WPI JOURNAL
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PHASE CHANGE

FRANK ADDESSIO '68

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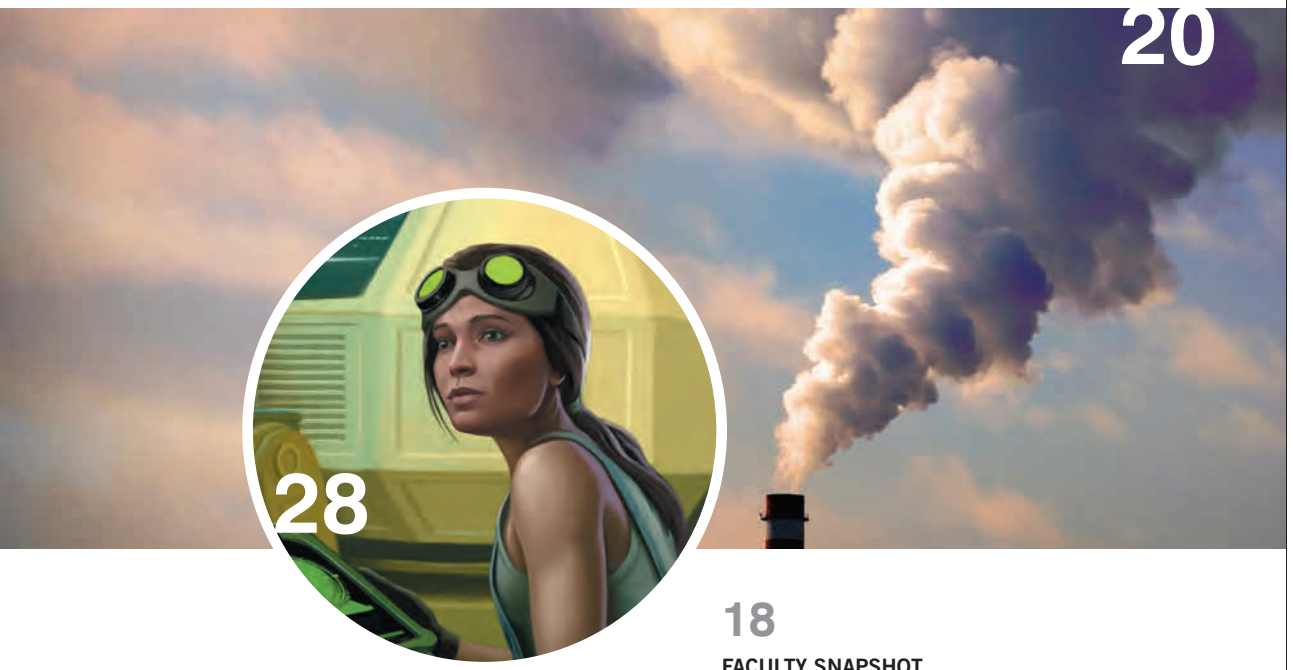

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gompei's gears

—*This free bike share program for the WPI community stations some of its vehicles outside Salisbury Labs; its other locations are the Quadrangle, Faraday Hall, and Gateway Park.*


SGA GSG
GOMPEI'S GEARS

[LETTERS TO *the editor*]

BELIEVE IN YOURSELF

One of the primary lessons I learned at Worcester Tech was determination, and building confidence in myself.

As a student, I had average grades, yet a true feeling of success when each semester ended.

In fact, the venerable Prof. Walter Kistler flunked me my junior year in Thermodynamics. I re-took Thermodynamics in the Civil Engineering Department the following semester and got an A.

Shortly after graduation I was called up to duty in the Army, and ended up as a platoon leader in Vietnam. I was assigned to a Combat Engineer Battalion with the American Infantry Division in Chu Lai.

ROTC didn't quite prepare me for doing mine sweeps. However, I told myself "if I can survive Walter Kistler, I can survive the Viet Cong."

When I was 38 years old, I was diagnosed with (neurofibromatosis) head tumors and had them surgically removed. I went deaf in one ear and blind in one eye.

I was in upper management in a manufacturing company, and it didn't take long for me to realize that my corporate career was over.

After discussing my predicament with my father (Robert G. Green, originally in the Class of '43, but he was a Navy pilot in the South Pacific in WWII, so he didn't graduate until 1948. My grandfather, Arthur Green, was Class of '18), I decided to start my own industrial sales agency. I told myself, "I can do this."

I just retired after 30 successful years in my business, and have educated two children, and I now have five grandchildren.

I am just an average alum who got his start at Worcester Tech by learning one of life's great lessons, which is believe in yourself.

—Bruce Green '69

MENTOR

I was so pleased to see my late husband Bernie Brown, Fr. Pete Scanlon, and John van Alstyne honored as "Mentors to Women" in the *WPI Journal*. Each of these men was sensitive to the needs of all the students and endeavored to make campus life comfortable and meaningful. The comments captured their personalities and efforts beautifully.

Thank you to all those who conceived of and designed this special tribute.

—Gayle Brown

RELAXED MODE

My WPI training gave me a satisfying career in new product development, entailing invention and management. I have many memories: watching Prof. Masius spinning on a turntable, forging steel links, making a transit survey, and working in the foundry, pattern shop, and machine shop. And doing calculations with the Log Log Duplex Decitrig, or log tables.

I am now living in relaxed mode in a senior residence, with funding indirectly provided by WPI. I give thanks for that.

—Dwight E. Harris '44

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

EDITOR DOREEN MANNING HANGS OUT BEHIND THE SCENES IN THE ROBOT PIT DURING BATTLECRY@WPI, AN ANNUAL COMPETITIVE ROBOTICS EVENT THAT BEGAN IN 2000; IT NOW HOSTS MORE THAN 60 PARTICIPATING TEAMS.

PRESIDENT LAURIE LESHIN TALKS WITH ANDREW TRAPP, ASSOCIATE PROFESSOR, FOISIE BUSINESS SCHOOL

PHOTO: JACLEEN LEMAY

LL Andy Trapp, it's great to be with you. You're in our business school, affiliated with our data science program, and working on projects using science and technology to assist in real human need. You're working on a really exciting project around refugee placement. Tell us about it.

AT Sure. This started several years ago. I started working with a fellow in the refugee space, Mike Mitchell, at HIAS—a refugee resettlement agency—and I started adding collaborators such as a professor at Oxford University, and we looked at this problem of how do you place refugees well? Presently, it's a manual process, which is a whiteboard and people sitting in a room every week. Operationally, they need to place the refugees that they receive through the United Nations High Commissioner for Refugees and the U.S. State Department. So these are already approved refugees. Where should they go throughout the country?

LL And you all were able to produce software that really optimizes that placement process, and makes it better and faster.

AT That's right. It's taken much of the labor and the manual decision making out of it, but not completely. And that's an important yet subtle point.

LL To keep the humans in the loop.

AT You need the humans in the loop, because if you don't have that, you can end up with recommendations that might not make sense. We can only approximately model the situation. But it's really helped the decision maker to make better decisions.

LL I can imagine a lot of other kinds of applications for this approach, to optimize decision making in placement. You all are working on a lot of other things that are also associated with this way of doing things. Tell us about that.

AT Another project is matching our sophomore students to international project centers—we have roughly 50 project centers throughout the world.

LL A thousand students a year, now.

AT A thousand students that need matching. And we really need to understand … what do the students want? What are their preferences? Where would they like to go, or not go? So we have these different tiers: very interested, interested, and not interested.

LL And it used to be a manual process to place the students, and not very effective because we'd end up with so many students on wait lists. So this year was our first time deploying this new software.

AT Yes. Each student gets to recommend where they'd like to go. Also, project center directors have criteria they're looking for, and so we're matching in a way that honors the student's preference and also according to their fit. Amazingly, we were able to achieve one hundred percent placement in terms of students going to "very interested in" project centers.

LL And this year you really did manage to do it and it was great.

AT It's really a team effort.

LL So, speaking of team, you have students working on these various projects with you. Tell us about the students you find and how they work across these disciplinary boundaries.

AT It's fascinating, being affiliated with the Data Science program at WPI, which includes statistics, business, and computer science. We really need these different skill sets and WPI is naturally aligned to understand technology in these different areas. So as we're putting them together, I've found students with mathematical backgrounds or computer science or business—or all three. And it's a joy to work with these students and plug them into problems. There's no shortage of students that have a real passion to work on humanitarian and social challenges.

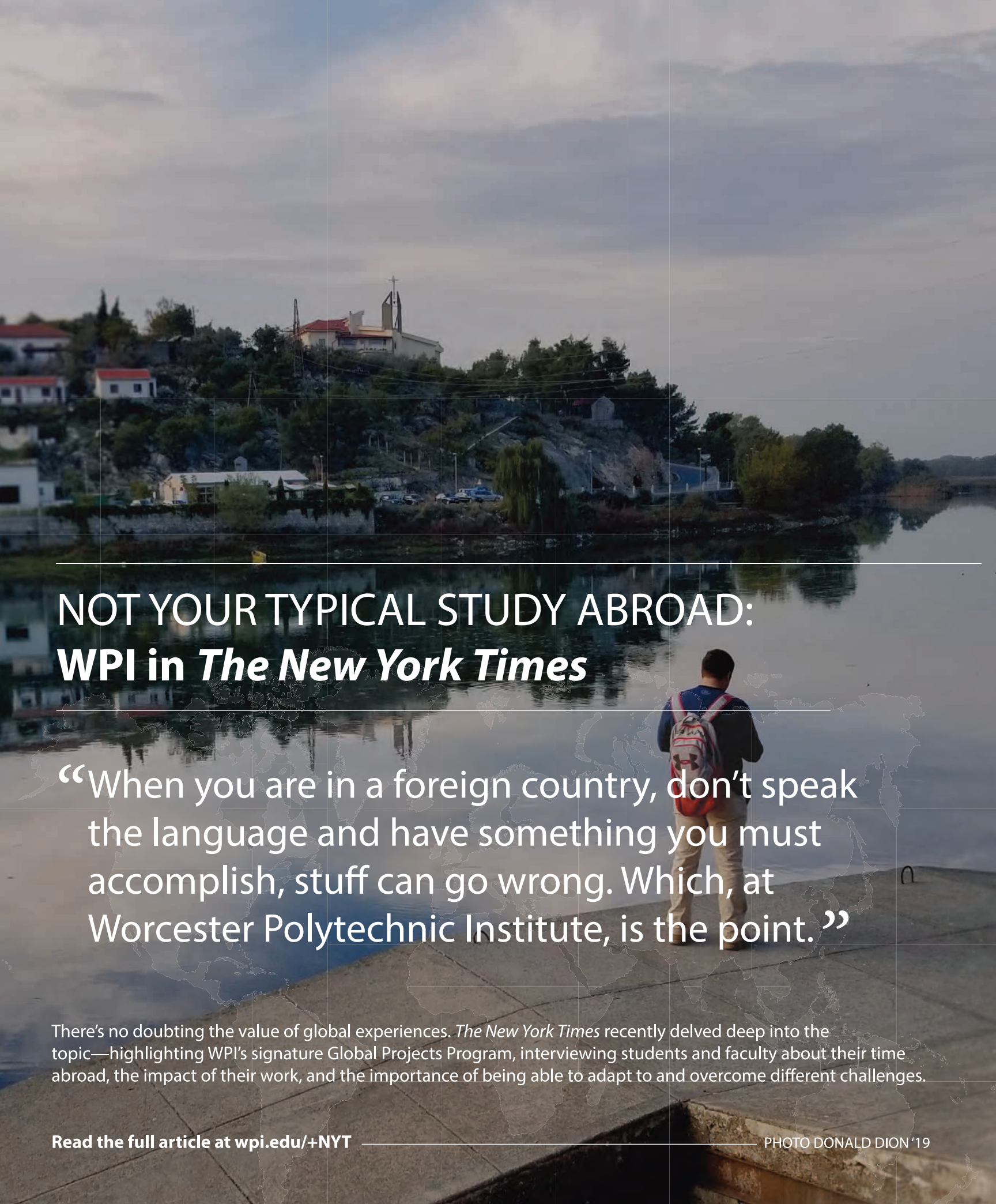
LL Well, that's the great thing, right? We all think of it as being this super-high tech program in data science and industry out there gobbling up our graduates as fast as we can produce them. But there's so many human problems that data science can be applied toward.

AT Absolutely.

LL And it's just great to see that work happening here at WPI. Professor Trapp, thank you so much.

AT Thank you.

See video of interview in its entirety at wpi.edu/news/wpijournal.



NOT YOUR TYPICAL STUDY ABROAD: **WPI in *The New York Times***

> "When you are in a foreign country, don't speak the language and have something you must accomplish, stuff can go wrong. Which, at Worcester Polytechnic Institute, is the point."

There's no doubting the value of global experiences. *The New York Times* recently delved deep into the topic—highlighting WPI's signature Global Projects Program, interviewing students and faculty about their time abroad, the impact of their work, and the importance of being able to adapt to and overcome different challenges.

Read the full article at wpi.edu/+NYT

PHOTO DONALD DION '19

ILLUSTRATION JON REINFURT

The latest expansion of WPI's Global Projects Program opened this past fall in Reykjavik, Iceland, and from what center director Aaron Sakulich has to say, there's no lack of interest from the WPI community in visiting the newest project locale.

"We were initially going to send just one team [last August], but there ended up being around 80 students on the wait list, so I thought, 'Let's put together three projects so we can send 12 instead,'" he says with a laugh.

Sakulich says he had thought about Iceland's potential for a project center location during past visits, but never considered it to be a real possibility. "When it comes right down to it, though," he says, "the Global Projects Program is an important thing that makes WPI distinctive. It's the centerpiece of our educational system, and we've gotten a tremendous response from both students and faculty who want to go to Iceland. Why not take a swing at it?"

Because the teams were going into Iceland without any professional connections to speak of, their projects took on a bit of a different form when it came to sponsorships. Instead of a local sponsor, professors Ingrid Shockey and Stephen McCauley filled the role, giving students the chance to work on projects that involved collecting data from a range of locations for future compilation and comparison.

Shockey's team cataloged reactions, stories, and lessons learned in regard to climate change over time, while McCauley's worked to develop and implement solutions to monitor microplastic pollution on the Icelandic shores. Teaching professor Melissa Belz served as advisor for both teams.

"The project definitely taught us how to improvise and make decisions on the fly," says microplastics team member Cecilia Schroeder '20, citing the fact that a particularly important component of their project didn't end up working at first. "It was a blow to our confidence," she continues, "but once we figured out a solution, it was smooth sailing. Any issues we encountered after that were relatively easy to fix because of this experience, and it was easier to stay composed while we were working on solutions."

The third team's project, sponsored by Sakulich himself, actually involved connecting with potential sponsors—ranging from tourism companies and the city's municipal bus system to museums and nonprofit organizations—and gauging interest in future partnerships.

"As a team, we had to refine our research, outreach, and presentation skills to encourage organizations to meet with us," explains Alissa Ostapenko '20, who says the experience will prove invaluable in her future career, especially when it comes to interacting with clients and business leaders.

"To tell people about the goal of the IQP and WPI's project-based learning, and then see them light up with all of these ideas that students could work on, it was a great feeling," adds team member Jacob DuPuis '20.

The team's work proved successful: when the newest group of students arrives in Reykjavík later this year, Sakulich says that there are six confirmed sponsors waiting for them, all stemming from this project—they actually ended up having to turn some sponsors away due to the overwhelming interest.

Although the IGSD team worked tirelessly to ensure that the students and faculty members would be as prepared as possible for their seven weeks in Iceland, there was still a bit of a learning curve to work around.

"There were a lot of little things about the culture and daily life in Iceland that we just had to figure out as we went," says DuPuis. "It was challenging at times, but a welcome challenge. We were able to take our own experiences and provide a lot of helpful information for students in the future."

While much of their time was spent working on their projects, the students also took advantage of the stunning natural beauty of Iceland, ranging from whale watches and hikes to concerts and, the pièce de résistance, the Northern Lights, a unanimous highlight for all.

"I dragged my IQP partners out of bed to walk to the lighthouse to see them," Schroeder says. "We watched for a little while and were about to head home when the lights really started dancing … it's so difficult to describe, but it was absolutely incredible. And I think it's safe to say that my IQP partners were fine with me dragging them out of bed after that."

—*Allison Racicot*

$25 MILLION AWARD WILL HELP KEEP THE ARMY ROLLING —*Michael Dorsey*

Most do-it-yourselfers know it's usually cheaper to repair something than to replace it. But the U.S. Army believes the ability to fix critical equipment in the field can also be a matter of life and death.

"If you're on a mission and need to move quickly to a safer place and a critical part on your vehicle breaks, you're stuck unless you can repair it quickly," says materials science professor Danielle Cote, principal investigator on a major award from the Army that supports advanced research on a promising repair technique.

Funded at $25 million over three years, the award allows WPI to build on its distinctive expertise in cold spray—powdered metal mixed with a gas-like helium accelerated to near supersonic speeds. The energy of impact causes the powders to adhere to substrate, often a damaged part. With the technique, layers of metal can be built up to replace sections of broken parts or even to make parts from scratch using a process known as additive manufacturing. The grant adds to the nearly $30 million from the Army that has funded work led by WPI on cold spray, powder development, and computational tools for the design of new materials at the nanoscale.

"Our modeling and computational experience really sets WPI apart in this field," Cote says. "With this new project, we will be applying that expertise to the development and testing of new types of powders specifically designed to make cold spray more effective and practical for use in field applications."

The grant will help outfit WPI's research team with state-of-the-art analytical equipment, including a scanning electron microscope and a laser powder diffractometer, and nanoindenters (tools to measure the mechanical properties at the nanoscale), which will find a home in an advanced manufacturing center now in development.

QUOTABLE

"Are we alone in the universe?

Is there a more profound question that we as scientists can ask?"

—President Laurie Leshin, a former NASA official, speaking at the John F. Kennedy Presidential Library and Museum, during a 50th anniversary celebration of the first moon landing. The daylong summit brought together astronauts and academics for a discussion of how space exploration has benefited other fields, such as environmentalism and the search for extraterrestrial life.

[CLASS*notes*]

From adventures to staycations, promotions to retirements...

your classmates want to know what you're up to!

CLASSNOTES@WPI.EDU

Q&A with Ron Bashista
Director of Emergency Management

Ron Bashista assists in protecting the WPI community as director of emergency management, a position created to advance the university's strategic approach to safety and security. On the job since last December, he focuses on emergency planning for large planned events, such as Commencement and TouchTomorrow, and enhancing preparedness for unexpected incidents, which could include blizzards, power outages, and threats of violence.

He previously served for nine years as director of Emergency Planning and manager of the Emergency Operations Center for the City of Boston, where special events can attract millions of visitors. He's coordinated emergency operations in good times and bad—including multiple World Series and Super Bowl celebrations, as well as hurricanes and major power outages. He helped bring stability and order to the city in the wake of the Boston Marathon bombings, and was dispatched to New York City to help with recovery after Hurricane Sandy. A retired U.S. Army lieutenant colonel, he served three combat tours as a tank officer in the Persian Gulf.

Are your concerns at WPI different from your previous posts in the military and homeland security?

Honestly, as a professional soldier, the college environment is far more familiar to me than the City of Boston ever was. As a commissioned officer in the United States Army, I was entrusted with the care and well-being of this nation's greatest treasure—[its] daughters and sons. The military is expected to take care (mind, body, and soul) of these exceptional young people who volunteer to serve. Many are away from home for the first time, and we've got to feed them, house them, look out for their well-being, and facilitate their maturation. Sounds a lot like the college experience, doesn't it? The expectations of our students' families make emergency preparedness at WPI a far more personal endeavor than in a large metropolitan area.

In 20 years as a professional soldier, my overarching mindset was "mission first, people always." Now, safety is the mission. With WPI's very active, open campus, located on the outer belt of a growing urban area, protection of the WPI community requires close cooperation and routine engagement with the larger Worcester community—particularly the critical life support and life safety sectors.

What's been most surprising about your first half year on the job?

I'd like to say I've seen enough in the last 30 years that nothing can surprise me anymore. (But doing so might jinx me—sort of like saying "Fire up the Duck Boats!" before Game 7 with the Sox in a tied World Series.) I'll just say that there's been nothing particularly surprising thus far. People who plan are rarely surprised. Planning brings together experienced individuals with diverse skill sets to examine complex situations, anticipate what could go wrong, and develop an array of feasible, supportable, and effective solutions. I've had opportunities to do this with numerous WPI departments, including WPI Police, Facilities, Residential Services, Dean of Students Office, Marketing, and Health Services. The institutional knowledge and subject matter expertise resident at WPI is truly remarkable; rarely have I encountered an organization as singularly well-postured for any contingency planning as WPI.

Are there lessons you bring from being on the scene after the Boston Marathon bombings, for example, or in New York City after Superstorm Sandy, that have changed how you approach preparedness and response?

First, never think "Nothing like that could ever happen here." Pretty much anything unfortunate you see on the news occurring elsewhere in the country or the world can happen here; bad things happen to good people everywhere. Comfort comes from preparedness, not denial. Next, as my father used to tell me, "Never put off until tomorrow, what you can do today; you never know what tomorrow will bring." Recognize vulnerabilities and fix them now. Finally, be aware of your surroundings and translate that awareness into appropriate actions. Watch the weather, watch the news, be familiar with emergency protocols, sign up for and monitor emergency alert services from local authorities. Above all, stay calm and leverage common sense.

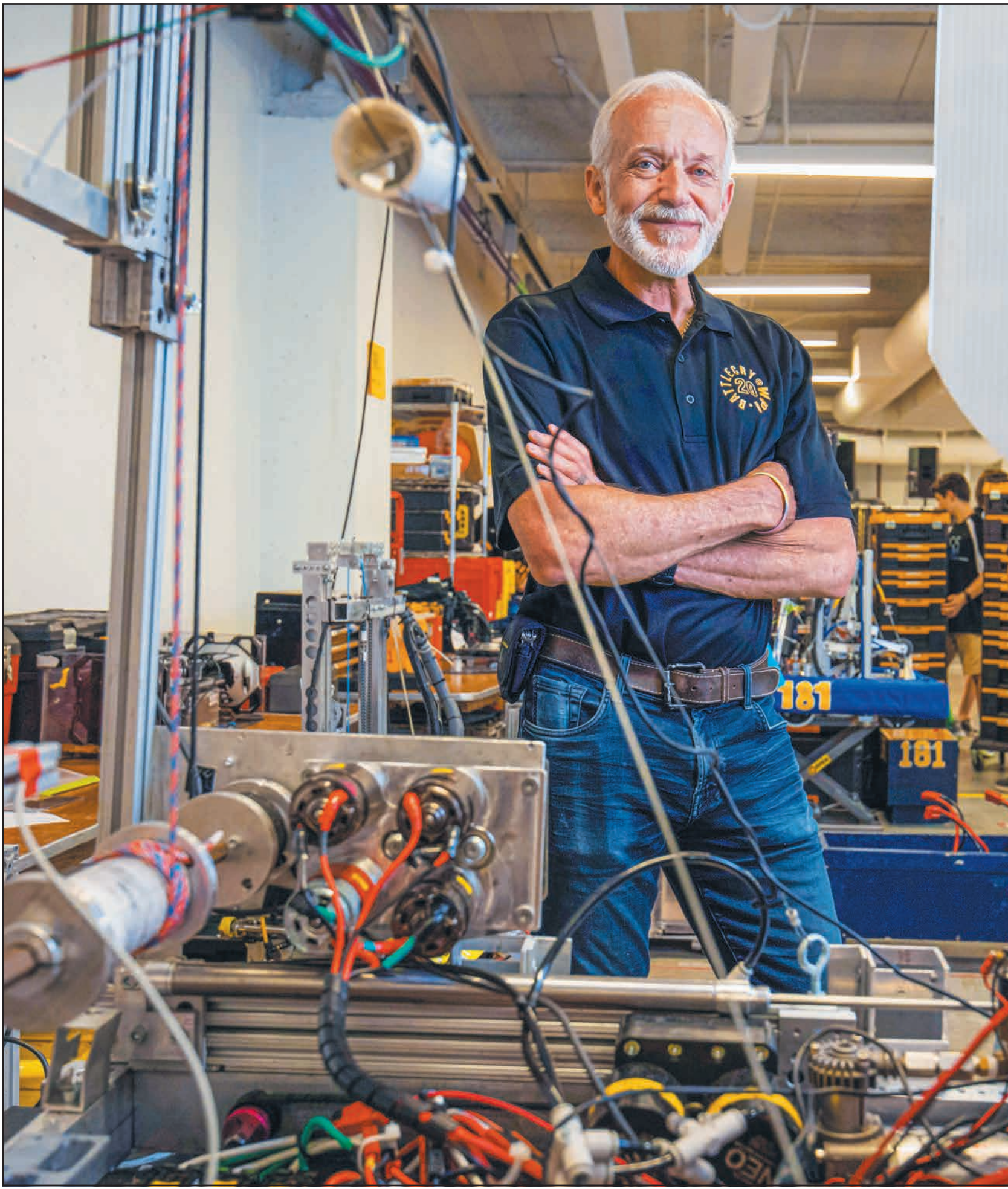

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PHOTO DAN VALLENCOURT

A PERPETUAL MOTION MACHINE WINDS DOWN

—Michael Dorsey

In 1997 associate provost Bill Durgin asked Ken Stafford to consider joining the faculty after wrapping up a highly successful three-year term as commander of the Air Force ROTC Detachment at WPI and a remarkable 24-year Air Force career. Durgin was impressed with Stafford's experience, enthusiasm, and boundless energy. The proposed job had a title, Director of Academic Initiatives, but Durgin made it clear that Stafford (now retired from full-time teaching and advising) could fill in the details to suit his interests.

Stafford's Air Force years gave a hint at the professionalism he'd bring to the task. After earning a BS in mechanical engineering at Oregon State and an MS in aeronautical engineering as the top graduate in his class at the Air Force Institute of Technology, he spent three years as an Air Force plant representative at Boeing, helping oversee 12 DoD programs, and served as a navigator and instructor navigator on various versions of the C-130 aircraft, including a model built to pluck film capsules ejected by Corona spy satellites out of thin air.

His initial focus at WPI was a roster of student engineering competitions, but robotics soon became his central passion as he took charge of the FIRST robotics team at the Massachusetts Academy of Math and Science at WPI. Stafford led Team 190 (one of the earliest teams to join the national STEM program launched by Dean Kamen '73) to regional and national competitions (including a win at the 2007 FIRST Championship). He helped launch the New England regional FIRST competition held at WPI, as well as BattleCry@WPI, considered the nation's best off-season FIRST competition. He also co-developed the Robot Sample Return Challenge, the first NASA Centennial Challenge held at a university.

WPI's success with robotics competitions played a key role in its decision to launch the nation's first bachelor's degree program in robotics engineering in 2007 (it offers BS, MS, and PhD degrees today). Stafford embraced the new program, developing and teaching courses, advising dozens of MQPs, and serving as advisor to hundreds of majors. His work on and off campus (including pivotal contributions to the FIRST organization and his evangelism for STEM careers at schools around the region) led to his promotion to full teaching professor and won him two WPI Board of Trustees' Awards: the Denise Nicoletti Award for Service to Community in 2010 and the Outstanding Teaching Award in 2019. In the citation for the teaching award, a student described Stafford as "the single most enthusiastic and energetic member of the teaching staff at WPI." He might have added that he also stands as among the most accomplished and impossible to replace.

CONNECTING WITH CARE — *Joan Killough-Miller*

People coping with problems such as addiction or homelessness need a streamlined way to sift through a confusing array of services. Stigma Free Worcester, a smartphone app developed by WPI students, directs them to relevant options and contact information, without stigma or judgement.

In April, the City of Worcester formally launched the program at a press conference. The students' work was lauded by the mayor and city manager, as well as commissioner of Health and Human Services Matilde Castiel, who worked directly with two WPI student teams on IQPs (Interactive Qualifying Projects) sponsored by her department. The first project, "A Mobile Application for Locating Treatment and Support," identified services and developed a functional, user-friendly application. The team's deliverables also included an update manager to allow the city's Technology Department to add and edit listings.

A follow-up project, "Public Health Campaign for Stigma Free Worcester," designed a step-by-step marketing methodology to help vulnerable populations—and those who serve them—find and use the free app. Stigma Free Worcester is available at App Store and Google Play, in English, Spanish, and Albanian.

Adjunct teaching professor Tom Balistrieri, project advisor, says, "Our students quickly grasped that this was much more than a technology-based project. They established meaningful relationships with people living on the street as well as human services professionals. The creative and functional features of the app, as well as the name they decided upon, 'Stigma Free Worcester,' indicate the depth of their empathy and understanding of the needs of the people this app serves. I'm very proud of them."

TRACKING GMOS FOR BIOSECURITY — *Sharon Gaudin*

If a genetically or synthetically engineered organism is released into the environment, how will we know? How can we tell it apart from the millions of microorganisms that exist naturally in the wild?

Eric Young, assistant professor of chemical engineering, is helping create a biosecurity tool that will be able to detect if an engineered organism has been released beyond the lab and into the environment. Part of a multi-institution research team, he will determine which genetically engineered organisms will most likely need identifying, and then pinpoint the genetic signatures for each. By virtue of the way they are produced, the majority of genetically engineered organisms have one or more short sections of DNA that are unique to their genomes and make them different from their non-engineered cousins. These signatures are their calling cards.

The knowledge Young is generating will ultimately be incorporated into a benchtop detection device that will be developed by other members of the research team.

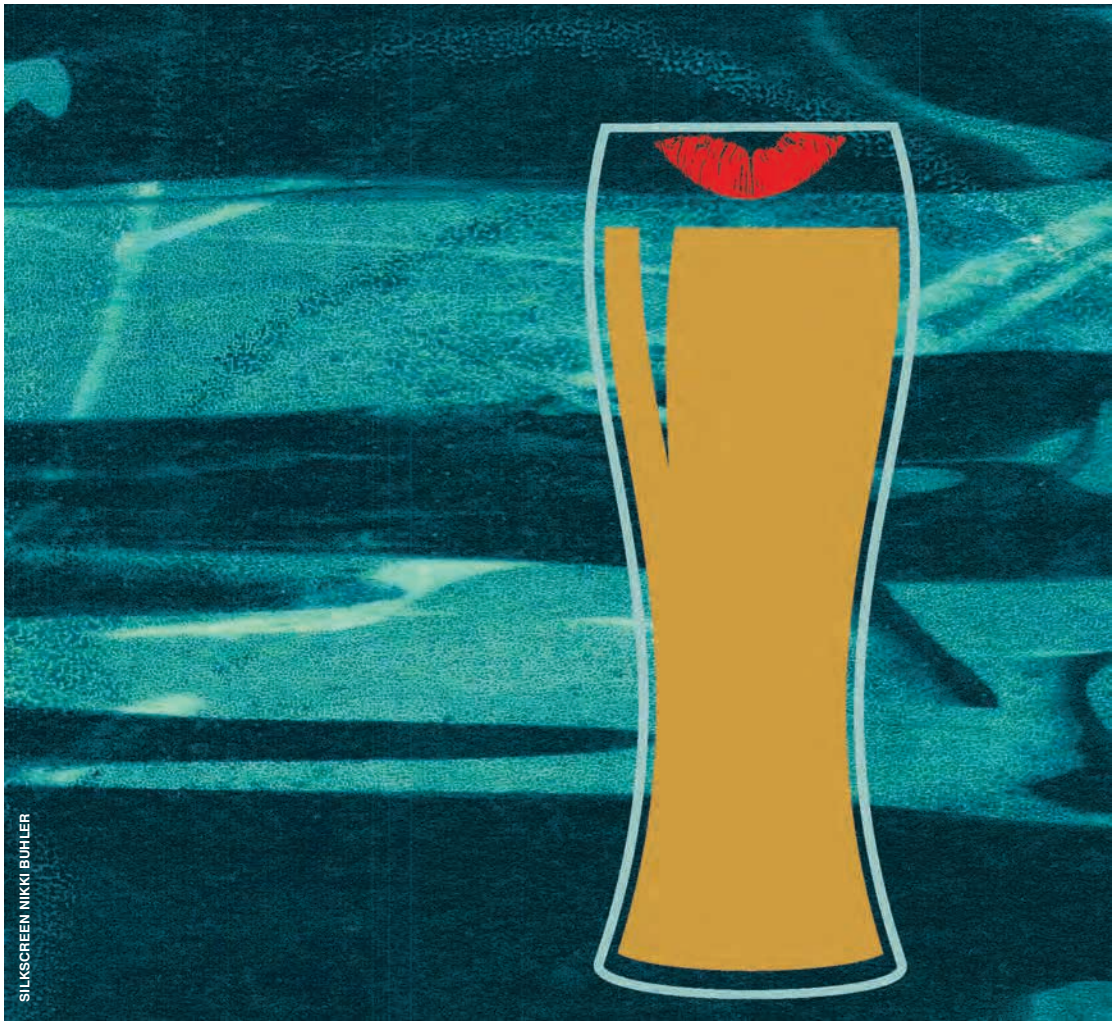
The project is funded by an 18-month award from the Finding Engineering-Linked Indicators (FELIX) program, which is run through Intelligence Advanced Research Projects Activity (IARPA), an organization within the Office of the Director of National Intelligence that funds research to address challenges facing the U.S. intelligence community. The award has a second phase that could be renewed for an additional 24 months. Massachusetts-based defense contractor Raytheon is the primary contractor; Young, who has received a $377,746 award for his part of the project, is one of five subcontractors.

"Hopefully, this project will lead us to a low-cost tool that we can use to make sure everyone is working to prevent the release of organisms into the environment," says Young, "from universities to manufacturing plants to DIY bioenthusiasts in their garages."

PROGRAMS ADDING UP IN DATA SCIENCE

Following the success of its master's and PhD programs in data science, this fall WPI will roll out a bachelor's program, making it one of the few schools in the nation to offer all three degrees in the field.

The programs, which draw on WPI's faculty expertise in business, computer science, and mathematical sciences, is designed to meet a growing demand for highly trained scientists with transdisciplinary technical and scientific expertise who can solve problems at the cutting edge of big data analytics for corporations, government laboratories, and universities.



SILKSCREEN NIKKI BUHLER

DANGEROUS MISCONCEPTIONS —*Jessica Messier*

Imagine walking into a bar, ordering your favorite beer. As you sit, eyes are on you, eyes that belong to other bar-goers. You finish that beer, order another.

You take a sip, see one guy elbow his buddy. He looks at you, leans into his friend and says, "Check her out. Bet she'd be an animal in bed."

Sound over-dramatized? Actually, science shows this is more truth than fiction.

A study conducted by Jeanine Skorinko, professor of social science and policy studies, shows that women who drink alcohol in social settings are viewed as more animalistic—or dehumanized—by men and women alike. Skorinko's research shows that women who drink alcohol are stigmatized as less human due to pre-existing stereotypes that alcohol and sexual promiscuity go hand-in-hand, and that women who drink socially like this are thought to be more sexually available.

The study also sheds light on how false perceptions of women and alcohol can lead to risky, aggressive sexual interactions. Plus, people may be less likely to help drinking women who are in these risky situations—if people believe that potential female victims are interested in risky or casual sexual behaviors, they may not perceive the situation to be a threat to the woman and may be less likely to intervene if she is sexually victimized.

"This research allows us to better understand how women who drink alcohol are perceived," Skorinko says. "By having this deeper understanding, hopefully we can start to increase awareness of these issues and reduce the victimization of women—whether they are drinking or not."

ANOTHER RECORD YEAR FOR WPI INVENTORS

— *Paula Owen*

There was a lot to celebrate at the fourth annual meeting of WPI's chapter of the National Academy of Inventors (NAI) in May. The event took place in the Foisie Innovation Studio—the front door to innovation at WPI.

117 students (33 percent women) are eligible to become honorary NAI members, twice as many as last year's record number.

A record **62** invention disclosures were filed; 2 patents were licensed.

5 faculty members were inducted into the WPI chapter of NAI.

Keynote speaker for the event was Brian Hanlon '90, director of the Office of Patent Legal Administration in the U.S. Patent and Trademark Office. He stressed that the impact of patents goes beyond the recipient. "They help fuel the U.S. economy and world economy. With a patent contract, you and the government share your innovation and, in return, the government gives you a certain number of years of protection. It keeps the cycle of innovation moving." But it doesn't end there.

"Patents create a ripple effect and provide a catalyst for prosperity and job creation, and inventors—and the protection they are offered—fuel critical growth of the economy and the U.S. itself."

Check out the full Herd *story at wpi.edu/+patents*

GO(A)T CHEESE? — *Allison Racicot*

IN CLASSIC WPI FASHION, IT ALL STARTED WITH A PROJECT.

Gompei's Goat Cheese began as an MQP back in 2012, and has evolved over the years into a full-fledged dairy dream team, offering a variety of cheeses to both the WPI and local communities through a partnership with Westfield Farm in Hubbardston, Mass. Haven't heard of the group? Better late than feta—here's a quick look at what makes them tick.

Back to Basics: It wouldn't be WPI without math—how much goat's milk does it take to make two pounds of soft cheese? Just one gallon.

Eight Cheeses a Week: It might not be as catchy as that one song, but we'll bet it's more delicious. Gompei's Goat Cheese offers eight flavors: Plain, Herb Garlic, Hickory Smoked, Pink Peppercorn, Chive, Fiery Fig, Calabrini, and Blueberry Lemon.

Lucrative Lactose: Cheese tastes just a little better knowing that the money you pay for it goes toward a good cause. The profits raised from sales go directly to scholarships—last year, the group donated $2,500 to WPI's World Class Scholarship Fund.

2 Fast 2 Cheesiest: You'd think a tech school would have exactly zero cheese-focused organizations, but WPI has two. While they haven't yet worked together officially, Gompei's Goat Cheese has presented its wares at Cheese Club meetings. Fondue, anyone?

Bring it Home: There are three ways to get your hands on some goat cheese of your own: at the Wine Vine on West Street, at gompei.com, or most recently at the Rubin Campus Center.

HELPING HANDS — *Andy Baron*

It was a chance meeting that left nothing to chance.

While WPI professor Ted Clancy was on sabbatical at Liberating Technologies Inc. (LTI) of Holliston, Mass., five years ago, conducting prosthetics research, he met amputee Debi Latour. Rather than work in a silo, Clancy recalls approaching Latour for her design insights into his latest project.

"We had the engineering knowledge, but we weren't sure if we're using it in a manner that's going to be useful," recalls Clancy. "So, we asked Debi a lot of questions about what's going to be useful, and how it's going to be used."

Today, Clancy and Latour are teaming up to develop wireless sensors to improve the performance of prosthetics for individuals with upper limb amputations.

Latour, an occupational therapist and assistant professor in the Division of Occupational Therapy program at Western New England University, is a consultant on the project; she was born without a right hand. For this research, Clancy, a professor of electrical and computer engineering, received a two-year, anticipated $400,000 subaward from LTI, which received funding from the Department of Defense.

Using a technique known as osseointegration, a prosthetic hand would be attached to a metal rod that would then be inserted into the bone. While this results in a much more rigid attachment, it presents a challenge because the wires used to control the device would have nowhere to go and would be hanging loose. That's because the molded plastic socket that is form-fit onto the natural tissue and contains the wires is no longer needed.

To address the challenge, Clancy and his colleagues plan to place silver dollar–sized wireless sensors on remnant arm muscle locations. He said they plan to start with two sensors, which could expand to up to eight or more sensors.

"The idea is to create a standardized system that is more space efficient that could be readily adapted onto various products," says Clancy.

For Latour, the partnership gives her a chance to make a difference for those with limb loss.

"It's also a way for me to provoke the up-and-coming generation to think outside the box," she says, "—to think and to transcend the boundaries of our own disciplines."

—Arthur Carlson

Q. On Project Presentation Day last spring there were many projects related to the environment. Has WPI always been concerned with sustainability and climate change?

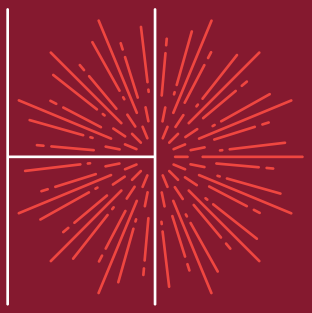
A. Beginning in the 1960s—as the world was becoming increasingly concerned with the impact of industrialization on the environment—WPI faculty understood the need to help our Earth. Among the first on campus to sound the alarm was Imre Zwiebel, professor of chemical engineering. He argued that the traditional engineering curriculum alone was insufficient to help address emerging issues related to pollution without incorporating the methodology and expertise of social scientists. Fortunately for Zwiebel, WPI was about to implement the WPI Plan, which was based on student-driven interdisciplinary projects. In 1969 the Sloan Foundation awarded WPI a $200,000 three-year grant to support innovation in technological education; of the 10 institutions selected, WPI was the only small college awarded a grant. With monetary support secured, Zwiebel, along with other faculty members, began to recruit project sponsors as partners in this endeavor, now known as the Environmental Systems Study Program (ESSP).

Beginning with the 1970–71 academic year, 20 student volunteers, their advisors, and corporate sponsors (including Norton Company, Digital Equipment Corporation, and the Massachusetts Department of Conservation and Recreation) studied a range of environmental issues in New England as part of the ESSP. Project topics included reducing noise pollution at a chemical plant and improving methods of sewage discharge into Boston Harbor. These student teams blended technical expertise with social awareness, which became the model still followed by IQP teams today.

As the WPI Plan matured, the focus on improving the environment remained central to many of these efforts. In the five decades since the full implementation of the WPI Plan, student teams have addressed issues related the impact of light pollution on migratory animals, the introduction of non-native species to waterways, and the harnessing of energy left in human refuse. To learn more about the history of the WPI Plan or to learn about other student projects, visit the WPI Archives in Gordon Library.

Arthur Carlson, assistant director of Archives & Special Collections at the George C. Gordon Library, would be glad to answer questions you may have regarding curious facts and figures about WPI wonders. Send your inquiry to archives@wpi.edu and perhaps see your answer here!

WPI HALL OF LUMINARIES



INDUCTION CEREMONY | OCTOBER 24, 2019 | 3PM

Join us to honor the individuals who have brought about the most extraordinary accomplishments to society.

JOSEPH ADAMS 1975 | **ROBERT BECKETT** 1957, HON. 2013 | **HAROLD BLACK** 1921, HON. 1955 *
GEORGE COWAN 1941, HON. 2002* | **HOWARD FREEMAN** 1940, HON. 1996*
SCOTT HARRIS 1982 | **MILTON HIGGINS*** | **DEBORA JACKSON** 1989 MS, 2000 MS
CHARLES THOMPSON, FOUNDER* | **EMORY WASHBURN**, FOUNDER*

**deceased*

Don't miss one of the most inspirational events for the WPI community!

When **Todd Alexander '11, '19 (PhD)** recalls his early years on campus, he beams.

"My undergraduate experience was amazing," he says. "Otherwise I wouldn't have stayed here for my PhD. I truly enjoyed all of my classes, and the professors were fantastic. It was clear to see the passion the teachers and students had for creating and learning."

Alexander was part of the first cohort of Integrative Graduate Education & Research Traineeship (IGERT) fellows at WPI. As he explains it, the focus of the IGERT grant was to instill an entrepreneurial mindset into PhD students, centered on projects under the umbrella of biofabrication, including courses in innovation and entrepreneurship. This led him to propose his own PhD major in Innovation and Entrepreneurship in Biomedical Engineering. "I wanted this training to reflect in my degree title," he explains, "as I felt it was just as important as the technical training I received."

Dean of Graduate Studies Terri Camesano calls him her go-to guy, helping with everything from international visitors to mentoring. "I think I've been really lucky," he says. "I have mentored some amazing groups and individuals, including MQP teams, REUs, and some really ambitious undergrads … though I think this speaks more to the quality of students WPI attracts than to my mentoring abilities."

Not only has Alexander excelled at WPI, but he says he earned a few extra credits when he met his wife in his senior year. "She—along with my family—has been unbelievably supportive throughout my PhD years. I am very lucky to have met her."

In addition to studying for a graduate degree, he cofounded a company, which he calls one of the deepest learning experiences of his education. "A start-up is a lot of work." he recalls, "whether it was working on grants, networking, pitching at competitions, or trying to raise funding." Unfortunately, the company closed, but he admits that many valuable lessons were learned through the process. "Even though it didn't end the way I wanted, I would do it again—hopefully better the second time around."

After graduation this fall, Alexander plans to work in industry or perhaps join—or even found—a start-up. "With my background in alternative antimicrobials and the growing problem with antimicrobial resistance, I want to help as many people as possible," he says. "I think a start-up is the best way I can do that."

HONORABLE MENTIONS

IGERT Fellow • University Innovation Fellow • Hitchcock Innovation Fellow • Tau Beta Pi

PHOTO PAT O'CONNOR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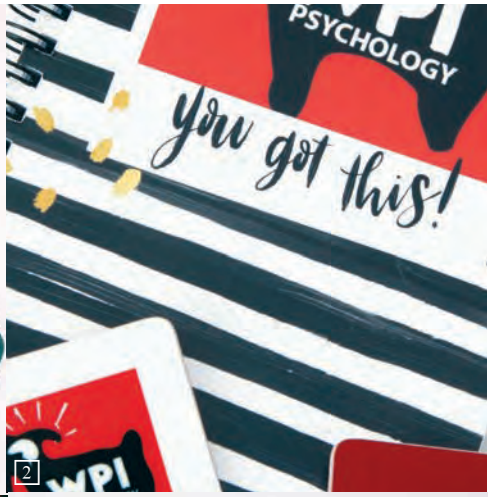

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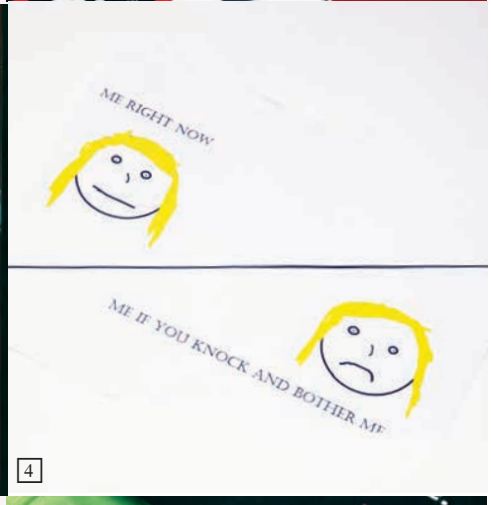

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IN MY OFFICE

1. GYM EQUIPMENT: I exercise every day to clear my mind and increase my happiness. I bike, swim, run (when not injured), hike/walk, paddleboard, etc. I also teach yoga, barre, pilates, and skiing.

2. WPI SUPERFAN T-SHIRT: When I joined WPI, my sister, Nadia, was a sophomore. Two of her friends, Ted and "Captain," brought a vat of Jello to my office to initiate me. My challenge was to dig through the Jello to retrieve a prize—a WPI Superfan shirt signed by them. Ted is now my brother-in-law! At their wedding, I made my sister and Ted dig through a vat of Jello for WPI SuperBride and SuperGroom shirts.

3. WPI PSYCHOLOGY SWAG: I find creative ways to let the world know about our amazing psychology undergraduate program. #WPIPsychology

4. ARTWORK: As I was going up for tenure, my husband created MS Paint artwork for my office to remind me to be ridiculous and laugh.

5. PROMOTION CERTIFICATE: My most recent professional accomplishment was being promoted to full professor!

6. GLOBES: Traveling is a passion. I've advised IQPs in Hong Kong, Costa Rica, Australia, and South Africa. I taught on the Semester at Sea voyage around the world in 2016—and met Desmond Tutu while wearing a WPI Psychology T-shirt! I've been to 42 U.S. states, 47 countries, and 6 continents ... 50 states, 50 countries, 7 continents, here I come!

7. LAB SHIRTS: My research investigates how subtle factors in our social world influence decision-making and beliefs. In my lab, we conduct creative experiments. For instance, I use messages on T-shirts, a person's name or appearance, and other fun manipulations/stimuli to answer important social psychological questions.

8. CONTRACEPTION KIT: In the classroom, I engage students in active learning to expand their knowledge. In Human Sexuality, we see, touch, and think about contraception options thanks to this kit from Planned Parenthood.

PHOTOS PAT O'CONNOR

9

MY BOSTON TERRIERS MAKE ANY DAY BETTER! PLUS, I GET TO USE PSYCHOLOGY TO TRAIN THEM!

Jeanine Skorinko

PROFESSOR, SOCIAL SCIENCE & POLICY STUDIES; DIRECTOR, PSYCHOLOGICAL SCIENCE PROGRAM


CLIMATE
CHANGE
five voices of

Addressing the U.N. Climate Change Summit in 2014, President Barack Obama said,

"For all the immediate challenges that we gather to address this week—terrorism, instability, inequality, disease—there's one issue that will define the contours of this century more dramatically than any other, and that is the urgent and growing threat of a changing climate."

Indeed, the relentless rise in global atmospheric temperature, driven by the greenhouse gases released by fossil fuel combustion and other human activities, is the root cause of a host of challenges facing the planet and bedeviling humanity. Itself a highly complex physical phenomenon, involving a host of intertwining physical, chemical, and biological systems, climate change and its multitude of impacts demand a multifaceted response from us.

Researchers and scholars at WPI view the changing climate through many lenses. They see its telltale fingerprints everywhere: in the ever more-powerful storms that batter our coasts, for example, and in the ever more-ravenous fires that consume our forests. They also see how these phenomena create a pressing need for greater resiliency—in our infrastructure, our habitats, and our communities.

They observe how a warming world exacerbates society's inequalities; how its effects (rising waters, deluges, and droughts) fall disproportionately on those who are the least responsible for its causes. And they understand how important it is that those with greater means help those with less, so things don't go from bad to worse.

They see how the slow drip of climate change can make us complacent, and lock us into the very habits that are precipitating our planet's collapse. They recognize how urgent it is that resignation be displaced by more productive emotions, like anger and even fear. And optimism, for they also see that bold technological solutions to a warming climate are possible, if there is a will and the ingenuity to bring them to fruition.

In this story, you will hear five of those researchers and scholars and learn what they see when they study the changing world with the benefit of their distinctive expertise and unique viewpoints. Their voices echo WPI's long heritage of not simply acknowledging problems, but crafting practical solutions. For in the end, these voices may be chilled by today's harsh reality, but they are also warmed by the prospect of a better world we can build together.

Introduction by Michael Dorsey

SILKSCREEN NIKKI BUHLER

The Road to Change

Mingjiang Tao, Associate Professor, Civil & Environmental Engineering

The United States has witnessed numerous natural disasters in recent years that have resulted in the inundation of thousands of roadways. Most recently, Hurricanes Harvey and Irma inundated streets and roads in Texas and Florida, with the cost of repairing the destruction wrought by Harvey alone estimated at $125 billion. The challenge of assessing damage to flooded pavements is one challenge agencies will likely face more often in the decades ahead, as climatologists predict an increase in extreme weather events.

Depending on its characteristics and on the condition of the pavement, a flood can cause various degrees of harm to roadways—from washing away structures to indirect damage, such as weakening the pavement's loading capacity.

Flood-induced visual damage to roadways is well recognized and documented. However, the injury to pavement structures that remain intact (i.e., not washed out) during a flooding event are not well understood or can go unnoticed. Quite often, flooding results in deterioration or weakening of underlying pavement layers, and such damage may not be visible on the surface.

After the floodwater has receded, pavement agencies, such as state and local municipalities departments of transportation, have to make decisions regarding the safety of roadways, assess repairability, and make decisions as to when it's safe to reopen a flooded road to different types of traffic. Severely damaged pavement can cause the surface to fail catastrophically under a relatively heavy vehicle, such as a fully loaded truck used for removing debris, whereas a moderately damaged pavement would show signs of structural failure. Therefore, it is highly imperative to conduct studies to identify the best practice of assessing flood-induced damages to roadways. The results can help in allocating resources for post-flooding investigative actions, and help identify vulnerable sections to allow pre-flood precautions or corrective actions to prevent or minimize damage after flooding.

A holistic framework for evaluating flooding risk of roadways was proposed by researchers at WPI, who considered degree of hazard (i.e., flooding), vulnerabilities, and consequence. Through our research, we have developed a quantitative, composite risk indicator for evaluating the resilience of roadways exposed to flooding. It is a product of hazard, vulnerability, and consequence, and a function of storm characteristics, pavement characteristics, and functional class of pavement and traffic volume. A flooding risk map was developed based on these risk factors in a space of criticality factor consequence, as well as a risk factor–based hierarchical engineering evaluation procedure. This is recommended to aid decision makers to (1) select appropriate engineering methods to evaluate flood-induced damage for immediate post-flood response; (2) decide when a flooded roadway can be reopened to what type of vehicles; (3) allocate funds and resources in advance to protect roadways that run through areas that are at a high risk of flooding in the long term.

As more extreme weather pounds the roadways around the world, WPI researchers hope our work can keep those roads safe for travel of all kinds for decades to come.

Climate Crisis: Time to Stop Digging

Roger Gottlieb, Professor, Philosophy

"You don't hit bottom," says a 12-step adage, "until you stop digging." In other words, when we are reckless, thoughtless, destructively selfish—and when this leads in a very bad direction—we can still cling to the damaging behavior, close our eyes, turn our backs, and distract.

Our global climate crisis—part of an encompassing environmental disaster that includes staggering pollution and biodiversity loss—is a case in point. Hundreds of thousands of acres of Midwestern farmland under water for months, hundreds of billions of dollars in climate losses, and tens of millions of climate refugees per year are just some of the present realities.

But the response of our political, economic, technological, educational, and spiritual leaders is still way below the scope of what's needed. Nations commit to lowering their carbon output and fail to meet their commitments. Leading countries (e.g., China, India, Brazil, Russia, U.S.) are cowed by or choose leaders who put military power, economic "growth," religious/racial/gender/ethnic oppression, and repression of dissent far above the serious and total commitment needed.

Crocodile tears shed by top corporations about reducing their carbon footprints are never, ever accompanied by imploring people to actually consume less, use less, fly less, drive less. Fossil fuel giants, hedging their bets with some investments in renewables, are still relentlessly pursuing the ultimate goal: get all of it out of the ground, sell it, and burn it. Universities advertise their green commitments, but their trustees refuse to consider divesting from fossil fuel portfolios.

The result? The percent of CO_2 in the atmosphere continues to rise, to about 415 parts per million currently. The year 2018 set a record year for annual greenhouse gas emissions—all this in spite of the brave and dedicated work of groups like 350.org, Sunrise, Sierra, and Greenpeace; the student strikes for action on climate crisis (not climate change); proposals for a Green New Deal; and all the rest.

How to respond to all this?

First, with anger. To say as loudly as possible that this crime of environmental ruin is putting our entire civilization at risk.

As well, there is fear for a future that is deeply in doubt; and grief for what has been lost.

And, possibly, a sobering realization: It may be decades, even centuries—if at all—before humanity may learn environmental values: love of life, respect for ecosystems, modesty in consumption, great care in the implementation of technology, and that community and personal virtue are the sources of true well-being.

It may be that centuries from now people will look back at today's environmentalists and say, "How brave and far-sighted … and how lonely and despairing they must have felt at times. Isn't it wonderful they did anything at all?"

So I am not offering hope, merely courage. This is what I try to communicate to my students—in everything from having them get to know one particular tree very well to asking tough questions about environmental justice, animal rights, and whether anything is more important than the future of life on earth. I hope we can inspire each other to have courage to keep the faith and try to show our fellow humans that that there is a better way to live.

We don't—we really don't—have to keep digging.

Building a Resilient Society in Response to Wildfires

Albert Simeoni, Department Head, Fire Protection Engineering

It has become a very familiar theme: every year we witness the increased burden that wildfires impose on society, in the United States and abroad. Wildfires have more and more dramatic consequences, from the megafires of 2017 and 2018 in California to the accident that happened in March 2019 in China's Sichuan province, where 30 firefighters were entrapped and died in a wildfire.

This increase is fueled by two main factors: the dramatic increase of the wildland-urban interface (WUI), where vegetation and structures are in contact, and climate change, which is creating worse and more frequent wildfire conditions.

When contemplating the future, one thing can be taken for granted: fire is part of the ecosystem and will never go away. So, we have to learn how to live with it and to become more resilient to it. To do so, we need to answer many questions that are already difficult but become blurred with climate change: what are the optimal fire management strategies that will help decrease the occurrence of catastrophic fires or what is the most efficient way to protect people and property at the WUI? Of course, future solutions will have to be balanced with other issues linked to economic activity, conservation efforts, ecological services, and lifestyle choices. But if we do not act now, wildfires will continue to grow as a major disruptor that limits our choices and makes all the other problems much more difficult to solve.

At WPI we are developing new knowledge in collaboration with external partners in government (U.S. Forest Service), the nonprofit sector (Tall Timbers), and academia (University of Notre Dame). To cope with the changing conditions, we are getting back to the fundamentals in order to provide the scientific basis needed to understand the processes driving extreme fire behavior and fire impact. We are developing tools to support designing fire-resistant communities, developing new fire management strategies, better estimating extreme fire risk, and improving firefighter safety. Many of these issues are multidisciplinary, so we need to collaborate with other fields and leverage our local talent. An example is our fledging collaboration with WPI's Robotics Engineering Program to enhance firefighter safety in fire conditions.

In a rapidly changing environment, when the usefulness of past experience is decreasing, research really shows its value as the best way to understand, predict, and adapt to the major challenges faced by our societies.

The Case for Directly Removing CO_2 from the Air

Jennifer Wilcox, James Manning Professor of Chemical Engineering

As a global society we have been burning fossil fuels to meet our energy and transportation needs since the start of the industrial revolution. This has resulted in atmospheric CO_2 concentrations much greater than at any other time during the last 650,000 years. That concentration reached a record 415 parts per million in May 2019. The replacement of fossil fuels with renewables, advances in energy efficiency, and carbon capture and storage are among the key strategies required to prevent warming beyond 2°C within this century. But they will not be enough. We need to ramp up our efforts in reducing CO_2 emissions, and then we need to do even more.

The Earth's natural systems, such as forests and oceans, are capable of removing roughly half of global CO_2 emissions each year, while the rest steadily accumulates in the atmosphere. Until now, our best approach to avoiding the worst impacts of climate change was simply to avoid such emissions in the first place. But because of our failure to act quickly and at a large enough scale, we are now faced with the need to go beyond that strategy—to actually start removing CO_2 directly from the air. Trees and oceans already do this, but these systems are overwhelmed. Manufactured or synthetic removal systems are designed to pull CO_2 from the atmosphere, and at a much faster rate than natural systems.

At WPI, our work in the Clean Energy Conversions Lab focuses on accelerating the deployment of such systems, which are also known as negative emissions technologies. To achieve this, we investigate pathways that help reduce the costs of CO_2 removal from such a dilute system (air). The technologies that allow for CO_2 removal include the acceleration of natural processes as well as synthetic approaches that use CO_2-selective chemicals and large air contactors for removal. These technologies are valuable tools for reducing emissions since they not only remove CO_2 that has accumulated in the atmosphere over time, but can also offset difficult-to-avoid emissions such as those associated with transportation, agriculture, and materials-based industries such as cement, pulp and paper, iron and steel, and refining.

Given the urgency of climate disruption, more rapid progress must be made to bring these technologies online. The portfolio of solutions should always include, first and foremost, reducing our CO_2 emissions. But we will need to also include CO_2 removal from the air if we are to avoid the worst effects of climate change.

Building Resilient Communities Together

Rob Krueger, Director of International Development, Environment, and Sustainability

The world's most economically disadvantaged people—those living in developing countries in the Global South—are also the most vulnerable to the impacts of climate change. How can we do a better job of helping them cope?

Institutions from wealthier nations (the United Nations and the German Adaptation Fund, among them) are making investments to help these populations adapt, but those efforts are clouded by development aid's flawed past. Since World War II, developed countries have sought to 'modernize' developing countries through large infrastructure projects like dams and power plants. These projects have sometimes worsened the lives of the people they were meant to help.

For a generation, social scientists have been studying the economic, social, and environmental impacts of such development projects. They've found that they relied heavily on top-down processes, often biased in favor of purely technological solutions, and overlooked or even ignored the perspectives of the local citizens.

I've been working with dozens of WPI colleagues to develop new theory and practice for responding to issues associated with the inequity of climate change and development. Our goal is to develop transdisciplinary approaches to problem solving, which require scholars, students, communities, and other stakeholders to work together closely to understand a problem's multiple dimensions and co-design solutions.

To do this well, we must understand the communities we work with. Our goal should be engagement, not education.

We have two main projects, currently. The first is a new project center in Dwenase, Ghana, where WPI juniors, seniors, and graduate students can explore issues related to climate change and community resilience. For example, we are working with the community to mitigate flooding around the local health center, which will require determining the appropriate gradient around the center, and then, with the community, regrading the site to incorporate green infrastructure principles for flood mitigation.

The second, in collaboration with researchers and students at Clark University, involves climate resilience in mega cities of the Global South—Mexico City and Accra are our initial test sites. We're looking at gateway sectors, such as water quality and scarcity, food security, energy systems, and transport system resilience.

Both projects seek to add to the emergent concept of "development engineering" by expanding the role of stakeholders to include communities, local governments, researchers, NGOs, and the like, who come together with a common goal of working collaboratively on this massive global challenge—one community at a time. J

wpi.edu/+journal

JEN FORSYTHE '01

Keeping soldiers safe inside the Army's fearsome tanks

BY MICHAEL BLANDING | ILLUSTRATION DAN COZENS

"Beautiful" may not be the first word that springs to mind when envisioning an M1 Abrams tank—the Army's most awesome and lethal combat vehicle, with a massive 120mm cannon and machine gun. But what other machine has the ability to function in such an intense variety of climates and terrain around the world, in situations that can literally mean life or death for its occupants?

"It is a beautiful piece of of engineering," says Jennifer (Cooper) Forsythe '01 (BS/MS). "You can't stand in front of a tank, or hear a tank, or be inside a tank and not feel its tremendous elegant beauty."

She should know. As an operations research master analyst for the U.S. Army, it's her job to do the rigorous research and testing to ensure that weapons such as the Abrams tank are able to both attack and defend. "They are, of course, killing machines, but at the same time, it's incredible how all the things they're able to do *do* indeed protect the people inside," she says.

Forsythe works for the U.S. Army Futures Command Combat Capabilities Development Command Data and Analysis Center, which supports equipment—including new ammunition and firing systems—to ensure that soldiers can perform with them in battle.

Her job consists of both rigorous computer modeling and supporting on-site testing at the firing range—which can mean making hard choices on the job. "Every time you turn on the tank, it costs hundreds of dollars per hour just in the amount of gas you're using," she says. "Every round you want to fire costs thousands of dollars." While she is often working under the constraints of a taxpayer-financed budget, Forsythe fights hard for the tests she feels are necessary to achieve confidence, thinking of the soldiers whose lives are literally on the line in the decisions she makes behind her computer screen. "The tankers inspire me," she says. "You want to do your best to give the soldiers on the front lines all they need to succeed."

A self-described "military brat," Forsythe comes from a line of military veterans; her father and uncles served in the Air Force and Marines, respectively, and her grandfather served in both the Air Force and the Army. Even after leaving active duty, her father continued to work as a contractor for the Department of Defense, and so the family was always shuttling between military bases—in Nebraska, Ohio, Virginia, Oklahoma, and Alabama. While proud of her family's service, Forsythe did not assume she'd go into the military herself; she was interested in biology and engineering instead.

Entering WPI with a full scholarship to study biomedical engineering, however, she thought that perhaps she could combine that with military service—for example, by researching artificial limbs to help amputees. She applied for and received an ROTC scholarship, waking up five days a week for physical training and classes. "Every single day I got up at 6 a.m. to French-braid my hair," she says. "I was one of the few people who used all 21 meals of my meal plan, because I was always up for breakfast."

She excelled at WPI—thrilled, even, to attend such basic engineering classes as Statics and Dynamics of Mechanical Engineering with Professor Ray Hagglund. "For something with the same equations over and over, it was exceptionally engaging," she says. "He really made it come alive."

At the same time, she took physiology classes where she was implanting simple medical devices and materials into mice. Her IQP (Interactive Qualifying Project) took a decidedly military bent with a trip to Venice, where she worked with interdisciplinary and global studies professor Fabio Carrera to help design a database to catalog the arms and armaments collection of the Doge's Palace, which dates back centuries. As a bonus, she got a rare opportunity to go to the roof of the palace and watch the festivities for the *Festa del Redentore*, which celebrates the end of a 16th century plague. "It was, honestly, the best fireworks display I have ever seen," she says.

For her MQP (Major Qualifying Project), Forsythe followed her medical interests to develop a surgical device that would input a polymer into the nervous system. "It was like the opposite of Jell-O," she says. "It was liquid at room temperature, and then when you inject it into the body at 98.6 degrees it becomes a solid." Such a device might help create a scaffolding for stem cells to repair a spinal cord injury. For her project, Forsythe experimented with different structures, sizes, and angles for the device to optimize its performance.

That combination of military and medical projects would serve her well when she graduated from WPI and joined the Army as an active duty preventive medical officer in May 2001. After the 9/11 terrorist attacks, however, her work took a dramatically different turn. "I can remember looking at the faces of these young people who had just joined the Army and realizing that everything in your life could suddenly change," she says. She exhibited pride and purpose in the fact that she was in a position to actually do something in response to the attacks.

For much of the next four years, she worked at projects to counter the negative health effects of weapons of mass destruction, including chemical and biological weapons. In addition to researching hazardous materials and analyzing contaminated soil and air samples, Forsythe worked on responses to protect soldiers, including selecting respirators specifically for WMDs, considering all the factors that could influence their survival. "What if they are under stress? What if they are having to run? You have to think very methodically—like an engineer—to walk through all the steps," she says.

Though she didn't serve in Iraq or Afghanistan, she did go to Honduras for a six-month posting. "It was by far one of the most transformational experiences of my life," she says. While her main mission was to ensure that soldiers and embassy staff didn't contract communicable diseases, she also confronted a host of other challenges—from safety concerns over the country's high rates of violence to the extreme poverty facing the people there.

Then there was the climate itself. "It was just ungodly hot and humid—it was a true jungle," she says. Dealing with those challenges in the remote locations where she did her work gave her a new appreciation for the difficulties soldiers face around the world. "A fair amount of being in the Army is understanding what the rest of the world actually looks like," she says. "It helps me for what I'm doing now to be able to envision how the Army systems can be deployed in different environments—and how much the environment can screw up your stuff."

After she completed her stint of active duty, Forsythe worked for a military contractor for seven years, continuing to engineer weapons of mass destruction. She returned to the Army in 2012 to work on ground combat systems, including the Bradley and Stryker fighting vehicles—especially the Abrams tank—and was recently promoted to her current position.

The Abrams M1 was first introduced in 1980, and its basic structure has stayed the same; but in order to keep up with the demands of modern combat, it has been through dozens of revamps—the second generation M1A2 deploying in 1992, and several new System Equipment Packages released since. It's the job of analysts like herself to ensure that each new upgrade continues to perform on the battlefield.

Forsythe primarily looks at lethality—whether a new piece of equipment will do what it needs to take out an opponent. Much of her work consists of supporting "force-on-force modeling"—simulated war games that test a component in real-world conditions. It's one thing to test a new laser rangefinder to make sure it accurately hits a target … it's another to integrate it into an actual combat situation.

"Once you put the laser rangefinder on a tank and put a person inside of it, how does it do?" she asks. "How does it work with a platoon? Or a battalion of soldiers? And then how does it work against the enemy?"

This means testing it for all four moving positions, and that's where the math equations Forsythe learned at WPI come in. Considering the tremendous cost of military testing, she is able to use computer models to shortcut tests while reserving the field tests for those that count. In making those calculations, she is constantly weighing the accuracy of tests versus cost. "You might want an 80- to 90-percent confidence interval or, if lesser, you might employ it differently."

A recent project, "Fleet Zero," helped conserve resources while making testing more effective. Anyone who has ever fired a weapon is familiar with the idea of "zeroing"—adjusting the scope to account for a weapon's particular geometry so it can fire accurately over long distances. Zeroing out every tank in a fleet is a time-consuming and expensive process, requiring firing dozens of rounds. Decades ago military analysts determined that wasn't necessary; coming up with an average setting for a fleet, and adjusting everyone's weapons to that setting was just as precise on the whole. "It gives you almost the same answer," she says.

When that longstanding idea was recently questioned, however, she went back to some of the analysts who developed it (many of whom used to be tankers themselves) to repeat the analysis, and convinced the Army to recommit to the practice.

In another project, Forsythe helped determine that the probability of a tank's making an accurate hit on its first round could be improved by adding in a correction for the Coriolis effect (a force caused by the rotation of the earth that slightly skews objects in motion) in accordance with the latitude of the weapon's location. While that phenomenon was known, she says, it took some convincing to have it made part of official practices. "The Army is a wall of red tape sometimes," she says. "Sometimes you have to find the right people to actually change something in the system."

Getting things done can sometimes be complicated by the fact that Forsythe is a rare woman in two professions—military and engineering—dominated by men. "I was the only girl in my AP physics class, and I've been one of a few for quite some time," she says. Sometimes having people underestimate her can be an advantage, she says; other times, it can be an impediment, causing her to work twice as hard to have her research accepted.

Since her recent promotion, she has redoubled her efforts to be a mentor to other women in the military, helping them overcome the obstacles she has faced herself. "Whenever I see younger interns or junior engineers, I offer to show them whatever ropes I can to help them understand where they are, who they should talk to—and who they shouldn't talk to," she says. "I was very blessed with this recent job promotion, and hope that more people can move up as well."

As for her own work, Forsythe attributes much of her success to the leadership training she's received from the Army itself. "Leadership is the art of influence, and that doesn't matter whether you are male or female," she says. "It matters how much you are able to understand what motivates another person." At the end of the day, people want the truth, she says, and if they don't accept her proof because she is a woman, she can use other strategies to present her findings.

"Maybe if I give them a chance to blow off steam, and then go back and talk with them separately and privately, there'll be ways to work around it," she says. On the other hand, she's had to learn that sometimes prejudice is too strong to convert someone. "I have to understand when it's okay to be, like, 'All right, that one's not moving. That's a rock I've got to climb around.'"

With all the competing pressures of the job, Forsythe has had to learn to pick her battles and defer to others on decisions at times, even when she might not agree with them. But she has her own bottom line—the safety and well-being of those who will be riding in the tanks she helps design. "If it's not going to impact the tanker a tremendous amount, then you try, but sometimes you have to let something slide," she says. On the other hand, "if something is going to impact the tanker, you argue for it as much as you can." J

In each issue you'll see how WPI students put theory into practice through projects.

PHOTO PAT O'CONNOR

Removing a Deadly Threat

Student Teams Design a Robotic System That Destroys Land Mines

1 THE BIG IDEA

Land mines kill or injure nearly 6,800 people worldwide each year, according to the Red Cross and UNICEF. In some countries, huge tracts of fertile land are left fallow or undeveloped because they're littered with mines which can remain active for up to 50 years. While militaries and governments can detonate mines with tanks or reinforced bulldozers, this option is too expensive for small towns and villages. Three Major Qualifying Project teams have worked on a dual-robot system (a rover and a drone) that will detect and destroy land mines safely and inexpensively.

2 2018–19 PARTICIPANTS

Dillon Arnold '19, mechanical engineering, robotics engineering
Nicholas Lanotte '19, robotics engineering
Benjamin Wagner '19, mechanical engineering, robotics engineering
Advisor: Craig Putnam, senior instructor, computer science; associate director, robotics engineering

3 HOW IT WORKS

SEARCH GRID: The autonomous rover uses GPS and a customized Google Maps app to define a search area. It then autonomously plans and navigates a search grid within that area.

DETECTION: A metal detector on the rover's arm sweeps back and forth, scanning for as little as a gram of metal. When metal is detected, the rover's arm rotates, bringing a can of spray paint into position. The rover paints the spot and sends its GPS coordinates to the drone.

DETONATION: When the area has been completely searched and the rover has moved to safety, the drone flies in and drops payloads on the designated spots to explode the land mines.

TECH USED: A Husky A100 ground vehicle serves as the rover's base and a platform for the sensors, metal detector, Google Maps Navigation system, and other components designed by the students. The teams used 3D printing to make some components; they adapted existing algorithms for communications, autonomy, and search grid creation.

4 WHAT'S NEXT

The rover has been the primary focus of the second and third project teams. The first team worked on the drone, which must be capable of carrying a payload heavy enough to explode a mine. In 2019–20 the final MQP team will complete the drone, make both robots waterproof, upgrade computer systems as needed, and finalize the communications systems to produce a fully operational system.

In an era of peaceful stewardship of the nation's nuclear arsenal, Frank Addessio's theoretical work at Los Alamos National Laboratory remains critical.

PHASE CHANGE

FRANK ADDESSIO '68

BY JOAN KILLOUGH-MILLER | PHOTOGRAPHY MATT FURMAN

In 1942 scientists in Los Alamos, New Mexico, began work on a top-secret project code-named "Project Y." Today the world knows Los Alamos National Laboratory (LANL) for its role in the Manhattan Project and the nuclear weapons that evolved from that historic work.


LOS ALAMOS
PROJECT
MAIN GATE
PASSES MUST BE
PRESENTED TO
GUARDS
SECURE
PASSES
HERE
POST
No. 1

FIFTY YEARS LATER, at the Nevada Test Site, the United States staged its last underground test of a nuclear weapon. Since 1992, the nation has observed the terms of the Comprehensive Test Ban Treaty. In the post–Cold War era, with a moratorium on the live testing of nuclear weapons, the scientists at LANL and its partner laboratories have relied on other means to certify that the existing stockpile remains stable, safe—and ready for action, should the need arise. The new strategy, known as Science Based Stockpile Stewardship (SBSS), is based on what Los Alamos Science calls "an iterative cycle of theory, experiment, evaluation, and innovations."

Frank Addessio, who has spent the last half-century modeling scientific problems, takes the long view. Reflecting on his 40 years at Los Alamos, he says, "Our job here is still as important as it was. It's just that there's been a shift away from doing experiments on the large-scale components. We can't test full-scale devices, so we've had to come up with other ways of certifying them." At 73, he's lived through some historic changes. Even as technology evolves, and history and politics shape the research agenda, it's the underlying theoretical questions about materials behavior that excite him.

THEORY AND PRACTICE

Addessio joined the Laboratory in 1978 to work on modeling loss-of-coolant accidents related to nuclear reactor designs. Following the Three Mile Island incident, which altered the face of that industry, he transferred into the Theoretical Division. Today he's working at the single-crystal and polycrystal length scales, zeroing in on the properties of individual materials, to help scientists understand how the materials that make up weapons behave under normal—and unexpected—conditions.

What happens if a weapon is dropped during transport? Or if there's heat from a fire in the storage facility, or a sympathetic shock from a nearby explosion? Scientists at LANL examine safety scenarios, as well as design performance under rigorous and demanding operating conditions. Addessio points out that nuclear weapons are composed of relatively exotic materials. "Some of these materials decay radioactively, emitting decay elements and generating heat. That is, like most things, they age!" To explore conditions of interest, scientists use a combination of experimentation and computational modeling.

Addessio draws a simplified analogy to testing the design of an automobile frame made of titanium and steel. "You could build the frame," he says, "then run it into a wall and observe what happens. If it didn't work, you would change the design and run it into a wall again, over and over." He points out that this process can get expensive, and, in the assessment of nuclear weapons, there are safety and environmental considerations, as well as the constraint of the nation's "zero yield" policy.

"To understand how the materials—in our example, titanium and steel—are going to deform when they hit the wall," he says, "we perform

'simple,' small-scale experiments—and I put simple in quotes—to develop stress-strain models. Using finite element analysis, we can model the entire frame, and the impact of that structure against the wall. Now we can run thousands of simulations on computers that are much cheaper and quicker."

The synergy between lab research and the power of the Advanced Simulation and Computing program is the basis of SBSS. It takes a lot of back-and-forth to refine the models. Ideally, theory and practice agree—but, he says, even when the models aren't perfect "the hope is that they put us in the ball park, so maybe instead of doing 25 experiments we only have to do 10."

Addessio has closely studied the properties of titanium crystals and composites. A current focus is a plastic-bonded explosive, or PBX, which contains organic energetic grains held together by polymer binders.

"Because of the atomic structure, the grains of the energetic component are subject to deformations in their orientation," he notes. "As with wood, if you cut it with the grain or against it, it's going to react differently, depending on direction. In some of our simulations, we consider the deformation of a collection of atoms to observe how the crystalline structure changes (e.g., phase transformations), and the impact those changes have on the stress and strain response. That determines the response of the engineering structure—just as in the earlier analogy of the automobile frame."

CAREER CONTINUUM

Addessio refers to the field of continuum mechanics to characterize how, over time, his work has progressed through all phases of matter. Along the way, he's had to fold in knowledge from many disciplines. He's worked on modeling everything from jet flaps, to supersonic flow fields within lasers, to potential accidents in nuclear reactors. For a time, under a cooperative agreement with General Electric Aircraft Engines, he worked on models of a composite fan blade for a turbofan engine. "They wanted computational models to look at a foreign object damage problem. We went through the same steps I outlined earlier. Experimentalists looked at the various components in the composite; people like me were developing the models, so they could run simulations of the damage that might be caused by a five-pound turkey vulture."

In the course of his career, he says, "I went from aerodynamic applications, to gas-dynamic lasers, to chemical lasers, to nuclear reactor safety, then to basic numerical techniques, to macro-mechanical solid mechanics, to single-crystal solid mechanics." His education—both classroom and self-taught—prepared him well. "In this line of work, you can't assume that what you learned yesterday is going to be applicable tomorrow," he says. "So you're constantly in a process of educating yourself."

As a mechanical engineering major at WPI, he faced that challenge during a summer internship at Bell Telephone Laboratories. "I was assigned to a project involving a vibrations problem. I'd never had a course in vibrations!" he says. "That's when I understood that I was going to have to work in areas in which I didn't have a formal education." The work at Bell Labs led to a master's degree from Stanford, and then a PhD from Purdue. Unlike the young colleagues whose computer skills he admires today, he's had to come up to speed through self-study.

Asked about his role in keeping the nation safe, Addessio deflects that charge onto LANL's Weapons Physics division.

"They're the ones that are really dealing with 'the problem.' I'm in the Theoretical Division. Our role is to give them better models."

He counts his colleagues in the Theoretical Division—specifically the group that focuses on fluid dynamics and solid mechanics—among his perks. "My coworkers are very smart and talented. I served as their group leader for a while—it's an honor to work with these people."

The importance of a good team became clear to him in his years at WPI: He credits his Lambda Chi Alpha fraternity brothers for helping him through some rough times in college by, as he puts it, "providing relief with a humorous perspective." He's also grateful for the support of Dean Bill Trask, who kept him in school and connected him with the summer internship that launched his career

The most recent—and the most rapid—"phase change" for Addessio revolved around retirement. Last year, he thought he'd reached a good point to wrap things up. But the activities he'd anticipated—biking, skiing, hiking, jogging, flying Cessna 172s, and restoring Alfa Romeos—were curtailed by knee replacement and what he calls "other exigencies of life that occurred as I 'matured.'"

He summarized the turnaround in a recent class note for the *WPI Journal:* "After 40 years at the Los Alamos National Laboratory, 35 of them in the Theoretical Division, I decided to retire in January 2018. Two weeks later I became bored and returned to the Lab part-time."

It was more than boredom that brought him back to the work he loves. It was approval of a grant proposal he'd submitted with colleagues. "That encouraged me to come back and finish what I had proposed. Currently, I am working with a combined theoretical/experimental team that is concerned with the high-rate deformation of organic, single-crystals of energetic materials. The research includes anisotropic, nonlinear elasticity; plastic slip; phase transformations; and brittle failure. Future concerns will consider twinning." His note concludes, "I remain grateful for my undergraduate education at WPI and for the friendship of my brothers at LCA."

As a retiree, he now enjoys the opportunity to remain engaged with problems of interest, relieved of some of the bureaucratic responsibilities of his former role of a full-time employee. The government allows the Lab to allocate 6 percent of its budget toward basic science research. Frank Addessio—although working part-time, for a small stipend—is still giving 100 percent to the pursuit of answers.

"During my career I have pursued research within a number of scientific fields." he says. "While this has proven challenging, it has given me a broad perspective regarding how different pieces of science fit together. The downside, of course, is that at times I feel like a dilettante.

"I had the notion that as I aged, I would become more comfortable with the knowledge and experience I had obtained. The opposite is true. I've become less confident with how much there is left to understand!" J

ENGINEERING A MORE DIVERSE FUTURE

Laila '16 Thompson

BY AMY CRAWFORD | PHOTOGRAPHY MATT FURMAN


CARLISLE
1664

Most of us enjoy a bag of chips from time to time, perhaps as an indulgence to brighten a dull afternoon, or a pick-me-up during a long road trip. According to the consumer research firm Nielsen, packaged snack foods are now a global industry worth $374 billion, with 91 percent of people around the world reporting that they snack at least once a day. But rarely, it's safe to say, do snackers stop to consider the diverse skills, complex logistics, and hard work that ensure the tasty experience they have come to expect.

Industrial engineer Lailah Thompson '16 (BS/MS) is one person who knows everything that goes into a bag of chips. As processing supply chain leader at a Frito-Lay plant outside Boston, she supervised a 30-member team making Stacy's Pita Chips. The process began with bread dough mixed from scratch and ended with an oven-baked snack that has a satisfying crunch—something chip fans appreciate. But as in any manufacturing operation, quality control is crucial, and when the plant started getting reports of broken chips, Thompson immediately set out to investigate the problem—and solve it.

"My team took pride in their product, whether they were creating the chips or bagging them," Thompson says. "I liked to get them involved, so I let them know what was going on. We looked at the data to see which product was incurring the most breakage, and we isolated it, went through the process to determine what had changed."

The problem seemed to be that crumbs from the oven were making their way into the production stream. One employee who had worked at another plant manufacturing potato chips mentioned that a fan was used to blow away lighter, undersized chips before they entered the rest of the production stream. That sounded like a good idea, so Thompson worked with the maintenance team to design a piece of equipment that could remove what the industry refers to as the "fines."

It was an elegant solution for an irritating problem, and figuring it out required an intimate understanding of the production line. But Thompson also called on the management training she received at WPI, as well as an innate facility with people, as she listened to her team and drew upon their experience to help find answers. It's not the sort of approach every boss might take, she acknowledges.

"But I'm like that," she adds with a laugh. "It's kind of my style."

That style served Thompson well at Frito-Lay, and it promises to help distinguish her as she takes the next step in her career, enrolling at Harvard Business School this fall. And while most of her accomplishments no doubt lie ahead of her, Thompson's unique talents have already allowed her to make a difference—in fact, her determination, hard work, and special touch with people helped change the face of WPI for years to come.

COMMUNITY

Thompson grew up in Bedford-Stuyvesant, a historically African American neighborhood in Brooklyn. The only child of parents who often struggled financially, she learned early the importance of community—in fact, it was her community that launched her on the path to WPI, rallying around a 16-year-old and her family to help her attend the prestigious National Student Leadership Conference, a summer program for promising high schoolers at the University of California, Berkeley. Donations totaling more than $5,000 came from members of the Bedford-Stuyvesant YMCA (where she worked as a lifeguard and co-captained the swim team), local business-owners who held fundraisers on her behalf, and even readers of the *New York Daily News*, which featured her and her mother in an article.

The conference earned her college credit and exposed her to STEM career options, helping cement her desire to attend an engineering school. But the path that took her there fired up another dream. As a first-generation college student, she knew her life's work would be to ensure that other young people could follow her up the ladder of opportunity.

"I want to be able to use my power, my networks, to help my community," she explains.

PERSPECTIVE

Thompson was recruited to WPI, which appealed for its academic strengths, as well as the scholarship it offered her. But soon after she arrived on campus in the fall of 2012, she began to wonder if she had made a mistake. Sure, she was—as she puts it—"learning a ton" in her classes, and WPI's "More in Four" program offered the unique chance to earn a master's degree at the Foisie Business School alongside her BS in engineering, taking her that much closer to her dream of becoming a senior executive at a multinational corporation. But there were so few other black students on campus, and very little sense of a black community. And many of her white classmates displayed an ignorance about race that came as a shock to someone who had grown up in diverse, cosmopolitan New York City.

"There were a lot of microaggressions," Thompson says, using a term coined to describe rude remarks, dismissals, and offensive questions commonly experienced by people from marginalized groups. "Everyone was intrigued by my hair, or why I wear a scarf at night. They made references to ghetto music. They were surprised that a black person went to WPI. They were surprised that I'm a swimmer, because I guess they thought black people don't swim, so my being on the swim team was a shock."

That casual racism from her swim teammates was especially hurtful. In Brooklyn the YMCA pool had been a second home, but—tired of having her presence questioned—Thompson soon quit the WPI team. In her darkest moments, she even considered leaving WPI altogether. Bonnie Walker, WPI's former director of multicultural affairs and an informal mentor during Thompson's years on campus, recalls giving the younger woman frequent pep talks.

"I told her that part of the growth of being here is perspective," Walker explains. "She would have to, on some level, be a teacher to people who weren't familiar with her culture or where she was from. She could look at that negatively, or she could look at it positively, as a way she could make an impact on the education of other people. We talked a lot about it. I just told her, 'You've got to give it a chance, absolutely don't transfer out. It's too early.'"

It wasn't always what Thompson wanted to hear. But she also knew people back home were counting on her.

"I kept thinking, 'I'm on track to graduate—with both of my degrees,'" she says. "I had this community that was really supporting me and really looking up to me, and I didn't want to let them down. So I just kept my eyes on the plan."

SOLUTIONS

Thompson never did transfer. After all, she enjoyed her classes, liked her professors, and was even forging close friendships. Instead, she set about fixing the problem, for the good of the university she was beginning to feel a part of—and for the sake of future students like her. First, she got involved with the Admissions Office, volunteering to

assist the coordinator of multicultural recruitment.

"It was about reaching out to get more students, making them feel comfortable, getting the different groups on campus to be a part of the recruitment process, to show that there is a support system," Thompson explains.

She helped organize events, became a campus tour guide, and coordinated overnight visits. For a while the role became almost a full-time job as Thompson—along with two other student interns she trained and supervised—took it upon herself to reach out to high school students of color who had begun but not completed the application process.

"I called them, emailed them, helped get them whatever support they needed," she says. "If I couldn't get them, I would call their guidance counselors. I would call their homes. Sometimes it was something as simple as their teachers forgot to submit their letters of recommendation, or they forgot to submit their scores. I just wanted them to have whatever they needed to get a foot in the door. And in the end we got our numbers up, so that was really exciting."

In 2012, the year Thompson enrolled, 557 students—10 percent of the student body—were members of underrepresented minority groups. By 2016 the numbers had ticked up to 750, or 11 percent, and last year there were 809, or 12 percent.

"She significantly impacted the admission decisions of many students of color," says Walker. "I think she made a huge difference."

Thompson's work also fit into WPI's larger effort to become a more welcoming place for engineers of all backgrounds.

"Diversity used to mean you had a double-E with a mechanical engineer," says Debora Jackson '89 (MS MG), '89 (MS ENG), currently the only black member of the WPI Board of Trustees. "This is something we're now having conversations about, as a board. If project-based learning is our bedrock, we want teams with racial, ethnic, and cultural diversity, so that the best teams and the best solutions come together."

Thompson helped WPI take steps toward that vision, says Jackson, who was matched with her as a trustee mentor in her junior year.

"And she did it all while maintaining a stellar academic record and keeping her career dreams always at the forefront of her mind," says Jackson. "I knew she was going places. I was just proud to get to walk with her for a couple of years on that journey."

In February 2018, Thompson went back to WPI for an event that had recently become a highlight of the social calendar, the Black Student Union's annual fashion show.

"It was phenomenal," she says. "Even the president goes. They've gotten some up-and-coming-artists to host the fashion show, which is like, 'Whoa! I never would have imagined this before.' They have designers from all over come and participate. It's become a really big show."

The evening was bittersweet—if only she had been able to attend such a gathering as a student, she thought—yet satisfying, because it represented the culmination of all the hard work Thompson and others at WPI had put into recruiting diverse students and building a community of engineers of color at WPI.

"It definitely has gotten a lot better," she says. "I kept in contact with some of the Admissions staff, and they would tell me, 'Your work is paying off! We increased our percentages by this amount!' When I visit campus I can see it. I can see that there are more black and brown faces, which is really exciting. And they're getting to know each other, supporting each other, building a community."

Thompson missed this year's fashion show, but she had a good reason—last fall, she gave birth to a daughter, Yasmina. It was no easy feat balancing parenthood with work at the Stacy's plant, but motherhood has also fueled her ambition.

During a few weeks of well-earned vacation after leaving her Stacy's position in July, Thompson enrolled in an accounting course online before starting full-time at Harvard Business School in the fall. She knows she is likely to face the same microagressions and cultural clashes she encountered during her first few semesters at WPI. Now, though, she considers herself better prepared to confront them, and to help pave a way forward for those who come after her.

"The biggest thing I want to do, and what I'm building my life upon—besides Yasmina—is showing people like me that they can do what I've done," Thompson says. "It's not going to be easy, but black and brown people deserve to be at WPI, and at Harvard, and in engineering and business, just as much as anybody else, and they can't let anyone tell them otherwise." J

WPI'S VALUES STATEMENT

We at WPI are a community that stands for civility and respect. We stand for acceptance of others and champion those who may need compassion and understanding. We are an inclusive community that respects peaceful discord and upholds a fundamental belief that all members of our community deserve to feel safe. Our collective mix of thoughts and experiences enrich those fundamental values that have long guided our university. As we navigate through times of change, know that our values remain.

As our Values Statement clearly attests, diversity, inclusion, and equity are crucial to our success as a leading research and technology institution—they impact the experiences of each member of our campus community.

Below is a list of recent initiatives that WPI has put forth in its ever-constant mission toward a more inclusive community.

February 2017: Great Minds, Brave Spaces Speaker Series features topics such as gender, race, and intersectionality.

March 2018: Dear World, an interactive art-on-skin project, provided an opportunity for students, faculty, and staff to share meaningful experiences that have helped shape their lives. The collaborative event sponsored by multiple departments was a new way to begin a conversation on sharing stories, celebrating the power of storytelling.

January 2019: Inaugural WPI MLK Commemorative Address was a campus-wide event offering the entire community a chance to reflect on how King's activism was not confined to race but, in fact, spread deep into other areas of social justice.

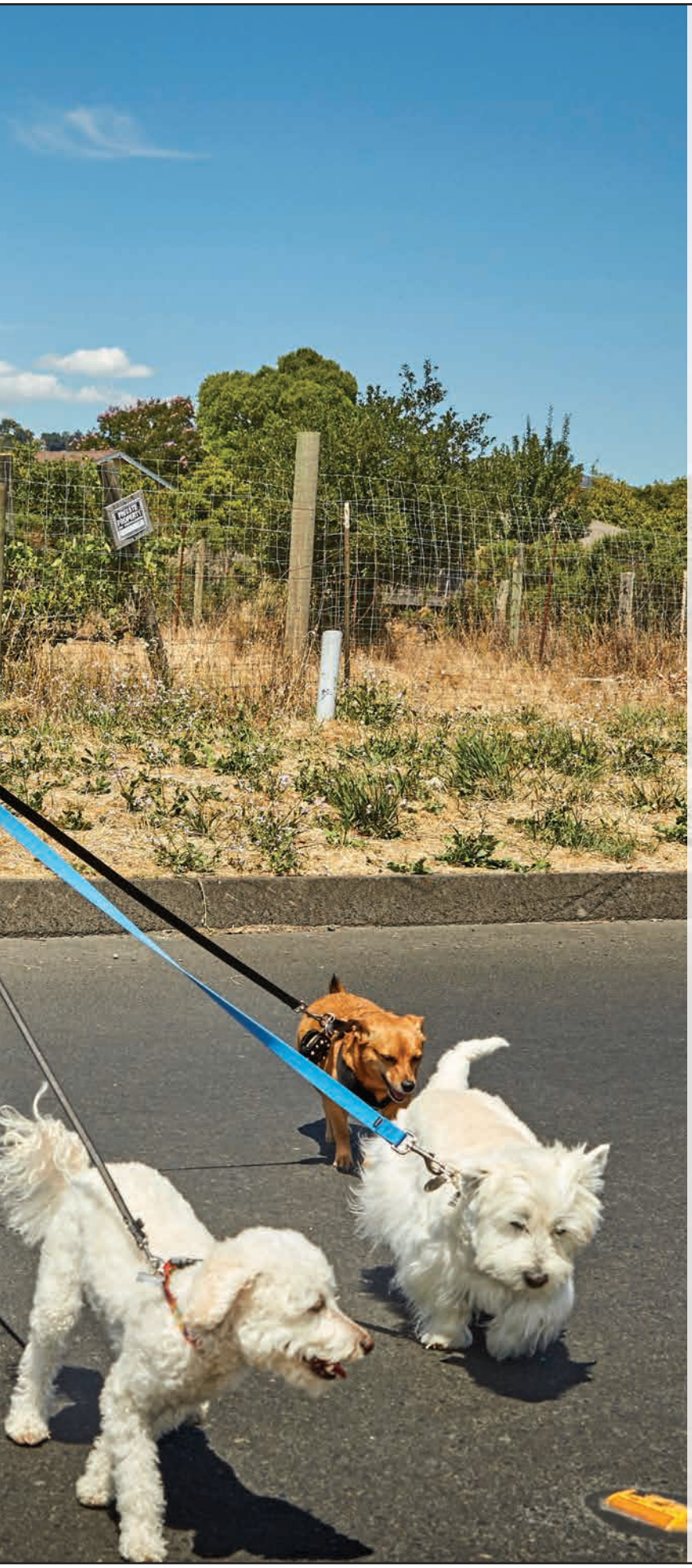
March 2019: Inclusive Excellence Employee Resource Groups are employee-led, self-directed voluntary networks that provide support, advocacy, education, and mentoring to staff and faculty.

April 2019: Inaugural Lavender Reception was held for Lavender Graduations—commencement ceremonies that honor lesbian, gay, bisexual, transgender, queer, and ally students—and acknowledged their achievements and contributions to the WPI community.

Learn more at wpi.edu/+diversity

Yesowitch and some of his clients on a vineyard path in Napa, California.

PHOTO MATT FURMAN



George Yesowitch ’73

knew he wanted to pursue a chemistry degree at the ripe old age of 12. Earning enough money to buy a Gilbert chemistry set at 13, he found himself hooked. Fast-forwarding to his parents’ requirement of a college no more than a five-hour drive from their home on Long Island, Yesowitch says he had multiple choices in that category—but he liked WPI best among them.

Freshman Orientation is where he met his future TKE brothers, along with more enthusiastic classmates than he ever could have imagined. “It was a huge change in lifestyle from living at home,” he recalls. “The biggest takeaway from my time at WPI is probably fraternity life and the care of the professors as educators and mentors.”

Before his recent retirement, he had established a successful career as a VP in sales and marketing at such companies as Process & Cryogenic Services and Praxair; in 1994 he founded his own company, UltraFluid Systems and Services.

Through it all, he says, he has held positions that required a technical degree. “I learned how to uncover problems and relay the solutions in ways that were cogent to technical and non-technical clients.”

He talks about the many high points in his career—installing the largest wireless radio data system in the world at Genentech, building a state-of-the-art semiconductor lab for Lockheed, helping salmon farming start in Northern California, and replacing chlorine with oxygen bleaching at a large paper mill for the first time [it is now common at all U.S. paper mills].

So what does a successful retired gentleman in Napa do with his newfound freedom? He starts a new business, of course!

“My wife wanted to plan for all aspects of retirement,” he says, “She decided I’d need something to do and assure that I get exercise.” His spouse of 21 years, Irene (a Cornell grad and managing attorney for Cozen O’Connor’s San Francisco office) had the epiphany of a dog walking business in 2015 and, within a tail’s wag, Walks by George! was born.

“Walking dogs is a pleasure, even when the weather isn’t very friendly,” says Yesowitch. Typically averaging three or four miles a day, he divulges that being paid for a walk is the perfect retirement job. “Getting out, meeting the neighbors, seeing the beautiful neighborhood … I am simply loving it.”

—Doreen Manning

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Come back to Worcester for a weekend of celebrating the old and the new—the places, friends, and memories that made and continue to make your WPI experience special.

MAY 28-31

wpi.edu/+alumniweekend

FROM THE DESK OF
MARK MACAULAY '89, '94 MS

Alumni Association President

TO DO

WPI Hall of Luminaries 2019—Learn about the second class of inductees and register for the celebration on Oct. 24 at wpi.edu/+luminaries.

Revisit the fun of Homecoming 2019—wpi.edu/+homecoming

CONGRATS

To the newest members of the WPI Athletic Hall of Fame, inducted at Homecoming See previous page for more information

To WPI on breaking ground on a new academic building and earning another challenge grant from the Alden Trust

To Robotics Engineering—celebrating its 10th anniversary

COMING SOON

Giving Day!—On Dec. 3 join the worldwide WPI community to make an impact with your gift. Start following Nov. 1 at wpi.edu/+givingday

Yes, we're putting it out there now—Alumni Weekend 2020: May 28–31

So many more opportunities to attend events and get involved—wpi.edu/+techconnect

THREE THINGS ALL GREAT ALUMNI DO

GO *to events*

GET *involved with WPI*

GIVE *to WPI*

wpi.edu/+alumni **wpi.edu/+give**

PHOTO PAT O'CONNOR

Four Generations *Strong*

The WPI lineage of Kim Main Heard '91 stretches back 100 years to just after World War I when her great-great-uncle enrolled in the mechanical engineering program. Altogether, 10 relatives spanning four generations have graduated from WPI. And now her daughter, Rachael Heard '17 works at the university.

Howard A. Mayo, 1919, went on to become a member of WPI's Board of Trustees in the 1950s. His son, Howard A. Mayo Jr., and nephew, Ken Mayo, graduated from WPI in the 1940s. Another nephew, Eric Rorstrom '59, was admitted a decade later. Rorstrom had wanted to be an engineer since he was a high school sophomore. His teachers encouraged him to apply to WPI.

"Most of the industry couldn't wait to hire our folks because they knew we were strongly taught engineers and we would be very effective," says Rorstrom, who earned the nickname "Dr. Thermal" for his work designing power plants. As a senior, he helped found WPI's Zeta Mu chapter of Tau Kappa Epsilon. That's also when he met his future wife, Priscilla, the sister of fraternity brother Irving Freeman '61. [Remember Irving. We'll meet him again later in the story.]

Eric Rorstrom's grandniece, Kim Main '91, wasn't aware of her family's ties to WPI when she learned about the WPI Plan at a college fair and applied to the biotechnology program.

"When I told my grandmother I got in, she told me about all of these men in my family who went to WPI. I was shocked. Not to get sappy about it," she says, "but I feel like it was meant to be."

Irving Freeman still lived in the area and agreed to give Kim and her mother, Carolyn, a campus tour. A romance bloomed between Irving and Carolyn … they married in Kim's freshman year.

Kim thrived at WPI, where she learned how to hold her own in what was then a male-dominated environment—a skill that she calls upon in her current role as safety advisor at Yale University. "Having WPI teach me how to be self-confident and stand up for myself in a room full of men has been absolutely essential for me," she says.

Kim was a junior when she began dating Derek Heard '90, a management engineering major. They married several years later.

"I found my wife at WPI, so I knew she was smart," Derek quips.

Around the time Kim and Derek were starting their lives together, Kim's cousin Neesa Tristano Lehman '96 became a WPI student.

Kim and Derek settled in Connecticut. Kim earned her master's degree in occupational, safety and health management from the University of New Haven and Derek now works for DXC Technology as a global delivery executive. After their children, Michael '14 and Rachael '17, were born, the family made frequent trips back to WPI for Homecoming and events at Derek's fraternity, Sigma Pi.

When it was Michael Heard's turn to apply to schools, his parents encouraged him to include WPI on his list. He was accepted and enrolled in the newly created aerospace engineering master's program. He earned his BS/MS in 2014 and began working at Textron in Wilmington, Mass.

Rachael Heard knew from the start that she wanted to attend WPI. One of the first things she did upon arriving on campus was join the cheerleading team (which she now coaches). She majored in biotechnology but her IQP in Namibia sparked her interest in working with students. She earned a master's degree in higher education from Boston College, then returned to WPI to become the assistant director of multicultural affairs.

"I think it's wonderful that my family was able to pave the way for me and my brother and mom and dad. It makes me feel, for lack of a better term, satisfied," she says. "I feel like this is where I belong. It's home. Now that I work here, it just feels right. Like this is where I'm meant to be."

–Sharron Kahn Luttrell

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Win '59 and Susan Priem endow Senior Gift Challenge

4

5

INSPIRING
STUDENT GIVING

Win Priem '59, a WPI trustee emeritus, and his wife, Susan, have inspired WPI students to give back to their alma mater by sponsoring the Senior Class Gift Challenge every year since 2002. The Priems recently made a $1 million commitment to WPI, endowing the Senior Gift Challenge and ensuring it will continue in perpetuity.

The Senior Class Gift has been a WPI tradition dating back to 1910 and has marked the campus and WPI community with physical legacies (our beloved Goat Statues from the classes of 2009 and 2013 and beech tree from the class of 1943) and non-physical ones such as scholarships and program support.

By the early 2000s, giving by the graduating seniors had started to decline. Win Priem, by then a WPI trustee, took notice. At the time, he learned that another area college's senior class gift was more than $10,000—and at WPI the total had not even broken $1,000. Priem believed that 700 graduates going on to successful careers thanks to their WPI education could do better by their alma mater. He decided to provide some inspiration and started the Senior Class Gift Challenge.

In 2002, Priem, the former president and CEO of the world's largest executive placement firm, Korn/Ferry (NYSE), and Susan offered to match up to $15,000 raised for the Senior Class Gift—if at least 40 percent of graduating students participated in giving. Since then students have been inspired year after year, successfully meeting the challenge and adding the Priems' generous matching funds to their Senior Class Gift totals. In recent years students have stepped up to meet an even tougher challenge from the Priems: 40 percent participation from the graduating class and $10,000 raised.

The Susan S. and Windle B. Priem '59 Endowment raises the stakes a little higher. To achieve the matching funds, the graduating class will now need to reach 40 percent participation and raise $15,000. This generous contribution from the Priems, and the inspiration it provides to students and young alumni, comes as WPI is in the leadership phase of its next major fundraising campaign.

"WPI taught me a disciplined approach of thinking that has helped me through the years and throughout my career, more so than my education at Harvard Business School and Babson," Priem said.

"We need these great young people to continue supporting WPI after they graduate to pursue their career goals so that future generations will have the same opportunities."

—Judy Jaeger

PHOTO CAPTIONS 1. CLASS OF 2018: GLACIER NATIONAL PARK PROJECT CENTER SUPPORT **2** .CLASS OF 2015: MOSAIC IN THE GORDON LIBRARY AND SCHOLARSHIP ENDOWMENT **3.** CLASS OF 2019: GLOBAL LAB IN THE FOISIE INNOVTATION STUDIO **4.** CLASS OF 2013: CHARGING GOAT STATUE **5.** CLASS OF 2014: GARDEN SWINGS AT HIGGINS HOUSE

Kasparian sits in his daughter's room, with her rescue dog Brody.

PHOTO KATHLEEN DOOHER

KEEPING HER MEMORY ALIVE

HARRY KASPARIAN '73 MAKES SIGNIFICANT GIFT TO HELP SAVE LIVES

When Julia Kasparian took her own life in 2016 at just 23 years old, she left a devastated family grappling with unbearable shock, heartache, and hopelessness.

Julia suffered from major depression, which was evidenced by marked low self-esteem and feelings of unworthiness to reach out and connect with people.

Harry Kasparian '73, Julia's father, knew more work had to be done on the dissociative states and episodes of Julia's diagnosis; these elements were especially complex and overlapped with other psychiatric disorders, making them extremely difficult to treat.

"What my daughter went through was horrible," says Kasparian, CEO and founder of CTI, a consulting firm that helps companies implement advanced data analytics solutions. "Knowing that someone you love suffers in anguish is devastating. It's especially frustrating because it's hard to relate to their pain as you would to a physical illness. People saw Julia as a thoughtful, funny, 'A' student at Bates College, unaware of her exhausting lonely battle with self-hatred, depression, and feelings of hopelessness."

While losing Julia often left Kasparian feeling hopeless, he strives to keep her bright light and memory alive, and recently donated a major gift to WPI, which established the Julia Kasparian Fund for Neuroscience Research.

Neuroscientist Jean King, WPI's Peterson Family Dean of Arts & Sciences and professor of biology and biotechnology, says the gift will support research aimed at the prevention, early diagnosis, and treatment of mental illness, with a particular focus on dissociative disorder.

Kasparian also established the Julia Kasparian Endowed Scholarship at WPI, which will honor Julia's life and help support female students studying under a newly established neuroscience program that began this fall.

The gift, coupled with a separate gift to the Dissociative Disorders and Trauma Research Program at McLean Hospital, will support a unique, collaborative research effort by neuroscientists, computer scientists, and bioinformaticians at WPI and clinical scientists at McLean to better understand the neurological underpinnings of mental health disorders.

"We see a very promising opportunity in mental health research to apply computer science, bioinformatics, and data analytics to psychiatric neuroimaging and clinical research," says King, whose work has focused on neuroscience, neuroimaging, and psychiatry. "Closer collaboration across these fields will help translate research findings into clinical diagnosis and treatment."

The research will be led at WPI by King in collaboration with colleagues Dmitry Korkin, associate professor of computer science and director of the Bioinformatics & Computational Biology Program; Xiangnan Kong, assistant professor of computer science; and Mohamed Eltabakh, associate professor of computer science. The Dissociative Disorders and Trauma Research Program at McLean Hospital will provide the WPI team with existing de-identified behavioral and genetic data along with fMRI brain scans from patients with dissociative disorders and similar mental illnesses.

King says this is the first time at WPI that a team will examine dissociative disorders, and she hopes that the analyses reveal more information about these conditions and inform the direction of future studies and treatment.

"Neurological research has always been fascinating and fulfilling to me. But talking with someone like Mr. Kasparian, and hearing him describe his daughter's suffering and her devastating loss, inspires me to bring the research as close to clinical application as I possibly can," says King. "We need to treat mental illness as individually as we do other illnesses, like different types of cancers. I hope this research can help us better target our diagnosis and treatment of patients."

Kasparian echoes King's aspirations for the research and hopes that the team's findings will lead to greater understanding of dissociative disorder and new discoveries.

"My hope is that this collaboration will help find a way to identify those at risk and tailor individual treatments for the best outcomes," he says. "It's so sad. These people don't want to die, they just want to stop hurting. We'll do everything we can to understand how people get to the point of considering suicide and to come up with new ways to save their lives."

– Jessica Messier

ALDEN SOCIETY

HAVE YOU INCLUDED WPI

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

Membership is about giving you recognition NOW for your plans to support WPI in the FUTURE.
To join, visit **plannedgiving.wpi.edu**.

FOR MORE INFORMATION

Contact Lynne Feraco, Executive Director of Gift Planning
888-974-4438 | lferaco@wpi.edu

"BASED ON MY INTERACTION WITH THE STUDENTS ON CAMPUS AND MY INTRODUCTION TO THE WPI PLAN FROM PROFESSOR JOEL BRATTIN, I BELIEVE MY COLLECTION WILL HAVE A SIZABLE IMPACT AT WPI."

— DAN RYAN

Though he earned his chemical engineering undergraduate, master's, and PhD degrees from another university, Dan Ryan and his wife, Alice, have bequeathed his impressive Dickens collection to WPI.

"This will provide a major upgrade in what we can offer to our students in terms of teaching—not only about the life, world, and works of Charles Dickens, but also a lot of the morality lessons that go into creating humanist engineers."

—Arthur Carlson, *WPI archivist*

1937

At 103, **Mort Fine** appears to be WPI's oldest living alumnus. Of his class, only **Frank Rollins** is unaccounted for. Anyone with information on Frank can contact informationupdate@wpi.edu.

1949

Margaret Sanborn writes with news of the death of her father, **Malcolm Sanborn,** on April 30, 2019. "My father was a proud member of WPI's Class of 1949 and proud of the engineering skills he honed there. After WPI, he earned master's degrees at the University of Virginia and Syracuse University. He enjoyed a 35-year career as a senior systems engineer at IBM, holding some three dozen patents for innovations in his field. He was honored by IBM for his work on robotics in computer chip manufacturing. He is survived by my mother, Anne, with whom he shared many fond memories of WPI and the friendships they formed there." Margaret notes that Anne still reads the *WPI Journal* as a link to Malcolm and the memories of meeting him more than 70 years ago in Worcester when she was a student at Becker. "In fact, she's carrying the most recent issue in her Rollator tote bag. She's 91 now, and memories are everything to her."

1955

John Calhoun is now in a nursing home, but remains in contact with a WPI contingent in the Plymouth, Mass., area. "The man across the hall is **Jack Barrett '46,**" writes his daughter, Mary Jane Calhoun-Donelan. John's sons are **Jack '82** and **Dave '84,** and his son-in-law is **Jim Bundock '86.**

"My Dad grew up in the shadow of Boynton Hall, at 34 Westland Street," she says. "He received his U.S. Navy commission in 1955. He worked in his major, mechanical engineering, for the local Heald Machine Co. He earned a graduate certificate from WPI's School of Industrial Engineering in 1981, and he became VP in charge of Human Resources at Heald. It's interesting to have so many 'Engineers/Goats' here in Plymouth, America's Hometown, which will be 400 years old in 2020."

1956

Darlene Gunn informs us of the death of her husband, **Charles Gunn,** on June 13, 2019, after a long battle with dementia. "Charlie spent over 43 years in community service and 39 years as an employee of a utility company. He enjoyed many hobbies: his favorites were antique automobiles and traditional jazz music. He served as board member and president of the National Ford V-8 Club of America, and as board member and volunteer of the Greater Connecticut Traditional Jazz Festival. He enjoyed people and life."

1957

Carol France writes, "It is with much sadness that I am writing to inform you that my husband, **Kurt France,** died on May 22, 2019. He was so proud of his school, and loved to attend his reunions."

Marion and **Spike Vrusho** were recognized as "Genies" at an awards ceremony at the Vero Beach Theatre Guild, where they served as judges in the organization's annual competitions, including best actor, best actress, best play, and best director. As Genie judges, they attended all six of the Guild's presentations; as benefactors, their names were placed on a plaque on a donor remembrance wall.

1958

WPI received word of the death of **William Segulin,** who started with the Class of 1958 and studied electrical engineering from 1954 to 1956. "He was a member of the 1954 undefeated football team," notes his wife, Nancy.

1963

Bob Magnant writes, "I just published my sixth Apple Book, *INCREDIBLE Storytelling!* It's 200-plus pages, with a separate Appendix of approximately 100 pages of my personal reviews, lists, and blogs. We are all storytellers, and by promoting some understanding for traditional communications and the ways of writing that the earlier generations learned, I hope to influence my grandbabies and users of these powerful devices in the iPhone/Internet/Information era. This book summarizes the ideas that I have been sharing with everyone in my earlier iBooks. Go to magnant.org/Cyberspace/storytellers.html for a free download."

1973

Diane Pritchard Clayton (MS CS) writes, "I recently became a certified Lay Servant in Zion UMC, and I'm working to become a certified Lay Speaker. I'm also a Lay Leader in my church."

George Yesowitch writes, "I am retired after a career mostly in sales and sales management, selling to high-tech companies, including Bay Area chip manufacturers, refineries, and biopharmaceutical companies. I've lived in the San Francisco area since 1977 and now reside in Napa, with Irene, my wife of 21 years. We have two daughters and two West Highland White Terriers. We plan to spend some of the year traveling to London, Manhattan, the Riviera Maya in Mexico, and Oahu, Hawaii. Between 1994 and 2002 I had my own manufacturers' rep firm. I now have a small dog walking business—Walks by George!—to keep myself busy and well exercised." Read more about George's new career on page 44.

1975

Barry Braunstein writes, "After a long career in high-tech marketing and sales, I have started a second career as a business and individual headshot photographer. You can check out my work and my services at barrybraunsteinphotography.com.

Judy Nitsch was honored at WTS-Boston's 23rd Annual Leadership Forum for her 40+ years of "commitment to building better communities and the vision and skillful strategy that have made her a leader." according to the organization's website. She was introduced by board president **Sarah Dennechuk '99,** who acknowledged Judy's role in guiding her to WPI as a high school senior through a letter with the general message, "Please come to WPI – it's a terrific school."

Judy writes, "The Admissions Office asked me to write those letters to all accepted women. I did that for several years—amazing to hear the impact of those letters so many years later. Sarah clearly is a proud alumna! At the time, I never thought I'd meet her and, of course, now I've known her throughout her career!"

1976

Denis Villiard retired from Sensata Technologies, formerly Texas Instruments, after 36+ years. He held various positions throughout his career, in engineering, operations management, and quality assurance, as well as product and program management. As a member of the technical staff, he was recognized by both TI and Sensata for his expertise in electroplating, and for consulting on numerous designs and products. Denis also achieved Certified Quality Engineer status as a member of the American Society for Quality. He and his wife, Joan, have sold their home in Mansfield, Mass., and moved to Sarasota, Fla. Classmates at a send-off party included **Richard Escolas, Mary Polanik Sherman, Paula Belair Zukas,** and **Walter Zukas.**

1977

Domenico Grasso is chancellor of the University of Michigan-Dearborn. He was interviewed in the *Detroit Free Press* on his goal of "holistic learning" and his plans to double the school's size in about five to 10 years.

1978

Michael Beaudoin shares that the 1978 FIJIs gather frequently for large reunions and smaller get-togethers. A recent outing brought together classmates Ray Dunn, Tom Medrek, Mike Beaudoin, and Tony Fernandes for some camping and paddling through the Okefenokee Swamp in Georgia.

Geof Narlee '19 Took the Long Road to a Diploma

My own little history is not some great journey, but rather a lifetime of errors and adjustments. I enrolled at WPI in 1976, having attended college in Michigan while working on a Ford factory line. WPI had just started its unique focus on project-based learning, perhaps a callback to Ichabod Washburn's original charge that "every student should blend theory learned in the classroom with practice in the shops."

I've always been interested in buildings, so I entered Civil Engineering, planning to become a structural engineer. During summer jobs with contractors, I realized I loved the personal interaction of the jobsite. It struck me that the life of an engineer might largely be a desk-bound existence of sizing of beams and columns all day—an ignorant misconception, I now see. I left to work in construction and foolishly decided I had no use for a formal degree.

After about 20 years in that business, I came to realize that my personality fit was better suited to the design side of things, more specifically in architecture. I joined an architectural firm and took some courses at Boston Architectural College. However, three kids and life took over, sidelining my education as I jumped into my own modest design practice.

My youngest graduated from college in May 2017, freeing me to advance my own ambitions. Returning for my WPI degree let me reconnect with my past, and graduation gave me a sense of accomplishment. I'm grateful to everyone I interacted with there, from the faculty to the Registrar's Office to the staff of the Gordon Library Archives. I needed to acquire a copy of my 40-year old MQP, which was buried somewhere in one of six offsite warehouses, and Archives managed to unearth it in a week and a half!

In my work I have spent countless enjoyable hours solving people's problems—I think that speaks to the WPI mission. I still recall the dean of students telling us to work our tails off studying for exams, but to take the night off prior to relax. Prepare hard, give yourself space, execute—good life advice!

1982

Trustee **George Oliver,** chairman and CEO of Johnson Controls, received the 2019 Fire Department of the City of New York Foundation Fire Commissioner's Humanitarian Award for the company's continued support of the FDNY and FDNY Foundation.

1983

Joel Kearns received his PhD in materials science and engineering from WPI on May 9, 2019. His thesis was "Origin of Growth Twins During Czochralski Growth of Heavily Doped, Dislocation-Free Single Crystal Silicon," under the direction of Professor Diran Apelian. Kearns has conducted materials science R&D on semiconductor single crystals since 1985. After serving as deputy director for Space Flight Systems at NASA Glenn since 2013, he was promoted in March to director of Facilities, Test and Manufacturing, at the NASA Glenn Research Center in Cleveland, Ohio.

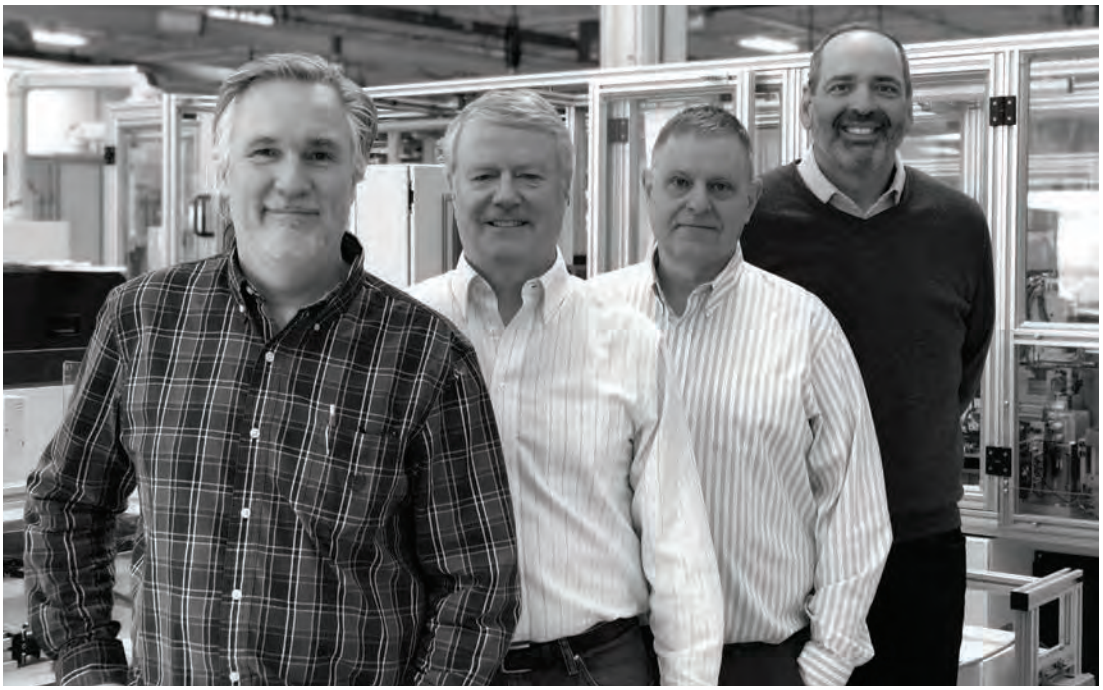
Eric Soederberg, president of Sunrise Labs, received the 2019 New Hampshire Tech Alliance Entrepreneur of the Year award. His career includes over 20 years of product development leadership at Draper Labs and Motorola. He was also part of the DEKA team that brought the iBOT mobility to market. Sunrise, in Bedford, N.H., specializes in developing medical device and life science instrumentation.

1984

Lee-Anne (Charbonneau) Dullea writes, "I was sorry to miss our 35th reunion but I was in France with my daughter and son celebrating his graduation from the University of Maryland. I continue in my role as director, Special Defense Operating Unit, of Northrop Grumman Undersea Systems in Annapolis, Md., where I've worked since we graduated. I've had positions in almost every part of the organization and have loved it. I never would have guessed that I'd be doing what I'm doing!"

1985

Eric Peterson is co-owner and co-president of engineering of Innovative Products and Equipment, along with partners **Kevin Prince '84** (operations) and **Dale Beaver '82** (technology). The only IPE partner who did not graduate from WPI is Rich Brownstein (business development). The privately owned company is in the custom automation equipment industry, servicing mostly medical companies. "We have been in business for almost four decades, with $40M in sales last year," they write. The company, now located in Hudson, N.H., was purchased by the senior management in 2004, and has grown to 80 employees. Engineering services, which include product and process development, cater to clients whose products require special consideration, such as automated assembly in a clean environment, or whose automation equipment must pass exacting validation procedures.



CONGRATULATIONS

2019 Athletic Hall of Fame Inductees

These outstanding individuals were celebrated at the 37th-annual Athletic Hall of Fame Banquet on Friday, Oct. 4, in the Rubin Campus Center.

JOHN BIBINSKI '84, Football

KRISTEN (GARZA) READER '11, Women's Soccer

STEVE GRAVELINE '87, Wrestling

DON MAKI '80, Baseball

LARRY NOBLE, Men's Rowing Coach

JASON STEELE, Women's Rowing Coach

Correction: The Summer 2019 WPI Journal incorrectly listed Oct. 4 as the date of the WPI Hall of Luminaries event. Join us for that event on Oct. 24!

1988

Chrys Demetry writes, "I've been selected to participate in the 2019–2020 cohort of the Executive Leadership in Academic Technology, Engineering and Science (ELATES at Drexel) Program, which involves three weeklong residencies. I was nominated by Provost Wole Soboyejo and supported by deans Art Heinricher and John McNeill. I'm excited to be selected and to participate."

1989

The 2019 WPI team that competed in the Frostbite Face-Off in Fairlee, Vt., in January included (from left) **Michael Fitzpatrick, Kevin O'Connell '89, Billy Hamilton '90, Mark Macaulay '89, Chris Altemus '87, Kevin Fitzpatrick '90** (Michael's brother), and **Paul Pelkey '89.** "We're all WPI grads, and all played together on the hockey team, with one exception," Michael writes. "Just think, we've skated with each other for more than half our lives, (except Billy who wasn't on the team), but we've all known each other for decades."

1990

David Black was promoted to vice president of Global Operations & Facilities Management at Fortune 500 UnitedHealth Group, out of the Twin Cities. A registered civil engineer, he has been with UHG for six years; prior to that he was with the U.S. Navy Civil Engineer Corps, Northwest Airlines (facilities design and properties), and, more recently, transportation infrastructure consulting firm HNTB ("design-build, design-bid-build operations and project management," he writes). "I received my MBA from the University of St. Thomas. Now I'm happily married and a proud father of four. Recent college visits have brought back many great memories of WPI. I wish all my fellow Engineers well!"

John Lombardi and **Bradley Howard '89** hadn't seen each other since parting ways at WPI in 1990, but recently met up again when they co-judged high school student chemistry projects at the Intel International Science & Engineering Fair held in Phoenix. John writes, "We had kept in touch via social media, but it was great to spend time reminiscing about the past and suggesting that some of the science fair participants consider continuing their project interests at WPI."

1991

Mark Cloutier was named director of project management at Clear Automation in Southington, Conn.

1992

Jim Kokernak sends this update from Niskayuna, N.Y. "I'm excited to announce that our daughter Charlotte has committed to run for the WPI women's track and cross country teams under Coach Brian Chabot. She will be joining WPI's Class of 2023 as a 3rd generation legacy and plans to major in biomedical engineering."

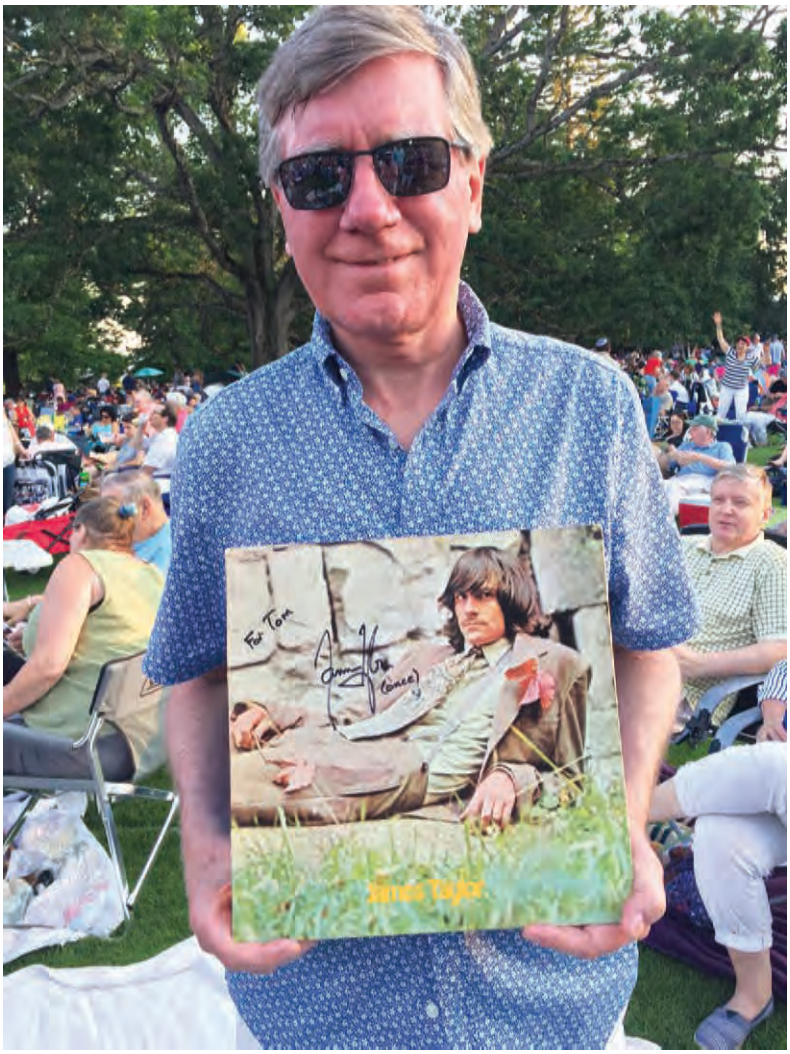
1995

USAF Colonel **Spence Cocanour** continues as Vice Commander, 24th Special Operations Wing, Air Force Special Operations Command, Hurlburt Field, Fla. He was a recent guest speaker at the monthly meeting of the Greater Navarre (Fla.) Area Chamber of Commerce Military Affairs Council.

1999

Sarah Dennechuk is president of WTS-Boston. She currently serves as senior project manager, Horizontal Projects, in the Massachusetts Port Authority Capital Programs and Environmental Affairs Department.

Patty Leavenworth (MS CE) was selected as Woman of the Year by WTS-Boston. Her career includes 32 years with the DOT, where she became chief engineer of the Highway Division in 2013. She and her teams work to deliver a $1 billion construction program annually, with hundreds of projects in 351 towns and cities across Massachusetts.



Beatty's Tanglewood with Taylor

While many people might dream of going to Carolina in their minds, **Tom Beatty '04 (MS MM)** got to go to Tanglewood for real as a guest of his favorite singer/songwriter—for James Taylor's July 3 performance. Beatty and his wife, Anne, were welcomed by Taylor, who chatted with them before the show. "The whole adventure was amazing," says Beatty. "When I pulled out the album cover he was impressed and happily signed it. I told him I bought it when I was a senior in high school."

The "adventure" began during Beatty's retirement celebration at Catholic Memorial School in West Roxbury, Mass., where he had served as teacher, coach, math department chair, and the school's first alumnus-principal. At the conclusion of a video of moving tributes came the words "Just one more thing …." Then onscreen was Taylor himself, offering congratulations and commending Beatty for singing "Carolina In My Mind" with a student during the school's National Honor Society induction ceremony.

"I can't remember a moment in my life when I was so completely overwhelmed with amazement at what was happening in the moment," Beatty said about the surprise greeting.

"Congratulations to you, sir, on 50 years of service," Taylor said, adding, "I'm in the same boat—basically 50 years in." The video got more than 30,000 views and hundreds of likes on Taylor's official Facebook page.

Beatty called Taylor's Tanglewood performance an amazing show, but he admits, "I have to say I think his version of 'Carolina' was a tad better than when my student and I sang it."

2001

Lizabeth (Amaral) Leveille ('02 MS BT) is head of the Merck Boston Innovation Hub, a business development & licensing team focused on early-stage therapeutics (prior to human proof-of-concept). Before that, she worked at the Novartis Institutes for BioMedical Research (NIBR) in the Strategic Alliances department. She holds an MBA from the F.W. Olin Graduate School of Business at Babson College.

2002

Luke Connery was named senior manager at Conquest Firespray.

Sara Swiatlowski writes, "In June, **Howie (Rappaport)** and I celebrated my cousin's graduation from Ware High School. Shelby Tweedie is now a first-year student at WPI. We are so excited for her."

2004

Jeremy Hitchcock joined the Zoom Telephonics board of directors.

Emily Nodine and **Mike Wilson '01**, who met on the WPI ski team and were married on the Aerial Tram in Jackson Hole, Wyo., in 2015, recently left their engineering careers to found Maine Craft Cannabis, an organic, fully compliant medical cannabis farm. "Indoor farming actually requires quite a bit of engineering to properly control the climate and growing environment," they write, "so our engineering skills are being put to good use in their new roles! We are very excited about having the opportunity to participate in the emerging legal cannabis industry and are excited to continue to grow our company." Learn more at mainecraftcannabis.com.

2011

Janese Cerulli works at Rubius in Smithfield, R.I., an R&D lab with headquarters in Cambridge, Mass. She writes, "I have been asked over the years, 'If you could do it again would you go to WPI?' Initially there was some slight hesitation giving a firm 'Yes,' but over

the years I have been able to answer that question more confidently, 'Of course!' I recently had a revealing moment that made me even more happy to have gone.

"I was asked to help the plant manager on a project to charter a cross-functional/cross-site initiative. A huge opportunity for me, but it has such an MQP feel and dynamic. Having experienced MQP, and now being part of this initiative at work, I have the confidence I can be successful in such a large-scale project! I am grateful for my experience at WPI even though it was challenging. I hope to be able to give back to the school with a scholarship for someone like myself who almost couldn't go to WPI."

Linnea Paton received the Young Energy Professional of the Year award from the New York Association of Energy Engineers for her work in energy engineering and climate change advocacy. She is an energy and sustainability manager at JLL, where she works to increase energy efficiency and reduce carbon emissions in corporate real estate portfolios. She was also a founding member of the successful campaign to divest New York City pension funds from fossil fuels. "Much of my passion for energy work stems from my involvement with WPI Students for a Just and Stable Future, which I founded in 2009," she writes. Linnea lives in Brooklyn, N.Y.

2013

Georgi Kardzhaliyski writes, "Hello WPI alumni. I'm challenging myself by running over 120 km to raise money for Teach For Bulgaria. You can help too, by donating to my GlobalGiving fundraiser to provide every child in Bulgaria, my home country, with equal access to quality education and place teachers in all classrooms, including remote locations where they are most needed." He adds, "I've been using WPI's TechConnect to share updates and stay connected with the WPI Alumni community, with stories about the random acts of kindness from faculty members, staff, friends, and the Worcester Rotary Club that came my way during my time at WPI.

"One is about the time my ESL teacher invited me for Christmas dinner with her family. I was a sophomore, hadn't been home to Bulgaria for two years, and wasn't looking forward to the holidays. They greeted me with a printout of the Cyrillic alphabet and had made the effort to learn some basic phrases in Bulgarian. I was so touched! It felt like a home away from home! I've been enjoying this creative process of finding and developing my writer's voice. I would like to publish the stories I've been writing in a book someday, but for now I've been sharing them online at blog.georgikdz.com." Georgi notes that he's working as a product manager at Mitrend, with founder and CEO **Paul Timmins '02 (MS CS).**

JP Miralda writes, "Developing great connections with the alumni crew in Dallas!" A photo and write-up on the Dallas/Ft. Worth group, which gathers for meals and an occasional ball game, appeared in the Summer issue of *WPI Journal*.

2014

Jessica Prashaw graduated with her JD from Albany Law School on May 24. She reported plans to sit for the bar exam at the end of July and noted, "At Albany Law I focused my studies on Intellectual Property, and I cannot wait to start my career at the United States Patent and Trademark Office in September."

2017

Tyler Golemo writes, "Since graduating, I've started two jobs, one in systems design with a small firm in Bedford, N.H., and the second coaching the New Hampshire state champion Science Olympiad team at Merrimack High School. Attending the national competition the last two years, I've helped aspiring STEM students improve their overall rankings by ten places, and won the Lockheed Martin Coaching Excellence award in 2018. This year, team member Nate Liscouski joined the WPI Class of 2023!"

2019

Celeste Marsan has gone on to doctoral work in the chemical engineering program at the University of Texas at Austin, with funding from an NSF Graduate Research Fellowship.

Colette Ruden writes, "Thankful to have graduated this year with the best of friends by my side every step of the way!"

Trustee Emeritus **Hilliard W. Paige '41** died June 4, 2019, at the age of 99. Predeceased by his wife of 71 years, Dorothea (Magner) Paige, and his brother, Rodney Paige '42, he leaves two daughters and a son.

Paige was a brother of Phi Gamma Delta and earned a BS in mechanical engineering. He later completed the General Electric Advanced Engineering Program. In 1962 he received an honorary doctorate in engineering from WPI, and in 1973 he was honored with the Robert H. Goddard Alumni Award for Outstanding Professional Achievement. He served on the Board of Trustees from 1974 to 1984.

Paige began his career with General Electric, where he rose to senior vice president for aerospace and computer operations in New York City. In the 1970s, he held leadership positions at General Dynamics Corp. and Satellite Business Systems (later acquired by IBM). He was appointed vice chairman of the board of International Atomic Energy Associates in 1976 and board chairman of H. A. Knott, Ltd. He also served as vice chairman of The Atlantic Council of the United States, and as board chair of Gallagher Marine Systems, from which he retired in 1995. In 2008 he was named a Pioneer of National Reconnaissance by the Central Intelligence Agency's Center for the Study of National Reconnaissance.

He held numerous patents in the field of astrophysics, and published in the fields of space and defense related professional journals. He was a Fellow and Founding Director of the AIAA and a member of the National Academy of Engineering. He received NASA's Public Service Award in 1969 and was honored with the Order of Merit from the government of Italy in 1970.

Trustee Emeritus **Paul Allaire '60,** former president of Xerox Corp., who was credited with revitalizing a flagging company with innovative products, died Feb. 24, 2019, after a long illness. He was 80. A brother of Tau Beta Pi, he earned his BS in electrical engineering at WPI, and a master's degree in industrial administration at Carnegie Mellon University.

Allaire joined Xerox in Stamford, Conn., as a financial analyst. He quickly rose through the ranks, becoming a managing director and a senior vice president and chief staff office before assuming the presidency of Xerox in 1986. In the 1980s the company was facing intense competition from low-cost copiers made by Japanese manufacturers. He implemented greater communication between the divisions, which resulted in the development of new product lines.

Allaire's success led to his appointment as CEO in 1990 and chairman a year later. In his new role, he repositioned Xerox as "the document company," which signified its role as an innovator at the intersection of the world's paper-based and electronic information. He is also credited with mentoring and promoting female executives: two women ultimately succeeded him as CEOs.

A strong supporter of his alma mater, he served on the Board of Trustees from 1987 to 2002. He received the Robert H. Goddard Alumni Award for Outstanding Professional Achievement in 1985, and the Hobart Newell Award in 1992. In 1994 he delivered the Commencement address and received an honorary doctorate in engineering.

Among his contributions to the university was a $1 million addition to the Class of 1960's 40th Reunion Gift. With part of those funds, he established and endowed the FIRST/WPI Future Engineering Leadership Scholarship Award, which provides a full-tuition to a FIRST participant in the national FIRST robotics competition who is Native American, African American, or Hispanic—and/or female. Allaire is survived by his wife, Tina, two children, six grandchildren, and five siblings.

FRANK BAGINSKI '45 CHE, PHI KAPPA THETA

ROBERT DOUGHTY '49 ME

RICHARD HATHAWAY '50 ME

WILLARD KING '50 ME, SIM, LAMBDA CHI ALPHA

JOHN SLONCZEWSKI '50 PH

JOHN WELSH '55 EE, ALPHA TAU OMEGA

CHARLES GUNN '56 EE, THETA CHI

KURT FRANCE '57 CE, SIGMA PHI EPSILON

TED HERETAKIS '58 ME, SIGMA PHI EPSILON

JOSEPH CARPENTIERE '61 EE, SIGMA ALPHA EPSILON

JOHN DONNELLY '61 CHE, SIGMA ALPHA EPSILON

ANDREW ANDERSEN '63

KENDALL COWES '66 EE

GEORGE BATTEN '67 MG, SIGMA PHI EPSILON

SIMON RAMO '68 DSCI (HON.)

FELIX BARLIK '69 ME, THETA CHI

ANDREW DI LEO '69 CE, PHI SIGMA KAPPA

THOMAS HUTTON '72 EE

PATRICIA CHRISTOPHER '74 MNS

MARIO DIGIOVANNI '75 CHE, SIGMA PI

BOURDILLON APREALA '76 MG, ALPHA EPSILON PI

JUDITH HOGARTY '77 EE

JAMES TOOMEY '82 MS CH

JOSEPH VIGNALY '82 ME, ALPHA TAU OMEGA

GORDON WENTZELL '86 SIM

SCOTT POPSUJ '93 MGE, SIGMA PHI EPSILON

DAVID CAMPANIELLO '94 MGE, '01 MBA

THE WPI COMMUNITY ALSO NOTES THE PASSING OF THESE FRIENDS OF THE UNIVERSITY: **MARTHA DENSMORE, DIETER LUND, JANICE MAYNARD,** AND **MARCIA TENNEY.**

Complete obituaries can usually be found online by searching legacy.com or newspaper websites. *WPI Journal* will assist classmates in locating additional information. Contact jkmiller@wpi.edu or call 508-831-5998.

Giving Day

SAVE THE DATE

You're among the first to know about **Giving Day 2019—December 3!**

It's WPI's biggest day of philanthropy this year—together, let's reach **1,500 donors** in 24 hours and unlock $150,000 for WPI.

Last year, 1,326 members of the WPI community participated.
Were you one of them?

Don't miss out this year—fun on campus and online!

WPI
Worcester Polytechnic Institute
100 Institute Road,
Worcester, MA 01609

FRANK ADDESSIO '68 ON A BREATHTAKING TRAIL BEHIND HIS NEW MEXICO RESIDENCE