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IT'S GOOD TO BE KING

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WITH AN ENGINEERING MINDSET

WORCESTER POLYTECHNIC INSTITUTE | VOL. 120, NO. 1

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26

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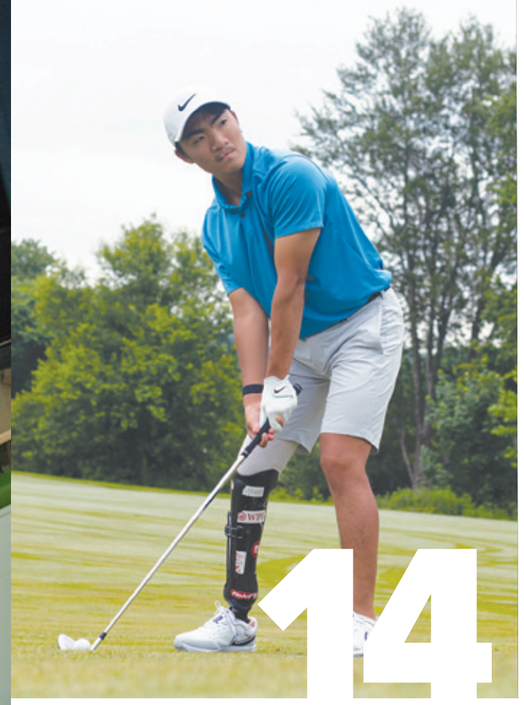
BY SCOTT WHITNEY | PHOTOGRAPHY BY SCOTT ERB



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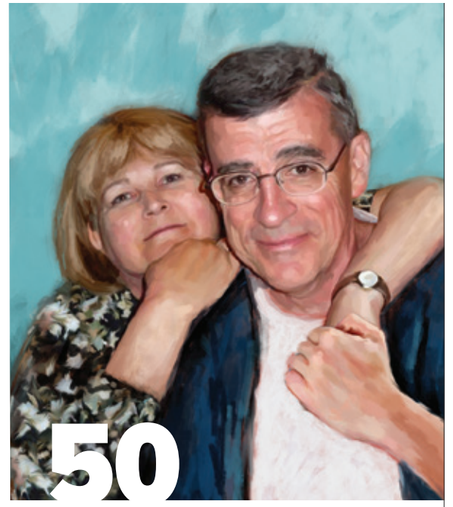

50

EDITOR
Kristen O'Reilly
wpijournal@wpi.edu

EXECUTIVE EDITOR
Alison Duffy

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

DESIGN & CREATIVE
James Casey, Casey Design

PRODUCTION MANAGER
Brian O'Connell

CONTRIBUTORS
Jonathan Cain
Arthur Carlson
Amy Crawford
Michael Dorsey
Lisa Eckelbecker
Steve Foskett
Sira Naras Frongillo
Judith Jaeger
Mia Lumsden
Julia Quinn-Szcesuil
Allison Racicot
Lauren Rebecca Thacker
Colleen Bamford Wamback
Scott Whitney

ILLUSTRATORS
Ivana Lena Besevic
Jonathan Reinfurt
Matias Trillo

PHOTOGRAPHY
Matthew Burgos
Scott Erb

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CONTACT US
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Class Notes: *classnotes@wpi.edu*
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EDITORIAL OFFICE
WPI Journal
100 Institute Road–Boynton Hall
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LETTER

Letters to the editor may be altered for length, clarity, and accuracy. Opinions expressed do not necessarily reflect the views of WPI. Send your letters to wpijournal@wpi.edu.

HOW DO YOU REVEAL YOUR WPI STORY?

A photo caught my eye as I was flipping through a batch taken at a campus event by our staff photographer, Matt Burgos. The image, out of place among the usual event photos, showed a closeup of a backpack covered in a bevy of colorful pins. As I studied the assortment, I realized they were revealing clues about the owner's life. Pins from Japan, Holland, and Poland reflected some travel experience. Multiple Puerto Rican pins indicated a stronger-than-average affinity for the U.S. territory. Others expressed pride in WPI, the city of Worcester, and the Worcester Art Museum. According to WizardingWorld.com, the Hufflepuff pin indicated the owner was the most trustworthy and hardworking of students.

My curiosity piqued, I checked with Matt to see if he knew the owner of the backpack so I might follow up for more details, but he'd snapped the photo on a whim and hadn't asked for a name. A few social media posts later, **Joelis Valez Diaz '24** revealed herself as the owner, and she was happy to tell me what each pin represented. See page 24 for the photo and her interesting life story.

The exercise made me think about how people passively reveal their life stories to the outside world—by what they wear on their body, stick on the cover of their laptop, tattoo on their skin, or pin on their backpack. Even a bumper sticker or a branded sweatshirt is an invitation to engage. Joelis tells me she welcomes conversations about her pins, each of which means something special to her.

So I pose a question to you, dear readers. How do you express your story to the outside world? And if WPI was an important part of your life story—from knowledge you gained, experiences you had, or the friends you made—do you show off that WPI pride in any particular way? If so, send me a photo and I'll include it in my next column.

A Familiar Request

The virtual mailbox has been empty of letters to the editor lately. I'm trying not to take it personally. We're all busy, but I'll welcome reader feedback on the stories within. Send an email to wpijournal@wpi.edu and become part of the conversation.

You may also comment on the digital versions of the story. QR codes at the end of each feature will lead you to the digital site and the comment section at the bottom of the story. The Fall 2023 cover story on pioneering-fighter-pilot-turned-STEM-teacher **Stacey Cotton Bonasso '90** did receive several encouraging comments from readers, including one from **Dave Andrade '92,** who wrote: "This is so inspiring. You were always so great to us young cadets and as a daughter dad, you are someone I can show my daughter as a great example. So happy to see you doing so well."

Keep those comments coming.

—Kris O'Reilly, Editor

WHO NEEDS TOM BRADY? SEVERAL AUTHENTIC GOATS VISITED CAMPUS AS PART OF FOUNDERS DAY ACTIVITIES ON NOV. 11.

PHOTO BY MATTHEW BURGOS

STUDENTS IN ASSISTANT PROFESSOR LORIS FICHERA'S COGNITIVE MEDICAL TECHNOLOGY AND ROBOTICS LAB.

A LIVING SPIRIT OF INNOVATION

"The spirit of innovation is not just a concept at WPI; it is a living, breathing force that permeates every corner of our campus."

Dear WPI Community,

The winter on campus feels peaceful, yet vibrant. In front of Boynton Hall, where my office is located, I can see the famous Magnetic Lab. Constructed in 1887—without any metal to permit studies in electromagnetism—the building was used for research in electrical engineering, then the rocketry lab of Robert Goddard.

Research at WPI traces back to the beginnings of the university. Today, that tradition not only continues, but is accelerating. Our faculty—which includes 25 Fulbright scholars and more than 40 CAREER Award recipients—collaborate across disciplines to drive discoveries and create solutions. From creating hydrogen fuels for aircraft, developing transparent wound dressing, and building autonomous vehicles for off-road environments, to making 3D-printed robots for search and rescue operations and uncovering structure details of SARS-CoV-2 virus, leading-edge research is underway at WPI.

This year WPI will celebrate 50 years of our first off-campus project center, established in Washington, D.C. Exceptional students of the highest caliber are drawn to WPI for the unique opportunity to work on real-world problems in real-world settings. Through their research at global project centers, students have designed solutions to make greenhouses more energy efficient in Armenia and monitored local air pollution levels in Greece. Closer to home, our students have studied ways to break down PFAS, also known as forever chemicals, in water systems. They have used their WPI-honed skills to probe issues that impact entire populations, such as how medical triage sometimes fails during disasters. Along this process, our students learn to be critical thinkers, problem solvers, value creators, and team players.

The spirit of innovation is not just a concept at WPI; it is a living, breathing force that permeates every corner of our campus. From cutting-edge research and design projects, groundbreaking discoveries to start-ups, the spirit of innovation is alive and well within our community.

It is this spirit that propels us forward, driving us to explore new frontiers, push the boundaries, and better the world.

Sincerely,
Grace

WTI

The latest in university news, research, and commendations

ILLUSTRATION BY MATIAS TRILLO

A SOLUTION TO THE ALARMING DECLINE IN VITAL POLLINATORS: ROBOTIC BEES

One-third of the food we eat comes from plants that need to be pollinated, but more than half of North American native bee species are in decline due to pesticide use, habitat loss, climate change, and intensive farming practices. **Nitin Sanket,** an assistant professor in the Department of Robotics Engineering, is studying an out-of-the-box solution to this alarming trend: the use of robotic bees.

"A lot of conservationists are working to preserve bees, and that's a good thing," says Sanket. "But the climate is changing pretty drastically, so we need alternatives as well, including looking at other ways to pollinate things."

Sanket and his graduate students are developing an autonomous flying robot with potential funding from a variety of sources, including military and environmental organizations. The current prototype is a small, 3D-printed black plastic cube that's outfitted with four 2.5-inch propellors, a powerful camera, and a rechargeable lithium battery.

The existing model is 4.7 inches across—about the size of a hummingbird—but at 200 grams weighs about 100 times more than one of those feathered pollinators. It can quietly whir through the air while darting to avoid obstacles and turning to navigate narrow spaces, flying for a total of 5 to 7 minutes, depending on the type of battery it has and the type of movements it makes.

Sanket's long-term goal is to create a device that's small enough and contains enough power to fly independently in a swarm for many hours. The programming will be sufficiently sophisticated and nuanced so that the bot can successfully collect and transfer pollen from a variety of plants—bonus points if they can create a model that runs completely on solar power and fully biodegrades into the soil when its parts wear out.

Sanket cautions that he's still many years away from a fully functional and environmentally friendly robotic bee, but he's optimistic—in large part because engineers and researchers at other institutions are working on details that will help advance his project. Researchers at MIT, Harvard, and the University of Washington are tackling the mechanical challenges necessary to build a bee-sized robotic body. Meanwhile, in partnership with Yiannis Aloimonos and Cornelia Fermüller at the University of Maryland, Sanket's team is perfecting the robot's ability to smoothly and autonomously navigate around objects. In other words, they are building the robo bee's brain.

But, notes Sanket, "You cannot use the same logic as you would for a human brain. And, obviously, we cannot probe into what bees are thinking. So we're speculating."

That speculation builds on existing entomological research into insect movement and behavior. Understanding how bees usually respond in specific situations helps Sanket and his team identify the many individual functions they need to program into the device's cognition and autonomy.

Each of the two doctoral students and eight master's students working with Sanket is tackling a different detail of the device. Specifically, they are working to improve the robotic bee's agility, speed, flight longevity, awareness of objects, and ability to avoid crashing into objects.

—Mia Lumsden

AN OXYGEN SENSOR FOR PREMATURE INFANTS OF COLOR

The National Institutes of Health has awarded $1.1 million to a team led by WPI researcher **Ulkuhan Guler** to develop a first-of-its-kind wearable sensor for premature infants that will address racial bias in healthcare by monitoring oxygen levels two different ways and correcting the measurements to account for variations in skin color.

The four-year project will create a convenient, affordable, noninvasive sensor about the size of a bandage that will enable infants at risk of lung disease to leave hospitals sooner and be accurately monitored at home, says Guler, an associate professor in the Department of Electrical and Computer Engineering, and principal investigator on the project.

"Premature infants are at risk of respiratory distress, and oxygen monitoring is critical to their care so that they can leave hospitals and go home," Guler says. "Some tools widely used at home to monitor oxygenation, however, do not accurately measure oxygen levels in infants with pigmented skin tones. There is a great need for new technology that mitigates the impact of racial bias in measurements and provides important information to the clinicians who are treating these infants."

Guler will collaborate on the research with co-investigators Dr. Lawrence Rhein, associate professor and chair of the Department of Pediatrics at UMass Chan Medical School, and Bige Unluturk, assistant professor of electrical engineering and biomedical engineering at Michigan State University.

The researchers will develop a wireless patch with a miniaturized low-power electronic sensor that will use light to measure blood oxygen levels two different ways: A transcutaneous blood gas monitor will sense oxygen gases diffusing through the skin, and a pulse oximeter will measure reflected or refracted light to determine oxygen saturation in hemoglobin, a protein found in red blood cells.

The sensor will transmit data to a small communications hub that could be placed on an infant's crib or carrier. A bias-mitigation algorithm to correct for inaccurate measurements in people of color will run on the hub. The researchers will integrate hardware and software into a system that will be pilot tested on adults and infants in a clinical setting.

—Lisa Eckelbecker

NSF TAPS WPI EXPERTISE FOR CREATIVE WILDFIRE RESEARCH

The National Science Foundation (NSF) has added WPI to its Wildfire Interdisciplinary Research Center (WIRC), a collaboration between universities and industry. Supported by a three-year, $450,000 grant with additional direct funding from industry partners, WPI will build upon its longstanding expertise in fire protection and work with San Jose State University to study new fire detection methods, robotics solutions to enhance first responder safety, and fire suppression systems for wildfires.

Over the past 22 years, wildfires in the United States have caused damages exceeding $100 billion, and as climate change continues to intensify wildfire frequency and severity, research is essential to protect lives, property, and ecosystems—and to help communities adapt to these changing conditions.

"The solutions to our current wildfire issues are going to require creative thinking across multiple sectors and disciplines," says Kendra McLauchlan, program officer at the National Science Foundation and chair of the NSF Wildland Fire Initiative Working Group. "This is exactly the approach taken by WIRC, and the new site at WPI adds some really exciting capacity. We are looking forward to the innovations this industry-university partnership will be able to achieve."

"In a rapidly changing environment, where past experience can get you only so far, research really shows its value as the best way to understand, predict, and adapt to the major challenges faced by our societies," says **Albert Simeoni,** WPI fire protection engineering professor and department head. "Many of these issues are interdisciplinary, so we need strong collaborations from a variety of experts. Not only do we have some of the world's leading fire protection expertise, but WPI's state-of-the-art Fire Protection Lab provides rare access to equipment to conduct experiments, enabling researchers to extract fundamental measurements of fire ignition and conflagration. I am grateful to be part of this center that will allow us to leverage our research and resources—and expand our knowledge in one of the most pressing environmental challenges of our times."

Simeoni is a world-renowned wildfire researcher and is the WPI principal investigator of the Center. Other WPI fire protection engineering researchers include Professor Ali Rangwala, Professor Nicholas Dembsey, and Assistant Professor James Urban.

—Colleen Bamford Wamback

NEW LAB DISSECTS IMPACT OF SOCIAL MEDIA

BUSINESS SCHOOL TEAM LOOKING AT HOW THE MEDIUM FOSTERS, HAMPERS COMMUNITY CONNECTIONS.

At the Business School's new Social Media Analytics Lab (SMAL), Associate Professor **Adrienne Hall-Phillips** and a group of undergraduate and graduate researchers are exploring how social media is changing our interactions with companies, organizations, and each other.

SMAL researchers consider how the power of social media can be responsibly harnessed across various aspects of life, from mental health to consumer behavior to LGBTQ inclusion on campus. Their findings could contribute to evidence-based development of products, services, and policies that improve daily life.

The team uses data gleaned from application programming interfaces, or APIs, at apps like X, formerly known as Twitter, and Reddit. The undergraduate-focused research centers on experimental work tracking the social media habits of fellow students.

"It's data you can collect and observe, to find out what's really giving people what they need," Hall-Phillips says. "Is it helping them find their own communities? Are they finding resources?"

SMAL's research this year focuses on several areas, including "Paying Attention," an undergraduate-led effort to look at how different interruptions—short- and long-form videos in particular—affect a subject's ability to recall information and perceive time. The study is also looking at interruptions through a mental health lens, researching how apps like TikTok, Instagram Reels, and YouTube Shorts can exacerbate feelings of stress, anxiety, and escapism.

SMAL is also looking at how social media affects our own sense of mental health and well-being. One team is investigating the immediate impact of body positivity posts on Instagram on the body appreciation, self-esteem, and mood of consumers. Graduate researcher Roshni Harish said the study produced unexpected results. The group found that body positivity posts on social media improved users' appreciation of their own bodies, but didn't have much of an impact on their overall self-esteem.

Hall-Phillips says there are real-life implications of social media that we are just now starting to understand. "It's trendy, but social media has also changed the way we, as humans, consume anything. It is definitely a news source for all things pop culture, but it's also real life—it has become part of everything from politics to health care. It's fascinating to study how it has infiltrated our lives."

—Steve Foskett

FROM LEFT, PHILLIP SHARP, KATALIN KARIKÓ, DEAN OF ARTS AND SCIENCES JEAN KING, AND PRESIDENT GRACE WANG.

NOBEL LAUREATE KATALIN KARIKÓ COMES TO WPI

Biochemist and newly minted Nobel laureate Katalin Karikó was the keynote speaker at a conference sponsored by *Nature* on the WPI campus in October 2023, a three-day event that drew scientists and researchers from around the world.

The Hungarian-born researcher talked about how she was often shunned by the scientific community for her belief that the tiny strands of life's building blocks could one day be used to treat illnesses and vaccinate people from disease. But Karikó and her colleague Drew Weissman—who met by chance one day while waiting to use a photocopier at the University of Pennsylvania—received the 2023 Nobel Prize in Physiology or Medicine for their discoveries about how mRNA interacts with our immune systems. Their groundbreaking discoveries laid the foundation for rapid development of COVID-19 vaccines that saved countless lives and helped the world recover from a global pandemic.

While walking the conference audience through the dense science that has helped make mRNA therapeutics a reality in modern medicine, Karikó weaved into her remarks very personal elements of an unconventional career timeline marked by frequent rejection, constant struggle, and unwavering persistence that she hopes inspires the next generation of scientists.

She talked about how early proposals she crafted to look deeper into mRNA—the delivery system for genetic information encoded in DNA that leads to the production of proteins—went unfunded, and about how, very early on, she carried out the bulk of her research on her own, without an army of graduate and PhD students to help. "I did the experiments," Karikó said. "I know what it takes."

Karikó said she didn't hold any grudges for having to wait for others to come around to her vision of how mRNA could be used as a therapeutic. Years of rejection didn't shake her confidence. "It always made me work better," she said. "That's why I'm here."

Karikó wasn't the only Nobel laureate in attendance at the conference. Phillip Sharp, who won the prize in 1993 for co-discovering RNA splicing, spoke at the conference about the promise of RNA therapies for treating various conditions.

More than two dozen other speakers shared insights during the conference, including WPI's own **Dmitry Korkin,** the Harold L. Jurist '61 and Heather E. Jurist Dean's Professor of Computer Science. Korkin's presentation was on decoding the functional and structural impact of alternative splicing in human cells.

The work being done on mRNA therapeutics is important for global health, but it's also becoming an economic engine in Massachusetts. Melissa Moore, chief scientific officer emeritus at Moderna, worked closely with **Jean King,** the Peterson Family Dean of Arts and Sciences at WPI, to bring the conference to WPI. Moore said 750 biotech or bio-manufacturing companies are currently operating in the state, and they offer high-paying jobs that cater to a wide variety of skillsets.

—Steve Foskett

A NEW GREENHOUSE IS PART OF AN EFFORT TO CREATE A VIBRANT COMMUNITY GARDEN FOR WPI STUDENTS, FACULTY, AND STAFF.

A COMMUNITY GARDEN TAKES ROOT

Inch by inch, row by row, WPI's Green Team is helping the campus community grow. A new greenhouse at 19 Schussler Road, located next to the Collegiate Religious Center (CRC), is the first visible piece of its plans to cultivate a vibrant community garden for WPI students, faculty, and staff.

"We want this to be not only a garden, but a community space where people can come and spend time and learn from each other," says **Gabriel Espinosa,** Green Team's president and a senior mechanical engineering major.

About 100 people stopped by during an open house in September that marked the official launch of the community garden. Many of those present had already lent some sweat equity to the project, one of the tasks specified in WPI's sustainability plan. More than a year in the making, the garden required Green Team leaders to develop relationships across campus—in particular with the Facilities Office; the Office of Diversity, Inclusion, and Multicultural Education (ODIME); and Dining Services.

"Facilities has been with us on pretty much every step of this. But we also wanted to make sure we weren't putting more work on them by creating this space," says **Paige Agostini,** chair of Green Team's community garden subcommittee and a junior double majoring in chemical engineering and environmental studies.

Construction of an accessible walkway and patio at the CRC, which is part of ODIME, was already underway when Green Team got the university's approval to use the side yard for a garden. The club's advisor, **Nicole Luiz '18,** is the energy and sustainability manager in the Facilities Office and the Office of Sustainability and has been instrumental in making the greenhouse a reality.

Sowing Stewardship

Even though Green Team isn't officially affiliated with the CRC, the club's focus on sustainability and environmental justice dovetails with ODIME's focus on multicultural community building. That connection became clear to both Agostini and Espinosa when they took courses with **Joseph Cullon,** professor of teaching in the Department of Humanities & Arts.

"Through industrialization, we've polluted a lot of the soil around us, particularly in marginalized communities," says Espinosa. "In Professor Cullon's classes he emphasizes that giving people control over a piece of land, where they can grow things and reap the rewards, is a great way to give a voice and power to communities that have traditionally been left out of conversations."

Noting that Worcester's industrial past means much of the city is likely a brownfield, Agostini adds, "While WPI may be in a privileged part of the city, we hope the community garden gets people thinking about environmental justice."

Kalvin Cummings, ODIME's assistant director for religion and spiritual life, is happy that the community garden is housed at the CRC. "Faith organizations have always lent their physical spaces to the needs of the community. As the university's primary interfaith space, the CRC is a natural place to put community efforts into action," says Cummings.

In total, launching the community garden cost just over $6,000 and was paid for entirely by the Student Government Association. That covered the purchase of the greenhouse structure itself, seeds and gardening tools, as well as pouring the foundation and other site preparation steps. Green Team members built the six raised beds, which are filled with soil and compost donated by the Greenhouse & Horticulture Club.

Anyone who volunteers at the community garden will be able to take home part of the harvest. Anything unclaimed after each harvest will be donated to DoughClub's campus food pantry.

—Mia Lumsden

AWARDS, HONORS, AND RECOGNITIONS

Bailey-Hytholt Honored by AIChE

Assistant Professor **Christina Bailey-Hytholt,** chemical engineering, was selected for the prestigious AIChE 35 Under 35 Award. One of six awardees in the bioengineering category, she was recognized for her impactful work on developing new biomaterials and drug delivery vehicles influencing fundamental understanding and treatment strategies for reproductive health complications. AIChE says the award honors "35 chemical engineering professionals under the age of 35 who have made great contributions to the field, as well as to AIChE. These award winners embody what it is to be an accomplished chemical engineer."

Sabuncu Named Engineering Unleashed Fellow

Assistant Professor of Teaching **Ahmet (Can) Sabuncu**, mechanical engineering, has been named a 2023 Engineering Unleashed Fellow. This prestigious designation recognizes his outstanding leadership in undergraduate engineering education and his significant contributions to the greater Engineering Unleashed community. The program is supported by the Kern Entrepreneurial Engineering Network, a partnership of more than 55 colleges and universities across the country.

Heinricher Named Interim Provost

President Grace Wang has named Professor **Art Heinricher** as WPI's interim senior vice president and provost. In the announcement, Wang wrote, "Art's reputation as a collaborative, empathetic, and respected leader precedes him. Serving as a professor of mathematical sciences since 1992, dean of undergraduate studies for 14 years, and interim provost last year, he is highly committed to the success of our students, the excellence of our academic programs, and WPI's mission. Art is knowledgeable about WPI's academic operation, and genuinely supports our faculty and staff. I am confident that he will bring our faculty, staff, and students together and help accelerate the momentum to advance our academic enterprise."

Stewart Receives Engineering Research Initiation Grant

Elizabeth Stewart, assistant professor of chemical engineering, received a $200,000 National Science Foundation Engineering Research Initiation grant, a prestigious early-career award aimed at supporting new researchers as part of the NSF's efforts to build engineering research capacity across the nation. Stewart will engineer an innovative microfluidic model to look specifically at how bacteria build biofilms on catheters inserted into blood vessels. This research aims to unravel how blood vessels and blood flow change the design and strength of those biofilms.

Rundensteiner Wins Test-of-Time Award

Elke Rundensteiner, the William Smith Dean's Professor in Computer Science and founding head of the Data Science Program, recently received the InfoVis 20-Year Test-of-Time Award from the Institute of Electrical and Electronics Engineers (IEEE) for her pioneering work on data visualization and visual analytics in 2003. This award honors articles published at previous IEEE VIS (Visual Identification System) conferences, in this case in 2003, that have withstood the test of time by remaining useful 20 years later and that have had significant impact and influence on future advances within and beyond the visualization community, according to the award's organizers. Award selection is based on measures such as the numbers of citations, the quality and influence of its ideas, and other criteria. Rundensteiner and her team, which included the late computer science professor **Matthew Ward** and former PhD students **Jing Yang** and **Wei Peng,** were honored for their work on interactive hierarchical dimension ordering, spacing, and filtering for the exploration of high-dimensional datasets.

CHRISTINA BAILEY-HYTHOLT

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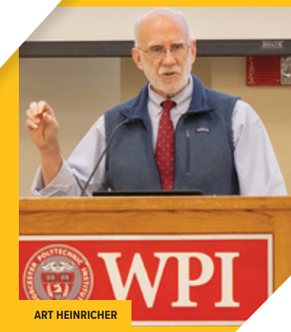

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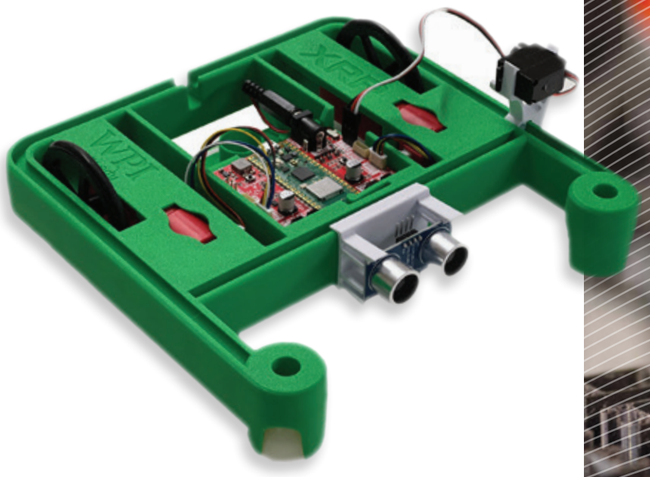
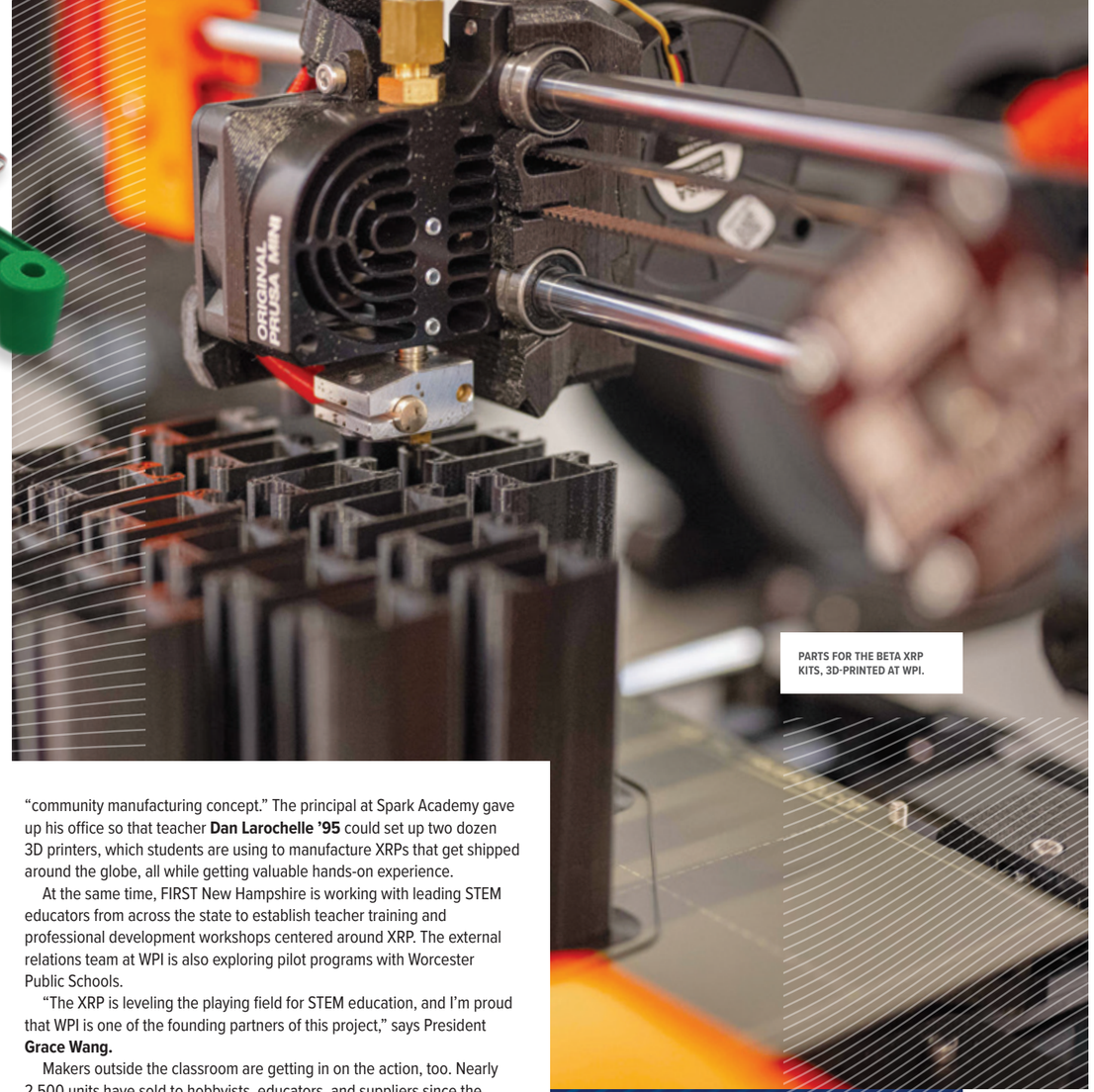




PARTS FOR THE BETA XRP KITS, 3D-PRINTED AT WPI.

OPEN-SOURCE PLATFORM TRANSFORMING ROBOTICS ENGINEERING EDUCATION

It's been over a year since young roboticists from around the world were introduced to the small open-source device that could revolutionize robotics engineering and help democratize global STEM access. And what a year it's been.

During the 2022 FIRST Global Challenge in Geneva, Switzerland, WPI and DEKA Research & Development Corp. distributed nearly 200 beta versions of the Experiential Robotics Platform (XRP), a kit that makes it possible for novice engineers to build and program a simple, powerful, and affordable robot. The small but mighty device even caught the eye of music superstar will.i.am, a staunch STEM supporter who attended the event.

"We started with the idea that we would create this prototype for an open-source engineering education platform," says DEKA chief development officer David Rogers, who worked hand in hand with WPI's **Brad Miller** to debut the original XRP in 2022. Miller is a senior fellow with longtime experience collaborating with DEKA and FIRST Robotics through WPI's Robotics Resource Center. "In Geneva we got a lot of validation that this kind of product was something people were excited about."

The excitement surrounding XRP followed WPI folks back to the United States and the project really took off. WPI and DEKA developed new partnerships with Raspberry Pi and ST Microelectronics to supply the microcontroller and the inertial measurement unit (IMU) chips, respectively, as well as with SparkFun Electronics to manufacture the electronics. And with DigiKey distributing finished devices to secondary schools, community colleges, and universities across the country, educators have begun integrating the XRP into STEM courses.

Officials from both DEKA, based in Manchester, N.H., and WPI are starting educational endeavors in their own backyards.

Thanks to a state grant, high school students at an engineering-focused charter school in Manchester are pioneering what Rogers calls a "community manufacturing concept." The principal at Spark Academy gave up his office so that teacher **Dan Larochelle '95** could set up two dozen 3D printers, which students are using to manufacture XRPs that get shipped around the globe, all while getting valuable hands-on experience.

At the same time, FIRST New Hampshire is working with leading STEM educators from across the state to establish teacher training and professional development workshops centered around XRP. The external relations team at WPI is also exploring pilot programs with Worcester Public Schools.

"The XRP is leveling the playing field for STEM education, and I'm proud that WPI is one of the founding partners of this project," says President **Grace Wang.**

Makers outside the classroom are getting in on the action, too. Nearly 2,500 units have sold to hobbyists, educators, and suppliers since the commercial units went on the market in August, according to Dave Ortendahl, WPI's executive director of corporate partnerships, who is managing the university's role in this project.

The current version of the XRP looks and works much the same as the original kits, which were 3D-printed in WPI's Innovation Studio. Thanks to some design innovations that happened at WPI, however, the manufacturing is now much simpler. A single-piece chassis has replaced the original body made up of many separate parts, allowing users to spend less time constructing the unit before they start programming.

That programming is key. It's the difference between building and engineering. It's also the part of the project where WPI's expertise lies, and **Annie Hughes '21** will consult to build out curriculum that one day will accompany the XRP kits.

—Mia Lumsden

FROM LEFT, DAVID REYNOLDS, GRACE HADLEY, AMELIA KOKERNAK, CHARLOTTE KOKERNAK, SOPHIA REYNOLDS, CAITLIN GUILFOYLE, RACHEL HURLEY, ELIE BOWMAN, ELISE DESHUSSES, SARAH OSSING, AND AVI BISSOONDIAL.

WOMEN'S CROSS COUNTRY, MEN'S SOCCER MAKE NCAAS

Grace Hadley earned All-America status with a fourth-place overall finish to help the women's program to a 27th place effort at the 2023 NCAA Division III Cross Country Championships hosted at Big Spring High School in Newville, Pa. **Avi Bissoondial** and **David Reynolds** represented the men's cross country program at the national race.

Hadley, named USTFCCCA DIII East Region Athlete of the Year, shaved 46 seconds from her last performance at Big Spring High School in a pre-nationals meet in October. The 2023 DIII Cross Country East Region Champion finished at 21:00.1 to earn All-America status, the first in program history.

The Crimson and Gray finished with 638 total points in WPI's first-ever team appearance at the national race. Other members of the team include graduate student **Amelia Kokernak,** senior **Caitlin Guilfoyle,** graduate students and 2021 NCAA Cross Country Championship participants **Elise Deshusses** and **Charlotte Kokernak,** graduate student **Rachel Hurley,** and junior **Elie Bowman.**

The Men's Soccer team returned to the NCAA Tournament for the first time since 2019 and for the third time under the tutelage of head coach **Brian Kelley,** but fell to the Stevens (NJ) Ducks in the first round on penalty kicks.

The Engineers and Ducks finished regulation and double overtime tied at one, but WPI scored on just one of three penalty kicks while Stevens converted on all four of its attempts to advance in the NCAA Tournament. WPI finished its season 9-3-8, including a 13-game unbeaten streak (8-0-5).

Graduate students **Luke Savoie** and **Francesco Valagussa** were selected to the 2023 NCAA Division III Men's All-Region II first team and senior **Aaron Vaz** was selected for the third team. Valagussa then garnered All-America accolades from the United Soccer Coaches, only the second player to do so in program history. Kelley and his assistants were recognized as the NEWMAC Men's Soccer Coaching Staff of the Year and as the Region II Coaching Staff of the Year from the United Soccer Coaches.

—Rusty Eggen

See how WPI students put theory into practice through projects.

PROJECTS

CAN DATA FROM THE NFL COMBINE PREDICT IN-GAME PERFORMANCE?*

THE STUDENTS: Matthew Dzwil '23, Mia Hopman '23, and **Katie Houskeeper '23**

THE ADVISORS: Associate Professor of Data Science and Computer Science **Yanhua Li** and Assistant Professor **Kenny Ching** of The Business School

THE BACKGROUND:

In a first-ever collaboration between WPI and the National Football League, the students recently completed a Major Qualifying Project that analyzed whether data collected during the league's main scouting event could accurately predict how wide receivers performed during real games. The students worked with the NFL central office in New York City to determine whether player-movement metrics from the 2022 NFL Scouting Combine could accurately predict in-game performance.

THE METHODOLOGY:

The team examined positional data gathered at tenth-of-a-second intervals by a radio frequency identification tracking device located on the players' shoulder pads. Working with NFL Data Scientist Tom Bliss and Senior Director of Football Data and Analytics Michael Lopez, the MQP team successfully developed a systematic approach to preprocessing data that uses specific thresholds to identify and segment drills.

THE OUTCOME:

"We manipulated data that provided valuable insights on NFL player combine movements and how those movements compared to in-game movements; plus, we provided recommendations to the NFL on how data collection could be improved in future years," says Houskeeper.

"The students did exceptionally well presenting the project to their NFL sponsors," says Executive Director of Corporate Partnerships **Dave Ortendahl.** "They expertly answered questions from the field of professionals, which included **Clark Ewen '20,** who is currently a football data and innovation analyst with the New York Giants."

The project provided the students with invaluable insight into the challenges of working with highly variable, real-world data. The knowledge and skills they acquired through this project have positively impacted their lives already: Houskeeper earned her MS in business analytics and is currently a business analyst with DraftKings; Dzwill earned his MS in data science and is currently a software engineer with Juniper Networks; and Hopman is studying for her MS in data science while working as a data scientist at Hologic.

IN SIDER

ADAPTIVE GOLFER DOUG SHIRAKURA HOPES TO INSPIRE

PHOTO BY MATT SWEET

Playing in the inaugural United States Golf Association's (USGA) Adaptive Open, being a top-ranked adaptive golfer in the United States, securing a clothing sponsorship from Nike Golf—there's no question **Doug Shirakura '24** has a lot to be proud of.

One of his favorite moments, however, didn't come from the golf course, but from the social media app formerly known as Twitter, specifically from the account of professional golfer Max Homa.

"He's known for being a big comedian on there," Shirakura says, explaining that Homa's online presence features a mix of golf commentary and the playful roasting of golf swings. After the inaugural U.S. Adaptive Open (which he simply refers to as "The Inaugural"), a reporter posted a video of Shirakura practicing his swing. The video eventually made its way to Homa's feed, and instead of engaging in his typical banter, Homa was impressed, retweeting the video to his 600,000+ followers with the comment, "This is one of the purest moves I've ever seen."

"It was the coolest thing ever," he recalls with a laugh. "My dad printed out a screenshot of it and has it framed up in the house."

A Family Affair

Shirakura was born with amniotic band syndrome, a condition where his body's development in the womb was hindered by amniotic bands, making his hands and right foot unable to fully form. When he was very young, his parents made the difficult decision to proceed with an amputation below the knee so that Shirakura could grow up learning how to use a prosthetic, allowing him to be more active in his youth.

His parents introduced him to golf at the age of seven. As he grew older, he regularly played after school with his dad, and then moved on to tournament golf and golf camps before starting to seek out tournaments specifically for amputees. The first search result was the Eastern Amputee Golf Association (EAGA) and its executive director, Bob Buck.

"I emailed him and asked if I could come play, and he was thrilled," Shirakura recalls. "He said, 'Absolutely,' told me to bring my whole family and that they could play, too. I'm 13, 14 years old, and the average age of golfers there was like 40. Bob was so nice to me. He was so generous and open, talking with me and introducing me to the other players. I still see those people pretty often. It's like an extended family."

An Inaugural Opportunity

That experience opened up an entirely new world of golf for Shirakura, who dove even deeper into the adaptive golf scene without hesitation. As he gained and perfected new skills, he was chosen to compete in the USGA's inaugural U.S. Adaptive Open in 2022 at North Carolina's Pinehurst No. 6.

"It was amazing," he says of the opportunity, where he ended up placing ninth. "This is the first major event they've put on for adaptive golf on this international level stage. It's an experience most people will never have, and to be able to compete in it was just really special."

Shirakura has gone on to compete in tournaments in Canada, England, and beyond. They're all incredible opportunities—and even more incredible memories—but for him, the part that he most looks forward to is simple. "Everyone's stories are amazing," he says. "There isn't a single story you'll hear from any of these adaptive players where you won't be amazed by what they've overcome to get to where they are now. That's what I love."

One story, in particular, is especially close to Shirakura's heart: that of his friend, Brian, an amateur golfer himself who acted as his caddy at The Inaugural. Just a few short months later, Brian was in an accident that left his left arm paralyzed. The accident reintroduced him to the adaptive golf community, this time for entirely different reasons as he continues on his road to recovery.

"To see him reach out to players when he needs help, to find players he relates to and is motivated by, to get better because of golf, it's so amazing," Shirakura says. "It doesn't come without its hardships, but he's done an incredible job of being motivated by golf rather than put down by it."

He adds Carlos Brown, one of the top golf coaches in the United States and an amputee himself, has been an important influence in his life. "He's really believed in me over the past five years and I owe him a lot."

Crimson and Green

Initially having chosen WPI due to its strong academics, especially in engineering, Shirakura has made a name for himself not only as a member of a handful of student clubs, but as a golfer and golf fan, which has shown him WPI's supportive community time and again.

"I really wouldn't trade any of the experiences I've had—not only with my friends and other students, but with faculty and staff—for the world," he says, adding that he had a tee time scheduled with Dean of Engineering **John McNeill,** who has competed in the U.S. Senior Amateur Golf Championship.

While Shirakura hasn't had as much time to practice, play, or compete in upcoming tournaments due to schoolwork, (he's on track to graduate in 2024 with a degree in aerospace engineering), he's confident that his focus on academics now will eventually get him to a place where he can build upon his passion for golf in the future—both on and off the green.

"There's a ton of overlap in terms of golf equipment and engineering," he says. "When you hear 'engineering' and 'structures' and 'materials,' you think of cars and rockets. But in reality, it applies to every aspect of our lives—including sports. There's a particular focus on improving clubs and aspects of your game through equipment, and what I've learned in my classes at WPI has opened that door for me as a potential career. I can apply my skills to bring a fresh set of eyes—as a player and as an engineer—into the industry."

But regardless of where his future career ends up taking him, one of Shirakura's main goals remains the same: to share adaptive golf with as many people as he can, and maybe even inspire them to pick up a club, too.

"You know, I genuinely believe sports gives people a feeling of purpose," he says. "Whether it's joining amputee soccer or becoming a rock climber or powerlifter, to believe in yourself, that you can be as good as anyone else regardless of your disability. Go as high and as hard as you can."

—Allison Racicot

PURVI SHAH

ASSOCIATE PROFESSOR OF MARKETING

PHOTO BY JAMES CASEY

MIRROR
For me, this mirror is more than just a tool to check my appearance. It is one of self-awareness, self-reflection, self-improvement, and self-discovery. I believe a mirror reveals the truth about our self-image and an unfiltered version of ourselves.

VOLKSWAGEN BEETLE
This toy car symbolizes my research interest. The Beetle lived a life of 81 years, from 1938 to 2019, and then was discontinued by Volkswagen. I have a 12-year stream of research that explains why and how brands/products are deleted from their portfolios, how the decision impacts various stakeholders, and how dead brands/products are brought back to life through brand resurrection movements.

LEGO DUCK
LEGO's core brand value is systematic creativity—creativity that combines logic and reasoning with playfulness and imagination. I apply this brand value in my teaching. I use this LEGO duck as an active learning team exercise in my class to drive in the concepts of systematic creativity, teamwork, and understanding and implementing customer specifications.

FAMILY PHOTO
This is a photo of me with my life partner (Akshay) and my daughter (Akshvi). I truly believe that life originates with family and the love shared in a family never ceases to exist. Akshay and Akshvi make my life beautiful and joyful!

QUALITATIVE RESEARCH BOOK
Numbers and statistics are important—and so is a rich, in-depth understanding of the story underlying those numbers. I fell in love with this aspect of qualitative research methodology. I not only use it in my research studies but also teach it to master's and doctoral students at WPI.

OWL
An owl is known as a symbol of knowledge and wisdom, as well as foresight. My teaching philosophy involves helping my students gain theoretical knowledge and then developing wisdom to apply it in real-world contexts. The owl reminds me to foresee future trends in business education, which helps me excel in my role as chair of The Business School's Graduate Policy and Curriculum Committee.

DUMBBELL
This dumbbell represents strength, health, and well-being to me. I keep it in the office so that I can do strength training while taking short breaks from work.

FACULTY SNAPSHOT

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

ILLUSTRATION BY JONATHAN D. REINFURT

GLOBAL IMPACT

WPI'S FIRST PROJECT CENTER CELEBRATES 50 YEARS

As our nation's capital, Washington, D.C., is home to many "firsts," which is why it's only fitting that it was chosen as the location for WPI's first project center back in 1974.

"The authors of the WPI Plan wanted to get students off campus to complete full-time projects in one term, and in 1974, Washington was at the center of a political upheaval," says **Kent Rissmiller,** associate dean of The Global School, who advised projects in the city in 1993 before becoming director of the center in 2012. Due to the ongoing Vietnam War and the impending Watergate investigation, he adds, "I think we all knew that history was in the making."

That spark of history (combined with the efforts of folks like Bill Grogan '46, Jim Demetry '58, and former dean of undergraduate studies Frank Lutz, who made cold calls to D.C.-area alumni, searching for potential project sponsors) led to the creation of WPI's first global project center. In those 50 years, students who've traveled to the nation's capital for their Interactive Qualifying Projects have worked with sponsors like the U.S. Coast Guard, the Consumer Product Safety Commission, the U.S. National Park Service, and the U.S. Department of Energy. They've completed projects focused on everything from developing recommendations for handling stormwater runoff in Dumbarton Oaks Park and emergency response procedures in harbors to improving the processing of the Federal Drug Administration's adverse event reports.

"It's a fascinating assignment," Rissmiller says of his role as project center director. "We've been able to provide students with projects in highly professional environments with dedicated federal servants. I really respect these people who are both committed public servants and very engaged project sponsors. But it's a two-way engagement; our students have been highly effective and have made significant contributions to the missions of these agencies."

The opportunity to make contributions to the federal government is exactly what attracted **Joe Peregrim '24** to Washington, D.C. Together with his teammates, he worked with the U.S. Coast Guard to investigate best practices for preventing and responding to lithium-ion battery fires at sea. Because trained firefighting professionals can't respond quickly to the fire, he explains, he and his group consulted firefighters, fire prevention specialists, and representatives from independent testing agencies before presenting 21 recommendations to their sponsor, including preventative policy changes, response training, and containment methods.

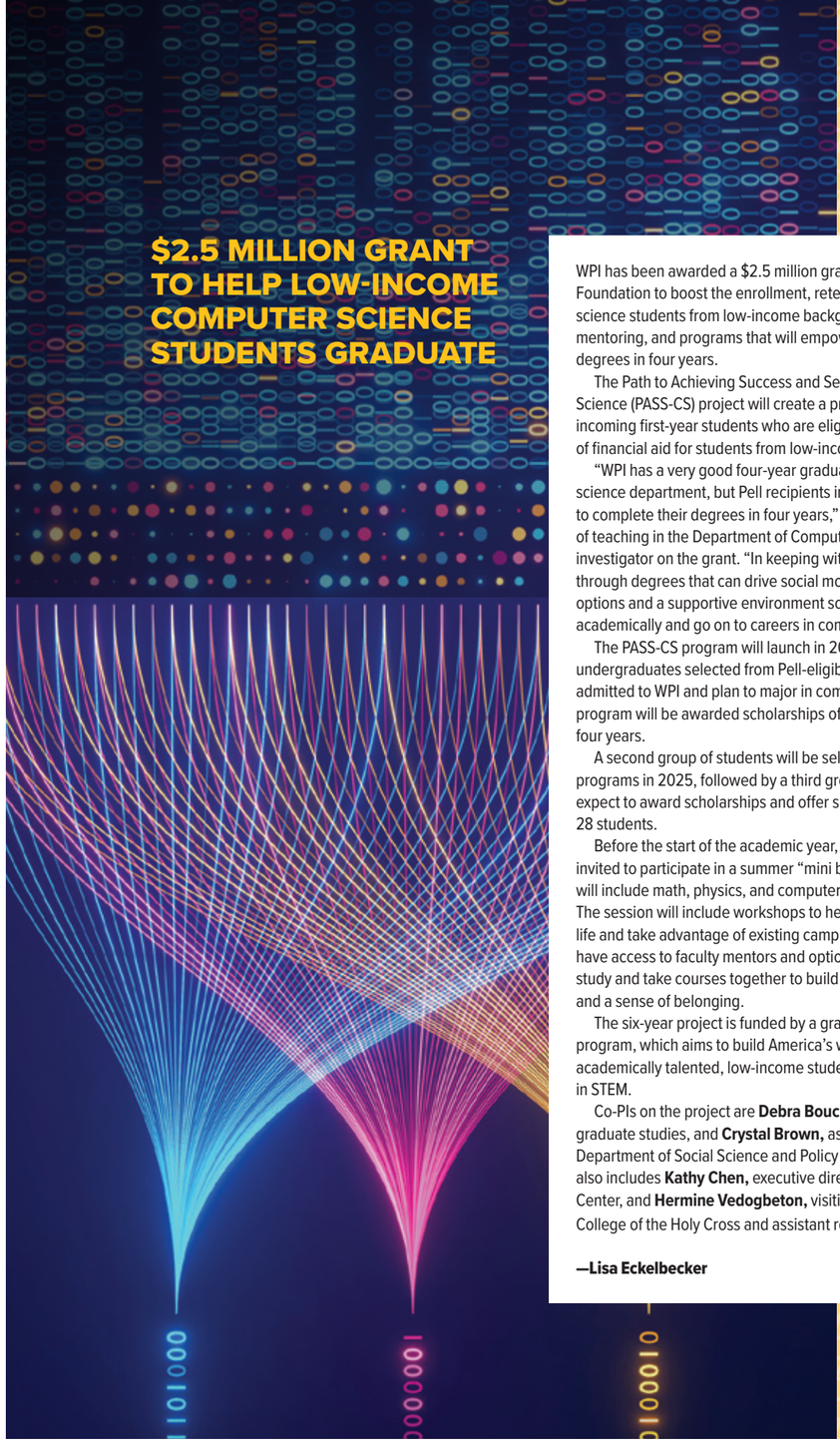
"It truly felt like I was working a real job," Peregrim says. "I gained experience in communication and coordination by working with multiple departments of the Coast Guard and other agencies, all while working on a project that would benefit my entire country."

His groupmate, **Ryan Malaquias '24,** agrees. "Completing this project for the Coast Guard was an amazing opportunity," says Malaquias, "and I met some great people, too. I never thought I would have the chance to work with the Coast Guard to complete a project that would help save lives."

Working on the project was only one highlight of his time in D.C. Besides visiting the Washington Monument and Lincoln Memorial with his fellow students, he cites getting to see everyone else's presentations as an especially memorable moment. "A great group of people went to the Washington Project Center," he says, "and it was great seeing all the hard work everyone put into their projects."

After more than 1,200 students having completed project work with more than 80 sponsors, the DC project center will celebrate its 50th anniversary in 2024. "It's been an honor to be associated with this program for 12 of its 50 years," says Rissmiller. "The project opportunities here in the U.S. provide wonderful ways for our students to contribute to our sponsors. I hope we can continue to do this important work. The agencies are ready to engage our students—and the projects are meaningful."

—Allison Racicot



$2.5 MILLION GRANT TO HELP LOW-INCOME COMPUTER SCIENCE STUDENTS GRADUATE

WPI has been awarded a $2.5 million grant from the National Science Foundation to boost the enrollment, retention, and graduation of computer science students from low-income backgrounds by providing scholarships, mentoring, and programs that will empower the students to complete their degrees in four years.

The Path to Achieving Success and Sense of Belonging in Computer Science (PASS-CS) project will create a program for academically talented incoming first-year students who are eligible for federal Pell Grants, a form of financial aid for students from low-income backgrounds.

"WPI has a very good four-year graduation rate, as does the computer science department, but Pell recipients in computer science are less likely to complete their degrees in four years," says **Rodica Neamtu,** professor of teaching in the Department of Computer Science and principal investigator on the grant. "In keeping with WPI's mission to transform lives through degrees that can drive social mobility, our goal is to develop options and a supportive environment so that students can excel academically and go on to careers in computer science."

The PASS-CS program will launch in 2024 with eight to 10 first-year undergraduates selected from Pell-eligible students who have been admitted to WPI and plan to major in computer science. Students in the program will be awarded scholarships of up to $15,000 a year for up to four years.

A second group of students will be selected for scholarships and programs in 2025, followed by a third group in 2026. In total, researchers expect to award scholarships and offer supporting programs to about 28 students.

Before the start of the academic year, new students also will be invited to participate in a summer "mini bridge" session on campus that will include math, physics, and computer programming bootcamps. The session will include workshops to help students navigate college life and take advantage of existing campus resources. Students will have access to faculty mentors and options to form small cohorts that will study and take courses together to build community, support structures, and a sense of belonging.

The six-year project is funded by a grant from the NSF's S-STEM program, which aims to build America's workforce by supporting academically talented, low-income students who are pursuing degrees in STEM.

Co-PIs on the project are **Debra Boucher,** assistant dean of undergraduate studies, and **Crystal Brown,** assistant professor in the Department of Social Science and Policy Studies. The leadership team also includes **Kathy Chen,** executive director of the WPI STEM Education Center, and **Hermine Vedogbeton,** visiting assistant professor at the College of the Holy Cross and assistant research professor at WPI.

—Lisa Eckelbecker

PHOTO BY MATTHEW BURGOS

Assistant Professor of Biomedical Engineering Solomon Mensah, on introducing high school students from underrepresented communities to the biomedical device industry and encouraging them to consider careers in STEM.

How did you get involved with developing medical devices for emerging economies?
I have always had the passion to give back to the community from where I came (Ghana). My hope is to use my engineering and entrepreneurial expertise to develop life-saving technologies that are easy to use and maintain, and that can be manufactured and purchased at a low cost. While at Northeastern studying for my PhD, I co-founded Therapeutic Innovations, a company dedicated to developing medical interventions for emerging economies without compromising on quality. I had toured neonatal wards in public hospitals in Ghana and saw no bCPAPs, a non-invasive ventilation strategy for newborns with infant respiratory distress syndrome, and no robust clinical protocols to effectively use the few devices they did have. I interviewed medical professionals across the country and conducted market research within many hospitals. The data collected formed the bedrock of what would eventually become Therapeutic Innovations, with a low-cost, easy-to-use bCPAP (called Airbaby) and a clinical capacity-building infrastructure template as the initial products.

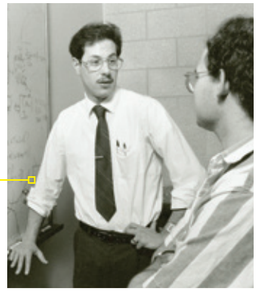
Why is it important to offer a summer program to expose high school students to the medical device field?
I received the opportunity to engage in medical devices and innovation at a later stage of my academic career, which resulted in a drastic shift in my interest and research focus. I wondered how impactful it would have been if I'd had this exposure at an earlier stage of my academic career. Our goal is to reach out to high school students in groups underrepresented in the industry to encourage them to consider a STEM education. In 2023, **Dirk Albrecht,** associate professor in the Department of Biomedical Engineering, and I received funding from the Massachusetts Life Sciences Center (MLSC) to create a seven-week summer program for high school students to learn about the medical device industry. Last summer we enrolled seven students—all nominated by their high school science teachers—in this pilot program. Two WPI students, **Abigail Holmes** and **Jack Rothenberg,** served as teaching assistants.

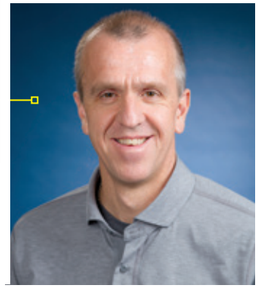
What did you learn from the Summer 2023 pilot program?
We learned that students are really in need of programs that would expose them to real-life problems at an early stage of their careers. We also learned that they responded best to Abigail and Jack because they could relate to teachers who are closer to their age. Some subject presentations were not as engaging as we would have liked, so we're partnering with Worcester Public Schools high school science teachers to tap into their expertise for the 2024 summer program. In a survey we conducted at the end of the pilot program, five of the seven students said they were definitely considering STEM careers, so that's a great first result.

How are you creating a curriculum to get all high school students, especially those from underrepresented communities, interested in the medical device field to improve global health?
Coming from an underrepresented community myself, I understand the dynamics involved in knowledge transfer from an experiential standpoint. My goal is to leverage these personal experiences to develop a student-centered program that draws from individual student experiences and cultures to help drive innovation. The goal is to start in the Worcester Public Schools, and then approach other cities across the state that might be interested in adopting the curriculum as well.

What's the next step in advancing your vision?
Thanks to MLSC and the BME Department, we hope to continue the existing collaboration and to secure further funding for program implementation. Our goal is to enroll 20 students in this summer's program, using what we learn to continue to improve the school-year curriculum so we can reach even more students in diverse communities and expose them to this exciting industry.

PHOTOS FROM WPI ARCHIVES





AT LEFT, STUDENTS PLAY VIDEO GAMES IN THE RESIDENCE HALLS IN THE 1990S. IN 2003, MICHAEL GENNERT, TOP RIGHT, MARK CLAYPOOL, BOTTOM RIGHT, AND THE LATE DEAN O'DONNELL PROPOSED A BOLD NEW PROGRAM AT WPI: THE INTERACTIVE MEDIA AND GAME DESIGN PROGRAM.

THE ARCHIVIST

A GAME PLAN FOR SUCCESS

Looking back at the first two decades of IMGD.

As WPI entered the 21st century, the Computer Science Department was beset with a curious problem. Despite a four-decade–long history of success and innovation, interest and enrollment in the Computer Science program were declining, despite the continued integration of technology into new aspects of everyday life.

At the time, the video game industry reflected society's growing fascination with electronic entertainment, accounting for a global market share of $27 billion in 2003, with projections of double-digit growth. Seeing opportunity, an enterprising group of computer science faculty proposed a bold new program at WPI, one that would change the trajectory of the department in ways they could not even imagine.

Professor **Michael Gennert,** then head of the department, was one of the new program's architects. He saw the proposed Interactive Media and Game Development (IMGD) program as a natural extension of the university's philosophy of blending technology and the humanities.

"It's not quite computer science, but it involves computer science, and it's not quite humanities and arts, but it surely involves humanities and arts," he said at the time. "We want something that will have an impact."

When faculty members, including the late **Dean O'Donnell** and **Mark Claypool,** unofficially surveyed students about this plan, the responses were overwhelmingly positive and enthusiastic. The newly formed WPI Game Development Club, which was less than three years old but had more than 60 active members, was the fastest growing student group on campus, and supplied many of its early students.

The newly proposed degree required existing courses in computer science, philosophy, art, music, and creative writing while also proposing new classes in game design, storytelling, and the history of video game development. Courses were designed on WPI's project-based learning principle. The faculty also envisioned the program would be a lure for underrepresented students in computer science, as the two tracks, artistic and technical, would offer wider appeal to prospective students interested in computer science and technology.

Within 10 years, the IMGD program earned global recognition. As it looks toward its 20th anniversary in 2024, it has solidified itself as one of WPI's most distinctive and successful fields of study.

The department continues to grow and develop, with its newest program producing WPI's first master of fine arts graduate in 2023. The program has also carried out its goal of serving as a model for creating a welcome and inclusive environment, hallmarks of WPI's community.

To recognize two decades of success, WPI Archives and Special Collections is showcasing IMGD as part of an exhibition: "Video Game Console Wars, 1976-2001, featuring WPI's Interactive Media Archive & Interactive Media and Game Development Department" in Gordon Library's Gladwin Gallery through August 2024. [See related story at right.] Visitors can learn about the history of the home console industry and WPI's work in diversity, accessibility, and inclusion in that field, and even play some of the historic consoles that comprise one of WPI's most interesting academic resources.

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

VISITORS CAN LEARN ABOUT AND PLAY SOME OF THE EARLIEST VIDEO GAMES IN AN EXHIBIT AT THE GLADWIN GALLERY IN GORDON LIBRARY.

Documenting History and Providing Access

Library exhibit turns back time with vintage video games.

It's not often you hear the fun and bouncy sound of *Super Mario Bros.* theme music in a library. But the recognizable soundtrack to the retro video game and the exclamations from excited game enthusiasts permeated the ground floor of George C. Gordon Library last October.

On this evening, the entrance to WPI's Archives and Special Collections was filled with dozens of students, faculty, and staff. They huddled in groups around four television sets to play classic video games like *Pac-Man, Mario Kart,* and *Zelda* and watch others test their skills on game consoles dating back four decades, all items preserved in WPI's collection.

The buzzy scene was the kickoff event for the newest exhibit of Archives and Special Collections, "Video Game Console Wars, 1976-2001, featuring WPI's Interactive Media Archive & Interactive Media and Game Development Department." The exhibit, located in the library's Gladwin Gallery, features a display of consoles including a 1970s Atari 2600, the Mattel Electronics Intellivision, a Nintendo Entertainment System from 1985, and a 1995 Sony PlayStation. The exhibit also includes vintage system controllers and games such as *Frogger* and *Metroid.*

The collection on display was built through collaborations between Archives and Special Collections and IMGD program faculty and staff. One of the program's founding professors, the late **Dean O'Donnell,** was a driving force in gathering and preserving the historical items. **Arthur Carlson,** university archivist and assistant director for the library, says the exhibit reflects a core mission of Archives and Special Collections, "to support WPI's unique educational model. One of the ways we do that is by documenting both the history and development of academic courses and providing access to unique resources."

Carlson says the archive of video games and interactive media is rare among colleges and universities. The collection places WPI with the likes of The Strong National Museum of Play and the Smithsonian, which developed a video game archive in 2016.

The exhibit will be on display until August 2024. It's one in a series of displays at the Gladwin Gallery that showcase WPI history and culture. Exhibit organizers expect other events throughout the academic year, including more opportunities for students to play the vintage consoles.

A stroll through the exhibit takes you down a nostalgic video game memory lane on one wall. And on the opposite wall, you travel back to the present, guided by snapshots of IMGD history, including *WPI Journal* coverage of IMGD's launch in 2004 as the nation's first such degree-granting program, the original degree proposal, information on the program's special events, and game and interactive media projects led by students and faculty. Among the projects highlighted are *Neurotype Café,* a video game designed to depict the everyday experiences of neurodivergent people; the Worcester Art Museum Augmented Reality Jewelry Try-On, a mobile app that lets visitors "wear" pieces from the "Jewels of the Nile" exhibit; and WHEEL UP, a virtual reality wheel-chair training simulator.

"I think the exhibit is a good reminder that if you're a student here, everything you do while you're here is something that contributes to WPI's future history," says **Gillian Smith,** director of IMGD and associate professor. She points out that the broader video game industry is building upon history, with some of the decades-old game titles and systems featured in the archives being used today in artificial intelligence research. "I'm excited for our students to be able to experience being able to look at this really rich history of games and think about how we design technology today and how we will design it far into the future."

—Jon Cain

SENSE OF PLACE

A STORY TOLD IN PINS

Joelis Valez Diaz '24 carries clues to her life story in the assortment of pins attached to her backpack. Several reflect her heritage: A native of Puerto Rico, she moved to the U.S. mainland after Hurricane Maria devastated the island. She was born in her grandparents' house, where "without having much, we had everything: family, friends, neighbors, and a profound sense of community. I am extremely happy to say that I found the same community spirit here at WPI."

Other pins remind her of the countries she visited while completing her Interactive Qualifying Project in Thailand; her art, which was recently displayed in Gordon Library; her emotional support guinea pig, Newton; and the Disney movie *Tomorrowland* with its message about perseverance.

A chemical engineering major, Diaz is part of the WPI Teacher Preparation Program and hopes to become a research professor "to work on improving the quality of life and our environment, and helping students visualize themselves as agents of change through education." A pin from the Louis Stokes Alliances for Minority Participation program shows her devotion to achieving equity and helping underrepresented populations.

Many of the WPI pins come from her role as a Student Philanthropy Ambassador for University Advancement. Her love of the city of Worcester is also evident.

"WPI showed me that it is beautiful to show who we are, and the importance of being vulnerable," she says. "If you see me around campus and want to chat about any of these pins, feel free to reach out!"

PHOTO BY MATTHEW BURGOS

IT'S GOOD TO BE KING

Paul Liberman '05 Builds a Gaming Empire with an Engineering Mindset

BY SCOTT WHITNEY | PHOTOGRAPHY BY SCOTT ERB

Work-life balance comes hard for Paul Liberman. Sure, he knows the standard tricks: Go for a drive with the family. (Oh look, a DraftKings billboard.) Catch up on the news. ("DraftKings Takes Market Share Lead," reads the headline.) Maybe kick back and take in the game? (Nothing less than a busman's holiday—a term coined in the early 1900s for downtime that involves what you do for work.)

Call it an occupational hazard or the cost of success, but Liberman is hard-pressed to escape the ubiquity of DraftKings, the online gaming colossus he co-founded in 2012. Little more than a decade after launching the company from his apartment, Liberman and his partners Jason Robins and Matthew Kalish stand at the helm of an international brand that shows no signs of flagging. Valued at just over $14 billion, DraftKings edged out its competitors for the largest market share of online gaming in 2023.

Of course, as the saying goes, "Uneasy lies the head that wears the crown." Although the three co-founders have experienced stratospheric success, they have also encountered their share of challenges in growing DraftKings to a thriving company with offices in six countries. However, it takes more than a few intractable problems to discourage Liberman—in fact, as an electrical engineering and computer science major, he was trained for it.

AN EARLY TINKERER

Find a young engineer-in-the-making and you'll likely discover a nearby pile of dismantled electronics. In that respect, the young Liberman fit the mold famously. "As early as I can remember, I was a tinkerer," he says, recalling the IBM 386 DX his father bought for him and his brother—which they promptly stripped down, rebuilt, and otherwise modified. "I used to like this QBasic game, *Nibbles BAS*. We'd open it up to see how it was programmed and write little programs of our own."

The son of an engineer, Liberman also showed an early proclivity for electronics and networking. His interest in robotics in high school soon blossomed into a love for engineering, leading him to follow in his brother's footsteps as an undergraduate student at WPI. In fact, it was on the WPI campus that he discovered his passion: technical problem solving with a focus on user experience.

For his Major Qualifying Project, Liberman and his teammates collaborated with Bose Corporation to develop an automotive voice-recognition program that allowed a driver to cue up specific music tracks using voice command. In 2004, programs like Siri were still years away and the basic challenges of voice commands had yet to be resolved. Without the benefit of plug-and-play algorithms, the MQP team members needed to train their program to decode each user's voice and then retrieve the correct track. To make the project even more challenging, the team chose a Christina Aguilera song with an especially hard-to-pronounce title as their test subject.

Though Liberman's MQP team succeeded at building a technical solution, he found the greatest satisfaction in creating a program that a driver might actually use—foreshadowing his future work. "The interesting part for me was the human-computer interaction," he says. "How easy could we make it for a driver to interact with the system without being distracted? Although I was an electrical engineering major, a lot of our project involved making the customer experience better and more productive, not just solving a technological problem."

His passion for systemic problem solving drove him through his undergraduate work, and following his graduation in 2005, Liberman accepted his first job as an applications engineer at a Massachusetts-based firm that built semiconductors and closed circuits for electronics devices. He was disappointed to discover that the position required a much narrower skill set than what he previously used to tackle open-ended challenges at WPI; however, what the job revealed about Liberman's interests proved to be invaluable. "A lot of my time was spent optimizing existing work, or doing mechanical stuff, like soldering," he recalls. "And I realized that I preferred the problem-solving aspect of engineering: tinkering, building, and constantly working on new projects."

> "I have filled a variety of roles at DraftKings, but in each one I asked, 'How can we make this department revolve around data? How can we bring it back to basic problem solving?'"

Liberman soon moved to a new position at VistaPrint, an e-commerce firm, that allowed him to dig into customers' user experiences when navigating the company's website. This new role brought him back to the methodical approach to problem solving he'd learned as an undergraduate, letting questions that arose organically guide his work. "How do people navigate the website? How do I measure that? How do I leverage data to make the experience better?," he recalls.

Liberman's experience at VistaPrint provided a critical eureka moment. "Whether you're facing an engineering problem or a business problem, you're using data, a hypothesis, and logic. The same approach applies, just in a different framework. It's a mindset, and, as I realized, that's my passion," he says. Although he had been trained in the technical aspects of electrical engineering, it was the methodical approach to problem solving—the engineering mindset—that was his greatest superpower. This epiphany freed him to think beyond the boundaries of electrical engineering to the broader world of entrepreneurship. In fact, with a proven approach to problem solving that transcends disciplines or industries, the sky was the limit. And in a few short years, that's exactly where he and several like-minded friends would be headed.

MORE TESTS NEEDED

Nearly a year into his job at VistaPrint, Liberman began meeting up with Kalish and Robins, friends and fellow VistaPrint employees, to finesse their fantasy leagues and bat around their latest entrepreneurial ideas. Over time, the two activities merged and the trio envisioned a fantasy sports platform that allowed players to opt in for one or two games, rather than sign up for an entire season. The DraftKings concept began to take shape. Of course, there was the little problem of building a platform from the ground up—but little problems happen to be Liberman's area of expertise. "I thought, 'Ok, awesome; here's a problem to solve," he says. "Let's build this. I'll take on the tech side.'"

In 2012, Liberman and his co-founders officially launched DraftKings, a few weeks into Major League Baseball's season. The startup won thousands of customers in its first few months, and the three friends watched trades turn to dollars. As with most startups, the owners held onto their day jobs, spending nights and weekends building and tweaking the new platform before quitting to focus on it full-time shortly before launch day. They soon committed to a five-month run, and scraped together $25,000 among themselves to do so.

Having proven their concept with a core group of users who provided a steady revenue stream, the co-founders then secured $1 million in venture capital from Atlas Venture, a Cambridge-based firm. “That was the most exciting thing that could ever happen to us,” says Liberman. More than $5 million in venture capital followed in the next few months, ensuring that they could further expand the business and reach profitability in the short term.

At first, the trio swapped roles frequently, searching for the positions best suited to their respective skill sets. “I started off as chief technology officer, but a year after we launched, I moved over to the marketing side, and then back to technology two years later,” Liberman recalls. But as with most challenges, he used each position to focus on the tool he knows and trusts best: data.

For many entrepreneurs, leading with intuition is the key to their success. “Intuition is a very powerful thing, more powerful than intellect, in my opinion,” Steve Jobs told his biographer, Walter Isaacson. Other business moguls, including Jeff Bezos, Richard Branson, and Elon Musk have shown a similar inclination to let their gut be their guide, with varying results. For Liberman, intuition needs to be paired with data for success—both are critical; good data leads to good decisions.

As he moved from one side of the business to the other in DraftKings’ early days, Liberman consistently applied the analytical approach to problem solving he’d learned as an engineer to business challenges. “I have filled a variety of roles at DraftKings, but in each one I asked, ‘How can we make this department revolve around data? How can we bring it back to basic problem solving?’”

In 2015, DraftKings faced its first major headwinds as an emerging industry leader. Questions arose nationally about the legality of fantasy sports, with some arguing that it constituted gambling and others defining simulation sports as a game of skill. Additionally, *The New York Times* ran a story accusing an employee of DraftKings of insider trading related to bets placed on a competitor’s website. The controversies proved to be temporary, albeit painful, bumps in the road to industry dominance. An internal review definitively confirmed that the employee in question did not have access to insider information prior to placing the bet. A 2018 decision from the U.S. Supreme Court resolved the legality of fantasy sports by allowing states to decide for themselves whether to allow sports betting. That same year, DraftKings announced its first online sportsbook in New Jersey; today, DraftKings Sportsbook is live with mobile and/or retail sports betting operations pursuant to regulations in 25 states and in Ontario, Canada.

> “We have such a great team right now, which gives me leverage to focus on the next thing we do. How do we grow? How do we scale?” he says. “You never run out of problems, which is what keeps me motivated.”

When remembering this difficult phase in DraftKings’ history, Liberman remains as analytical as ever; for him, these hiccups simply provided more invaluable data. “My mentality is that a failure is just another problem to be solved,” he explains. “The reason we’re here today—as a public entity, a regulated company, and even the gaming industry as a whole—came from what we learned in 2015. You can look at those experiences as failures, but we became a much better company because of it.”

HERE COMES SUCCESS

In the summer of 2023, a study from Eilers & Krejcik Gaming revealed that DraftKings had taken the national lead in online gaming, commanding a 31 percent share of overall gaming revenue. In just 11 years, Liberman and his two co-founders had turned their modest idea into an international juggernaut. As impressive as their growth has been, DraftKings’ meteoric rise has also posed personal and professional challenges for Liberman. Among them is the high visibility that comes with reaching the top of the proverbial mountain. “The scale changes. When something goes wrong, it’s on the front page of ESPN, or there’s 50,000 Tweets about it,” says Liberman. He adds with a chuckle, “If there’s a bad news story, I’ll say to my friends, ‘I know you guys all saw that article, because you all sent it to me within 30 seconds.”

Not that he’s complaining—in fact, most of the pressures attendant to his success aren’t related to him at all. “The pressure is a lot higher because your employees rely on you,” he notes. “But that’s also the best part of the job. I love going into the office on Sunday when football starts and seeing all the amazing people here, focused on making this organization a better place.”

Liberman sees another upside to having built an international team of high-caliber professionals: more problems. “We have such a great team right now, which gives me leverage to focus on the next thing we do. How do we grow? How do we scale?” he says. “You never run out of problems, which is what keeps me motivated.”

In fact, according to Liberman, all three co-founders thrive best when naysayers underestimate their abilities. Since becoming a publicly traded company in 2020, the company has discovered a new proving ground in the stock market, with financial gurus hailing their stock alternately as the next great buy or significantly overvalued. “Whether it's Wall Street or our competitors, our challenge is to prove them wrong, beat their expectations, and launch a better product,” says Liberman. “When I get together with my co-founders, we always say, ‘We haven’t achieved everything; we’ve got more to prove.’ And that’s a huge driver for me.”

TIPS FROM THE TOP

Paul Liberman’s journey from the WPI campus to the helm of a publicly traded, international corporation has given him a rarified perspective on success. What advice would he give to WPI students and graduates just launching their careers?

DO WHAT YOU LOVE:

According to Liberman, the key to harnessing one’s personal drive lies in your unique interests—not in becoming all things to all people. “When your passions align with what you’re good at, you’ll excel,” he says. “A lot of people want to get better at what they’re bad at, but I’m a big fan of emphasizing your strengths.”

PERSEVERE:

In the face of failure and criticism, the successful person accepts the experience as inevitable and embraces the lessons it brings. “You’re always going to encounter people who tell you why you can’t do something. You’ve got to be persistent and aggressive in the face of that.”

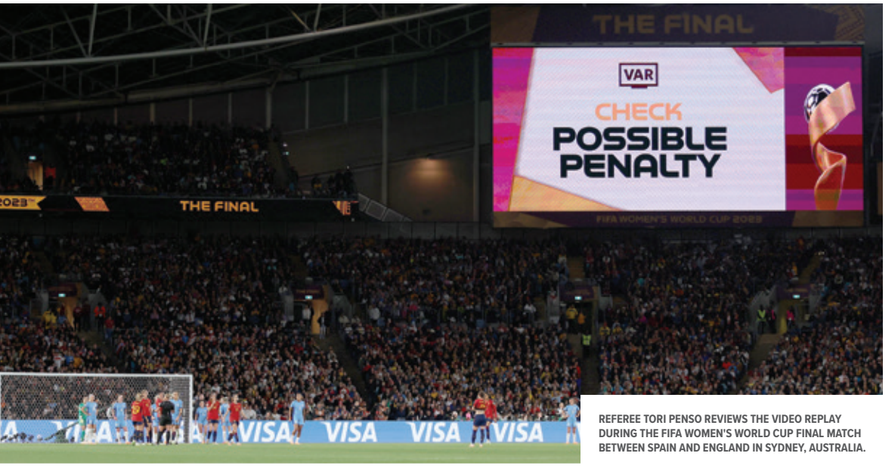
OWN YOUR LIFE:

Never wait for a career counselor or mentor to show you your life’s path. “No one cares more about you than you, so map out what you want to accomplish proactively,” says Liberman. He suggests writing down your long-term objective and posting it where you’ll see it every day. “Every time you read it, ask yourself, ‘Am I moving in that direction?’”

Pitch Perfect

Gabriela Hoops '19 operates at the crucial intersection between sports and tech.

BY AMY CRAWFORD



REFEREE TORI PENSO REVIEWS THE VIDEO REPLAY DURING THE FIFA WOMEN'S WORLD CUP FINAL MATCH BETWEEN SPAIN AND ENGLAND IN SYDNEY, AUSTRALIA.

With the score a stubborn nil-nil, the tension ratcheted up as the match proceeded into overtime. Nigeria and England, competing fiercely to earn a slot in the quarterfinals of the 2023 FIFA Women's World Cup, would have to shoot it out in a series of penalty kicks.

Athletes from each team alternated attempts: An England miss, then a goal snuck in by Nigeria. The crowd—some 50,000 people filling the largest stadium in Brisbane, Australia—held its collective breath as the kicks continued. Within three dramatic minutes, the score was 4-2 and the crowd went wild. England would advance.

Seated before a bank of monitors at the International Broadcast Compound (IBC) in Sydney, Gabriela Hoops '19 was watching the match closely. It had been a long day, and she still had a post-match review to complete. There were two weeks—and nine matches—to go before a world champion emerged. But Hoops wouldn't have chosen to be anywhere else.

"I've just always been passionate about soccer," she says. "It's one of the few sports that, as a girl, you can imagine growing up to play professionally."

Making it to the World Cup was always her ultimate dream. And while Hoops may not have been on the field during the tournament in Australia and New Zealand last summer, she did have a key role. As a replay operator with Hawk-Eye Innovations, the world's top provider of video assistant referee (VAR) technology, she used the firm's cutting-edge system to help FIFA officials make fair and accurate decisions about goals, offenses, and penalties. The stakes were as high as they get, and Hoops was in her element. For the 2019 mechanical engineering graduate and former WPI soccer goalkeeper, a career with Hawk-Eye offered the perfect combination of sports and technology, bringing together the engineering skills she honed at WPI with a love of the game that has animated her for as long as she can remember.

MAKING THE TOUGH CALLS

Hawk-Eye Innovations' computer vision technology was originally developed by British engineers in 2000 for use in television broadcasts of cricket to help viewers see the ball's trajectory. The company soon adapted its ball-tracking, smart replay, and other technologies for sports as diverse as golf, ice hockey, and NASCAR. Meanwhile, applications grew to include not only telecast enhancement but officiating. Hawk-Eye now works with the majority of the world's top leagues and has become a brand recognized by sports fans around the globe.

"A lot of people know us from watching tennis, where you see the ball and its shadow," Hoops says. "That's what we do."

Although the technology can determine locations down to a few millimeters, some leagues were cautious in embracing video review to make officiating decisions. As time went on, the utility of using it for tough calls—for instance, determining the precise location of a ball or a player's foot relative to a boundary line—became impossible to ignore.

"The more popular sports tend to be entrenched in their ways," she notes. "But, at the same time, I think players, coaches, and fans would be more upset if it wasn't used."

Hoops joined Hawk-Eye's U.S. headquarters in Atlanta immediately after graduating from WPI. In the summer of 2019, it was a small office (although it would grow by 2023 to more than 70 U.S. employees), and

> You're not just sitting back and waiting for something to happen...there are official checks that you see on TV when the referee runs over to the screen. But the VAR team is **checking everything throughout the game.** The moments of high pressure are certainly there, and it takes a lot of experience to get used to it.

the team was looking for someone who would immediately fit in, says operations manager Laura Harris, who became Hoops's boss and good friend.

"We really needed someone who would have a great attitude, as well as having great tech knowledge, and she ticked all the boxes," Harris says. "She blitzed the interview—obviously her experience playing soccer was a big pull. Gabriela's very passionate about everything she does, which is a huge asset, as is her ability to work well with all different people. She's very good at organizing herself and organizing others. I'm sure that has a lot to do with her sporting background and working in a team."

Hoops's first assignment at Hawk-Eye was to undergo training in the company's proprietary systems at its European offices, first in France and then in the U.K. Those early weeks set the pace for a job that would involve plenty of travel, as she went on to operate or provide tech support for soccer matches as well as for the National Hockey League, Major League Baseball, and professional golf's Masters Tournament.

VAR made its international soccer debut in 2016, starting with exhibition matches and the FIFA Club World Cup, one of the international soccer organization's lower-profile tournaments. It wasn't long, however, before FIFA wrote video review into its Law of the Game. On-field officials, simply because of their single vantage point, can't see everything that happens on the field. On the other hand, the dozens of cameras that a Hawk-Eye system taps into can track balls and players from multiple angles, and video assistant referees (the FIFA officials who use VAR technology) are tasked with reviewing decisions to ensure the right call is made.

Hoops's role in the 2023 Women's World Cup began before the players arrived. In July she and the Hawk-Eye team flew to Australia for a practice camp with FIFA officials, during which they worked through every element of the game—from fouls to penalty kicks—in a series of on-field simulated matches. Once the tournament was underway, Hoops put in nine-hour days, beginning with reviewing the previous night's games and all decisions made by officials before she and her team spent several hours setting up for the evening's match. The highlight of each day was the match itself, a thrilling experience that demanded both skill and composure.

"You're not just sitting back and waiting for something to happen," Hoops says. "There are official checks that you see on TV when the referee runs over to the screen. But the VAR team is checking everything throughout the game. The moments of high pressure are certainly there, and it takes a lot of experience to get used to it."

In addition to knowing how to operate the system, knowledge of the game itself is crucial, she explains. "You need to know who you're listening for and what you're checking. There's a lot of audio and visual information in this high-pressure situation with not a lot of time to think. But it's also exciting. To be able to go to a Women's World Cup was a dream come true, and I like that I got to be a part of it as more than a spectator."

A PERFECT FIT

Hoops can't actually remember when she first stepped onto the soccer pitch—she may have been 3 or perhaps 4, but it was definitely at the age "when kids' shirts are too long and you can't find shorts that fit," she says with a laugh.

The Connecticut native played through high school and knew she wanted to play in college. She also loved math and science; she wanted to study engineering; and she hoped for the opportunity to study abroad. A few interviews with college coaches helped her narrow her options, but it was only when she met **Stephanie Riley-Schafer,** WPI's head coach since 2013, that she knew where she was going to spend the next four years.

"I could do my engineering degree at WPI," she says, "but I could also play soccer at a high level on a competitive team where I liked the coach, and I could study abroad—and do all that in four years without disrupting my studies. So that was all I needed."

The school proved to be a perfect fit. Hoops completed her Interactive Qualifying Project in Copenhagen, examining the potential for urban rooftop farming as a way to create a more sustainable food system and mitigate climate change. Project-based learning worked well for someone who was used to being part of a team, and Hoops learned to take a step-by-step approach to solving difficult technical problems—one that has served her well in her career.

"In the technology sector, a lot of what you're working on is

GABRIELA HOOPS '19 AND HER HAWK-EYE INNOVATIONS COLLEAGUES PROVIDED THE VIDEO ASSISTANT REFEREE TECHNOLOGY DURING THE 2023 FIFA WOMEN'S WORLD CUP IN SYDNEY, AUSTRALIA.

proprietary," she explains. "There's no way for me to have been able to learn Hawk-Eye's tech before I got here. But what I did learn from WPI was 'This is how you troubleshoot; this is how you approach complex problems. You just take it one step at a time. How does point A get to point B? What are all the little jumps and hops and skips in between?'"

Hoops excelled academically, but her heart stayed on the field, and Riley-Schafer was pleased to see that her own efforts to recruit the young goalkeeper had paid off.

"Gabi was one of, if not *the*, best goalkeepers to go through our program," the coach says. "She was very dedicated to the sport and the team and the academics. I think she found a really good balance in WPI."

During her sophomore year, Hoops helped the team win a New England Women's and Men's Athletic Conference championship. As a senior, she got to flex her leadership muscles, taking on the role of team captain.

"She really took the back line under her guidance and was great about giving feedback and helping younger players," Riley-Schafer says. "Gabi's one of those people who includes everybody. A lot of our players just want to put their heads down and get the job done, and she would key in on them and recognize their hard work and recognize what really drove them to be successful."

The season after Hoops graduated, Riley-Schafer recalls, she did an exercise with her players about what makes a great leader. She asked, 'What qualities did the players seek in a leader and who embodied those qualities for them?' Some players named world leaders, others historical figures. But the players who had been on the field with Hoops named her.

"She was somebody that really loved the sport, loved the team," Riley-Schafer says. "I can see her taking that into what she's doing now."

A WORLD CUP DREAM

During the 2023 Women's World Cup, Hoops spent seven weeks in Australia, working most of that time—in all, she operated for 15 of the tournament's 64 matches, including the final, which saw Spain beat England, 1-0, in a match played before 75,000 fans. Back in Worcester, Riley-Schafer and the WPI women's soccer team were watching together when the coach got a glimpse of a familiar curly-haired head.

"There were moments where they flashed to the VAR room," Riley-Schafer recalls. "At one point, they flashed to her. I went up to the screen and I pointed at that head and I said, 'This is one of our alumni!' And the players were like, 'What? That's amazing. How do we get to talk with her?'"

Hoops graduated before any of the current WPI Women's Soccer Team members arrived, but they were inspired to know someone who had been in their cleats had made it to the World Cup, working at a crucial intersection between sports and tech.

"I really do think WPI was great for Gabi," Riley-Schafer says. "I'm glad that she gets to keep sports in her life. And as the years have gone on, hearing where she's been and what she's been able to do and all of that, I just think it's a great fit. Working in sports can be hard. It's long hours; it's off hours. So you really do have to love what you're doing. And I think she does."

That's the truth, Hoops says. And while she plans to keep rising through the ranks at Hawk-Eye—she just took on a new role, leading a team on the tech side of the business—the 2023 World Cup will always be a highlight.

"It was really a core memory moment," she says. "To be involved, at that level, in a World Cup final—that was probably one of the coolest things I'll ever do in my life."

A DRY HEAT

Jamal Yagoobi's dual areas of expertise have him in demand everywhere from outer space to the manufacturing floor.

BY LAUREN REBECCA THACKER

PHOTO BY MATTHEW BURGOS

Jamal Yagoobi has two areas of expertise, and both involve heat—more specifically, the theoretical, numerical, and experimental study of heat transfer and mass transport enhancement. One area helps keep electronic equipment from overheating in space; the other addresses the energy-hogging drying process in the large-scale manufacturing of items such as food, paper, and chemical products.

As a result, the George F. Fuller Professor of Mechanical and Materials Engineering can find his innovative technologies in places as exciting as the International Space Station or as ordinary as a snack food manufacturing plant.

"Although these two areas may seem to be very different, they're based on a common technical platform," he says. "Drying deals with the heat and mass transfer in moist porous media while the cooling of electronics is concerned with liquid/vapor phase change in the presence and absence of gravity."

In addition to being technically complex, Yagoobi's research considers heat transfer at a large scale. "Picture a football field–sized oven that dries or bakes dough that will eventually be snacks, or pulp that will end up as packaging," he says. "This is the scale of industrial drying. The processes that companies use are mostly decades old and the U.S. Department of Energy estimates that almost half of this energy use is wasted. Industry needs new technologies."

Heat is also a concern aboard spacecraft. Without proper cooling, the heat generated by electronic equipment can damage critically important equipment or harm astronauts. Innovative non-mechanical heat transfer technologies are crucial for the success of next-generation satellites or deep space missions.

Both areas of Yagoobi's research have gotten attention and support from academia, government, and industry over the course of his career. He has received funding from NASA each year for more than 30 years, as well as from the National Science Foundation, Air Force Office of Scientific Research, Department of Energy, Massachusetts Clean Energy Center, and various industry sources. Fellowships and consulting projects have taken him around the world, and he holds 10 patents along with four provisional patents. Previously head of the Mechanical and Materials Engineering Department for 11 years, he is also the founding director of the National Science Foundation–funded Center for Advanced Research in Drying (CARD), the first North American research center dedicated solely to studying industrial drying.

OUTFITTING OUTER SPACE

When Yagoobi was in the fifth grade, his teacher asked members of his class to write essays about what they wanted to be when they grew up. For him, the assignment was easy. He would explore space—somehow, some way. Even as he grew older, his interest in space didn't wane. "I had such a keen interest," he says. "I went through everything in the local bookstore and even subscribed to magazines about space."

From his hometown of Tabriz, Iran, a 14-year-old Yagoobi wrote to one such magazine, asking how he could pursue a career that would allow him to investigate the many mysteries of the universe. The answer came back: study physics or engineering. He chose engineering and began a journey that would take him from Sharif University of Technology in Tehran to the University of Illinois in Urbana-Champaign, to WPI—and even to NASA's zero-gravity aircraft.

As a graduate student at the University of Illinois, he studied mechanical engineering, which led to a postgraduate fellowship at NASA's Goddard Space Flight Center. These days, he and his research team are in regular contact with Goddard as well as Glenn Research Center scientists and collaborate on the development of cooling technologies that function in the absence of gravity.

"It's based on a technology called electrohydrodynamics," he explains. "It's a non-mechanical way to move fluids with extremely low power and no vibration or rotating machinery."

The technology, which uses electrically charged fluids to absorb and carry heat away from electronics and other heat-generating equipment, was tested for over a year aboard the International Space Station in 2018. In addition, Yagoobi and several of his students were able to test their technology on NASA's zero-gravity flights for a total of 12 days over three years.

"That was a great experience," Yagoobi says, reflecting on the Zero-G flight. "You really rise up from the floor! I'm grateful that my students and I had that opportunity. More important, we got to conduct important experiments—we also tested the technology

JAMAL YAGOOBI AT A CENTER FOR ADVANCED RESEARCH IN DRYING INDUSTRY ADVISORY BOARD EVENT, WHERE INDUSTRY LEADERS AND ACADEMIC RESEARCHERS SHARE INFORMATION.

with moon and Mars gravity. We're proud of what we developed and are confident the technology will be used in next-generation satellites as well as long missions by NASA. It also has terrestrial applications in industrial cooling and heating, ventilation, air conditioning, and refrigeration systems."

IN-DEMAND DRYING TECHNOLOGY

While Yagoobi's interest in space tech can be traced to his childhood dreams, his work on industrial drying developed from his work experience after receiving his doctorate.

"I didn't know much about drying until I worked in industry after graduating," he says of the three years he worked at Westvaco, a pulp and paper company. "That's where I began to appreciate the importance of drying, the amount of energy it uses, and how much work we can do to reduce our carbon footprint. I decided to return to academia and focus on this challenge."

Yagoobi's work in this area has established him as a national leader whose technological advancements are in demand by industries looking to reduce their energy usage and carbon footprint.

As the founding director of CARD, which was established in 2016, Yagoobi leads a team of faculty and graduate and undergraduate students from WPI and the University of Illinois in Urbana-Champaign. As one of NSF's Industry University Cooperative Research Centers, CARD facilitates close cooperation between academic researchers and industry partners. Companies such as BASF, Mondelez International, and PepsiCo have partnered with CARD.

These collaborations allow researchers to have an inside look at how companies function and what solutions would be most viable, at the same time helping companies quickly bring advanced drying technologies from the lab to the plant floor. Each year, CARD hosts two meetings with its industry advisory board, where faculty and student researchers share updated findings and, in turn, industry leaders provide direct mentorship and feedback about their challenges. In addition, CARD offers site visits to member companies and provides advice on what technology is needed to achieve their objectives. Students hold virtual meetings every month with member representatives.

Yagoobi's research has major implications for the nation's energy and sustainability goals. Industrial drying, particularly in the food, paper, and chemicals industries, accounts for about 1.2% of this country's total energy consumption. "U.S. companies are mandated to have a zero-carbon footprint by 2050. CARD will play a critical role in helping meet that goal even earlier than that," he says.

CARD researchers have developed a dielectrophoretic drying technology that extracts vapor from moist material, and airborne ultrasonic dehydration process that removes moisture with ultrasonic waves. They are also working on the use of fiber optics to detect information about moisture in porous materials, which may lead to more precise measurements and efficient drying. Artificial intelligence also plays a role in CARD projects—researchers can simulate various drying processes to determine the optimal processes for different materials. With simulation, numerical calculations, and experimental data, CARD research can minimize energy consumption while also improving product quality.

Yagoobi is particularly proud of the development of slot jet reattachment nozzle technology, which improves convective heating and reduces natural gas consumption, and ultrasound-

ENGAGING STUDENTS IS IMPORTANT TO JAMAL YAGOOBI. IN 2023, HE COMPLETED THE DISSERTATION OF HIS ONE OF HIS PHD STUDENTS, THE LATE MICHAL TALMOR TILLEY, SECOND FROM LEFT IN ABOVE PHOTO.

assisted radial jet reattachment nozzle atomizer technology, which significantly reduces energy usage in processes such as liquid evaporation or atomization.

CARD has licensed this atomizer technology to Bright Feeds, a company that converts food waste to animal feed.

"One-third of food produced in the U.S. is wasted," Yagoobi says. "Imagine the carbon footprint created by producing that food, and then that food is wasted! If we can convert that waste to animal food with minimal energy consumption, the impact on the environment is huge."

DESTINATION: WPI

Yagoobi's research on heat transfer and industrial drying has drawn two major conferences to Worcester, with researchers coming from around the world to WPI's campus. The International Drying Symposium (IDS), founded in 1978, brings together world-renowned researchers and engineers from academia and industry. It's the most important event for scholars who study drying.

"The last IDS held on U.S. soil was in 1986 at MIT's campus. I was successful in bringing IDS back to the United States in 2022," Yagoobi says. "I'm so grateful to WPI for providing the space and showcasing our beautiful campus. We were able to highlight CARD's impact on the field."

WPI was in the spotlight again in the summer of 2023, when Yagoobi chaired the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Dielectric Liquids on campus. The forum, which included participants from 18 countries, had never been held in the United States.

"Conferences like these improve the image and reputation of WPI globally," he says. "By hosting these international events, we become known as leaders in the field."

Worcester is also home to research breakthroughs, thanks to work Yagoobi and colleagues conduct at the Advanced Manufacturing Center, which opened in 2021 in a former manufacturing building near WPI's campus. The new space accommodates a technology that came to Yagoobi's mind during a run—when many of his ideas come to him, he says.

"I'm not a fast runner, but I very much enjoy it," he says. "During one of my runs, I wondered if I could design a dryer with various technologies, one that could help industries by testing different methods and gathering scalable data."

After some more thinking and $3.5 million in funding from the U.S. Department of Energy, plus support from the Massachusetts Clean Energy Center and CARD member Reading Bakery Systems, the smart dryer testbed became a reality. Coming in at 10 meters long and equipped with a conveyer belt and custom sensors (developed by his colleagues Associate Professor **Yuxiang Liu,** mechanical and materials engineering, and Professor **Doug Petkie,** physics, and their students), the testbed includes technologies such as airborne ultrasonic drying, slot jet reattachment nozzle technology, infrared technology, and dielectrophoretic dehydration technology.

"This testbed, widely used by industry partners, is for food, paper, chemicals, you name it," Yagoobi says. "We can easily change the location of these technologies. So, for a given product, we determine the optimal combination and operating conditions. It's quite novel—there's nothing similar to it in the world."

In addition to testing drying methods that industries can implement to lower their energy usage, he intends to use the testbed as a teaching tool for graduate and undergraduate students.

LEADER IN THE LAB AND CLASSROOM

Yagoobi knows that listening to a lecture can be challenging, and it's also not the best way to develop a deep, nuanced understanding of complex topics. In his classes, he looks for ways to interrupt lectures with opportunities for interaction. That might mean inviting a student to the front of the room to explain a concept, or simply pausing to ask a question. He gives students a heads-up that his class functions this way and offers the chance to opt out, but most students want to participate.

> **"Showing the testbed to students who aren't necessarily doing research themselves lets them see how research is done and how it's relevant to the classroom material."**

He also brings undergraduate students to the Advanced Manufacturing Center so they can get insights on what it means to conduct research.

"Showing the testbed to students who aren't necessarily doing research themselves lets them see how research is done and how it's relevant to the classroom material," he says. "We all daydream when we sit in a meeting, right? I try to create a collaborative environment, so that students stay engaged."

Students who do engage in research with Yagoobi get fundamental understanding as well as hands-on experiences—the zero-gravity experience being the most exciting example—in addition to receiving mentorship from partner industries and seeing how experimental technology is actually used in manufacturing plants.

One experiment from Yagoobi's lab soon will be flying into space and will bear a logo designed by a former student **Michal Talmor Tilley, PhD '23,** who passed away in 2021 while working on her dissertation. After her death, Yagoobi took it upon himself to complete her dissertation on electrohydrodynamics.

"I had known her since 2013, and I felt responsible for her work," he says. "There was no question that I would do this. I wanted her work to be in the scientific literature under her name."

What followed exemplifies Yagoobi's commitment to his students. He reviewed years of drafts and data that Talmor Tilley had shared during her time as his advisee, revisited and submitted scientific articles they had written together, and watched recordings of their meetings. He submitted her dissertation, which included tributes from current and former graduate students who worked with her. WPI posthumously awarded Talmor Tilley a PhD in Mechanical Engineering.

Over the course of his career, Yagoobi has supervised upwards of 100 other students as they complete their doctoral dissertations and master's theses, both at institutions where he has worked and at universities in France, Sweden, Morocco, and India. He's also hosted more than 70 international students and scholars in his research laboratories at WPI, and at Illinois Institute of Technology-Chicago and Texas A&M University. He's been recognized for his outstanding teaching and research by Texas A&M; for his research by the American Society of Mechanical Engineers (ASME), IEEE, and NASA; and for his collaborative work by the French Ministry of Education. He is a fellow of ASME and IEEE and has published 335 articles in lead journals, conference proceedings, and book chapters.

"Teaching is interactive and interesting to me," Yagoobi says. "I don't look at it as a distraction from my research—absolutely not. In fact, so much of research is teaching. I really love teaching, going into the classroom, and interacting with students."

COMBINING INTERESTS

In the future, he hopes to add additional technologies, such as microwave, radio frequency, laser, and induction heating to the smart dryer testbed at WPI. He's also working on making heat pump technology more efficient by adding electrohydrodynamic technology, something he calls "really, really exciting." And there is more to be done in the world of heat pumps, as he works to develop one that can operate at higher temperatures and with reduced energy consumption. For this project, he says, he is "merging my two research hats."

Ultimately, Yagoobi says, he will continue pushing his research interests forward, keep teaching, keep collaborating, keep musing on heat transfer and energy consumption during his runs, and see where it takes him, whether that's to zero gravity or zero carbon emissions.

"In 2005, I reconnected with WPI. A year later, I was able to complete my MQP based on my RADAR work. I finally got my degree in computer science in 2006! This whirlwind reconnection eventually led to Patricia's and my creating a scholarship in honor of my parents who worked tirelessly for me. We hope the James and Alice Kelly Memorial Scholarship helps WPI students realize their goals now and in the future." —**KEVIN KELLY '75**

Kevin Kelly '75 knew WPI was the right fit for him. The experiences he had with the WPI Plan gave him the tools to get an early start in his career. While trying to finish his MQP, he landed a great job as a software developer in Harvard Square doing project management applications. His new job took up all his time, which ultimately caused him to be unable to complete his MQP. Kevin says, "I walked into a 30-year career in digital real-time signal processing and algorithms for RADAR systems," which he used to complete his MQP in 2006. His tenacity is a great example of how it's never too late to achieve your goals!

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ALDEN SOCIETY

ALUMNI NEWS

From the Desk of

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

ILLUSTRATION BY ZOE PAPPENHEIMER

Dear Alumni,

In the previous *WPI Journal*, I invited you to reflect on your WPI experience and contemplate how the university and your WPI education have impacted your life. Today, I invite you to join me in looking forward to the future that I and the Alumni Association Board hope to achieve for the WPI alumni community.

Founded more than 100 years ago by a small group of alumni to promote general interest in education and to strengthen ties with the university and each other, the WPI Alumni Association continues this work today while also developing new ways to serve alumni and students.

Below, I have outlined strategic steps the Alumni Association Board has planned to meet our overarching objective of increasing meaningful alumni engagement with the university:

- Increase alumni connections by doubling social media engagement
- Increase alumni volunteering and event participation
- Develop and launch a "Welcome to the City" program for alumni
- Elevate our collective network through alumni engagement
- Demonstrate the impact WPI alumni have on the world by promoting alumni accomplishments
- Strengthen the alignment of Alumni Association resources in support of our mission
- Leverage Alumni Association committees to identify annual priorities and areas of focus
- Align Alumni Association Board effort and discussions on strategic goals and priorities

As the Alumni Association continues to seek ways to perpetuate WPI's cherished traditions and inspire pride in the WPI community, we ask you to partner with us on this mission, by sharing your time, treasure, and talent with our beloved alma mater.

Student Alumni Society Celebrates 40th Anniversary

If you noticed a stunning vista of red-and-white striped rugby shirts spread across campus on Homecoming Weekend, you can thank the Student Alumni Society (SAS) and its 40th anniversary celebration. Easily recognized by their striking "rugbies," members of SAS are the university's beloved tradition keepers who encourage participation from alumni, students, faculty, and staff in WPI's rich and historic traditions.

The well-attended Homecoming event, held in the Rubin Campus Center Odeum, found SAS members enthusiastically enjoying each other's company, as well as a delicious spread of sweet and savory fare. President Grace Wang offered a congratulatory message to the attendees, and as the microphone was passed, current and former SAS members shared heartfelt memories of SAS joys and uproarious tales of SAS shenanigans.

When asked how SAS began, event attendee and founding SAS member **Kathy Vignaly '84** shared, "As an undergraduate student, my friends and I would help the Alumni Association with Homecoming and Reunion events. During those times, alumni often talked about long-forgotten WPI traditions, such as beanies, the Tech Bible, and the Goat's Head Rivalry. After hearing how much alumni enjoyed those traditions and lamented their disappearance, my friends and I began work to revive those traditions for students to enjoy." In 1983, with the support of the Alumni Office, the Student Alumni Society was officially established on campus.

SAS member **Daniel Shea '24** says he had an amazing experience at the event. "It was nice connecting and reminiscing with friends I haven't seen in a little bit and to get a glimpse of how their college lives shaped their current life paths. Also, it was a great opportunity to connect my recent graduate friends to current members for networking opportunities, and current members could have a glimpse of what has shaped SAS over the past few years."

Reminiscing on her SAS experience, **Rachel Delisle '96** says, "I earned my rugby as an alumna when I served as Alumni Association president. It is one of my most prized possessions. I still participate in as many Bridge Crossings as I can to help welcome the first-year class into the WPI family."

On behalf of the entire WPI community, we congratulate SAS on its 40th anniversary, and thank the members for all they do to keep WPI's traditions alive.

—Sira Naras Frongillo

"My experience at the SAS anniversary event was amazing! It was everything I could have asked for. I was able to meet SAS alumni, hear how SAS has changed over the years, and hear about how SAS alumni's lives have turned out." **—Christian Oliveira '26**

TURNING POINT

HER MOM'S HEALTH SCARE SET AUTHOR **NINA SIMON** ON A QUEST TO PLOT A MURDER.

At first blush, one might not think an engineering education could be useful for writing a bestselling murder-mystery novel. But author **Nina Simon '03** says the problem-solving skills she honed as an electrical engineering major at WPI helped her successfully pivot from a fast-paced career as a CEO to one where she's plotting murders and considering how to reveal clues and plot twists.

"Writing a good murder-mystery starts with a 'What if?' question," says Simon, just like in the scientific process. What if—as in the plot of her new novel, *Mother-Daughter Murder Night*—an older woman recovering from cancer treatments at her estranged daughter's cabin saw something suspicious as she looked out of her bedroom window one night? "You ask a juicy question, then you explore it from all these different angles. That spirit of experimentation has been with me my whole career. I'm finding it such a joy to apply it to writing novels."

The mystery-solving protagonist is a feisty real estate executive based loosely on her own mother, whose real-life battle with cancer was the catalyst for Simon's abrupt career change. "The first draft I wrote 100 percent to make my mom smile. The main character is this outrageous, superhero version of my mother," she says. In the end, what began as a fun distraction turned into a Reese Witherspoon Book Club-endorsed novel now climbing the *New York Times* bestseller list.

Her First Four Careers

By her own calculation, Simon is on her fifth career. Just out of college, she worked as a contractor for NASA in Washington, D.C., a job that evolved from her Major Qualifying Project. At the same time, she was working at a low-paying but highly fulfilling weekend job fixing exhibits and creating puppet shows for the Capital Children's Museum. The creative joy she found at the museum infused doubt into her initial career aspirations. "I felt very much conflicted. A part of me felt very proud that I was a woman in electrical engineering," especially at a time when women represented only one percent of workers in the field. "I thought this was my dream job. But I was sitting in a windowless room doing math problems. I just wasn't loving it."

Simon has always embraced both sides of her brain—the creative and the technical—even at WPI, where she described herself as "an engineer by day and a slam poet at night." Using one side without the other left her wanting more.

After much introspection, she followed her creative heart and for the next eight years designed exhibits for museums around the world. Her most memorable role was as an exhibit design specialist for the International Spy Museum's "Operation Spy," an escape room-type experience that let visitors take on the persona of a spy. As part of her research, she spent time with many former spies, including the director of the museum (a former CIA agent) and the highest-ever defector from the KGB.

A move to California opened the door to her third career, when she took over as director of the then-struggling Santa Cruz Museum of Art of History. "I knew how to make a museum fun and engaging, but I also knew that the job was also going to involve fundraising and management, two things I'd never done before." She reached out to new audiences, opening doors to make the museum more relevant to the community. After five years, "we turned that sleepy and struggling museum into the creative hub of Santa Cruz."

Simon expected to be invested in her fourth career for the long term. She became CEO of a global nonprofit called Of/By/For All, an organization she founded to create inclusive, relevant, participatory community spaces. "A creative community organization should be of, by, and for all," she says in explaining the organization's name. "If you want to be FOR everyone in your community, you need to be representative OF them, and you need to be co-created BY them. That's what I really thought was going to be my thing, what I had been building toward for 20 years. I have the vanity plate on my car; I almost got a tattoo of the logo."

The organization grew rapidly, but just two years after its founding, she learned her mother had stage 4 cancer. "All I wanted to do was care for my mom," she says, so she notified her board chair that she was quitting, helped recruit a new CEO, and stepped off the high-pressure leadership track to become a full-time care giver.

Love and Escape

Simon spent months with her mother trying to help her heal and get stronger. (She is quick to assure, her mother is doing well today.) "I was also working on myself to deprogram and let go of some of the intensity of all that CEO life. We both love mysteries, so I said to her, 'What if I try writing a murder mystery, and make the detective someone like you.'"

At some point she decided to take "this little project about love and escape" and see if she could actually get it published. Simon's husband was an essential partner in this undertaking and he gave his blessing without hesitation. "We're both entrepreneurial and creative. We decided early on in our marriage to live fully and well on one salary so we could always say yes if one of us wanted to start a new business, or write a book, or take time off to help someone. We've made that trade about five times in the past 21 years."

She tapped her engineering skills to deconstruct the technical craft of writing. "I've never taken a writing class, so I would take some of my favorite books off the shelf and diagram a scene to see, for example, how an author builds tension. I was trying to take it apart–like an engine–to see how it works."

Simon describes finding an agent as a brutal experience that involved lots of rejections, but again she tapped her problem-solving skills. "Having an engineering education was helpful, particularly the design cycle where you start with a question, explore it, experiment, fail, try again in a different way, and try not get knocked down by failure." She researched individual agents, A/B tested query letters, and populated spreadsheets that tracked every interaction.

The backstory of her mother's cancer, as well as her multi-career background, appealed to publishing executives. "They loved the story of someone who has lived many lives. One editor said, ' You probably have a lot of stories to write,'" she says. "My persistence and my energy and the continual learning finally paid off."

She found an agent who worked with her to rewrite the book to flesh out two other main characters—the protagonist's daughter and granddaughter—and they sold it to publisher William Morrow. Being the September 2023 selection in Reese Witherspoon's Book Club gave it critical visibility that helped launch it onto the *New York Times* bestseller list. Simon also sold film adaptation rights to Kapital Entertainment, a production company now developing the story for the screen.

While she's currently spending most of her time crisscrossing the country promoting *Mother-Daughter Murder Night*, Simon is also working on her next fiction project. "I'm staying in general genre of strong women and crime fiction," she says. "I haven't hammered out all of book two's plot, but I'm sure there will be a dead body and some kick-ass women."

—Kristen O'Reilly

Philanthropic Giving in Support of Gender Equity

Susan and **William Rutherford '73** have nine granddaughters, and when they endowed the William A. '73 and Susan Rutherford Civil Engineering Scholarship, they did so to help ensure there would always be scholarship support available for all women if they chose to study civil engineering.

Growing up in the 1950s and 1960s, Rutherford says he recognizes how different his life would have been had he been born a woman. With the gender inequity of the mid-20th century, he says, "No matter how capable or hard-working I was, if I were a women in those days, I would never have been encouraged to take the pre-requisite high school courses needed to attend WPI, never joined the Army Reserve Officers' Training Corps (ROTC), never joined a fraternity, never worked as a union ironworker, welder, and truck driver, never become a professional engineer and construction manager, and, ultimately, I never would have experienced having my own forensic engineering business."

Rutherford reflects, "Regrettably, I didn't appreciate these sad facts of American life until I entered the work world. Susan did a lot to educate me after telling me about her youth and the professional struggles she faced, so we are doing what we can to help close the persistent workplace gender inequity gap. Our hope is that our nine granddaughters, and their daughters and granddaughters after them, will grow up in a world where women engineers have the same professional opportunities as their male counterparts."

Rutherford grew up in Worcester, attended Burncoat High School, and was drawn to WPI by its long-standing reputation for rigorous academics. He commuted from home for two years to save money and says he was fortunate to have received a three-year ROTC scholarship that enabled him to complete his education. "Without it, I most certainly would have left WPI," says Rutherford.

"I was never a wizard at anything," he says. "I had to work hard at everything I did. Over the years, I learned the importance of good luck, persistence, and having the desire to take advantage of good opportunities." He graduated in 1973 as a second lieutenant in the Army Corps of Engineers and a member of the Civil Engineering Honor Society (Chi Epsilon). "I credit my Lambda Chi Alpha fraternity brothers and civil engineering professors with much of my success, as they were a great support system throughout my academic journey at WPI."

Rutherford left the service in 1977 as a captain and moved to New Hampshire with his young family to begin his professional career. "From truck driver and pre-cast concrete plant manager to union iron worker and structural steel welder, my professional journey led to design engineering and field engineering at nuclear power plants, among many other positions." He became chief planner for the Beaver Valley II Nuclear Power Station in Pittsburgh, and then took a position as senior nuclear waste management engineer with the Department of Energy in Richmond, Wash. From 2000 to 2010, he managed his own forensic engineering/consulting business and eventually retired to Idaho and then Arizona with Susan. "Today, we enjoy the blessings of our three children, 10 grandchildren, and one great-grandchild," he says.

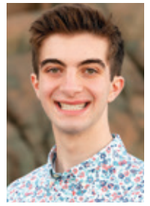
Acknowledging the role WPI played in his professional career, he says, "The technical training I gained at WPI was invaluable. I learned how to tackle complex problems, adapt quickly, work with others, ask for help, and most important, persevere. Making it through WPI's tough curriculum gave me confidence in myself, and having a WPI degree opened a lot of doors."

When asked about why they endowed the William A. '73 and Susan Rutherford Civil Engineering Scholarship, he says, "I feel very fortunate to have received a three-year Army ROTC scholarship, which allowed me to earn a WPI education. I am especially grateful for the many WPI alumni who played roles in my fulfilling professional journey. For all WPI has afforded me and my family, Susan and I wanted to give something back. Our named scholarship will give students who need assistance an opportunity to attend WPI and pursue a degree in civil engineering. We have structured the scholarship with WPI's help so that half of the recipients will be men and half will be women to the best of WPI's ability. We would like to see all the scholarship programs offer the same equity, if they don't already do that."

As *Beyond These Towers: A Campaign for WPI* continues its mission to sustain and enhance the university, this gift supports both the student scholarship campaign priority as well as the priority for all students to feel a sense of equal belonging and support in their quest for excellence on The Hill. "Susan and I have had a good life and want to invest in WPI and the young women and men who choose to attend this great school. To my fellow WPI alumni, I say, 'Give, give, give. You, too, can make a positive difference in someone's life.'"

—Sira Naras Frongillo

"Being able to pursue both engineering and the arts has been critical to my WPI experience, so I serve as a Giving Day Ambassador to help raise funds for WPI's growing jazz program. Each year we try to provide unique experiences for our students by playing at local and distant venues and by bringing in guest artists; I want to help create more of these experiences for more WPI students."



—Nate Reppucci '24

Giving Day 2023: One for the Record Books

GENEROUS DONORS AND ENGAGED STUDENTS SHOW UP IN FULL FORCE

If you missed Giving Day 2023, you missed 1,865 minutes (see what we did there?) of exhilarating and impactful donor philanthropy. Held in mid-September and with the support of university donors near and far, this year's Giving Day event yielded 1,564 gifts for a total of $312,502 raised in the just-over-36-hour event. According to Director of Annual Giving **Liz Chirico**, "This year's Giving Day saw the highest number of gift-challenge, gift-match, and leaderboard opportunities in Giving Day history and yielded the most dollars associated with these giving opportunities."

Explaining her gift-match for the High-Powered Rocketry Club (HPRC), of which her daughter, **Reya Truher '25**, is a member, WPI parent and Giving Day donor **Tammy Truher** says, "The opportunity to work on HPRC has been the highlight of my child's experience at WPI. It's as hands on as you can get, and it's hard to imagine a better experience for an aerospace engineer, or anyone interested in rockets. WPI provides students an education and professional development all rolled up in one. Last year, as an incoming sophomore, Reya was able to travel to New Mexico for an international rocket competition. There is so much opportunity for students who are involved in HPRC."

As in previous years, committed Giving Day Ambassadors led the call to philanthropic donors in support of their causes. This year, **Peter Korfuzi '24** (for the High-Power Rocketry Club) and **Kristen "Ten" Heller '25** (for the Video Game Club) earned the Top Student Ambassadors positions, and **Steve Hall '87** (for the DeFalco Endowed Wrestling Fund) and **Morgan Bell '17** (for the Women's Impact Network (WIN)) earned the Top Alumni Ambassadors positions. In recognition of their Giving Day outreach efforts, all four groups these Ambassadors represented received an extra gift.

Of special note this year, was the especially strong student engagement with Giving Day. Fifteen student clubs and groups staffed tables in the Rubin Campus Center during both days of the event where they provided peer-to-peer education on Giving Day and encouraged philanthropic support to their many student groups. Their efforts resulted in 96 student groups receiving at least one philanthropic gift—up from 82 groups last year.

And new this year was the Pie-in-the-Face Challenge. Over a dozen WPI students, alumni, faculty, and staff are so enthusiastic about the university, they agreed to take a pie to the face for their philanthropic cause. Giving Day donors, who were able to cast a pie-in-the-face vote while making their Giving Day gift, gave the most votes to Associate Athletic Director Ann McCarron in support of the WPI American Cancer Society on Campus, Relay for Life. McCarron received her pie in the face—and an extra $600 for her cause—before an excited crowd during Homecoming Weekend.

If you missed the opportunity to join the excitement by supporting the university during Giving Day, please note that the Goat Nation Giving Challenge in support of WPI athletes and athletic teams will take place in February 2024. Philanthropy is a founding tenant of the university, and WPI would not be the robust, global, and critically relevant institution it is today without the generosity of our alumni, parents, and friends—including students, faculty, and staff. Support your alma mater as part of *Beyond These Towers: A Campaign for WPI* and do your part to help ensure the university continues to develop the world's leading innovators, researchers, and leaders.

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CHARLES (CHUCK) BURDICK '62

1957

Alvin Lanson writes, "The company I founded in 1970, Polytechnic Industries, has been acquired by a major manufacturer and provider of high-quality weapons support and ground support equipment for the U.S. Department of Defense (DOD) and over 50 international air forces. The affiliated company, Polytech Defense Spares, will remain in Mt. Laurel, N.J., and will continue to manufacture gears, small gun parts, fasteners, and other hard-to-find spare parts for the DOD. After over 53 years as managing director, my retirement commenced at the end of 2023."

1962

Charles (Chuck) Burdick was the grand marshal in the most recent Fourth of July parade in Duck, N.C. He has lived in Duck since 2001, having first visited in 1970. He has managed the town's U.S. Post Office for the last 20 years and served for 10 years on the town council.

1969

Anthony (Tony) Leketa, MS '77, writes, "As a member of the National Academy of Construction (NAC), I recently collaborated with **John McNeill,** WPI's Bernard M. Gordon Dean of Engineering, and **Carrick Eggleston,** department head of Civil, Environmental & Architectural Engineering, to conduct a symposium at WPI that assembled representatives of industry and regional academia to discuss the topic, "Introducing and Embedding Safety Culture Concepts in Undergraduate Education." It was one of five symposia conducted throughout the United States between August 2022 and February 2023, with the other four being held at the University of Kansas, New Jersey Institute of Technology, the University of Texas at Austin/Texas A&M University, and the University of Colorado at Boulder. The results of the five symposia were captured in a document, "Proceedings of the Symposia Series: Introducing and Embedding Safety Culture Concepts in Undergraduate Education," which was recently distributed to attendees and the Board on Infrastructure and the Constructed Environment (BICE) of the National Academy of Science, Engineering, and Medicine. What a great experience to be able to return to the WPI campus to not only work with McNeill and Eggleston, who gave freely of their time and energy to make the symposium a success, but to experience many of the changes to the university and its campus. For those who haven't been back to WPI in a while, things have changed dramatically—and for the better. I would encourage all alumni to take some time to return and experience all that has changed at WPI."

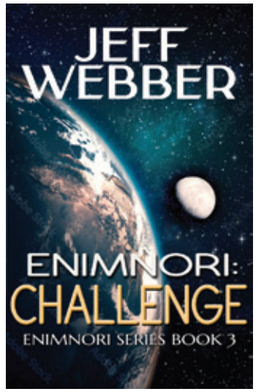
1971

Ron Zarrella, WPI trustee emeritus, won the 51st annual Opera House Cup regatta on his sailboat, *Alerion Sea Horse*. He has competed in this event since 2008. He writes, "We were maybe 500 yards from the finish line before we even thought about winning the overall. We were just looking at our competitors in the *Alerion* class. As we approached the finish line, we saw *Siren* coming down on us and if the race was 200 yards longer, they would have passed us. We just got in there, and the adrenaline rush is kind of unexplainable. Today was not a day for sissies. It was a war. It was really hard sailing, hard steering, but you win and it's worth it." The Opera House Cup, based in Nantucket, is one of the premier wooden boat races in the country.

1973

Bill Haddad writes, "I have retired from the federal government after working as a clinical psychologist for the Veterans Administration and Defense Intelligence Agency in Washington, D.C. I continue to work part-time for Optum Health, providing mental health services to Veterans of the Afghanistan and Iraq wars."

Jay Schnitzer has been named MITRE's corporate chief engineer, in addition to serving as senior vice president and chief medical officer for the company. In this role, he will help assure technical quality and mission impact across MITRE as well as supporting technical staff development. After joining MITRE in 2013, Jay served as the company's chief technology officer. He worked for more than 15 years as an attending pediatric surgeon and associate professor of surgery at Massachusetts General Hospital, Shriners Children's Hospital, and Harvard Medical School.



CARY PALULIS '68 WRITES, "DAVE HOPKINSON, BOB PLEINES, AND I—FRATERNITY BROTHERS OF PHI KAPPA THETA—HAD OUR ANNUAL FISHING TRIP ON MY BOAT TO CONGAMOND LAKES IN SOUTHWICK, MASS. WE CAUGHT SOME BEAUTIFUL RAINBOW TROUT AGAIN!"

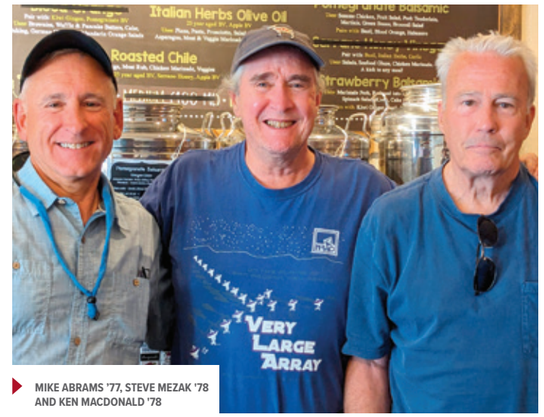
Rick Urjil was in a car accident in May 2023 and faces some major health challenges. His brother-in-law **Bill Cooper '67** reports Rick sustained a paralyzing spinal cord injury and is using a wheelchair. He is diligently working on rehabilitation and healing to overcome this life-altering injury. To learn more, visit https://helphopelive.org/campaign/22599/.

1975

Steven Sweeney writes, "I retired from the Department of Defense in 2018 after working for four decades on numerous engineering project teams for the Secretary of Defense, Acquisition, Technology, and Logistics; Agency Headquarters, and Service Programs of national strategic necessity. Now I am volunteering in the Silicon Valley community, tutoring part time, visiting with family, and enjoying our great outdoors, including climbing mountains. Since 2021, I've climbed Mount Rainier, Mount Baker, Mount Whitney, and Mount Shasta. The adventures continue. Excelsior!"

Jeff Webber writes, "The third book in my *Enimnori* series was published in August 2023. The series is the continuing story of an engineer from California who is accidentally transported to a medieval(ish) world where magic is real."

Stephen Wojciak, MSME '77, reports that he has retired after working 21 years at the GE Mechanical Drive & Naval Turbine and then 25 years at Leonardo DRS Power Technology. He is looking forward to spending time on his various hobbies, including stained glass, guitar, painting, and a '40 Ford coupe resto rod.



MIKE ABRAMS '77, STEVE MEZAK '78 AND KEN MACDONALD '78

1977

Mike Abrams writes, "Classmates **Steve Mezak '78** and **Ken MacDonald '78** came to visit me at my summer house in Ruidoso, N.M. We talked about old times, did a couple of hikes, and visited a winery and brewpub for some tastings. It was great catching up with them. Ken is a contractor at Kirtland Air Force Base in Albuquerque. Steve is retired and lives outside Reno. I am retired and split my time between Houston and Ruidoso when I am not traveling. I am still on WPI's Alumni

Association Board of Directors and the Trustees Subcommittee on Lifetime Engagement."

1978

Christopher James writes, "After an estimated 35-40 trips to China over 12 years to work with Chinese governmental officials on air quality, energy policy, and law, I am now (mostly) retired. My wife, Anne, and I are really enjoying traveling the U.S. in our Sprinter van, as well as spending lots of time in Europe for long cycling excursions. We recently completed a 700-km loop with five others around the Netherlands, and I joined my cycling club from Nice (where Anne and I spent the autumn of 2022) for two weeks of cycling in the Pyrenees, just days before the Tour de France passed through. This fall, we are making 'the big trip,' driving back to New England to visit with friends and family, and we hope to see some WPI friends there as well."

1979

Steve Rusckowski, a WPI trustee, has been appointed to the Board of Directors at Baxter International, a multinational healthcare company headquartered in Illinois. The company primarily focuses on products to treat kidney disease and other chronic and acute medical conditions. He most recently served as chairman, president, and chief executive officer of Quest Diagnostics. He currently serves as a director of Tenet Healthcare Corporation and Qiagen.

Joan Szkutak, a WPI trustee, owns SAMsARA Wines—a boutique winery in Santa Barbara that specializes in pinot noir, syrah, grenache, rosé, and chardonnay—with her husband, Dave. SAMsARA Wines has embraced sustainability, and Szkutak offered insights into the industry's efforts to reduce its carbon footprint. She says, "We went to lightweight bottles in 2023 because, for us, sustainability is incredibly important. We're a SIP (Sustainability in Practice) Certified winery, and so we recognize that the biggest impact on the carbon footprint is the weight of the bottles. Now these bottles are sourced in California, along with our grapes, which are sourced right here in Santa Barbara."

1980

Chartsiri Sophonpanich was featured in the line-up of distinguished speakers for the 21st Forbes Global CEO Conference, held in Singapore. Over 450 prominent business leaders from around the world were included in this prestigious event. Chartsiri is president of Bangkok Bank.

Martin Rowe is Senior Technical Editor at *EE World*, one of the WTWH family of publications along with *Design World*.

1982

Scott Harris joined the Board of Directors for the Discovery Museum in Acton, Mass. A mentor in residence at WPI, he was inducted into WPI's Hall of Luminaries in 2019, and was awarded the 2012 Robert H. Goddard Alumni Award for Outstanding Professional Achievement. He is also a member of the Technology Advisory Network at WPI. Scott co-founded SolidWorks Corp, a computer-aided design company, and Onshape Inc., which works in full cloud implementation of CAD.

SEVERAL MEMBERS OF WPI'S PHI GAMMA DELTA FRATERNITY CHAPTER—FROM LEFT, TOM MEDREK '78, DAVE MAKRIS '78, MIKE BEAUDOIN '78, TONY FERNANDES '78, STEVE GILREIN '80, AND RAYMOND DUNN '78—CIRCUMNAVIGATED THE GRAND TETONS OVER A FIVE-DAY PERIOD THAT INCLUDED BACK-COUNTRY CAMPING. THEY COVERED 30 MILES OF HIKING, REACHING 9,000 TO 10,500 FEET OF ELEVATION.

1984

Jason Macari's business, Phantom Farms Brewery, was featured in an article by *The Valley Breeze* in Rhode Island. The brewery had a soft opening in November and a full opening at the end of 2023. With a sit-down menu and full view of the brewing process for guests, it features various unique options, including fruited beers.

Laurie Ortolano has received the 2023 First Amendment Award from the Nackey S. Loeb School of Communications in Manchester, N.H. The honor is a recognition of Laurie's steadfast commitment to government transparency, which started with right-to-know requests while she was a member of the Litchfield School Board more than 20 years ago. Since then, an article in the *Nashua Patch* noted that Laurie has worked tirelessly to get access to public financial documents and development information.

1985

Paul Chodak was named executive vice president and chief operating officer at Eversouce Energy, where he has served

in various roles, including executive vice president of generation since 2019. The company announcement says Paul will now lead the electric transmission and distribution, gas, water, electric engineering and grid modernization, enterprise emergency preparedness, offshore wind project execution, operations services, and safety organizations as COO. He is also a veteran, having served 12 years in the U.S. Navy.

1986

Robert Kitchen reports that he has retired from Pfizer after a 33-year career in biopharmaceuticals. In his last role, he helped establish and lead the quality control testing labs for the COVID mRNA vaccine.

1987

Lisa Barton has been named CEO of Alliant Energy, a utility company serving Iowa and Wisconsin. She moves into this role after serving as president and COO of Alliant since February of 2023. Lisa began her role on Jan. 1, 2024.

1988

Larry LaFreniere, CEO and president of Electric Supply Center, an electric and light distributor based in New England, has announced a new partnership with one of Boston's most beloved sports franchises: the Boston Bruins. Electric Supply Center is now the team's official electrical supply distributor. In an announcement, Larry remarked, "As we join forces with the Boston Bruins, we're reminded of the parallels between our two worlds—high-level competitive stakes, excellence in all aspects of our work and the relentless pursuit of greatness. We're honored to be the driving force behind those who build, and now to be part of the foundation that helps propel the Boston Bruins to new heights."

1990

Tim Membrino has joined cancer detection firm Mercy BioAnalytics in Natick, Mass., as vice president for program and portfolio management. He previously led product development and operations at Quanterix Corporation as vice president for program and portfolio management. "I'm thrilled to join an executive team that embraces program and portfolio management best practices paired with robust clinical development efforts as we drive Mercy's test portfolio through the product realization life cycle," he writes.

Matt Ronn writes, "My wife, Alison, and I spent some vacation time with my former college roommate, **Dave Lavallee '89,** in Switzerland, where Dave and his wife, Lucy, have been living and working the past few years."

1993

Joshua "JP" Onffroy became the vice president of research and development at Johnson & Johnson, where he leads engineering, digital, and clinical teams in delivering robotic hardware and software in the area of endoluminal diagnosis and treatment of cancer and kidney stones. He says, "My WPI foundation continues to empower and embolden my career journey, underpinning a lifelong learning mindset that has encouraged my experience in both hardware and software engineering and has enabled me to cross the chasm from high-tech product development into the medical device space."

1996

Leila Carvajal Erker founded Cocoa Supply, a company that imports pasteurized cacao pulp from cacao farms in Ecuador and works with brewers to figure out its best use in the brewing process. She was interviewed in the *Bean to Barstool* podcast about her work.

1998

Jeevan Ramapriya was named executive director of the Massachusetts Office of International Trade and Investment (MOITI). MOITI plays a crucial role in positioning Massachusetts on the global stage, growing its economic competitiveness, and strengthening its relationships with international partners. "I am incredibly honored and thrilled to join the Healey-Driscoll Administration's Massachusetts Office of International Trade and Investment," he says. "I'm looking forward to creating jobs and leveraging my international network to further global opportunities throughout the Commonwealth as part of Team Massachusetts." He was previously a managing director in State Street's regulatory, industry, and government affairs department, where he was responsible for state government relations and public policy–related activities. Before entering public service, he worked as a technology and management consultant with Accenture, assisting in implementing customer relationship management solutions for Fortune 500 companies.

1999

Liz Beatty, co-founder and chief strategy officer at Inato, is working to combat underrepresentation in clinical trials, she tells *Outsourcing Pharma*. At Inato, a clinical trials platform, Liz focuses on the complex problems of ensuring that access to new and potentially life-saving treatment is equally available to and inclusive of all through clinical trials.

Steve Flannery was appointed senior vice president and general manager for Avery Dennison Materials Group EMENA. His role oversees the organization's short- and long-term business, financial, and operating objectives. He has worked for Avery Dennison for over 22 years in the fields of innovation, sales, marketing, and operations.

2000

Deepthi Bathina served as a panelist during the College of Healthcare Information Management Executive Fall Forum in November. Deepthi is the founder and CEO of RhythymX AI, a health company using generative AI to help doctors deliver hyper-personalized patient care. The panel, titled "Helpful or Hype? Emerging Applications of Generative AI in Healthcare," discussed how generative AI is

MATT RONN '90 AND DAVE LAVALLEE '89

rapidly changing the healthcare industry and the way we talk about health.

2002

Liz Hitchcock and WPI Trustee **Jeremy Hitchcock '04** celebrated the opening of their Manchester Distillery, in Manchester, N.H., last summer, according to the *NH Business Review*. The distillery produces premium, American-style gin and vodka, with plans to distill whiskey in the near future.

Anil Ranganath was appointed senior vice president, general counsel, and corporate secretary of TransMedics, a medical technology company that is transforming organ transplant therapy for patients with end-stage lung, heart, and liver failure. "It is a pleasure to have the opportunity to join TransMedics at such an exciting time for the company," he says. "I look forward to collaborating with the entire team to support a range of growth initiatives and strategies designed to provide industry leading technology, service, and clinical care to the transplant community."

2003

Gina Aquilano was a featured speaker at the Institute of Electrical and Electronics Engineers Women in Engineering Leadership Summit this past November. She is an analog devices fellow and senior technology director for the Automotive Electrification and Sustainable Energy Business Unit, where "she drives advanced technology development and system initiatives to support future growth and drive industry-level impact," according to the IEEE website.

Ryan McDevitt and **Matt Shea**'s company Benchmark Space Systems—which they founded in 2017 and for which they serve as chief executive officer and chief product officer, respectively—was recently profiled in *VTDigger* for its successful work in satellite propulsion systems. This summer, the company received $33 million in Series B funding and announced a nearly $3 million U.S. Air Force contract to test safer and more affordable satellite thrusters. Benchmark also expanded with a move into a 40,000 square-foot testing and manufacturing facility in Burlington, Vt.

2007

Sam Feller shared a post from his *Awkward Engineer* blog about his efforts to counter the habit-forming nature of smartphones and internet use. "Rather than blocking or limiting access to the internet, my idea is to modify websites/apps so that they are less rewarding, which will make it easier for me to control my usage to a more reasonable level."

Adam Young has served in the U.S. Marines since graduation from WPI. Rising through the ranks, he is currently a lieutenant colonel and most recently served as the operations officer and executive officer at 2nd Marines, where he was deployed to the southwest border in support of U.S. Border Patrol. He was selected to assume command of the 2nd Battalion, 2nd Marines in the spring of 2024. He has been awarded the Meritorious Service Medal, Navy and Marine Corps Commendation Medal with Combat "V," and the Combat Action Ribbon. He currently lives in North Carolina.

2008

Ryan Graves was featured in an article by the *Worcester Telegram & Gazette* about his time as a Navy pilot and his testimony in D.C. about his witness to unidentified aerial phenomena. "UAPs are in our airspace, but they are grossly underreported," he testified. "These sightings are not rare or isolated, they are routine. Military air crew and commercial pilots—trained observers whose lives depend on accurate identification—are frequently witnessing these phenomena." Ryan founded the nonprofit Americans for Safe Aerospace, a haven for UAP witnesses often afraid to come forward for fear of repercussions. He hosts a podcast that discusses the latest research on UAPs and has appeared in other podcasts to discuss his experiences.

2011

Funmi Ayobami joined the UMass Chan Medical School Morningside Graduate School of Biomedical Sciences (GSBS) in the role of associate dean for student success and

engagement. She leads GSBS initiatives in student advocacy, success, and retention, as well as communication, community building, and engagement through development of policy and academic programing. She has a decade of experience in research, education and mentoring, and development and implementation of student success programing at the undergraduate and graduate levels.

2012

Kyle Powers writes, "I hope all is well up on Tech Hill! I graduated from the Craft Brewer Apprenticeship program with American Brewers Guild (ABG) in November and am preparing to make a career transition from pharmaceutical manufacturing to the craft beer industry."

2015

Dave Coughlin, MBA, was a panelist at a GOLD (Graduates of the Last Decade)-sponsored discussion on formal vs. informal leadership, which took place in December 2023 at WPI's Seaport facility in Boston. Currently vice president of growth data science at Barton Associates, Dave is the author and architect of *Entry Level Escape*. He is an analytics executive with experience at large companies like CVS Health and PwC.

John Guerra, IMGD, released a game, *Cobalt Core*, on Steam in November 2023. John is the lead gameplay designer at Rocket Rat Games, a small independent studio. In addition to design, he's also involved with programming, production, and story writing. His prior game, *Sunshine Heavy Industries,* received an Independent Game Festival Honorable Mention for Excellence in Design in 2022.

Jesse Lehman reports he is now a PhD candidate at UMass Chan Medical School. He uses RNA sequencing approaches and quantitative analyses to determine how quickly mRNAs from different genes are produced and matured. "I came to graduate school to learn how to define and address my own complex biological questions," he says. "The qualifying exam process reinforced the importance of research autonomy and self-discipline. When I left the exam room, I felt validated in my scientific ability and ready to truly dive into my thesis work."

Zhuofan (Norberta) Lu appeared in an *EE World* profile about her work during her summer 2023 internship at Transaera, a Boston-area start-up developing more energy-efficient cooling systems. Noberta, who is currently working toward her MS in robotics engineering at WPI, credits her grandfather, who worked as a radar engineer for the Chinese Air Force, with piquing her interest in engineering. She is especially aware of the need for a diverse engineering workforce. "People with different backgrounds approach problem solving differently," she said in the article, "especially when it comes to user needs. Diversity in project teams broadens the team's perspective. Not only do you need different backgrounds, but you also need people with different skills to solve problems."

ZULEAN CRUZ-DIAZ '17

2017

Zulean Cruz-Diaz, management engineering, was featured in a speaker series as part of the inaugural *Business Week at WPI* in October 2023. Zulean reports that after graduating, she dove into the nonprofit world, and she has lived all over the country (including Hawai'i). Now in Texas, she's recently transitioned to leadership consulting. "My company, Z Conecta, is helping shape the next generation of leaders through communication and interpersonal skills as they make their transition into managerial roles," she writes.

2019

Miles Nallen was a panelist at a GOLD (Graduates of the Last Decade)–sponsored discussion on formal vs. informal leadership, which took place in December 2023 at WPI's Seaport facility in Boston. Miles is a strategic account manager at Tulip Interfaces, a frontline operations software company based in Somerville, Mass.

2022

Jeremy Trilling offered tours of his solar-powered innovation studio The ToolBus at the Craft & Creativity Showcase held in Manchester, N.H. in August 2023, according to an article in the *New Hampshire Business Review*. The ToolBus is a makeshift makerspace retrofitted in a school bus that houses 3D printers, laser-cutting tools, digital innovations, and much more.

David P. Norton ’62, Business Management Pioneer and WPI Luminary

David P. Norton, an emeritus trustee and one of the world’s leading authorities on strategic performance management, died Dec. 6, 2023, of complications from Parkinson’s disease. He was 82. With Robert Kaplan, Norton created the Balanced Scorecard, a strategic planning and management systems that is credited with improving the performance of businesses, government agencies, and nonprofits around the world. Designed to transform the way managers and executives develop an organization’s vision and strategy and measure its performance, the Balanced Scorecard was named in 1997 one of the most influential management ideas of the previous 75 years by the *Harvard Business Review*. In 2013, Norton and Kaplan were named to the Thinkers50 Hall of Fame, which honors “the leading business and management ideas of our age.”

In addition to a BS in electrical engineering from WPI, Norton received a master’s in operations research from Florida Institute of Technology, an MBA from Florida State University, and a doctorate in business from Harvard Business School. He was co-founder and director of several professional services firms focused on strategic management, including the Palladium Group. He also co-founded Nolan, Norton & Company, which was acquired by KPMG Peat Marwick. With Norton, he was the author of five books and eight *Harvard Business Review* articles on using the Balanced Scorecard. The books have sold more than a million copies and been translated into 23 languages.

Norton was a member of WPI’s Board of Trustees from 1990 to 2000. The university honored him with the Robert H. Goddard Alumni Award for Outstanding Professional Achievement, named him the 2012 Innovator of the Year, and inducted him as part of the inaugural class into the WPI Hall of Luminaries.

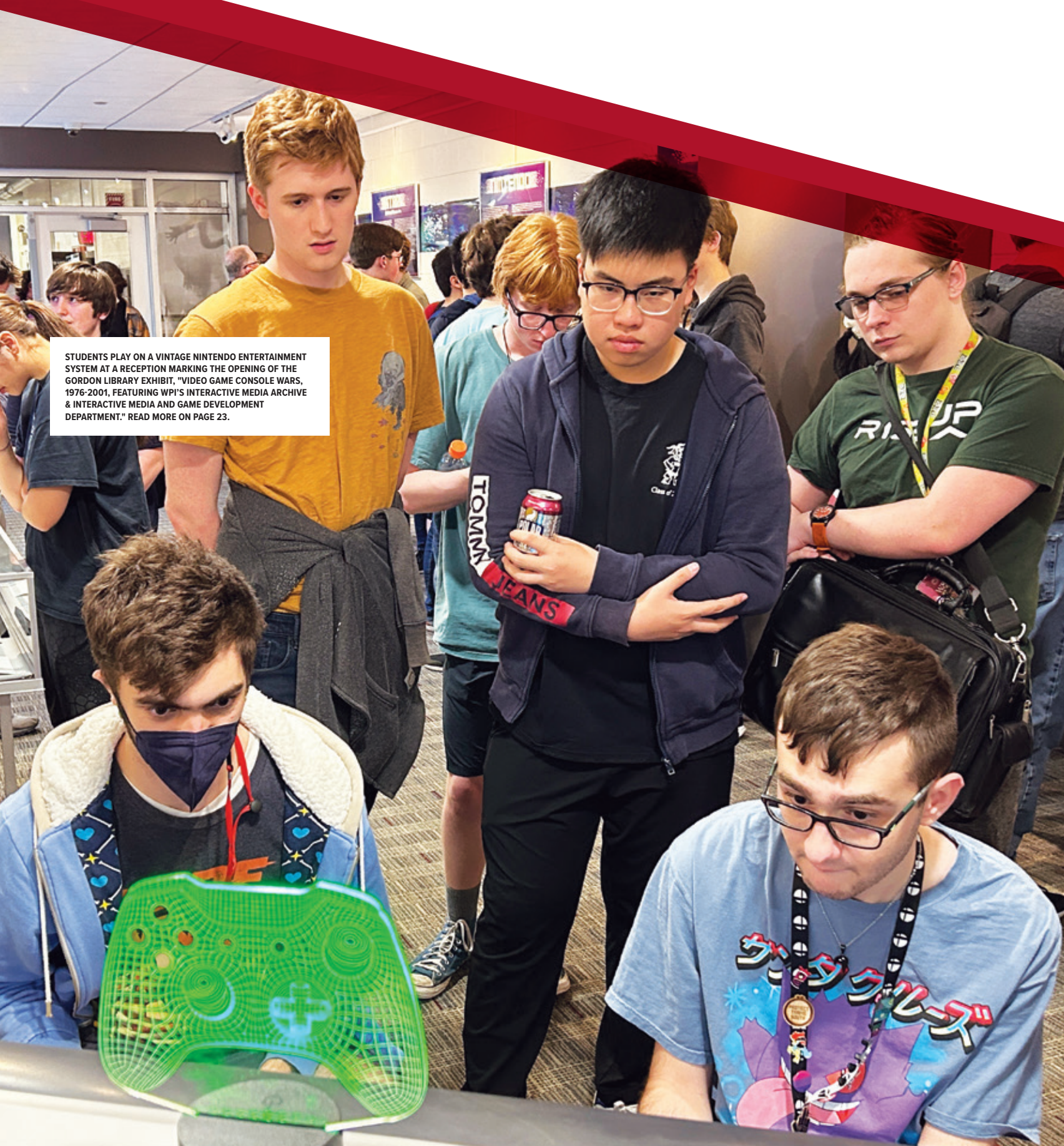
Norton leaves Melissa, his wife of 60 years, three daughters, nine grandchildren, two step-grandchildren, and three great-grandchildren.

—Michael Dorsey

William Julian ’49 CE, PHI KAPPA THETA, Midlothian, Va.
Richard Goldman ’55 EE, ALPHA EPSILON PI, Mountain View, Calif.
Birino D'Ambrosio, ’58 MS, PhD CHE, Wilmington, Del.
Gordon Sigman ’59 ME, PHI SIGMA KAPPA, Port St. Lucie, Fla.
Donald Sieurin ’60 SIM, South Yarmouth, Mass.
Bruce Willbrant ’60 CE, SIGMA PHI EPSILON, Audubon, Pa.
Thomas Pantages ’61 PH, SIGMA PHI EPSILON, Marlborough, Mass.
Robert Cunningham ’62, MNS, Medford, Mass.
Victor Dufault ’62 CE, Groton, Conn.
Stanley Szymanski ’64 CHE, PHI KAPPA THETA, Youngstown, N.Y.
W. Zisch ’64 EE, Chelmsford, Mass.
James Pierce ’65 CH, East Sandwich, Mass.
George Wing '68 MS NS, Marlborough, Mass.
Mildred Marengo ’70 MNS, Chicopee, Mass.
Frances Dupont ’72 MS NS, Auburn, Mass.
Royce Brainard ’73 EE, South Windsor, Conn.
Donald Salerno ’73 CHE, THETA CHI, Sutton, Mass.
Thomas Savage ’73 CHE, SIGMA ALPHA EPSILON, Evergreen, Colo.
Andrew Wemple ’74 MA, ALPHA CHI RHO, Southbridge, Mass.
Carl Harris ’75 SIM, Rutland, Mass.
James McKeown ’79 SIM, Centennial, Colo.
Robert Hawkins ’81 EE, Bacliff, Texas
Michael O'Brien ’84 CHE, SIGMA PI, Holyoke, Mass.
Christopher Stakutis ’84 CS, East Walpole, Mass.
William Metevia ’86 MS MG, Westminster, Mass.
James Daley ’89 ME, Boston, Mass.
Michael Madara ’89 CHE, ZETA PSI, West Lawn, Pa.
Quentin Rissler ’92 CE, Denver, Pa.
Donald McNamara ’98 CS, Brookline, Mass.
Caitlin Kuhlman ’17 MS, PhD CS, Boston, Mass.

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



STUDENTS PLAY ON A VINTAGE NINTENDO ENTERTAINMENT SYSTEM AT A RECEPTION MARKING THE OPENING OF THE GORDON LIBRARY EXHIBIT, "VIDEO GAME CONSOLE WARS, 1976-2001, FEATURING WPI'S INTERACTIVE MEDIA ARCHIVE & INTERACTIVE MEDIA AND GAME DEVELOPMENT DEPARTMENT." READ MORE ON PAGE 23.