

WPI

JOURNAL

consumed by

FIRE

sending oil spills up in flames





[CONTENTS]

22

FEATURES

16

FIRST PRINCIPLES

LENNOX HOYTE '79 FOUND HIS LIFE'S WORK AT THE INTERSECTION OF HEALING AND ENGINEERING.

BY JOAN KILLOUGH-MILLER | PHOTOGRAPHY MATT FURMAN

22

[COVERstory]

CONSUMED BY FIRE

THE FLAME REFLUXER, A NEW TECHNOLOGY FOR BURNING OIL SPILLS IN PLACE, UNDERGOES A CRITICAL REAL-WORLD TEST.

BY MICHAEL DORSEY | PHOTOGRAPHY PATRICK O'CONNOR

30

TURBOCHARGED JOURNEY

HOW ONE MAN MADE IT HIS MISSION TO SAVE THE MUSTANG.

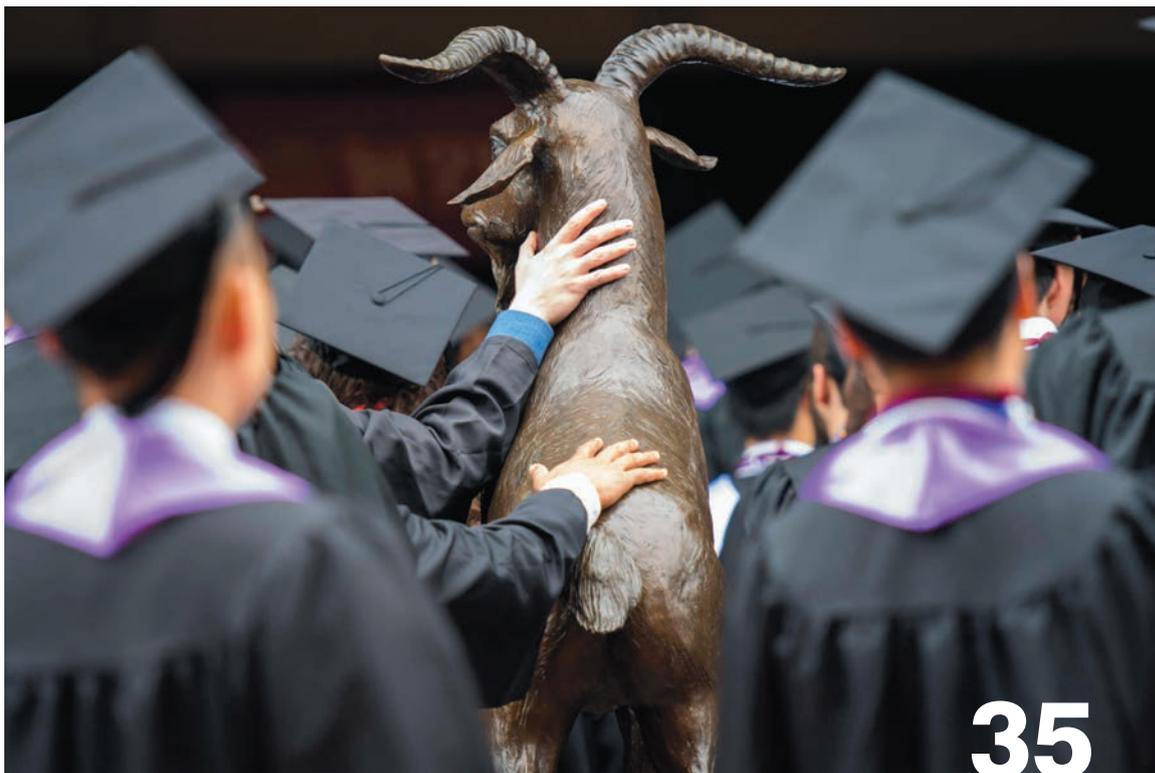
BY ANDREW FAUGHT | PHOTOGRAPHY MATT FURMAN

36

CRACKING TECH'S TOUGHEST CODES

AS SHE SCALES INCREASING HEIGHTS IN DIGITAL DEVELOPMENT AT AUDIBLE, URVASHI TYAGI '01 IS FINDING WAYS TO HELP OTHERS DO THE SAME.

BY ERIN PETERSON | PHOTOGRAPHY MATT FURMAN



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DEPARTMENTS

02

LETTERS TO THE EDITOR

THIS PAGE IS INTERACTIVE: IT IS MEANT TO SHOW YOU HOW READERS REACTED TO OUR LAST ISSUE, AND TO GIVE YOU A CHANCE TO DO THE SAME. BUT IT DOESN'T WORK UNLESS YOU SEND YOUR OWN THOUGHTS ON THE JOURNAL TO DMANNING@WPI.EDU.

03

A CONVERSATION WITH THE PRESIDENT

SUE SONTGERATH, DIRECTOR OF PRE-COLLEGIATE OUTREACH, SITS DOWN WITH LAURIE LESHIN TO SHARE THE SUCCESS OF WPI'S SUMMER PROGRAMS.

05

GLOBAL IMPACT

COSTA RICA IS KNOWN FOR ITS LUSH RAINFORESTS, DIVERSE WILDLIFE, WELCOMING CULTURE, AND—SINCE THE MID-'90S—ITS THRIVING WPI PROJECT CENTER.

13

ASK THE ARCHIVISTS

DID YOU KNOW THAT NEWTON HALL WAS A RESIDENCE HALL BACK IN 1901? CHECK IT OUT AS WE DELVE INTO THE ARCHIVES.

15

TURNING POINT

MARK RICHARDS '73 IS NOW CHAPLAIN AT UNITY HOSPICE AND PALLIATIVE CARE.

35

COMMENCEMENT

HIGHLIGHTS FROM THE 149TH COMMENCEMENT CEREMONIES.

42

WPI INSIDER

CAROLYN DETORA '18 IS GETTING THE MOST OF HER EDUCATION, WORKING TOWARD A BS IN MECHANICAL ENGINEERING AND AN MS IN MANAGEMENT.

44

ACROSS EARLE BRIDGE

LAUNCHING THE WOMEN'S IMPACT NETWORK; ALUMNI AROUND THE GLOBE; THE IMPACT OF OUR DONORS ON RESIDENTIAL LIFE, AND MORE.

49

CLASS NOTES

ADMIT IT, YOU RUSH TO THIS SECTION AS SOON AS THE WPI JOURNAL ARRIVES IN YOUR MAILBOX. SHARE YOUR NEWS WITH CLASSMATES AT CLASSNOTES@WPI.EDU.

56

COMPLETED CAREERS

IN MEMORY OF ALUMNI, FACULTY, AND OTHER MEMBERS OF THE WPI COMMUNITY.

PRAISE US OR PAN US OR SIMPLY SHARE BY SUBMITTING YOUR LETTER TO EDITOR DOREEN MANNING AT DMANNING@WPI.EDU.



REINVENTING YOURSELF

WPI was indeed a place that taught me how to learn. It provided the foundation and the tools that have enabled my lifelong interest in learning. That served me well in my 17 years in industry, as a very young executive band leader with GE and The Stanley Works (Now Stanley Black & Decker). It has also been invaluable over the past 13 years as I took the entrepreneurial plunge, starting my own business back in 2004. I knew absolutely nothing about the executive search business when I started my firm, but my industry experience and WPI education enabled me to reinvent myself and head in a totally new career direction.

I wisely decided not to take the franchise route. I was not impressed with what they had to offer and how they conducted their business. I wanted to build my own brand. I spent six months learning all I could from every available source of information in my new field and took what I felt was my new field's best practices and charted my own path and process. That path has proven to be very rewarding and fulfilling.

If I could tell a new WPI graduate one thing, it would be that now, more so than ever before, you will be called upon to reinvent yourself at some point in your professional career, it may be by choice, as it was in my case, or it may be by circumstances not of your own making. In either case, you will find yourself falling back on your WPI experiences and the fact that WPI, first and foremost, “taught you how to learn.” What a great foundation to help you build the next chapter in your career.

— Tim Noble '87

EDITOR, DOREEN MANNING IN
HER BOYNTON HALL OFFICE.
PHOTO STEVEN KING.

GENDER NOTWITHSTANDING

As the mother of a young woman WPI graduate (Hannah Brown '15, BS, Mechanical Engineering), I was interested in the article about the Power of Play featuring Anna Chase '13. I was dismayed, however, to read that she had applied to Hasbro to work in “Boys Product Development” — why do companies persist in thinking that only boys might be intrigued to play with Star Wars figures? This continued gender stereotyping needs to stop! I hope that Anna might have helped to set them straight on this issue.

— Patricia Vilas Brown
Kirkland, WA

REMEMBERING DEAN TRASK

A passing of an era has happened. Bill Trask, who died in March at the age of 87, was the individual who arranged my coming to WPI in the summer of 1963, when I was a junior at Lincoln High School in Yonkers, N.Y. He took me and my parents aside, during our campus visit, and had us up to his office for what turned out to be my college interview. He told us to send in the application and I would be accepted. Which we did, and I was the third in my senior class of 350 to be accepted to college.

I entered the WPI Class of '68 in the fall of 1964, away from home for the first time in my life. Seven other freshmen, two sophomores, and a junior formed a fraternity in the spring of 1965, organized by Rick Brodeur '68 to fill a need at WPI for those of us who were left out of the then flourishing fraternity system (80 percent of students were in Greek social fraternities, but 20 percent weren't). Bill, along with his buddy, [former mathematics professor] Ollie Olson, were true friends of our fraternity, helping convince the administration that a nerdy and cocky group of misfits should be recognized and supported as the newest fraternity on campus: Delta Sigma Tau. We were recognized in 1966, obtained a house in the fall of 1966, and officially joined the IFC in 1968 as a full member fraternity. Olson later took our fraternity from the abyss of the mid-1970s to the merger with Alpha Chi Rho National Fraternity in 1978. We have survived and flourished for over 50 years thanks to these great men. For this, Bill will forever be beloved by me and should be remembered upon his death.

R.I.P., Dean Trask.

— Jeff Semmel '68

PRESIDENT LESHIN TALKS SUMMER PROGRAMS WITH SUE SONTGERATH

For more than 20 years, Frontiers and Camp Reach have welcomed middle and high school students to campus each summer; for the past 10 years elementary school students have been added to the mix of STEM and athletic offerings. These popular programs boost interest in STEM, expose children and their families to WPI, and bolster learning on and off the field. President Leshin spoke with Sue Sontgerath, director of Pre-collegiate Outreach Programs, to help our readers understand just how important these summer programs are to the future of WPI.

LL Summer programs are such a key component of what we do here at WPI. People think we serve just undergraduates and grad students, but we start them young here, don't we?

SS Yes! It's exciting to see WPI give these opportunities to over 800 students in the summer STEM programs alone, and about 1,000 in our sports programs. We give them a taste of what WPI life is like by offering them project-based learning and hands-on tasks, and exposing them to teamwork they might not get in a traditional school setting. We give them an opportunity to discover their passions and, hopefully, continue down

the STEM pipeline.

LL And we know these programs really do feed our student body—and STEM more broadly, something we're also passionate about.

SS We recognize that not every student who goes through our programs will end up at WPI, but our hope is that they will end up in STEM somewhere. Professor Chrys Demetry and I just finished a quasi-experimental study on the Camp Reach program, and what we're seeing is that the girls who come to Camp Reach vs. the girls in the control group are matriculating at WPI at a statistically higher rate.

LL It's proof that being here on the campus and having this exposure is such a meaningful and transformative experience for those young people. Especially as we're trying to diversify the pipeline that's coming in: more women, more underrepresented students of color. I think these summer programs are so critical to help them see themselves at WPI or at a place like it.

SS It's very important that we continue to look at the right opportunity for these students. Developing programming that is specific for girls, for example, because girls still have a harder time seeing themselves in STEM roles. Giving participants an opportunity to be with peers who are like-minded and enjoy the same types of things will

hopefully build self-efficacy and their interest in STEM.

LL You mentioned Chrys Demetry, one of our leading faculty members—there are a lot of professors who get involved in these summer programs, right?

SS We have about 60 faculty members and as many graduate and undergraduate students who work with the participants. This work requires a passion and willingness to give of their time in the summer, when they could be doing other things like research or vacationing.

LL Our participation for both athletics and STEM programs extends beyond our Central Mass. area, right?

SS Typically, we see representation from 20 to 25 states and roughly 10 international locations in summer programs alone. This year we've implemented the Summer Scholarship Program, which offers scholarships to students in the Worcester Public Schools. We have 16 students participating in the program at varying levels, and our hope is to maintain these students, and offer them scholarships for as many years as they want to come back. It's our hope to inspire them, and eventually see them choose WPI when it comes time for college.

LL Great talking with you, Sue, and thanks for all you do to bring the next generation to WPI!



Inaugural Induction Ceremony
WPI HALL OF LUMINARIES

NOVEMBER 1, 2017

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

*George Alden, Hon. '26**

*John Boynton, Founder**

Curtis Carlson '67, Hon. '06

*Robert Goddard 1908**

*William Grogan '46, Hon. '90**

Dean Kamen '73, Hon. '92

Judith Nitsch '75, Hon. '15

David Norton '62

*Stephen Salisbury II, Founder**

*Ichabod Washburn, Founder**

*Richard Whitcomb '43, Hon. '56**

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



ILLUSTRATION JONATHAN REINFURT

Ben Parent '18 was thrilled to have completed his Interactive Qualifying Project (IQP) last year in Costa Rica, a country known for its lush rainforests, diverse wildlife, and welcoming culture. Yet it was the up-close view of the impoverished neighborhoods in its capital city that left the deepest impression on the biomedical engineering major. Parent's IQP involved designing park-like corridors along the rivers of San José.

"It was so eye opening," he says. "I went down there thinking I'd be doing environmental work, but it was more about trying to help the people living there—the people who don't usually have a voice."

Enshrined in the country's constitution is the right to a healthy and ecologically balanced environment, making Costa Rica a natural partner for environmentally focused projects. The Costa Rica Project Center was established 20 years ago and hosts several IQP teams each year. Like Parent, many students emerge

from the experience with a deeper understanding of the interconnectedness of the environment, the economy, and human rights.

The country was tapped for a project center in the mid-'90s by now-retired social sciences professor Susan Vernon-Gerstenfeld, who reached out to Costa Rican native Christopher Music '95 to find sponsors in that country. He put her in touch with his mother, Marcela Music, who has been on site helping organize projects ever since. The project center is a popular one, according to assistant teaching professor Melissa Belz, who took over as its director two years ago.

"Tourism is booming and they want to make sure development happens in an appropriate way," says Belz. "This provides a lot of opportunities for us to work with great nonprofits and agencies, the ministry of education, and the ministry of agriculture, because they're all trying to do environmental programs."

For their project, Parent and his

three teammates partnered with the nonprofit Rutas Naturbanas, which hopes to create 25 kilometers of green space along the Rio Torres and the Rio Maria Aguilar, which run through San José. The effort seeks to remedy the contradiction between the country's eco-friendly image and San José's urban realities. The students researched Boston's Emerald Necklace for inspiration and interviewed Costa Rican activists, police, and residents of the neighborhoods that would be affected, says team member Cara Bereznai '18. The students learned that sewage-polluted rivers, traffic congestion, and crime make daily life difficult and keep tourism dollars away. Creating a riverside green corridor would inject money into the local economy while providing an easily navigable route around the city for people on foot and bicycles. The hope is that the effort will also draw attention to the need to clean up the rivers.

Bereznai says she looks forward to seeing the outcome of the IQP team's work. Jared Danaher, who

last year was among a team of four students who worked with the Costa Rican Ministry of Agriculture to develop a tourist route of sustainable farms, feels the same way. The team visited farms in Copey de Dota, catalogued the ecologically conscious techniques that made each one unique, assessed farms in other areas of the country where agritourism thrives, and offered the farmers suggestions for appealing to tourists. The students used their smart phones to collect GPS data and map the tourist route.

"I've spoken with a couple of other students and they all agree that it's nice to be back home," says Bereznai, "but as time goes on, you start missing your project sites more and more. A lot of people want to check and see if the work they did is helping the people of Costa Rica ... I would love to see it from the other side as a tourist now."

—Susan Shalhoub

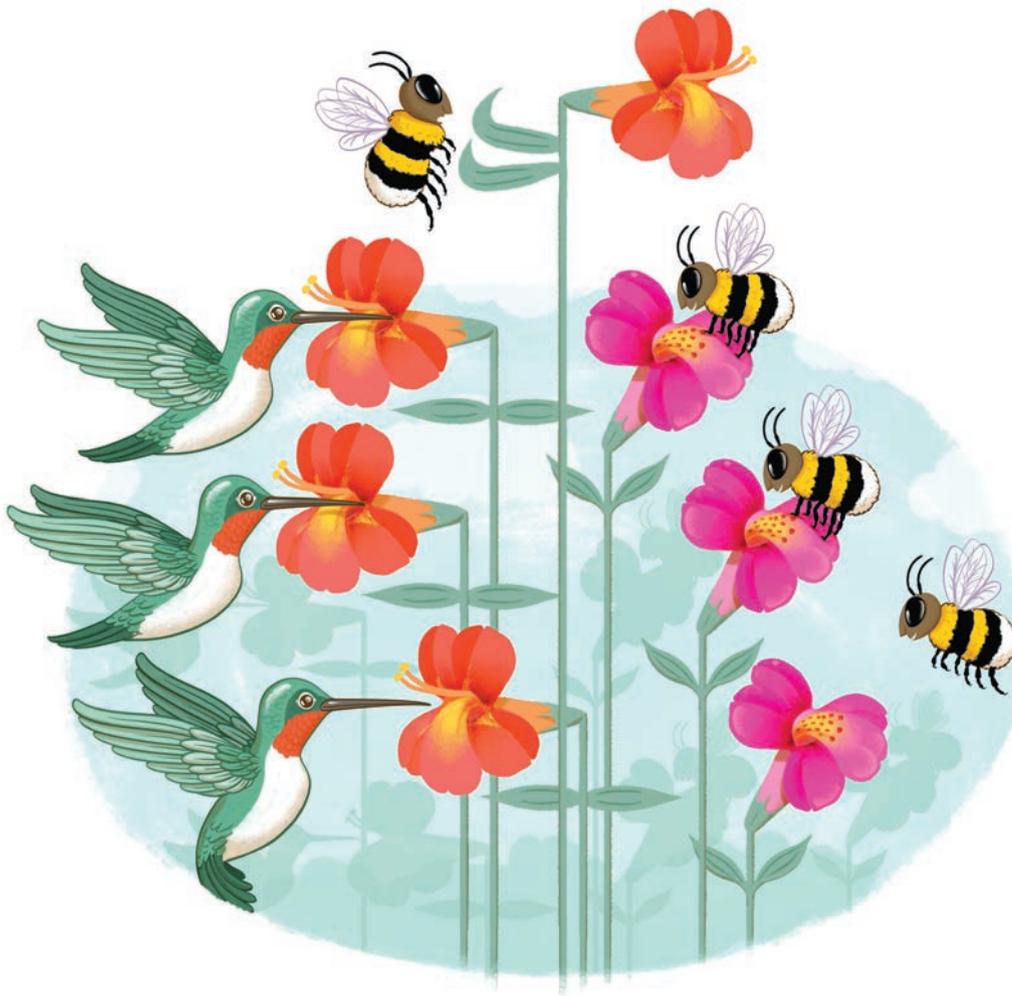


ILLUSTRATION ANDY WARD

STUDY OFFERS CLUES TO HOW FLOWERS EVOLVED TO ENCOURAGE POLLINATORS TO SPECIALIZE

Ecologists who study flowering plants have long believed that flowers evolved with unique combinations of colors, shapes, and orientations to attract specific pollinators. But a recent paper in the journal *Ecology* suggests that flowers that are visited almost exclusively by hummingbirds are actually designed not to lure birds, but to deter bees.

Most hummingbird-pollinated flowers evolved from bee-pollinated ancestors. While the “bee” variants tend to be upright and have blue or purple coloration, the “bird” versions have a horizontal orientation and red or orange coloration. Research by a team led by Robert Gegear, PhD, assistant professor of biology and biotechnology, shows that these trait combinations interact synergistically to confuse bees and cost

WHY SOME FLOWERS SAY “NO” TO BEES

them precious time as they move from flower to flower.

In the lab, Gegear observed bees as they foraged among arrays of paper flowers, regardless of their color, and lavender flowers, regardless of their orientation. But when red flowers were oriented horizontally (mimicking the blooms of typical bird flowers), visits dropped dramatically.

Bumblebees, like most pollinators, are not genetically programmed to visit only particular flowers, Gegear says. They are generalists that seek to maximize their rate of reward intake. By combining particular floral characteristics (the study showed that at least two floral characteristics had to change

for a bee flower to become a bird flower), plants manipulate pollinators to become specialists by making it costly to generalize.

To learn why bees avoid the bird flowers, Gegear first trained bees to associate every color and orientation combination with a reward. Next, he had them forage on mixed arrays in which only one color-orientation combination contained nectar. He observed that bees found it harder to learn and effectively locate bird-trait combinations than bee-trait combinations.

“It takes them longer to learn to seek out these combinations,” he says, “and once they learn them, it takes them longer to recognize these flowers. When you put all this together, you

find that ‘bird flowers’ are really ‘anti-bee flowers.’”

Gegear says the study offers a new perspective on prevailing theories about how plants evolve to manipulate their animal pollinators. “From an ecological perspective, an ideal pollinator is one that always forages on flowers of the same type so pollen is transferred effectively. But the big question has been, how do plants get the pollinators to do what they want?”

“The answer lies in floral complexity. Each plant has a flower made up of a unique combination of sensory and structural traits that pollinators must learn and remember in order to effectively locate nectar rewards. But pollinators are limited in their ability to manage information on more than one unique combination at a time, making generalization a costly foraging strategy.”

SEEING IS UNDERSTANDING

They call it the “hairy ball.” It’s an unflattering name for two-dimensional representations of a complex biological network, a depiction of a system of linkages and connections so complex and dense that “it looks like a big mess,” says Dmitry Korkin, PhD, associate professor of computer science and director of WPI’s bioinformatics and computational biology program.

Korkin, whose research focuses on bioinformatics of complex diseases, computational genomics, and systems biology, has long been interested in finding new ways to visualize biological networks, which can include everything from the neural connections in the human brain to all of the interactions between proteins within a yeast cell.

“It is good that we can collect this information with high-throughput techniques, but when you try to visually analyze it, you realize that it is next to impossible with conventional means,” Korkin says. The lack of adequate visualization techniques not only hinders understanding of complex networks, it constrains research, Korkin says, since the most meaningful and important connections and relationships within these networks may not be readily apparent.

A few years ago, Korkin got his first look at a technology that, for the first time, seemed to offer the capabilities he had been searching for. Called HoloLens, the device under development by Microsoft is a set of smart glasses that takes visual information and projects it into the space in front of the user. Unlike virtual reality goggles, which are designed to block out reality and put the user into an artificial world, HoloLens uses mixed reality to merge a computer generated holographic visualization with the real world.

In 2016 Korkin received two HoloLens development kits from Microsoft. Since then he, postdoctoral researcher Pavel Terentiev, and a team of graduate students and undergraduates have been working to take data on actual biological networks that have been the focus of research in the Korkin Lab and represent them in as three-dimensional objects in the real world using the HoloLens. One network describes the myriad connections between proteins in a breast cancer cell.

In the Korkin Lab, a user slips on the device, which looks a bit like a futuristic version of laboratory safety glasses. Suddenly a three-dimensional array of white balls connected by lines appears to hover in the air in the middle of the room. The balls and lines are nodes and connections in the network, representing the proteins and the physical interactions between the

proteins. While it floats in space, the network seems rooted in a spot several feet off the floor. As the user walks around the display, he can see the nodes and the connections from various angles.

Reaching out, the user pinches his thumb and index finger together, as if taking hold of the network, and rotates it—right and left, up and down—to bring different parts into view. Using gestures or voice commands, the user can highlight particular nodes and then call up information about them, such as the structure of individual proteins or the locations of particular mutations. When another user dons the second HoloLens, they are able to explore the network together as it seemingly sits between them.

“This is not just a visualization,” Korkin says. “It is an intelligent object that integrates information and feeds it back to the researcher with a number of suggested options. This would be just too much information for a two-dimensional visualization.”

Korkin says HoloLens has opened up a wealth of new avenues of research for his lab, some of which are aimed at expanding the capabilities of the display device itself. He says he sees great opportunities ahead for the technology. “It could greatly speed up the pace of discovery by making it less cumbersome and less time-consuming to see relationships between data.”

QUOTABLE

“I’d like to point out that this is our Strategic Plan, coming out of the ground right here.”

—President Laurie Leshin, standing before the steel frame of the Foisie Innovation Studio, with the WPI community gathered on the Quad to celebrate the building’s topping off ceremony on Feb. 23. The Foisie Innovation Studio will house two floors of classrooms, laboratories, and offices.



WE THE SHOPPERS

WPI PROFESSORS WEIGH IN ON THE MARKET BASKET BOYCOTT

When Massachusetts-based supermarket chain Market Basket's majority shareholder, Arthur S. Demoulas, fired his cousin, revered CEO Arthur T. Demoulas, it set off a chain reaction more powerful than anyone could have anticipated. About 25,000 Market Basket employees and millions of customers joined forces in a six-week boycott of the 71-store regional chain, until "Artie T." was reinstated as CEO in August 2014. The story took New England by storm, and garnered national attention as an example of democracy in action.

At WPI's Foisie Business School, a screening of the 2016 documentary *We the People: The Market Basket Effect* drew an eager

audience. Joining the film's producers in the discussion that followed were WPI professors Michael Elmes and Elizabeth Long Lingo, authors of a paper based on their study of the case.

"People were moved by the tensions highlighted in the film," says Long Lingo. "We had rich discussions around the fight of the middle/working class for respect and their livelihoods, and the conflicting interests of corporate shareholders. We considered what leadership means in today's society by asking, 'Would your employees take a stand for you the way Market Basket employees did for Artie T.?'"

Elmes compares the dynamics of the boycott to other highly charged events, such as the Occupy movement, and the hostile takeover of Norton Company in Worcester. He notes, "Our paper talks about how many of the non-family members of the Market Basket community talked about the company as a family—their family."

At the time of the boycott, another WPI expert was called on for perspective. WPI business professor Frank Hoy, whose research includes complications arising from family business ownership, offered his insight in a number of recent media interviews.



PHOTO MATT BURGOS

CROSSING KINGDOMS

PLANTS HELP GROW FUNCTIONING HEART MUSCLE

When researchers try to scale up human tissue regeneration to produce functioning tissues, bones, and organs that can be implanted in people to treat disease or traumatic injuries, they face a critical challenge: how to deliver oxygen and nutrients deep into the developing tissue.

Current bioengineering techniques, including 3-D printing, can't fabricate the branching network of arteries, veins, and capillaries that delivers the blood needed to keep cells throughout our bodies alive. In a bit of

serendipity, a research team from WPI, the University of Wisconsin-Madison, and Arkansas State University-Jonesboro found an unexpected substitute for the human circulatory system, and it all began over lunch.

As Glenn Gaudette, PhD, professor of biomedical engineering, and PhD candidate Joshua Gershlak dined and chatted one day, a piece of fresh spinach caught Gershlak's eye. He noticed that the leaf had a network of veins: a large one in the stem branching to smaller and smaller vessels toward the edges. "And really, that stem, it shouted out to me," he says. "It was just like an aorta."

"Plants and animals exploit fundamentally different approaches to transporting fluids, chemicals, and



macromolecules,” the authors wrote in their groundbreaking paper in the journal *Biomaterials*, “yet there are surprising similarities in their vascular network structures.” To take advantage of those similarities, Gershlak developed a method for removing plant cells from spinach leaves by flowing a detergent solution through the veins. Left behind were the cell walls, which are made largely of cellulose, a biocompatible material.

In a series of experiments, the team used these “decellularized” leaves as scaffolds on which to grow human heart tissue. They flowed fluids and microbeads similar in size to human blood cells through the spinach vasculature, to confirm that the vessels remained open. Then human cardiac

stem cells, or cardiomyocytes, were grown on the surface of the leaves, sustained by nutrients flowing through the veins. In a few days, the cells grew into heart muscle that began to beat.

The proof-of-concept studies opened the door to using multiple spinach leaves to grow layers of healthy heart muscle to treat heart attack patients, Gaudette says. In continuing research, the team will work to optimize the decellularization process and further characterize how various human cell types grow while they are attached to, and are potentially nourished by, plant-based scaffolds. (Gaudette says different plant species may be suited for growing particular types of tissue; jewelweed, for example, with its hollow stem structure, may work well for arterial grafts, while bamboo might support growing bones.)

“We have a lot more work to do, but so far this is very promising,” Gaudette says. “Adapting abundant plants that farmers have been cultivating for thousands of years for use in tissue engineering could solve a host of problems limiting the field.”

On a more far-ranging note, he adds, “The development of decellularized plants for scaffolding opens up the potential for a new branch of science that investigates the mimicry between plant and animal.”

In addition to Gaudette, whose research focuses on cardiac tissue regeneration, the WPI team includes Tanja Dominko, PhD, DVM, associate professor of biology and biotechnology, who studies molecular mechanisms of human cell development; Pamela Weathers, PhD, professor of biology and biotechnology, a plant biologist; and Marsha Rolle, PhD, associate professor of biomedical engineering, who focuses on vasculature tissue engineering.



SYNCHRONIZED MOTION

WPI RESEARCHERS WANT TO GIVE AMPUTEES MORE VERSATILE PROSTHESES

When you reach for a glass of water, your wrist turns to align your hand while your fingers simultaneously spread to encircle the glass. For an upper-limb amputee using a hand-wrist prosthesis, that simple action becomes a two-step process, because existing prosthetic devices can move only one element or “degree of freedom” (either the hand or the wrist) at a time.

At WPI, electrical and computer engineering researchers Edward Clancy, PhD, and Xinming Huang, PhD, want to give prostheses the same versatility as real hands and wrists. In part, they are motivated by the desire to provide a better quality of life for individuals born without hands and amputees (including soldiers returning from Afghanistan and Iraq), who often find it difficult to carry out daily tasks with current one-degree-of-freedom hand-wrist prostheses.

With a two-year, \$712,812 subaward from Liberating Technologies Inc. (part of a \$1.4 million grant the National Institutes of Health awarded to LTI, a maker of upper-limb prosthetic devices for adults and children), Clancy and Huang are exploring how to record electrical impulses generated by remnant

muscles in the forearm and translate them into signals that can coordinate the wrist joint and finger movements of the prostheses.

Clancy, director of WPI’s Laboratory for Sensory and Physiologic Signal Processing, is developing the system design and the advanced control algorithms, while Huang works on instrumentation and signal processing. They are conducting the research at WPI and LTI.

One challenge they’re tackling is how to make their technology robust and compact. For example, they’re working to reduce the number of electrodes used to detect muscle activity in the upper arm from the 64 used in their lab studies to just 4, without sacrificing functionality. They plan to wirelessly connect the electrodes using embedded low-power integrated circuits.

They are also developing algorithms and technique to help select the best locations for the electrodes. Ultimately, they will load the selection and control algorithms into a microprocessor in a prototype prosthesis that, once fitted to the user, will determine the optimal electrode locations and convert the recorded muscle activity into the coordinated movement of wrist and finger motors.

“This research is really exciting,” says Todd Farrell, director of research for LTI. “If the technology is proved out, it would be a substantial improvement over the current state of the art.”

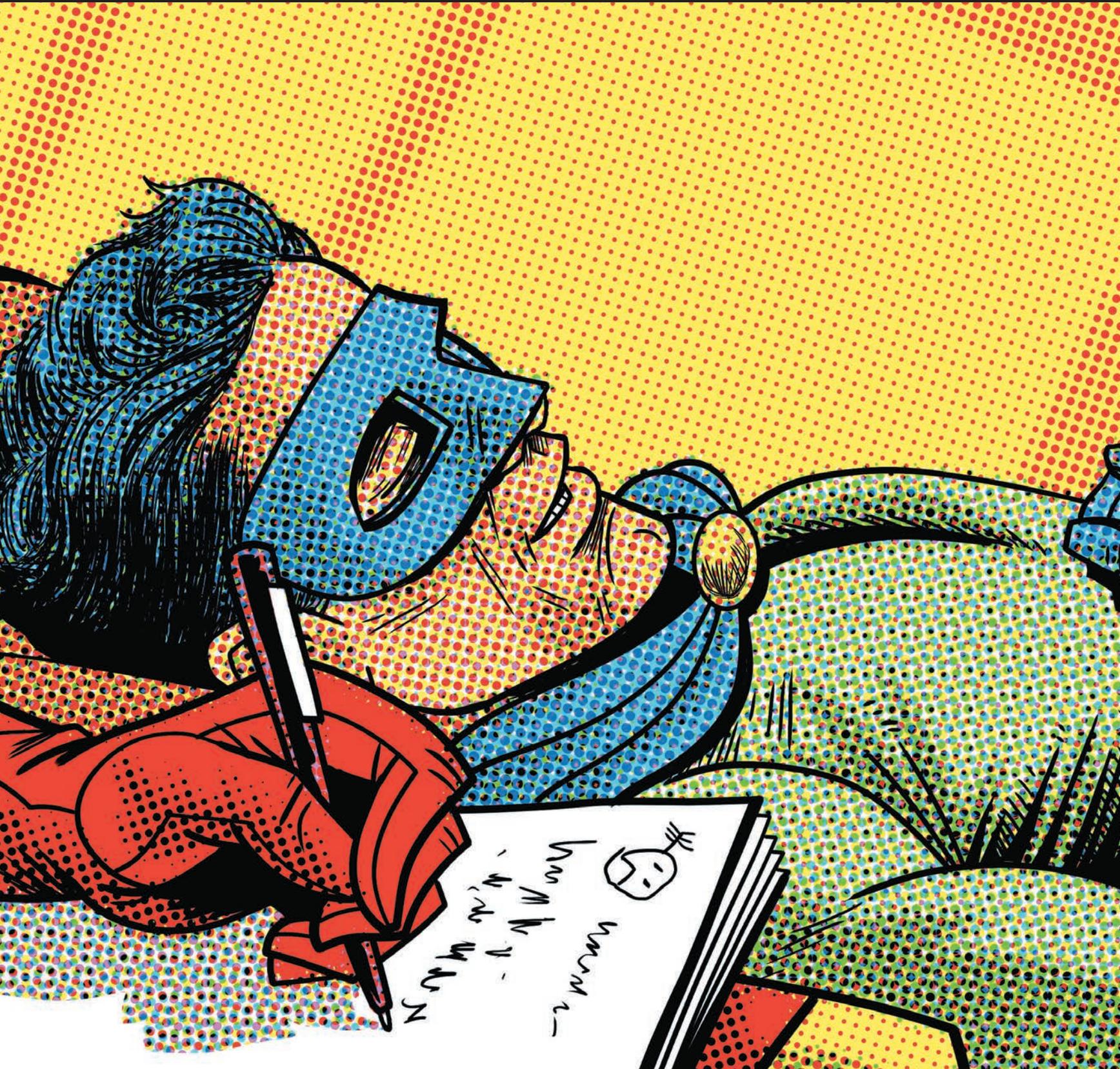


ILLUSTRATION ANDY FISH

COMIC PSYCHOLOGY

Reading comic books and watching cartoons might sound like something you'd do behind the teacher's back, but Batman and Wonder Woman were required reading for an independent study led by adjunct professor Tom Balistrieri. In D-Term, 14 students registered for a newly announced offering, "The Psychology of Comic Book Superheroes and Villains." Together they delved into the darker side of the "Dark Knight," through the lens of Jungian archetypes and Freudian aspects of the mind.

Using those frameworks, the students analyzed their favorite characters from the DC and Marvel canon in a series of papers and oral presentations. Their research included a review of the existing literature, and they had to back their assessments with evidence from their character's behavior in actual episodes. For the final project, they were asked to create a character based on their own innermost personality, specifying their powers and weaknesses, and drawing their costume and weaponry.

Right from the very first class, students were engaged in seeking the source of Batman's defiant behavior, considering "The Joker" as unrestrained Freudian id, and examining the symbolism of darkness—and bats. A special highlight was a field trip to That's Entertainment, Worcester's comic book emporium, where they were given a thorough grounding on the history of the art by the resident expert before shopping for research materials.

"Comic book writers love Jung," says Balistrieri. "There's a portrait of him hanging in Arkham Asylum." He notes that comic books have made their way into the classroom at universities across the country (including Stanford), and says that he would like to see the independent study become a regular course offering in the psychological sciences program. Balistrieri, a licensed mental health counselor, was director of WPI's Student Development & Counseling Center for a decade, and has been teaching general and abnormal psychology at WPI for the last few years. A lifelong comic book lover, with a row of superhero figurines on display behind his office desk, he deems this latest adventure "one of the highlights of my long career."

DESIGNER. MAKER. USER.

At London's Design Museum, a crowdsourced collection of almost 1,000 objects—from rubber gloves to road signs to political posters—forms a snapshot of the 20th and 21st centuries. It is installed in a permanent exhibit, called "Designer Maker User," which aims to inspire learners to think like designers. These everyday objects invite viewers to explore the impact of design on popular culture.

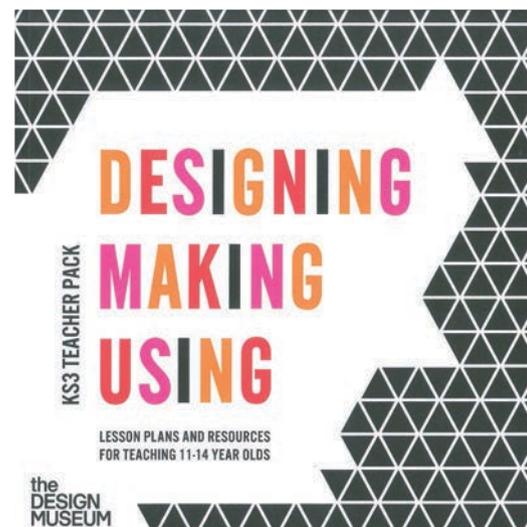
School children can continue their exploration after visiting the museum with a Teacher Pack developed by a WPI project team. *Designing Making Using*, a cleverly designed booklet of six lesson plans, features hands-on activities and open-ended discussion questions. Using simple materials (newspapers, balloons, and colored pencils, for example), students undertake tasks such as creating functional signage for their school, drawing

posters for an imaginary political campaign, or altering an everyday object to make it work better for them.

Each unit begins with a background story and then puts students in the designer's seat. After learning about American architect Frank Gehry, famous for creating elegant cardboard furniture, they are asked to build a weight-bearing "Wiggle Chair" out of paper.

The IQP team, advised by professors Joel Brattin and Lauren Mathews, worked with members of the museum staff, sought input from school teachers, and field-tested some of their lessons at primary and secondary schools. The lessons link directly to elements of the exhibit, but can stand alone for those who have not visited. Follow-up surveys indicated that students found the lessons engaging and enjoyable.

Designing Making Using is sold in the museum gift shop and online at designmuseum.org



Navigating Bias in STEM

Gender bias is alive and flourishing in the country today, according to a recent study by the U.S. Department of Commerce. With women at the desks of close to 50 percent of all jobs in the U.S. economy, they hold fewer than 25 percent of STEM jobs, even though those STEM jobs earned them 33 percent more than women in non-STEM fields.

With this in mind, WPI's Office of Multicultural Affairs recently celebrated National Women's Month with—among a mix of other events—an alumnae panel discussion, *Navigating Bias in STEM*.



Here are some words of wisdom, from WPI alumnae working in the field:

TERUMI OKANO '09 (MS CM)
Product Marketing Manager, AspenTech

I've heard that women tend to apply only to positions for which they meet close to 100 percent of the job requirements. As a hiring manager, I'm realizing I should have applied to those enticing jobs for which I felt only partially qualified because usually there are one or two top traits or skills they are looking for in every role. If you've got those traits or skills, you can learn the rest. Recently, I've hired folks who've met only 50 percent of the job requirements. Take advantage of the fact that you are a woman and/or a minority—this will give you an edge at some companies. If there's a job you really want but you're not sure you

have the qualifications, just go for it. You have a better chance than you think.

ASIMA SILVA '04
Software Engineer, IBM

Find a mentor that will guide you through discrimination of gender, race, age, disability, or family status. Don't hesitate to ask questions for fear of being seen as incompetent. Understand that motherhood/family should not be a factor in your performance.

SUSAN ROBERTS '92
Professor and Head, Department of Chemical Engineering, WPI

The best way we can support each other is to serve as advocates—speak highly of each other, promote each other, and challenge each other when we start to doubt ourselves.

unconventional CONVENTION

“Cool courses taught by cool people”

WPI LaunchPad, a student-run entrepreneurship, has brought back Intersession, but the course offerings—which range from 3-D printing to Scrum certification to vinyl record pressing—are nothing like the '70s. And your former classmates are now the teachers! Here are a few choice course listings.

SMART PHONES: BACTERIA'S PLAYGROUND?

Ever hear that your cell phone is dirtier than a toilet seat? Learn how to grow bacterial cultures from your very own phone!

Prof: Todd Alexander '11, now a Chem Eng PhD candidate working on antimicrobial coatings for medical devices

WILDERNESS SURVIVAL FOR TAX ATTORNEYS

How to survive in the wilderness, from basic first aid to good camping practices.

Prof: Josh Fuller '16, “WPI's very own Bear Grylls”

WEB DESIGN FOR THE APOCALYPSE

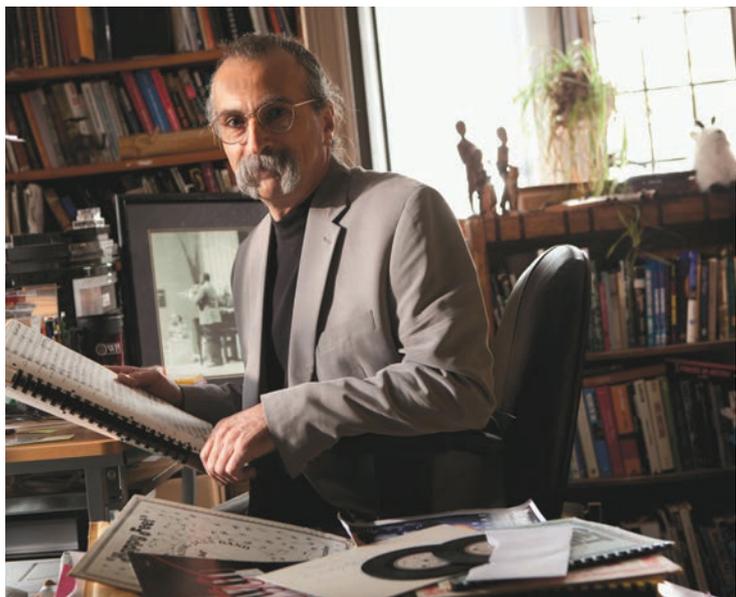
Quick! You only have one hour until it goes live. Or not.

Prof: Joe Samela '16, creator of the “For Your Brain” blog.

HOW TO RUN YOUR LIFE LIKE A BUSINESS

Let Joe walk you through the way to optimally utilize the business model canvas to meet your career and academic goals.

Prof: Joe Bush '04, executive director, Worcester Clean Tech Incubator



WHERE JAZZ DWELLS

During Jazz Appreciation Month, WPI was officially named home of the New England Jazz Alliance Hall of Fame (nejazz.org). NEJA established the Hall of Fame in 2001 to honor the contributions of New England jazz musicians to the rich musical heritage of the area, but until now the exhibit did not have a permanent home.

The April event also served as the official launch of the International Jazz History Database

(jazzhistorydatabase.com). Hosted by WPI and under the direction of Professor Richard Falco, director of jazz studies, the database is an interactive multimedia museum focused on artists deserving of wider recognition and dedicated to the preservation of “at-risk” jazz artifacts. For more than a decade the database has primarily featured New England artists, but WPI is now expanding the platform and inviting collaborators across the world to trace the origins and influence of jazz music in various regions.

Visit wpi.edu/+nejazz for a video clip with Professor Falco to learn more about the database.

ASK THE ARCHIVISTS

Q. Sanford Riley is WPI’s oldest residence hall, but was it its first dormitory?

A. Newton Hall, just under a mile south of campus at 2 State St., was the first WPI-run residence offering both room and board to students and instructors when it opened in September 1901.

Originally a wedding gift built for Mrs. Hester Wetherell, a young Worcester bride, the home was loaned to WPI in 1900 for an initial six years by her estate. It offered “low cost living” with rooms for rent at \$1.00 to \$1.50 a week and an optional meal plan at \$3.50 a week. The dormitory was outfitted with cast-off furnishings, a small library, and iron beds supplied by local merchant Denholm & McKay at a cost of \$5.17 apiece.

The dormitory was governed by a committee of students and campus administrators and staffed by a married couple from the Brookfields with inn-keeping experience. It offered the 25 to 30 upperclassmen and young faculty members renting rooms, as well as the nearly 50 boarders that visited each day, “intimate social companionship,” illustrated talks by Worcester community leaders, and “a cheery place for reading, singing, and a general good time.” Both Pi Omega Pi (later Theta Chi) and Delta Tau were founded in Newton Hall.

Considered by WPI’s trustees to be “an experiment,” Newton Hall lasted nine years before being deemed too costly to maintain. The house was returned to the Wetherell estate and was later used by the Girls’ Trade School before being destroyed by fire in the 1920s.

Do you have a question for WPI’s archivists? Send it to archives@wpi.edu and check out the next issue of the WPI Journal for more interesting facts and information about WPI wonders.





WPI

Take advantage of these services and programs offered by the Alumni Association and Office of Alumni Relations. Some, like the insurance program, have special rates for WPI alumni. Several are free, and some benefit WPI student scholarships.

More at wpi.edu/alumni

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A global network of more than 38,000



GORDON LIBRARY *Lifetime access*



INSURANCE PROGRAM
Great prices on many insurance products



CENTENNIAL WALKWAY *Leave your mark*



WPI RING PROGRAM
Your connection to WPI tradition



[TURNINGpoint]

What attracted Mark Richards '73 to WPI was the Humanities and Technology curriculum. "I thought that one who can speak the language of both ends of the spectrum would have value."

With the soul of a wanderer, Richards left for Oregon after graduation. His career span included owning four pizza franchises, a journey into manufacturing, back to WPI for an MS in management ('91), then a 25-year career in corporate technical training that had him touch down on every continent, minus Antarctica.

"I live in the understanding that everything I do prepares me for the next thing," he explains. "To specify what I gained from my WPI experience, I'd begin with my study of Henry David Thoreau. In the summer of '72, classmate Bruce Nunn and I spent two weeks in the woods of Maine following the path that Thoreau traveled in 1846. That trip was the foundation of my MQP. I was one of a handful of students who graduated under the WPI Plan in its second year. I can never tell whether the Plan ignited or enabled my wanderlust. Either way, I have spent a good portion of my life traveling, trying on new work, and exploring new paths. WPI developed in me the capacity to observe things as they are, to imagine a way to make them better, and to engage in putting that way into action—qualities that are as important for a humanist as they are for an engineer."

After 9/11, he began to delve into more meaningful work through a call to the ministry. While pursuing a master of divinity from Andover Newton Theological School, he spent a year at St. Luke's Hospital in Kansas City.

As his residency was winding down, Richards began to look for work to gain more experience in pursuit of his ultimate goal of prison hospice work. "I came across the Unity offering and we discovered our match. I wanted a well-established, nonprofit agency that could support my interest in prison work."

Now, as chaplain at Unity Hospice and Palliative Care, his role is to "ensure that the clients' spiritual needs are being met," he shares. "My task is to comfort the spirit. I also provide a resource to our staff, as working so closely with death can be spiritually draining."

Richards says his life's journey has been, in part, a result of a passion found at WPI. "The theme of making the world a better place, of taking responsibility for improving and maintaining a just, kind, and livable world, were values WPI encouraged and developed."

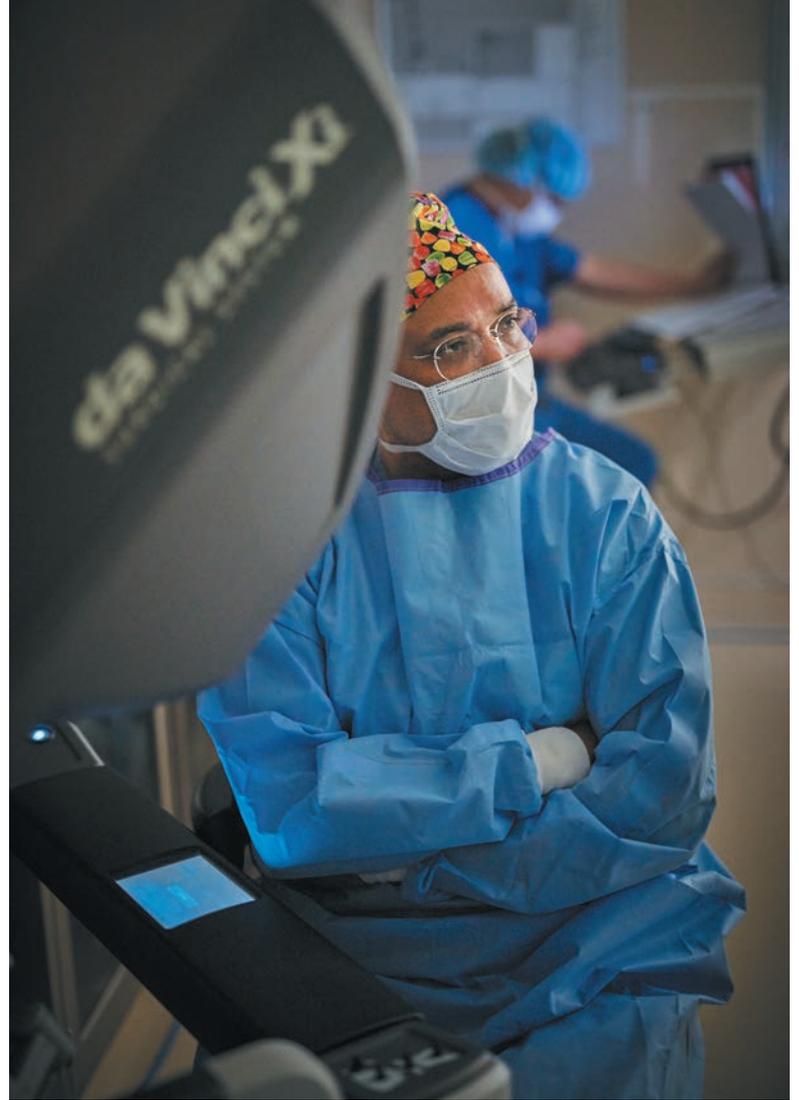
A photograph of the Tampa skyline across a body of water, with a metal railing in the foreground. The Tampa Convention Center is visible in the middle ground. The sky is clear and blue.

First Principles

LENNOX HOYTE FOUND HIS LIFE'S WORK AT THE INTERSECTION OF HEALING AND ENGINEERING



BY JOAN KILLOUGH-MILLER | PHOTOGRAPHY MATT FURMAN



LENNOX (JOHN) HOYTE '79 grew up in Trinidad, watching his mother—a registered nurse-midwife—care for women and deliver their babies, sometimes in the family's home. The way she tended to the needs of each individual made a deep impression on him. It was her dream to have a son who would grow up and become a physician.

Instead, Hoyte became an engineer—majoring in electrical engineering at WPI and earning a master's at MIT. It took a decade in the computer chip industry for him to “go back to first principles,” as he puts it, and face his mother's vision of what he was born to do. “I kept asking myself, ‘Why aren't you a physician?’” he says. There came a time when the only way he could respond to that question was to become one.

The engineer did not get left behind. At Stanford Medical School in the early 1990s, he found an educational system that was opening up to engineering-style thinking. “Before that time, medical school was about memorizing everything you can and doing table look-up,” he says. While many of his med school classmates had spent their college years cramming for exams, Hoyte's undergraduate work, in the early years of the WPI Plan, had trained him to analyze problems and seek solutions. “The Plan was one of the best things that happened to me.”

Today Hoyte is innovating with an engineer's mind *and* doing the hands-on healing his mother envisioned. At the Pelvic Floor Institute (which he founded in 2016, with offices in Tampa and Sarasota, Fla.), he treats women who suffer from

disorders that are common consequences of bearing children—and of getting older. In his research, he is developing predictive models, informed by high-tech imaging and big data algorithms, that can help women make informed choices about their medical care.

“With my background, I was a natural for the OB/GYN specialty,” he says. Though he enjoyed delivering babies, he became intrigued by the biomechanics of the female pelvic floor: what can go wrong, and how to fix it. It was here that the midwife's son, the engineer, and the urogynecologist found their true work.

To understand how the bones and muscles of the female pelvic basin work together to support internal organs, one must fully comprehend their complex anat-

omy—in three dimensions. Starting in his residency at Brigham and Women's Hospital, Hoyte began using magnetic resonance imaging (MRI) to create 3-D reconstructions of normal and dysfunctional anatomy. Since then, he's created atlases and tutorials that demonstrate aberrations in full color, one structure at a time.

AN ANCIENT ART, A YOUNG SPECIALTY

Hoyte sums up his specialty, female pelvic medicine and reconstructive surgery (FPMRS), with frank humor: “If it's falling out, leaking, or hurting—between the belly button and upper thighs—and the patient is female, that's what I take care of.” It's estimated that a third of women who have given birth vaginally, and half of women over the age of 50, experience some

HOYTE AT WORK, PERFORMING ROBOTIC PROLAPSE REPAIR SURGERY AT MEMORIAL HOSPITAL TAMPA. AN EARLY ADOPTER OF THE DA VINCI SURGICAL SYSTEM FOR COMPLEX FEMALE PELVIC SURGERY, HE HAS DEVELOPED SPECIALIZED INSTRUMENTS AND TECHNIQUES TO IMPROVE THE MINIMALLY INVASIVE PROCEDURE. IN ADDITION TO TRAINING SURGEONS ACROSS THE NATION, HE HAS WRITTEN A PLAIN-LANGUAGE BOOK TO HELP PATIENTS UNDERSTAND THE PROCEDURE.



symptoms of pelvic floor prolapse (often described as organs “falling” out of position). Eve could have been his first patient—but Hoyte is a pioneer in a clinical discipline that, as a formal subspecialty, is only about five years old. He’s done much to further training in the field, including launching and directing the first clinical fellowship program in FPMRS in the state of Florida (at the University of South Florida College of Medicine). “If you have an F-15 aircraft, you don’t go to a bicycle mechanic to fix it,” he says. “I designed our FPMRS program to create thoughtful, analytic, highly competent, and sought-after subspecialists in our field.”

Over the last few decades, Hoyte has seen greater openness about female pelvic floor disorders, thanks in part to public information efforts of the National Institutes of Health and patient advocacy groups. Yet he still sees patients who come in seeking help for incontinence, prolapse, or sexual dysfunction, thinking they suffer alone. “They’re relieved when I tell them their condition is common—and often fixable,” he says. He helps them consider options—which can include observation, physical therapy, or minimally invasive surgical reconstruction.

“Surgery is pretty much an ancient art,” says Hoyte. Early in his practice, he observed that the techniques being used for pelvic floor reconstruction “hadn’t really evolved.” While minimally invasive approaches, such as laparoscopy, offered some advantages, he says, “I looked at it with my engineering background and saw that the laparoscope was just not set up to work optimally in the confined space of the pelvic cavity.” He was an early adopter of the robotic-assisted da Vinci Surgical System and has developed specialized techniques and tools that make complex surgical procedures simpler, faster, and safer.

PREDICTIVE CARE

For Hoyte, “personalized patient care” means more than just an attentive bedside manner. He wants to know how a particular patient’s pelvic muscles and ligaments will withstand the stresses of childbirth. He also wants to assess which of the various repair options would give the best outcome for each patient. Under his guidance, researchers in

says. With enough data, Hoyte sees a future in which “we’ll be able to look at a particular patient, get an MRI scan, perhaps do a blood test to assess her biomechanical tissue properties, and run computer simulations of different birth scenarios.” With the right algorithms, he says, “We could tell that woman, based on her baby’s weight and head size, and how long labor lasts, what her

HOYTE BEGAN INNOVATING AT WPI WITH HIS SENIOR PROJECT, “COMPUTER-BASED PATIENT MONITORING,” (FUTURISTIC IN 1979). SINCE THEN HE’S RESPONDED TO THE NEEDS OF PATIENTS AND PHYSICIANS WITH NOVEL IMPROVEMENTS TO PRACTICE AND EDUCATION.

Instead of scolding a patient who didn’t want to wear a urine collection bag after surgery, Hoyte developed and patented a portable push-button device that can easily be emptied by the patient throughout the day.

The patented Hoyte SacroTip positions and stabilizes organs during surgical repairs, making suturing faster and more accurate.

Biomechanics of the Female Pelvic Floor (Elsevier, 2016, co-edited with Margot Damaser) is the first textbook to bring bioengineers and clinicians together in a holistic approach that integrates engineering principles, radiology, physiology, anatomy, and computer science.

In addition to numerous scholarly publications, Hoyte has written two plain-language books for patients to guide them through robotic surgery, from decision making to recovery.

his group have identified critical markers—such as muscle shape and thickness, and bony geometry—that go beyond what a doctor can learn in a physical exam. “By taking a few selected measurements,” says Hoyte, “we can tell a patient what the success rate of prolapse repair will be, using a particular surgical approach.”

Perhaps his most exciting research is in developing 3-D computer simulations of childbirth. “We can pass a model fetal head through the pelvis and look at the damage that occurs—on the computer,” he

risk of childbirth injury would be with vaginal delivery.” He stresses that the goal of his research is to be able to present options, so the patient and doctor can make informed decisions together.

“We build cars and test aircraft on a computer before we build the physical model,” proclaims Hoyte. “Why are we repairing pelvic floors without running computer-based simulations of the different repair options, so we can figure out which one is right for you? Your pelvic floor is worth more than that!”

THE RIGHT TOOLS

Back when he worked in the computer industry, Hoyte’s tools included CAD programs that were developed by the people who actually used them. “The tool builders were the tool users,” he points out. “So the tools were optimized for them.” Today he wants to bring that same ethic to the programs used for computerized medical records. He laments that the shift to electronic records has caused doctors to shift their focus from talking with patients to entering data. “How do we optimize the building of a medical record so that the doc can be back in charge of how it functions?” he asks, “and so that the doctor–patient relationship comes first?”

The Pelvic Floor Institute is a “testbed” for the HIPAA-compliant electronic medical records software that Hoyte is designing with colleagues. To head up that R&D, he recruited another WPI-trained engineer: his son, Dante Johnson-Hoyte ’13, who serves as the Institute’s chief technology officer. Dante is continuing the family legacy of keeping patient care personal.

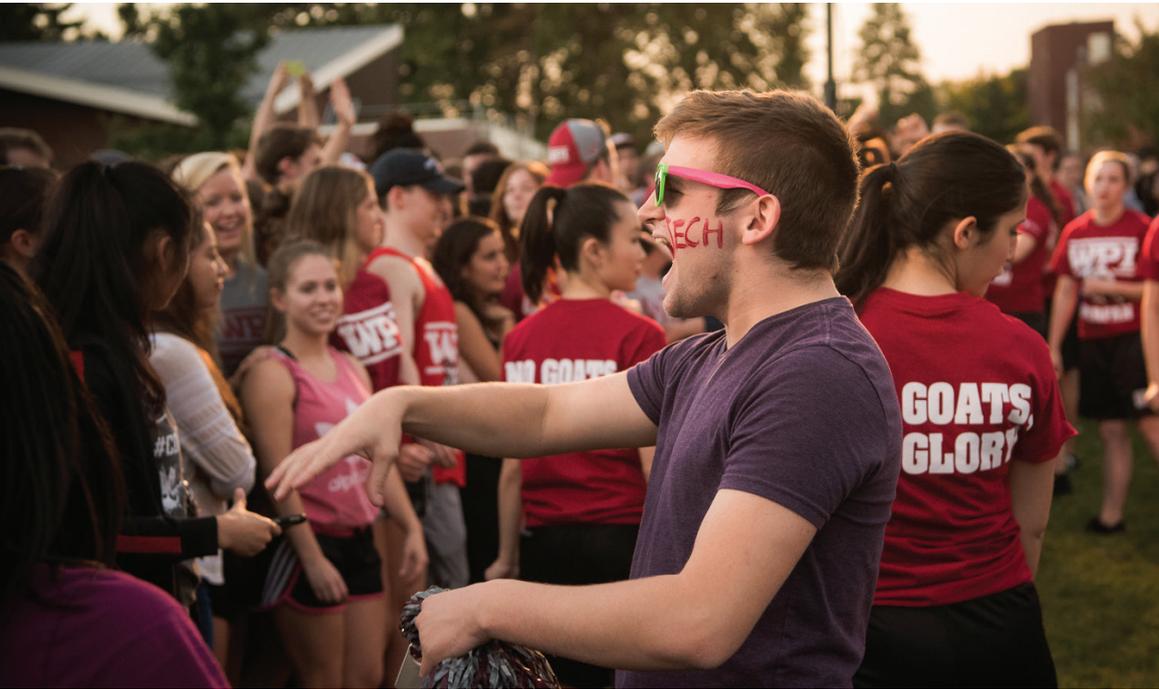
“My mom was an amazing care provider,” says Hoyte. “My goal in my practice was to build a personalized model of pelvic floor care, where the ‘engineer’—that is, the doctor—listened carefully to the patient to help define what her individual problem is—and then set about solving that problem.”

It’s an approach he says harks back to the competency exams that WPI students took in the 1970s.

“My WPI experience taught me to think about every single patient as a specific engineering challenge—where I have to learn what the question is by listening to the patient; to use my scientific understanding to develop and test hypotheses regarding her care options; and to deliver a personalized solution for that patient.”

It’s a vision that would make his late mother proud. **J**

CAN'T HIDE THAT TECH PRIDE



WPI

HOMECOMING 2017
SEPTEMBER 8 & 9

wpi.edu/+homecoming



consumed by

FIRE

*On a tiny island in Alabama,
The Flame Refluxer,
a new technology developed at
WPI for burning oil spills in place,
undergoes a critical
real-world test.*

BY MICHAEL DORSEY | PHOTOGRAPHY PAT O'CONNOR



THE WPI RESEARCH TEAM ON THE CATWALK ATOP THE BURN PAN AT THE JOINT MARITIME TEST FACILITY ON LITTLE SAND ISLAND IN MOBILE, ALA. FROM LEFT: POST-DOCTORAL RESEARCHER KEMAL ARSAVA, LAB ASSISTANT DAVID PETROW, COMBUSTION LAB MANAGER TREVOR BORTH, MASTER'S STUDENT PANYAWAT "OAT" TUKAW, AND PROFESSOR ALI RANGWALA.

A thick overcast masks the sunrise on this unseasonably cold mid-March morning as a crew of WPI researchers and personnel from the U.S. Coast Guard, the U.S. Navy, and the Department of the Interior board a small landing craft at Coast Guard Sector Mobile on the Gulf Coast of Alabama. With a rumble, the craft pulls away from the dock and plows through the muddy waters of Mobile Harbor, shadowed by cormorants, pelicans, and frolicking dolphins. Rounding McDuffie Island, with its massive coal terminal, the craft comes in sight of Little Sand Island, a 49-acre windswept stretch of sand and low vegetation.

The boat beaches beside the ex-USS *Shadwell*, a retired World War II-era U.S. Navy landing ship dock that, since 1988, has served as a lab for the Fire Research Detachment of the U.S. Naval Research Laboratory (NRL). With the Coast Guard Research and Development Center, the NRL runs the Joint Maritime Test Facility here. While the Navy focuses on preventing and extinguishing fires aboard ships, the Coast Guard's interest is using fire as a tool to clean up marine oil spills in place—a technique called in situ burning.

That's what has brought the WPI research team here. For the past three years, under the leadership of Ali Rangwala, professor of fire protection engineering, it has been developing a new technology that could make in situ burns (or ISBs) easier to conduct, more efficient, and cleaner. Simple and inexpensive, the Flame Refluxer could revolutionize how spills are mitigated.

The technology has delivered highly promising results in controlled tests in WPI's state-of-the-art fire protection engineering laboratories. Today is the first of three days of testing that will reveal how well the device functions under real-world conditions.

FAST AND EFFECTIVE

When crude oils spills in open water, the potential for ecological harm looms – to plants and animals in the water column, and to those on shore, should the oil drift. Traditional clean-up methods, like corralling the oil and skimming it from the surface or breaking it into small globules with chemical dispersants, are often ineffective and they can, themselves, be harmful to marine life. Oil spill experts have long believed that the fastest and most effective way to remove the oil is to light it on fire, transforming the thick, toxic goo into water, CO₂ and other gases, and particulate matter. Still, the clean-up method has seen only limited use.

Research on ISBs began in earnest in the early 1970s with groundbreaking laboratory studies aimed at understanding the physical and chemical properties of the emulsions that form when oil mixes with water and the challenges entailed in igniting and sustaining oil fires on water. Tests at the National Oil Spill Response Test Facility in New Jersey in the early 1980s and work by the National Institutes of Standards and Technology (NIST) in the 1990s proved the effectiveness of ISBs, which can remove about 90 percent

of spilled oil.

At around the same time, NIST, in partnership with other U.S. and Canadian agencies and oil companies, began an extensive research program on Little Sand Island. Starting in 1998, a new steel burn pan (108 feet long, 38 feet wide, 5 feet deep) hosted a series of large-scale burns that refined the challenges and promises of ISBs and drove the development of fire-resistant booms, which would be necessary to corral and contain the burning oil. The last test was conducted in 2000, and in 2005, the burn pan was seriously damaged by hurricane Katrina.

In the interim, in situ burning would receive its most extensive real-world application to date. On April 20, 2010, a catastrophic explosion on the Deepwater Horizon rig off the coast of Louisiana triggered the largest accidental marine oil spill in history; in all, about 4.9 million barrels of crude leaked into the Gulf over the course of nearly three months.

About 5 percent of that oil was burned in a large-scale operation overseen by an interagency group. More than 400 burns were conducted inside 400-foot-long fire booms towed by small boats. "The burns were quite successful," says Kurt Hansen, project manager at the U.S. Coast Guard Research and Development Center. "They worked better than expected. The fires were so hot they created updrafts that pulled more oil into the booms."

That success revived interest in research on ISBs at the Joint Maritime Test Facility. By the fall of 2015, the Coast Guard, the NRL, and Interior Department's Bureau of Safety and Environmental Enforcement (BSEE) had repaired the burn pan and readied it for a new era of test burns. A year later, WPI would become the first university granted use of the reopened facility.

THE BIRTH OF AN IDEA

Much of the early interest in in situ

burning arose from worries about how to clean up oil spills in the Arctic, an inaccessible region covered by ice and snow much of the year. In situ burning seemed the only practical solution. But while the approach made sense, there was no guarantee that oil would burn in extreme cold and while sitting on top of ice and icy water, both excellent heat sinks.

That's where WPI entered the picture. In 2014 BSEE awarded Rangwala the first of a series of awards that now total more than \$1.5 million. The initial grants funded laboratory studies aimed at answering fundamental questions about the combustion of oil in Arctic conditions.

Starting with test burns on disks of ice the size of hockey pucks and moving on to experiments with ice sheets, ice channels, and one-meter-square pools of crude oil surrounded by a field of ice blocks, Rangwala's team, which included postdoctoral researchers Xiaochuan (Lydia) Shi, made a number of groundbreaking discoveries, including the fact that burning oil sinks into ice, creating widening pockets that thin out the oil, making it more difficult to burn, and which can ultimately trap unburned oil beneath an ice layer.

They also found that ice and frigid water create thermal inertia, making the oil harder to ignite and the fires more difficult to sustain. Rangwala wondered if there might be a way to warm the oil to make it more volatile. Since it's oil vapors that burn, not the oil itself, getting the oil to vaporize more readily should enhance ignition and burning, he reasoned. "Typically, with in situ burns, about 95 percent of the heat goes up into the atmosphere by buoyancy," he says. "I knew that if we could transfer some of that heat to the fuel we could create a feedback loop, enhancing the burning rate, creating still more heat, to enhance the burning rate further, and so on."



CONSISTING OF COPPER COILS ATTACHED TO A BLANKET MADE OF A LAYER OF COPPER WOOL SANDWICHED BETWEEN TWO LAYERS OF COPPER MESH, THE FLAME REFLUXER TRANSMITS HEAT FROM AN OIL FIRE TO THE OIL TO SUPERHEAT IT, INCREASING THE BURNING TEMPERATURE AND RATE, AND CUTTING EMISSIONS.





ARSAVA AND BORTH PLACE THE FLAME REFLEXER IN THE TEST STAND SURROUNDED BY A FIRE BOOM CHARRED FROM AN EARLIER TEST. THE INTENSE FIRE AND GRAY SMOKE (RISING TOWARD THE EMISSIONS COLLECTION SYSTEM, WITH ITS ORANGE WINDSOCK) ARE TESTAMENTS TO THE REFLEXER'S EFFECTIVENESS.

VARIOUS CONFIGURATIONS OF COILS WERE TESTED IN THE LITTLE SAND ISLAND BURNS. THE TOP PHOTO SHOWS ONE WITH COILS OF DIFFERENT HEIGHTS, WHICH HELPED DETERMINE WHETHER TALLER COILS DO A BETTER JOB OF TRAPPING HEAT WHEN PREVAILING WINDS BEND THE FLAMES TOWARD ONE SIDE OF THE BLANKET. AFTER THE OIL FLOW WAS SHUT OFF, THE RESIDUAL HEAT IN THE BLANKET KEPT THE FIRE GOING FOR OVER AN HOUR, BURNING OFF NEARLY ALL THE OIL AND RESIDUE AND LEAVING THE WATER LOOKING CLEAN.



Rangwala started experimenting with the use of metal rods to conduct heat into the oil. From that brainstorm was born the Flame Refluxer. Practical experiments with the rods and a computational model of the effects of immersed metal objects developed by postdoctoral researcher Hayri Sezer showed that the idea had great promise. The rods acted as both collectors, absorbing heat from the flames, and heaters, promoting vaporization of the oil. The next step was to more effectively spread the refluxed heat through the oil. That led to replacing the heater portion of the rod with the blanket. The final innovation was transforming the simple rods into metal coils to increase their surface area and their contact with the flames.

Tests of prototypes of various sizes and with varying numbers and configurations of coils helped refine the design and provided insights into how it would behave at the large scale (up to 60 feet across) that would likely be required for real-world applications. The next step, funded by a \$1 million award from BSEE, was to take the Flame Refluxer outside and see how it performed when subjected to the whims of wind and weather.

“We receive a lot of proposals for technology to improve in situ burning,” says Karen Stone, oil spill response engineer at BSEE. “This one really got our attention, because of WPI’s proven expertise with combustion and because they were able to offer us something that went beyond a good idea. They had the data and they understood the science.”

MAKING A DIFFERENCE

The WPI research team fans out to make preparations for the week’s first burn. The equipment and instruments for the test are already in place, having been set up the week before by a crew headed by Trevor Borth, manager of Rangwala’s Combustion Laboratory. The centerpiece is a test stand consisting of a metal ring 1.4 meters across, resting on four legs just over a meter tall; the stand will support the blanket at the surface of the water inside the burn pan.

Tubes projecting up from each leg and one in the middle of the stand hold dozens of thermocouples that will measure the temperature of the flames. Other instruments will monitor heat flux, and an innovative system designed by FPE master’s candidate Panyawat “Oat” Tukaew will collect and analyze emissions. The system consists of a windsock that funnels gases through instruments that measure their volume and temperature and feeds them to an analyzer that records levels of oxygen, carbon dioxide, carbon monoxide, nitrous oxide, nitrogen dioxide, and sulfur dioxide.

A network of pipes delivers oil to outlets beneath the blanket, while a camera below the waterline helps the researchers keep the oil layer at about one centimeter (previous work showed that ISBs work best when the oil layer is maintained at between 1 and 4 centimeters). Before each burn, members of the Coast Guard’s Gulf Strike Team position portable air monitoring devices around the burn pan to measure particulate matter, the pollutant that presents the greatest health risk to personnel who need to be in close proximity to open-water oil burns.

Before the week is out, six burns will be completed, overseen by Rangwala and postdoctoral researcher Kemal Arsava. They will include a test with the blanket alone (no coils) and three tests with various coil configurations. Lab tests showed that with two rings of coils, the outer ring does the lion’s share of absorbing heat, probably because it receives more oxygen and because convection currents near the center of the

blanket create soot that interferes with heat transfer to the coils there.

This week, a test with just the outer coils and one with longer coils in the center will help fine-tune the configuration to maximize heat transfer to the oil. In future research, the WPI team plans to inject air at the center of the blanket to see if pre-mixing the oil vapors with air will reduce soot formation.

The two burns planned for Day 1 will serve to dramatically demonstrate the beneficial effects of the Flame Refluxer. The first is a baseline test—a 10-minute burn without the Refluxer. For the second, the blanket with two rings of 20-centimeter coils is placed in the ring. Even without glancing at the stream of data flowing into the control shed, it is clear that the Refluxer has made a difference.

In contrast to the thick black smoke that billows from the baseline burn, the smoke from the Refluxer test is thin and gray, and it dissipates quickly. When the fuel flow is shut off, the baseline fire burns on for another five minutes, but leaves a layer of unburned oil that Arsava and David Petrow, a lab assistant in FPE and the fifth member of the WPI team, must laboriously sop up with absorbent pads so it can be weighed. It takes more than an hour for the last flames to die out after the Refluxer burn, and when the blanket is lifted up, the water looks clean. Even the tarlike residue normally produced by ISBs (which can harm marine life as it sinks into water column) appears to have been burned off.

“After the baseline burn, we collected 20 kilograms [about 44 pounds] of unburned oil,” Arsava says. “One of the advantages of the Flame Refluxer blanket is that it can collect that residue. In our test burns, the blanket collected about six kilograms [13 pounds] of residue, and only one kilogram [2.2 pounds] was left in the water.”

By week’s end, the research team is all smiles. In the real-world laboratory on Little Sand Island, the Flame Refluxer has been a resounding success. On average, Rangwala and Arsava note, the fuel temperature with the Refluxer was 140 degrees C higher than in the baseline fire. In addition, the fire consumed four to five times more oil per minute than the baseline burn, and oil burned more completely, producing 50 percent fewer emissions.

“We have high hopes for this technology, which can make a good technique even better,” says Stone as the testing wraps up. “There is more work to be done, particularly in thinking about how the technology can be deployed in practice, but we are very pleased with what we’ve seen this week.”

KEEPING FOCUSED

Back in Worcester, the WPI team unpacks and thinks about where the research may go next. Rangwala is interested in finding ways to further refine and optimize the Refluxer. Studies in the lab showed that it can increase burning rates up to 10 times; he believes it may be possible to get closer to that number in the field. In the meantime, BSEE has invited Rangwala and his colleagues to submit proposals for three new research projects that will expand on the Flame Refluxer work.

Rangwala says this new research will be motivated by the same goal that has driven his team for the past three years. “The longer you let oil linger in the environment, the greater the danger becomes,” he says. “That’s what our work on ISBs is aimed at: reducing the clean-up time to a minimum, and removing the maximum amount of oil from the environment. With each advance, we get closer to those objectives.” **J**

FRAMING SEG 4 & 5

TURBO CHARGED

One Man's Mission to

SAVE THE MUSTANG

BY ANDREW FAUGHT | PHOTOGRAPHY MATT FURMAN



As a 5-year-old growing up in Winchester, Va., Arthur Hyde '77 sat in his front yard and recited the makes and models of cars that drove past his family's white, two-story brick Colonial, among them Packards, Chevys, Fords—even the ill-fated Edsel, which had just hit the streets.

Hyde's passion grew as he continued to watch the motorized cavalcade roll through the town famous for changing hands 72 times during the Civil War.

Then, in the summer after third grade, came the moment that changed his life. It was at the 1964 World's Fair in New York City, where a new creation, the 1965 Ford Mustang, was unveiled to the public. Named after the famous World War II fighter, it had a base price of \$2,300.

"I was so excited about seeing the Mustang," Hyde says more than five decades later. "Of course, there was a long line to see it. I waited with my brother while the rest of our family went around to different things."

Ninety minutes later, the giddy brothers finally crawled inside the Guardian Blue convertible's vinyl sanctum. The car, suspended above a pool of water, took the boys on a short, automated ride in the Ford Pavillion. For Hyde, the moment was indelible—even sacrosanct.

"I was completely hooked," he says. "From that point, I decided that the only thing I wanted to do in my life was to be a chief of Mustang."

And he would be. Not only did Hyde lead Mustang as the iconic brand's chief engineer from 1998 to 2002, he's credited, moreover, with being the guy who saved the car from extinction after sales and profits declined due to growing company indifference about its fate. The model, as Hyde puts it, had "lost its way."

Hyde never wavered from his plan to take Mustang by the bridle. At WPI, he called and wrote to Ford's then-executive engineer, Bob Alexander, a dozen times. The queries went unanswered. But Hyde wasn't deterred. He found a Ford annual report and looked up the names of other company executives. He wrote more letters.

Someone finally took notice and Hyde ultimately scored an interview with Alexander, himself, who was impressed enough with the young engineer to give him a job that, in part, required him to work on turbo-charging the engine of the Mustang that was to serve as the 1979 Indianapolis 500 pace car.

He was the perfect guy for the job. At WPI Hyde conducted research on automotive turbo-charging—increasing an internal combustion engine's efficiency and power output by forcing extra air into the combustion chamber. For his MQP, he explored the impact of turbocharging on fuel economy and emissions.

But his ultimate goal took some time to realize. That dream came true in 1998 when Hyde became Mustang's chief program engineer. These days, Mustang fan groups regard Hyde with rarified esteem.

The Mustang Club of America (MCA) inducted him into its hall of fame in 2002 for saving the car. "It's a huge honor," Hyde says. He served on the MCA board of directors from 2000 to 2004. During those years he

penned a monthly column in the club's magazine, *Mustang Times*.

Forty years on, Hyde is still at Ford's Dearborn, Mich., headquarters. He's been the only engineer to helm two Mustang programs—SN95 and S197—that produced the car's fourth and fifth generations.

"Anybody who's ever been the chief engineer of a Mustang is held in a different regard. These guys are like rocks stars," says John Clor, who, as Ford's Enthusiast Communications manager, serves as the company's liaison with 350 car clubs around the world, most of them Mustang-related. "Art was the first person in the company to understand the passion of clubs and what they could bring to the development of the car."

After leaving the Mustang program in 2002, he resumed his previous role as chief engineer for Ford's global product development system. "Fundamentally, I'm responsible for making sure every program is on time and that it's not consuming too many engineering resources," he says. "We want to hit that budget." This year he'll travel twice to China,

Brazil, and Australia. His itineraries include four stops in Europe, and another in Japan.

Hyde also is an adjunct professor at the University of Michigan's College of Engineering, where he teaches systems engineering and program engineering. He's taught in Ann Arbor since 2001, at the invitation of the department.

Building cars involves "a very critical set of skills that we want to give our students," says Panos Papalambros, chairman and professor in the college's Division of Integrative Systems + Design. "You cannot replicate that in school, but you can prepare them so they can be ready for the experience when they go to work. Art has been instrumental in getting this done right. He's very meticulous in what he does, and he's a good conduit to connect students with Ford engineers who might be looking at placements."

When he hired new college graduates for Ford, "I was disappointed that we were getting these students who really didn't understand systems engineering," Hyde says. "They didn't understand how to trade off things like cost and function, like crash safety and ride and handling. They knew how to do stress analysis, which was great, but they were not able to look at the vehicle to the extent I thought they could have. I felt better prepared coming from WPI than some of these other people."

A fellow alumnus—Jamie Forbes '88 ('90 MS), recruited by Ford from WPI in 1990—was initially hired to do noise and vibration research. For a time he worked with Hyde on the Mustang, but he's since become manager of interaction and ergonomics at Ford, perfecting everything from cup holders to video screens.

Working on the Mustang is the envy of most employees, Forbes says. "If you get to work on Mustangs, you must have done something right."

But Hyde is driven by more than reverence for the brand, Forbes adds. "Art is a responsible engineer. There's a huge social obligation when you design a vehicle that can kill people."

"The only thing I wanted to do in my life was to be a chief of Mustang."



CLOCKWISE FROM TOP:
THESE 2017 MUSTANGS GET
ONE LAST INSPECTION AT THE
END OF THE ASSEMBLY LINE;
ANOTHER MUSTANG READY
TO DRIVE OFF THE FACTORY
FLOOR; THE WHITE OUTLINES
OF A PAINTED CLAY PROTOTYPE
OF THE FORD GT SUPERCAR;
ART HYDE WALKS THROUGH
THE MUSTANG ASSEMBLY
PLANT IN FLAT ROCK, MI.



Hyde is considering retirement, but there's still the spirit of that car-loving 5-year-old reminding him that some passions never die.

"I have almost 40 years in, but I'm really enjoying it," says Hyde, whose first "pony car" was a 1983 Mustang Turbo. "And as long as I'm enjoying it, I'm gonna keep doing it."

His turbo-charged journey, he notes, had a critical stop at WPI: "I would never have been able to do what I did if I had not had that experience. My MQP advisor was Roger Borden, who used to say stuff like 'crawl in the mud and get dirty with the pigs.' It was just one thing after another that you had to work through. Professor Borden kept me calm and focused through all the challenges. It was a fantastic experience."

Hyde was as much a grease monkey as a student during his Worcester days. He canvassed the city and the campus, leaving business cards on windshields advertising his skills as a mechanic (something he began doing in the seventh grade). He particularly enjoyed working on British sports cars.

"The card said, 'Need work done?' and I knew that the answer was 'yes,' because it's a British sports car, after all," Hyde says, noting that he did most of his repairs in WPI parking lots. "I also worked on Volkswagens, Volvos, and Porsches. Frankly, it was pretty demanding, but it gave me enough spending money to get through the month."

As for his own wheels, he drove a brown 1970 vinyl-top Ford Capri during his college days, in which he installed a racing-style Formula

Ford engine. He pined for his dream car, but his father had forbidden him to get a Mustang because of hefty insurance costs.

"He wasn't into cars at all, and he thought it was all stupid," Hyde says of his father. "But he gave me \$100 and basically said, 'You can have any car in the junkyard.'"

As a middle schooler, Hyde found an old 1966 Datsun 411 SSS, but it was inoperable. In the summer after eighth grade, he hitchhiked regularly to the yard until he got it running.

He's since upgraded.

He somewhat abashedly admits to owning four cars: his daily driver, a Ford Focus ST; a 1999 Mustang that was used for testing and development purposes; a 1967 Lotus Elan ("It's a British model, right-hand drive, the way it should be"); and, for thrills, a 2015 Shelby GT350R ("It's a hell of a car!").

But Hyde doesn't necessarily find satisfaction in speed and muscle. He's an engineer at heart.

"I like balance," he says. "I'm never going to be a great race driver; that's not my goal. I like managing the physics, where you can feel the weight transfer and you can feel all of the forces. That makes me feel so alive."

His role with Mustang also tested his political chops, particularly during those days when the Mustang appeared to be a dying breed.

"Ford had a bunch of people who didn't know what a Mustang was, but they thought they did," Hyde says. "The mistake I saw them making was thinking they were the customer. They may be caretakers for the customer, but they have to keep grounded on what the actual

customer wants. Management didn't necessarily understand that."

In a controversial move, Hyde launched a program called "immersion excursions," in which executives and engineers spent a day with Mustang owners around the country. Those owners were given video cameras to film a week in the life of their Mustangs. He says one, a homeless man in Newport Beach, Calif., has stuck with him over the years — his situation showed that Mustangs are more than just four wheels and a chassis.

"He lived between two houses and had a corrugated roof over his head," Hyde says. "He had a couch, water-cooled speakers for his stereo system, and nothing else. But the guy did have a Mustang convertible, and everything he earned he put into his Mustang. It was hopped up; it was beautiful!"

"So what makes somebody do that?" Hyde asks. "Well, they get in and they feel special. This guy didn't feel special in any other part of his life. He felt like he had been overlooked by everybody, including his family, but this car *made* him, and it was empowering."

Now in his 60s, Hyde knows there are legacies to consider as he approaches the end of his long and esteemed career. There is something of the race car driver in his words.

"My main motivation is to make a difference in the industry," he says. "I want people to chase me rather than [having to] chase the competition. If you set the tone and pace, then everybody has to match you." **J**



WPI OBSERVED ITS 149TH COMMENCEMENT

with four ceremonies, including separate undergraduate and graduate exercises, all held on the Quadrangle under a spacious white tent. In all, 1,821 students graduated this year (1,027 with bachelor's degrees, 748 with master's, and a record-setting 46 with PhDs).

This was only the second time the Institute has held a commencement ceremony just for graduate students, a reflection of the growing stature of WPI's graduate programs and the sheer numbers of graduate students enrolled in the university's increasingly popular on-campus and online programs.

A highlight of the graduate ceremony was the awarding of an honorary doctor of science degree to Audrey Carlan, who returned to campus 60 years after becoming the first woman to receive a WPI degree. She and her late husband, Alan, received WPI's first two master's degrees in physics in 1957 (it would be another 15 years before a woman would receive a bachelor's degree from WPI). Carlan (shown here with President Leshin) stood proudly on the platform before the Class of 2017 and marveled, both at the progress that has been made since her graduation and at the wonders yet to come. "You all are the future," she told the graduates. "There is more to look forward to and you will be at the forefront of it all." ►

COMMENCEMENT 2017



MORE HIGHLIGHTS

GRADUATE CEREMONY

Graduate Keynote Speaker and Honorary Doctor of Humane Letters Degree Recipient

Deborah Wince-Smith, president and CEO, U.S. Council on Competitiveness

Student Speaker Rodica Neamtu

ROTC COMMISSIONING CEREMONY

Commissioning Officer

Lt. Col. Brent E. French, U.S. Air Force

BACCALAUREATE CEREMONY

Student Speakers Casey Broslawski, Robert LaFlamme

Guest Speaker Matthew Beaton '01, secretary of Energy and Environmental Affairs, Commonwealth of Massachusetts

UNDERGRADUATE CEREMONY

Undergraduate Commencement Speaker and Honorary Doctor of Science Degree Recipient Rodney Brooks, chairman and CTO of Rethink Robotics

Honorary Doctor of Engineering Degree Recipient Donald K. Peterson '71, trustee emeritus and former CEO of Avaya

Student Speaker Veronica Delaney

Chairman's Exemplary Faculty Prize Recipient Diane M. Strong, professor, Foisie Business School; director, Management Information Systems Program

Cracking Tech's Toughest Codes

As she scales increasing heights in IT,
URVASHI TYAGI '01
is finding ways to help others do the same

BY ERIN PETERSON | PHOTOGRAPHY MATT FURMAN

She was restless. It was 1999, and Urvashi Tyagi had landed what should have been a plum teaching job as a visiting faculty member at the Centre for Development of Advanced Computing Training Center. This was in addition to her full-time academic role at the Indian Institute of Management Ahmedabad in western India.

She had already shown herself to be a capable engineer at a large Indian manufacturing firm, and the teaching position offered a new challenge. But when the same courses came around a second time, she began to find the work monotonous.

A colleague who had visited WPI suggested she consider applying to the school to get an advanced degree that would open up opportunities. Skeptical at first—she had no idea how she'd pay for more schooling, and she didn't know a single person in the United States—Tyagi was swayed by WPI's flexible programs and its focus on applied learning.

In August 2000 she boarded a plane for the very first time to make her way to Worcester. "I came to the United States with a semester's tuition, three months of living expenses, and two bags," she recalls. "One of the bags was stuffed with homemade snacks."



TYAGI IN THE FRONT LOBBY OF AUDIBLE'S OFFICES IN NEW JERSEY

AN OPPORTUNITY MINDSET

Tyagi had chosen to pursue a master's degree in information technology, but the timing could hardly have been worse. The industry was in the doldrums in 2000: tech companies were hemorrhaging cash, laying off employees, and working with skeletal staffs just to stay afloat.

Nonetheless, just weeks after arriving on campus, Tyagi dutifully visited WPI's Career Fair, hoping to find opportunities in the flailing industry she would soon join. She had just started her coursework, but she felt confident that she had something to offer.

"I told [company reps at the fair] that I'd love to build an application that had been on their back burner," she says. "I'd use it as a project for my coursework and get real-world skills. And they'd get their project done for free."

It was an irresistible pitch. Over the course of her two semesters at WPI, she ended up doing three industry projects, landed two internships, and had a full-time job offer in hand by graduation.

Tyagi took her academic coursework just as seriously, using the challenging feedback from her toughest professors as a chance to grow and learn.

"Professor Diane Strong made a lasting impact on me," she says. "I remember thinking that an application I had built as part of a course would impress her,

but then I was frustrated by her feedback. She consistently raised the bar for what I delivered."

These experiences, which demanded that Tyagi expect more from herself and find possibilities even when it seemed few existed, proved valuable once she moved into the working world. First at a start-up, and then at IBM, she uncovered unexpected problems that she turned into solvable side projects with a big impact.

As an engineer at start-up NuGenesis, her first job after WPI, she learned about a federal regulation linked to electronic records that affected pharmaceutical and medical device companies. (In industry lingo, it had the not-quite-poetic moniker 21CFRP11.) Once she landed at IBM in 2003, she saw ways to use that knowledge to help her new employer. "As a side project, I started to customize and configure a set of more than 10 IBM software products that would meet requirements [for the regulation]," she says.

Within months, and with the blessing of her boss, she had created a poster presentation and developed a whitepaper with engineers several levels above her connected to the work. Her nights-and-weekends project had paid off.

She took a similar approach after accepting a job at Microsoft in 2008. While working on software technology known as "application virtualization,"

she uncovered dozens of bugs hampering outside developers who were supporting the work. Despite her full-day meeting schedules, she found time to crack open the bugs for Microsoft's engineering team to fix—and spearheaded the creation of a debugging guide that would make life easier for the developers going forward.

"A common theme of my work is addressing a deeply rooted customer pain point," she says. "There are many low-hanging fruits in our workplace that we can pick based on our backgrounds and strengths," she says.

While she took on these side projects because she was truly interested in solving the complex problems they presented, there were benefits well beyond the solutions themselves.

"These types of initiatives that started outside my day job," she says, "eventually took over, and became turning points in my career that helped me land more opportunities."

Today, as director of engineering at Audible, a company best known for its vast catalog of audiobooks, Tyagi continues to think beyond her job description. Since arriving in 2014, she's tackled a range of projects. She led the launch of Audible's mobile store worldwide, delivered a scalable platform for international expansion, shepherded its entry into the enterprise business, and built its customer relationship

management and search traffic technology teams from the ground up.

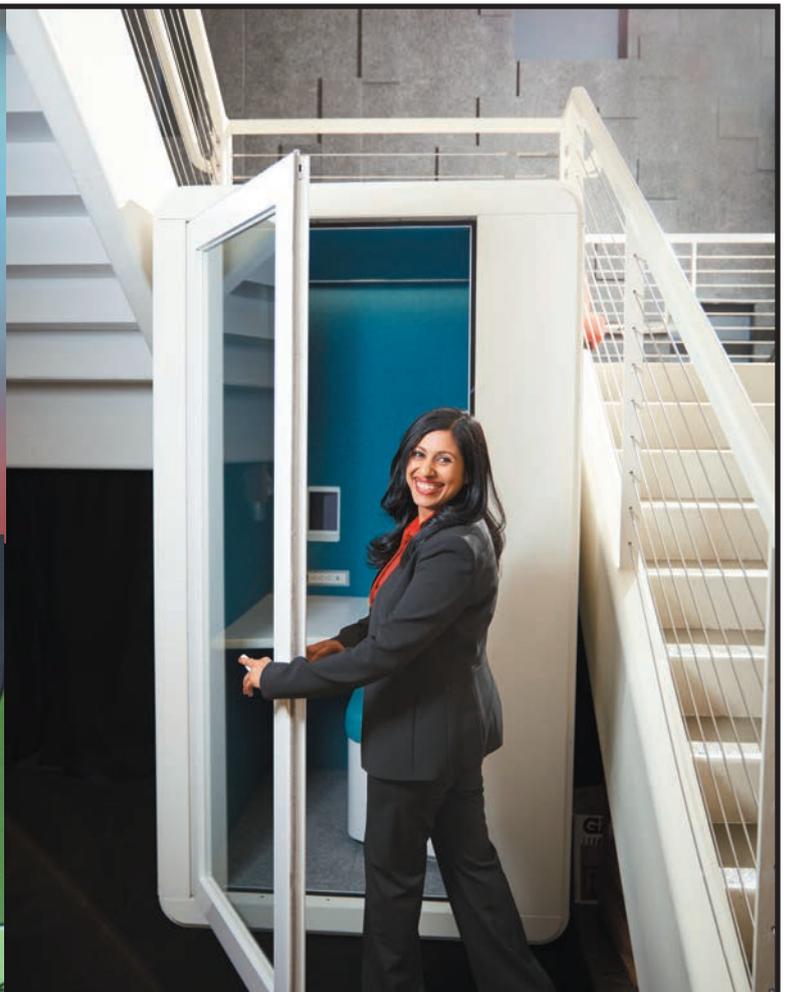
Her colleagues, including director of product management Justin Kim, praise her skills as a collaborator and as an innovative thinker.

"Urvashi's passion for this area is evident," Kim says, "and she doesn't hesitate to share her thoughts on [strategic] directions that go well beyond the boundaries of a traditional software development manager."

These days, Tyagi is also working to solve a challenge that most of us know all too well: communicating with users at the right time, with the right message, and on their channel of preference. For example, we might like an Audible email reminding us to get the latest Dan Brown thriller but someone else may like a notification on their device reminding about a bestselling book that maybe doesn't interest us. Building insights-powered communication campaigns that iteratively machine-learn users' interests and preferences is as much an art as a technical challenge. She is working to solve the question that drives that problem: How do we engage them only in ways that are most meaningful to them?"

If there's anyone who can answer that riddle, it might just be Tyagi. And she might just do it on nights and weekends.





ONE OF THE SOUNDPROOF BOOTHS FOUND WITHIN THE AUDIBLE OFFICE OPEN FLOOR PLAN.

SOLVING AN EVEN BIGGER PROBLEM

Urvashi Tyagi has shown herself to be adept at tackling an array of technical issues, but she admits that one of the knotty problems she'd most like to unravel—in-creasing the numbers of women who enter and stay in tech fields—can't be fixed by creating a better spreadsheet or a more perfect line of code.

She knows the issue intimately. Growing up in a relatively conservative Indian family, her parents came around slowly to the idea of allowing their daughters to pursue engineering degrees. (Eventually, she and all three of her sisters went on to study engineering.)

Years later, shortly before the birth of her first child in 2005, Tyagi found herself creating a spreadsheet to model whether

it made sense financially for her to continue her tech career. Her mom ultimately persuaded her that staying the course in her career would have benefits both to her and her children.

In each case, she was able to sidestep what experts recognize as two of the biggest landmines for women in tech, known informally as pipeline and retention challenges. In the first situation, she could have been nudged out of tech before she'd even started; in the second, her own fears might have been the obstacle in her path.

Tyagi wants to find ways to prevent both problems. That's part of the reason she's a tireless supporter of a variety of organizations and initiatives that help smooth the sometimes-rocky path for women in tech. She's a

strong advocate, for example, of Audible's 20-week maternity leave that's designed to help retain women who have children.

Outside her office, she serves on the Grace Hopper Scholarships committee, which supports the world's largest gathering of women technologists. She's been a panelist for Girls Who Code, a nonprofit organization designed to close technology's gender gap. And she's strongly connected to Illicit Mind, a New York City organization that supports diversity in technology.

Her partners in these ventures say she takes on these responsibilities with seriousness and heart. Georgie-Ann Getton-Mckoy, CEO and founder of Illicit Mind, says Tyagi routinely exceeds expectations. "After our Civic Hackathon last fall, Urvashi stayed well

beyond the event to talk with the teams, answer questions, and give advice. She asked thought-provoking questions, and we all really appreciated the extra effort."

For Tyagi, this work isn't just about seeing more people like her in technology. It's about making sure the best minds are at the table to make transformative technology possible.

Indeed, she speaks about the issue with problem-solving mentality that has marked all her very best work. "Technology has been an enormous enabler of economic development during the past two decades, and there are still many more problems to solve," she says. "While this transformation is happening, I want to see women and minorities have a seat at the table. That way, the outcomes serve all of us." **J**

WORCESTER POLYTECHNIC INSTITUTE

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A FESTIVAL OF SCIENCE, TECHNOLOGY, AND ROBOTS

We were thrilled to welcome thousands of guests to

WPI's beautiful campus for TouchTomorrow 2017.

Surely many of the kids who were with us at the event

will be future WPI students, successful alumni,

and STEM innovators of tomorrow.



Thank you!

[WPI*insider*]

PHOTO PHILL LEHANS



CAROLYN DETORA

HONORABLE MENTIONS: MARIETTA E. ANDERSON AWARD • SLAYMAKER-KINSEY AWARD • CHARLES O. THOMPSON SCHOLAR • DEAN'S LIST • UNIVERSITY AWARD • ENGINEERING AMBASSADOR • ORDER OF OMEGA • TAU BETA PI • PI TAU SIGMA • EXPLORADREAMS PRESIDENT • ALPHA XI DELTA • PEER LEARNING ASSISTANT OF THE YEAR

When parents today offer advice to their college-bound children, incoming freshmen may hear something analogous to “Get the most out of your four years!”

CAROLYN DETORA, of Avon, Conn., apparently took such advice to heart: she dove headfirst into a BS in mechanical engineering *and* an MS in management through WPI’s Foisie Business School, with sights on graduation in 2018.

It was her father, James Detora ’92, who insisted she tour the WPI campus during her college search process. “I fell in love with it on my first visit. When I got accepted, it was a no-brainer.”

With a passion for leadership, Detora says she was motivated to jump into a two-degree track in order to become a more well-rounded engineer. “I can envision myself as a project manager and I wanted to make sure I am preparing myself now with the skills necessary for this role.”

In the summer between her freshman and sophomore years, she was approached to join a team of students willing to provide input for the new Foisie Innovation Studio. “I knew the project would have a big impact on campus,” she says, “and I would be working with some amazing advisors (Art Heinricher, dean of undergraduate studies, and Diran Apelian, professor and director of the Metal Processing Institute). It was an opportunity I couldn’t pass up.”

This past winter she and another IQP teammate traveled to Florida to present their final findings at the WPI Board of Trustees winter retreat. “They were really impressed with our work and we received a standing ovation,” she recalls. “It was definitely one of my most memorable college experiences.”

She was able to network with the trustees – in particular, Dorothea Wong ’92, who has become one of her strongest supporters within the WPI community as well as her mentor through the Trustee Mentor Program.

With her fascination with the aerospace industry and her burgeoning interest in renewable energy, Detora sees her future leadership role falling into one of these industries – but she’s leaving her options open to interpretation. “I don’t have too many plans for my career; I am very much an opportunist,” she says. “I don’t like to have my whole life planned out. Most of my choices are based on my experiences, and I have so much to experience in the next year before I can make too many decisions!”

WHITNEY HAZARD '17
Hometown: Sandwich, Mass.
Major: Biology and Biotechnology

Involvement:

- **Colleges Against Cancer**
- **Phi Sigma Sigma**
- **Senior Community Advisor**
- **Student Support Network**
- **Trustee Mentor Program**

“Attending WPI has changed my life. It has allowed me to grow both personally and professionally. I’ve been able to explore what I am passionate about, while making a positive impact on my community.”



WPI is built on a long and proud tradition of philanthropy. When you give to the WPI Fund, you become a part of this tradition, supporting students like Whitney.

Your gift and those of your fellow donors supported Whitney in the lab and in her endeavors to enrich the dynamic WPI community. Thanks to you, her dream of a WPI education was realized in May when she took her final walk across Earle Bridge with the Class of 2017.

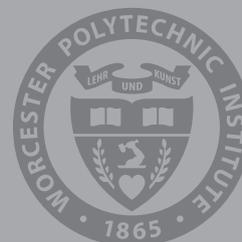
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LETTER FROM THE ALUMNI PRESIDENT



Dear Alumni:

Thanks to all who were able to join us for a great Alumni Weekend. I am looking forward to getting to know more of you during my time as Association president. A special thanks to everyone who participated in the Annual Meeting of the WPI Alumni Association.

Congratulations to outgoing president Rachel Delisle. Rachel's leadership has improved the Alumni Association and the services we provide to the WPI community. Her good works, including launching The Women of WPI, will leave a positive lasting legacy.

The campus is always so vibrant in April and May. It was especially busy on Community Service Day, Saturday, April 22. More than 150 students, alumni, and staff were out in the parks cleaning and improving public spaces in Worcester. My team walked back to campus through the last-minute tours of prospective first-years making their final decisions. Returning for Commencement a few weeks later, completed the cycle with our graduating seniors crossing back over Earle Bridge. Best of luck to the Class of 2017 – and welcome to the Alumni Association!

The WPI community lost a friend when Bill Trask passed away on March 25. He was a fixture of WPI life and a mentor to many. On behalf of the alumni community, I express our gratitude to Bill's family, Jeff, Terry, Carrie, and Laurie, for sharing Bill and Ruth with us for so many years.

Summer on campus is so much fun. TouchTomorrow is always a hit with my family, and my six-year-old is already asking when he can go to WPI sleep-away camp. I am personally looking forward to the completion of the Foisie Innovation Center and the new Hall of Luminaries exhibit space. Both the new building and the exhibit space will be such great additions to the campus.

In keeping with Rachel's tradition and that of other past Association presidents, I also encourage open communication of feedback or ideas you want to share. Please feel free to email me at wheelerda@alum.wpi.edu.

My best,

David '93 '04

David Wheeler '93, '04 MS

OVER
[EARLEbridge]

WOMEN'S IMPACT NETWORK LAUNCHED

Just over a year ago, a group of alumnae, faculty, and friends gathered with President Laurie Leshin in the Massachusetts Berkshires for a weekend of focused discussion about their role in helping to advance the future of WPI. With their connection to WPI and similar experiences in male-dominated STEM fields, the women felt engaged and supported. Naturally, they wanted to extend that feeling.

"The passion and energy for the weekend was so high, and it was so clear that there was this pent-up interest to reconnect with the university and, importantly, to support WPI women," says WPI Trustee Joan Szkutak '79, who helped organize the weekend. The conversation turned to the need for a formal network of WPI women who want to support one another and WPI in a meaningful way.

In February the Women's Impact Network (WIN) was officially launched, and in April nearly 40 women gathered in Boston for a weekend with President Leshin to discuss ways to invest in WPI women and connect more substantially with WPI and one another.

WIN is a philanthropic and networking group whose goals are to invest in programs that foster the success of WPI women students, faculty, staff, and alumnae, and to expand the role of women as leaders, advisors, trustees, and donors at WPI. Membership is open to anyone who makes an annual gift of any size, though engagement

opportunities are tiered to giving levels. Each fall the group will use its pooled fund to award grants, the first round to be announced September 30.

According to assistant vice president of leadership giving Donna Stock, WIN will disperse the sum of its annual gifts through grants. Organizers expect that applicants will include faculty, staff, and undergraduate or graduate students seeking seed money for initiatives that will support and advance women at WPI.

“We’re all open to seeing things grow and change over time,” says WIN member Maureen McCaffrey, who earned her BS in civil engineering from WPI in 1986.

WIN is modeled after similar university-based women’s networks, including those at Arizona State University, where President Leshin was a faculty

member, and at Xavier, where Szkutak earned her MBA after receiving a BS in electrical engineering from WPI.

In addition to faculty and alumnae, spouses of WPI graduates and parents of students have joined WIN. The diverse membership is expected to make the network stronger through new ideas and perspectives, its organizers say. They note that the need for a networking and philanthropic group for women affiliated with WPI is clear. Women remain underrepresented in science, technology, and engineering, with hidden and overt biases blocking opportunities. Plans are to actively promote WPI’s brand as strongly supportive of women, prepare women for STEM careers, invest in women faculty, students, and staff, and to consider ways to help women stay in or re-enter STEM careers.

“We have a huge opportunity to use the Women’s Impact Network to drive conversation around why women are not staying in STEM, why they’re not staying in the workplace – and, yes, a lot of that is driven by personal choice, but what can society and industry think about doing differently to enable retention, and can WPI have a role in facilitating that dialogue?” says Jenn Wyse ’94, co-chair of WIN with Szkutak.

There are also plans to learn about WPI and the challenges for women in STEM from WIN members themselves and from other women experts. WIN members are also considering ways to engage more deeply with the campus community through panels, mentoring, and funded projects.

The potential to make a positive difference through WIN has

energized its organizers. A year from now, they aim to have their first funded projects under way and another round of fundraising off and running, more events to galvanize and inspire WIN and the campus community, and more women on WPI boards and committees to better reflect the campus population.

“WPI needs more women engaged in our projects and research partnerships,” says Leshin. “I believe our campus will benefit from engaging more of our alumnae (and faculty, staff, and students) in making WPI a place where all can become their best selves.”

For more information about WIN or to join, contact Donna Stock, 508-831-6073, dstock@wpi.edu.

— Sharron Kahn Luttrell



**WOMEN’S WEEKEND
ATTENDEES TAKE A BREAK
FROM STRATEGY SESSIONS
TO TOUR FENWAY PARK.**



PRISCILLA AND GEORGE MESSENGER '51
VIEW RENDERINGS OF MESSENGER
RESIDENCE HALL.

LAYERS OF GRATITUDE

Ask George Messenger Jr. '51 about his career as a physicist, and you will hear a long line of impressive discoveries. An equation bears his name – the Messenger-Spratt Equation – which describes the effects of neutron radiation on bipolar devices. His other discoveries include the Kirk Effect (also called current-induced base push-out), an apparent increase in the width of the base of bipolar transistors that occurs at very high injection levels and current densities.

Messenger explains his career in simpler terms: he found a way to harden electronics to withstand radiation, an advancement that has enabled huge leaps forward for humanity. His equations and

patents make it possible for electronics to work in semiconductors, nuclear reactors, and satellites – including the Global Positioning System satellite. His work has touched many other critical areas, among them radiation treatment for fighting cancer, long-range radar for the Navy, and the development of the EKG. One way or another, we all owe George Messenger a debt of gratitude.

And yet his story, like many others, is one of chance. Visiting campus this spring with his wife, Priscilla, Messenger recalled that about 70 years ago he almost didn't make it to "Worcester Tech," as he affectionately calls his alma mater. A high school athlete in a "Triple C" school in West Upton, Mass., he turned for help to a local man who umpired for the Boston Red Sox, and this man appealed to WPI's

admissions office to accept Messenger. Once enrolled, he majored in physics and lettered in three sports: cross country, track, and baseball. But his education was a heavy financial burden.

"Whenever Worcester Tech would see me in real need," he says, "Worcester Tech would find a way to give me money."

Messenger remembers the staff, the administration, and his coaches always finding little jobs for him that ended with some pay, just when he needed it most. "I got so much help from so many people."

That's why the Messengers have generously supported student scholarships at WPI over the years. They stand among WPI's most generous scholarship donors. During their recent visit, the Messengers attended WPI's Annual Scholarship Dinner (see

page 48), which brings together scholarship donors and student recipients for an evening of recognition and appreciation; they also enjoyed a separate opportunity to get to know some of their current scholarship recipients.

"That was a wonderful experience," says Priscilla.

"It's just great to be able to meet these kids and have an experience with them to remember," adds George.

The Messengers have never sought anything more in their philanthropy than the opportunity to give back. George especially recalls trying to repay his loans and WPI not taking any payment on interest. However, in recognition of the Messengers' lifetime commitment to WPI and the positive impact they've had on so many students' lives, the university thought it only fitting that the new residence hall currently under construction on the Quad as part of the Foisie Innovation Studio be named Messenger Residence Hall.

"That's probably the nicest way WPI could thank us," he says, "... give us something that can be remembered by our children and grandchildren."

So much thanks to go around.

GLOBAL ALUMNI

WPI has a strong and loyal alumni base that spans the globe. In fact, nearly 2,000 of our alumni live outside the United States. We traveled the world this spring to meet some of our alumni and friends in their backyards. President Leshin attended several of the events. "It's so important for us to stay connected to our alumni all over the world," she says. "These industry experts are proud to spread the word about WPI in their own countries." To view photos from these events, visit the WPI Alumni Facebook page.

BARI HAMAMI '93

The second annual Jakarta reception was held in the spring. I was pleased to see the interest from alumni in the area. Although we had been informally getting together among the alumni for several years now, a recent visit from WPI executives attracted great attendance. It was wonderful to hear about all the good things happening at WPI in recent years, directly from the professors. Such an honor for all of us here as alumni.

CHARTSIRI (TONY) SOPHONPANICH '80

The reception in Bangkok was a great success. We celebrated the partnership of the WPI project center and Chulalongkorn University, which hosted 24 students in C-Term. The students presented their projects and networked with alumni, parents, project center sponsors, and friends of WPI.

VIJAY KIRLOSKAR '74

We were thrilled to have President Leshin visit Bangalore and Mumbai in March. It was lovely to see her engage with alumni, parents, prospective students, and corporate and academic partners. There is strong interest in WPI from India and I am proud to represent the university locally.

HENRY STRAGE '54

I am proud to be the first president of the London Alumni Chapter. There were 50 people at our reception at the House of Lords to announce the exciting news. I look forward to many other events in the London area.



ILLUSTRATION DAN PAGE

SHARED GRATITUDE

THANKFUL VOICES HEARD AT SCHOLARSHIP DINNER

Hosted annually in honor of WPI's generous scholarship donors, this year's Scholarship Dinner was a beautiful celebration of legacy and philanthropy. Since John Boynton's gift in 1865, WPI has been a thankful and vigilant guardian of his philanthropic legacy; the dinner speakers communicated—loud and clear—that just as Boynton's legacy of philanthropy lives on in the university's collective memory, the legacy of each WPI scholarship donor lives on as well.

Michael Galbraith '58, a third generation legacy at WPI, was the perfect speaker to kick off the evening's program. Beginning with his grandfather, James E. Smith, Class of 1906, Galbraith's family members have been loyal and generous supporters of scholarship at the university. Galbraith shared with humility, grace, and humor that supporting the Margaret A. and Michael M. Galbraith '58 Endowed Scholarship is his way of honoring his family's significant legacy and giving back for all that WPI has made possible in his life.

Guests also heard from Jean and Plummer Wiley '35 Endowed Scholarship recipient Kyle Young '17, who expressed his deep gratitude and shared what he hoped his personal WPI legacy would be. He assured them that Mr. Wiley's legacy was forever safe and sound. The robotics engineering and computer science



double major explained that when he received his scholarship he researched Mr. Wiley and learned that the two had a great deal in common as WPI students. And although Young was saddened to learn that his benefactor had passed away in 2004, he said, "...from everything I read about him, I know I would have liked him, and I'm really proud to be a keeper of Mr. Wiley's legacy." Young will be returning to WPI in the fall to study for his graduate degree in robotics engineering.

Fellow scholarship recipient and speaker Emily Curci '17 had the pleasure of having her Robert H. and Patricia A. Beckett Endowed Scholarship donors in attendance at the dinner. The aerospace engineering major offered a heartfelt message of gratitude

to the Becketts and to all WPI scholarship donors. Curci shared specifically that her global travel support and Interactive Qualifying Project in Thessaloniki, Greece, gave her a whole new view of her place in the world as an engineer. Although she had scheduled a monthlong European vacation following her seven-week IQP, when faced with the international refugee crisis, she forewent her vacation and spent the month volunteering in refugee camps. She shared that she was dramatically changed by her global project work: "...engineering became less 'what can it do for me' and more 'what can I do with it.'" Curci happily shared that she had just accepted a position with the Johnson Space Center at NASA.

—Sira A. Naras

(FROM LEFT) PRESIDENT LESHIN, BECKETT SCHOLARSHIP RECIPIENT AND SPEAKER EMILY CURCI '17, SCHOLARSHIP DONORS BOB '57 AND PATRICIA BECKETT, AND MORE BECKETT SCHOLARSHIP RECIPIENTS.

ALUMNI WEEKEND 2017

No, you didn't miss it. Our coverage didn't make it into this issue of the *WPI Journal*, due to an effort to bring you more of the magazine—four issues per year, instead of three. Since our schedule is a bit off-kilter right now, we missed our chance to include Alumni Weekend in this issue. But not to worry ... you can find it online right now (wpi.edu/+alumniweekend2017) and in print in our fall issue.

1943

Ted Pierson writes, "I'm still living in an independent apartment in a continuing care retirement community of approximately 400 residents near Princeton, N.J. We have great food, plenty of social activities, and a 24/7 medical department. I would love to hear from any of my classmates."

1954

Milton Meckler writes, "After having served as an adjunct professor of mechanical and chemical engineering at the California State University, Northridge (CSUN), where I taught environmental engineering classes for several years; having received the Environmental Professional Award issued by the Environmental Engineers & Managers Institute of AEE in 1992; having served as a Oregon licensed professional engineer in environmental engineering for several years; as a member of ASCE, its EWRI affiliate, and as a contributor to the *International Journal on Global Warming*, I published *Frozen Legacy* on Amazon.com to focus on the serious climatic change that representatives of 195 countries at the Paris 21COP Conference agreed to address, but which our new government has apparently chosen to ignore."

1956

Roy Stone writes, "My life's work has been devoted to consulting, designing, and programming computer applications as local businesses converted to digital calculation and storage of data. I have traveled extensively, for business and pleasure, including all 50 United States and portions of Canada and Mexico – from Point Barrow, Alaska, to Key West, Fla., and from Nova Scotia to Hawaii. I've also traveled through 10 European countries and to Brazil and Argentina. I became officially retired 25 years ago, but continued some consulting work with local businesses. I have researched and published two books detailing my family genealogy. For several years I have been compiling my life story, which now exceeds 500

pages, complete with photographs. My wife and I lived comfortably in New Hampshire for over 30 years. We spent 14 winters in Florida, but gave that up last spring."

1957

Al Papianou writes, "Since retirement, I have begun writing regular op-ed articles for the local newspaper, *The Foxboro Reporter*, plus doing memoirs. I just wrote my third book. This one is a collection of memories of my first 10 years, growing up in Woonsocket, R.I., during the Great Depression and WWII. It's called *Woonsocket Born*. I encourage everyone to put their memories in printable or electronic form. The lives we've led and the period we've lived through are very different from what our children and grandchildren will remember."

1958

Sherman Poultney and his wife, JoAnn Overton, visited Les Braves Memorial at Omaha Beach in Normandy. He reached 80 on March 18, 2017. ▼

Robert Weinberg writes, "My WPI education has been an invaluable component of a career focused on building my own award-winning businesses and currently advising other businesses in achieving optimal development and liquidity events. My M&A and corporate finance advisory firm, First Boca Associates Inc. (FirstBoca.net), specializes in the confidential representation of U.S. businesses seeking sale of all or a portion of their company or funding for growth or recapitalization. We also advise large projects in the energy sector and major real estate transactions. We have received much recognition in the past few years, including numerous awards from AI Global Media and ACQ Global. I would look forward to an opportunity to discuss business interests with any WPI alum."

1967

SAE fraternity brothers **Joe Ferrantino**, **Gary Dyckman '66**, and **Wayne Blanchard '68** once again enjoyed their annual Georgia Cup golf competition, a

12-year tradition, staying with Joe at his St. Mary's, Ga., home.

1968

Stephen Schwarm writes, "Enjoying my 39th year of marriage to Sue. We have three granddaughters, whom we enjoy. I just started a new job at Black Duck Software doing code quality analysis."

See the Letters to the Editor page in this issue for **Jeff Semmel**'s reflections on the passing of Bill Trask.

1969

Michael Delleo retired to Goodyear, Ariz., after a 20-year career in the Army Corps of Engineers and a 17-year civilian career in the Boston area, including 11 years as associate VP of administrative services at Emerson College, and four years as an engineering project manager with the Arizona Department of Transportation.

Peter Heins reports, "It is over 10 years since I retired from flying Boeing 767s at Delta Air Lines. My wife keeps me



busy with 'domestic engineering,' and I still do ham radio operating. We reside on the 'left coast' and spend time near Los Angeles and Seattle."

1971

Dan Demers writes, "I am one year retired, after working 38 years for GE Aviation in Lynn, Mass. My wife and I live in Massachusetts on the North Shore. Our two granddaughters live two blocks away. :)"

Ben Katcoff reports, "Just completed my third assignment as a volunteer for Israel doing civilian work on an Israeli Defense Forces base, packing medical supplies for use in field hospitals and other IDF facilities around the country. My other volunteer activities include ushering at the Strathmore Music Center in Bethesda, Md., (an 1,800-person music venue for the Baltimore Symphony Orchestra, the National Philharmonic Orchestra, and other performers) and at Arena Stage (a three-theater music and drama performing arts center in Washington, D.C.). Nancy and I have also traveled extensively to Europe, Hawaii, and within the continental U.S. in my three years of retirement."

Dave True writes, "My wife, Mary, and I are now hanging our hats in Florida from January through mid-April. Our home is where we park it. This year it has been within the Florida State Park system, thus we have to move every two weeks. When not 'snowbirding,' we both teach as adjuncts at Bristol Community College in Fall River. Mary retired as an associate professor in natural sciences in December 2015. I have been teaching there since I retired from National Grid in 2004."

1972

Jim Tarpey writes, "I've been retired in southeastern NY for five years, after a 40-year career, and have still been active in the utility business since then, concentrating on emerging and disruptive energy storage applications. Since retirement, my wife, Stephanie, and I have been presented with two granddaughters in Brooklyn: Piper Lillian (3½), and, just recently, Lark Elena (0+). We have managed to become a major part of their lives, as well. I have

reconnected with my SAE brothers on the golf course and back at WPI, and have recently gotten involved with our upcoming 45th reunion this year. Our committee hopes to see more of our '72 alumni there. We are having a social hour on Friday afternoon at the Courtyard Marriott. We hope to see you there!"

1973

William Nutter writes, "I am lucky to be writing this class note. In December 2016, my primary care doctor saw something on an EKG she did not like. A cardiologist observed the same reading. A week and a half later, I underwent an ultrasound scan and a stress test. Three days later I underwent an electrocardiogram, where the cardiologist found a 95 percent blockage of the lateral anterior descending artery, which was cleared, and a stent was implanted. It was doubtful I would have made it through the summer. I was given a second chance at living."

1975

Robert Andren writes, "Retired from Dominion Nuclear Connecticut in October 2013, after 33 years. Moved to Myrtle Beach, S.C., with my wife, Edie, and love the area and its beaches. We took our travel trailer on a cross-country trip in 2014, hitting Mount Rushmore; Devils Tower; Yellowstone; Bend, Ore.; Lake Tahoe; Vegas; and the Grand Canyon. We continue to visit all six grandchildren in Mass., Fla., Jersey, and Oregon. We are both Patriots and NASCAR fans. We have taken many cruises, including one to Hawaii in April."

1976

Anthony Merolla (MS CS) writes, "I am currently retired. I spend time working around my house and volunteering, playing piano for a group of women who sing in nursing homes. I am always on the lookout for something new to try, as I have time now. After having played piano for 50+ years, I am also back to taking lessons."

Joe Winston (MSCS) writes, "After 40+ years in IT sales and management, I've taken a different road and am currently

aquatics director at the Cranston (R.I.) YMCA. Managing a staff of 30+ high school and college students is exciting, to say the least. The yearlong process of researching, writing, and presenting a thesis has been extremely valuable throughout my career. I know from that experience that I am able to tackle a project that will last a year or longer and overcome the many obstacles which will arise. The final challenge was presenting/defending the thesis in a lovely Worcester snowstorm. I do wear WPI gear when working out in the fitness center—one the perks of Y employment. WPI's continuing focus on community and social responsibility for all of us, especially 'pocket protector' techies, blends well with the Y's cause of youth development, personal fitness in spirit, mind, and body, and social responsibility. This is a good home for late in my career."

1977

Dave Makris shares, "Have been with Hewlett Packard Enterprise for 14 years, and now we're executing a merger with CSC to become DXC Technologies. Both kids have graduated (Bucknell and Stevens Institute), so I'm thinking more and more about those sandy beaches on Cape Cod. Won't be long!"

1978

Jim Fowler writes, "Enjoying retirement by keeping busy with church ministry, playing golf, and creating stained glass. I have fond memories of Glee Club from my years at WPI. The WPI Glee Club is the oldest continuous club in the country."

1979

Fred Gonzalez writes, "Took early retirement from G&V USA Inc. back in 2010, and moved from Hudson, N.H., to Caracas, Venezuela, where I still reside. Enjoying the weather and spending time with my family."

1980

Martin Rowe writes, "I'm now on my fourth employer without having left my job. In 1992 I started with Cahners Publishing as technical editor at *Test & Measurement World* magazine. *T&MW* went online-only in 2012, and the

brand was discontinued in 2013. Content was folded into sister publication *EDN*, which went out of print in 2013 but continues online today. At that time, I moved over to *EDN* and also spent part of my time on *EE Times*.

"Cahners Publishing became part of Reed Business Information. On March 1, 2010, *T&MW* and *EDN* were sold to Canon Communications, which was acquired by UBM later that year. On Aug. 1, 2016, UBM sold *EDN*, *EE Times*, and other properties to AspenCore, a subsidiary of Arrow Electronics.

"This year will be 25 years since I was hired by Cahners. Many people have moved on—some by choice, many by layoff—as the media business transformed over the years."

1981

Mark Fitz Maurice writes, "Hello WPI friends. My wife, Ann, and I celebrated our 33rd wedding anniversary in February here in beautiful (but extremely wet) Portland, Ore. We've lived here the past two years after raising our family in Columbia, S.C. Our sons are now grown, and we are empty nesters. I've taken a new job as a manager with Schneider Electric. My team designs smart sensors for commercial building HVAC systems."

Marc Trudeau joined SimpliVity Corp. of Westborough in the role of Scrum Master in March of 2016, and SimpliVity was acquired by Hewlett-Packard Enterprise in February 2017. In his volunteer role at WPI of Scrum and Agile coach, he has been supporting the Robotics Engineering program's team competing in NASA's Space Robotics Centennial Challenge, and taught a two-day Scrum Master certification course as part of Unconventional Convention, WPI's winter session program, prior to the start of C-Term. Marc lives with his wife, Tammy, three cats, and a huge dog in West Boylston, Mass. ▶

1982

Gary Adams was honored by CommScope during the company's first Innovators in Action Conference held in Frisco, Texas, in February. He was one of 80 global employees recognized for their creative work on the wired and

wireless networks of the company's clients.

Mark Brown retired from Northrop Grumman Corp. Electronic Systems (formerly Westinghouse Electric) after 32+ years of continuous service since graduating from WPI. He achieved the position of senior consulting engineer, "the highest technical position in the company," he notes. "I'm now the 'senior domestic engineer' at my home in Ellicott City, Md., where I reside with my wife, Shirley, and our two dogs, Tycho and Sophie."

1983

Cynthia Kosciuczyk writes, "I'm in my second year as project coordinator at Naval Medical Center San Diego. It's been an exciting time. After a long journey on the road less traveled, I have come full circle back into research. The journey included 12 years in Greece and led me through the food industry, with Cindy's Baking Cakes, and 15 years in the Oriental rug business, to an MBA. My first book, *My Odyssey*, came out this spring. I volunteer in many areas. This year I achieved a trifecta of VP of the Coronado Optimists (a chapter of Optimists International), program director (for the third year), and Optimist of the Year. I recently judged a regional science fair, and I think I finally feel at home."

1984

Michael Atamian and **Roland Martin '85** recently kicked back for a weekend of drinks and laughs on Catalina Island, Calif. "The highlight of our trip (besides the adult beverages) was riding golf cart #18 around Catalina while reminiscing about WPI and TKE," says Roland. "We hope to make this a regular event every five to seven years." ▶

1985

Wayne Lipson writes, "I have been practicing cardiothoracic surgery since 2001. I recently completed my MBA at Sloan School of Business. I pursued the additional degree to help navigate the waters of healthcare transformation and for use in my additional role as a physician executive."

1987

After many years in industry, with GE and The Stanley Works (now Stanley Black & Decker), **Tim Noble** is president and managing principal of The Avery Point Group (leasignarecruiter.com) His thoughts on reinventing yourself—and how WPI prepared him for this—can be found on the Letters to the Editor page.



1988

Bryan Sheppeck joined the New York State board of Best Buddies International, a nonprofit organization dedicated to establishing a global volunteer movement that creates opportunities for one-to-one friendships, integrated employment, and leadership development for people with intellectual and developmental disabilities.

Jim Wachala is a project executive with Turner Construction in NYC. "Current projects include NY Aquarium, Copiague Schools, Verizon, and UBS," he writes. "I married Kate Maloney on Jan. 17. We bought a home in Brooklyn, and I still love my Manchester, Vt., house. I have three sons—the youngest is a junior at BBA."

the United Kingdom. David's team joined the company's field account managers in San Francisco recently, to plan, share, collaborate and learn. "It wasn't all work though," he writes, "as we got to tour Alcatraz." His job involves working with school districts on technology solutions to improve teaching and learning.

Michelle Rosenberg is a partner of the Boston law firm Patent GC LLC. On March 6, she was admitted to the Bar of the Supreme Court of the United States. Michelle is married to her high school sweetheart, Dima Seliverstov, and has a 10-year-old son, Evan.

1993

James Cooke writes, "I am back in Salt Lake City, working for Moxtek Inc. as a staff process engineer. We make optical polarizers for projectors, VR headsets, etc. When not working or snowboarding, golf is most often on the agenda. I was in Hartford, Conn., for a while with JDSU/Lumentum, but they decided to move the site to San Jose, and the salary upgrade to move was not matched to the COL downgrade."

1990

Michael Pace writes, "My office has moved to a new location in Tempe, Ariz., and I recently received a promotion to vice president, investments, at Wells Fargo Advisors, where I have worked for the past 16 years."

1992

David Andrade is a K-12 education strategist for CDW-G, a leading multi-brand technology solutions provider to business, government, education, and healthcare organizations in the United States, Canada, and

Tania Wolanski writes, "Recently I earned my CQE credential. I'm also leading a Girl Scout troop and will be getting Level 2 archery instructor certification—a different type of continuing education. :) As I write, we are on a family spring break holiday in Maui, for the tail end of whale season."



We were able to see and hear humpback whales and, of course, explore the beaches.”

1995

Norman Gosselin was promoted to principal engineer with Cornerstone Energy Services Inc., responsible for the Odessa, Texas, office operations.

George Roberts and **Laura Gregory Roberts '93** recently celebrated two years with TechScale Solutions in Tolland, Conn., a consulting firm they founded to assist companies in transitioning clean energy technologies into viable commercial products. George leads the consulting engagements and has worked with a range of large-scale and start-up clients in the areas of fuel cells, hydrogen generation, energy storage, and microgrid development. Laura is actively involved in IT initiatives and business operations. She continues to serve on the WPI Industrial Engineering Advisory Board. “Check out our company website, techscalesolutions.com, to learn more about our projects,” they add.

1996

Mike Caprio is consulting on innovation at the American Museum of Natural History, where he has organized three annual hackathons for the museum’s scientific research and has aided with community development for the museum’s NASA-funded OpenSpace

scientific visualization and mission planning software. The most recent hackathon, “Hack the Stacks,” produced new scholarly results on Charles Darwin’s manuscripts and was written up in the *New York Times* in March.

1997

Natalie Grace writes, “As vice president and co-founder, I am pleased to announce the launch of the intellectual property law firm of Gardella Grace. Our procurement services include domestic and international prosecution of invention and design patents, as well as management of global patent portfolios. Some of our professionals specialize in post-grant proceedings before the U.S. Patent and Trademark Office and are integrally involved with companion procedures in foreign countries, most commonly called oppositions. Our attorneys have extensive experience in patent litigation in district courts throughout the United States. We also support all facets of trade secret protection and enforcement, from trade secret policy development to litigation.”

1999

Paul Graves visited campus with his family on March 20. “My girls were intrigued by the arm and hammer weathervane on the Washburn Shops, so I explained ‘Lehr und Kunst,’” he writes. “They had fun making up their own theories about it.”

2000

In January, **Victoria Valentine** became the Society of Fire Protection Engineers’ director of professional qualifications and industry alliances. “I’m excited to join the team at SFPE,” she says, “and to be working with the Committee on Professional Qualifications, as well as the Committee on Outreach and Advocacy.”

2001

David Christenson’s company, Delta Group IT Solutions, has acquired the Northampton-based web design firm Gravity Switch. Delta Group provides a wide range of IT services to small to mid-sized businesses throughout Massachusetts. “With the addition of Gravity Switch, we are now able to offer our customers high-quality web design services,” he says. “Gravity Switch operates primarily in the Pioneer Valley. They have created websites for many Western Mass colleges and universities, as well as both non-profit and for-profit organizations. Among their clients are UMass, Yale, Guggenheim, HTC, Honda, and Disney.”

Amanda Egan writes, “In May 2015, I gave birth to a baby girl, Bridget. In February I completed my doctorate in education in administrator leadership for teaching and learning through Walden University.”

2002

Brian Zahnstecher writes, “This year, I will be celebrating the third anniversary of the company I started, PowerRox! Not only was this company inspired by our love of music, but also by our first child, Roxy. I was laid off two weeks into the FMLA leave I took for her birth—it ended up being the motivation (along with a very supportive wife) to start my own company, which is now successful. Furthermore, the third anniversary will align with the birth of our second child, TBD, who is due around the 4th of July.”

2004

Tasha (Andrade) and **Josh Clark** welcomed Kenzie Lee Clark on Feb. 21, 2017. “She was a whopping 11 pounds, 2 ounces, and 22.5 inches,” reports

Tasha. “Kenzie joins her siblings Dylan (6), Noah (4), and Riley (2).”

Steven Ruo and his wife, Lauren, welcomed their first child, Calvin Matthew, on Dec. 4, 2016.

Krystal Tam writes, “We celebrated our son Sawyer Yong’s first birthday in January!”

2005

Drs. **Gregory Krane** and **Farleigh Krane** welcomed their son, Leo Alexander, in December of 2015, and shortly after moved to Raleigh, N.C., where Greg is dual enrolled in a toxicologic pathology fellowship with the National Institutes of Health and a PhD program at North Carolina State University. Farleigh, Leo, and Greg have enjoyed exploring the various cultural and outdoor offerings around the Research Triangle, and they welcome opportunities to connect with any members of the WPI community in the area. ▼



Lindsay O’Donnell was selected as one of 50 finalists from a candidate pool of over 200 for the 13th annual Connecticut Technology Council’s Women of Innovation awards in the category of Large Business Innovation and Leadership for her work at Sikorsky Aircraft, a Lockheed Martin Company.

2006

On March 3, 2017, **Greg Ratner** married **Jamie Julian**, in Tamarindo, Costa Rica. They live together with their two dogs in Williamsburg, Brooklyn.



2007

Corinne Linderman writes, "I moved to Houston and took a new position with Elliott Group as the service center manager for the company's repair facility here."

2008

Mike Demers (MBA '13) writes, "My wife, **Jesse '16 (MBA)**, and I just finished building our house in Grafton. We're expecting our first child this summer: a baby boy! ('Ice Ice Baby!') I am working on filling every home with music over at Sonos, and Jesse is working on the Internal Communications Team at Dell. Looking forward to this next chapter in our lives." ►

Mark Filomeno and his wife, Sandra, were married Sept. 17, 2016, in West Hartford, Conn. "We had a great time celebrating with friends and family at the wedding," he writes. Alumni attending included **Ben and Cathryn (Bedard) Cleveland '07**, **Joe Guzman '07**, **Bert Lavalley '07**, **Arly Dungca '08**, **Vincent Kan '08**, **Elizabeth Stewart '08**, **Kevin Wilson '09**, **Brendon Willey '08**, and **Richard Grossman '09**.

Cheryl (Boquist) Ingram and her husband, Eric, happily welcomed their third child, a son named Ozlo James, on May 24, 2016. "**Katrina Kucher '08** graciously agreed to be his godmother!" Cheryl writes.

Rachel (Pennellatore) Ramirez was married on Nov. 11, 2016, in Costa Rica, with 30 friends and family members in attendance. She and her husband, Alex, will be moving to Columbus, Ohio, in June as he completes a pediatric anesthesiology fellowship at Nationwide Children's Hospital. ►

2009

Alison LeFlore was named Young Planner of the Year for 2015 by the American Planning Association Massachusetts Chapter. She also received the 2016 Distinguished Service Award.

Congrats to **Alex Schwartz**, CEO of Owlchemy Labs, who won the award for Best VR/AR Game at Game Developers Conference in San Francisco.



2010

Alejandro Sola has accepted voluntary retirement with Mylan Pharmaceuticals, where he led a team supporting Mylan's strategic planning process, assessing external trends, evaluating potential markets, and formulating market entry strategies. "I am now looking for opportunities at the director and above level with life sciences companies on the West Coast," he writes. In addition to his MS in system dynamics from WPI, he holds an MBA from Emory University, and a graduate certificate in risk analysis from Stanford University.





BORISYUK
PHOTOGRAPHY

2012

Holly Fletcher and Nicholas Bebel '09 were married Sept. 30, 2016, at Searles Castle in Windham, N.H. Officiating was **Kathryn (Byorkman) Gauthier '12**. Six of the eight bridesmaids, and all five groomsmen/groomswomen are WPI alumni. Holly writes, "We both currently work and live in Boston, and we're in the process of buying a house. We met at an engineering school, but it was theater and love of travel that brought us together. (Nicholas proposed in Venice, where I went for my IQP.) We have a map set up showing where we've already traveled in the world, and where we want to go next." ▲

Samantha O'Connor writes, "Mark and I moved to Connecticut this year and will be married in July! Hope to see lots of my classmates at our 5-year reunion in June!"

John Wilder writes, "This past fall I became an uncle for the first time, when my sister and her husband welcomed Grace Elizabeth to the world. In the Aleppo Shriners Minutemen I was promoted to executive officer,

which is second in command. We are looking forward to a great parade season; all our efforts support the Shriners Hospitals for Children."

2013

Sarah Dinwoodie shares, "I'll always be thankful for the opportunity of going to WPI. I'm so proud to be a WPI alum and love that I get to say I went to WPI."

2014

Kelly Ames writes, "I just accepted a job that I found through WPI's Handshake system, working at Pulpdent as a manufacturing and production engineer. I am excited to start a new career in a different industry!"

2015

Nicolas Hewgley writes, "I've been working for Alpha Chi Rho National Fraternity as a leadership consultant; traveling around the country helping college men have a better fraternal experience!"

Henry Nguyen reports, "From January through May 2016, I worked as a

financial advisor. Since June 2016 I have been working as a test engineer for Panasonic."

2016

Chris Chagnon writes, "Following my MSIT from the FSB [Foisie School of Business], I started research as a PhD student at WPI."

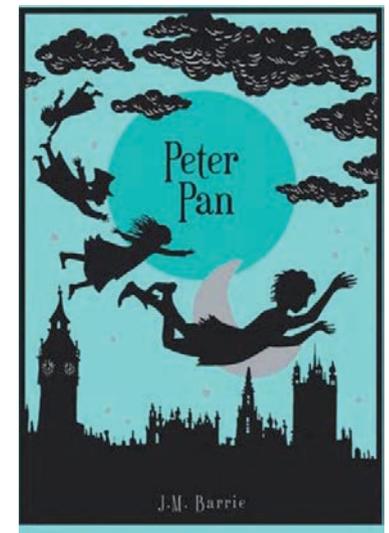
Maev McCuskey shares, "I've just been cast in my first post-grad theatrical production. I will be playing the role of Peter Pan in the Needham Community Theatre production of *Peter Pan*, by J. M. Barrie, to be performed this May." ►

Veroniki Nikolaki writes, "I am currently pursuing my master's degree in biotechnology at Columbia University in New York. The expected graduation date is October 2017."

Anthony Ward writes, "Hey folks! I'm employed, which is cool, and I have money for housing and food. Sometimes I can afford nicer food or drinks, which is tight. Student loan debt is crushing, but as long as I don't think about it and can give the money dragons my currency blood every

month, then I usually can sustain myself. I'm made friends that I perform comedy with. Comedy helps distract me from the other unsavory bits of the world. Also, I'm pretty good at it. Hopefully I can get better at it and find a way to do it full time. Okay, toodles."

Hui Zheng writes, "Nothing really new, 'cause everything keeps changing as usual. Miss y'all n love y'all. :)"



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[COMPLETED *careers*]

William Foley “Tuna” Trask, a devoted friend to WPI and to generations of students, died on March 25, 2017, at the age of 87. He came to WPI in 1958 to fill two jobs, as placement director and assistant dean of students. In 1975 he was moved to the placement office, now known as the Career Development Center, where he served as director until his retirement in 1992. Throughout his career he made himself available to any students who needed advice, a sounding board, or just a comfortable space where they could feel safe and supported amid the turmoil and stress of student life.

A graduate of and former dean at Middlebury College – to which he remained a dedicated alumnus – Trask made an immediate connection with WPI undergraduates, who dedicated the 1962 *Peddler* to him. He quickly earned a reputation for welcoming students into his office at all hours, rejecting formalities and insisting, “My door is open, and I want the kids to feel comfortable coming in to see me, and not having to make appointments.”

Trask’s impact was felt in many sectors of the

WPI community, from students to retirees. He helped establish the Delta Sigma Tau fraternity at WPI, which later merged with Alpha Chi Rho. He took on the role of “traffic manager” for queues of graduates at Commencement, and served on the board of the Goat’s Head Pub, a watering hole for students and faculty members located for many years in the lower level of Sanford Riley Hall.

A member of the Skull Class of 1962, Trask served as advisor to the organization and was honored with the inaugural George P. Dixon Award at Skull’s 100th anniversary celebration in 2011. He received the Alumni Association’s first Distinguished Service Award (now known as the Goat’s Head Award for Lifetime Commitment to WPI) in 2010.

Even in retirement, Trask remained an almost constant presence on campus, making regular visits to fraternity houses to chat and play cards, attending sporting events and student theatre and music productions, and getting to know each new class of students. He was a longtime secretary to the Tech Old Timers.



In recent years, Trask devoted himself to the curation of “The Tuna Files” (an extensive collection of postcards, correspondence, memorabilia, publications, and T-shirts chronicling his decades on campus), which he donated to the Gordon Library archives in 2015.

Trask is remembered by the WPI community for his fierce dedication to the university he loved, and for his generous spirit and unfettered humor. He is survived by sons Jeff and Terry, daughters Laurie and Carrie, and three grandchildren. His former wife and dear friend, Ruth, passed away in July 2016.



Trustee Emeritus Wilfred J. Houde '59, an early champion of WPI’s Silicon Valley Project Center, and the recipient of an honorary Doctor of Engineering degree in 2001, died March 29, 2017. He was the retired president of W. J. Houde & Associates. In the 1980s he headed up the personal computer division of Apple, and later launched a number of small, targeted enterprises in technology sector, including the E*Trade Group, ViMart Corp., Seehorn Technologies, and Knowledge Resources.

Houde served on the Board of Trustees from 1988 to 1998. He was the first chair of WPI’s Electrical Engineering Advisory Board and received the department’s Newell Award in 2000. The university honored him with the Robert H. Goddard Alumni Award for Outstanding Professional Achievement in 1984, and the Herbert F. Taylor Alumni Award for Distinguished Service to WPI in 2009.

He is survived by his wife, Dorothy Houde, three children, and seven grandchildren.

The death of **John Warren “Jay” Geils Jr. '70** in mid-April was mourned by rock fans around the world. Although Geils left WPI for a life in music before completing his degree, the group that bears his name was born on campus in the mid-1960s. Students from that era cherish memories of dancing to the music of the founding members of the J. Geils Band before they were famous.

The band’s genesis was recounted by Richard “Magic Dick” Salwitz '67 in the Winter 2013 issue of the *WPI Journal*: “I was walking across the Quad one day, when I saw Jay playing an acoustic guitar and Danny [Klein '68] playing a washtub bass, which was really cool. I had just started playing the harmonica over the summer, and since I had one in my pocket, I asked if I could sit in. They said, ‘Sure.’”

After playing frat parties and local venues with his fellow engineering students as “Snoopy and the Sopwith Camel,” the band evolved and went on to commercial success with a string of pop hits, 11 studio albums, and repeated nominations to the Rock and Roll Hall of Fame. Geils, who lived in Groton, Mass., was 71.



HAROLD HOLLAND '41 PH
 PAUL CRAIG '45 EE, PHI GAMMA DELTA
 SWICK SWICKER '46 ME, LAMBDA CHI ALPHA
 JOHN CONCORDIA '48 EE, SIM
 GUY METCALF '49 EE, '62 MS EE
 RICHARD MCMAHAN '50 EE, PHI SIGMA KAPPA
 HERBERT SLOTNICK '53 MS CHE
 DICK POPP '54 CE, PHI GAMMA DELTA
 FRANK GROSS '56 CE, ALPHA TAU OMEGA
 BILL VAN KEUREN '56 ME, SIGMA ALPHA
 EPSILON
 JOHN DEHNERT '59 ME
 DAVE TREADWELL '59 CE
 PAUL ENGSTROM '62 MAS, SIGMA PHI
 EPSILON
 PAUL BRENNAN '63 SIM
 CARL BROZEK '65 MS CH
 BEN GORDON '65 ME, '67 MS MTE, '77 PHD
 ME, TAU KAPPA EPSILON
 PETER LEASCA '65 SIM
 BOB EDGE '68 ME
 CARL STEELE '68 CHE, SIGMA ALPHA EPSILON
 FRANCIS SHEEHAN '73 MNS
 STANLEY MANN '74 SI
 DONALD TATA '75 CE, PHI KAPPA THETA
 JOHN JOHNSON '77 SIM
 RICHARD GOTTLIEB '78 CE, SIGMA PHI
 EPSILON
 DWIGHT BRIGHAM '80 SIM
 TOM CLARK '81 CS
 ROBERT BROOK '82 ME
 WILLIAM LELAND '82 SIM
 GEORGE SCHULTHEISS '82 ME
 RONALD MERKEL '83 MSM
 JOHN RILEY '84 ME, PHI GAMMA DELTA
 MEGHAN HORSLEY BEAUDOIN '07 CHE
 JOAO CORREIA '14 EVE, LAMBDA CHI ALPHA

THE WPI COMMUNITY ALSO NOTES THE PASSING OF FORMER STAFF MEMBER **DORIS JOHNSTON** AND FRIENDS OF WPI **JUNE MELDEN** AND **ABRAHAM SHEN**.

Complete obituaries can usually be found online, by searching legacy.com or newspaper websites. *WPI Journal* will share information from our files and assist classmates in contacting surviving family members. Contact jkmillier@wpi.edu or call 508-831-5998 to request further information.

AT PRESS TIME WE LEARNED OF THE DEATH OF TRUSTEE EMERITUS LEONARD REDON '71. His obituary is posted on the WPI website and will be published in the next issue of *WPI Journal*.

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