

W  
R  
JOURNAL



*Fluid*  
collaboration

*Jenna Balestrini '09*



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#### COMPLETED CAREERS

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

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## [ LETTERS TO THE *editor* ]

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

### CHEERS

Extending many thanks to those that prepare, edit and send the *WPI Journal* each season! I very much look forward to receiving it and so appreciate all the hard work that goes into it.

Thanks again and hope this continues!

— Ken Hartlaub '13

### A DYNAMIC MIND

I really enjoyed your article about Professor Lurie in the last *WPI Journal* [Winter 2017, by Michael Dorsey].

I'm not a mathematician and I'm not in any way related to that field. I started reading the story for want of anything better to do, and I couldn't stop until I got to the end.

My wife doesn't understand why I read the *Journal*. I'm not a rah-rah alum. It's the consistent quality that somehow seizes my precious time.

— John Sgammato '95 (MS BTB)

### FOND MEMORIES

Regarding the [obituary in the] Winter 2017 issue of the *WPI Journal*: Most of us have a teacher or professor that we remember whenever we think of our college years. For me that teacher was Nick Onorato.

He was a kind and gentle man who seemed to completely enjoy his chosen profession.

After dealing with the uncertainties of the draft board and Vietnam I was given the opportunity to enter the SIM program in 1982. Of the 3 semesters I had with him, the most memorable was a class where he taught us (tongue in cheek) to apply the principle of "float" to accounts payable by mailing through the Whitinsville, MA, post office, as mail there usually took 4 to 5 days longer to reach its destination, thereby gaining additional interest on our money.

I will always remember him fondly.

— Bill Sacramone '86 (SIM)

### CABLE CONNECTION

In preparing for attending the cable industry's Cable-Tec Expo in Denver this year, I decided to grab the Fall 2017 *WPI Journal*. Without realizing it, this was one of the most interesting engagements with alumni since the 50th anniversary celebration for WPI Crew.

As I read about Robert Cruickshank and his experience in the cable industry and now in Denver at UC Boulder and working with NREL, I was excited that I might connect with him.

We did [connect] at the Cable-Tec Expo, and I am looking forward to working with him and NREL to take renewable energy resources beyond the next level.

Great to be a grad from WPI!

— Andrew Paul Clancy '77

### MAILING DISCREPANCIES

As parents of a WPI student, we enjoy reading the *WPI Journal*. In particular, we enjoy the profiles of diverse staff and alumni. Most recently, the conversation between President Leshin and Kristin Tichenor about Gender Equality struck a chord, as I have researched and written about girls and STEM, most recently an award-winning parent guidebook: *Breaking Through! Helping Girls Succeed in Science, Technology, Engineering and Math* ([www.prufrock.com](http://www.prufrock.com)).

Given the enlightened nature of the reporting, it would be wonderful if the mailing office caught up to the inclusive nature of the *Journal's* content. Our issue arrives addressed only to "Mr. Saul Nieves," omitting the most avid reader in the household! Perhaps we are not alone in experiencing this odd discrepancy between the content and the style of delivery!

— Susan Matloff-Nieves and Saul Nieves

*Editor's Note: Our mailing office is working on this, and I urge anyone with a similar issue to email [dmanning@wpi.edu](mailto:dmanning@wpi.edu).*

*Engage with your university magazine community through your own letter to the editor, by sending your thoughts on our printed pages to [dmanning@wpi.edu](mailto:dmanning@wpi.edu).*

*Letters may be edited for length and clarity.*

WPI JOURNAL EDITOR WITH JENNA BALESTRINI AT  
DRAPER HEADQUARTERS, CAMBRIDGE, MASS.



**PRESIDENT LESHIN DISCUSSES  
THE CENTER FOR PROJECT-BASED  
LEARNING WITH RICK VAZ**

[ A CONVERSATION WITH THE *president* ]

*The Center for Project-Based Learning is another bold first from WPI. Born of the same passion and persistence that launched the WPI Plan, the university's landmark project-based learning model in the 1970s, the Center is changing the face of higher education. Faculty and administrators from colleges and universities around the world turn to WPI's Center for Project-Based Learning to benefit from our experience and expertise – and take what they learn back to their campuses. Our shared goal: to reimagine the systems of higher education. Center director Rick Vaz and Laurie Leshin chat about what this collaboration means for WPI.*

**LL** I'd like to start with why. Explain for others: Why the Center for Project-Based Learning.

**RV** Higher ed has known for a long time that project-based learning can have an enormous benefit to students of all types, from the strongest to the least prepared student. However, very few colleges and universities have figured out how to implement project-based learning in ways that make sense for them. As you know, WPI has 48 years of experience in project-based learning, and we're in a position to help others take that leap toward a more effective curriculum.

**LL** Share what kinds of things the center does with colleges and universities.

**RV** Our signature offering is the Institute on Project-Based Learning. In June we'll be offering our fourth Institute, and we're expecting about 180 participants from 30 colleges and universities around the country, and some international as well.

**LL** That's scaled up...

**RV** Yes, it's gotten bigger every year. Teams of five or six people will be here for three days, and each

team will leave with an action plan. We also deliver custom workshops at colleges large and small all around the country – and our first international workshop was held in Peru last summer.

**LL** Explain what types of universities we have worked with.

**RV** Over 90 of just about every type – from community colleges to research universities.

**LL** That includes public, private, a historically black college, and international universities.

**RV** Exactly. Curricular change is a complex process that takes time, and very often the teams that attend the summer institute are at the beginning of the process. They're looking for a vision, looking to identify a group of leaders and champions for their campus. Some that are a bit further along have us travel to them to present a custom workshop, which might last a couple of days, and involve anywhere from 15 to 50 faculty members.

**LL** With 90 schools – that's close to a million students.

**RV** Yes, close to a million enrolled. So much evidence shows that this type of education can really benefit every student in terms of critical thinking, problem solving, teamwork, communication, and leadership.

**LL** We at WPI know that one of the biggest impacts of project-based learning is that students take responsibility for their own learning. If there's one thing I could ask our graduates to do, it's just that. Because they have to be lifelong learners. And we know project-based learning is about making that happen.

**RV** You're right. In an alumni study we talked with

38 years worth of WPI alumni, and they credited their project experience for not only taking responsibility for their own learning, but developing a stronger personal character, having confidence, and having all the professional skills to succeed.

**LL** A lot of people, when they hear about this, worry about WPI losing its special and unique position as a leader in project-based education by sharing what we know with so many others. What do you say to rebut that?

**RV** I have yet to encounter an institution that would ever attempt to do what we do. Our students are doing projects across all four years, in and out of the major. Most of the clients we're working with are trying to figure out just how to break projects into a single course or a single area of the curriculum. Most are working with very different students, resources, and cultures than those at WPI. No one can just adopt the WPI Plan, but everyone can learn from our experience in ways that will help their own students succeed.

**LL** This is really about making education as a whole better, which helps our reputation and is a fantastic community service.

**RV** I think that the biggest lever WPI has to change the world is to improve higher education in this way.

**LL** Well, thanks for your work, Rick. Congratulations on the first few years of success. And let's keep it going!

*To see a video of this interview in its entirety, visit [wpi.edu/news/wpjournal](http://wpi.edu/news/wpjournal).*





Worcester Polytechnic Institute

SAVE THE DATE

# TOUCHTOMORROW

A FESTIVAL OF SCIENCE, TECHNOLOGY, AND ROBOTS AT WPI

**JUNE 9, 2018**

Festivities begin at 10am | Free and open to the public | Rain or shine

Hands-on experiments, virtual reality experiences, robotics presentations—and that's just in the first hour. Join WPI for all this and more during the seventh annual

TouchTomorrow, a family-friendly festival showcasing interactive exhibits by WPI and friends.

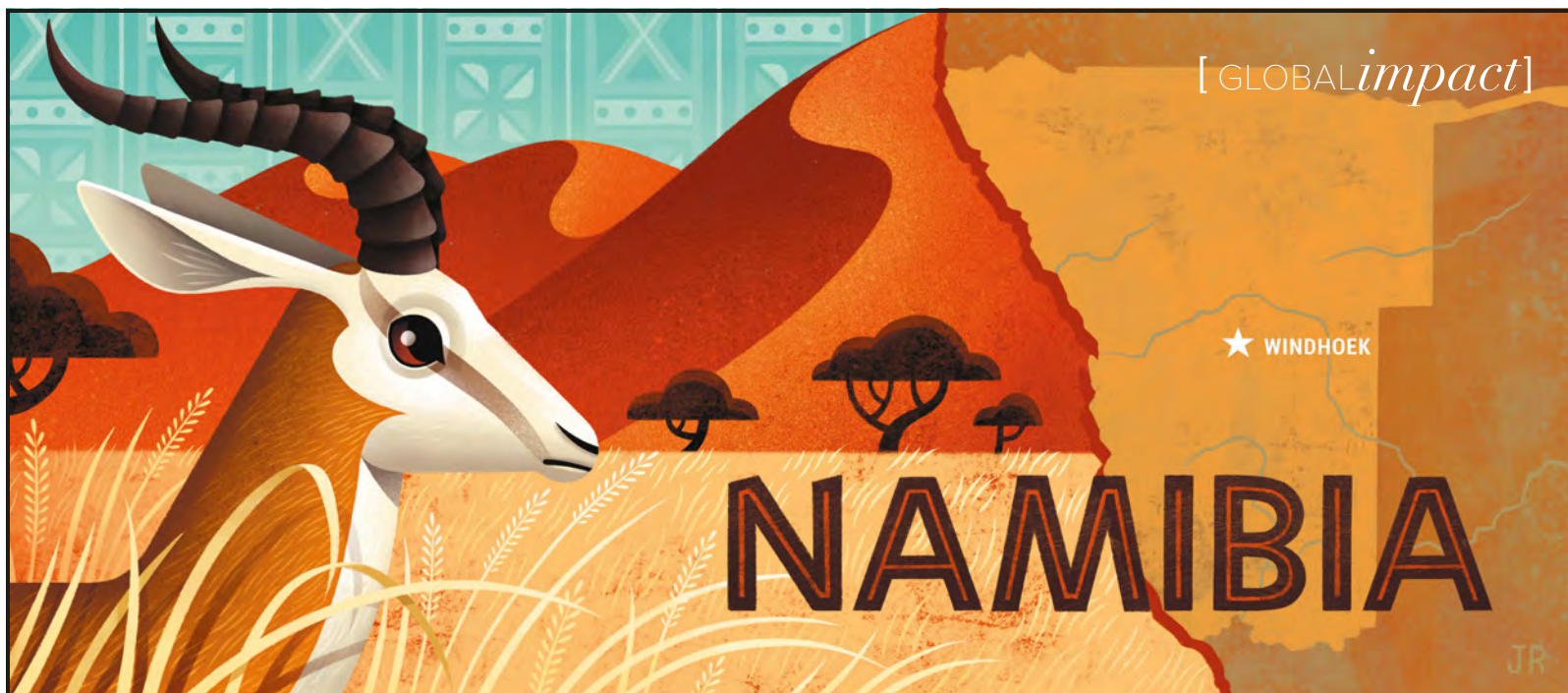
LET US KNOW YOU'RE COMING!



[touchtomorrow.wpi.edu](http://touchtomorrow.wpi.edu)



[touchtomorrowwpi](https://www.facebook.com/touchtomorrowwpi)



**F**or the past 16 years, WPI IQP students have been leaving their mark on Namibia, and the African nation has left an indelible imprint on them. The experience spurred some to join the Peace Corps after graduation. Another pursued a career in international development and now works in Africa. And many more have returned to the States transformed by the Namibian culture of positivity.

“Have we changed Namibia?” asks project center director Creighton Peet, Interdisciplinary & Global Studies Division (IGSD) teaching professor. “In small ways, yes, and hopefully in other ways too, such as Namibians’ ideas about who Americans are. But looking at the big picture, I think Namibia has changed our students more than our students have changed Namibia.”

The project center, which Peet and Art Gerstenfeld (professor emeritus, Foisie Business School) established in 2001, tends to attract adventurous students, says center advisor Sarah Wodin-Schwartz, assistant teaching professor, mechanical engineering. That was

the case with aerospace engineering major Emily Chretien '18, who says she couldn't pass up the once-in-a-lifetime opportunity to spend eight weeks in Africa last spring.

Chretien's team of four traveled to the northern Namibian town of Oshakati to focus on the informal waste collecting industry. The students observed and interviewed the waste collectors—all women—who spend long hours at local dumps separating recyclables from the refuse. The women sell the glass, metal, and cardboard to processors, earning wages roughly 30 percent below the poverty level. Chretien was nervous that the women would view the students as meddling outsiders, and was surprised by their warmth and openness to new ideas.

“They have a huge sense of pride and hope in their country and they believe they can make their country the place they want it to be. You get that feeling from everyone you talk to,” Chretien says. “It was a unique feeling compared to the U.S. It was a more relaxed and generally optimistic feeling.”

Wodin-Schwartz agreed. “One of

the things that struck me the most was the positive outlook the people have about the world around them,” she says. “Even when they were in tough situations, they carried themselves with an air of positivity.”

The IQP team found that the laborers could net higher prices for the recyclables by processing them on site. They researched various options, took into account the waste collector's working style and preferences, and recommended installing a small-scale solar-powered plastics and aluminum shredding machine at local landfills. The team estimates the device will increase the waste collectors' earnings by up to 330 percent per month.

The project was a 2017 President's IQP Award winner and the team's partner—Namibia University of Science and Technology—is drafting a proposal to fund the machine.

Other IQP teams in Namibia last spring calculated the use of car seats and child restraints among drivers in the capital city of Windhoek; created lessons on sustainable energy using smart-board technology; promoted the

debut of MOOCs; looked at improving soft skills among employees of the nation's railway; and developed a plan for small businesses to create and sell products using recyclable materials.

Those, and projects stretching back 16 years, have each contributed in some way to a country proud of its relatively new independence. The proof is not just in the recommendations implemented, but in the lives touched. These include one woman who named her newborn baby after a student whose team found an inexpensive way to insulate her community's homes, and the many truckers in Namibia who now have places to rest up and refuel since an IQP team addressed the lack of truck stops in the country. “Change happens slowly,” says Peet, “but if you could somehow quantify all the things our students have done and the lives they have impacted, it would add up to much more than we might imagine.”

—Sharron Kahn Luttrell



# WEEDING OUT FAKE “LIKES”

If you're concerned that a five-star review for a product you're eager to buy seems a bit fishy, there's a chance it is. WPI assistant professor Kyumin Lee has created an algorithm to help give you legit reviews ... and keep the Internet more honest.

Dubbed “crowdturfing,” this type of online fraud is like a cyber black market for false information, undermining the credibility of major websites – and it happens more than you may realize. This illegal crowdsourcing involves hundreds of people hired to create phony reviews,

retweet insincere posts, and share fake news and thumbs-up lies on social media.

Funded by a National Science Foundation CAREER Award, Lee is taking on these online lying schemes – hitting sites like Amazon, Twitter, and Facebook – by developing algorithms that have proven highly accurate for catching fakes online.

Using machine learning and predictive modeling, Lee builds algorithms that sift through posted tasks looking for patterns associated with illegitimate jobs. One type of algorithm can identify the malicious organizations posting the tasks,



# CANCER'S IMBALANCE

**Breaking up is hard to do** for cancer cells. For reasons that are not entirely understood, when cells in a tumor divide, the process that in normal cells produces two daughter cells with identical sets of chromosomes can go awry. As a result, the new tumor cells can end up with the wrong number of chromosomes, a condition known as aneuploidy.

It is believed that errors in chromosome segregation, or chromosome instability, are one cause of the genetic differences that are seen between tumors of the same type, and even between cells within the same tumor. They may also contribute to the increasing number of mutations that can occur as a tumor grows. That increasing genetic heterogeneity may also help explain why some tumors become resistant to chemotherapy drugs over time.

With a three-year, \$300,000 award from the Smith Family Awards Program for Excellence in Biomedical Research, biologist Amity Manning hopes to learn more about the biology behind chromosome instability with the hope that a better understanding of the phenomenon could pave the way for new kinds of cancer treatments.

The awards program, established in 1991 by the Richard and Susan Smith Family Foundation in Boston, helps launch the careers of newly independent faculty members in Massachusetts whose research focuses on biomedicine. Manning is one of just six recipients of the prestigious award this year.

In her research, Manning explores the biology of cancer cells, looking in particular at molecules that help regulate changes in the genome, or genetic material, within these cells. Her current focus is a molecule known

as retinoblastoma protein, or pRB. In normal tissue, pRB helps determine when cells can divide. In tumor cells, the protein is either defective or not present, which leads to uncontrolled cell division.

In previous work, funded by the National Institutes of Health, Manning and her research team showed that pRB also seems to play a role in regulating proper chromosome segregation. During normal cell division, or mitosis, a cell's chromosomes are duplicated, then the pairs of duplicates are pulled apart by microtubules that emerge from structures known as centromeres.

Manning believes that pRB may act by recruiting proteins that regulate the organization of chromatin, the complex of proteins and genetic material that make up chromosomes. "We want to look at which of those regulators might be altered and if there are specific regions of the genome that are most sensitive to those alterations when pRB is absent. If we can identify those changes, we can try to understand, functionally, how they are involved in cell

division."

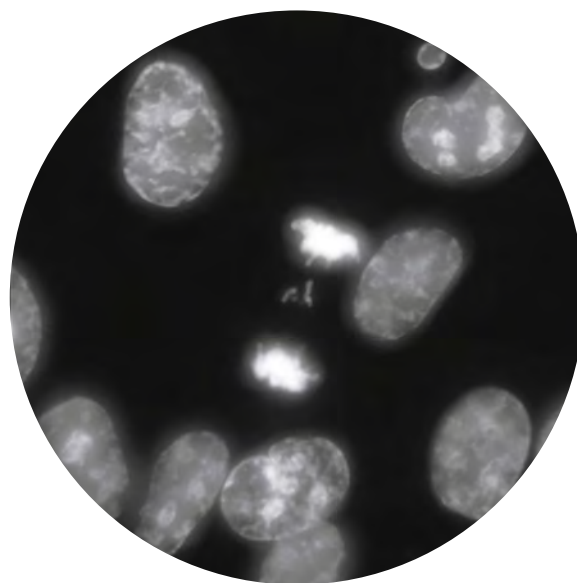
Manning said her team will be looking closely at changes that affect the centromere. "The centromere is the functional region of the chromosome that is important for attachments. Attachments to the microtubules are required for proper segregation. We think pRB is particularly important in recruiting regulators to the centromere, such that the absence of pRB may cause defects in centromere structure, which would alter how the microtubules attach and lead to errors in chromosome segregation."

Unlike mutations and other genetic alterations, changes in the way regulatory proteins work (called epigenetic changes) are reversible, Manning says. "If we can show that the absence of pRB results in changes in the way that chromatin structure is regulated, we may also be able to show how those changes can be reversed with new treatments. To me, that is one of the most exciting aspects of this project."

—Michael Dorsey

the websites the crowdworkers are told to target, and even the workers who are signing up to complete the tasks. Lee also has algorithms to predict the probability that new users of a site are, in fact, there to carry out assigned crowdworking tasks. His algorithms have detected fake "likes" with 90 percent accuracy and fake followers with 99 percent accuracy.

—Sharon Gaudin



# TOP WOMEN

WPI, under the leadership of Laurie Leshin, was named to the *Boston Globe* “2017 Top Women-Led Businesses in Massachusetts,” ranking 49th. Nitsch Engineering, founded by Judy Nitsch ’75, WPI Board of Trustees member emeritus, is listed 99th.

# ONE GIANT LEAP

WPI’s participation in the AIM Photonics Institute, one of the eight Manufacturing USA institutes to which the university belongs (“Building Tomorrow’s Economic Renaissance,” *WPI Journal*, Fall 2017), received a boost in January when Massachusetts Lt. Gov. Karyn Polito came to campus to announce a \$4 million grant from the state. With the funds, WPI and Quinsigamond Community College will create a Lab for Education & Application Prototypes (LEAP) at WPI. The facility will be a hub for research, project work, education, and workforce training in integrated photonics, an emerging area of information technology and advanced manufacturing that merges electronics and photonics. The overriding goal is to support the growth of the integrated photonics industry in Central Massachusetts.

—Michael Dorsey



PHOTO MATTHEW BURGOS

# RILEY TURNS 90

*“Someday, we’re going to have a dormitory.”*

The authors of that statement, which ran in a 1927 article in the student newspaper, *Tech News*, didn’t know how right they were.

With more than 15 residences now on campus, WPI’s housing options have grown faster than you can say “Gompei” — but one in particular recently took the spotlight. The oldest, Sanford Riley Hall, celebrated its 90th anniversary on October 30.

Mike Hamilton, assistant director of residential operations, worked with the rest of

the Residential Services team to plan a birthday party for the ages outside Riley, featuring music, a photo booth, a tent with Riley memorabilia, and free apple cider donuts made fresh on site.

And the celebration didn’t stop there — in addition to honoring the past, students had the opportunity to usher in the future by voting on which furniture would be used in Messenger Residence Hall. Riley’s newest neighbor directly across the Quad is set to open in A-Term 2018–19.

While Riley has seen many

changes over the past 90 years, one constant is its status as a core part of campus.

“My year at Riley was one of my best at WPI,” says Andrew Teixeira ’09, who, after living in Riley as a resident advisor and graduating with a degree in chemical engineering, is currently a professor in the Department of Chemical Engineering. “It was a place where we built a community of lifelong friends right in the heart of campus.”

—Allison Racicot

# RESEARCHERS WORK ON HEALTH APPS

At the intersection of computer science, healthcare, and mobile technology lies an opportunity to improve the health and well-being of people around the world. WPI's researchers are working to make that happen by building mobile applications that marry sophisticated technology with medical expertise.

One, **SlipBuddy**, uses machine learning and artificial intelligence algorithms to predict when users are apt to overeat, and then intervene to change bad behaviors to healthier ones. Another, **LifeLine4Moms**, is

designed to help obstetricians diagnose perinatal depression and guide them in prescribing the proper treatment.

Bengisu Tulu, associate professor in the Foisie Business School, is a primary researcher on both; Carolina Ruiz, associate professor of computer science, is principal investigator on SlipBuddy.

"I thought it would be interesting to look at how technology can create opportunities to support people's health journeys, whether it's through eating healthier or dealing with the problem of perinatal

depression," says Tulu. "I'm very hopeful that what we're doing will make a big difference."

Initial development of both SlipBuddy and Lifeline4Moms was completed through MQPs. SlipBuddy, currently designed for the Android platform, is still in development and testing; LifeLine4Moms (built for both Android and iOS) is expected to be released in April. Team partners on the projects were the University of Connecticut (SlipBuddy) and UMass Medical School (LifeLine4Moms).



CAROLINA RUIZ, LEFT, AND BENGISU TULU CREATED THE SLIPBUDDY APP TO PREDICT AND INTERVENE IN USERS' OVEREATING.

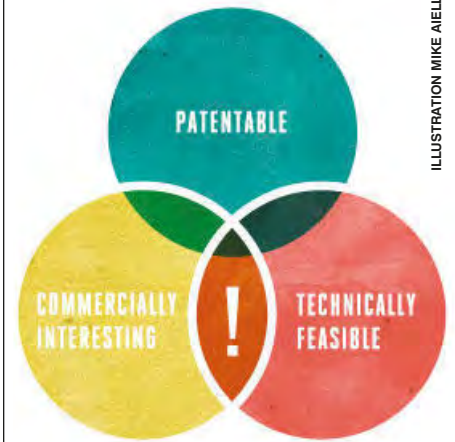


ILLUSTRATION MIKE AIELLO

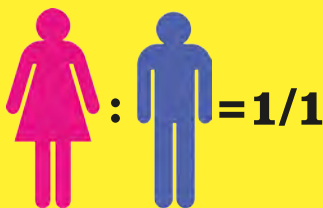
## PATENT SWEET SPOT

Patent and licensing attorney Peter McDermott '73 returned to campus recently to talk about intellectual property (IP) law for the **Foisie Business School Lunch & Learn** series. His talk, "Some Things Every Technologist Should Know About IP," stressed several key points, chief among them that different technologies and business plans will be best served by different strategic combinations of U.S. and, perhaps, foreign IP assets, including patents, trade secrets, trademarks and service marks, copyrights, exclusive supply contracts, and/or other forms of IP.

McDermott noted that effective patents are expensive to obtain and enforce, and therefore suggested focusing a patent application budget on inventions that have been carefully evaluated and found to lie in the sweet spot of commercially interesting, technologically feasible, and patentable.

# DOMESTIC VIOLENCE: ANOTHER LOOK

Emily Douglas, professor and head of the Department of Social Science & Policy Studies, specializes in family issues. In collaboration with Clark University research professor Denise Hines, she is investigating a little-known area: men who have experienced abuse at the hands of female partners. With funding from the National Institutes of Health (NIH), they have conducted surveys with men recruited through relevant websites and helplines. They're interested in the victims' mental and physical health, the well-being of any children involved, and the experience of "helpseeking" – which, Douglas says, can be another form of abuse.



**MEN AND WOMEN EXPERIENCE DOMESTIC VIOLENCE at roughly equal rates, according to multiple studies, although Douglas notes that women are more likely to be harmed: "Partner violence exists on a continuum, from pushing, slapping, or grabbing an arm, to the very severe forms that are life-threatening. Most often it's lower-level."**

## MUTUAL COMBAT

Violence between partners often goes both ways: about 50% of women interviewed in shelters say they have used violence against their partners. "We have this tendency to think of people as either good or bad," Douglas says. "But the rigid categories of 'abuser' and 'victim' don't always work." Two-thirds of men who report abuse have children living in the home – who may be in danger if the man is denied help. In one survey, 59% of respondents reported that their children had visually witnessed an assault, and an additional 11% had heard one.

## WHY MEN DON'T CALL FOR HELP

The only services they see have names like "Place for Maria," or "Mary's Hope."

They fear false accusations.

They're afraid that any involvement with the criminal justice system might mean they'll never see their kids again.

They have a hard time seeing themselves as victims of abuse.

"We don't think of men as victims," says Douglas. "We think of men as being strong and capable, and protectors. We don't want to automatically turn away someone just because they don't meet our preconceived notion of what a victim would look like."

## WHAT MEN MIGHT HEAR WHEN THEY CALL FOR HELP

*I'm sorry, but we only have the means to help women.*

*You must have done something to deserve it.*

*What's wrong with you? Can't you control your woman?*

When police arrive, they often assume that the woman must be the victim. Men are sometimes handcuffed and arrested – even when they have physical injuries and the woman does not.

*But he's bigger – and stronger!*

"Those arguments only hold up in the case of an outright fistfight," says Douglas. "The man might not wish to be violent, or he may have been brought up to never strike a woman. Some are afraid to defend themselves, because that could bring on accusations."

**12%** OF AMERICANS REPORT EXPERIENCING RELATIONSHIP VIOLENCE (2/3 OF COLLEGE STUDENTS).



# ASK THE ARCHIVISTS

**Q.** "I recently came across one of Theo Brown's diaries in the library. Who was he?"

**A.** Born in Worcester in 1879, Theo (Theophilus) Brown graduated from WPI in 1901 with a degree in mechanical engineering. He worked for several years on tractor design at Richardson Manufacturing Company before moving in 1911 to Moline, Ill., to work for John Deere. Five years later, he was named head of Deere's Plow Works experimental division, designing and redesigning everything from cultivators to power lift assemblies—all to make the tractors more functional and more efficient.

A draughtsman and photographer, he was also a dedicated diarist. Often beginning with "Thought of this idea today ...," he wrote in his diary from 1911 to 1971, with day-to-day accounts of travel and dinner with friends, including photographs, Pullman tickets, clippings, sketches, and numerous technical drawings. The diaries are visually rich—Theo was a keen observer of everything from which wildflowers were in bloom to world events.

Among the delightful aspects of the diaries is the progression of a tractor from a sketch, to a working tractor in the field, to a half-size model for his children. These photos show the 101 tractor Theo designed with industrial designer Henry Dreyfuss.

The entire collection of 65 diaries may be viewed in Gordon Library's Archives & Special Collections. Nearly half of the collection has been carefully digitized and is available online at [theo.wpi.edu](http://theo.wpi.edu). The remaining diaries will be digitized as funding becomes available.

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

# INSPECTOR ROBOT

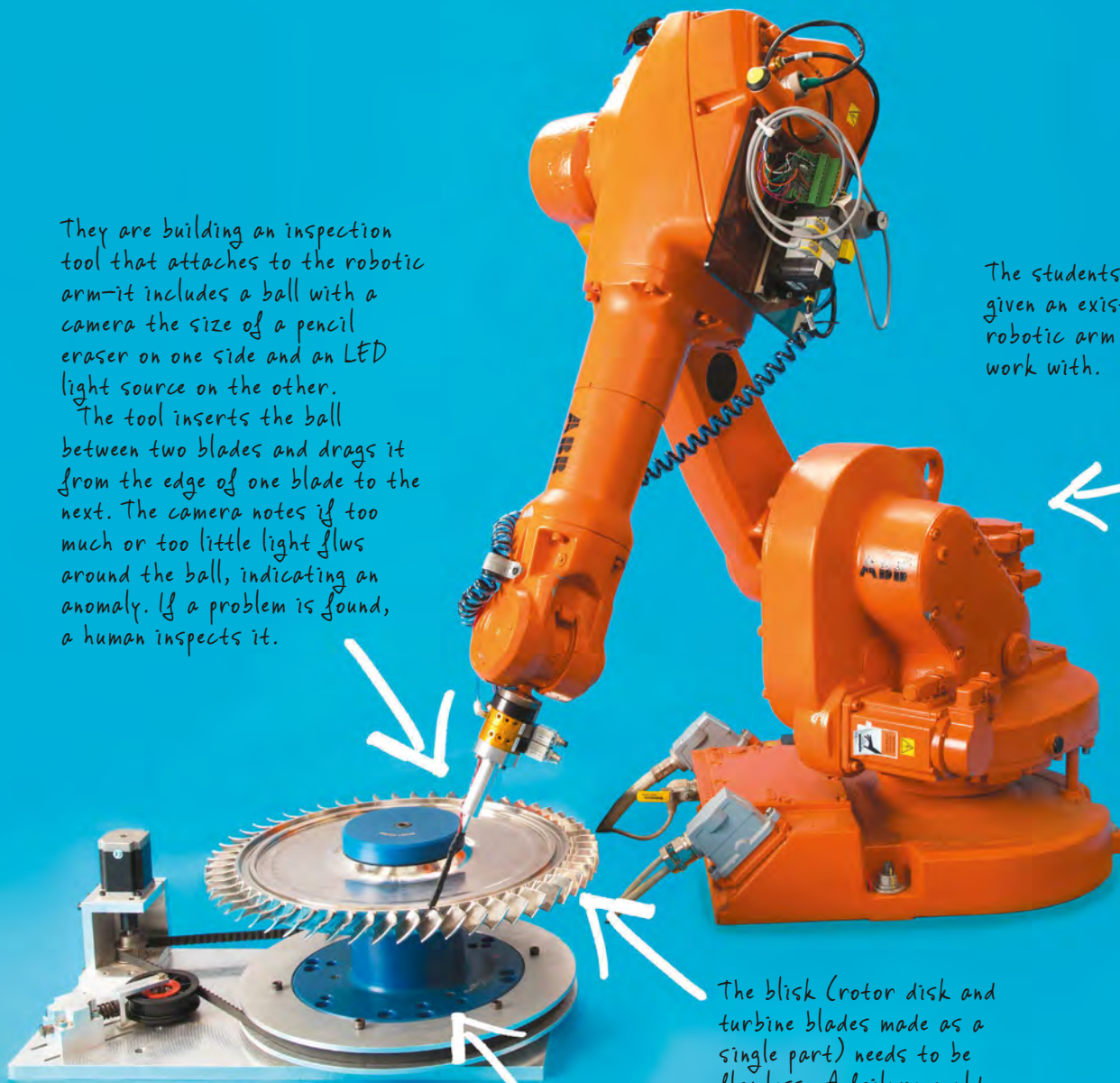
Seniors Michael Hopkins, Kevin Macintosh, and Nicholas Hollan are developing a robotic system that could help GE Aviation inspect a critical component of jet engines with greater accuracy and less physical stress on human workers. This is the third MQP team to work on the multiyear project. Advised by Craig Putnam, associate director of WPI's Robotics Engineering

program, and Ken Stafford, director of WPI's Robotics Resource Center, the students are building the hardware and software needed to enable a robot to inspect blisks, critical components of the engines that power Airbus and Boeing aircraft. If GE Aviation finds the students' work mature enough, it could be readied for use in its facilities.

They are building an inspection tool that attaches to the robotic arm—it includes a ball with a camera the size of a pencil eraser on one side and an LED light source on the other.

The tool inserts the ball between two blades and drags it from the edge of one blade to the next. The camera notes if too much or too little light flows around the ball, indicating an anomaly. If a problem is found, a human inspects it.

The students were given an existing robotic arm to work with.



The blisk (rotor disk and turbine blades made as a single part) needs to be flawless. A failure could cause an engine to shut down during flight.

They designed a turntable that holds the blisk and rotates it so a robot can inspect each blade individually.



Professors Berk Sunar (left) and Xinming Huang were recently honored as the first recipients of the Dean's Excellence Professor and Joseph Samuel Satin Fellowship Award in Electrical and Computer Engineering, which offers \$30,000 per year for a period of five years.

## [ QUOTABLE ]

**“PEOPLE NEED TO UNDERSTAND THE PREVALENCE OF HATE CRIMES AND HOW PEOPLE ARE IMPACTED BY IT. WE HOPE TO USE OUR VOICES AND EXPERIENCES TO MAKE CHANGES THAT WILL HAVE A MEANINGFUL IMPACT.”**

—Vice President for Talent and Chief Diversity Officer Michelle Jones-Johnson, on being tapped for Gov. Charlie Baker's restructured Task Force on Hate Crimes

## GAMING GETS CRAFTY

Computer science professor Gillian Smith's work is all about intersections.

It may seem odd to mix computer science, game design, and crafting, but for Smith, it's a natural intersection that makes her a better scientist and

a better crafter.

Smith's work integrates research into artificial intelligence, gaming, and human-computer interaction with art forms like embroidery and quilting. An award-winning game designer, she co-created *eBee*, a quilt-based game that

teaches the basic principles of circuits. Players create working circuits from pieces that use regular quilting material, conductive fabric, conductive Velcro, batteries, and LED lights.

"It's about broadening our thinking of computer science, gaming, crafting, and art," says Smith. "The interactions let us look at each of them differently by looking at them together."

Smith also has created algorithms that generate original embroidery patterns she then uses in another game, *Thread-steading*, which is played on an embroidery machine. "The action of making the software pushed the boundaries of making the craft," she says. "Creating the craft has changed how I think about algorithms and code."

—Sharon Gaudin





FROM LEFT, RSI TEAM MEMBERS PICCIOLI, WRIGHT, VERNESCU, AND COLLEEN MCSHEA, GRANTS SPECIALIST FOR LEARNING SCIENCES AND TECHNOLOGIES.

# A LEG UP FOR RESEARCH AT WPI

**WPI's strategic plan calls for raising the university's sights as a research university. One way to do that is to be more successful at seeking and winning large grants. Helping faculty researchers tackle that challenge is the job of the new Research Solutions Institute (RSI). To learn more about this new initiative, the *Journal* spoke with three individuals charged with making RSI a success.**

**Bogdan Vernescu**, vice provost for research and RSI's director, oversees the operation and nonfinancial support of WPI's research enterprise, including oversight of university-wide research institutes and centers.

*How will RSI support the university's strategic vision?*

"We'll build on the success we've already had. Over the past decade, our research funding has been continually increasing; it's almost doubled in just five years. That

record has been built largely by individual faculty members and small WPI-based teams seeking smaller awards. To reach our goals, and increase the impact of our research, we need to set our sights on larger multidisciplinary and multi-institutional awards—of \$3–5 million and more."

*How will RSI help?*

"We'll start by building multidisciplinary research clusters of faculty focused on our strategic research focus areas and seek out external

partners, including other universities, corporations, and NGOs. We'll help our faculty establish and sustain new research centers, and then seek out opportunities for large, center-type awards from federal agencies and provide support throughout the proposal development process."

**Michael Wright**, research opportunity development lead, guides the development of new multi-investigator research proposals, builds external partnerships with sponsors



and collaborators, and develops opportunities for translational activities.

*What should faculty members know about the challenges of seeking big awards?*

“The success rate for proposals to federal funding agencies is only 15 to 25 percent; it’s even lower for large awards. For many competitive opportunities, you might have to apply five times to get one award. We are going to focus on preparing better proposals, and that’s largely about the art of telling one’s story.”

*What does storytelling mean in this context?*

“It’s about explaining the problem that needs to be solved and the science in a way that makes them come alive in reviewers’ minds and makes them excited about wanting to fund it. It does not change the scientific merit to tell the story in a compelling way, but it can significantly improve the odds of success.”

**Ellen Piccioli’s** focus is new initiatives in advanced manufacturing, particularly multidisciplinary, multi-institution, and multicenter collaborations associated with the eight Manufacturing USA institutes of which WPI is a member.

*Why should RSI have a particular focus on manufacturing?*

“WPI is a global leader in manufacturing innovation. By attracting premier students and faculty, and by engaging industry, academic, and government partners, the university can accelerate high-impact research and tech transfer, and help build a thriving manufacturing workforce.”

*How will RSI achieve its goals?*

“We will succeed by focusing on three key missions: collaboration, growth, and economic development. In that way we can create a virtuous cycle of growth and investment that will enhance WPI’s impact and further its growth, so more people want to work with us.”

— Michael Dorsey

# OPTICAL TWEEZERS

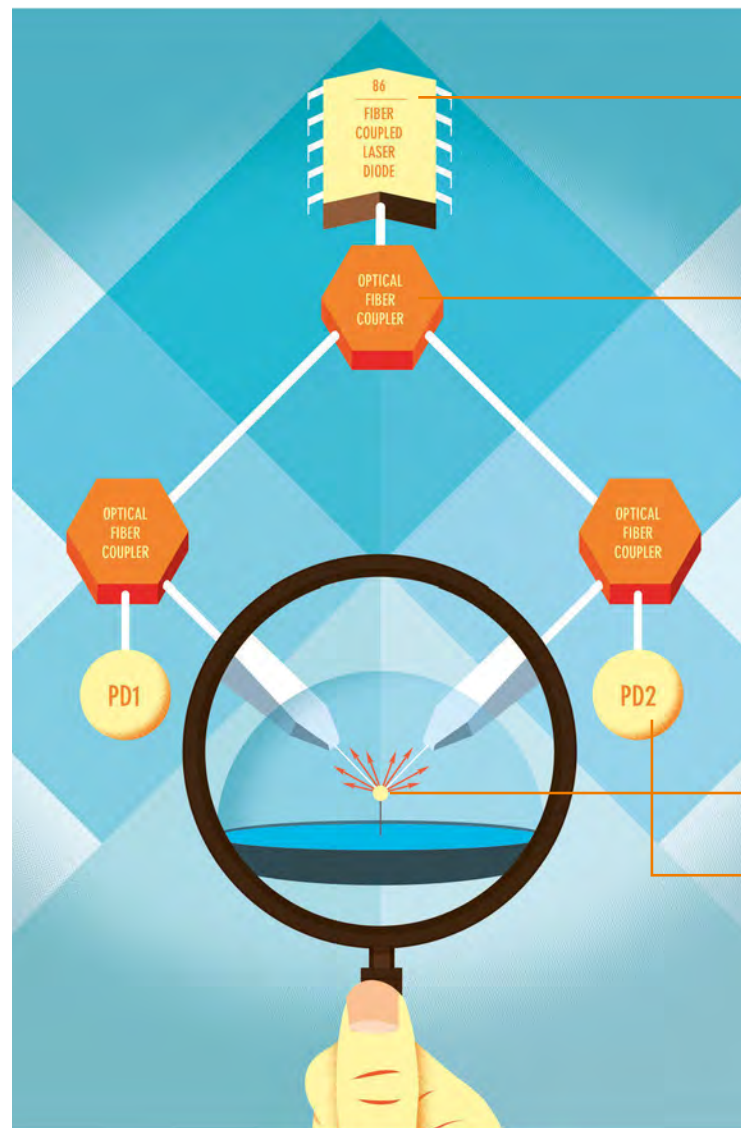
WPI researchers’ work on a scientific tool called optical tweezers soon could help doctors diagnose cancer as much as 10 years earlier – making the cure easier and more successful.

Optical tweezers use highly focused beams of laser light to move and hold small objects, like

blood cells, in place. Most use a bulky and expensive lens to focus the light, which makes it difficult to miniaturize the technology or use it outside the lab.

A research team led by Yuxiang “Shawn” Lui, assistant professor of mechanical engineering, found a way to replace the lenses with

fiber optics, opening the door to creating portable devices small enough to be inserted into the bloodstream to trap individual cancer cells – which could mean detecting the disease at its earliest stages. See [wpi.edu/+research](http://wpi.edu/+research).



Like other types of optical tweezers, the device developed by Liu and his team uses laser light to create an optical trap to catch and hold small objects.

Since the fibers are too thin to fashion into lenses to focus the laser light, Liu’s device splits the laser beam into two beams that pass through optical glass fibers.

The fibers direct intersecting beams at the object, which create forces that serve to hold the object in place. The object also scatters the light, some of which passes back through the fiber.

The scattered light passes back to position detectors that can determine the exact location of the object and the magnitude of the forces holding it in place.

— Sharon Gaudin

ILLUSTRATION GAËTAN HEUZÉ



A PhD student in metallurgical and materials engineering at Colorado School of Mines, **MARK STRAUSS** came to WPI to complete his degree after his advisor, Brajendra Mishra, was offered a position as director of WPI's Metal Processing Institute (MPI).

"I jumped at the chance to follow him to Worcester to conduct innovative research," Strauss says.

Set to cross Earle Bridge in May 2019, he is working on research to create an economically viable process to extract rare earth oxides from waste fluorescent lamps. "We have provisionally patented a hydrometallurgical process that is economical under most conditions," he says. "I am also utilizing electrometallurgy to separate and purify europium oxide from the waste."

Strauss says he is impressed by the international and interdisciplinary aspects of the WPI community – and the connectivity he immediately tapped into upon arrival. "I enjoy how close-knit the departments are, as well as the opportunity to work with professors from other departments for my research. Everybody knows each other – personal relationships are extremely important."

When asked what advice he may have for potential PhD students hoping to enter the WPI graduate program, Strauss shares that becoming a part of the on- and off-campus communities is key for a well-rounded experience. Participating in Graduate Student Government events, choosing a particular major, being involved with an outside group, and connecting with classmates is crucial, he says.

**HIS OWN EXPERIENCE AS A BOWSPRING YOGA INSTRUCTOR AT THE SPORTS & RECREATION CENTER HAS HELPED WIDEN HIS CIRCLE AND ENRICHED HIS TIME HERE.**

Strauss's ultimate dream is to facilitate the creation of state-of-the-art, environmentally conscious recycling facilities in the United States. He says he's getting closer to this goal, due in part to the expansion of his skill set since he's been at WPI.

**HONORABLE MENTIONS:** 2ND PLACE WPI GRIE COMPETITION: PHD ENGINEERING • WPI GLOBAL ENTREPRENEURSHIP WEEK ELEVATOR PITCH COMPETITION AT CSM • NANCY PETRY SCHOLARSHIP FOR STUDY ABROAD • TREASURER, MATERIALS ADVANTAGE CLUB • FIRST PLACE POSTER IN THE GRADUATE RESEARCH AND DISCOVERY SYMPOSIUM: METALLURGICAL AND MATERIALS ENGINEERING



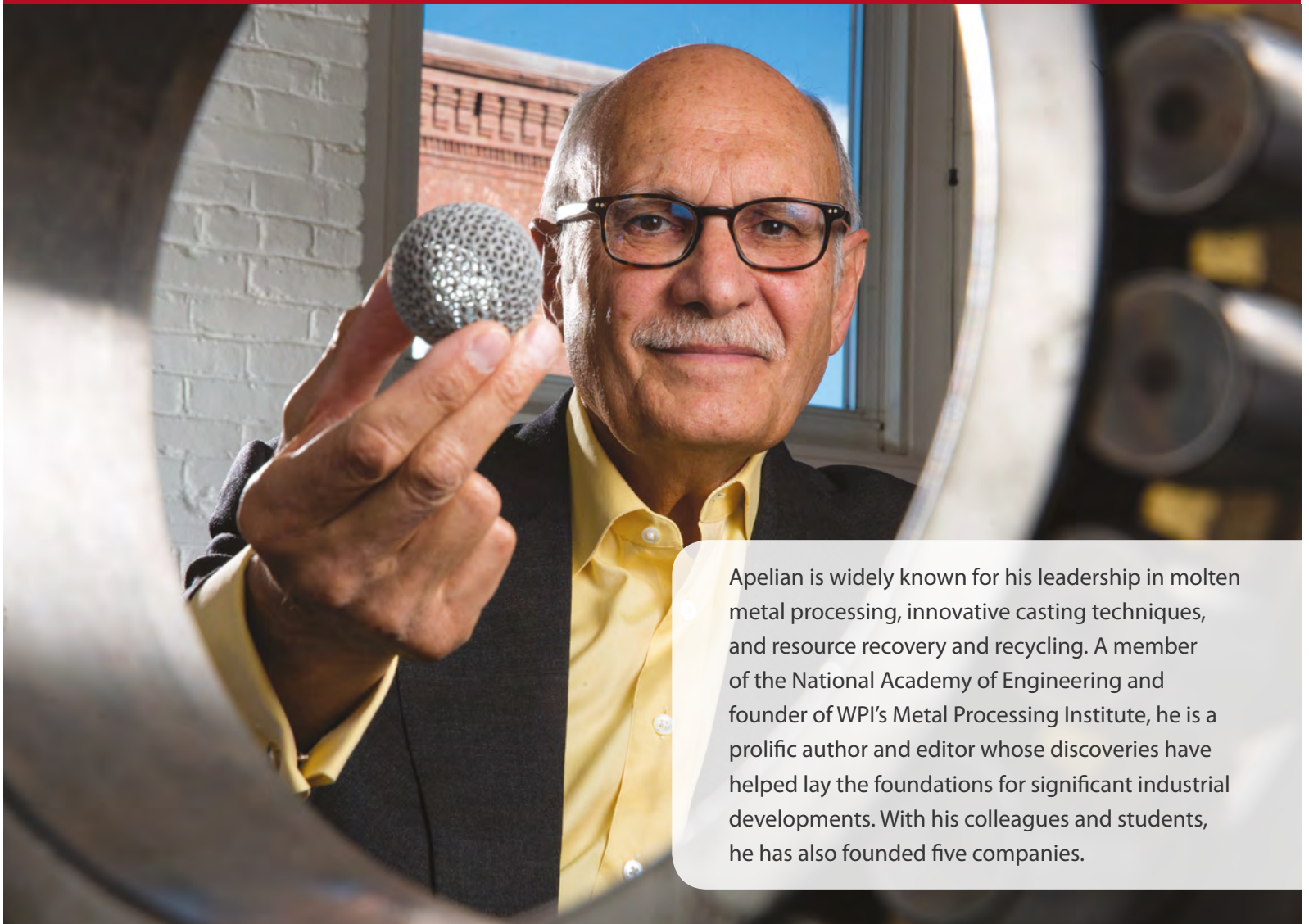
# Worcester Polytechnic Institute

Congratulations to

**Diran Apelian**

on being named a

*Fellow of the National Academy of Inventors*



Apelian is widely known for his leadership in molten metal processing, innovative casting techniques, and resource recovery and recycling. A member of the National Academy of Engineering and founder of WPI's Metal Processing Institute, he is a prolific author and editor whose discoveries have helped lay the foundations for significant industrial developments. With his colleagues and students, he has also founded five companies.

[wpi.edu/+innovation](http://wpi.edu/+innovation)



ELASTIC BEAMS AND FRAMES

$x = a$  and  $H = 1$  the beam is

bending moment

$$\varphi(5x) = \sum_{n=1}^{\infty} P_n e^{n \dots}$$

$$\log 2 \times 10^6$$

$$2 = 1 - 2x$$

$$\frac{FHCr - \dots}{KL} + \frac{\dots}{KL}$$

$M_1$

HP 8000

$M_2$

$$\log \varphi(t) = \int_{-\infty}^{\infty} e^{-\frac{u^2}{2}} du$$

the "stiffness factor" of the

equations (a),  $S_1$ . Then

$$\frac{Fab^2}{l^2} + \frac{Fa^2b}{\dots}$$

$$\frac{3x}{2} + \dots$$

(2-33)

$$\lim_{N \rightarrow \infty} b^2(S_N)$$

E-mail

a slope of zero in a positive slope number. Slope is UNDEFINED, the equation of the line will be  $x$  equals a number. SAME Slopes. the Slope of the line is to the



$$\cos(2t) + (\cos(2t))$$

$$\cos(2t) + \lambda \sin(2t)$$





Bob Woog had been living in Tehran for almost four years when everything started to fall apart. It was 1978 and he and his wife, Barbara Jean, both AT&T specialists on temporary assignment to Iran's national telecom company, had been working to modernize the country's long-distance communication system. The couple had a one-year-old daughter, a settled life, and a network of Iranian friends, and their project was nearly complete when strikes and demonstrations rocked the nation. The Iranian Revolution had begun.

**“WE COULDN'T GET OUT,” WOOG SAYS. “THE AIRPORTS WERE SHUT DOWN FOR ABOUT A MONTH.”**

It turned out that his best friend was chief of staff for the resistance movement, which was fighting to topple the country's monarch, the Shah. Despite Woog's work for the Shah's government, the ties of friendship would protect the American engineer and his family.

“The phone would ring at the house, and you'd pick it up,” he recalls. “A voice would say, ‘Don't be at this corner of this street and that street between 10 and 12 today.’ At the end, we were right there in the middle of the Revolution. But I knew that my friends would smuggle me out of the country if it came to that.”

Eventually, it did come to that—another friend secured the Woogs' tickets on a departing KLM flight. “We were under military curfew, but we broke it,” he says. “We put together a convoy and had a caravan go to the airport, and we really just got lucky, but we got out.”

It was perhaps more excitement than the electrical engineering graduate from suburban Connecti-

cut had signed up for, but what saved the Woogs were the connections they made in a country where they had landed just a few years earlier without speaking a word of the local language. And nearly half a century after Bob Woog graduated from WPI, that extraordinary ability to forge connections despite differences of language, culture, race, generation, and outlook on life has become the clear theme of a long, successful career—with ups and downs, plenty of adventure, and countless friends made along the way.

### AN OUTSIDER

As different as Tehran was from New England, living in Iran was not Woog's first experience as an outsider.

“My parents were from Europe, they had strong accents, and maybe because I'm Jewish, I grew up a little different, and conscious of that,” he says.

His father was German, his mother the privileged grand-

daughter of one of Lithuania's leading industrialists. The couple met at a ski resort in Czechoslovakia in 1938 and stayed in touch, later reuniting in London, where Woog's father had fled the Nazis and where his mother was in college. They married, then traveled to New York to sell folding umbrellas, a new technology at the time. What was originally intended as a business trip turned permanent after the United States entered the war. Bob was born a few years later in Connecticut, the second of two sons.

“There were only about six Jewish kids in my high school,” he says. “It was a WASPy environment, and although there wasn't much anti-Semitism, you just felt you were a minority.”

After high school, Woog landed at WPI, following his gut as he weighed several tech schools across the Northeast. He quickly became a popular figure on campus, but after he was elected chair of the junior prom for 1967 he ascended



to the status of legend—at least among the students who were lucky enough to be in Worcester when jazz icon Louis Armstrong came to play.

“He boasted about how we should bring in a big name for the prom ... and he did,” recalls his good friend Jack McCabe '68. “No one believed him until the night of the prom—it was pretty amazing when Louis Armstrong really showed up.”

As a senior, Woog served as student body president, and it was in this position that his budding talent as a diplomat first came in handy. He learned he could serve as a bridge between generations.

“My predecessor as student body president was kind of revolutionary and stirred the pot,” he recalls, noting that the 1960s was a time of turmoil on many campuses. But that approach had not sat well with WPI's then-president Harry P. Storke, a retired U.S. Army lieutenant general and former NATO commander who was used to a certain way of doing things.

“I was interested in achieving some goals,” Woog says, “and I saw a little bit of my father in General Storke. We were able to build a relationship, and I developed the capability to talk with someone with tremendous respect, but also with a difference of opinion.”

Those goals included creating a social life for students beyond the fraternities, and it was Woog's idea to create a student social fee, charged by the semester, that would allow WPI to bring big-name musical acts to play in the newly opened Harrington Auditorium. It passed by student referendum. He also lobbied successfully to loosen the rules around female visitors in the dorms, and he helped abolish an unwritten edict that Jewish students could only join a special Jewish fraternity.

“General Storke and I had an ongoing dialogue about how students were feeling, as opposed to just us being dictated to,” he says. “I remember we talked about drugs, we talked about leadership, we talked about other things. My predecessor

had done the strikes and the activism, which raised awareness that things had to change. I was able to take advantage of that momentum to actually make things happen.”

## A SOLID CONNECTION

An ability to make things happen would serve Woog well after graduation. He was hired as an engineer at AT&T, where he met Barbara Jean—“an extraordinary woman,” he says, “an African American woman in a professional career when that was a difficult thing to be.”

The Woogs accepted the assignment in Tehran partly because they were seeking a fresh start, away from the uncomfortable attention that came with being an interracial couple at that time. They were happy there, but tragedy struck soon after they returned to the United States. For several years, Barbara Jean had suffered from a rare disease, sarcoidosis, which flared up intermittently. Three months after they returned to the United States, a final flare-up proved fatal. Bob threw himself into work,

while his daughter stayed with her grandparents and her nanny, Ligaya, an immigrant from the Philippines whom Barbara Jean had grown close to in Tehran and persuaded to return with them to the United States. After a few years, he fell in love with the woman who had served as a surrogate mother to his daughter.

“To make a long story short,” he says, “we decided to get married, and we had two more kids. Now we're a tri-racial family.”

Meanwhile, he was pursuing a project at work that would have broad implications for AT&T—and the entire world.

“When I came back from Iran, AT&T said to me, ‘We heard this thing about using computers in the office environment. We don't know if we should be for or against it,’” he says. “They asked me to research that.”

Woog recruited a psychologist and a sociologist for his team, and they studied various AT&T departments' reactions to the new technology.





"First of all, we found executives were totally intimidated," he says. "They would agree to let their secretaries have it, because typing was 'a lady's job' in those days—in fact, later we had to invent the term 'keyboarding' so that it wasn't typing. The whole thing took time. Some people wanted it so they could look progressive. And for workers who were geographically dispersed, it started to make a lot of sense, particularly for those in sales."

Out of Woog's research came the first corporate electronic mail system, implemented throughout AT&T. He also wound up on the speaking circuit, addressing leaders of other Fortune 500 companies about AT&T's new system. Traveling around Silicon Valley gave him the itch to strike out on his own, joining a friend to start a microwave-based long-distance service company, Digital Transervice.

"Technically, we made it work, and I was very proud I was able to do that," he says. "But the sales couldn't keep up with what was estimated in the business plan. That was the first start-up venture—which failed, but we learned a lot from it."



Woog landed on his feet, and soon he was running operations and engineering for IX Net, another start-up that sold special telephones for high-volume stock and bond trading. The job took him around the world—from New York, London, and Paris to Singapore, Sydney, and Tokyo—as he worked to convince local governments to grant regulatory approval.

Stephen Prendergast, who worked for the company in London in the 1990s and still counts Woog as one of his most important mentors, often came along on those trips.

“From the start, Bob was an inspiration and mentor to me,” he says. “We met with some tough negotiators as we tried to do deals and get our business off the ground. Bob had a knack of seeing both sides of the deal. He had a great way of negotiating; he would almost join the ‘other side’ and sell back to himself.... Bob is a true diplomat, whether in government meetings, with national telecoms companies in Europe or Asia, or

even with some ‘dodgy’ characters. Bob always stayed calm and professional, a soft-spoken giant. He had real presence and ability to move the conversation in his direction.”

Once again, Woog’s ability to connect—a skill he had first honed at WPI—proved as useful as his technical expertise. The start-up was a huge success, selling for \$3.3 billion in 2000.

He was comfortable, and might have begun to consider an early retirement, but by now the Internet was becoming the world’s primary mode of communication, and he realized what a good connection could mean for a community, whether a mid-tier American city or a developing country. Under the banner of his own company, Transcom, he launched ventures to unspool fiber optic cable around the world.

The efforts did not always work out as planned. One ambitious scheme would have extended submarine fiber optic cable from Portugal to South Africa, linking all of West Africa. For seven years,

Woog traveled the continent, speaking at conferences and talking to governments as he worked to stimulate interest. While his group did not secure the necessary financing, the evangelism helped, as others picked up the concept and built a number of cables along Africa’s coasts.

“Everything changes when you bring broadband into a country that didn’t have it before,” he says. “I’m really inspired by my kids—I’ve watched how they’ve embraced technology. My oldest started out with emails and instant messaging. My son, who now works in television, is much more into video. My youngest made a career out of social networking for movie studios. In other countries, where they’re significantly behind because the infrastructure hasn’t been built, I look at the young people there, who are just as wonderful and intelligent as anywhere else. If they don’t have broadband, they can’t compete on the world stage for jobs. That’s what drives me.” **J**





# Fluid

collaboration

[COVERstory]

# Jenna Balestrini

MARSHALS CELL TECHNOLOGIES TO CONQUER DISEASE

BY JOAN KILLOUGH-MILLER | PHOTOGRAPHY MATT FURMAN

Everyone has a favorite organ, says Jenna Balestrini '09, PhD BME. Her mother, a nurse practitioner who treated burn patients, had a special interest in the skin. Her WPI mentor, Professor Kristen Billiar, is partial to the heart.

"I am definitely a lung person," Balestrini declares. Despite her preference, she doesn't play favorites in her work at Draper, where she heads the Cell Bioprocessing program, working on tools to create an amazing array of cures for all parts of the body.

As an undergraduate in chemical engineering at Iowa State University, she worked on platforms and polymers for skin substitutes. Early on, she came to understand that research scientists and engineers think differently. "The engineer will apply knowledge and build the thing; the scientist will ask why," she says. She resolved to pursue both in equal measure.

On a graduate admission visit to WPI, she found Billiar (who now heads the biomedical engineering department) using classical mechanical engineering principles to design heart valves. "He was young and hungry to learn," she says. "I couldn't have asked for a better mentor." Billiar recalls their first encounter vividly: "She talked and talked and talked about different scientists in the field. She knew their work as well as I did."

Together the two segued into

skin and connective tissue – a bit of a stretch for the heart man – investigating how mechanical variables, such as stretch, load, stiffness, and scaffolding affect cell function. Many joint publications later, Balestrini's pull toward the lung could no longer be denied.

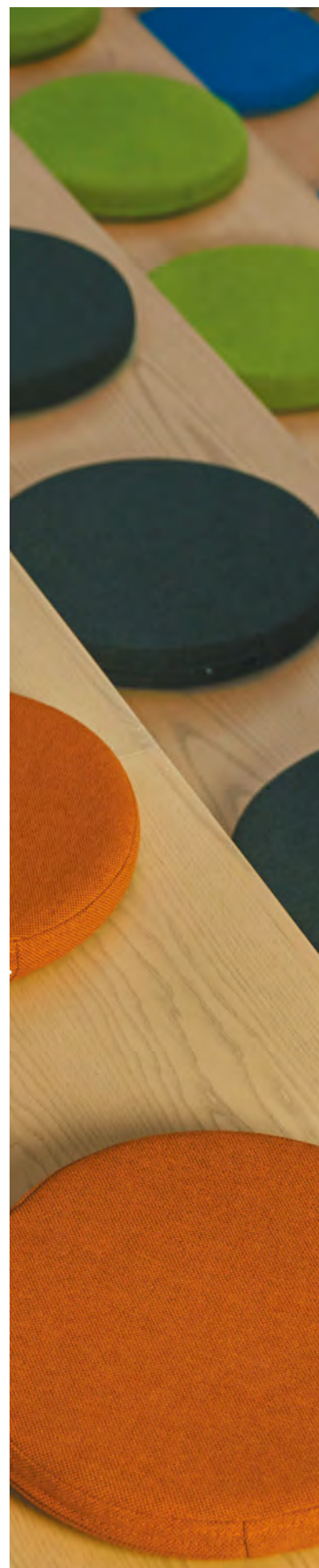
"Look, I don't really do lung," Billiar told his mentee. Balestrini began connecting with key researchers in the field – and connecting him. "She's one of the most passionate scientists I know," he says, "and she's definitely a people person. At conferences, she would introduce me to scientists in our field."

The social and political concerns around lung disease also intrigue her. "People think of the skin as your first defense, but I think it's the lungs. The bioburden that lives in your lungs is a testament to what they're combatting every day. And the architecture of the lung is just stunning!" she exclaims, urging a look at histology images she calls "gorgeous."

Balestrini went on from WPI to postdoctoral work at the University of Toronto and then Yale, but the bond with her mentor remains strong. "Kris was the last person on the dance floor at my wedding," she relates. He recalls the spirited, "friend-powered" wedding at her in-laws' organic flower farm in Maine for a different reason. Minutes before

the ceremony, clouds rolled in and the skies broke open – but there was no trace of stress or dismay. "They just broke out the drinks and started the reception early," he says. When the rain stopped, the party moved outside, wiped down the chairs, and proceeded with the ceremony. "She doesn't let anything get her down; she just keeps working at it, and that attitude makes a difference," Billiar says. "Let me tell you, in lab things don't work very often. Experiments fail all the time. That's what makes the PhD worthwhile: The failures, and the problem solving required."

At Draper, Balestrini serves as a senior member of the technical staff, but the organization's matrix structure blurs hierarchies and boundaries in favor of fluid collaboration. She refers to the nonprofit as "a giant think tank – but we can design and build just about anything." Primarily she's building microfluidic platforms for cells to live on while they are either being experimented on or modified for use as a therapeutic. "You can think of microfluidics as 'plumbing-on-a chip,'" she says. The goal is to recapitulate important aspects of the human body, allowing for precise manipulation of the many factors in the cell matrix that influence function. This provides researchers with a precision preclinical testing platform to create better, safer, and more efficient



"I AM DEFINITELY *a lung person*"





*Balestrini's prototype*

OF A MICROFLUIDIC ELECTROPORATION DEVICE THAT WILL RAPIDLY TRANSFORM CELLS FROM A PATIENT INTO A THERAPY

cell therapies for diseases ranging from cancer to sickle cell anemia, or even diabetes.

Every cell lives somewhere, and what's happening in the neighborhood can be life-changing for a cell. "If we can understand how cells interpret who and where they are, we can use those same signals to manipulate certain cellular behaviors," she explains. For example, the factors that make scars form and wounds heal could be exploited to grow tissue equivalents and replacement organs. Or cells from one's own body could be reprogramed to fight diseases ranging from HIV or hepatitis to diabetes. She points out that her role isn't to create these cures, but to build the tools that will allow Draper's clients to make them. Part of the challenge is to come up with processes that eliminate the financial or processing "pain points" and make such customized therapies scalable and affordable.

In addition to the cell therapy work, Draper's "organ on a chip" systems make it possible to efficiently run in vitro tests on a large number of cell samples in an environment that closely mimics the functions of the human body, including interactions between organs. With numerous "wells," multiple compounds can be tested simultaneously, with

real-time monitoring, before involving human subjects. Down the road, Balestrini projects, "You could test a sample from a person's cancer in vitro to interrogate 20 different drugs and quickly figure out which ones would work best on that person."

A current focus of her work—modifying cells using electroporation—might even make chemotherapy obsolete. She describes electroporation as "zapping" cells with electrical current to temporarily open tiny pores in the cell membrane, thus offering a brief window to introduce therapeutic components. "It makes it possible to 'weaponize' your own cells to fight your disease," she says. She envisions a time when a patient could come in for a simple blood draw and leave after being re-injected with modified cells. "Electroporation allows us to impart altered genetic information across the cell membrane and into the cell. Once that's integrated, it re-programs the cell to function in a way that could restore function to a failing organ, for example, or target a particular cancer, based on the unique signature from the patient's tumor."

Balestrini is looking forward to getting back to working on lung models again. Her voice lifts when she talks about it. "We've made lung models in the past,

beautiful ciliated systems that are responsive to breathing, infection, or air flow. Typical in vitro lung models don't have an immune system, but we can build in those components." She is speechless for a moment, contemplating the prospect. "It's the best organ. I'm always trying to get people to leave their organ of preference and come over to pulmonary work."

#### RESTORING LIVES

Her vision has always been wider, though, going beyond the cell, running deeper than the organ systems she studies. She's been raised to look beyond the scientific or engineering problem, to see the impact on the person. Her mother's tireless devotion to rehabilitating injured patients set a strong example. "I was driven to look for ways to restore function, not just to the body, but to the lives of the people that are impacted by their ailments," she says. She also credits her mother with giving her the confidence to succeed in science. "You always hear about women needing strong female role models. There was one in my house every day!"

The love of science runs deep in her family, connecting them in compelling ways. When her grandmother was dying, one of her requests was for Jenna to read

her thesis to her. In the acknowledgements section of the thesis, the final thanks (after Billiar and her "greater Worcester family") go to the person who first sparked her love for the sciences: her paternal grandfather, a nuclear physicist at Los Alamos. She describes him as a classical physicist whose interest extended to biological problems. He developed a technique for using photons to treat cancer in the brainstem, which is still used in some intractable cases. Grandpa Silvio Balestrini took little Jenna to the Los Alamos observatory to look at the stars, and her first lessons in chemistry and physics were conducted in his lab. "He made me a little lab coat with my name on it, and that just sealed the deal," she says. Grandpa amazed her with a demonstration of the sublimation of dry ice—a lesson that changed her life.

"With that, he liberated me from the idea that what they teach you in school is all there is. Because in school, you learn that solids turn to liquids, and liquids turn to gas. He taught me that some rules can be broken, and that science can be more interesting than what you learn in class. Her thesis dedication concludes, "Although it has been years since you have passed, I still take your lessons with me, every day." J

# WANG



*Battery Resourcers is commercializing a groundbreaking process for recycling lithium ion batteries, developed by WPI Professor Yan Wang. Having already shown that it can scale up the process from recycling 1 kilogram of batteries per day in the lab to at least 50 kilograms, the company will now seek to recycle 500 kilograms, or half a ton of batteries, every day in this pilot plant in Worcester. Expected to be operational this summer, the plant represents the company's final hurdle before full-scale commercialization.*





# CHARGING AHEAD

BY MICHAEL DORSEY

PHOTOGRAPHY PATRICK O'CONNOR





*Yan Wang and his team developed the lithium ion battery recycling process in his lab in WPI's Washburn Shops. Working first with powders used to make commercial battery cathodes, they moved on to actual batteries, which they broke apart, first with saws, and later with an industrial shredder. They used other equipment to roughly separate the shredded bits by material type—steel from the casing, graphite from the anode, aluminum from the separator, and so on. "We want to be able to reuse most of the materials that go into making these batteries," Wang says. "Our goal is to devise a zero-waste recycling process."*

First commercialized in 1991, lithium-ion batteries have become the de facto power source for portable electronics and electric and hybrid vehicles. The global market for these rechargeable energy storage devices, valued for their high energy density and light weight, was over \$30 billion in 2016 and may reach close to \$70 billion by 2022.

That rosy forecast aside, lithium-ion batteries have their drawbacks, including the energy consumption and environmental issues associated with their manufacture (see sidebar). But one of the most significant issues facing manufacturers and customers comes when the batteries reach the end of their useful lives.

Lithium-ion battery cathodes are typically made from a mixture of lithium, cobalt, nickel, iron, and manganese, though the exact proportions used in a particular battery may be impossible to determine. To fully recover those materials, a recycler needs to be able to sort the batteries by chemistry. Since that is usually not possible, most recyclers simply burn the devices, producing a slag from which some materials (though not the lithium) can be salvaged.

In truth, only about 10 percent are ever recycled. The rest are trashed, putting a wealth of hazardous materials into the environment. And since most battery components are not reused, manu-

facturers must import more and more raw materials—often from poorer countries with lax environmental and human health rules.

A solution to this global problem may be on the horizon. It began seven years ago at WPI, with a budding friendship and a hunch.

#### **A NEW SOLUTION**

Yan Wang joined WPI in 2010, fresh from a postdoctoral position in the laboratory of Yet-Ming Chiang at MIT. A world-renowned materials scientist and energy storage expert, Chiang has founded several companies, including A123 Systems, a developer of advanced lithium-ion batteries. Wang says he was impressed by his advisor's entrepreneurial passion.

"From him I learned that doing good research is not enough," he says. "You also must try to commercialize it."

With that end goal in mind, Wang launched several research projects early in his WPI career, including one aimed at increasing the energy density of flow batteries, which can store power produced by solar and wind arrays. His innovation, which replaced the electrolyte solutions typically used in these units with thick suspensions of nickel and zinc particles, won him a \$40,000 Catalyst Award from the Massachusetts Clean Energy Center.

A year before Wang arrived, WPI and Colorado School of Mines

established the Center for Resource Recovery and Recycling (CR<sup>3</sup>), a National Science Foundation (NSF) Industry-University Cooperative Research Center (I/UCRC). Led by Diran Apelian, founding director of WPI's Metal Processing Institute, CR<sup>3</sup> works with industry to develop new technologies that recover, recycle, and reuse materials throughout the manufacturing process.

CR<sup>3</sup>'s faculty and students work on projects funded by its nearly 20 industry members. After Wang's Catalyst Award win, Apelian asked him to take on a project on lithium-ion battery recycling. "I liked Yan right away and we became good friends," Apelian says. "He has good ideas, and he's entrepreneurial in his thinking. I wasn't sure where this research would lead, but you go with your hunch. Lithium-ion batteries are going to be a big growth market, and they will eventually have to be recycled."

As Wang began the research, he found he had little competition. "Few people were working in battery recycling then," he says. "When I'd deliver talks about my research, there was little interest. But today, many of my colleagues want to collaborate with me."

Wang focused first on cathode chemistry, the Achilles' heel of lithium-ion battery recycling. He wondered if it might be possible to devise a recycling process that

could work for any battery, regardless of the cathode's make-up. He started by buying the powders battery makers use to fabricate cathodes and mixing them together—as if a recycler had shredded a pile of batteries and tossed the insides into the same bin.

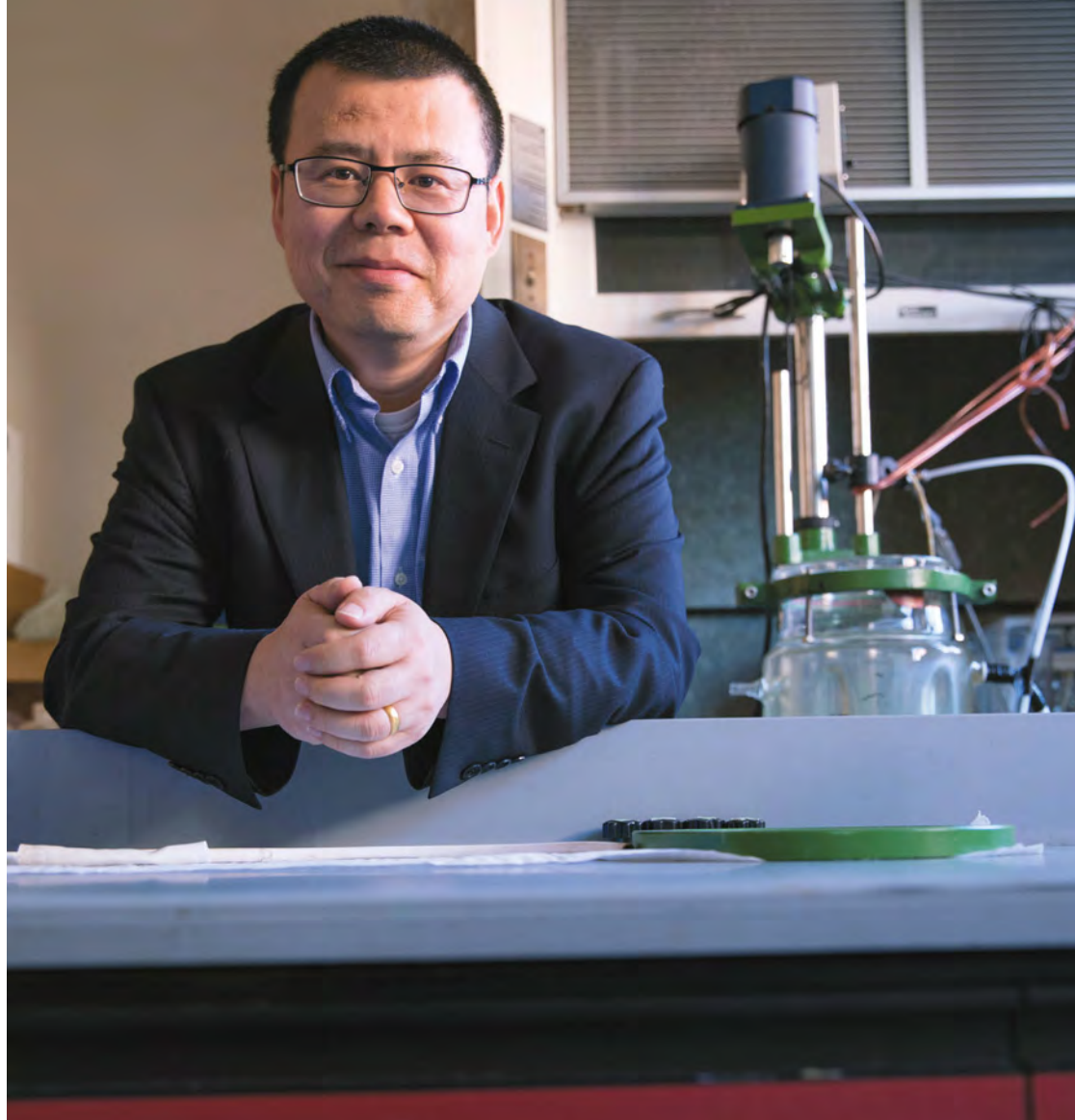
Through trial and error, Wang, Apelian, and graduate student Haiyang Zou hit on a now-patented chemical process that removes impurities from the mixture and creates a solution consisting of just lithium, cobalt, nickel, and manganese. In the final and critical step, the solution can be adjusted to precipitate out new cathode powders with any desired chemistry.

Wang knew he had made a breakthrough. The next step was to see if the process would work with actual batteries. "The NSF has a program to fund promising fundamental research coming out of I/UCRCs," Apelian says. "We ultimately received two research awards for this work."

#### **TESTING THE WATERS**

With CR<sup>3</sup> and NSF funds, Wang showed that his process worked well with mixed cathode materials extracted from shredded batteries, though the cathode powers produced were not yet the equal of those available commercially, says Eric Gratz, a postdoctoral researcher who'd earned his PhD in materials science at Boston University. "The materials used in batteries

*In the reactor to Wang's left, recovered battery chemicals are turned into new cathode materials. His process is unique because it not only recycles spent lithium-ion batteries, but lowers the cost of making new ones.*



are ceramics made of spherical particles. They need to have the right shape and density and be free of impurities. We showed that we could, theoretically, achieve these specifications, but there was still work to do.”

More, the positive results convinced Wang that he might have the basis for his first company. He successfully applied to the NSF’s I-Corps program, which encourages researchers to expose their ideas to the scrutiny of potential customers. The program requires the researcher, as the technical lead, to work with an entrepreneurial lead. Gratz stepped forward to fill that role.

Wang asked Todd Keiller, director of intellectual property and innovation at WPI, to join the project as a

mentor. In late 2014 Wang, Gratz, and Keiller went on the road to talk with customers, including battery makers and end users—particularly car companies. The grant requires at least 100 customer interviews; the WPI team completed 137.

The meetings confirmed the commercial value of the recycling innovation and gave the team a better sense of how a new company might fit into the battery ecosystem. Energized by the experience, Wang, Gratz, and Apelian founded Battery Resourcers. Wang, choosing to retain his academic post, became the company’s chief scientist, while Gratz assumed the role of CEO.

Apelian, drawing on his industry network, assembled a distinguished board of directors, which

he now chairs. The members are A123’s founder Yet-Ming Chiang; Mike Aspinwall ’75, a WPI trustee and managing partner of CCP Equity Partners; Pearson Spaght, founding partner of Fletcher Spaght Ventures; and David Spencer, founder and chairman of wTe Corp., a leading recycler of metals and plastics.

With Keiller’s help, the founders sought the advice of WPI’s Tech Advisors Network (TAN), a group of more than 80 alumni, faculty, staff, and friends who are experienced innovators, entrepreneurs, and investors. A TAN team, including an alumnus who’d worked in the battery industry, was assigned to shepherd Battery Resourcers through the next steps in its development.

One of the first was to enter the MassChallenge competition and seek Wang’s second Catalyst Award. “The I-Corps experience and TAN input prepared Eric well for the presentation he made on a big stage before several thousand people,” Keiller says. “Though Battery Resourcers didn’t win, the company was among 25 finalists, out of a pool of 3,000 applicants.”

#### **FIRST TO MARKET**

Bigger wins were awaiting Battery Resourcers. Late in 2015 the company’s fortunes were bolstered by an NSF Small Business Technology Transfer grant and a \$1 million award from the United States Advanced Battery Consortium (USABC), a collaboration of the nation’s “big three” auto makers

# THE RACE TO BETTER ELECTRODES

(Fiat Chrysler, Ford, and General Motors). The USABC funds (half of which came from the U.S. Department of Energy) were for a project aimed at scaling up the recycling process and producing actual automotive batteries from the recovered cathode powder.

Gratz says the influx of funds allowed him to leave the university and work for Battery Resourcers full-time. “People take you more seriously if you are a full-time employee,” he notes, “so that was a key step in the company’s development.”

As part of the USABC project, WPI awarded a subcontract to A123 to evaluate the cathode materials that Wang’s team was producing from recycled batteries (the materials have also been independently verified by Argonne National Laboratory) and to construct and test new batteries. Wang says the results have been excellent: the cathode materials are now as good as those available commercially, but at 80 percent of the cost, and the batteries are the equal of any available on the open market.

As the USABC project winds down, Wang says he anticipates applying for another award from the consortium to further explore how the company can meet the recycling needs of automakers, virtually all of which are committed to greatly expanding their fleets of electric vehicles. In the meantime, Battery Resourcers is making another bold push toward the marketplace. In late 2017 it leased 5,000 square feet of space in an industrial building in Worcester to set up a pilot plant for its recycling process.

The pilot plant is being funded by an NSF Small Business Innovation Research grant; funds from WPI through its Accelerator Fund; funds from the Massachusetts Cleantech accelerator fund and angel investors; and, most significant, a successful round of venture funding, including an infusion of funds from a major battery maker that has taken a 30

percent ownership stake in the company. (Keiller says the venture funding will allow Battery Resourcers to begin reimbursing WPI for the cost of the firm’s three patent applications.)

If the pilot plant performs as well as expected, the next step will be seeking out opportunities to build full-scale recycling plants (capable of handling five tons of batteries per day) located near major battery manufacturers and collectors. (Wang says Battery Resourcers will also generate revenue by licensing its unique recycling technology to other companies.)

## A PROMISING FUTURE

Last December the B2B research firm MarketsandMarkets estimated that the market for lithium-ion battery recycling could grow from \$1.8 billion (in 2017) to more than \$23.7 billion by 2030, with most of that growth driven by the rapidly expanding need for vehicle batteries. “That is huge,” Apelian says. “This could be a big company. I can’t put a number on it, but it’s extremely promising.”

“I feel we are two years ahead of everyone else,” Gratz says, “but now people are starting to pay more attention to recycling. They’re trying to come up with ideas in the lab while we are moving to pilot scale. We have the advantage of being first to market and our technology is the best. Then again, most start-ups fail. So we have to be diligent and work hard.”

As for Wang, as he anticipates the opportunities ahead for Battery Resourcers, he is also thinking about his next entrepreneurial opportunity. Having founded a second company to make lithium-ion battery electrodes (see sidebar), he sees one more niche to fill. “Maybe later we’ll have a materials company, to produce all the materials for the batteries,” he says. “Then, with the materials, the manufacturing, and the recycling, we will have truly closed the loop.” **J**

Lithium-ion battery manufacturers have an energy problem. The current process for making the batteries’ electrodes uses a slurry of either lithium compounds or graphite mixed with a binder and a toxic solvent. The mixture is spread on a metal current collector strip and then heated to dry it, while the solvent is collected to be reused (and to prevent environmental contamination). It’s an expensive and protracted process.

Two companies spun off from WPI research labs are testing simpler processes. One is AM Batteries, the other start-up to emerge from the lab of Yan Wang. With Heng Pan at the Missouri University of Science and Technology, Wang is developing a process to make electrodes using additive manufacturing. The process starts with a dry powder of anode or cathode materials and binder that is electrostatically sprayed onto the current collector. The coated collector then passes through a pair of hot rollers to compress the electrode to a set thickness. Wang says laboratory studies indicate that the process, which won the 2017 Catalyst Award from the Massachusetts Clean Energy Center, could reduce the cost of the batteries by as much as 20 percent, while also producing units with better electrochemical properties. Wang is currently seeking venture capital to fund a scale-up facility.

The other, Kinetic Batteries—founded by Diran Apelian and Aaron Birt, a PhD candidate in materials science and engineering at WPI and a 2017 *Forbes* 30 under 30 winner for manufacturing and industry—also starts with dry powder, but it uses a process called laser-assisted cold spray to deposit the powder on the conductor. In cold spray, the particles are accelerated to supersonic speeds, which causes them to fuse to the substrate. Having won a \$40,000 award from the Massachusetts Technology Transfer Center and a \$10,000 Kalenian Award (which provides seed funds to advance innovations by WPI students, faculty, and alumni), Apelian and Birt believe they have hit on a process that will make cheaper batteries with better properties, and also make it possible to produce customized cathodes of any size.

“AM Batteries and Kinetic Batteries are competing head-on to win a share of what could be a huge market,” notes Apelian. “To be truthful, I don’t care which one wins. I just hope the winner is one of our companies, and not somebody else’s!”



NETFLIX ENGINEERING LEADER  
**KAREN CASELLA '83**

IS ADVANCING THE TECHNOLOGY THAT DELIGHTS MILLIONS  
AND WORKING TO MAKE THE FIELD MORE INCLUSIVE

BY ERIN PETERSON • PHOTOGRAPHY MATT FURMAN

KAREN CASELLA IN THE LOS GATOS OFFICES OF NETFLIX.



ENGINEERING



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### Set up your sources

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CATS Golden Device  
(wait keyboard at gpio)

Model: 446077  
Model ID: 446077-001

NOTE: This device is currently not supported. **SEND FEEDBACK** which may affect the device's health.

Have a question? Get help from our community or contact our support team.

# NETFLIX

NTS Gibbon Client Test - 4.2  
Current Device Time: 20:01

Welcome Log Bridge Registry DPI Activation

Device Info SDK Capabilities - Profiles and Settings

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nrtp.device.VOLUME_STREAM: 2
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nrtp.device.getUptime: onTime: 6 Hours, 19 Minutes, 49
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FLIX  
KEEPING

Rainbow for the BLACK

#SheRules

QCon

PLAYBACK

ORANGE IS THE NEW BLACK



In the predawn hours of a late November day in 2016, more than 40 Netflix engineers gathered in a makeshift war room. The table was piled with donuts and coffee as they prepared for the 6 a.m. launch of a brand-new download feature.

The much-requested feature allowed users to download entire films or television shows and watch them without an Internet connection—a sanity-saver for frequent fliers, families on car trips, and anyone in a location with spotty or expensive Internet. The feature was a massively complex problem that required new infrastructure, download systems, and licensing agreements.

For Netflix engineering leader Casella, who had spent months working with her team to arrive at this climactic moment, it all came down to this: Would it work? Would it crash?

“At 6 a.m., we pushed the button and we sat and looked at each other,” she recalls. “Within minutes, we started seeing downloads.”

By the end of the day, the download feature had a cool million users. “Every fifteen minutes, we would update the stats and everybody would cheer,” she says. “It was amazing to be part of that.”

It’s easy for her to get excited about the work she’s doing at

Netflix, because her work is designed for impact. The code that she and her team push out several times a day can affect 109 million Netflix subscribers around the world. With Netflix users representing more than 35 percent of all Internet traffic in America on any given night, her work fuels the most relaxing and enjoyable part of many people’s days.

But for Casella, it’s just one part of the difference she hopes to make in the world. A long-time advocate for diversity and inclusion in the workplace, she’s at the forefront of a movement to make tech a more inclusive place for women, the LGBTQ community, and others who have been traditionally less represented in the field. “It’s not as easily measured as percentages or numbers,” she says. “It’s about creating a culture and an environment where [different kinds of people] feel welcome and thrive.”

#### ENGINEERING HEADSTART

For Casella, who grew up on the South Shore of Massachusetts, a love for building and engineering came through both nature and nurture. Her mom was the first woman accepted into Northeastern University’s engineering program. Her dad was a jet engine mechanic for the U.S. Navy, and he often took her to

work with him on Saturdays. She would hand him tools while he worked on the engines, explaining step-by-step what he was doing.

Though she considered many universities, Casella ultimately settled on WPI, where she could experience project-based learning and continue playing basketball and softball. She majored in mechanical engineering, but she was fascinated by computers. She gobbled up CAD courses.

For her MQP, she focused on three-dimensional finite element analysis. The process is a way of examining the stress and response of an object when pressure is applied, and is a common method to determine whether a given product will break, wear out, or work as it’s designed. The math-intensive project required three-dimensional matrix manipulation, and Casella wrote Fortran programs to solve the problems.

After graduation, she continued with that balance—finding ways to use programming to solve mechanical engineering problems—at Maxtor, a company that manufactured hard disk drives. “When I got to Maxtor [in 1988], we were still doing design on drafting boards with paper,” she recalls.

After drawing one too many #10 countersunk holes—a design element in the company’s

products that allows bolts and screws to sit flush with the surrounding material—Casella suggested using CAD technology to automate some of this tedious design work. Her bosses were open to the idea, and handed her the proverbial keys to the project. “When I wrote a program that could do [this work] automatically, everyone was like,

**‘OH MY GOD, IT’S MAGIC!’**

It was reactions like that—along with the realization that such projects could allow people to do their work more quickly and accurately—that pushed Casella further into software engineering. In 1993 she headed over to Sun, a computer, software, and IT services company, where she honed her skills as a software engineer and architect.

It was an exciting time. Java, one of the most successful programming languages in history, was being developed at Sun, and Casella got to play a part in its evolution (in early iterations it was called Oak.) And in later roles, she got to do “white hat hacking” where it was her job to help Sun’s corporate security group investigate flaws and holes

THE NETFLIX OFFICES ARE FILLED WITH INSPIRING GRAPHICS AND IMAGERY—FROM TELEVISION AND FILM TO COMPANY VALUES AND ETHOS.

in existing systems by breaking into them.

Software engineering and architecture was advancing at breakneck speed, and for Casella it was an exhilarating challenge to try to keep up, since she'd had little formal training on the topic. "It was my education at WPI that allowed me to do the work without having to go back to school to get a software engineering degree," she says. "At WPI, I learned a methodology for learning new technologies."

After a dozen years at Sun, Casella took a position at SHOP.com, an e-commerce company that sells a range of retail items. She was charged with updating old but serviceable technologies to newer more flexible ones.

When she arrived, SHOP.com used two different code bases for its website. One was for users on desktop computers, the other was for smaller devices like tablets and smartphones. Over the course of two years, Casella led a team to develop updated architecture to allow the SHOP.com website to utilize a single code base, greatly simplifying the challenges of keeping everything up-to-date.

For Penny Varcoe, then the senior director of project management at SHOP.com, the successful project was a testament to Casella's strengths as an engineer and manager.

"Karen is able to take large projects, break them into smaller, manageable pieces, and determine how those pieces can be developed and then put together to create a

finished project," she says. "Instead of looking at a large project as impossible, she sees it as a challenge and puts her game face on, ready to win."

It was skills like these—working on big problems with tenacity and optimism—that made Casella a perfect fit for her next job—at Netflix.

#### LEADERSHIP AND SOCIAL CHANGE

To an engineer, Netflix offers an irresistible challenge: the technology is some of the best and most advanced in the world. Few organizations work at Netflix's scale and speed.

But Casella liked Netflix for additional reasons. She wanted to do more than just manage teams writing killer code or pushing out new products. As a woman and a lesbian, she wanted to see more people like her choosing technical careers, landing leadership positions, and moving the field forward. Netflix offered her a chance to work on those problems, both within the company and beyond it.

Even early on, she'd noticed the imbalances. In her time at WPI, she guesses, just 5 percent of mechanical engineering majors were women. Still, her professors and fellow students were uniformly respectful of her skills, and she admits her unwavering confidence in her abilities didn't hurt.

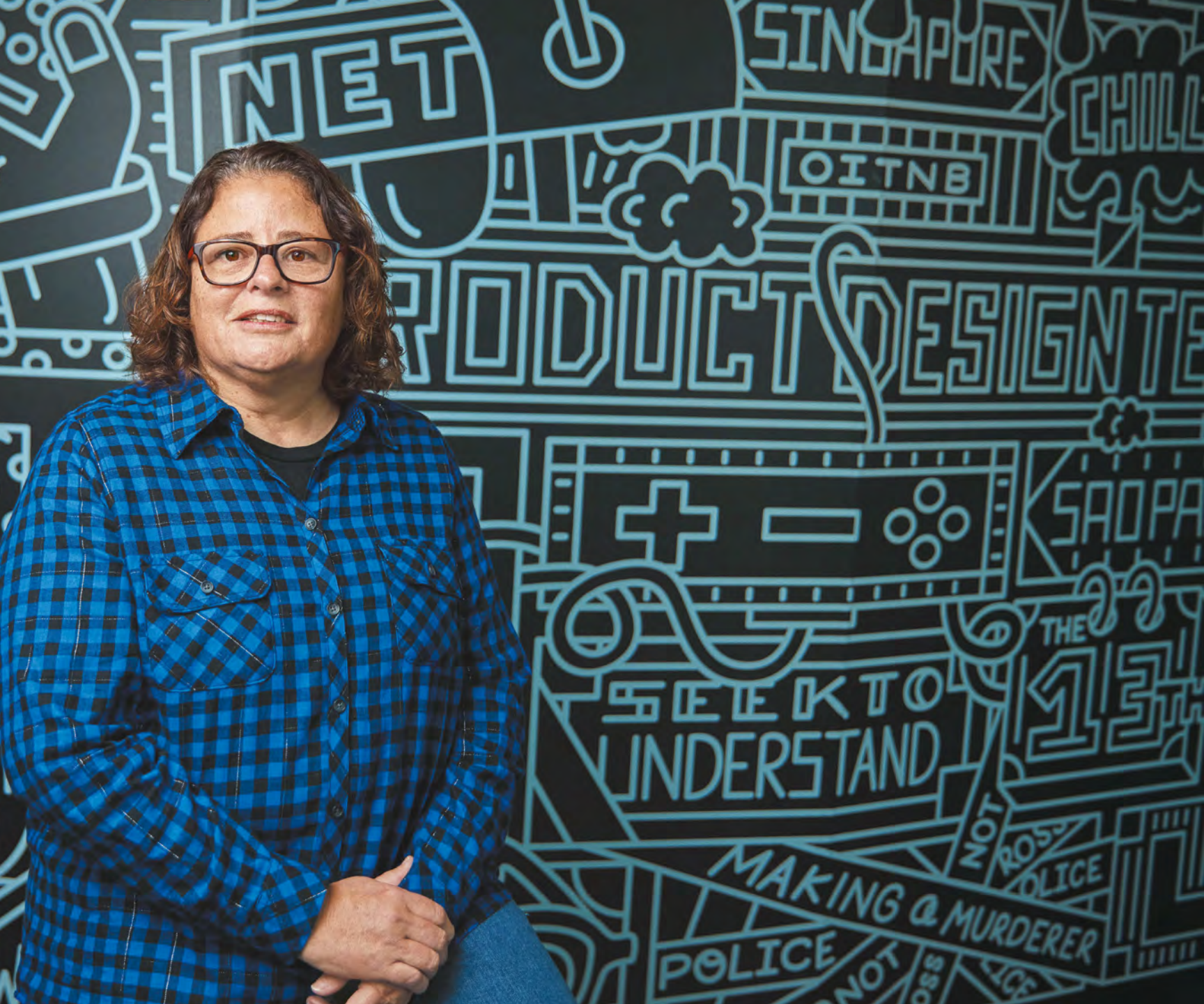
But the welcoming environment didn't last past graduation. In early jobs before she arrived at Maxtor, she faced both casual sexism and overt sexual discrimination and

sexual harassment. Though it was upsetting, she didn't realize her experience could be otherwise. "I just thought I had to deal with men making sexual advances," she says. "I thought: 'This is just the way the world is.' I didn't have the courage to stand up to say that the way I was being treated wasn't OK."

In the back of her mind she hoped that someday she could make it easier for women who

followed her. That opportunity opened up during her time at Sun. She began working more methodically to support and mentor young women and help them in their careers, whether that was a promotion to management or working on increasingly challenging technical problems.

By the time she arrived at SHOP.com, she drew on her connections and her values to build a team that



looked very different from most. Says Varcoe, “Women made up 70 percent of our technology team. As a female software developer, Karen was a pioneer. She is determined to help women have opportunities in technology. When she finds an initiative she’s passionate about, she is an evangelist.”

In recent years Casella has done such work on an increasingly large stage. In the past year alone, she

hosted a panel at a software architecture conference in San Francisco about diversity and inclusion. She was also one of 140 people across the country selected as an LGBTQ Tech and Innovation fellow by Lesbians Who Tech.

As part of that five-month fellowship, Casella served as an engineering lead for a Tegan and Sara Foundation–fueled mentoring app. The app is designed help young queer

women find mentors in their career area of interest. Even in her side projects, says Susan Nesbitt, another fellow on the project, Casella is committed to complete success.

“Karen brings world-class engineering chops, business acumen, humor, humility, and empathy to everything she does,” says Nesbitt. “Her work helps ensure that everyone’s perspective is valued.”

Casella continues to push for

progress at Netflix and outside of it. With more than 30 years’ experience in the technology field, she’s ready to help the next generation of tech leaders look more like the rest of the world.

“I’m finally in a position where I can do something about [supporting women and LGBT people],” Casella says. “It’s better than it was when I started, but I’m passionate about driving this kind of change.” **J**

## [ FACULTY *snapshot* ]

### PLANT COLLECTION

AS AN INSIGHT ADVISOR FOR OUR FIRST-YEAR STUDENTS, I RUN A PROGRAM ABOUT HOW SELF-CARE CAN HELP YOU THRIVE AS A PERSON AND A STUDENT. MY ADVISEES LEARN HOW TO CARE FOR SUCCULENTS AS A METAPHOR FOR THEMSELVES, AND ALL OF THEIR PLANTS COME FROM THESE PARENT PLANTS I CARE FOR.



PHOTOS MATTHEW HEALEY

**Zoe Reidinger** ASSISTANT TEACHING PROFESSOR, BIOMEDICAL ENGINEERING



**LARGE TEA COLLECTION**

LOTS OF STUDENTS FREQUENT MY OFFICE. MOST ARE FROM MY COURSES, OTHERS ARE IN THE ALLIANCE (WPI'S LGBTQ+ GROUP), THE BIOMEDICAL ENGINEERING SOCIETY, PLUS MY INSIGHT AND ACADEMIC ADVISEES—BUT ALL STUDENTS ARE WELCOME. NO MATTER THE QUESTION, I ALWAYS HAVE TEA, CHOCOLATE, AND SILLY PUTTY TO SET THEM AT EASE.



**JAKE THE DOG, WATERCOLOR**

IN MY BIOMEDICAL ENGINEERING DESIGN COURSE, I WOULD BE DOING MY STUDENTS A DISSERVICE IF I TALKED ABOUT THE DESIGN PROCESS WITHOUT COVERING FAILURE. WE SPEND TIME BECOMING COMFORTABLE WITH ADMITTING MISTAKES AND LEARNING HOW TO GROW AND IMPROVE IN RESPONSE TO THEM, INSTEAD OF HIDING THEM.

**CARDIAC HISTOLOGY COASTERS**

MY DOCTORAL RESEARCH FOCUSED ON MAKING AND IMPROVING ARTIFICIAL BLOOD VESSELS. TALKING ABOUT IT USED TO GROSS OUT MY FAMILY AND FRIENDS, BUT NOW THEY GET ME, AND GIVE ME GIFTS LIKE THIS.



**BOX OF RANDOMNESS**

IT'S SO MUCH EASIER TO CONVEY A DIFFICULT CONCEPT IF STUDENTS CAN VISUALIZE IT. EVERYTHING IN THIS BOX HAS BEEN USED IN CLASS TO DEMONSTRATE A POINT OR TEST A THEORY, AND I JUST KEEP ADDING TO IT.

**CHILDREN'S BOOKS**

AFTER YEARS OF WORK BY THE SAFE ZONE COMMITTEE AND RESIDENTIAL SERVICES TO MAKE IT POSSIBLE, I AM NOW LUCKY TO BE THE INSIGHT ADVISOR FOR WPI'S FIRST GENDER-INCLUSIVE FLOOR FOR FIRST-YEAR STUDENTS. SOMETIMES SCHOOL IS REALLY STRESSFUL, SO—UPON REQUEST—I WILL DROP BY THE DORM AND READ BEDTIME STORIES TO MY ADVISEES.



**GEORGE, GEORGIE, & GEORGETTE**

I LOVE BEING INVOLVED WITH SEVERAL SUMMER CAMPS AT WPI AND GETTING KIDS INTERESTED IN ENGINEERING. LAST SUMMER SOME OF MY BME DESIGN CAMPERS LEARNED THAT MY FISH DIDN'T HAVE NAMES, SO I LET THEM NAME THEIR NEW SCALY FRIENDS.



**OLIVIA GIBBS '20**

**Hometown: Rutland, Mass.**

**Major: Industrial Engineering**

**Involvement:**

**Engineering Ambassador**

**Phi Sigma Sigma**

**Crimson Key Tour Guide**

*"I came to WPI because I wanted a challenge. I wanted to travel and learn from more than the inside of a classroom. Your support of WPI helps make my dreams, including traveling to Namibia for my IQP experience, a reality. Thank you!"*

---

Through WPI's hands-on, project-based curriculum, and its Global Projects Program, students learn to solve real-world problems, work in diverse teams, experience resiliency, and see firsthand the positive impact they can have on individuals and communities around the world—all skills and experiences that help shape well-rounded and innovative thinkers and leaders.

When you give to the WPI Fund, you support students like Olivia, and provide scholarships that empower students to pursue important projects and research, on campus and abroad. You also become part of the long and proud tradition of philanthropy that built this world-class university and keeps advancing it to new heights.

---

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**WPI**

**FROM THE  
DESK OF**  
David Wheeler '93, '04 MS  
Alumni Association President



**TO DO-**

✓ REGISTER FOR ALUMNI WEEKEND 2018,  
MAY 31-JUNE 3: [wpi.edu/+alumniweekend](http://wpi.edu/+alumniweekend)

✓ Review Valentine's Day photos and  
fun at WPI - aka #WPIloves-when the  
WPI community celebrated donors and  
our tradition of giving back.

**CONGRATS-**

TO THE GRADUATES OF THE LAST DECADE  
COMMITTEE on another sell-out GOLD Winter Social  
at Harpoon Brewery in Boston. February

TO THE STUDENT ALUMNI SOCIETY for a fun  
birthday party for Gompel in February and a year full of  
successful traditions events.

TO ATHLETICS AND THE WPI FUND for partnering on  
the fun and successful campaign, "Engineering Excellence:  
A Goat Nation Giving Challenge" March

**COMING SOON-**

✓ Community Service Day-  
watch for opportunities to  
register.

✓ End of WPI's fiscal year-  
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**KEEP IN TOUCH!**

David '93'04  
[wheelerda@alum.wpi.edu](mailto:wheelerda@alum.wpi.edu)





# Fueling an Automotive Revolution

*Fifty years ago, Floyd Wyczalek spearheaded the creation of fuel-cell vehicles. Now 93, he is poised to see his efforts come to fruition.*

Growing up in Detroit, **Floyd Wyczalek '46** was practically fated to work in the automobile industry. “In the 1930s, US automotive technology was equivalent to Silicon Valley,” he says. “And Detroit was the automobile capital of the world. Automobile technology was inescapable – you were immersed in it.” As a General Motors engineer in 1964, he was tapped to develop a space-age technology spun off from the Apollo moon landing: hydrogen fuel cells.

Eventually, he helped develop the first hydrogen fuel cell car (the GM Electrovan, in 1966); and the first commercial fuel cell vehicle will be released by GM and Honda in 2020. Along the way he has inspired a new generation of WPI students through the establishment of the Floyd A. Wyczalek Science and Engineering Technology Scholarship. “America faces a critical shortage of qualified STEM candidates,” he says. “Technical institutions are forced to seek applications to staff positions from offshore nations. Therefore it is incumbent upon WPI alumni to attract and inspire potential STEM undergraduates.”

Wyczalek showed promise in science from a young age; scoring at the top in a 7th grade IQ test caused him to be automatically transferred to Flint Technical High School, which focused on creating new recruits for the burgeoning

automobile industry. The outbreak of World War II sealed his career trajectory when he made it into a yearlong US Navy cadet officer training program at Dartmouth College. Successful graduates qualified for engineering programs at MIT or WPI, and Wyczalek chose the latter, completing six semesters in two years at WPI.

At WPI, he immersed himself in metallurgy, aerodynamics, machine design, and electrical engineering, graduating with a mechanical engineering degree in 1946. “That’s where I learned how to think and analyze challenges systematically,” he says. “The WPI two-year period established a ‘magnetic center’ that attracted and continues to determine all events.”

Based on the prestige of his degree, he was hired to teach engineering upon his return to Michigan at Lawrence Technological University and the University of Detroit, even as he started working at GM Research Laboratories. “WPI’s reputation as a prestigious STEM-focused university was highly respected throughout the academic world,” he says.

In the early 1960s, GM created a program to explore the possibility of a zero-emissions vehicle. The staff at the GM technical center responded by proposing two projects: a battery-powered electric vehicle based on a Chevy Corvair, and a hydrogen fuel-cell vehicle based on a GM Handi-Van that would be called the Electrovan.

To head the latter project, chief engineer Craig Marks tapped

Wyczalek, who had to oversee construction of a fuel-cell powertrain simulator development test facility, as well as training a team of test engineers and technicians. “Except for principal engineering staff leadership,” he says, “most of the engineering team were not familiar with fuel cells.”

Wyczalek took the team of engineers to Pratt & Whitney, which was then developing fuel cells for use in the Apollo Project, the “moon-shot” launched by President John F. Kennedy to put a man on the moon by the end of the decade. Batteries then available didn’t have the capacity to provide electricity for life support and communications for the lunar module. The fuel cells module would create energy from a reaction of hydrogen and oxygen, producing only heat and water as byproducts.

The fuel cells Pratt & Whitney designed, however, were too large and bulky to fit on a van, so Wyczalek created a joint project with Union Carbide to shrink them down into an acceptable size. They began the project in earnest in January 1966, with just 10 months to produce a drivable van in time for an international trade show in October. Eventually Wyczalek was overseeing a team of 200 people working in three shifts to develop the van, which rolled out of the plant in time for its triumphant test drive.

The final prototype had 32 fuel-cell modules lining the entire bottom of the van, with two large tanks of oxygen and hydrogen in back. It was able to travel an impres-

sive 70 miles an hour, with a range of 150 miles. But with a weight of over 7,000 lbs., acceleration was poor. The high costs of platinum needed to create the system, as well as safety concerns about hydrogen catching fire, shelved the project soon after, and the Electrovan went into storage in a warehouse for more than 30 years.

Starting in 2000, however, GM revived its fuel-cell program, and rediscovered the Electrovan, which it now proudly displays in a museum in Sterling Heights, Mich. Since then, the company has produced 11 fuel-cell prototypes, including the Chevy Colorado ZH2 pickup truck, which the US Army will subject to extensive testing this year. The Electrovan has served as an early model for fuel-cell vehicles now under limited production by Hyundai and Toyota.

Last year, GM announced a project with Honda to create a new fuel-cell manufacturing plant in Brownstown, Mich., that could produce vehicles for commercial ownership as soon as 2020. Wyczalek hopes to participate in the dedication ceremony for the plant, a fitting testament to the innovative project he helped launch and bring to fruition five decades ago. “I continue to reflect and marvel with wonder and humility at opportunities that continue to materialize unexpectedly,” he says. “What really matters is intense homework, subconscious intuition, literature research, and pure luck.”

—Michael Blanding

# ALUMNI WEEKEND

## MAY 31-JUNE 3, 2018

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## CELEBRATING YOUR PAST



## COME BACK FOR ALUMNI WEEKEND

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Nearly 1,000 alumni and friends come back to Worcester each year for Alumni Weekend. Don't miss out on these great events, and much more, in 2018.

- Alumni Weekend Golf Tournament
- 50-Year Associates Reception & Dinner
- Alumni Weekend Luncheon & Awards Ceremony
- WPI After Hours
- Special events for Reunion Classes ending in 3 and 8

*"It was great fun seeing classmates from the past.  
We had a lot of fun, and a lot of good memories."  
– Edward Siegel '66*

Find out more and register at [wpi.edu/+alumniweekend](http://wpi.edu/+alumniweekend).  
Pre-registration closes May 23  
**#WPIalumniweekend**



## A Celebration of Giving

At the 2017 holiday concert, it took five full rows of Alden Hall seating to accommodate a group of WPI Giving Societies members and their guests – their ranks displaying the generosity of the university’s most loyal supporters.

The annual concert, directed by Douglas Weeks and Joshua Rohde and featuring the WPI Orchestra, Brass Ensemble, and Festival Chorus, served as an opportunity for alumni to spend time on campus and interact with a talented student body.

In recognition of leadership philanthropy, the evening also included WPI Giving Societies receptions hosted in the Bartlett Center, with the post-concert reception allowing guests to interact with many of the evening’s student musicians and vocalists.

“My wife, Sarah, and I are frequent visitors to WPI because the university is and has always been a big part of our lives,” said Joe Ribeiro ’58 when asked what prompted their visit. Similarly, Timothy French ’73 said, “I feel like I have been connected to WPI since my very first step on campus and although work and family didn’t always allow for frequent visits, Elizabeth and I are at a point in our lives where we can be more involved.”

WPI Giving Societies is made up of six recognition groups in which, through philanthropy, members advance the university by supporting the students, enriching the faculty, and strengthening academic and research programs, in addition to enhancing campus living and learning spaces.

—Sira A. Naras

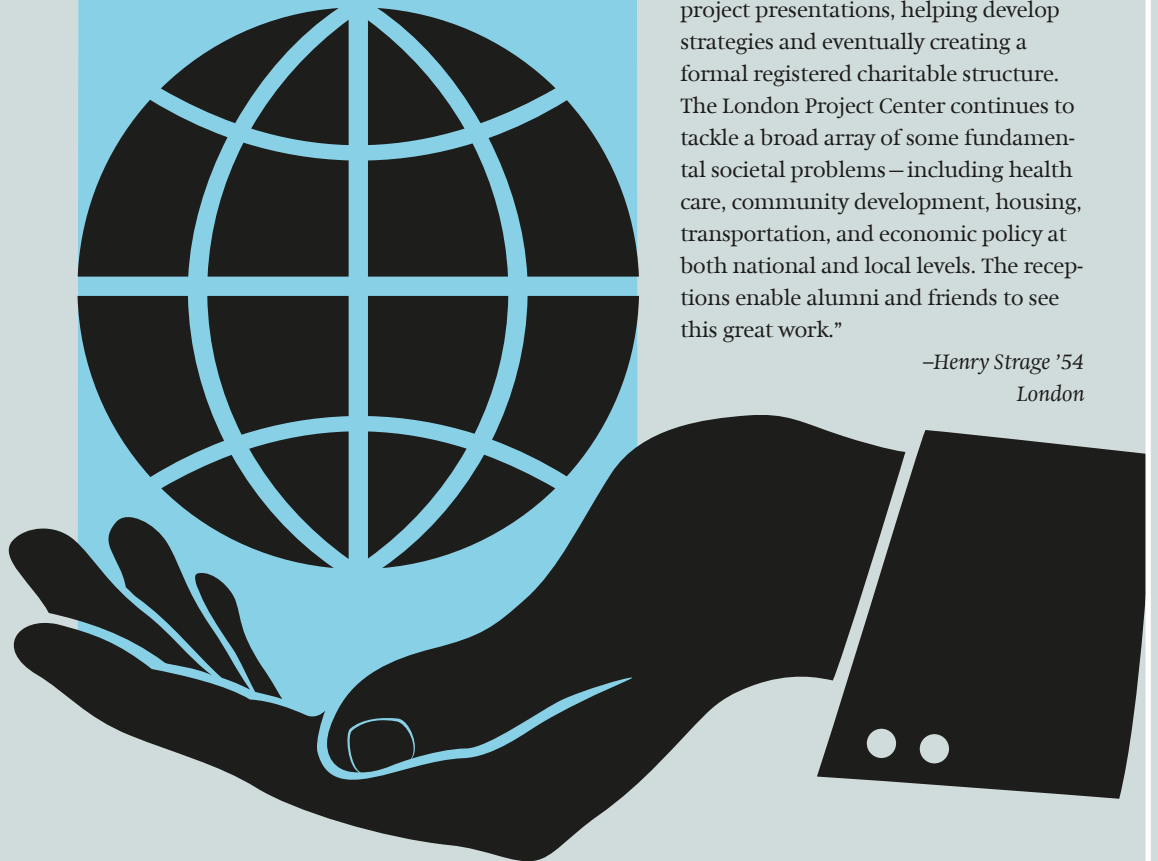
OVER  
[EARLE*bridge*]

# Project Center Experiences

## 2017–18 PROJECT CENTER RECEPTIONS

BANGKOK  
BOSTON  
HONG KONG  
LONDON  
NASHUA, N.H.  
PANAMA  
SILICON VALLEY  
SWITZERLAND  
WASHINGTON, D.C.

The signature element of a WPI education is hands-on, project-based learning, and the centerpiece of that education is often the Interactive Qualifying Project. For many, it is a life-changing experience, one where students are challenged to work together, solve a real-world problem, and potentially live in a different part of the country or world. At the end of each term, students studying at select project centers have the opportunity to present their projects to alumni, parents, and friends. Alumni attend these receptions to reconnect to their own project center experiences and to learn about the problems current students are analyzing and helping solve—all aimed at making the world a better place.



“So much of what is better and what is different about Worcester is a direct result of our relationship with WPI.”

—Rep. Jim McGovern (D-MA)  
Washington, DC

“The project center reception is a great way to stay connected while learning about the projects students are doing in my area. I go so I can meet new alumni in the area, learn what companies people are working at, and reconnect with friends.”

—Jon Morgan '11  
Silicon Valley

“Since 1987 I have been privileged to provide help to the London Project Center from finding new projects, reviewing project presentations, helping develop strategies and eventually creating a formal registered charitable structure. The London Project Center continues to tackle a broad array of some fundamental societal problems—including health care, community development, housing, transportation, and economic policy at both national and local levels. The receptions enable alumni and friends to see this great work.”

—Henry Strage '54  
London

## A SAMPLING OF PROJECTS

*Risks from Sea Level Rise in Boston's Port Areas*  
*An Environmental Analysis of Pollution in the Informal Settlements Surrounding Rio Burunga*  
*Infant Sleep Environment Product Safety Analysis*  
*Improving Guidance Systems for Patent Applicants*  
*Business Adaptation in the Swiss Energy Sector*



PHOTOGRAPHY TANNER COLVIN

When **Matt Oney '90**, came to WPI to pursue an electrical engineering degree, he recalls not thinking much beyond how much fun it would be to work with stereo sound systems. Little did he realize that his athletic pursuits also would drive his future career as mentor, teacher, and coach.

The USAW Gold-certified instructor is currently head wrestling coach at Kansas Wesleyan University. Oney says the impact of WPI upon his life can, by degrees, be traced back to the guidance of now retired coach Phil Grebinar, who steered the wrestling program at WPI for 33 years.

“I truly believe,” he says, “that my successes and my failures at WPI—on the mat and in the classroom—have helped me continue to develop as a coach, and never stop learning.”

Oney had taught math and wrestling at Punahou School in Honolulu for 23 years, due in part to a mentoring pilot program designed to draw new teachers and nontraditional professionals into the teaching field.

Referring to his time in Hawaii, he says that “without the understanding that I sometimes need to ask for help and accept support from those more knowledgeable and experienced than I—which I developed during my time at WPI—I would never have been able to succeed in a teaching/coaching role at an established academic institution like Punahou School.”

Sharing lessons he learned through his own experiences as a student-athlete, Oney says he tries to stress to his students the importance of balancing academics and athletics. He monitors two mandatory study halls for his athletes each week, he discusses grade reports with individual team members weekly, and he encourages his athletes to seek help and plan workouts around their studies.

“I also remind them that earning their degree is a higher priority while at college than winning wrestling matches, and that ultimately they are the ones who need to do the work and put themselves in the best position to succeed.”

When asked what collegiate lessons he still carries with him, Oney says he has a full cache from those days. One that stands out, one he shares with his current students, is that awards and accomplishments will eventually gather dust to be packed in a box with every move.

“It’s the relationships the students develop with coaches and teammates while collectively striving for greatness within each other that will never fade,” he says. “That will always remain the most valuable lesson from these experiences.”

# Alumni Benefits & Resources

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 scholarships.

More at [wpi.edu/+alumni](http://wpi.edu/+alumni)



## CENTENNIAL WALKWAY

Leave your mark  
[wpi.edu/+bricks](http://wpi.edu/+bricks)



## INSURANCE PROGRAM

Great prices on insurance products  
[wpi.edu/+alumnibenefits](http://wpi.edu/+alumnibenefits)



## ALUMNI CAREER SERVICES

Free—for life  
[wpi.edu/+alumniCareers](http://wpi.edu/+alumniCareers)



## WPI RING PROGRAM

Your connection to WPI tradition  
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## GORDON LIBRARY

Lifetime access  
[wpi.edu/+library](http://wpi.edu/+library)



## ALUMNI DIRECTORY

A global network of more than 38,000  
[wpi.edu/+alumnibenefits](http://wpi.edu/+alumnibenefits)



## WPI MERCHANDISE

Show your WPI pride in style  
[wpi.edu/+alumnimerchandise](http://wpi.edu/+alumnimerchandise)

## 1946

**Bob Ballard** was the subject of a recent Derby Spotlight profile by the International Soap Box Derby organization. According to the article, he was born to be an engineer. “The moment he set foot on the Derby track his fate was aligned.” As kids, he and his brother participated in Derby racing with help from their father. Bob grew up and became a draftsman for General Motors, where he worked at styling new cars, including hood ornaments, interiors, and headlights for Oldsmobile, Chevrolet, Cadillac, and Pontiac vehicles. “This was especially exciting for Bob since he had access to the car studios, meaning he was up-to-date on all the new car designs coming out.” The story concludes, “Even though Bob is retired, we hope his story inspires other youth to pursue an exciting career in a fast-growing STEM field.” ▶



healthy, willing, and able! Life has been good and we are blessed!”

**Bill Rabinovitch** was featured in a Facebook video that referenced his WPI background. “It includes an image of a six-page feature article from *WPI Journal*, besides reflecting my days as an Air Force jet pilot,” he writes. He traced his transition from aspiring engineer to jet pilot to SoHo artist in an *ArtNet* feature called “How being a jet pilot prepared me for a life in art.” He says, “My adventures in cutting-edge image making continue daily on Facebook, where I interact with a great many about the arts. There’s a feature film being made about me with a book about my career.”

## 1951

**Lee Bassett** writes, “I’ve been retired from Skil Power Tools for 20 years. Became busy playing piano at two Chicago suburban restaurants, three years at each. Active with the local Park District managing Eagle Scout projects. Resident now at a Del Webb retirement community in Mundelein, Ill., where my harmonica-playing partner and I for the last six years have been presenting monthly programs titled ‘Music Memories.’ Health reasonably good ‘for my age,’ as they say.”

to make an 800-mile tour of the NW mountains there. Having donated my DNA to Dr. George Church’s quest for thousands of volunteers to submit samples for use by scientists all over the world, I regret the fact that genetics should have been in my studies at WPI. My generation just missed that, as well as the growth of computers.”

may not have gone where we intended to go, but we think we have ended up where we needed to be.”

## 1959

**Peter Bertsch** writes from Wolfeboro, N.H., “After 40 years of R&D work for Brown University (ScM ’62), Union Carbide, and other companies, Mary and I have enjoyed almost 18 years of retirement. Sorry to hear about Don Bottomley’s passing.”

## 1953

In mid-January, **David Hathaway** reported, “At this time, Harriet and I are practically snowbound in Bedford, Mass., during the blizzard of 2018. Carleton Willard Village seemed like the nicest retirement for us, and we are still close to Boston and near Worcester. No garages for my two BMW cycles, but friends have loaned us storage. My last trip was in the state of Washington. My son and I flew out, rented motorcycles, and joined his son-in-law, so three generations were able

## 1957

**Jack Daly** writes, “As a continuation of community service since retirement, including current and ongoing local condominium board positions in both Mystic, Conn., and Longboat Key, Fla., I am serving my second publicly elected term as a commissioner for the Town of Longboat Key. This has enabled me to evolve my WPI and professional career experiences in order to add such values to the lifestyles in the communities that I continue to enjoy. Among the many positives, these community roles present ongoing opportunities to influence positive changes now and in the future.”

**Spike Vrusho** writes, “I served as fundraising chair for my Unitarian Universalist Fellowship in Vero Beach, Fla., where my committee has raised over \$25,000. I also helped the Hope for Families Center raise money via an annual Top Chef competition, and I work with the Gifford Youth Orchestra, an African-American string orchestra whose mission is More Violins—Less Violence—Better Tomorrows, and whose motto is Each One Teach One, and whose teen theme is Off The Street—On The Stage.”

## 1961

**Jim Kachadorian** writes, “**Ned Rowe** and I have traveled extensively together over our 60-year friendship, including a month-long trip to Armenia and Iran this past fall. Very educational. We traveled with my wife, Lea, and Ned’s wife, Barbara.”

**Tom Pantages** shares, “After the example of my classmate, Mo Rees, I have established a scholarship for WPI students in honor of my late grandmother, Agorou Gatzoulis Zecy.”

## 1958

**Bill Hopf** writes, “After 29 years in my second professional career as a CEO coach with my own consulting business in Jacksonville, Fla., I have made a big transition step by selling my business to a very capable associate who is moving to Jacksonville from Pennsylvania. I am now looking forward to the freedom to travel with Sandy, visiting grandchildren and great-grandchildren who are scattered around the world. We look forward to the many opportunities ahead while still

## 1962

**Christopher Jacobs** went on to receive a PhD in biomedical engineering. He now has a company, Genteel LLC, that makes and sells a device called Genteel, for those with diabetes or any other disease that requires repeatedly drawing a drop of blood for testing. He writes, “This device is the only one in the world both FDA and CE cleared to be able to

**Boakfar Ketunuti** writes, “The world out there is ours to do as we like after the 1957 graduation. We can go and make changes as much as we want. We

[ CLASSnotes ]

painlessly draw blood from anywhere on the body, as well as from fingers. I am looking for business partners and can be contacted at 432-559-7013. Check out our website at mygenteel.com.”

**Steve Wells** comments, “It’s as hard to keep up with technology and history today as it was in ’62. But in many ways more fun.”

## 1963

**Bob Magnant** reports that his latest iBook has expanded, and Apple has upgraded *The Future Is at Your Fingertips* on iTunes for Mac, iPhone, and iPad users. “I have also reset the price to ‘Free’ to facilitate this and promote the broad distribution for everyone,” he writes. “I am continuing to study all sides of the iPhone/Internet issues and trying to connect with anyone who has similar inclinations. All questions, comments, or suggestions that you send to me will be accepted and pursued.”

## 1964

**George Hammond** writes, “Hello, Whoopie Tech, you were the smartest people I ever met in life. I’m wondering what you might think of this for a U.S. strategy?” After running through various scenarios of nuclear war between the United States and North Korea, George proposes “I say we reformulate M.A.D. (Mutually Assured Destruction). Russia and China should join us in a Superpower Triumvirate and demand North Korea give up nuclear weapons. If not, they’re on notice that M.A.D. now includes the contingency of a Korean ICBM. We were surprised on Dec. 7 and Sept. 11, but not this time!” He adds, “BTW, I went on to take an MS at N.U. in ’67 and am currently a writer.”

**Bruce Maccabee** has published his fifth book on UFOs. He writes, “*Three Minutes in June: the UFO Sighting that Changed the World* is the most complete analysis and discussion of the June 24, 1947, sighting

that gave us the internationally known term, ‘flying saucer.’ My analysis of the details of the sighting by Kenneth Arnold shows that what he reported seeing has never been explained and appears to be technology not known to mankind, such as indicated by the recent Navy encounters reported in the *New York Times* in December. The book is available on Amazon.”

## 1965

The Faculty Speaker Series at St. Johnsbury Academy featured **Gene Dionne** (St. Johnsbury ’61), a former vice president at Lockheed Martin. He spoke about his career in classified defense programs, including research, development, and acquisition of space technologies. Gene concluded his career as director of space and missile technologies at Phillips Laboratory in Albuquerque. He is also a retired colonel with 26 years of service in the U.S. Air Force.

**Gerald Kaplan** shares, “One of my most enjoyable and rewarding retirement experiences has been teaching inner city grammar school students karate. (I have a black belt in tai kwon do.) In addition to teaching kicks/blocks/boxing, I talk to them about the importance of courtesy, respect, and education.”

## 1966

SAE Fraternity brothers **Gary Dyckman**, **Joe Ferrantino ’67**, and **Wayne Blanchard ’68** gathered once again in Georgia for their annual golf competition last March. “This was our 12th year staying with Joe at his winter home in St. Marys for this weeklong event,” Gary reports. “We are not hitting the ball as long as we would like, but still enjoy the game and, more important, our friendship going back to when we first met as freshmen in 1962.”

**Phil Hopkinson** writes, “It’s been some time since our 50th Class Reunion, but I





continue to think fondly of WPI and the many friends that I had, and of great instructors like Bill Grogan. I still have not figured out how to retire and am quite active running my consulting business, HVOLT Inc., doing power transformer consulting worldwide. I also continue to be active in the Industry Standards section at IEEE, where I am a Life Fellow, as well as in NEMA and IEC, where I am technical adviser to the US National Committee for TC 14 Power Transformers, a position that I have held since 1996. In December I received the IEEE Standards Association Lifetime Achievement Award. I am the fifth recipient of the award. Interestingly, the first winner was a gentleman named Joe Koepfinger, now 92 years old, that I have actually known for around 30 years. It surprised me that Joe was at the awards banquet. Like me, he has not figured out how to retire!"

**Pete Sommer** writes, "I retired from Phillips Lytle LLP in 2010, and am enjoying my eighth year of retirement. We have a new Australian Shepherd puppy who is pretty entertaining. My son, Drew, is the third generation of patent lawyers in the Sommer family. He recently posted registration certificates for my dad, myself, and himself."

## 1967

◀ Former ice hockey stars **Dusty Klauber** and **Mark Macaulay '89** cheered on the WPI team at the home opener. The Nov. 5 game at the new Worcester Ice Center marked the first time WPI had played in the city in 30 years. Dusty notes, "I played JV hockey in the '60s and one memory that sticks with me is a practice we had at the old Worcester Arena near the Clark campus. In the middle of practice, the Great Blackout of 1966 left us all skating around in absolute darkness. Needless to say, practice ended abruptly that night."

"The opener against Tufts was close-fought for the first period, which ended tied at 2-2. WPI went on a tear in the second period, scoring 8 unanswered goals to put it away, beating Tufts 12-4. The new arena is a great venue. Good viewing from a heated seating area high above the ice." Dusty adds, "Mark is on the Citations

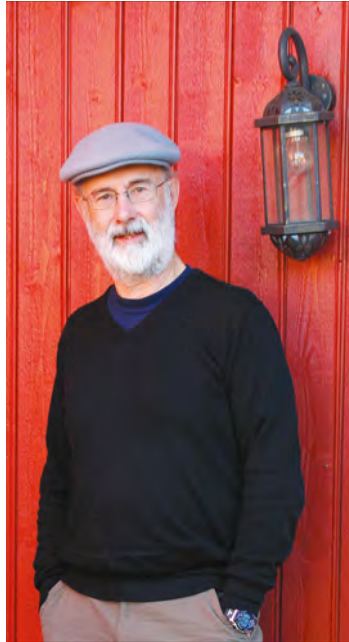
Committee that I chair, and he has kept me abreast of the hockey program at Tech for many years now." Mark's son, Patrick, scored the first goal in the opener.

## 1968

**Jack Holmes** writes, "I retired from teaching chemistry, physics, and other high school science subjects in 2006. For the past dozen years I have been pursuing a second career as a traveling photographer. I maintain a studio-gallery at Western Avenue Studios, in Lowell, Mass., where I prepare my wall art travel images and digital travelogues." ▶

**Germán Perez-Mera** writes, "Married in 1970 a beautiful Connecticut girl named Donna. Do not have children, but have managed to breed and show dogs and Paso Fino horses. Travel to Central and South America and the Caribbean. Worked for 30 years as a civil engineer in the Dominican Republic and in Houston. At present I live in Santo Domingo and am semi-retired, as Donna and I have a translation company, SD Language Solutions S.R.L. (Spanish-English), doing legal, technical, book translations, etc. In my 74 years I have had some health issues: a left hip replacement, kidney stones, and cervical and lumbar surgery, which have impaired some mobility, but I remain as stoic as ever. As a hobby I am teaching baseball pitching mechanics to young boys from the barrios in Santo Domingo north. Donna and I are planning to visit Worcester Tech for the 50-year graduation celebration. Hope to see some of you there."

**Scott Wilson** writes, "I've been retired for going on four years, living in Arlington, Va., keeping fit (swimming, running, biking), trying to slow down the decay process. I've also been umpiring and refereeing wrestling (third year for both), which isn't easy, but has been surprisingly fulfilling. Once my wife fully retires (???), I hope to travel a lot more. Our SAE class has been getting together, the latest at the home of **Jack Barkus** in Auburn. We see my brother, **John '65** quite a bit as well, and periodically get together with **Dave Gumbley**, **Dave Andersen**, and **Richard Fortier**. Here's hoping the 50th Reunion is fun."



## 1969

**Peter Heins** writes, "It's 52°F at my house, with dry pavement here in SoCal, the morning after the big blizzard of January 4, 2018, in New England. We have had had only .09 inches of rain since September first, but the last vestiges of the 'Thomas Fire' have mostly burned out now. I've been retired from flying at Delta Air Lines for 11 years."

## 1971

**Abbas Salim** retired from Lockheed Martin Corp. in September 2010. "However, I am continuing to work for the company as a casual employee," he notes. "I'm also advising a young team (a start-up) from India competing for the Google Lunar XPRIZE. The task is to send a rover to the moon and drive it half a kilometer on the surface of the moon while taking pictures of the surroundings. Finished late last year, authoring a chapter on Spacecraft Power Systems to be published in a McGraw-Hill *Aerospace Engineering Handbook*. First edition is expected to be available in the February/March 2018 time frame. Continuing as an Aerospace Power Systems topic area organizer for the Propulsion & Energy Conference

(earlier known as Inter-society Energy Conversion Engineering Conference). I have led this effort for several years."

**Dave True** and his wife, Mary, are hauling their trailer south to Bradenton, Fla., for the winter. "Will be kayaking and bicycling, as well as doing some serious birding," he writes. "Since retiring from National Grid in 2004, I have been teaching chemistry, physical science, and fire dynamics at Bristol Community College."

## 1973

**Dean Kamen** was featured in an *Industry Week* article, "Creating a Life-Saving Industry—Regenerative Manufacturing."

## 1974

**Ken Charak** sends this report: "After having retired from both Procter & Gamble (28 years) and Johnson & Johnson (11 years), my lovely wife, Adrienne, and I recently sold our home in Cincinnati and relocated to Naples, Fla. Loving retirement life in the Sunshine State with days filled with tennis, golf, and for the most part just having fun. Kind of like going to Adult Camp every day! All that said, I will never forget the awesome four years at WPI and Phi Gamma Delta, which in hindsight were instrumental in making all this possible!"

## 1975

**Wilson Dobson** sends word of "WPI at the Froshinn Club in Shrewsbury, Mass., ballroom dancing and plotting to take over the world." The group included **Roland Beauregard '62**, **Amy Schneider '77**, **Dobson**, and **Richard Kirk '73**.

**Nelson Marquina** is founder and president of USA Laser Biotech. He has given presentations on laser physics and laser therapy in the United States, Asia, and South America. In a recent trip to Japan he explained the use of this as a first option for providing pain relief and disease treatment, rather than opioids, surgical interventions, or other medications.

**Judy Nitsch's** company, Nitsch Engineering, was one *The Boston Globe's* Top Women-Led Businesses in Massachusetts for 2017. WPI also made the list.

**Mike Parker** retired from FEMA on Nov. 30, after nearly 11 years as a federal coordinating officer. "In that time, I was deployed for over 2,600 days coordinating federal responses to over 40 disasters in 14 states and 21 reservations. Now I've found myself being called to do something else. After recent nursing home deaths, I'm particularly concerned with providing continuity of care for patients and staff in the face of an emergency in hospice agencies—maybe there's some way that I can assist with their preparedness. Planning on continuing or ramping up with my volunteer activities (We Honor Veterans, FIRST, ICA, Team Rubicon, Warriors' Ascent). Also going back to school full-time at BU, to pursue an MS in healthcare emergency management. Other than that, and in addition to traveling, there will be plenty of things to keep me occupied here at home in Kansas. The adventure and the journey continues!"



**Steven Sweeney** writes, "I retired from the Department of Defense on Jan. 6, 2018, after combined service of 46 years in the United States Marine Corps and as a civilian. I worked for various defense acquisition agencies as chief engineer, engineering supervisor, and staff engineer. In addition to my BS in management engineering from

WPI, I also earned four more college degrees, including an MS in mechanical engineering from Western New England College, and an MBA from the University of Hartford. I now plan to look for part-time work, volunteering in the community, visiting family across the country, traveling, and running. I qualified for and ran three Boston Marathons."

## 1976

**Bob Cormier** writes, "After a successful 39-year career in the civil engineering/land surveying profession (32 years as president of Cuoco & Cormier Engineering, Nashua, N.H., and Tewksbury, Mass.), I retired in 2015. Since that time, to keep busy and active in early retirement, I have been working for Silva Associates in Tewksbury as a property manager. (I have 22 +/- years of experience serving on several condominium boards). I have also been doing some temporary part-time plan review work for the city engineer in Nashua. Our family has grown—our sons, Todd and Brian, have gotten married (2013 and 2017). Todd has a 2-year-old son and a baby daughter expected in May 2018. Life has been busy and rewarding. I would love to hear from classmates."

## 1977

**Andy Clancy** attended the 2017 Cable-Tec Expo in Denver, and had a "close and great encounter" with the Fall 2017 issue of the *WPI Journal*: Robert Cruickshank '83. "I am looking forward to working with him and NREL to take renewable energy resources beyond the next level," Andy writes. Read all about it in his Letter to the Editor on page 2.



**Gary Loeb** retired from Exelon Corp. in 2016, after 39 years in the electric generation industry. Upon retirement, Gary and his wife moved to Peoria, Ariz., a suburb of Phoenix, where he volunteers as a docent for the Challenger Space Center. As one of his fraternity's charter members, Gary remains active "from a distance" in WPI's Pi Tau Chapter of Zeta Psi, and attended its 40th Founders Day in Worcester in April 2016.



## 1978

**John Bourassa** is a test engineer with EOIR Technologies, a Polaris Alpha Company in Aberdeen, Md.

**John Moulton** writes, "I retired at the end of the year after 39 years in the auto industry and international assignments in Germany and China. Robin and I have moved to our new home on Lake Keowee near Greenville, S.C. Would be great to have visits from my ATO brothers here in SC."

## 1979

**Fred Gonzalez** writes, "I retired from GL&V Inc. in September 2010 and moved to Venezuela, where I still reside. Planning on moving back to the U.S. in the near future."

**Joseph Kolis** is the Tobey-Beaudrot Professor of Chemistry at Clemson University in South Carolina, where he has taught inorganic chemistry since 1985. The Kolis lab at Clemson focuses on the synthesis and chemistry

of novel inorganic compounds, particularly those reactions that occur under very high temperatures and pressures or in unusual solvents.

◀ **Frank Maldari** sends this report of a day on the Charles. "WPI alumni rowers and friends of WPI Crew got together to row a mixed eight in the 53rd running of the Head of the Charles Regatta, a two-day event that attracts over 11,000 rowers worldwide to compete on the very picturesque and challenging Charles River in Boston. The weather was perfect and our team posted respectable results in the Directors Challenge Mixed 8 event. Coxing our boat was **Amy (Jackson) Michaud '06**, with rowers **Brandt Bonin '82**, **Mary White '83**, **Christine (Olson) O'Toole '85**, **John Lombardi '90**, **Peter Tousignant '90**, **Ruth Sweeney '92**, and me, plus 'Friend of WPI Crew' Kathryn Acciari. We hope to enter another boat next year." Photo Courtesy Sports Graphics.

## 1981

**Marc Trudeau's** employer, SimpliVity, was acquired last year by Hewlett Packard Enterprise. He's been promoted to Agile Coach, serving teams and packs of teams, and contributing to HPE's organizational-level Agile transformation. "I continue to experiment with gamifying work and event facilitation, most recently facilitating successful Open Space Technology events (OpenSpaceWorld.org) to accelerate change through invitation. I also recently secured the LikeBreathin.com domain, because (team)work done well should be easy, 'like breathin'! Who knows where that might lead?" Marc extends an invitation to all alums to Agile Games 2018 and Mob Programming 2018 in Burlington, Mass., in April.

## 1982

**Michael Grady** was inducted into the Athletic Hall of Fame at Bishop Fenwick High School, where he ran track and cross country. He holds school records in the 50-yard hurdles, the indoor high jump, the 120-yard high hurdles, and the 110 hurdles.

On Sept. 9, 2017, **Steve Kaneb** was ordained as a permanent deacon for the Roman Catholic Diocese of Manchester,

N.H. Bishop Peter Libasci has assigned him to serve Our Lady of the Miraculous Medal Parish in Hampton. One week after his ordination, Steve officiated at the wedding of his son, Kevin, to Corrine Winter.



**George Oliver** assumed the title of president at Johnson Controls in September 2017. As the former chief executive officer of Tyco, until its merger with Johnson Controls, he led the integration of the two companies.

## 1983

**Don Montgomery** shares, "My granddaughter, Dakota Jae, turned 3 in September. My wife, Denise, and I now live in a 150-year-old house on Cape Cod that we are (slowly) restoring and improving, including lifting the entire structure and putting a modern, full basement under it. I'm still a partner in WinGreen Marketing Systems."

## 1984

**Mark Hasso (MS CE, '86 PhD)** writes, "I am delighted to report that I was recognized by the Construction Management Association of America as a Fellow of the College of Fellows." The Fellow designation is the highest honor that CMAA bestows on an individual." Mark is a professor in the Department of Construction Management at Wentworth Institute of Technology.

**Scott Rudge** is co-author of a Biotechnology chapter in the latest edition of Perry's Chemical Engineers' Handbook. He relates that he remembers when he bought his edition in 1980 at the insistence of the late Professor Bob Wagner.

## 1986

**Jim Daly** is COO of Sea Machines Robotics, a Boston-based company that specializes in smart ship technology and is building autonomous control systems for commercial vessels with the goal of smarter, safer, and more efficient marine operations.

**Jasmohan Singh** writes, "I am the managing director of Frick India, an industrial refrigeration company manufacturing out of India. Married to Gona now for 28 years. Have one boy, 23, doing law school. I've been in touch with **Edward Werner '87** and **Buddy Vincent '86**. Best wishes to all in '86 and '87."

## 1987

**Patrick Bannon** was promoted to vice president and general manager at RBC Bearings in Oxford, Conn. A 26-year veteran of the company, he is responsible for the business management as well as manufacturing operations of a number of significant business units.

**Emilio Sacristan Rock** writes, "I was awarded the 2017 Mexican National Prize for Science, in the field of technology, innovation, and design, for my 'many innovations in biomedical engineering, [my] work in translating innovation to the healthcare sector, and for [my] contributions in the creation of Academia-Business research groups.' The prize is the highest Mexican recognition for scientists and is presented by Mexico's president. I'm currently chief executive officer of Nerve Inc., in Akron, Ohio, and director of the Mexican National Center for Medical Instrumentation and Imaging Research, CI3M, in Mexico City." Emilio's accomplishments include leading the project to create the first Mexican artificial heart Vitacor UVAD (Universal Ventricular Assist Device).

The WPI Alumni Association honored **Zhi Tan (PhD)** with a 2017 Goddard Award in recognition of his outstanding achievements in sales, e-commerce, and media business. Tan's work history includes China Chipcom, Microsoft China, and Northern Light Venture Capital, as well as other high-profile companies where he was instrumental in building sales, business partnerships, and revenues. President Laurie Leshin

and vice president for university advancement Bill McAvoy traveled to Beijing to present the award.

## 1990

**Michael Barone** led Mega Industry of Gorham, Maine, to a record \$2-million month in October of 2017. He started at Mega as operations manager in November 2015, after a 25-year career at Bath Iron Works as a shipbuilder. “Mega,



known for its Radio Frequency solutions, has grown from 47 to 95 employees in the last year,” he writes. Michael lives in Brunswick with his wife, Hillary, and their four children.

**Michelle Gass** is CEO of Kohl’s, where she previously served as chief merchandising and customer officer. She joined the company after holding top management positions at Starbucks.

**Mike Kentley** writes, “Continuing to work as a consultant in the computer chip and product development world. This year I am working on wildlife conservation, SoCs for wireless VR and hardware-enforced embedded security. My work has taken me to Taiwan, Texas, and Los Angeles this year. I’m using my day jobs to fund my own start-up activities in cybersecurity (usb-defender.com) and sextech (unatouch.com). Una Touch CEO (and my wife!) Dr. Kathy Hoyt attended our first trade show last January. Also, this year, I brewed the world’s most awesome Cascadian Dark Ale.”

**Karin (Ricci) Newman** reflects, “Hard to believe my daughter Emily will be graduating from WPI in May. She did her IQP abroad in Venice, and we were able to travel out as a family and spend Christmas 2016 and New Year’s 2017 in Venice and Florence. Many things at WPI have changed since I graduated but the education and experience are still among the best.”

## 1991 ▲

**Gerry Burns** took on the position of president of CIVIQ Smartscares, headquartered in Milford, Mass., last year. “CIVIQ is a fast-growing international Smart City technology and solutions company innovating for safer, more sustainable, and livable cities,” he writes. “Our people-centered, street-level interactive devices create a smarter infrastructure and stronger communities with free WiFi and Wayfinding, to mention a couple of features. Since my arrival we have hired three WPI alums: **Spenser Brouwer ’12**, **Geordie Folinas ’13**, and **Kyle Sweitzer ’15**. Today, we can be found in cities such as NYC, London, San Antonio, Toronto, Sydney, and Singapore. We are also expanding our market to include many private venues, such as sports complexes, hospitals, airports, and universities (like WPI!). We love to give tours of our facility, so feel free to reach out if you’d like one.”

**Loree Griffin Burns** released her newest children’s book, *Life on Surtsey: Iceland’s Upstart Island*, in November. It tells the

story of one of the newest pieces of earth on Earth, a tiny island formed in 1963 that started out as a lump of steaming lava and transformed into a thriving island ecosystem. Loree accompanied a team of scientists from the Icelandic Institute of Natural History to observe the island’s flora and fauna, to record changes, and to collect samples to bring back to the mainland for further study. The latest in the “Scientists in the Field” series, it was published by Houghton Mifflin Company. Read about her books and her adventures at [loreeburns.com](http://loreeburns.com).

## 1993

**Peter Cavallo** has completed 10 years as an adjunct professor with the ME department at Temple University, where he teaches fluid dynamics, aerodynamics, and compressible flows. He is a senior scientist with Combustion Research and Flow Technology, a small DoD and aerospace contractor specializing in computational fluid dynamics (CFD) research and code development, a position he has held for more than 20 years. Over that time, he has worked on aspects of the F-35 and V-22 programs, as well as the AIAA High Lift Prediction Workshops. His work on error transport models for the verification of CFD simulations was featured in a recent NASA publication, and his current research efforts for the Navy are focused on fluid-structural interactions and modeling tanker wake interference to improve manned flight simulators for training pilots in aerial refueling.

## 1995

**Charles Gillis**, a Continuing and Professional Education instructor at WPI, is the author of a new textbook, *Hammer’s Blueprint Reading Basics*, published by Industrial Press. He notes, “With the publication of this 4th edition, I take over ownership of a work begun by a seasoned professional with more than 50 years of experience in manufacturing. The late Warren Hammer originated the *Blueprint Reading Basics* book, and with this revision, his legacy lives on. The book is available in softcover and e-Book formats. An Instructor’s Resource Kit is sold separately.”

**Kevin Petrini** is a team leader for the UN Development Programme in Fiji. In November he traveled to Bonn, Germany, for the UN-hosted Conference of Parties (COP), the annual gathering that seeks to address ways to fight climate change and bring international attention to these issues. He holds a master’s degree in chemical engineering from the University of Colorado, where he focused on air quality modeling and atmospheric chemistry.

## 1996

**Eric Denoncourt**, of Keller Williams Realty North Central of Bolton and Leominster, Mass., is currently working with the company’s Coastal Land and Commercial Group in Portsmouth, N.H., to develop the Government Services Division for KW Commercial. The division will assist municipal, regional, county, state, and federal government entities to unlock the potential value of land and building assets within their portfolios. Members of the team already provide these services to MassDevelopment, school boards, utility organizations, and several municipalities throughout New England.

**Steven LaBranche** shares his triumph on completing the Grand Slam of Ultrarunning this summer, an endurance event that comprises four specific 100-mile ultramarathons spread over an 11-week period. “Races took place in California (Western States 100), Vermont (Vermont 100), Colorado (Leadville Trail 100), and Utah (Wasatch Front 100),” he writes. “Thirty-two runners started the first race, but only 11 finished the entire series. Since the competition started in 1986, only 310 individuals had completed the series in a summer. I am the second runner from Connecticut to finish it. Out of the 11 finishers, I had the 7th fastest time overall. My times for the individual races ranged from 23 hours to 31 hours. During the competition, I encountered over 20 miles of snow, temperatures over 100 degrees, river crossings, nighttime temps below freezing, mountain ascents and descents of over 1,200 feet per mile, and altitudes over 12,000 feet. All this to earn some fancy belt buckles and to demonstrate that human beings are limitless.”

## 1997

**Erik Thomas** made a run for mayor of Waterville, Maine, last year, but was unable to oust the incumbent. He is self-employed as a printmaker and concert promoter, and also works for Port City Music Hall and the State Theatre.

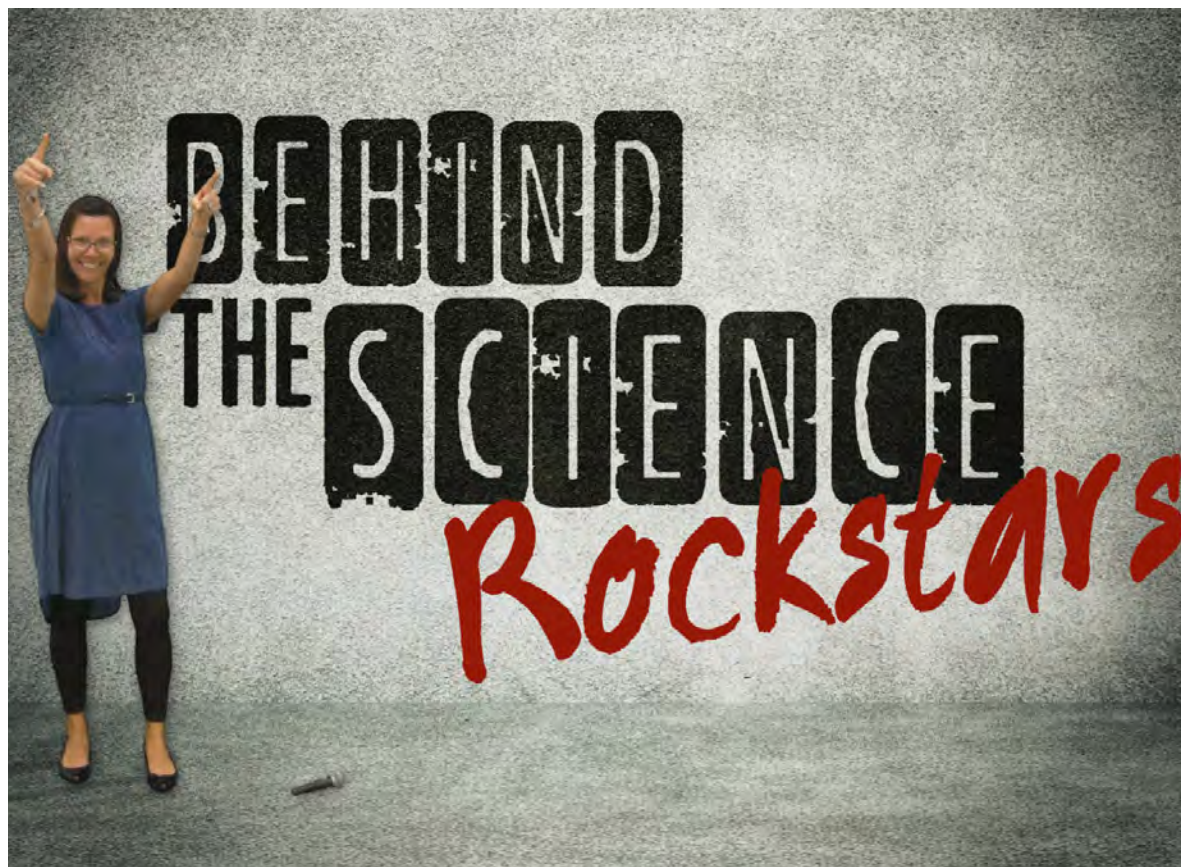
## 2000

**Nicole Buote** went on to veterinary school at Tufts after WPI and graduated with honors. "I then completed a rotating medicine/surgery internship at Angell Animal Medical Center in Boston, a surgical internship at Dallas Veterinary Surgical Center, and a surgical residency at the Animal Medical Center in Manhattan. Post residency, I joined a large specialty hospital in Los Angeles as a staff surgeon, and five years later was promoted to chief of surgery. Areas of interest include minimally invasive surgery and interventional radiology procedures. On a personal note, I celebrated our 10th wedding anniversary with my husband, Nathan, who is a critical care specialist. We have two sons."

**Lisa Granquist (SIM)** graduated in May 2017 with a PhD in Law and Public Policy from Northeastern University. "My fields are the governance, economics, regulatory environment, and resilience of coastal communities," she writes. "I completed a guest studentship at the Marine Policy Center, Woods Hole Oceanographic Institution, where I developed a spatial (GIS)-economic framework for analyzing the impacts of accelerated erosion caused by seawalls."

## 2001

**Jason Syversen** writes, "In 2016 I sold Siege Technologies, the cybersecurity company I started in 2009. At the end of 2018 I'll be moving into full-time investing, philanthropy, and some consulting/board work. The education I got at WPI in cryptography and security proved to be very timely as we were able to navigate the "cyber" boom and build a valuable company upon that expertise. Looking forward to engaging with the university and fellow WPI graduates in a new way later this year!"



## 2002

▲ **Jennifer (Kaska) Fournier** is the on-camera host of "Behind the Science," a scientific series produced by her employer, Waters Corp. "Each episode features a scientist explaining his or her work and describing how we used science to solve that problem," she explains. "For example, we did a local episode on colony collapse disorder, in which a scientist partnered with local bee farmers to investigate the link to a pesticide." She reports 1,100 viewers ("and growing"), and over a half-million views on YouTube and Facebook. "I have worked at Waters for over 12 years, starting a year after I got my MS at WPI. I began in the Life Science R&D group, then moved into manufacturing for a few years before becoming a product marketing manager. I am now director of product marketing for our Chemistry organization. Tune in on YouTube to see all the episodes."



## 2003

**Chris Cammack** recently reunited with **Bonniejean Boettcher '02** and **Tom Roy '05** in Worcester to show the Cammack kids the old stomping grounds. Two of the three like the idea of becoming future "Goats," according to Chris's wife, Jamie, who notes that the one hold-out was disappointed at the size of the Formula SAE "closet," and said he would reconsider if it moves out of the former materials room.

## 2004

◀ **Brian Landry** became a partner in the Boston office of Saul Ewing Arnstein & Lehr LLP. He assists clients of all sizes in protecting their intellectual property including patents, trademarks, and design rights relating to medical devices. He lives north of Boston with his wife and two children.



**Rodica Martin, MS ('06 PhD)**, a physicist at Montclair State University, is part of the LIGO (Laser Interferometer Gravitational-Wave Observatory) collaborative that detected the collision of neutron stars for the first time in 2017. The team's network of listening devices registered gravitational waves at roughly the same time that NASA's Fermi Gamma-ray Space Telescope detected a burst of gamma rays. Martin helped design and install upgrades to various components of the LIGO detectors, and continues to work on designs for future detectors to observe even more distant events or sources that are currently too weak to detect. She also contributes to [soundsofspacetime.org](http://soundsofspacetime.org), which is devoted to exploring the physics of gravitational waves via an analogy to audible sound.

**Erik Ross** writes, "I started a Service-Disabled Veteran-Owned Small Business for Federal Engineering Services in Simulations, Design, and Data Science.

Ross Consulting U.S. LLC in Winter Park, Fla., has had a presence in MicroStrategy World, ASCE, and ASME Fluids Engineering Division Conferences. We currently have an SBIR proposal for the DOE under review, and a few local clients in the Orlando area."

## 2005

**Jay Kramarczyk** is a district manager and principal engineer with Unified Investigations & Sciences, a nationwide forensic engineering firm. He and his wife (and daughter) have purchased his childhood home and are enjoying living back in New England.

## 2008

**Alexander Patkowski** writes, "I published papers in mathematics in journals, taught calculus at universities, and then decided to go into accounting/finance."

**Matthew Schulze** writes, "My wife and I are excited to attend our 10-year reunion this summer. We hope that the Class of 2008 makes a strong showing. In 2016 we celebrated our nuptials with many WPI grads. We were so fortunate to share our union with classmates **Arlly Dungca**, **Vincent Kan**, **Elizabeth Stewart** (now a professor at WPI), and **Ryan '09** and **Meghan (Labounty) Sottolano**, as well as **Brian Kuhn '05**, **Todd and Megan (Van der Kloot) Prokop** from the Class of 2007, **Zach Taillefer '11**, and **Elliott Wiegman**, and **Jan and Molly Lellman Keleher** from the Class of 2015.

## 2009

**Matthew Zagaja** writes, "I have been at the Metropolitan Area Planning Council for a year as lead web developer. We launched our first major product: Youth Match, a project built with the City of Boston to match young people to summer jobs for the mayor's summer jobs program. You can learn

more at [youthjobs.mapc.org](http://youthjobs.mapc.org). I also created a voter guide for local elections in Connecticut in conjunction with a local news website called CTNewsJunkie ([vote.ctnewsjunkie.com](http://vote.ctnewsjunkie.com)). In 2017 I volunteered over 200 hours of my time with Code for Boston and now serve on its leadership team along with **Liam Morley '10**.

## 2010

The WPI community gathered in Alden Memorial in August for a memorial service for **Ryan Sebastian**, who died June 15, 2017, after a long illness. He was also commemorated at the ice hockey team's season opener on Nov. 5, with the first puck dropped in his memory by his parents, Maria and Rich Sebastian. His jersey hung at every home game, with number 16 retired for the season.

**Alejandro Sola** reports from Long Island that that he has joined American Regent in Shirley, N.Y., as head of strategy and analytics.

## 2012

**Alfredo Barragan (MBA)** laced up his sneakers on Nov. 5 to run the New York City Marathon as a member of Team UNICEF. His appeal read, in part, “I am just days away from becoming a dad for the first time. I am dedicating this run to my future baby and to all those kids in need. My child is going to be lucky to be brought up in a warm and loving family, but becoming a future dad also made me realize that not all children have the same opportunities.” He completed the marathon with a finish time of 3:19, and exceeded his \$3,500 goal to raise a total of \$5,157 for UNICEF.

**Michael Gorgone and Audrey Blasius '14** send this update. “We met in 2011 at WPI through mutual friends, since then we have found great jobs, bought a house, adopted two dogs, and last June got engaged. We came back to do it and made sure we got a picture in front of our freshman year dorm. WPI taught us both so much, not on just an educational level but how to learn and grow without a classroom. We look forward to our wedding this coming June, just outside of Worcester.” ▶



**Alison Mendonca** writes, “It’s 2018, and many people are setting goals for themselves. What’s mine? To compete in and finish strong at IronMan Barcelona on Oct. 7. A 2.5-mile swim, 112-mile bike ride, 26.2-mile run—I’ve got this. Oh, and by the way, as of July 2017, I didn’t own a bike or know how to swim. See you out on the trails!” ◀

**Paul Ventimiglia** returned to campus in November to attend the Hall of Luminaries event. He works for a small Silicon Valley start-up called Robby Technologies, where he’s building sidewalk delivery robots to deliver packages for big companies like Amazon, or even groceries from Whole Foods via Instacart. In his spare time, he mentors high school students in the FIRST Robotics program. In an interview he reflected on his early influences.

“I’ve been interested in robotics and engineering since I was a kid,” he told an interviewer from WPI’s *Daily Herd*. “I was especially excited by watching movies—like *Star Wars* and *Terminator* and *Jurassic Park*—and I always wanted

to build the special effects that were in the movies. In middle school, I first built my big robot, a Battle Bot. It was 60 pounds.

Asked what he would do differently, he said, “If I had a chance to go back, I probably wouldn’t change a whole lot, except maybe have more fun.” Read the whole interview in the *Daily Herd* at [wpi.edu/news](http://wpi.edu/news).

**Christopher Zoto (PhD CH)** writes, “In 2017, I got three manuscripts published, two in the *Journal of Molecular Structure*, and one in the *Journal of Laboratory Chemical Education*, based on research that I conducted and was jointly involved in while in graduate school at WPI. After working for three and half years as a postdoctoral research fellow at the U.S. Army Natick Soldier Research, Development, and Engineering Center, I accepted an offer last August as an assistant professor of chemistry at Community College of Rhode Island, where I am currently teaching introductory-level chemistry courses.”

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“Not only did I get a great engineering education, I was given a second chance. It enabled me to have a rewarding career in manufacturing. I will always be grateful and hope that my small contribution will help other young people have the opportunities that I have had.”

-Roger Massey '62



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SOCIETY

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*in a life income gift?*

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IRA, or other retirement account?*

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accepting new members,  
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## FOR MORE INFORMATION

Contact Lynne Feraco  
Director of Planned Giving  
888-974-4438  
[lferaco@wpi.edu](mailto:lferaco@wpi.edu)





## 2013

After buying her first home last November, **Susie Brennan** ran her first marathon in Disney World. She is now managing Dell's renewable energy and greenhouse gas emissions program for its supply chain. ▼



**Alex Feng** reports that he moved to Wisconsin for work last year.

## 2014

**Aaron Birt** was selected for the *Forbes* 2018 "30 under 30" in the Manufacturing & Engineering category. He is a cofounder of Kinetic Batteries. His PhD research focused on commercializing Laser-Assisted Cold Spray, a manufacturing process that deposits metal powders at supersonic speeds onto laser heated surfaces. By applying the technology to the manufacturing process for lithium-ion battery manufacturing, he simplified the process and eliminated toxic solvents from the process. His start-up, Kinetic Batteries, received a \$40,000 grant to commercialize the technology. ►

**Joshua Croke** continues his work with Action!Worcester and Worcester Idea Lab, which recently added WPI to its membership roster. WPI began using the Idea Lab earlier in the fall semester, when Hurricane Maria prevented an IQP team from traveling to Puerto Rico. The students used the Idea Lab facilities to work on an aid project. The Idea Lab also secured \$104,000 in funding from the state agency MassDevelopment to build classroom space in downtown Worcester, just across from City Hall. "Worcester's very much a word-of-mouth town," Croke told *Worcester Business Journal*. "It takes a while to tap into that."

## 2015

**Mumtaz Abdullah Abdulahad Morad** writes, "I'm currently in charge of planning and overseeing the design process for a residential complex and following up on a construction project (a 23-story tower plus two basement levels) for the Al Gurg group in Dubai, UAE, as the as client's representative."

## 2016

**Katie Hedberg** and **Alex Kloze** have gone from living in Daniels Hall freshman year, to owning a home in Old Lyme, Conn., with their dog and cat, Acadia and Teddy. They report that a WPI wedding is in the works for June 2018. Alex is a design engineer at Solli Engineering in Monroe, and Katie has moved from Tighe & Bond to VN Engineers in North Haven, as a project engineer. "While we miss our time on The Hill, postgraduate life is going well," she says.

**Weijia Tao** won WPI's Kalenian Award for inventing a soft robotic hand with silicone "fingers" that can wrap around items to perform tasks that require fine motor skills, such as packing individual donuts into a box, or even grasping an egg without crushing it. She worked with ME assistant professor Cagdas Onal to develop the concept. She is employed at PowerHive LLC, a start-up in Natick, Mass.

**Murphy Wonsick (MS RBE)** is a doctoral student at Northeastern University, working with Taskin Padir, now an associate professor in Northeastern's electrical and computer engineering department, on a 6-foot, 290-pound humanoid robot prototype called Valkyrie, which will help astronauts and robots work together in space. Their work was highlighted on NU's news website.

## 2017

**Kimberly Coddling** and **Rupak Lamsal** celebrated their WPI love by getting engaged this past fall on the Cliff Walk in Newport, R.I. Meanwhile, they began their professional careers at Amgen and Liberty Mutual.

**Alexander Ruggiero** started work at Tesla's Gigafactory as a process technician.



## COMPLETED *careers*

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 jkmiller@wpi.edu or call 508-831-5998 to request further information.

**Charles Rich**, professor of computer science and a pioneer in artificial intelligence (AI) and human-computer interaction, died Jan. 3, 2018. Rich, who was also affiliated with the university's Interactive Media and Game Development, Learning Sciences and Technologies, and Robotics Engineering programs, joined the WPI faculty in 2007 having already earned widespread recognition for his work in artificial intelligence, software engineering, and human-computer interaction. His previous positions included principal research scientist at MIT and founding member and distinguished scientist at the Mitsubishi Electronic Research Laboratories (MERL).

With his wife, Candace Sidner, a research professor in computer science at WPI, he explored the use of AI to create artificial intelligent human companions that could emulate human verbal and nonverbal communications and collaborate in task and games. He brought to campus a humanoid robot named Melvin that he helped design while



at MERL, which became a platform for a wide range of research and undergraduate projects at WPI on human-robot collaboration. Rich and Sidner also collaborated on NSF research to build "always on" virtual agents that could provide round-the-clock support to the elderly in their homes.

A senior member of the Institute of Electrical and Electronics

Engineers (IEEE), Rich was elected a fellow of the Association for the Advancement of Artificial Intelligence in 1992. In addition his numerous honors and publications, he was known as an excellent classroom instructor who pioneered a number of new courses at WPI, including "Artificial Intelligence for Interactive Media and Games" and "Serious Games."

**William Hobey**, professor emeritus of chemistry, died Dec. 12, 2017. He was 82. A graduate of Tufts University and the California Institute of Technology, he received a fellowship for postdoctoral studies at Cambridge University in England with theoretician Andrew McLachlan. Hobey was also a fellow of the American Institute of Chemists and a member of Phi Beta Kappa and Sigma Xi.

He joined the WPI faculty in 1963 as an associate professor to teach

physical and theoretical chemistry. In time, his interests transitioned from understanding the mechanics of molecules and predicting their properties, to biochemical research in the areas of cellular membranes. He was instrumental in establishing the Department of Chemistry and Biochemistry at WPI. He advised numerous MQPs in the new major, and mentored new faculty members. He also procured grant funding from the National Science Foundation to equip the laboratories with critical

equipment for bioanalytical electrophoresis, and he put much work into maintaining the instruments. In the early years of the WPI Plan, he was a member of the Group for Integrated Studies that examined the Plan's implementation and called for greater connection between the humanities and sciences.

Hobey retired from WPI in 2005. He was predeceased by his wife of 54 years, Ruth (Duquette) Hobey, and is survived by their three children and a grandson.

KENNETH BLAISDELL '40 ME, ALPHA TAU OMEGA  
 WILLIAM PAULSEN '41 ME, THETA CHI  
 TED PIERSON '43 ME, PHI SIGMA KAPPA  
 JACK QUINLAN '45 ME  
 ARMAND COCCHIARO '46  
 GENE KOSSO '46 EE  
 FRED KULL '46 EE  
 DICK MARTIN '46 CHE, SIGMA PHI EPSILON  
 ROBERT ORRANGE '46 CHE, ALPHA TAU OMEGA  
 HOWARD COHEN '49 PH, ALPHA EPSILON PI  
 CARROL SMITH '49 EE, LAMBDA CHI ALPHA  
 GEORGE ENGMAN '50 EE  
 DICK DAVENPORT '52 EE  
 HARRY MANLEY '52 PH, MS EE, SIGMA ALPHA EPSILON  
 TOM BELLEW '53 ME  
 DICK MORTON '53 EE, SIGMA PHI EPSILON  
 DICK SAMOLIS '53 EE, PHI KAPPA THETA  
 MIKE ZUCKER '53 EE, ALPHA EPSILON PI  
 HOWARD LATIMER '54 ME, SIGMA ALPHA EPSILON  
 RICHARD VALINSKI '54, THETA CHI  
 BERNIE CAMPBELL '58 ME, SIGMA PHI EPSILON  
 JOSEPH DUDDY '58, TAU KAPPA EPSILON  
 RAY JOHNSON '58 ME  
 WILLIAM WESOLOWSKI '58 CH, LAMBDA CHI ALPHA  
 BRUCE PERSON '60  
 FRED SNIVELY '60 EE, '62 MS EE, ALPHA TAU OMEGA  
 HIRAM GIBBS '63 SIM  
 CHARLES DESIMONE '65 CHE, PHI KAPPA THETA  
 PHILIP GIANTRIS '65 CE, PHI GAMMA DELTA  
 GARY CASSERY '66 ME  
 DWIGHT BAKER '67 CE  
 CARL ENGSTROM '68 ME  
 JIM PALMER '68 CH, SIGMA ALPHA EPSILON  
 JIM HILLS '69 ME, SIM, PHI SIGMA KAPPA  
 GEORGIA DADOLY '70 MNS  
 RICHARD LINDSAY '70 ME MS  
 JAMES DRISCOLL '73 MSM  
 BILL GIUDICE '76 EE, '00 (HON.)  
 FORMER TRUSTEE  
 RICHARD ISAACS '76 TAU KAPPA EPSILON  
 PETER LIDDY '76 SIM  
 GEORGE CHAISSON '77 SIM  
 EDWIN SWIATEK '77 SIM  
 CHARLIE SULLIVAN '80 CE, THETA CHI  
 GENE FAULK '86 MNS  
 KEVIN HARTY '91 CS  
 MICHAEL KRUCZYNSKI '94 MAS  
 KEITH WARGAT '94 CHE, ZETA PSI  
 RALPH SMITH '96 MG MS  
 SAN-PING HO '03 PHD FPE  
 RYAN SEBASTIAN '10, '11 MS ME, PHI GAMMA DELTA

THE WPI COMMUNITY ALSO NOTES THE PASSING OF THESE FRIENDS OF THE UNIVERSITY:  
 KAY DRAPER (RETIRED FACULTY), CHEMISTRY TRAILBLAZER MILDRED DRESSELHAUS, KNOWN AS "THE QUEEN OF CARBON," WHO RECEIVED AN HONORARY DEGREE IN 1976, CHARLES FELDMAN, MARTIN GRIMES, COLLEEN HENNING, PAUL MOONEY, PATRICIA JOHNSON, ROBERT HALL (RETIRED STAFF), JOHN HAM, JACK HART, DEBBIE MCDONALD (STAFF), DICK MORLEY, AND EVELYN TURNER.



we preserve  
**ICONS**

*“I made my gift out of appreciation for my time and education at WPI, for WPI’s history, and for its architecture.”*

*—Raymond Dunn ’78*

The WPI community’s pride in its history and traditions will be displayed outside the new Foisie Innovation Studio and Messenger Residence Hall, where some of the 34 century-old limestone grotesques that once gazed from the heights of Alumni Gym will be incorporated into a promenade.

The grotesques present a unique opportunity for alumni and friends to preserve these WPI icons, representing athletic and other popular campus activities from the early 1900s, and participate in our long and proud tradition of giving back. Those who donate \$100,000 or more to this effort can name a grotesque on the new promenade and claim a piece of WPI history.

Take your place in WPI’s long and proud tradition of philanthropy, and claim your piece of WPI history—while supplies last!

*Selection is first come, first served.*

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For more information:  
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ON THE COVER: Jenna Balestrini in the Precision Medicine and Tissue Systems lab, where she creates microfluidic systems for use in cell therapy.