candidates for the delivery of anti-cancer treatments to malignant cells that resist other targeted therapies.

Triple-negative breast cancer accounts for about 15–20 percent of all breast cancers. The disease is a global problem, but is more prevalent in younger women, women with inherited genetic mutations, and women of African and African American descent.

"Targeted therapies aim to reduce the side effects of chemotherapy by delivering drugs directly to cancer cells. However, triple-negative breast cancer cells lack the surface receptors that conventional targeted drugs typically bind to," says Soboyejo. "Thus, the development of nanoparticles that target other receptors that are present on the surfaces of triple-negative breast cancer cells could lead to next-generation targeted treatments. The therapeutic approach can also be extended to the specific targeting and treatment of other types of cancer."

The new findings build on earlier research, published in *Nature Scientific Reports* and led by Soboyejo, that identified targeted drugs that reduced the size of triple-negative breast cancer tumors in mice without inducing toxic side effects. However, the recent research focuses on the development of targeted gold nanoparticles that can attach to receptors that are over-expressed on the surfaces of triple-negative breast cancer cells/tissues. Such nanoparticles can also interact with incident laser beams to induce localized heating that can kill the cancer cells at temperatures comparable to those in a warm bath.

In addition to Soboyejo, WPI-affiliated co-authors on the paper include postdoctoral fellow **Arvand Navabi '22, Vanessa Uzonwanne '22 (PhD), John Obayemi,** assistant research professor in the Department of Mechanical and Materials Engineering; **Ali Salifu,** assistant professor in the Department of Biomedical Engineering; **Shahnaz Ghahremani '19; Nelson Ndahiro '18;** and **Nima Rahbar,** associate professor in the Department of Civil, Environmental, and Architectural Engineering. Soboyejo has received funding for his research from WPI, the World Bank African Centers of Excellence, and the Pan African Materials Institute at the African University of Science and Technology.

—Lisa Eckelbecker

FROM LEFT, VLADIMIR VANTSEVICH, GRADUATE STUDENT HUASHUAI FAN, AND LEE MORADI.

OFF-ROAD AUTONOMOUS VEHICLE RESEARCH EXPANDS OPPORTUNITIES

New faculty members Vladimir Vantsevich and Lee Moradi have established an Autonomous Vehicle Mobility Institute (AVMI) at WPI, expanding the university's interdisciplinary research into autonomous vehicle technologies and boosting educational opportunities for students.

Professor Vantsevich and Professor of Practice Moradi, both of the Department of Mechanical and Materials Engineering, are building on their extensive experience managing multimillion dollar autonomous vehicle research projects, and on WPI's existing research, to position the university as a major contributor to the fields of autonomous vehicles for land, sea, air, and space, says Interim President Wole Soboyejo.

"A significant portion of vehicles on and off roads are expected to be autonomous in the coming decades," Soboyejo says. "WPI researchers across departments are already doing groundbreaking work in this field, and Vladimir and Lee will allow WPI to transform the scale of our innovations with their expertise and their ability to bring together collaborators with complementary expertise. This will lead to several new opportunities for our students and prepare them for leadership positions in a field that will define the cutting edge of transportation and space exploration."

WPI's history of autonomous vehicle research spans departments and disciplines. Currently, the university's researchers are working on projects such as models to sift through large amounts of sensor data from autonomous systems and software that will enable groups of lunar robots to collaborate while exploring the moon.

Vantsevich and Moradi worked together as members of the faculty at the University of Alabama at Birmingham for a decade before joining the WPI faculty in early 2022. They co-direct AVMI, which focuses on technology for off-road autonomous vehicles that travel across rough terrain—everything from farmland to battlefields to other planets. Their work has been funded by the U.S. Army, NASA, the U.S. Department of Energy, and industry partners in the United States and Western Europe.

"Much of the current research into autonomous vehicles focuses on cars that travel on roads, but we focus on off-road vehicles, from small robotic vehicles to full-scale vehicles, both manned and unmanned, with as many as 8, 12, or 16 wheels that are driven by electric motors or mechanical drivetrain systems with controls," Vantsevich says. "The technological challenge for these off-road vehicles is making them intelligent enough to sense and understand the terrain under the wheel to supply in real time the correct amount of power to each wheel and thus improve the vehicle's terrain mobility, maneuverability, and energy efficiency. We believe that WPI is an excellent place to engage students, other faculty members, and industry partners in this work."

—Lisa Eckelbecker

GLOBAL INITIATIVE BRINGS ACCESSIBLE K-12 STEM EDUCATION TO THE WORLD

With a growing need to empower and encourage more students around the world in STEM disciplines, WPI's Global STEM Education Initiative leverages the university's expertise and resources to help other countries and under-served schools in the United States provide high-quality, accessible K-12 STEM education the world needs now.

For more than 50 years, WPI has shared its expertise and resources to grow the STEM pipeline, inspire and equip the next generation of STEM leaders, support the educators who introduce students to STEM, and collaborate with global partners in their own communities. With the programming, resources, activities, and support provided by this initiative, WPI is increasing its work with educators around the world to customize and enhance their STEM educational systems.

"WPI has recognized the importance of global demand for STEM education for a very long time," says **Joseph Doiron,** director of the initiative, assistant teaching professor in The Global School, and co-director of the Global Lab. "At the core of WPI's value proposition is hands-on STEM teaching and learning. That's always the starting point. When you couple that with our global presence in 50-plus project centers in all parts of the world, we come equipped with a global network of relationships that is different from other places. We partner with people who share our commitment to tapping teams' multidisciplinary knowledge and lived experience to the fullest benefit. We are already doing this with local communities and around the world."

Whether it is engaging students in STEM at the Farm Stay Project Center's working farm and educational nature center in Paxton, Mass., or using project-based learning modules to establish a consistent method for training teachers in Africa with the Math and Science for Sub-Saharan Africa (MS-4SSA) initiative, WPI's approach is holistic and purposeful. As the globe continues to face increasingly complex challenges, a more diverse population of professionals who can bring different lenses, experiences, questions, and passions to labs and boardroom tables is essential. Creating, translating, and deploying new scientific insights and technologies to benefit everyone's health and well-being will depend upon the inclusion of many perspectives.

As a founding principle, WPI prepares and supports future scientists, engineers, and business leaders in their journeys to become the empathetic, collaborative, and resourceful STEM professionals the world needs. But the university's parallel expertise includes a purposeful and thoughtful approach to inspiring and supporting the educators who teach the content students depend on. Students can't progress without teachers who understand the latest developments, have the tools to convey the information, and are themselves excited by the material.

"The Global STEM Education Initiative will increase our impact on things that many of us across campus care deeply about, which is giving educators the ability to transform their communities through their classrooms," says Doiron. "Our approach is to understand the problems in the local context and share our expertise and help people create solutions based on the local conditions. That lends itself extremely well to training STEM educators. If we can train and educate the people who are going to educate future STEM leaders, we can maximize our own impact and achieve these goals much faster."

—Julia Quinn-Szcesuil

PHOTO BY MATTHEW BURGOS

WINNER OF PRESTIGIOUS PHD FELLOWSHIP FOCUSES ON FAIRNESS IN AI

OLUSEUN OLULANA HOPES TO INSPIRE WOMEN AND GIRLS

After receiving bachelor's and master's degrees in in her home country of Nigeria, **Oluseun Olulana** eventually zeroed in on WPI when deciding where she would pursue her doctorate in data science with a focus on fairness in artificial intelligence. Biases about age, gender, and race can make their way into AI learning models; she says she is evaluating the models used in AI and machine learning to find ways to identify and avoid those pitfalls.

The university's model of blending theory and practice appealed to her, and she wanted to do research while working and gaining valuable experience. The PhD student brought with her a sense of advocacy for women and girls in science. In Nigeria, there are still strong notions about what women can and cannot do in society, Olulana says. She believes being able to pursue her doctorate at WPI could show women and girls that there are viable careers for women in traditionally male-dominated fields.

"I want to add value in a practical way," she says.

In recognition of the importance of her work and her goals, Olulana recently received the American Association of University Women's 2022–2023 International Doctoral Degree Fellowship. She was one of 320 individuals or organizations receiving a total of $6 million in grants or fellowships. The funding will enable her and the other recipients to pursue academic work and lead innovative community projects to empower women and girls.

Elke Rundensteiner, head of the WPI's Data Science program and William Smith Dean's Professor in Computer Science, says she was tremendously proud of Olulana, who is working on Rudensteiner's NSF-funded project focused on fairness and AI, in collaboration with co-principal investigator Lane Harrison and PhD students Kathleen Cachel and Hilson Shrestha. She says the development of solutions for tackling fairness in AI is increasingly important for our society, given the profound impact of AI-based tools on automated decision-making in society from loan applications to hiring processes.

—Steve Foskett

PROJECTS

TRANSFORMING TRASH INTO TREASURE

See how WPI students put theory into practice through projects.

THE STUDENTS: Henrique Checcucci '24, Sol Giesso '24, Can Guven '24, and Efthymios Loukedes '24

OVERVIEW:

A proposal to recycle usable items discarded when students move out of their residence halls won first place and $1,500 in the 2022 WPI Sustainability Innovation Challenge, a weeklong series of networking and skills-building seminars that culminated in a pitch competition before a panel of faculty and alumni. The contest was sponsored by the Innovation and Entrepreneurship Center, WPI's chapter of Engineers Without Borders, and the Office of Sustainability.

THE PROBLEM:

Students could spend about $600 to buy all the items in WPI's residence hall move-in list. The team estimates the average student produces 640 pounds of trash every year, most of which is a result of the moving-out process. Many usable items are discarded because students don't have the time or ability to resell or donate items during the hectic move-out process.

THE PROPOSED SOLUTION:

1. Collect usable items that students might throw away during move-out, store them over the summer, and then have incoming students pick out what they want during move-in.
2. Create a year-round Canvas group where students can post items for sale/trade and find out more about residential waste.

The team estimates each student might save about $70 while keeping thousands of pounds of usable items out of the landfill.

FUTURE STEPS:

1. Identify space to store items over the summer.
2. With help from Green Team, collaborate with the Facilities Department to determine the most convenient drop-off locations for students as they move out.
3. Inform all students about the system—those moving out and those moving in.

The team plans to spend C- and D-Terms moving the idea to the next level with the help of Green Team, faculty mentors, and the Office of Sustainability. The hope is to have something in place by spring 2023.

Joseph Sarkis

PROFESSOR OF MANAGEMENT IN THE BUSINESS SCHOOL

CASSETTE RECORDER
I used this recorder as we traveled to a number of U.S. cities and states to interview pulp and paper industry representatives for a study on sustainability topics. I remember walking down Beale Street in Memphis, Tenn., on one visit.

CERTIFICATE
This is from the American University of Cairo in recognition of an address made on Sustainable Transformation for Cairo and Egypt, with a particular focus on sustainable supply chains. While there as a visiting professor, I rode a camel and saw the pyramids.

PAPERWEIGHT
This comes from colleagues from Universitas Padjadjaran in Bandung, Indonesia, to thank me for giving the keynote address at their conference on sustainability science. The conference was also related to my work with the Greening of Industry Networks (GIN), which I've been involved with for over 25 years. I help organize conferences throughout the world and manage publications for GIN.

THESIS
This is a dissertation thesis for a PhD student from Linköping University in Sweden. I was flown in as an "opponent" to question the student, who successfully defended. It's an hours-long event that ends with a large party to celebrate. I participated in a Finnish one as well, which is called a Koronka.

PHOTO BY TODD VERLANDER

GREETINGS FROM GHANA
This is a gift I received from a Ghanian PhD student in China whose dissertation I supervised. He is now an associate professor at the University of Southampton.

TEAK CARDHOLDER
This was a gift from Hangzhou Dianzi University in Hangzhou, China, where I taught courses on two separate occasions. We were hoping to travel there for IQP projects, but plans have been canceled three years in a row. We are still persevering and eventually will make it back again!

FACULTY SNAPSHOT

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

PHOTO BY MATTHEW BURGOS

IN SIDER

MARTIN THULANI MILANZI BRINGS STEM TO REFUGEE STUDENTS IN ZAMBIA

They say good things come to those who wait, and whoever "they" are, they'd be right. Just ask **Martin Thulani Milanzi '24.**

Shortly after beginning his first year at WPI in the fall of 2020, the chemical engineering major heard about Projects for Peace, an initiative sponsored by the Davis United World College Scholars Program that gives undergraduate students the chance to complete grassroots projects to promote peace and build understanding. While the opportunity was intriguing, the timing was a bit off—from traveling to the United States to start college (amid a global pandemic, no less) and wrapping up his own work with nonprofits and leadership trainings (more on those later), Milanzi was concerned that it would all be too much, too soon. So he decided to tuck the program away for later.

That, as it turned out, was a wise decision, leading to not only a successful first year of college for him, but ultimately an invaluable high school experience for students back in his home country of Zambia.

Bridging the Gap

Hailing from Lusaka, Zambia, Milanzi attended the Pestalozzi Education Centre, which educates students from Lusaka as well as those from the nearby Meheba refugee settlement. His time at Pestalozzi forced him to recognize his own privilege as a Zambian citizen.

"It felt like I was missing something that was happening right in front of me," he says of learning of the struggles of his refugee classmates. In particular, he cites their difficulty in acclimating to Zambian culture and vastly different regulations compared to his own as a Zambian citizen. "There was a big gap between what they could access and what I could access."

An example came during Milanzi's senior year of high school in 2017. While he had several offers to continue his education upon graduation, his best friend, Vianne, was denied a scholarship because of his refugee status.

Disappointed and upset for his friend, Milanzi kept Vianne in mind as he was chosen as Zambia's sole candidate to attend the 2019 Ashinaga Africa Initiative, a six-month leadership training program in Uganda. There, he learned about being a business leader in modern Africa and furthered his skills in using technology to support social development. It was also where he first heard of WPI.

But before his arrival in Worcester, Milanzi checked one more thing off his to-do list: completing volunteer work for the nonprofit Kucetekela Foundation. There, he mentored students and prepared them for SATs and the college application process. In much the same vein as at WPI's project centers, Milanzi was also tasked with finding community service-oriented project opportunities for the students he mentored and, remembering his high school days, he chose to work with the Meheba refugee settlement.

The experience, he says, made him even more aware of not only the students' lack of resources, but their endless ambition and enthusiasm despite their situation. When he was finally ready to revisit Projects for Peace, he knew exactly what kind of project he'd propose.

"I was definitely a bit nervous," he says of finally hitting that submit button on his grant application. "But what stuck with me the most was that through it I would have a chance to go home and contribute something positive."

Mentorship Spanning Continents

And contribute he did. Milanzi's proposal was accepted, and with the $10,000 award he created "Education Meheba—Experiential STEM and Tertiary Education Support for Refugee Children in Zambia." The three-week program allowed him to build on his time and experiences working with students through the Kucetekela Foundation, all while helping refugee students like his friend Vianne.

"There's a world far bigger than the refugee camp they've grown up in," he says. "There are countries around the world where they can travel and make a name and a mark for themselves, and I want to help give them the skills and resources to do that."

During the summer of 2022, Milanzi returned home for the first time since arriving at WPI and ran workshops on everything from science experiments and associated careers to the use of technology to improve interpersonal skills. Other workshops focused on growing as a leader in Africa; writing college essays, scholarship applications, resumes, and cover letters; creating and maintaining a peaceful community; and providing mental health support specific to refugees.

It made for a summer of growth and learning for all, with no shortage of memorable moments. Two of his favorites: the reactions of students when they created a color change in a titration science experiment and then applied the science they learned to other aspects of class; and when a friend used Zoom to discuss the importance of technology in the 21st century, and how the students could use it to access opportunities and improve their livelihoods.

While Milanzi may be back in Worcester and further immersing himself in his own college experience—he's the treasurer of the African Student Association, a student worker at the Rubin Campus Center, and a member of the club soccer team—his plans to continue Education Meheba are just beginning.

"We've got plans to help students with scholarships and connect them with mentors in Zambia and college students at WPI to be role models and encourage them to keep working and bettering themselves," Milanzi explains, adding that they're also working to find a way to make the program self-sustaining.

In the meantime, Education Meheba is still running strong in Zambia. Milanzi stays connected with the students on Zoom throughout the college application process, all thanks to his friend Vianne.

"He's a project assistant with me, and at the end of the project, I had him share his story with the students," Milanzi says. "Seeing him share his story, seeing myself as part of his story, it was an emotional moment, for sure. It really got to me and made me realize how much change I'm capable of bringing to my community."

—Allison Racicot

Dana Harmon, who has served as the director of physical education, recreation, and athletics at WPI since 2002, answers questions about success, mental health, and Title IX.

Several WPI athletic teams and individual student-athletes have achieved regional and national recognition recently. What's the secret to their success?
Our coaches do an outstanding job in recruiting talented individuals who are committed to their academics as well as their athletics, striving for excellence in all that they do. Additionally, our coaches are some of the best in the profession, helping our student-athletes get better not only in their athletic skills but also bringing them together as a team, supporting them academically while also remaining committed to helping them be the best individuals they can be. And it also takes a village—we have a great administrative group that helps support our coaches and student-athletes with all the work behind the scenes required to make this work, day in and day out. We are committed to excellence in competition, in the classroom, in the community, and for each other.

What unique challenges do student-athletes face at an academically challenging STEM school like WPI?
Our student-athletes are really great individuals who fully embrace how wonderful WPI is while they are here for four years and what this education can do for them for the rest of their lives. The challenge is they want to do it all, and do it all perfectly. With the term system, they have to really be disciplined with excellent time management skills—I am in awe of what they do every day. Learning to prioritize and knowing that you can't do everything perfectly can be hard; that's why we talk about striving for excellence and understanding that you can't give 120 percent every day, but to do your best that day, learn from your mistakes, and keep trying to expand your comfort zone. We also know our faculty are really special in helping them achieve a good balance between academics and athletics while also being supportive when there are academic conflicts with athletic contests; that understanding has been crucial in minimizing the academic challenges for our student-athletes, and we are grateful for that support.

What role does physical activity play in the mental health of all our students, not just varsity student-athletes?
Our student body is very physically active, from PE courses to intramurals to club and varsity athletics. We know this physical activity is important to many in helping them with their mental health, wellness, and for managing stress. We hear from many students (and employees!) how much they appreciate the Sports & Recreation Center and outdoor facilities along with the various physical activities they can participate in as they manage their own mental health and wellness. We know our PERA Department has an important role on this campus to provide and support the spaces, equipment, and programming for those seeking physical activity, as well as to help our campus community overall in improving wellness and mental health.

The 50th anniversary of the passage of Title IX was celebrated in 2022. How were you personally affected by this landmark legislation?
This legislation changed my life. I am a "Title IX Baby," since it had just passed when I was reaching the age to participate in sports. There were not a lot of girls' youth sports leagues at that time so I had to tag along with my dad (and brother) as he coached him in myriad different sports. I could participate in practices against the boys but couldn't compete in their games. I was lucky to have a "Girl Dad" (and wonderful brother) who believed in the power of sports for both of his children and wanting us to have those equitable experiences growing up. Eventually some sport leagues for girls started (soccer was first). I had to wait until junior high to participate in volleyball, basketball, softball, and track. Thankfully, I was good enough in basketball to earn an athletic scholarship, something that was still very limited for women at that time, and it helped me get a college education while participating in a sport I loved. It was then that I began to see women like myself be coaches and administrators in college athletics and then I could begin to chart my path toward this wonderful profession in college athletic administration that I have been able to enjoy these past 30 years—all because of Title IX.

Why is serving on the executive committee of the NADIIIAA (National Association of Division 3 Athletic Administrators) important to you?
There are two reasons: First, I firmly believe in giving back to this athletic administration profession that has been so good to me. Many people and mentors have been crucial to my development and success, and I like to continue to pay it forward to the next generation of leaders. Second, this is a crucial time in the history of college athletics. Big-time NCAA D1 programs like Ohio State and Alabama have previously driven how college athletics operate—and any changes will affect us in NCAA D3, even without athletic scholarships; this is a real opportunity to help shape the future of athletic programs like ours at WPI while staying committed to the true student-athlete model for college athletics. I'm excited to be part of NADIIIAA with the important role it will have in the process.

PHOTO BY MATTHEW BURGOS

ILLUSTRATION BY JONATHAN D. REINFURT

GLOBAL IMPACT

SOLUTIONS WITH A SOCIAL DIMENSION

It's said time and again that there's no such thing as typical WPI students. Their interests, passions, and talents run the gamut from technical and athletic to artistic and scientific. One thing they all seem to have in common? Their desire to help.

They want to take what they've learned in the classroom and combine it with the firsthand knowledge and experiences of others with the overall goal of creating lasting solutions to problems around the world.

However, director of the Panama Project Center Aaron Sakulich, associate professor of civil, environmental, and architectural engineering, has seen firsthand that sometimes the STEM-heavy solutions students bring from Worcester to project centers around the world just don't add up.

"The answer is usually not just as simple as, 'Let's do some math,'" says Sakulich. "Solutions to problems are rarely purely technical in nature; there has to be a social dimension and impact to them as well."

That, more than anything else, is what Sakulich hopes students gain out of their time at the Panama Project Center.

The first iteration of this project center came in 2009, when an alumnus on the Board of Directors of the Panama Canal Authority expressed interest in hosting students for the hands-on project experiences for which WPI is well known. Initial projects were led by Tahar El-Korchi and Jeanine Dudle, professor and associate professor of civil, environmental, and architectural engineering, respectively, and focused on improving the canal's maintenance and operation.

In 2014 the project center shifted. After applying for and winning a National Science Foundation grant that gave students the chance to complete MQPs spanning six months, Sakulich worked with El-Korchi to expand the project center to include IQPs, a change that went into effect the following year. Sakulich took over as director shortly thereafter.

Today, the focus of projects ranges from sustainability and wildlife management to social and wealth inequality; sponsors include Cope Airlines, Footprint Possibilities, and El Caño Archaeological Park. Students spend their seven weeks living in the appropriately named City of Knowledge, a former military base turned academic and entrepreneurial ecosystem. In addition to pursuing social and psychological solutions to problems, students also have the opportunity to explore a country rich in nature, art, and museums.

"Partially because of the canal, so many different cultures have transitioned through Panama," Sakulich explains. "It's a really interesting place—unlike the rest of Latin America, it has its own unique vibe that I hope the students find, as well."

That opportunity to explore a new place is exactly what appealed to Bridget Gillis '24. "I wanted an adventurous and memorable experience," she says, "so I tried to apply to project centers located in places where I wouldn't necessarily have a reason for visiting after college."

Gillis and her teammates worked with IDAAN, Panama's national water authority, to analyze its systems in the greater metropolitan area, and use maps, models, and simulations to help them optimize distribution times and schedules for citizens who are experiencing severe water shortages.

"It's not necessarily because of droughts; it rains in Panama every day," added Gillis's teammate Steve DeFreitas '23 while sharing some of his experience during a virtual panel with members of the WPI Voyagers, a WPI alumni group. "It's because there isn't enough water to actually go around in their system."

Every day, Gillis and DeFreitas went out into the field with IDAAN employees to inspect current infrastructures, take measurements of flow rates, determine where the system could be improved, and make recommendations.

"Having an insider view of operations in an environmental engineering position was very insightful," says Gillis, who was pleasantly surprised to realize that the team's project was especially relevant to her civil engineering major. "At a recent networking event, I had a great experience talking with company representatives about our project."

While their days were busy with project work, the students still found time to explore local museums, enjoy scenic hikes, and, of course, take time to slow down with some animals who are experts on the topic.

"Visiting the sloths at the sloth sanctuary," Gillis says when asked about one of her favorite memories from her time in Panama. "Seeing them and the other rescued animals up close was a lot of fun."

—Allison Racicot

THE ARCHIVIST

WPI Welcomes a New President for the First Time

At a little after 2:30 p.m. on June 28, 1883, **Dr. Homer T. Fuller** stepped to the podium to publicly address the entire Free Institute of Industrial Science community for the first time. A Dartmouth graduate, the 43-year-old had most recently been the principal of St. Johnsbury Academy in Vermont before being selected as WPI's second president, succeeding Charles O. Thompson, who had departed for Rose Polytechnic Institute in Terre Haute, Ind.

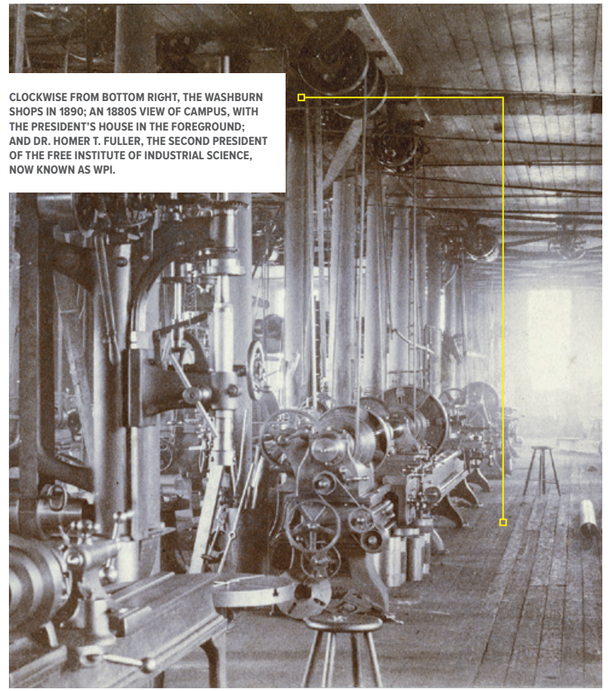
In his more than 10 years at St. Johnsbury, Fuller earned high praise for his integrity and diligence, evidenced by his overseeing a 500 percent enrollment increase. After securing an annual salary of $4,000 plus housing, Fuller embarked on a five-month tour of Europe to study technical education before moving to Worcester.

In his inaugural address, "Present Place and Work of Technical Schools," Fuller challenged the Institute to solve the pressing issues of an increasingly industrial world. He mentioned providing cleaner rivers, economizing fuel, arresting the corrosive nature of salt water, and even controlling malaria as among the technical problems that required "more room, appliances, and instruction."

Fuller addressed the school for the final time during the 1894 commencement ceremony. He reflected on the many changes under his tenure, including the official name change to Worcester Polytechnic Institute, the installation of the hydraulic laboratory, the creation of a four-year course of study, and the partnership with the city to improve sewage treatment and water quality.

As WPI is set to welcome a new president nearly 140 years after its first change of leadership, we can take heart knowing the Institute will continue to use its innovative educational model of theory and practice to continue to solve the many challenges facing the world today.

—University Archivist Arthur Carlson, assistant director of George C. Gordon Library



CLOCKWISE FROM BOTTOM RIGHT, THE WASHBURN SHOPS IN 1890; AN 1880S VIEW OF CAMPUS, WITH THE PRESIDENT'S HOUSE IN THE FOREGROUND; AND DR. HOMER T. FULLER, THE SECOND PRESIDENT OF THE FREE INSTITUTE OF INDUSTRIAL SCIENCE, NOW KNOWN AS WPI.

SENSE OF PLACE

SNOWY, SNOWY NIGHT

Student photographer Cole Parks '24 captured Earle Bridge in a wintery scene during the season's first snowfall in mid-November. Snow coated the grassy areas but had melted by morning.

PHOTO BY COLE PARKS '24

"I look forward to listening and learning from the great minds who make WPI what it is and whose voices will play an essential role in defining our way forward. To lead this amazing university, one I have always held in high esteem, is an honor and a privilege."

—Grace Wang

"Dr. Wang is precisely the leader WPI needs to take project-based learning and purpose-driven research to the next level. She is as passionate and skilled at advancing community well-being and sustainable inclusive excellence as she is at investing in global education and research, and she will give our students, faculty, and staff the support they need to thrive in an increasingly interconnected world."

— WPI Board Chair Bill Fitzgerald '83

FROM SOCIAL MEDIA

"Welcome to Worcester! As a parent of an alumna and as a city councilor, I look forward to meeting you."
— Kate Toomey, Councilor-at-large, Worcester City Council

"This is awesome. There are no words to describe being able to see someone who looks like me in a position of influence in higher ed. Congratulations, Dr. Grace Wang."
— Isabella Camasure

"Congratulations, Dr. Wang! As a graduate ('87) and parent ('20), I wish you well on this most important new endeavor."
— Dave Bernier

PHOTO BY MATTHEW BURGOS

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GRACE WANG NAMED 17TH PRESIDENT OF WPI

"Grace" Jinliu Wang, PhD, a materials scientist and highly accomplished and collaborative leader in higher education, government, and industry, has been selected as the 17th president of Worcester Polytechnic Institute and will join the university on April 3, 2023.

The WPI community welcomed Grace Wang at an on-campus event Nov. 7 when she was introduced as the successor to Laurie Leshin, who served as WPI president for eight years before joining NASA's Jet Propulsion Laboratory as director in May 2022. Wang and Winston "Wole" Soboyejo, WPI provost and senior vice president, who has served as interim president since Leshin's departure, have already begun the transition process. Soboyejo will resume his former roles in April.

With a long-established record of building collective vision and developing partnerships and resources that advance missions, Wang believes WPI's approach to hands-on teaching and learning helps students become more effective, and more thoughtful, professionals.

"WPI is a unique and distinctive institution that is innovative and also practical enough to focus on the real world," says Wang. "WPI's founding principles of theory and practice resonate strongly with me. This is a world-class institution with a unique and vital approach to teaching, learning, and discovery. Preparing STEM-focused professionals to see the world through technological, human, societal, and cultural lenses is distinctive, especially when so brilliantly coupled with WPI's research and innovation ecosystem."

With an appreciation for WPI's reputation as a respected institution with a history of cutting-edge progress, Wang says this forward-thinking perspective is an essential component of WPI's future. "WPI has been staying ahead of the curve as a learning institution since its founding," she says. "In a community deeply dedicated to advancement that helps people, I look forward to working with the WPI community as together we will continue to innovate in project-based learning, in purpose-driven research, and in building an innovation ecosystem."

Wang also shares the university's deep commitment to wellness, diversity, inclusion, and belonging—and extends those efforts into the wider community. In reference to her own WPI interview process, she pinpointed a key turning point when her interview shifted into discussions that felt more like conversations between colleagues who care deeply about the university and about the future of WPI. "That was the moment I realized I belonged at WPI," she recalls. "The question is, what can we do together to continue to cultivate that kind of sense of belonging? When faculty, students, staff, neighbors, and local leaders come to our campus, they are not just here to study or work. They also join our community."

And she is eager to continue and to amplify the campus work around mental health and well-being. "What can we do to redefine academic success and make that excellent and revolutionary learning as fun, stimulating, and interactive as it always has been," she asks, "but at the same time reduce academic stressors?"

Wang's selection follows an extensive national search that attracted a strong and diverse candidate pool. The presidential search committee, chaired by WPI Trustee **David LaPré '74,** applied feedback from community listening sessions to determine the characteristics and experiences essential in a new president.

As an esteemed materials science engineer, Wang earned BS and MS degrees in polymer materials from Beijing University of Chemical Technology, and a PhD in materials science and engineering at Northwestern University; she holds seven U.S. patents. Her career has taken her from industry research and development at IBM/Hitachi Global Storage Technologies to government, where she was deputy assistant director for engineering at the National Science Foundation, to academia, including leadership roles within the SUNY System. She most recently served as executive vice president for research, innovation, and knowledge at The Ohio State University and holds several leadership roles with national organizations, including the Government-University-Industry Research Roundtable at the National Academies of Sciences, Engineering, and Medicine. Wang, her husband, and their daughter are looking forward to moving to Worcester and joining the WPI community. Their son is a sophomore engineering student at Northwestern University.

WPI Board Chair **Bill Fitzgerald '83** highlighted Wang's reputation as a collaborator who is focused on advancing the entire community. "I speak for the Board of Trustees in expressing my confidence that we have found the ideal leader to guide us in this journey."

LaPré gave a special acknowledgement to "those who served on the search committee and the advisory group for their efforts, diligence, and commitment" as they considered a wide and highly qualified field of candidates.

Soboyejo reflected on WPI's continued growth and momentum as a global leader in project-based learning. "We have really important work ahead," he said. "It's exciting to be part of this as we work with the 17th president to realize the potential of WPI."

—Julia Quinn-Szcesuil

MUSIC & SCIENCE in Harmony

For Sergio Salvatore ’02, coding is just a form of composing.

BY AMY CRAWFORD
PHOTOGRAPHY BY NICOLE MAGO

The piano was Sergio Salvatore's first passion. The son of a successful music teacher and singer, he was performing publicly by the age of 4, and he recorded his first album at 11. But while it may have surprised observers when the talented teen went from touring jazz clubs to majoring in computer science at WPI, Salvatore says the leap has turned out to be far more logical than it first appeared.

"I think that being a musician, especially being a composer or an improviser, is very akin to software engineering," asserts Salvatore, who is now senior director of engineering with the video hosting platform Vimeo. "It's not all that different a process. If you zoom out far enough, you have a certain set of tools, a certain language that you can express yourself in. With music, it's harmony, melody, and rhythm—those are the ingredients, and you manipulate them in order to tell a story. And then when you're designing a piece of software, you have a programming language, you have set of inputs, and you're trying to make it do something. Coding is just a form of composing."

For most of Salvatore's career, he has kept one foot in each of his passions, alternating between coding and composing, between his love of music and his fascination with computer science. It's a sort of dance that, over time, he has learned works best when the two sides are in harmony.

A MUSICAL DESTINY

Salvatore was destined for a life in music, from even before he was born. His mother, Carla, trained as a singer, and his father, Luciano, majored in classical piano at Boston University and went on to study and then teach jazz piano at Berklee College of Music. In 1980, he started his own music school in New Jersey. Sergio was born the following year, and music fills his earliest memories.

"It's hard to think of that not being a part of my life," he says. "Music was just in the house all the time. My mom loved the Great American Songbook and Broadway and show tunes. My dad would have students come to the house, and he practiced a lot himself. There was music playing all the time. I guess all kids want to do what their dad's doing, and my dad played piano."

Salvatore soon discovered that he had a natural ability with the keys and a flare for public performance. He also fell in love with jazz, thrilling at the opportunity for improvisation, the way jazz let him follow his musical imagination wherever it led. Luciano soon came to think of the boy as his star pupil and, in 1992, he helped Salvatore secure the opportunity of his young life.

The internet was in its infancy then, and no one had yet dreamed of YouTube, SoundCloud, or any of the other online platforms that performers use to promote themselves today. What ambitious musicians did have, however, was videotape.

"My dad's friend Larry had a camcorder," Salvatore remembers, "and he called a couple of his friends who were session musicians, and they went over to his house and set up in the living room, and we played some tunes that he recorded. And then we copied that tape as many times as we could and mailed it to everyone we knew who maybe had a cousin whose uncle's wife was in the music business. It ultimately ended up in the hands of the director of A&R for a major jazz label. And that's what started the whole train rolling."

Over the next few years, Salvatore would record four albums and go on several tours, performing with the American Jazz Philharmonic, at Carnegie Hall, and in Japan, Italy, and Canada. He played and recorded with more seasoned jazz musicians and won critical acclaim. In 1996, his third album, *Always a Beginning*, landed on *JazzTimes* magazine's list of the year's best albums. All that, and he hadn't yet graduated from high school.

"It was a lot of fun for me," Salvatore says. "I got to play with these really good musicians. I didn't have a sense of the gravity of the situation. Now I realize that just to be talking to these musicians was a real privilege."

But as he looked toward adulthood, Salvatore faced a dilemma. Would he continue on the path he had chosen at 11, alternating tours and albums as he worked to make a living in an industry that, with the advent of digital technology, was about to be upended? Or would he try something new, exploring a different side of his personality, a different set of talents—and a field that, for better or worse, was poised to change both music and the world?

> SERGIO'S CONNECTION TO THE PIANO WAS IMMEDIATELY EVIDENT. IT WAS CLEAR THAT HE WAS NOT SIMPLY EXECUTING A PIECE, BUT WAS CHANNELING DIRECTLY TO THE KEYBOARD WHAT HE HEARD INTERNALLY, IN THE SAME WAY EXPERIENCED PROFESSIONAL JAZZ MUSICIANS PLAY. I WAS VERY PLEASED WHEN HE CHOSE TO COME TO WPI, BECAUSE I THOUGHT WPI WOULD OFFER HIM AN OPPORTUNITY TO EXPLORE DEEPLY HIS OBVIOUS CREATIVITY."
>
> —PROFESSOR RICH FALCO

TWO WORLDS CONVERGING

As Salvatore considered college, he knew it would have been logical to apply to music conservatories. But that step now felt less necessary—after all, he had already achieved a successful career as a musician, and cultivated a network of fellow musicians and industry connections, a critical component of performing arts education. Meanwhile, he'd long been interested in computer programming, and it occurred to him that studying computer science might be more useful than pursuing a formal credential in music.

"I remember my dad bringing an Apple IIe home in the '80s," he says, recalling the 8-bit green-screen classic, with its 64 kilobytes of RAM. "He would use it to do his taxes, but you could also play games on it. And I got to asking, "What else can you do?" and "How does that work?"

"This was when there was no internet—you had to go to the library, you got a book or you talked to a friend who knew how to do something on the computer. I got really into that. And then technology was becoming more a part of music, with specialized computers and synthesizers, and as computers evolved there was more that became possible. So those two worlds were converging."

Salvatore set out to find a school where he could study computer science while maintaining a rigorous practice schedule. He wanted to be close to New York City, the center of his musical universe, but not too close—having grown up in New Jersey, he was ready to venture beyond the Tri-State Area. Searching for institutions online—a relatively new approach in the late 1990s—led him to WPI.

"My concern at first was, how am I going to practice?" Salvatore says, "because I'm obviously not going to have a piano in my dorm room."

When he and his family headed to WPI for a visit, school officials connected them with Doug Weeks, WPI's longtime coordinator of music. Weeks, who retired in 2021 after spending more than 40 years building WPI's music program from a single brass band to a full-fledged department, assured Salvatore that there would always be a piano and a practice room available to him. That pledge effectively sealed the deal.

"I left knowing I would be able to do what I wanted with both music and computer science," Salvatore says. "So Doug Weeks is one of the significant reasons why I ended up at WPI."

In fact, the entire music department was excited to have Salvatore at WPI. Professor Rich Falco, director of jazz studies, remembered seeing him perform before an audience of 3,000 jazz teachers at the International Association for Jazz Education several years prior, when Salvatore was just 12.

"Sergio's connection to the piano was immediately evident," Falco says. "It was clear that he was not simply executing a piece, but was channeling directly to the keyboard what he heard internally, in the same way experienced professional jazz musicians play. I was very pleased when he chose to come to WPI, because I thought WPI would offer him an opportunity to explore deeply his obvious creativity."

Salvatore arrived on campus in 1999, at a time when seismic changes were taking place in the tech industry. Already accustomed to an intense schedule of practicing, touring, and recording on top of his high school classes, he realized if he worked even harder and compressed his education into three years, he could get out into the world sooner, positioning himself to seize new opportunities.

"I saw what was going on in the business world," Salvatore says. "Friends were out with jobs, making money and doing stuff. I wanted to get out there, too."

Naveen Selvadurai '02, MS '03, a freshman year neighbor who would become a lifelong friend, remembers sharing that eagerness. It was a heady time to be studying computer science, and the friends bonded over their love of Apple products and their dreams of getting in on the digital revolution.

"It was all about telecom companies and software companies and dotcoms changing the world," says Selvadurai, who also compressed his bachelor's degree into three years and is now an entrepreneur and venture capitalist based in Southern California. "The dot-coms proved that anybody could make something—you know, this whole trope of two guys in a garage. I think we had that mindset as well. We both wanted to do things our own way, build things for ourselves."

MAKING CELL PHONES SING

Even as he was working to graduate as soon as possible, a part-time job the summer before his sophomore year offered Salvatore a toehold in tech—one that, at least tangentially, called upon his skills as a musician. Through music industry connections, he met the founders of a New York-based start-up called RunTones, which created ringtones and wallpapers for mobile phones. They offered him a gig, and soon he was figuring out how to make those early cell phones sing.

"I'm under no illusions that a ringtone is a highly artistic sort of thing," he says with a laugh, "but we tried to apply that kind of thinking as much as possible to get the best quality ringtones. And it was an interesting challenge, because the early phones were so primitive. They kept getting a little bit better and a little bit better, but it felt like the Wild West, because there wasn't any sort of commonality among the different models. A lot of the time we were just exploiting bugs to make it work the way we wanted to."

In 2002, the year Salvatore graduated, RunTones was acquired by Sony Music Entertainment, which made it the foundation of the division's mobile products group. Salvatore would spend 10 years with Sony, first managing the development of mobile products, then branching out into the nascent technology of direct-to-consumer music sales. All the while, he was watching digital technology transform the business he had grown up in.

"The music industry has generally been at the forefront of technological change," Salvatore says. "If you look at media evolution, it was music that embraced digital technology first, and then it sort of filtered on down to movies and publishing. But that cuts both ways, because if music gets the benefit of being first, it's also often the industry that ends up making all the mistakes at the beginning."

Over the early 2000s, it became at once easier for musical talents to find an audience—no more mailing videotapes to friends in the era of YouTube and Vimeo—but also more difficult to make a living the traditional way, by recording albums with the support of a record label.

"In the 1990s, when I was doing records for major labels, the problem was getting shelf space," Salvatore explains. "People still went to stores to buy CDs, and if you had a 2,000-square-foot store, how many square feet are dedicated to the jazz aisle?" And within the jazz aisle, Salvatore notes, the shelves were dominated by best-selling artists, all of which resulted in a high barrier for a new musical act to reach the wider public. The internet eliminated that physical limitation, making it possible—at least in theory—for any audience to find any media. But soon it became difficult to break out amid a sea of artists and content creators.

"So I don't have to compete with Miles Davis anymore," Salvatore says. "But now I'm competing for attention with cat videos, or a parakeet pecking away at a song on YouTube. What I didn't realize then was if you open those floodgates, then you're opening them to everyone."

FINDING THE FUN AGAIN

As the music industry was in upheaval, Salvatore's media technology career was soaring, and for a time it became his primary focus. From Sony, he moved on to lead engineering teams at Barnes & Noble and then Steinway & Sons before joining Vimeo in 2017. Eventually, he realized that entire years had gone by in which he hadn't given a single performance.

"And soon I realized that I was unhappy, because I was not exercising that part of my brain or that part of my life," Salvatore says. "So I said, 'Okay, enough with this, I'm going to just produce my own concert. I'll get my friends, whoever I can find to play. I'll produce it myself, try to get some people to show up—and for no other reason than I want to, it's going to be fun for me.'"

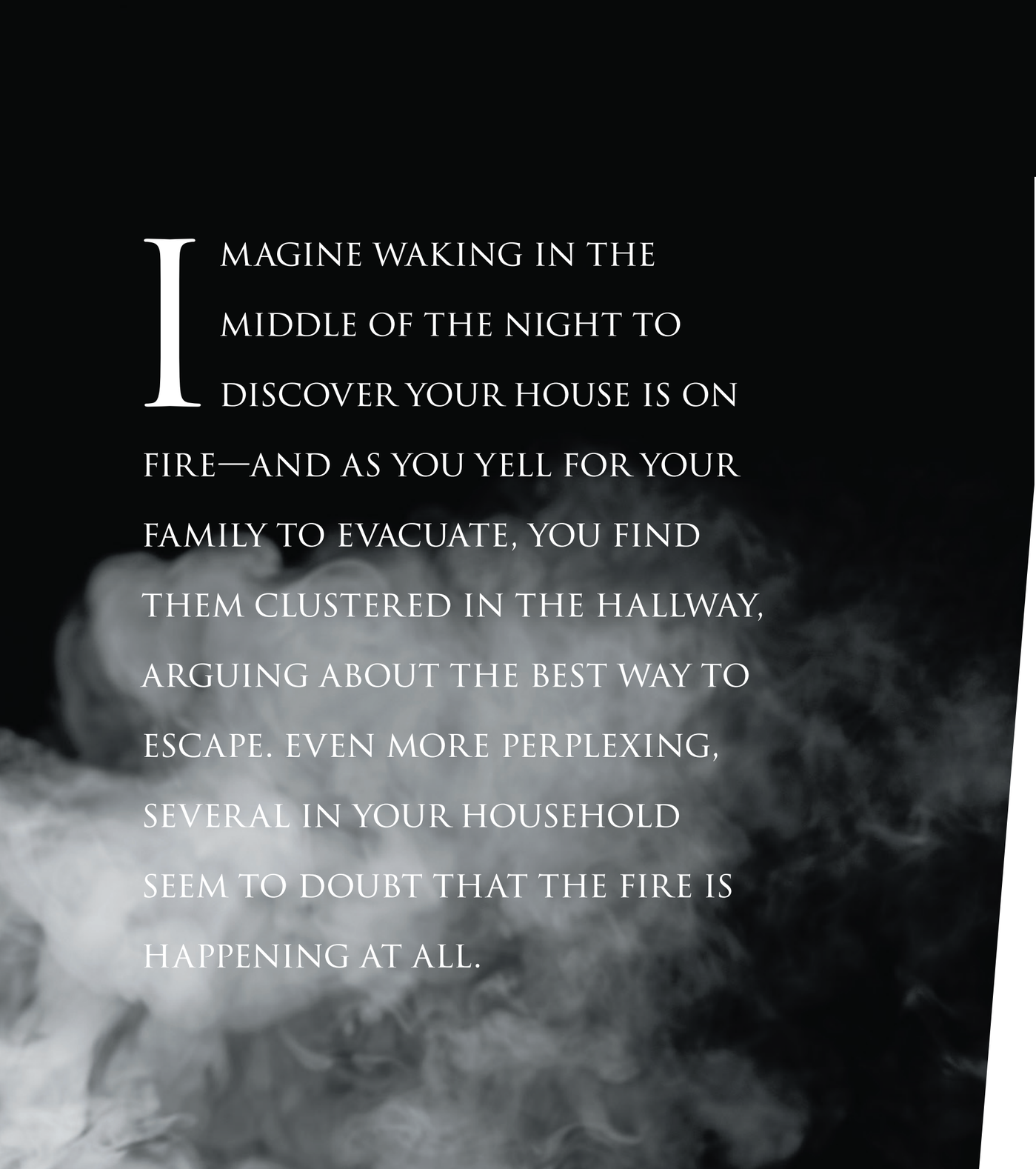
In the years since, Salvatore has recorded two more albums, this time promoting them on digital platforms like Spotify. He also reconnected with WPI, joining the School of Arts & Sciences Advisory Board in 2012 (he is currently co-chair). That's provided opportunities to meet a diverse array of WPI alumni, as well as to support the music department and the university in general.

An especially fulfilling experience came in 2018, when the threads of Salvatore's life as a musician, technologist, and WPI alum came together in a performance at the Rubin Campus Center Odeum for the launch of WPI's neuroscience program. The appearance was part of a symposium called "Music and the Brain," which explored the potential for music as a treatment for neurological disorders. It was also an opportunity for WPI researchers to consider the ways in which creativity can work across disciplines. That's something that makes perfect sense to Salvatore, whose original jazz piece, composed for the occasion, was titled "That Goes Without Saying."

BUILDING CONSENSUS IN THE MIDST OF CRISIS

JULIE CERQUEIRA ’02 BRINGS THE URGENT CALL FOR CLEAN ENERGY TO THE INTERNATIONAL COMMUNITY.

BY SCOTT WHITNEY
PHOTOGRAPHY BY JEFF MAURITZEN



The work of climate scientists, clean-energy advocates, and environmentally focused policy makers can feel much like that metaphor—and among the aforementioned crowd, **Julie Cerqueira '02** stands at the front of the pack. But despite the challenges inherent to her work, and that of thousands like her, she is arguably the perfect person for the job.

Armed with a portfolio of undeniable data, Cerqueira reports daily to the U.S. Department of Energy (DOE), where she is tasked with bringing the nations of the world—and sometimes her own—to the table in the development of clean energy. Following years of climate change policy work in both nonprofits and the U.S. Department of State, she joined the Biden administration in September 2021 as principal deputy assistant secretary in the DOE's Office of International Affairs. For a lifelong environmentalist, she seems to have landed her dream job. More than ever before, she is able to advance clean-energy initiatives on a global scale. And though the fruits of her labor may not be realized until long after she has left her post, she radiates optimism in helping the United States lead the way in clean energy.

What brought this biotechnology major from the labs of WPI to Washington's halls of power? That story begins with a winged rodent that most people could do without.

A NEW PERSPECTIVE

With a Brazilian-born mother and a Portuguese father, Cerqueira knew she wanted to give back to the country that had given her family the gifts of education and a new start. Following her graduation from WPI, she joined the Peace Corps and traveled to the Philippines as part of a conservation project for endangered bats. Filled with idealism and ambition, she moved in with a family of Filipino farmers who complicated how she understood her mission and fundamentally altered her worldview.

As is common in countries like the Philippines, several members of her host family were forced to look for work abroad, leaving their children to be raised by relatives during their time overseas. Despite her best intentions, Cerqueira began to see her Peace Corps work in a different light based on her host family's lived experience: "First, the audacity of being 22 years old and in a village where you're going to impart knowledge on people who already have generations of wisdom—that's hard to comprehend," she recalls. "Second, having gone through a fracturing of their family unit just to make a living—and we're asking them to care about bats?"

Deepening the disconnect, many Filipino farmers view bats as a threat to their crops and livelihood, and are more inclined to exterminate or eat them than celebrate their place in the ecosystem. For a community living on the socioeconomic margins, Cerqueira's preservation efforts felt out of touch.

Her experience in the Philippines provided a lesson she's carried into her career. "I realized in that project just how deep social inequity can go, and to protect environmentally sensitive areas, we often need to help families find employment, education, and the opportunity to stay together," she says. "These are hyper-local issues. We can't just parachute in with our solutions."

When she returned to the States after her stint in the Peace Corps, she experienced a renewed passion for place-based and inclusive action on ecologically important issues. Environmental policy wasn't entirely new to Cerqueira—as an undergrad at WPI, she had pursued the subject as one half of a double major. But her experience in the Philippines had shown her the way forward professionally, and she soon enrolled in a graduate program at Fordham University focused on international policy. The next time she was called upon to save a habitat or endangered species, she'd be ready to support the people, too.

ONE SIZE DOES NOT FIT ALL

Her career path traced through a host of nonprofit organizations before she landed a position within the U.S. Department of State focused on climate change. Though her new position dramatically widened the scope of her work, she kept the lessons learned in the Peace Corps top of mind. She recalls meetings with well-intentioned colleagues who would proffer solutions for black carbon emissions she knew would be unsuccessful at the local level.

"You can't tell people not to burn their trash when they don't have trash collection," she explains. "Or not to use a dirty cooking stove when the alternative [propane] costs more than they make in a month. Many of these communities have significant constraints, so if we're coming in with policy solutions, but don't actually know what it's like on the ground, it's hard to predict if any of our ideas are going to work." In short, she had learned that one solution does not fit all, and that policy interventions that don't include input from the communities affected are often doomed to fail. Cerqueira notes that these lessons are as true in domestic communities as they are abroad.

In 2018, she took on the role of executive director for the U.S. Climate Alliance, a bipartisan coalition of state governors committed to reducing carbon pollution and promoting clean energy deployment in line with the 2015 Paris Agreement. (The U.S. withdrew from the Paris Agreement in 2017 and the Climate Alliance offered an opportunity to live up to the spirit of that agreement.) By her own admission, state politics had not been her focus; however, she relished the opportunity to bring her experience mobilizing international coalitions at the State Department to a bipartisan alliance of governors in search of meaningful climate-change policy.

"[State government] can turn around policy so quickly. We would propose a regulation or policy initiative, and within a year, multiple states would be adopting it or something similar," she says. "This was at a time when the federal government had essentially abdicated leadership on climate—and we had all these governors,

mayors, the private sector, and young people working together to maintain momentum in the United States. That work gave me a lot of room for optimism."

Cerqueira didn't know at the time, but her skills for building consensus would soon experience their greatest challenge yet.

THE REALITIES OF REALPOLITIK

As any advocate for clean-air policy or climate-change initiatives will tell you, abiding passion is required to stay the course. However, working toward these same goals within government requires another "p" word: pragmatism. "Everything is compromise," Cerqueira admits from her office in the Department of Energy. Although she maintains the environmental ideals she held as a student at WPI, years of making the proverbial sausage has also taught her the realities of policy work. "You're never going to get to the perfect solution, because that's not how the world works." And knowing how the world works is practically in her job description.

Since September 2021, she has worked with the DOE's Office of International Affairs to nudge the world's governments closer toward a transition to clean energy. In so doing, she and her team are in constant search of common ground among a broad coalition of countries interested in advancing clean-energy technologies and policies around the globe. A core part of her work involves collaborating with other countries, scientists, and industry to accelerate technological innovation—for example, as the new chair of Mission Innovation—or conducting energy diplomacy to enhance national security.

Her department also serves as the "right hand" to U.S. Secretary of Energy Jennifer Granholm, advising her on international energy policy and supporting her engagement on the world's stage. And if she has learned anything from more than a decade spent in rooms of power, it's the need to check your stubbornness at the door.

"I've seen a lot of fights lost because people don't understand why compromise is necessary," she says, recalling a project she worked on with the U.S. Climate Alliance in which advocates in one state were unwilling to accept a climate target proposed by their governor. As a result, negotiations broke down and everyone was left empty-handed until the next legislative cycle.

While she believes in a readiness for compromise, she also stresses the need for loud-and-proud advocates in tackling climate change. "You do need advocates who are pushing for the most progressive ideas, because they bring everyone else with them," she explains. "And then you need your NGO partners who are a bit more centered and can say, 'Let's all acknowledge this is where we want to get to—but this is what we can actually do today.' Having those partners around the country and around the world points you toward solutions that are both ambitious and pragmatic."

FEELING THE HEAT

After an unprecedented summer of natural disasters and record heat waves, one has to wonder how Cerqueira assesses our collective progress on climate change. First, the bad news: "We've made a lot of progress recently, but we are still far from meeting our climate goals, and the impacts we're seeing across the world are disastrous," she says, adding that a denial of climate science is making progress ever more difficult. "There's a saying, 'Just because you don't believe in the devil, doesn't mean he doesn't believe in you.' That's what keeps me up at night; how do you awaken people to the severity of this crisis? What else is it going to take?"

To be sure, the numbers on climate change are in. According to a recent report in *The New York Times*, the planet has already warmed by 1.2 degrees Celsius, marking the hottest global temperatures in civilization's history. Continuing this trajectory, experts anticipate rolling droughts, the extinction of swaths of plant and animal life, and a mass migration of people to more moderate climates—a move sure to amplify socioeconomic inequality.

Despite these sobering projections, Cerqueira finds room for optimism. For starters, she cites tremendous economic incentives to be found in the implementation of clean-energy technologies. "We're looking at a $23 trillion market by 2030 to deploy clean-energy solutions," she says. "That's a huge opportunity for folks to develop new skill sets and get good-paying jobs, boost the economy, bring down energy prices, and make our communities healthier."

She also cites the negotiations surrounding the 2015 Paris Agreement as a model for introducing new, often marginalized voices into policy discussions. The agreement, brokered by 193 countries and the European Union, ultimately called for a 1.5-degree goal for global warming—but that's not where they started. According to Cerqueira, this goal was established not by the world's most powerful countries, but by an often-overlooked grouping of developing countries and island states. "We had small island developing states, indigenous groups, young people whose voices were finally being heard, and they helped compel governments around the world to aim for 1.5 degrees, not the two degree marker we thought we were working toward," she explains. "And that half a degree makes a big difference."

She notes another group who will be critical in solving the world's climate crisis: the next generation of scientists and engineers. "Clean energy companies around the world are already facing skills shortages that will be exacerbated in the years ahead as we accelerate clean energy deployment," she says, adding that the skills required by the future clean-energy workforce will most certainly be found in science and engineering. "Finding solutions to this crisis requires that we rapidly innovate lynchpin technologies and build clean energy infrastructure, bringing down costs so that clean technologies are affordable. These are all skills you learn in the sciences," she says.

In fact, although Cerqueira's career track has taken her far from her coursework as a biotechnology major, she has no academic regrets—and no hesitation in recommending a STEM education for the next generation of climate-change advocates. "The foundation you get in STEM gives you the ability to process complex information and coordinate across very diverse teams," she says, noting that the mindset inherent to the sciences is a must-have in processing the evolving nature of climate science. "The answer we have today may not be the answer we get in 10 years," she says. "That's not to say that the science is invalidated—just that we're constantly refining our understanding of how climate science works. A science degree gives you the ability to think through these shifts critically."

SUSTAINABILITY OF THE BUILT ENVIRONMENT

Researchers seek solutions for a source of 40 percent of carbon emissions worldwide—human-made infrastructure.

BY LISA ECKELBECKER
ILLUSTRATIONS BY ALBERT ESPÍ

Roads threatened by coastal flooding. Homes battered by hurricanes. Air quality tested by heat waves. Communities faced with costly choices.

All are linked to climate change, the long-term and accelerating shift in global temperatures and weather patterns associated with greenhouse gas emissions from human activity.

No single source is responsible for those emissions, and no simple solution for the problem exists. Yet one often-overlooked area—one that accounts for an estimated 40 percent of carbon emissions worldwide—is known as the built environment: roads, bridges, buildings, and other types of human-made infrastructure.

That's why, in the laboratories at WPI, researchers are working on sustainable construction materials and building designs, computational models, and other advances that could not only reduce emissions related to construction and operation of the built environment, but help communities plan for and adapt to disasters and economic impacts that have been intensified by a changing climate.

"It will be critical to do many different things to reduce the impact that buildings, materials, and construction have on global emissions," says Carrick Eggleston, professor and head of the Department of Civil, Environmental, and Architectural Engineering (CEAE). "We will need to develop new materials and retrofit older structures, all while assisting those who are least able to make the changes that are needed."

INSPIRATION FROM NATURE

When it comes to the hunt for new materials, **Steven Van Dessel** thinks nature might be a good place to look for inspiration.

"The field of bio-inspired materials is promising and wide open for exploration," says Van Dessel, who is a CEAE associate professor and director of WPI's architectural engineering program. "The goal is to discover cost-effective solutions that can easily be implemented not just in new buildings, but in existing buildings, because that is where there's potential to have the greatest impact."

He is working on new concepts for building envelope design—solutions that would allow a building to regulate its own temperature by using solar energy and smart materials that store and release heat.

With colleagues, including CEAE Associate Professor **Mingjiang Tao** and Clark University chemistry Professor Sergio Granados-Focil, Van Dessel is conducting basic research into smart polymers that could be integrated into construction coatings, foams, or other materials.

The researchers are developing new approaches for thermal energy storage that use reversible chemical reactions between sorbents and sorbates to store and release energy, much like a battery. Other work focuses on phase-change materials that, when used in coatings for windows or roofing, changes from clear or opaque under different temperatures to admit or block solar energy. A third area of research involves investigating changes to the thermal conductivity of materials to make them more or less insulating and adapt to environmental conditions and climate.

The biological inspiration comes from plants' abilities to adapt to changes in the environment. Solid materials that change from opaque to transparent, depending on temperatures, could absorb and release heat much like how layers of a plant leaf function. Phase-change foams that the researchers studied resemble some of the cross-sectional features of a plant leaf.

"We're trying to combine a number of different technologies into a smart system to create buildings that are comfortable for people and use zero energy from the power grid," Van Dessel says. "It will likely require materials with different functions, especially for buildings in different climates."

TURNING A PROBLEM INTO A SOLUTION

Concrete may not be the flashiest building material, but it's cheap, strong, and widely available. It's also a problem for the planet.

"Concrete production and transport accounts for 9 percent of global CO_2 emissions," says **Nima Rahbar,** CEAE associate professor. "That's not sustainable. We need to find alternatives to concrete that are strong, durable, and non-polluting. In fact, it will be important to develop carbon-negative materials that will absorb CO_2 because we need to reduce the effect of climate change."

Toward that goal, Rahbar and **Suzanne Scarlata,** professor in the Department of Chemistry and Biochemistry, have developed an enzymatic construction material (ECM) that is made of sand, gelatin, calcium, and trace amounts of a naturally occurring enzyme, carbonic anhydrase, in a process that consumes CO_2 from the air. The researchers described their material in the journal *Matter* and says the ECM could also "heal" itself through exposure to CO_2 and a calcium source, which causes a chemical reaction capable of depositing new material into damaged areas.

"The process uses carbonic anhydrase to capture carbon dioxide," Scarlata says. "CO_2 is everywhere, and we can change the form of CO_2 into something that's not causing climate change."

The researchers have also added iron oxide nanoparticles to ECM and treated the material with incandescent light or a laser. Rahbar and Scarlata reported in *Cell Reports Physical Science* that the method could make it possible to manufacture ECM without oven heating and enable rapid repairs to the self-healing ECM.

Their work has led to the launch of a startup company, Enzymatic Inc., that is commercializing the technology. The researchers also recently were awarded $692,386 from the National Science Foundation to improve and develop new functions for their ECM.

For Rahbar, working on ECM represents a chance to positively impact both his field of civil engineering and, ultimately, the world. It is a path he took at the encouragement of WPI Interim President **Wole Soboyejo,** who was Rahbar's PhD advisor when both were at Princeton University.

"I was working on the mechanics and physics of materials, and he said to me, 'Why don't you do something for the field of civil engineering?'" Rahbar says. "This is the way I can do that."

MAKING BUILDINGS COMFORTABLE

Shichao Liu studies indoor environments such as homes, offices, schools, and cars for an important reason: That's where humans spend most of their time.

"Most people stay indoors for about 90 percent of each day," says Liu, a CEAE assistant professor who is affiliated with the Department of Fire Protection Engineering. "To understand human well-being during climate change, we have to look at how occupants of buildings are affected by extreme weather and disasters, such as heat and wildfires."

In his Building Occupants Signal Synthesis (BOSS) Lab, Liu is bringing together advanced sensors and artificial intelligence to understand the impact that indoor spaces have on the comfort, health, and happiness of occupants.

Liu and his collaborators have examined how indoor temperatures, air quality, lighting, and sound levels affected college students' mental health and learning during the COVID-19 pandemic. The work, funded with a $199,999 grant from the National Science Foundation, showed a weak, but not negligible, link between indoor environmental factors and depression the students experienced.

He has also built a driving simulator to study how carbon dioxide levels and chemicals emitted by the human body affect driving performance. With funding from WPI's Transformative Research and Innovation Accelerating Discovery (TRIAD) seed grant program, he has led an interdisciplinary study of how temperature, humidity, lighting, sounds, and air quality affect group decision-making.

Liu's interest in indoor environments arose partly from his own experiences—he grew up in a home without central heating or air-conditioning. Now he sees that, in some communities, a significant percentage of residents live in low-income households that lack the resources to sustainably cool hot rooms and filter wildfire smoke from the air in their homes.

"Rather than cool entire buildings, it might be better to adapt existing systems with smart devices to create comfortable microenvironments around individuals," Liu says. "That could include pointing cool or warm air to specific points in a room or developing origami-like structures that could surround a person and limit the amount of space that needs to be heated or cooled. Solutions for those who are most vulnerable to climate change will need to be simple and inexpensive."

STORMS, FLOODING, AND ROADS

When Hurricane Katrina descended on New Orleans in 2005, it killed more than 1,800 people, displaced thousands more, and damaged buildings and infrastructure. Just weeks later, Hurricane Rita swept into southwestern Louisiana, causing additional destruction.

As floodwaters receded from the region, a researcher at the Louisiana Transportation Research Center in Baton Rouge became interested in a critical question: Just how safe are the roads that have been submerged in floods? "A flooded road may look fine, but the layers below the paved surface can be weakened by flooding," says **Mingjiang Tao,** now a CEAE associate professor at WPI. "It's like looking at a patient who appears healthy but is actually very sick."

Tao's research has focused primarily on making transportation infrastructure more sustainable and resilient. He has worked to develop risk assessment models that will enable federal, state, and local transportation agencies to make proactive long-term planning and informed short-term response to climate-compounded hazards.

"With climate change and more extreme weather, it's not just coastal communities that will be impacted by hurricanes and severe storms," Tao says. "Locations far from the coasts are experiencing flooding and disruptions to infrastructure. This is a complex problem, and there is a practical need to help communities that are vulnerable to climate change but lack the staff and resources to prepare for its effects."

And with other researchers, Tao has also investigated durable and sustainable asphalt alternatives, including recycled asphalt pavement, to reduce the amounts of new materials going into road construction. He has studied geopolymers that could be synthesized from abundant industrial byproducts like coal ash and red mud to create a greener cement than the ordinary portland cement now used in mixing concrete.

MAKING DECISIONS WHEN CLIMATE CHANGES

Two important things to know about climate change, according to **Sarah Strauss,** professor in the Department of Integrative and Global Studies (DIGS) in The Global School, are that it intensifies existing problems and upends zoning and construction expectations that were based on historic experiences.

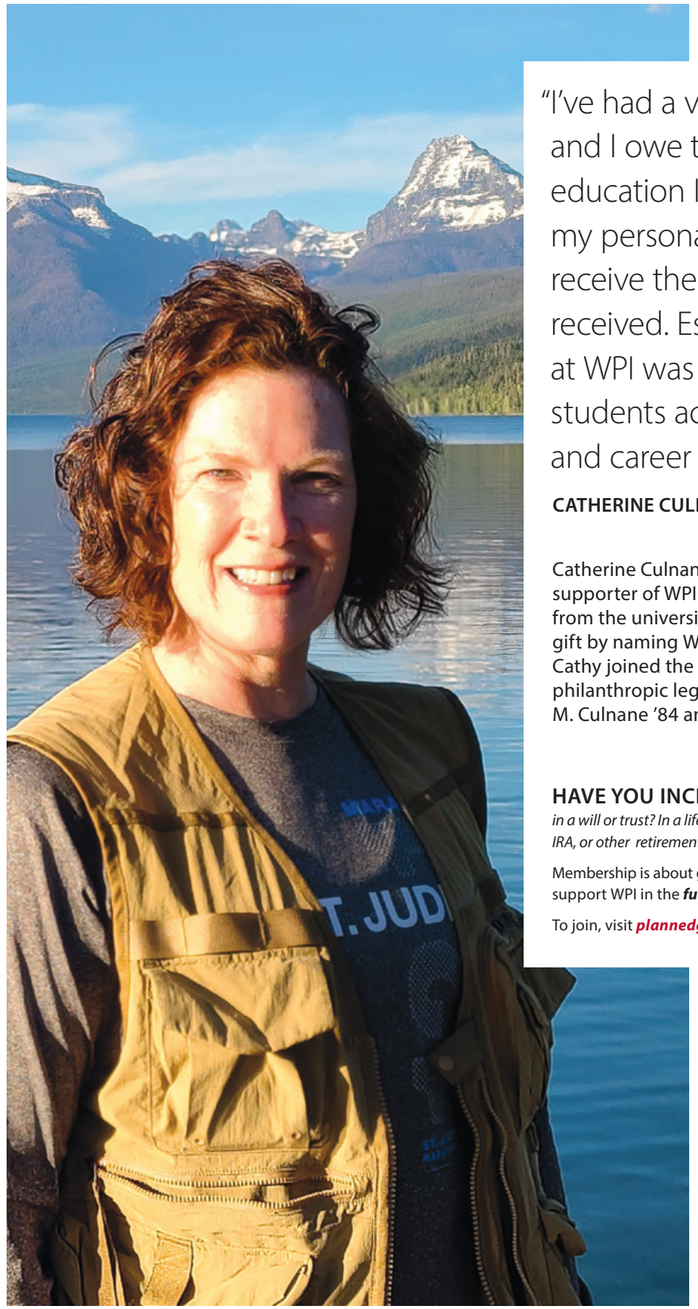
"Climate change shows us that 'natural' disasters now are often not really natural," says Strauss. "If we think about Florida, where marshes have been drained and paved over, rising seawater now has nowhere to drain. This raises questions about what communities are doing as they build and repair infrastructure, add housing, and think about the things that society has come to expect in the built environment."

An anthropologist who co-directs WPI's master of science program in Community Climate Adaptation, Strauss has studied the way that communities address climate change and has co-edited an anthropological examination of climate in the book *Weather, Climate, Culture,* published in 2004. Her more recent work focuses on transitions to renewable energy systems (*Cultures of Energy, Power, Practice, Technologies,* 2013), looking at how communities are responding to the need to reduce greenhouse gases.

Climate change is a global problem, but the strategies we take to address this challenge are local and depend on the needs, histories, resources, and desires of different communities, Strauss says. Those solutions also have implications about justice and equity for the people in those communities.

As a collaborator on the TRIAD-funded study led by Liu, Strauss participated in research into how temperature, humidity, lighting, sounds, and air quality affect group decision-making. One takeaway from the research was that people will need to have conversations about whether to continue doing the things they've always done, the things that grow from a community's culture but may lead to impacts in the future. That could mean not rebuilding a structure that was destroyed in a disaster, or even moving a community to a location less vulnerable to disasters.

"Building and rebuilding are not just a matter of mechanics, materials, and locations," says Strauss. "There will be conversations about the things that were not considered when a community formed, when settlers created a certain kind of society in a place, or when people paved over marshes. There is a need for conversations about whether people can continue doing things that they have always done, or how they want to 'build back better.' It won't always be possible for communities to do things in the future the way they did things in the past, but using our collective imagination to envision and produce a vibrant and innovative path forward is very much within our grasp."



"I've had a very successful career and I owe that to the extraordinary education I received at WPI. One of my personal goals was to help others receive the same opportunity that I received. Establishing a scholarship at WPI was my way of helping WPI students achieve their educational and career goals."

CATHERINE CULNANE '84

Catherine Culnane '84 has been a consistent and loyal supporter of WPI. An active donor since she graduated from the university, she recently completed her legacy gift by naming WPI a beneficiary of her life insurance. Cathy joined the Alden Society this year and achieved her philanthropic legacy at WPI by establishing the Catherine M. Culnane '84 and Patrick J. Torosian Scholarship Fund.

HAVE YOU INCLUDED WPI

in a will or trust? In a life income gift? As a beneficiary of life insurance, IRA, or other retirement account?

Membership is about giving you recognition ***now*** for your plans to support WPI in the ***future***.

To join, visit ***plannedgiving.wpi.edu***.

FOR MORE INFORMATION CONTACT
Lynne Feraco
Assistant Vice President of Gift Planning
774-239-7326 | *lferaco@wpi.edu*

ALDEN SOCIETY

ALUMNI NEWS

From the Desk of

PAULA M. DELANEY '75 PRESIDENT, WPI ALUMNI ASSOCIATION

Dear Alumni,

As we round the corner into the second half of the 2022–23 school year, I am pleased to share the following extra special highlights from last term on the Hill.

Beyond These Towers: The Campaign for WPI is going strong with wonderful support from October's Giving Day, which raised over $300,000 for the university in 24 hours. With more than 1,300 donors—alumni, parents, students, faculty, staff, and friends—Giving Day 2022 had one of the university's highest levels of participation yet. Of special note were the 44 Giving Day Ambassadors—our most ever—advocating for their WPI passions, and the more than 580 donors who supported them and their efforts directly. Thank you for being part of our caring community by supporting *Beyond These Towers: The Campaign for WPI.*

Homecoming 2022 saw many of you, as well as students, families, and friends, back on the Hill. All were welcomed back for a weekend of friendship, celebration, competition, and school spirit. Planning for Alumni Weekend 2023 is already underway. Watch your email inbox for Alumni Weekend news and registration information. Between now and then, there are plenty of opportunities to stay connected and get involved. I hope you'll join me in attending events, getting involved, and giving back to our alma mater this winter and upcoming spring.

The Alumni Association launched its inaugural Graduates of the Last Decade (GOLD) 10 Under 10 Awards. This program recognizes and celebrates alumni from the last 10 years who have excelled in one or more of the following areas: career achievements, philanthropic endeavors, community outreach & inclusion, and artistic impact & accomplishments. See page 55 to learn more about the 2022 recipients.

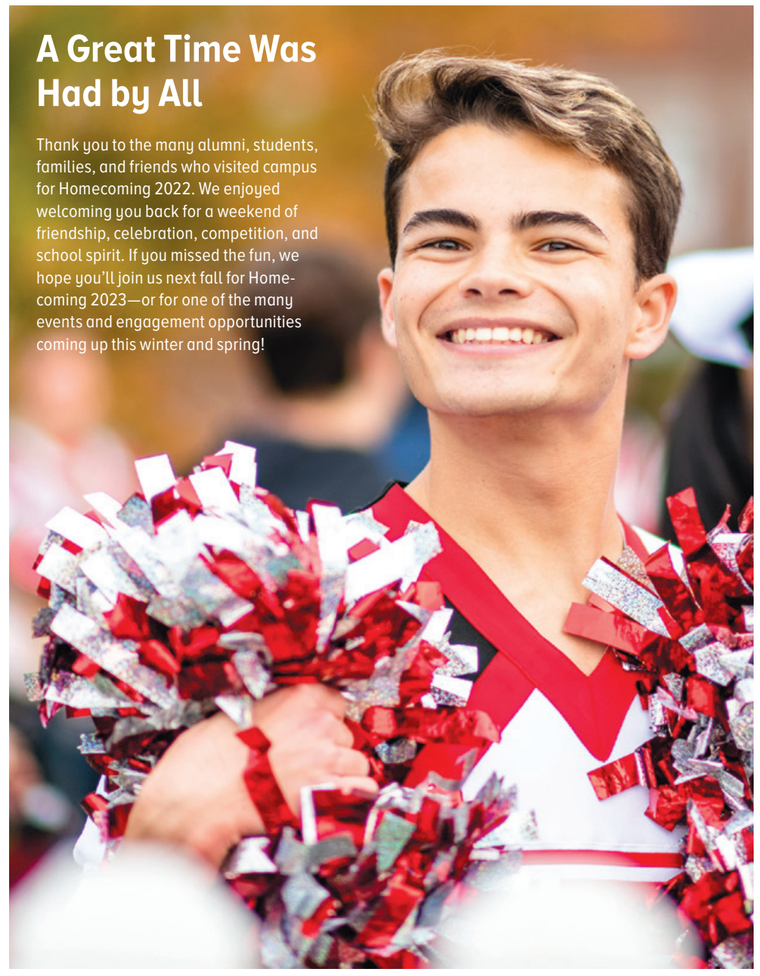
"Grace" Jinliu Wang, PhD, a materials scientist and highly accomplished and collaborative leader in higher education, government, and industry, was selected as the 17th president of WPI. Elected by the Board of Trustees after an extensive national search, Wang will assume the presidency on April 3, 2023.

Trustee Emeritus, former WPI Board Chair, and former WPI interim president **Philip B. Ryan '65** received the Phi Kappa Theta 2022 Man of Achievement Award in November at a special ceremony in his honor. Established by the Phi Kappa Theta National Foundation, the award recognizes brothers who have risen to prominence in their fields of endeavor and whose accomplishments inspire members to achieve their own goals.

HOMECOMING 2022

A Great Time Was Had by All

Thank you to the many alumni, students, families, and friends who visited campus for Homecoming 2022. We enjoyed welcoming you back for a weekend of friendship, celebration, competition, and school spirit. If you missed the fun, we hope you'll join us next fall for Homecoming 2023—or for one of the many events and engagement opportunities coming up this winter and spring!



PHOTOS BY MATTHEW BURGOS

Holly Zimmermann '91
Enjoys Pushing Limits

HOLLY ZIMMERMANN COMPETING IN THE 2022 SNOWMAN RACE IN BHUTAN.

To understand the extreme nature of an ultramarathon, picture the already grueling distance of a typical marathon, and triple or quadruple it. Then imagine these multi-day races under the most challenging conditions, such as in the intense heat of the Sahara Desert or the bitter cold of the world's highest mountains, where runners test their physical and mental limits while flirting with disaster—from a potential misstep on an Alps ridgeline to disorientation caused by high-altitude sickness.

This is a world where Holly Zimmermann thrives.

A former engineer turned extreme athlete, blogger, book author, and motivational speaker, Zimmermann now shares with others the lessons she's learned—and continues to learn—from her unusual passion. Her most important message: anyone can do what she does, if they have the will.

"I always say, 90 percent of ultramarathoning is mental, and the other 10 percent is also mental," she says. "As long as you're physically prepared on the starting line, it's a head game. Once you've reached a certain point and you think you can't go farther, you have to get your head straight because you can accomplish it. The body ... we can push it a lot farther than we think."

Going strong at age 52, Zimmermann has the credentials to be considered one of the best in this extreme sport. She was the first international woman to finish the 2018 Mt. Everest Marathon in Nepal and was one of 20 athletes invited to participate in the inaugural Snowman Race in Bhutan in 2022. Among other events, she's completed the 257-km (160-mile) Marathon des Sables in Morocco and the Polar Circle Marathon in Greenland—and she's been on adventure race teams (combining running with hiking, biking, and kayaking) that have competed in national and world championships, all when she was over 50 and her teammates were in their 30s.

She credits her numbers-oriented mind—plus acquiring a GPS watch—with drawing her to races that are faster, longer, and more adventurous.

"Running marathons on the road wasn't cutting it for me. I live in southern Germany, not too far from the Alps, and there's a lot of trail running here. I love the trails, the nature, seeing the beauty around me. I'm always pushing my limits and seeing how much is really in me," she says. "And it seems like I haven't found it yet."

An Athletic Start

Always athletic in her youth, Zimmermann competed on the lacrosse and field hockey teams at WPI. The mechanical engineering major admits she studied hard, partied often, and "took in everything I could" while a student. Her Major Qualifying Project involved a heat transfer analysis of a canister that was going into orbit on the Space Shuttle.

After graduation, she earned a master's degree in mechanical engineering from the University of Rhode Island and took a job at AEL Industries in Virginia working on antennas and radar jamming equipment for fighter aircraft. She married and moved to her husband's home country of Germany, where she worked as a freelance editor for technical journals while raising four children.

After the birth of her fourth child, she decided to get back into shape and soon caught the ultramarathoning bug. Preparing for her first major multi-day race (2016 Marathon des Sables in the Sahara Desert), she found there was a dearth of information about what to expect.

"We were going to be in the desert for seven days and you had to carry everything on your back that you needed for the entire week, except for water—all your food, gear, clothing. But there wasn't that much information out there about how to prepare," she says. That was her inspiration for writing her first book, *Ultramarathon Mom, from the Sahara to the Arctic*, which evolved from a daily journal she kept before and during the race, and includes stories from subsequent races and her personal life.

Her second book, *Running Everest: Adventures at the Top of the World*, tells the story of how she and other runners ran a marathon that started at the Mt. Everest Base Camp—at 17,000 feet, it's the highest marathon in the world. The beauty of the Himalayas and the life stories of her fellow runners made the experience life changing, she says. "People who do these things aren't super athletes. They are normal people looking for adventure, and it's really attainable for everybody, which is what I was trying to portray in the book."

In her motivational speeches, she uses her own experiences to inspire others to push their own limits.

"When I give my talks, I like to tell people, 'everything is possible. If you have the desire to push your limits, you have everything you need,'" she says. "I describe the feeling of what it's like running on a single track trail, feeling the grass and seeing the trees and the views, and finishing exhausted and empty, and how the chaos in your head is quelled. When you talk with passion about something that you love, that's inspiring just as it is."

Zimmermann's children are her biggest supporters—two of them were part of her crew for an ultramarathon she ran in September 2022, following her in a car with everything she needed and cheering her on as she crossed the finish line as the second woman. But that doesn't mean her family completely understands her passion.

"I don't see any limitations," she says. "My mother asked me recently, 'When are you going to retire from these crazy races?' I told her, 'I love it, so I won't stop unless I have to.'"

Follow Zimmermann's blog: *http://www.hollyzimmermann.com*

—Kristen O'Reilly

TURNING POINT

Catherine Culnane '84 and Patrick Torosian

ILLUSTRATION BY HELENA PEREZ GARCIA

Gift Addresses Barriers to Women in Technical Careers

***ALUMNA GIVES BACK THROUGH* BEYOND THESE TOWERS: THE CAMPAIGN FOR WPI**

Catherine Culnane '84 still marvels that her widowed, homemaker mother managed to put four of her children through college. And although Culnane offers the utmost gratitude to her mother for those nearly heroic efforts, she is acutely aware of the accompanying role WPI's generous donors played in her university experience. "My siblings and I benefited from financial aid. I've always believed in the importance of paying it forward and that contemporary alumni contributions make a difference at WPI," she says.

Living her beliefs, Culnane has been an active donor since graduating from WPI, and, with her husband, Patrick, recently established the Catherine M. Culnane '84 and Patrick J. Torosian Endowed Scholarship—and established a bequest to further support WPI students in the future. Their generous contributions support a key priority of the university's $500 million fundraising effort, *Beyond These Towers: The Campaign for WPI*: removing financial barriers to a WPI education.

She is concerned about waning interest in engineering and technology careers in the United States, particularly among women. "I believe the number of women in engineering and technology positions doesn't seem to have grown much since I graduated, and may, in fact, be shrinking. As a female technology professional and leader, I benefitted from making my way with the support of teachers and mentors in a mostly male setting. I was comfortable working in the traditionally male companies and industries where I built my career, and it is my greatest honor to be able to assist similar students in making their way for years to come."

Reflecting on her time on the Hill, Culnane shares, "WPI stood out to me for its fit; it was just the right size. I liked the humanities and project focus, and I got the sense the staff really cared about the students—it truly felt like a family. I started as a computer science major and, with helpful guidance from my advisor, I incorporated management and accounting coursework to prepare me for the business-oriented career I aspired to. I absolutely loved my time at WPI and couldn't have imagined a more perfect campus experience."

Following graduation, she began her career developing and supporting commercial software for American Management Systems (now CGI Group). She later held executive leadership roles at Dell as well as at several large industrial businesses within General Electric; she recently retired from AutoZone as vice president, information technology. Relating her WPI experience to her successful career, Culnane says, "WPI's 'learning to learn' philosophy resonated and really carried through my college, graduate, and career development. The seven-week terms and project work were very beneficial; completing a course in seven weeks forces one to get serious early, a discipline that proved beneficial in meeting business objectives and deadlines. Additionally, working together with classmates on projects also translated directly in my professional roles, where teamwork was so important."

She feels a sense of pride when she looks at her alma mater today. "The campus and programs have continued to evolve and improve; the new buildings are amazing, and the degrees and project experiences offered have grown. WPI has more than kept pace with the times, benefitting from strong leadership, great alumni support, and phenomenal staff. Our alumni accomplishments are impressive, as are the interests and developments of today's students. I see a bright future for WPI and its graduates."

This pride motivated her to get an early start at giving back to WPI. "Knowing I would not have been able to attend such a great university without the financial assistance that was provided to me at the time, I began annual contributions to WPI my first year working professionally," she says. "My memories and attachment to WPI are so strong that I feel compelled to give back and leave an impactful legacy at WPI."

If you see yourself in Culnane's story, consider the many opportunities to give back through Beyond These Towers: The Campaign for WPI. *Learn more at* wpi.edu/+beyond.

—Sira Naras Frongillo

Alden Voices Sostenuto

GIVING DAY DONORS MAKE ALL THE DIFFERENCE

More than 1,300 alumni, parents, students, faculty, staff, and friends gave generously to WPI on Giving Day 2022, Oct. 6, raising more than $300,000 for WPI in 24 hours. In case you're wondering why the fuss about Giving Day—what impact it could possibly have—look no further than Alden Voices, WPI's soprano and alto choir of more than 90 members.

Professor Joshua Rohde, director of choral activities, explains that Alden Voices is both a university course and a student club, led jointly by himself and a board of students. As a result, he says the ensemble is "both a place of important musical curriculum and a social home for students." The choir performs a variety of traditional and contemporary works, including recently acclaimed concerts that focus on the role of women in science, technology, engineering, and math.

"Alden Voices strives for excellence in musicality while engaging with relevant issues, appreciating multiple cultural backgrounds, and interacting with the larger Worcester community," he says.

A key differentiator for WPI is its emphasis on humanities and arts in a STEM academic environment. WPI requires students to immerse themselves in the humanities and arts, and provides many opportunities for them to pursue their passions for music, theatre, art, and other creative endeavors. Each year, hundreds of students participate in music courses, labs, and performing ensembles, Rohde notes. Alden Voices is one of 18 music ensembles on campus that include orchestra, bands, African drumming, jazz, and more.

WPI's oldest student music group, the Glee Club—the tenor and bass choir—has nearly 150 years of history, music, traditions, alumni, and a healthy endowment to support its activities. Though Alden Voices has grown rapidly in recent years while establishing a strong identity of its own, the group lacked the same financial foundation needed to truly advance and thrive.

That changed this Giving Day, when Alden Voices raised just over $7,000 from 120 generous alumni, students, parents, and friends. How can $7,000 make any difference? It was the amount needed to reach the group's $25,000 goal, earning them a $25,000 matching grant from the WPI Women's Impact Network. The total combined $50,000 finally established the group's endowment: Alden Voices Sostenuto, using the Latin musical term "to sustain."

"This endowment will serve to support the ensemble in perpetuity and create an equality of opportunities for all students," Rohde says. "The ensemble aims to use funds from this endowment to purchase new music, record its first CD, and engage in special projects both on and off campus."

Abbey Blauser '23, a mechanical engineering major and current president of Alden Voices, is excited about the opportunities enabled by the endowment.

"Overall, this endowment will be crucial to furthering the success and continued advancement of Alden Voices," she says, "and will provide many opportunities for our members for years to come."

Blauser joined Alden Voices as a first-year student when she saw it offered as a course. She'd always enjoyed singing and theatre when she was younger but didn't have those opportunities in high school. She jumped at the chance to get back into music at WPI and instantly felt at home in Alden Voices. She's been moved by the support from the community.

"On behalf of all our members I can say we are extremely grateful to everyone who has supported us by both donating and coming to concerts to see us perform," Blauser says. "I would like to especially thank everyone who supported the final push in creating Sostenuto on Giving Day 2022. Without you all, we would still be pushing for its creation. I would also like to thank the Women's Impact Network for its contribution in establishing the endowment. Without its matching grant, we would not have the endowment at all."

Alden Voices is just one program positively impacted by our Giving Day donors. To see more of your impact, visit wpi.edu/+givingday and visit the Challenges and Matches page.

And if you missed Giving Day—there's still time to make your impact! Visit wpi.edu/+give *to make your gift any time.*

—Judith Jaeger

10 Graduates of the Last Decade (GOLD) Bestow Inaugural 10 Under 10 Awards

WPI Graduates of the Last Decade (GOLD) recently announced the inaugural GOLD 10 Under 10 Award to recognize and celebrate the outstanding achievements of WPI's recent graduates. The four criteria that define a GOLD 10 Under 10 awardee are career achievements, philanthropic endeavors, community outreach and inclusion, and artistic impact and accomplishments. This year's award winners have demonstrated excellence in one or more of the noted areas and have made a significant impact on their local or global communities.

1. Christina Bailey-Hytholt '15 "I have had many tremendous mentors throughout my academic journey who offered their time and guidance to me. I now find it so important to give this time to the students I serve as a mentor, because I know the impact that it could make."

2. Morgan Bell '17 "Giving back to others is the only way that we will continue to move forward. I wouldn't have been able to attend WPI without the scholarships I received, many of which were made possible through donations from others. I wouldn't have gotten all of the experiences I did at WPI if others hadn't given back their time or chosen to invest in me. I try to live by the mantra 'be the person you needed when you were younger.'"

3. Marissa Capua '14 "Giving back to the organizations and people who have already given so much to us is a sign of gratitude and appreciation, and it is a way to lead by example for others in those organizations to continue to pay it forward."

4. Jorgo Gushi '22 "In all my endeavors so far, my motto has been: 'We rise by lifting others.' Giving back is not only about enriching your perspective of the world, but it empowers you to better the lives of those around you."

5. Conor Hoey '18 "WPI provided me with a great foundation for professional success while simultaneously cultivating some of the most important relationships in my life. Giving back to WPI matters to me because I feel that others deserve the same opportunity that I had to better myself at the university."

6. Marisol Mari Sanchez '21 "Investing your time in others creates such an important positive ripple effect. This is especially true if you're giving back in a way that you are passionate about. Passion moves people; having that passion to do good and give back can spark so many positive things in others."

7. Emily Molstad '19 "Volunteering your time is one of the most rewarding ways to stay connected to the WPI community and support its growth. It's provided a valuable path for me to stay up-to-date on the different opportunities for WPI alumni and opened doors for me to provide support where I can to current students."

8. Miles Nallen '19 "Giving back time to WPI and others is important because I certainly wouldn't be where I am today and had the opportunities that I've had without the help I've received from others over the years—especially from WPI alumni. It's important to me to pay it forward and help current WPI students in any way I can, just like alumni did for me when I was an undergrad."

9. Nde Nkimbeng '18 "I've always been driven by a desire to contribute to the world. I strive to make a difference in the lives of others every single day. It's my life's mission."

10. Aaron Weeks '18 "Giving back is so important because it's amazing to see the difference you can make for a cause or for another person."

If you're interested in becoming a GOLD committee member or have an idea for a great event, email **gold@wpi.edu.**

CLASSNOTES

submit yours to **CLASSNOTES@WPI.EDU**

1958

Bill O'Neil reports, "My wife, Adele, and I have recently permanently relocated to our home in Naples, Fla. Just in time for hurricane Ian! All is well."

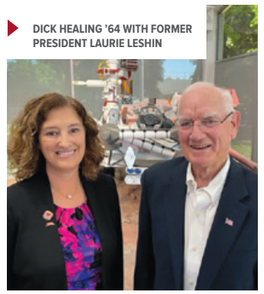
1962

Bill Krein writes, "I have finally learned to row a single shell at Duxbury Bay Marine School. If only we'd had crew back in my day!"

1963

Joseph Mancuso reports that he has published his 13th book, *CEO Smiles*, on Amazon.com and Ali Baba, in both English and Chinese. He is the founder of CEO Clubs (www.ceoclubs.org), with members in 80 percent of the world's countries, including India, the United States, and China.

Ed Polewarczyk was elected to the Maine House District 47. Before the election he was featured in an article in the *Wiscasset Newspaper*. He served in the U.S. Army as a first lieutenant, and retired from the Space Shuttle program after a 34-year career. He has been an active member of various budget committees since relocating to Maine and is a member of several local clubs and organizations. He told the reporter that the most pressing issues for his campaign were the economy, education, and business/industry.



DICK HEALING '64 WITH FORMER PRESIDENT LAURIE LESHIN

1964

Dick Healing writes, "I had a very special visit at NASA's Jet Propulsion Lab (JPL) with the Walker family from Cheyenne, Wyo. Our special honor was meeting the former president of WPI and current NASA JPL Director Laurie Leshin. She personally met with us for several minutes just before we were escorted on a private tour of the Mars Yard and the EMSL (Extraterrestrial Materials Simulation Lab), where we were up close with the twin of the *Perseverance* Mars Rover as it moved over terrain emulating the surface of Mars. Dr. Leshin's record of leadership and significant achievements during her eight years as the first woman president of WPI certainly led to her becoming the first woman director of NASA JPL at a very exciting time in NASA JPL's history."

CARY PALULIS, DAVE HOPKINSON, AND BOB PLEINES, CLASS OF 1968

1968

Cary Palulis, Dave Hopkinson, and **Bob Pleines** reunited during this past summer. Cary writes, "Fraternity brothers had our annual boat ride in Massachusetts, with Bob catching a nice 16-inch fat rainbow. Perfect weather for our annual get-together!!!"

1970

Greg Barnhart writes, "As part of a 7,000-miles, cross-country road trip, my wife, Karen, and I stopped by WPI, as I hadn't been back in over 40 years due to living on the West Coast. Although I avidly read the *WPI Journal*, seeing the campus and having a very gracious tour by Lynne Feraco from Advancement's Alden Society was awe-inspiring. Wow! We met impressive students and the director of the Innovation Studio. Highly, highly recommend to all alumni to obtain the latest history of WPI, *True to Plan*. It is well written, informative, 'behind the scenes,' and a compelling read for all of us who were there."

1974

Ashok Kheny spoke with *Business News This Week* about his work in development over his 40-year career. He is currently the managing director of Nandi Infrastructure Corridor Enterprise in India. Before moving back to India from the United States, his first company, SAB, laid fiber-optic cable networks across various regions of the United States and implemented various transit and infrastructure projects. His current company focuses on roadways and rail infrastructure development.

1975

Barry Braunstein writes, "After a long and successful career in high tech sales and marketing, I've started a headshot/portrait photography business. I studied (virtually) with the world's top headshot photographer and achieved a level of proficiency that only 175 photographers worldwide have achieved. My studio is in Wellesley, Mass., and I also go on location for my larger clients. Check out my website: www.barrybraunstein-photography.com. I'm also proud to be part of a nationwide organization of great headshot photographers providing free headshots to military veterans transitioning to civilian life (PortraitsforPatriots.org)."

LARRY HINDLE, JOHN MOULTON, PETER LANDRY, BRIAN CLANG, LARRY SHIEMBOB, BOB GROCHMAL, CLASS OF 1978

1976

Roland Moreau was elected to the Society of Petroleum Engineers as a distinguished member. Before his retirement, he worked at ExxonMobil for 34 years, serving as safety, security, health, and environmental manager for their upstream research, gas, and power marketing and upstream ventures business units. He is currently on the Board of Trustees for the United Engineering Foundation and serves as vice chair for the National Academies' Gulf Offshore Energy Safety Board. He has also been recognized with the 2022 Offshore Technology Conference Heritage Award.

1977

Gary Loeb reports that he is enjoying retirement with his wife, Denise, in Peoria, Ariz., outside of Phoenix. Gary retired from Exelon Generation in 2016, where he was a corporate engineer in Kennett Square, Pa. He is enjoying serving as the secretary of Masonic Sun City Lodge #72, as well as being the captain of a bocce ball team.

1978

John Moulton writes, "Back in 2017, I wrote in Class Notes that I was retiring and hoped that my Alpha Tau Omega brothers would visit me in South Carolina. Several of them saw the note and reached out to me. After a delay due to COVID, one of my brothers came to visit me at my home on Lake Keowee in upstate South Carolina on Oct. 5. We had an awesome time together boating, swimming, sharing stories, and having good food and drinks. Even though we had not communicated since my wedding 43 years ago, it was an amazing feeling of brotherhood to be back together again and catch up. A lot older, a little wiser, in good health, and a commitment to get back together annually."

1979

Bob Hart was named Los Angeles Philanthropist of the Year by the Association of Fundraising Professionals (AFP). He is the founder and CEO of TruAmerica Multifamily, an investment firm focused on acquiring, renovating, and managing multifamily housing in the Los Angeles area. He is also involved with a variety of charitable and academic organizations, helping to raise tens of millions of dollars. He is a member of the board of directors for Chrysalis, an employment readiness program. Bob was presented the award at AFP's 37th annual National Philanthropy Day luncheon this past October in Los Angeles.

Peter Simonson writes: "I retired from BAE Systems in November 2021 as the technical director for the space systems product line, responsible for internal technology investment and supporting new business creation. My career of 42 years was principally in the synthesis, system design, development, and integration of signal processing systems for communication, control, sensing, and self-protection. Despite a few forays into organizational management, not all voluntary, I preferred to stay technical, focusing on how the team could solve systemic problems. No doubt studying communications signal processing and executing my MQP while at WPI has served me well. Since retirement, I have stepped up the pace of repairing our old farmhouse in southern New Hampshire. I suspect my love of old houses can be traced to living at Sigma Pi fraternity. That house is an 1890s early Colonial Revival structure. One of my hobbies is fly tying (for fly-fishing), with a particular interest in flies from the late 19th and early 20th century. I am a demonstration fly tyer at various fly-fishing shows in the Northeast. My work studying the unnamed, unknown, and unusual streamer fly patterns by Carrie G. Stevens was featured in the Autumn 2022 issue of *Fly Tyer* magazine, and my dressing of one of those streamer flies appears on the cover of that issue."

1980

Fran Boucher finished a 23-year career with National Grid as a leader in commercial and industrial energy efficiency. He says, "My passion for this career field was ignited during my very first semester at WPI and later with my MQP. I went on to truly enjoy opportunities to innovate and educate in this field locally and nationally. I continue to be busy raising my two teenagers!"

Marc Hildebrant says, "I have been writing a book that describes my engineering life from before college to my retirement. The purpose of the book is to help the new graduate as they start a career in engineering by learning from my experiences in an electrical engineering career."

Mark Lefebvre writes, "I'm pleased to announce that I have published my first book, *A Place in Time: Youth, Community & Baseball*, which chronicles the incredible three-year run of consecutive state championships for Leominster, Mass.—Babe Ruth in 1971, 1972, and 1973—and the role that community played in that success. Until that three-year period, no city or town had ever accomplished this feat. This story is about the players and coaches. But it is perhaps, most important, a story about the role of the Leominster community, its neighborhoods and schoolyards,

where kids had safe places and opportunities to thrive. It is about sports and other recreational activities that provided kids with the opportunity to develop the necessary skills to cope and succeed as adults. But sadly, this story is also about the erosion of those very things at a time when we, as a society, perhaps need them most."

1981

David Jacobs and **Vida Afumwaa** married in Accra, Ghana. He also retired from the uniformed services of the United States. David and Vida report they are happy and living in Florida.

1982

George Oliver, a WPI trustee, was part of Business Roundtable's Responsible Artificial Intelligence (AI) CEO video campaign that featured America's top CEOs. In the video, he describes the benefits of responsible AI and why it is critical to the building industry. His company, Johnson Controls, was named to the 2022 *Fortune* Change the World list. This list recognizes companies "that use creative tools to address society's unmet needs and is evaluated based on measurable social impact, business results, and degree of innovation," according to the announcement.

1983

Patrick Guida writes, "I left industry in 2012 after 30 years of design, manufacturing, and management, and joined WPI working full-time in the Office of Online & Corporate Education. I retired last September while continuing my long-time assistant coaching with the Women's Rowing program.

SCOTT PENA '24, JOHN HALL '25, ROB HENDERSON '84 AND HIS COUSIN, JOANNE

2022 was a very special year—after the disappointments and challenges of 2020 and 2021 due to COVID-19 protocols, the team had a great spring 2022 season, earning a bid to the NCAAs in Sarasota, Fla., at the end of May. The women's Varsity 8 then surprised the world of NCAA DIII rowing by winning the national championship! Let me tell you, it was unbelievable!! If you are a rower and have not seen the 2022 NCAA video of the DIII Varsity 8 grand final race, I urge you to watch it. It was a stunning victory and an amazing accomplishment for this crew and for WPI; it shows what can be accomplished when you simply believe in yourselves. I am privileged to be a part this team and humbled by the persistence and commitment that these women possess. In June, we took two eights to England to compete in the Henley Women's Regatta for the fourth time since 2011. Our boats did very well, with strong performances against very fast international crews in the storied setting of Henley-on-Thames."

David Kent's Framingham Makerspace was featured in an article for the *MetroWest Daily News*. This space is designed to explore "the intersection of art, technology, and community," according to the article. It is designed for crafters and artists of all types to have the space and the right equipment to create. The Makerspace works like a gym membership, with members paying a monthly fee to use the various resources. The location has wood, metal, and welding shops, a 3D printer, an etching press, and more—including a quilting machine.

A GROUP OF ALUMNI PARTICIPATED IN THE TEAM CORK MEMORIAL GOLF TOURNAMENT FOR FELLOW CLASSMATE CHRIS "CORKEY" CURTIS, WHO PASSED AWAY IN 2021 FROM COLON CANCER: DAVE HENRY '86, RICK TACELLI '85, JEFF EELLS '86, TOM CROWLEY '86, BILL CLEMMEY '86, STEVE ROGERSON '86, JOHN MCNAMARA '86, BILL CAMPBELL '86, PATRICK DUFFY '85, DAN COAKLEY '86, AND BOB HYLAND '86.

1984

Rob "Hendo" Henderson took part in a private tour of campus prior to attending the WPI Athletic Hall of Fame event this past September (at which he was honored as a key defensive player on the football team). He was joined by students Scott Pena '24 (with dog, Chip) and John Hall '25, along with his cousin, Joanne.

Jason Macari has purchased Phantom Farms in Cumberland, R.I. According to the article in *The Valley Breeze*, he hopes to expand upon the farm's offerings, including adding a café and garden center, planting more apple trees for pick-your-own, and opening a seasonal outdoor restaurant. "I'm super excited about Phantom Farms. It's a really beautiful farm," he said in the story, "and I feel blessed to be able to get involved with it, make it better for everyone involved."

1985

David Doherty was a keynote speaker at Industry Tech Days 2022, a virtual conference this past September hosted by All About Circuits. He is president and chief operating officer of Digi-Key Corporation with over 35 years of experience in the electronics industry. His speaking session was titled "Bringing Design Order to a Chaotic World: Insights From Top Execs at Digi-Key and Molex."

1987

Olatunji "Tunji" Taiwo was named president and CEO of Junia Holdings, a provider of digital, non-contact optical inspection systems in the specialty metal fabrication industry. "I am very excited to be joining the Junia Holdings team and I look forward to working with the talented management team to innovate, grow our Oasis Inspection Systems brand, strengthen distributor partnerships, and continue to improve our George Products business," he said in the company's announcement.

Richard Wronski was a guest speaker for an Aerospace & Defense Technology webinar, which covered topics relating to advances in unmanned aircraft—threats, solutions, and opportunities. He is vice president of sensing, perception, and applied robotics at Charles River Analytics, leading a team of scientists and engineers who are developing a product portfolio that stems from research focused on sensing and perception, both for autonomous robotics and for human physiological assessment. He has more than 30 years of program leadership experience for a wide range of both government and commercial customers, including various agencies within the Department of Homeland Security and the Department of Defense, as well as numerous international clients.

1988

Casey Grant spoke at the Boston Public Library about the unsolved mystery of the 1942 Cocoanut Grove Fire. His presentation reviewed the background and details of the tragic fire that claimed almost 500 lives in the Boston nightclub. He is the executive director of D&S Research Associates & Engineers, an independent professional consulting firm with a focus on the design and implementation of research for the fire protection and emergency response communities.

1989

David Wright joined Syska Hennessy Group as associate vice president, senior practice area leader for health care. Syska Hennessy, based in Richmond, Va., is an international engineering firm. His role will focus on health care projects in Virginia and North Carolina. He has more than 30 years of experience in health care engineering and project management.

1990

Karen Tegan Padir, a WPI trustee, was named chief product officer at ESG Global, a software engineering company for energy customers in North America, the United Kingdom, and Japan. "I am honored to have been given the opportunity to lead a strong team of market specialists focused on keeping ESG as the market leader of energy retail software and services, helping customers with the digitization of their businesses, and supporting the energy transition," she said in the company's announcement.

1991

John Kirwan was appointed president of Hobbs Medical, a global manufacturer and direct supplier of high-quality, low-cost accessories for the flexible GI and pulmonary endoscopy markets. He is also president and founder of Spark Medical Device Consulting of Wilbraham, Mass. He has served in various leadership roles throughout his career including his time as vice president of Blackstone Medical, Biologics Division, where his group "launched the first commercially available stem cell product for spine surgery," according to the announcement. He said, "I'm excited to begin my new role at Hobbs Medical. I've been working with their team as a consultant and I'm ready to hit the ground running in a full-time capacity."

Herman Purutyan, a board member of the Armenian Assembly, traveled to Armenia to meet with the country's former president, Robert Kocharyan.

1995

Tricia Fitzmaurice was named vice president of sales by Rancher Government Solutions (RGS), a company that addresses the unique security and operational needs of the U.S. government and military. She has 27 years of government IT leadership experience and spent eight years at Red Hat as director of National Security Programs, Federal Law Enforcement, and Justice. Before joining RGS, she held numerous positions that worked closely with government executives to build their strategy for enterprise-wide automation adoption.

1996

Greta Boynton, MD, was appointed chief medical officer and senior vice president of Waterbury HEALTH network. She has held successively expanding leadership roles in the medical field, including chief of hospital medicine at Eastern Connecticut Health Network and the national medical director for the National Clinical Innovations Council for Sound Physicians.

Colleen Wade, director of Fire Research Group, spoke at the Fire New Zealand Conference on fire safety engineering in mass timber buildings. She was interviewed by Defence Security New Zealand about her book, *Fire Safe Use of Wood in Buildings: Global Design Guide*. *After* earning her master's degree from WPI in fire protection engineering, she returned to New Zealand to earn her PhD and cofounded Fire Research Group, specializing in fire research and advisory work.

1997

Natalie Grace, a co-founder of Gardella Grace, was selected as a 2022 IAM 1000-recommended individual in the area of patent prosecution. IAM highlights outstanding work by those in the field of patent law. Her firm was also honored with an IAM 1000 recommendation in the area of patent prosecution and was listed as one of the best law firms in the country by U.S. News.

Que Nguyen became the acting president of the Assemblies of God Vietnamese Fellowship. She's been a clinical pharmacist for 15 years and works as a full-time pharmacist for the Department of Veterans Affairs in Worcester.

1998

Anu (Henna) Karna has been named to the Essent Group Ltd. Board of Directors. Essent Group is a Bermuda-based holding company, headquartered in Radnor, Pa., that offers private mortgage insurance for single-family mortgage loans in the United States. She has more than 25 years of experience leading digital, data, and analytics innovation across high-tech consumer packaged goods, risk management, and insurance industries, according to the announcement. She has held various high-level positions in the risk management and insurance industry, including with AXA and American International Group, Inc.

2000

Deepthi Bathina was named to the advisory board for the Kerry Murphy Healy Center for Health

Innovation and Entrepreneurship at Babson College. In this advisory role, she will help guide the center's "focus on global programs to help organizations all over the world achieve health and economic value simultaneously," according to the center's announcement. She is president, CEO, and founder at HealthTech Ventures.

2001

Max Liberman was interviewed by Yole Group about the automotive radar market and his work as vice president at Uhnder, a company focused on "revolutionizing automotive and automated mobility with the world's first digital imaging radar-on-chip (RoC) to enable safe mobility for both people and goods as well as to make roads safer for all users," he said. He oversees global sales and marketing for Uhnder's digital imaging radar-on-chip, having previously served for 19 years at Analog Devices as director of sales for automotive businesses across the world.

2002

Brian Fenton was named to the Board of Directors for Odylia Therapeutics, a nonprofit biotechnology company focused on the development of treatments for people living with rare diseases. He has 30 years of experience in the biotechnology industry, having previously served as chief business officer at Translate Bio.

Liz Hitchcock spoke at Worcester's Historic New England Summit this past October. She joined other preservation leaders who spoke on topics that explored "critical, transformative issues in building more livable, resilient communities in the 21st century," according to the organization's press release. She represented Orbit Group, a business that supports economic development initiatives, urban planning, and creative place making in New Hampshire.

2004

Brooke Tropf was featured in an article by the *Midland Daily News* that discussed her efforts to test the United States' ability to address the threat of space objects, such as asteroids. Her research work with Johns Hopkins and NASA helped launch the Double Asteroid Redirection Test mission. This technology is aimed at redirecting large asteroids to avoid a devastating collision with Earth. The article stated that "she feels lucky to have a job that she loves. She acknowledged her work contributes to important science, while adding there are a lot of things happening on Earth." She said, "It also gives us a chance to turn around and say, 'Okay, we're going to protect ourselves from out there (space). How can we also protect ourselves from things that are happening to us already on the earth?'"

2005

Keri Sicar was a speaker at a UMass Lowell Lunch and Learn workshop called "Leadership & IP Management—Pitfalls to Avoid." She discussed pitfalls to avoid in organizational leadership and intellectual property management, along with business strategy and patent law. She is a patent attorney and owner of Virtual IP Law, with 20 years of experience in the field of intellectual property law. She has also served as vice chair of the Intellectual Property Law section of the New Hampshire Bar Association since 2016.

2007

Greg McHale presented at the International Manufacturing Technology 2022 Conference in September. His presentation discussed using machine learning to understand production—from tools to finished parts. His panel covered "software and hardware solutions that provide more data and actionable insights into everything from toolpath optimization to overall production intelligence in real time," according to the announcement. He founded the company Datanomix that offers automated production intelligence for precision manufacturers.

Sanjayan "Sunny" Manivannan started as CEO of ManyChat, a social media marketing company, which is currently hiring for entry level positions in New York City. His previous position was senior vice president and general manager at Global SMB. He says, "To the ManyChat team and community: I am excited to work with all of you to help brands and customers interact with each other in new, meaningful ways."

Charlie Pasquariello was named to *Business Observer*'s 40 under 40 list. He currently serves as senior product manager of Watts Water Technologies in Fort Meyers, Fla., which develops instruments to help produce clean drinking water for municipalities, marine ballast water systems to help keep oceans clean, and water managements solutions for health care settings.

2008

Ryan Norman (PhD) joined Sidney Resources Corporation's board of directors. He earned a PhD in physics from WPI and was a recipient of the NASA Graduate Student Research Program Fellowship, 2005-2008. He has served as a research professor of nuclear engineering and physics. Having co-authored over 60 research articles, he has presented at numerous international conferences.

2009

David Willens was named to *Worcester Business Journal*'s 40 Under Forty list for 2022. He is the director of research and development at Kinefac Corp in Worcester, where he has worked for the last 17 years. He also sponsors engineering student projects at WPI and Northeastern University and guest lectures for an introductory course on manufacturing science at WPI. He co-authored a chapter on the rolling process in the *McGraw-Hill Manufacturing Engineering Handbook* in 2015. He says the key to his success is "building a strong foundation of education, mentors, hands-on experience, and networking relationships, and staying in tune with current and future technological needs and exploring innovative ways of developing it and applying it."

2010

Vishal Sunak has been appointed to the WaterIQ Technologies Board of Directors. He is the founder and CEO of LinkSquares, a software development company. Businesswire's announcement notes that as part of the board, he will help guide company strategy, operational excellence, and best practices. The board will also provide guidance on the technical and commercial aspects of WaterIQ's digital offerings.

2011

Ryan Brown was named to *Worcester Business Journal*'s 40 Under Forty list for 2022. He is the founder of a program called "Go Hard or Stay Home," which teaches children basketball skills along with "respect, confidence, teamwork, and helping others," according to the article. Thousands of children engage with this three-year-old program in the Greater Worcester area.

Quontay Turner's business, Emerald City Plant Shop in Norwood, Mass., was featured in a *CBS News* article as New England's first Black-owned plant shop. Turner also teaches people how to care for their plants and will make house calls to help customers.

Sahag Voskian's MIT team, Verdox, was featured in an article by *DesignBoom*, "MIT 'verdox' effortlessly captures and removes carbon dioxide using electricity." Verdox uses electrochemistry to capture carbon almost effortlessly from the air. According to the article, "The invention is kind of a battery that naturally attracts carbon dioxide under certain conditions and does not do anything when these conditions are not triggered. When a low-level electric current flows in the device, the battery charges and the carbon dioxide that goes inside rises to the surface ... The team is now planning to commercialize its device to help ease climate change."

2012

Samantha Fontaine wrote an article for the Analog Devices website, "Turning the Tide on Climate Change: ADI, Woods Hole Oceanographic Institute & OCIA." This technology company focuses on providing solutions to their customers' problems in the instrumentation, automation, communications, healthcare, and automotive industries. She is currently the director of technology for social impact at ADI and has held various positions in product marketing and engineering in precision and high-speed technology groups.

2013

Kevin Griffin is a project manager at Leggat McCall Properties, a real estate development company in Boston. His role "focuses on planning, budgeting, construction, and closeout activities for various projects. He has experience with demolition, renovation, and ground-up construction projects as well as the permitting and design phases. Kevin has worked on projects at Newton-Wellesley Hospital, Worcester's CitySquare, as well as mixed-use office and research laboratory projects. He has also assisted in real estate consulting assignments for healthcare clients," according to the company's announcement.

2014

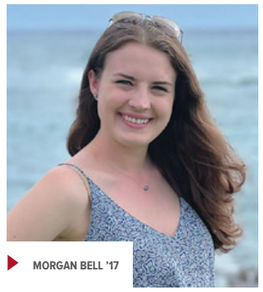
Aaron Birt and **Sean Kelly,** who founded Solvus Global, celebrated the company's joining the Inc.com 2022 list of "America's Fastest Growing Private Companies." This manufacturing technology firm was also named No. 3 in manufacturing and No. 1 in the Worcester area. Inc.com reports that the company has seen 1,927 percent growth within the last three years.

Denis Kole (PhD) was a speaker at Cell & Gene Therapy Insights' Live 30 webinar roundtable discussion in September, "Successful suspension-based viral vector manufacturing scale-up, from process development to clinics." He is the director of Accelerator SM Process Development Services at Pall Corporation in Westborough, Mass., having served in other roles at Pall. Before that he spent nine years in the biotech field with several positions at large pharma and contract research organizations.

2015

Randi Isenhart was named a 2022/2023 Penn Center for Innovation Fellow. According to the announcement, only 12 fellows were admitted from a large application pool. PCI Fellows is an experiential education program open to graduate students, postdoctoral fellows, and junior research staff at Penn. PCI Fellows get exposure to a wide range of emerging technologies and commercialization

RACHAEL HEARD '17



MORGAN BELL '17

opportunities in the life sciences, physical sciences, nanotechnology, and more. Randi worked as a research technician in a cancer genetics lab before beginning her PhD in genetics at Penn. She currently uses state-of-the-art microscopy techniques to elucidate answers to basic biology questions in the field of genome organization.

2016

Jaclyn Rogacz is founder and CEO of Firepoint Consulting, a third-party plan reviewer and fire protection consultant for municipalities. She has worked as the sole Worcester fire protection engineer for the last five years and is responsible for reviewing plans for construction submitted to the city and ensuring compliance with all Massachusetts codes, standards, and laws.

2017

Rachael Heard is the coach of WPI's cheer team, which has qualified for nationals this year. She is also WPI's director of academic programming and student transitions.

Morgan Bell was named to the 2023 Top 50 Women of Impact in the tech industry list by Women Impact Tech for her advocacy work toward bringing more women into the technology field. She says, "We have come so far in our DEI work, but we still have so much further to go. This award only ignites my passion more, and I look forward to continuing to raise silenced voices, inspiring and empowering those who need it, and making sure that we are always headed in the direction of true equity." This list comprises noteworthy women who are making strides in promoting DEI in the male-dominated tech industry.

Elzani van Zyl (MS '19) is a PhD student in the Functional Biomaterials (Coburn) Lab. She helped establish GROW: Graduate Organization for Women in STEM, worked with the Belmont Street Community School in Worcester, and helped support the National Science Foundation Research Experiences for Undergraduates program. She has won several awards for leadership and academic excellence at WPI, has published a first-author paper and patent application, and has presented at several conferences.

2018

Basliel Demessie is assistant project manager at Colantonio in Holliston, Mass. According to the announcement, "His four years of construction experience include work as a field engineer and assistant project engineer on large-scale residential and office building projects with former employers Mill Creek Residential Trust and John Moriarty & Associates."

Bryan Hughes was appointed president of Western Builders, a general contracting company in Granby, Mass. While at a partner company, O'Connell Companies, he held numerous project management roles for multimillion-dollar construction projects on several college campuses in the Northeast.

2019

Benjamin Shaffer is a research engineer at the U.S. Air Force Research Laboratory. His area of expertise is machine learning, algorithm development, adaptive optics, tracking, and laser weapons systems. In this role, he works to develop advanced beam control technologies.

Grant Zahorsky presented at the International Manufacturing Technology 2022 Conference in September. His presentation discussed the process of using automation to reduce labor costs. At Canon USA, his position focuses "on the progression of the Canon RV-series machine vision system. This system uses Canon's high-end consumer and professional cameras to globally assist companies by automating their facilities, thereby creating a more efficient and safer workplace," according to a company announcement. He also has experience in robotic welding in the automotive industry, in artificial intelligence, and in machine-vision systems.

2020

Tyler Morris was featured in *American Household News* for his work as a musician and on the business side of music. According to the article, he's played guitar since he was a child and his music crosses between blues and country. He performed his newest show, "Cathedral, a Tribute to the Music of Van Halen," in Salisbury, Mass. Many of his performances are featured on his YouTube page and he has been regularly featured in YouTube promos for *Vintage Guitar* magazine. He has earned two Grammy nominations for his recordings.

Christian Tweed was hired as a full-stack engineer at OnCorps. He joined the Derivatives Confirmation Team, which uses AI as part of an end-to-end workflow to manage unique and complex contracts, according to OnCorps' announcement.

2021

Justine Davids is an associate at Carbon Direct Capital Management. According to her profile on the company's website, she "was drawn to this position due to her passion to make carbon dioxide removal and reduction an accessible topic to people of all backgrounds."

Zachary Goldblatt (PhD) received the Sigma Xi Graduate Research Award for his dissertation, "Mechanical Regulation of Cell Death." The Society of Sigma Xi and the Committee on Graduate Studies and Research honors students with this award for outstanding research at the doctoral and master's levels.

Nathan Jackson presented at the International Manufacturing Technology 2022 Conference in September. The panel, "How can I be certain that my Automation System Process will work … BEFORE I buy it?" covered how to use proof-of-concept systems to make sure your automation system works. He is also a graduate of FANUC Programming School for FANUC Industrial robots.

MALVINA PIZIAK '22, AT FAR RIGHT, WITH THE STAFF OF WPI'S CAREER DEVELOPMENT CENTER.

2022

Gabriela Chong and **Brian Desjardins** were hired by Jensen Hughes, a fire protection engineering company. Their roles "support the company's fire and life safety practice with a focus on industrial process safety," according to the announcements.

Luca Ialong was hired by Jensen Hughes as associate fire protection consultant. He will work in the Warwick Fire & Building safety team, according to the announcement by the company.

Justin Moy will attend Boston University to pursue a PhD in bioinformatics. He is a Muscular Dystrophy Association (MDA) National Ambassador who also lives with Congenital Muscular Dystrophy. His time as a WPI student was featured in an article in MDA's *Quest* magazine.

Malvina Piziak writes, "I am thrilled to say that I accepted a position as a career advisor with WPI's Career Development Center. I am very excited to be working in a position where I can take my love for educating others and help people through a major turning point in their lives—going from college into the working world—while assisting in the development of their careers. While taking on this role, I am also a behavioral therapist for children with autism and have been since October 2019 and through most of the pandemic. I want to focus on working with individuals with disabilities and mental health disorders to help increase the quality of their lives and happiness, allowing them to find innovative, non-traditional ways to solve challenges through continuous improvement. Thank you so much to all the WPI faculty and staff who made this a possibility and taught me everything I know to get to this point in life. Also, thank you to my family and friends who have been super supportive through my journey!"

Delaney Tedtsen, a design engineer at the civil engineering firm McCrone, joined the company's Public Works Department. The role will focus on bringing clean water to the community by tackling various public water and sewer system challenges. The announcement notes how she wanted to make an impact in her engineering career: "She finally discovered a passion for environmental engineering in college and knew this was her way to help make the world a better place."

Tom Gannon, beloved teacher, systems engineering expert

Tom Gannon, a teaching professor in the Department of Electrical and Computer Engineering known for his love for teaching, respect for others, and interminable good humor, passed away on Nov. 6, 2022.

Tom had over 50 years of experience in enterprise systems engineering, real-time control systems, and information management systems. He started at WPI as an adjunct teaching professor in 1983 while also working in industry as the director of information systems engineering and chief engineer for the Technology and Innovation Directorate of the Command and Control Center at the MITRE Corporation, where he was responsible for the formation and management of technology strategy, investment plans, and science and technology programs. Previously, he served as director of the Corporate Technology Transfer Office at MITRE and held senior engineering management positions at Digital Equipment Corporation (DEC) and Bell Laboratories.

He also served as a member of the technical advisory boards and boards of directors of several research consortia, including the Microelectronics and Computer Consortium, the Microelectronics Center of North Carolina, SEMATECH (Semiconductor Manufacturing Technology), and the Semiconductor Research Corporation, and also as a member of the National Academy of Sciences Committee on International Trends in Computer Science and Technology. While at DEC, he also served as chairman of the Technology Policy Committee of CSPP, a public policy forum established by the U.S. computer industry, and was responsible for directing the development of public policy positions on strategic technology issues that affected the global competitiveness of the U.S. computer industry.

He published many papers in systems engineering and systems thinking, becoming a world-renowned expert in these fields. He also (in collaboration with his colleague Jamie Monat) published a book titled *Using Systems Thinking to Solve Real-World Problems*. He was often called upon to deliver lectures, host discussion panels, and lead symposia and podcasts in these fields.

He held a PhD in electrical engineering and computer science from Stevens Institute of Technology, as well as an MS from Purdue University and a BS from the Illinois Institute of Technology, both in electrical engineering.

Tom was instrumental in founding the new systems engineering program at WPI, and joyfully contributed to the success of its many students and alumni.

—Jamie Monat

Paul Kokulis '45 CHE, THETA CHI, Potomac, Md.
Joseph Morgan '51 ME, ALPHA TAU OMEGA, Bedford, Mass.
Alden Tucker '52 EE, SIGMA PHI EPSILON, Gladwyne, Pa.
Richard DeLuca '55 EE, PHI KAPPA THETA, Plaistow, N.H.
Philip Bedard '56 EE, THETA CHI, Helotes, Texas
Allan Hunderup '56 EE, SIGMA ALPHA EPSILON, Rochester, N.Y.
Donald Rising '57 ME, SIGMA PHI EPSILON, Stow, Mass.
Raymond Abraham '60 EE, SIGMA ALPHA EPSILON, Cape Coral, Fla.
Raymond Levesque '60 CHE, ALPHA TAU OMEGA, Bel Air, Md.
Thomas Lopresti '61, PHI KAPPA THETA, Columbus, N.J.
Donald Diamond '62 EE, ALPHA EPSILON PI, Sarasota, Fla.
John Peterson '62 MS NS, Worcester, Mass.
Richard Allen '63 CHE, SIGMA PHI EPSILON, Huntsville, Ala.
Lawrence McGrail '64 MS NS, Grafton, Mass.
John O'Keefe '64 MA, ALPHA TAU OMEGA, Tilghman, Md.
H. Altenburg '65 ME, PHI GAMMA DELTA, Tamaqua, Pa.
Raymond Brodeur '65 EE, SIGMA ALPHA EPSILON, Bethlehem, Pa.
Charles Foley '66 MS NS, Dedham, Mass.
Robert Joy '66 MS NS, Vernon, Conn.
Malcolm White '66 CHE, TAU KAPPA EPSILON, Rockport, Maine
Richard Graham '67 CE, SIGMA ALPHA EPSILON, Somerville, Mass.
Ronaldn Mucci '67 EE, THETA CHI, Tiverton, R.I.
Dwight Dickerman '70 CHE, PHI SIGMA KAPPA, East Amherst, N.Y.
Robert Pape '70 SIM, Shrewsbury, Mass.
Mark Whitley '73 CHE, Keller, Texas
Marc Langlois '76 ME, MS MSE, Old Lyme, Conn.
Stephen Bednarz '83 ME, ALPHA TAU OMEGA, Hobe Sound, Fla.
Barbara Haller '83 EE, Southbridge, Mass.
David Mankevetch '93 SIM, Millbury, Mass.
Edward Doyle '93 MBA, Buzzards Bay, Mass.
Benton Cassie '09 CE, Hopkinton, Mass.

The WPI community also notes the passing of these friends of the university: **Mary-Ellen Boyle, John Durkin, Suzanne Keene, and Paul Kennedy.**

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*.

WPI
Worcester Polytechnic Institute
100 Institute Road
Worcester, MA 01609