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JOURNAL

genius

a Journey
to PURPOSE

TERRI-ANN KELLY '98





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OFFICE OF DISABILITY SERVICES (ODS) AMBASSADOR
JARED GRIER '19

EDITOR

Doreen Manning
dmanning@wpi.edu

ASSOCIATE EDITORS

Peggy Isaacson
Joan Killough-Miller

RESEARCH EDITOR

Michael Dorsey

CONTRIBUTING EDITOR

Judith Jaeger

ART DIRECTOR

Caryl Guarino Buhler

GRAPHIC DESIGNER

Lynn Saunders

CONTRIBUTORS

Alison Duffy
Andrew Faught
Sharon Gaudin
Sharon Kahn Luttrell
John Martin
Erin Peterson
Julia Quinn-Szcesuil

PRODUCTION MANAGER

Dianne Vanacore

PHOTOGRAPHERS

Matthew Burgos
Kathleen Dooher
Matt Furman
Matthew Healey
Patrick O'Connor
Dan Vaillancourt

ILLUSTRATORS

Nikki Buhler
Aurelia Durand
Rafael Favoretto
Lapin
Michael Mullan
Jon Reinfurt

Send address changes,
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infoupdate@wpi.edu.



CORRESPOND WITH WPI JOURNAL

WPI Journal
100 Institute Road - Boynton Hall
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wpjournal@wpi.edu
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FOND FAREWELL

Rick Isaacs, Class of 1978, passed away July 1, 2017. WPI was a great college for Rick—he earned his civil engineering degree and made friends for life. I met him my first weekend at Becker Junior College in 1973; we were married for 39 years, 11 months.

Rick worked for Sikorsky Aircraft for over 30 years and in 2015 received the Knight of the Honorable Order of Saint Michael medalion from the Army Aviation Association of America. Rick was diagnosed with ALS in 2013. He hit it head-on advocating for ALS patients and their families. He was on the local and national boards of directors for ALS, advocating to legislators in D.C. three years in a row. He spoke to groups all around the country, always from a patient’s perspective. He was selected to be a NEALS Ambassador, a forum for education and discussion on ALS clinical research and therapy, empowering people with ALS to be research advocates. He was the top fundraiser for the Huntsville ALS Walk to Defeat ALS four years in a row. He even worked with a local brewery to have a Red IPA, Mango Rojo, made with the proceeds going to research institute ALS TDI of Cambridge, Mass. “Mango” is our mascot and was Rick’s service dog.

Team Rick is still going strong, and we will not give up until a cure is found. Maybe the next generation of WPI graduates will discover treatments—and even a cure! Google Rick Isaacs for more on ALS.

— Cindy Isaacs

Editor’s Note: WPI Journal received several responses to a quote about the mind-changing experience of working with WPI’s Project Inclusion, and the development of a wider awareness of the experience of women, people of color, and underrepresented minorities at WPI. A few alumni from the 1960s took issue with the depiction of the student body as “all white,” and pointed out that they were part of a movement to create a more diverse curriculum.

For an in-depth look at Project Inclusion, and for Peter’s full interview in the *Daily Herd*, visit wpi.edu/+projectinclusion.

IN DEFENSE OF NOSTALGIA

Pondering the Quotable in the Winter 2018 issue of *WPI Journal*, I was taken up short by the last sentence, which proclaimed “zero nostalgia” for the non-diverse, almost-all-engineering [school] of an earlier era. ‘Gee, that’s me! That’s my WPI’, I thought. For better or worse, I sensed castigation in that sentence.

I definitely embrace nostalgia for my youth, including those college years, and I encourage my classmates to do the same. Yes, for sure, The Times They Are a-Changin’, and vive la difference. Just as we won’t go back to dung in the streets of pre-internal combustion transport, or slaughter of whales in the name of lamp light, we won’t tolerate exclusion. That said, those of the Classes of Yesteryear

reflected the demographics of our city, state, and region. We didn’t choose or condone exclusivity. It was the way it was; the way we were. We’ve moved on. But if our hearts call to us to look over our shoulders, let’s treasure the good things that we see back there.

— George Spires ’64

Professor Peter H. Hansen responds:

I am gratified to hear that alumni remember their time as students in the 1960s with pride and even with nostalgia. I am excited to engage with the entire WPI community to look to the future with an attitude of generosity and spirit of equity-mindedness. As Project Inclusion identifies opportunities for WPI to become a more welcoming place for all, I hope we continue to feel a fierce urgency to make changes coupled with a determined patience to keep working even when change remains incomplete. All alumni are lifelong members of the WPI community, and everyone—whether on campus or in our worldwide network of alumni—has a critical role to play in building a more diverse, equitable, and inclusive university.

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



EDITOR DOREEN MANNING
TESTS THE LIGHTS FOR
PHOTOGRAPHER MATT FURMAN
AT AMAZON ROBOTICS.

PRESIDENT LAURIE LESHIN TALKS WITH ERIC BEATTIE, VP FOR CAMPUS PLANNING AND FACILITIES MANAGEMENT



PHOTO MATT HEALEY

LL So, Eric, it's great to get to talk to you about something so important on our campus: our infrastructure and our facilities. With our great, beautiful campus—a combination of historic buildings and newer structures—now that you've been with us for about a year, what do you think of the campus at WPI?

EB It's really a terrific campus with such rich history. The original buildings are used every day, and the buildings that have been added to the campus over the years have really added a lot of texture and richness, with each one serving an important, clear purpose for WPI's mission.

LL It's so true, whether it's a building that supports student life and activity through the sports and recreational center or the academic buildings. Looking forward, one of the things we're focused on is putting together an integrated, five-year plan for the campus. One of the things I'm most

excited about is a focus upon some of the more historic buildings, buildings that almost all of our alumni took classes in, whether that's Stratton or Olin or Kaven Hall. Tell us a little bit about what's going to happen with some of those historic buildings on campus.

EB We're really excited with the five-year plan, because it's going to allow us to address a lot of deferred maintenance that some of our older buildings really need. We're going to make improvements that not only replace older systems that are worn out, but make the buildings more accessible. We'll improve spaces and replace systems to keep those buildings in great shape for the future generations.

LL They're such beautiful buildings but, as you said, they're not all accessible to our students, so the idea of making all of our older buildings accessible to me is one

of the most exciting things in the five-year plan. But just renovating our existing spaces isn't going to be enough because WPI is growing. Our student numbers are growing, our research is through the roof, so we really need new spaces for future innovation at WPI, and we've got some big plans there too, right?

EB Spaces have become tighter and tighter. Classrooms are stretched these days, faculty offices are all filled and we're really running out of places to put people. So we're excited that with the plan we intend over the next five years to bring a new academic building online. It has some really exciting programming and features to it, to not only address some of those space constraints we have, but thinking about growth for the future.

LL Right. So the new building is going to be in the Boynton parking lot—kind of at the base of the library, for everybody that knows

our campus. It'll allow students to have access to the Hill from inside the building, which will be great on a cold January day.

EB Especially on a cold day in January.

LL We're very excited about the new building, with an interdisciplinary, computational sciences, and smart-world focus. And we know that new spaces really inspire new thinking, and that's what really motivates me when pondering the physical infrastructure of the campus. So I just want to thank you for all the work you're doing in support of our beautiful campus.

EB You're very welcome.

To see a video of this interview in its entirety, visit wpi.edu/news/wpjournal.



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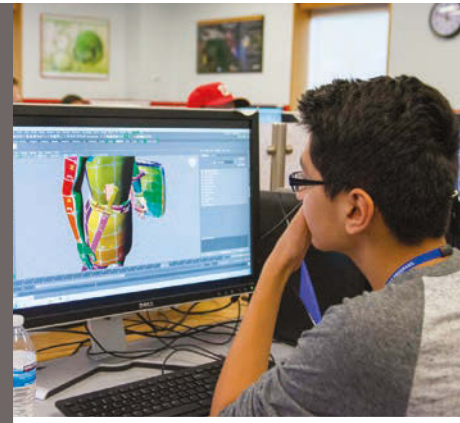
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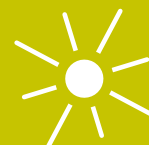
Join us on June 8 for TouchTomorrow, a family-friendly festival featuring hands-on experiments, research lab activities, interactive exhibits for all ages, and the 2019 BattleCry robotics competition.



touchtomorrow.wpi.edu



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The options don't stop there—our programs for students in grades 4-12 offer everything needed for a fun, STEM-filled summer.

THAILAND



ILLUSTRATION JONATHAN REINFURT



WPI's global project centers offer students the opportunity

to immerse themselves in different cultures while tackling real-world problems. At the Bangkok, Thailand, Project Center, students go a level deeper, joining Thai counterparts from a local university to complete their IQPs. It's one of just two project centers where students work on dual-cultural teams. The Mandi, India, Project Center offers a similar model.

"The ability to work with Thai students was so eye opening—seeing their opinion of you as an American, and then seeing our opinion of them and how different it actually is," mechanical engineering and international studies major Olivia Baranowski '19 says of her IQP last year.

WPI began sending students to Bangkok nearly 30 years ago. The late Michael Gerson '65 and his wife, Ruth, of Bangkok, were instrumental early supporters and Ruth continues to be involved. Supawan Tantayanon '82 (PhD)

connected WPI with Chulalongkorn University, where she is a professor of chemistry. WPI and CU students first teamed up for projects in 2009, when the latter established its own degree program with a requirement similar to the IQP.

"It's been a wonderful thing for the students. They get to work closely with people their age who are from a different culture" says Center for Project-Based Learning director Rick Vaz, who also serves as co-director of the Bangkok Project Center.

Baranowski's team of seven included three students from CU. The group's sponsor was the Thai royal family's Chaipattana Foundation, which wanted to develop new markets for coconut farmers in Amphawa, a village west of Bangkok. Her team was tasked with developing a marketing program for a local fermented drink, coconut cider vinegar.

It took a while for the American and Thai students to gel as a team, she says. The Thai students, with their structured 9-to-5 class schedule, approached project work

differently than the WPI students did. It was frustrating at first, but Baranowski realized that learning to accommodate different work styles was good preparation for life after graduation. Eventually, the team divvied up the workload according to one another's strengths, with the Thai students doing design and translations. "It was hard in the beginning," she says, "but in the end, we wouldn't have been able to do it without them."

Baranowski took advantage of free time during the weekends to tour the country. She was so taken by the experience that she added international studies as a second major. An ROTC student, she will attend flight school after graduation; she plans to go into foreign relations after a career as a Navy pilot.

Ryan Eley's IQP experience in Thailand in 2008 didn't influence his major, but it did set him on a course that led to Tanzania and now Haiti, where he has lived for two years. Having grown up in a small Connecticut town, he was eager to see the world—he chose WPI because it offered opportuni-

ties to do project work abroad. In Thailand, his team worked in the Mae Moh district of Lampang Province to improve communication between the Electricity Generating Authority of Thailand and villagers who suffered under the authority's earlier environmental practices.

Having majored in civil and environmental engineering, Eley worked for construction firms for several years. He volunteered for six months in Tanzania with Engineers Without Borders, after which he took a consulting position in Haiti before starting his own construction company in that country. His time in Thailand, and a year later in Costa Rica for his MQP, sparked his desire to work in developing nations.

"I'm sure a lot of that is the reason for wanting to work abroad again," he says. "If I hadn't gone overseas in college, I don't think I would have thought to do it professionally."

—Sharron Kahn Luttrell

SUPPORTING THE BACKBONE OF THE WORLD

Located in Montana on the U.S. Canada border, Glacier National Park spans over a million acres. Visitors come for the snow-capped mountain peaks, glacial-carved valleys, and pristine lakes. The park's number one challenge? Traffic and congestion.

Glacier draws more than three million visitors each year. All must travel the only through route – the 52-mile Going-to-the-Sun Road. It offers breathtaking views and frustrating tie-ups. Parking lots fill up early in the day, sending disappointed hikers and bikers back onto the road in search of another starting point.

In A-Term, two student teams took on these issues in the inaugural IQP projects at WPI's new Glacier National Park Project Center. Center director Professor Fred Bianchi selected these intrepid souls – including two Eagle Scouts – from a pool of 35 applicants, looking for hardiness and a passion for the outdoors. “You’re not going to London,” he warned jokingly, at an orientation briefing. Indoor housing was provided, but access to the outside world – including cell service – was limited.

One project investigated the feasibility of a webcam network to monitor live traffic conditions and systems to communicate updates to visitors. The other developed parameters for parking reservations in lots at the Many Glacier area. Forest fires delayed the teams' onsite work at Glacier. They used the first half of the term profitably, conducting research from Maine's Acadia National Park, where Bianchi also directs the Bar Harbor Project Center.

Bianchi points out that in WPI's partnerships with the National Park Service, projects are designed around needs of the parks. “We’re not going out there, like so many academics, following some rare species of woodpecker and studying its behavior. Our goal is to assess how the parks are being managed, and how they could be better managed.”

Glacier lies along the Continental Divide and bears the nickname “Backbone of the World.” WPI project work can offer much needed support for the park that's also called “Crown of the Continent.”

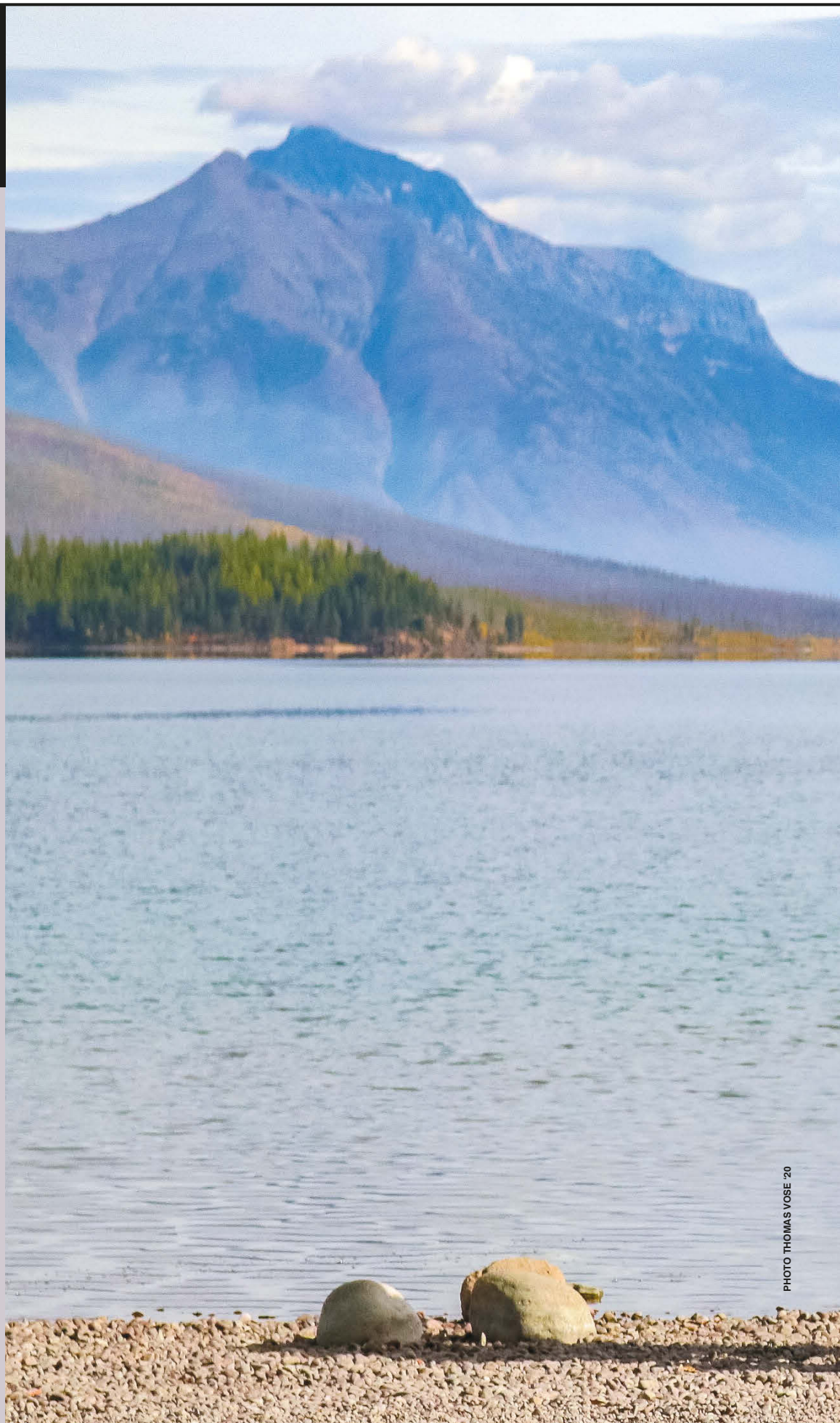


PHOTO THOMAS VOISE '20





PHOTO DAN VAILLANCOURT

HONORING A THEATRICAL TRAILBLAZER —Michael Dorsey

When **Susan Vick** joined WPI in 1981 to oversee the Institute's drama/theatre program, there was not much of a program to manage. But having already blazed some trails as the first woman to earn an MFA in directing at Southern Methodist University and the first woman to earn a PhD in theatre at the University of Illinois, and having chalked up a strong opening act in the professional theatre—with several acting awards, more than 20 directing milestones, and a budding career as a playwright—she was ready to bring her trailblazing ways to a new forum.

Today the evidence of what she achieved is everywhere. The university calendar is filled with shows by several performing groups, including Masque (one of WPI's oldest student organizations), a repertory theatre company, improv and comedy groups, and a musical theatre association. A highlight of the year is "New Voices," an annual festival of plays written, performed, and produced by students and other members of the WPI community. Founded by Vick in only her second year at WPI, it is the longest running collegiate new and original plays festival in the country.

Many of the annual cavalcade of performances take place in the Little Theatre, WPI's first dedicated theatre, which was built under Vick's

direction with a \$400,000 grant from the George I. Alden Trust. Hundreds of students get involved in theatre, by actively participating in drama groups and shows, taking courses, completing their Humanities & Arts (HUA) Requirement or other project in the area of drama and theatre, or completing an HUA minor or major.

Vick once noted that WPI's project-based approach to education, which offers the opportunity to connect with students across the academic spectrum, was one of the key reasons she chose to teach at the university. "There's always that person in an area you wouldn't expect who wants to participate," she said. "Here it's legitimate. You can do it. Everybody has a place at our table."

Now retired, Vick walked back into the spotlight last fall to accept the 2018 Leonidas A. Nickole Award from the New England Theatre Conference, given for outstanding teaching in the field of drama.

"Theatre is the world where everyone in it can learn by opening our minds to hear the truth about what we can say, about who we can be, about who we can love, about what we can do in this world," Vick said in her acceptance speech. "Teaching the amazing undergraduates at WPI keeps me educated."

REFUGEE DATA – Julia Quinn-Szcesuil

Each year around the globe, tens of thousands of refugees fleeing war, violence, and persecution put themselves at the mercy of host governments in the hopes of establishing new and better lives for themselves and their families. The United States accepts some 20,000 per year, but how does a refugee family from, say, Syria end up in a suburban neighborhood in Des Moines?

For Foisie Business School professor **Andrew Trapp**, data is the key.

“We have a lot of information about the people and the resources, so how can we match them up to give refugees the best shot possible of assimilating and becoming self-sustaining in their new communities? People’s futures are at stake, and we have tools that can help.”

Trapp has spent several years developing and piloting a computational tool that helps resettlement agencies combine data about the refugee—language, nationality, religion, age, job skills, and education—with data about the host community—housing and job opportunities, for example—to calculate the best possible placement.

The program—called *Annie MOORE* (*Matching Outcome Optimization for Refugee Empowerment*; named for Anna Moore, an Irish woman who was the first recorded immigrant processed at the Ellis Island federal immigration station in the late 1800s)—integrates machine learning and optimization algorithms to suggest options to resettlement agency staff. Staff member then make the final decision, but the program helps them quickly place the more straightforward cases and spend more time with complex cases.

Trapp, who has been collaborating with Oxford University and Lund University, received a \$320,000 National Science Foundation grant to further the work.



ILLUSTRATION RAFAEL FAVORETTO

CONTAINING HACKERS – Sharon Gaudin

Craig Shue, associate professor of computer science, is working on a new technology that could protect companies—and users—from malware attacks when they interact with web servers in the cloud.

With a three-year, \$265,631 grant from the National Science Foundation, he is creating what he calls single-use services that could prevent a web attack from compromising other servers, data, or users. The idea is to isolate each user within an environment known as a

container, that can be removed, along with any harmful software that may have been uploaded, when that user’s session ends.

He explains that “each user gets her own copy of the webserver, and when she leaves the site, her copy is destroyed so she cannot harm others, even if the webserver is vulnerable, because the container isolates her. The technology would be invisible to the user but it could change the way we interact with the likes of Amazon or Google.”

The containers would also enable the system to automatically detect tampering or malware infections, and changes would be preserved to discover how the attack was launched.

Shue is collaborating on the project with Timothy Wood, an associate professor at George Washington University. Wood has created a system that can rapidly spawn tens of thousands of new containers per second, enabling the system to scale up.

COMMUNITY ACTION IN THE FACE OF NATIONAL HEARTBREAK *—Julia Quinn-Szcesuil*

At first devastated and then galvanized by the deadly synagogue shooting in Pittsburgh, Ariel Goldner '19 (mechanical engineering) and Maggie Kuck '19 (chemical engineering) knew it was time for campus discourse on the raw and painful topic of hate with the hope it would lead to healing and awareness.

This past December the two organized a daylong event featuring speakers and breakout sessions meant to bring others together and shine a light on topics that are difficult and painful to discuss.

The pair collaborated with the Student Activities Office and other campus organizations; approximately 200 students participated throughout the day. Attendees listened to presentations by Rwandan genocide and Holocaust survivors, a discussion with a former KKK leader, conversations about privilege, and personal perspectives from a student panel.

“We have the privilege of raising our voices loud and we wanted to start that conversation,” says Goldner. “Small acts make big differences in the long run.”

They created a space for community-wide discussions that addressed the complexities, fear, and pain others felt around their experiences with or understanding of topics such as microaggressions or hate.

And while the two have different experiences with Judaism, it is their faith that brought them to this space. Goldner, the granddaughter of a Holocaust survivor, says the dangers of hate are ingrained; Kuck didn't begin exploring Judaism deeply until she arrived at WPI. Both say theirs is not the only community suffering, and that all students benefit from understanding the depth and correlation of these issues.

“If we don't say something now, when are we going to say something?” Kuck asks.

“If you don't start acting, the other side — the hateful side of this nation, of the world — is going to overpower all the amazing people we have.”

ZEROING IN ON BRAIN TUMORS *—Michael Dorsey*

Imagine an operating room of the future. A patient with a deep brain tumor is placed in an MRI scanner, where a small robot guides a needle-like probe through a small hole in the patient's skull and into to the center of the tumor. While the robot adjusts the probe and physicians watch a thermal imaging display, the probe heats the tumor with high-intensity therapeutic ultrasound. In a short time, a tumor that would once have been all but impossible to effectively treat, is gone, while surrounding tissue is unaffected.

With a five-year, \$3.5 million award from the National Institutes of Health (NIH), a team led by **Gregory Fischer**, professor of mechanical engineering and robotics engineering, and Julie Pilitsis, chair of the Department of Neuroscience and Experimental Therapeutics and professor of neurosurgery at Albany Medical College, will develop and test this robotic system and certify its readiness for human clinical trials. They will work closely with Acoustic MedSystems, which will design, build, and validate the probe, and GE Global Research Center, which will implement the thermal imaging capabilities.

Fischer's team at WPI will concentrate on the robotic system that will guide the probe. It must work within the tight confines of the MRI scanner, alongside anesthesia equipment, imaging coils, and patient monitoring apparatus. And because MRI scanners use a powerful magnet, it must be made plastics, ceramics, and other non-ferrous materials.

Some of their work will be conducted at WPI's PracticePoint, a membership-based R&D and commercialization alliance founded to advance healthcare technologies.

UPDATES FROM THE RESEARCH ENTERPRISE

A NEW TWIST ON BATTERY RECYCLING

A \$1.08 million award from the United States Advanced Battery Consortium (USABC) will allow materials science professor **Yan Wang** to explore a new capability for his groundbreaking process for recycling lithium-ion batteries (Spring 2018). With a previous \$1 million USABC award Yang showed that he can scale up his process and use the recycled cathode powder to produce new automotive batteries whose properties equal commercial units. With the new award, he and his team will work to show that the process can produce cathode powders that are rich in nickel, a reflection of the rising price of cobalt and the fact that nickel-rich cathodes offer higher energy density.

ADVANCING THE FLAME REFLUXER

The Flame Refluxer (Summer 2017) is designed to efficiently burn off open-water oil spills by capturing heat from the flames and transmitting it to the unburned oil. With a new \$900,000 award from the Bureau of Safety and Environmental Enforcement (Department of the Interior), which funded the development and testing of the Flame Refluxer, fire protection engineering professor **Ali Rangwala** and his team will advance the technology to the point where it can be commercialized.



ASK THE ARCHIVIST

Q. When I was in the library, I saw an old poster for the Clean Air Car Race. Was this a WPI-created event? Where did it take place?

A. The Clean Air Car Race was organized by college students in 1970 in response to Congress's recent passing of the Clean Air Act, which mandated that auto manufacturers reduce vehicle emissions 90 percent by 1975. Major automakers objected, telling the press and Congress that those standards were impossible to achieve within the allotted time frame. Inspired by the first Earth

Day (April 22, 1970) and a national awakening regarding sustainability, 43 teams of college students representing 32 institutions from across the country—including a five-member team from WPI—organized the first and only Clean Air Car Race.

Each vehicle entered in the competition was required to transport two adults, maintain a speed of 45 mph across flat terrain, and meet the upcoming 1975 emission standards. The 3,490-mile race began in Cambridge, Mass. (MIT), with the finish line set in Pasadena, Calif. (CalTech). Stops along the way included Toronto, Detroit, Oklahoma

City, and Tuscon. Vehicles competed in six classes: electric, gaseous-filled, hybrid, liquid-fueled, steam, and turbine. Emissions from each vehicle were measured at three points during the race—at the start and finish lines and in Detroit.

Of the more than 250 team members competing in the race, only one woman was present, Nancy Wood Popinchalk '73. She and her teammates entered a Saab 99E that featured lead-free gas, modified pistons, new injectors, and a new computer to improve the fuel-air ratio that drove the internal combustion engine. While the winner of the race was a team of Ford engineers

attending night school at Wayne State University, the students demonstrated that what the auto manufacturing industry claimed was impossible could be achieved with innovative engineering.

Learn more about the Clean Air Car Race and other amazing stories from WPI's past at the University Archives, Gordon Library.

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

JOE ADAMS '75

completed a term as board president of Engineers Without Borders USA at the end of last year. WPI Journal asked this WPI trustee to reflect on his service and how the organization's mission dovetails with WPI.

What's your history with EWB? How did you first get involved?

EWB-USA was founded in 2002 by Bernard Armadei at the University of Colorado (CU) at Boulder. At the time I lived in Boulder and was an executive at MWH Global, a large engineering and construction company working all over the world. We hired many civil engineering graduates from CU, and as time went on we noticed a distinct difference in the effectiveness of new hires who'd had an EWB experience in college. They had done a volunteer project where they identified the need, put together a design, implemented the design, and monitored it over time. It is essentially the project-based learning that is the pillar of WPI.

Interestingly, Armadei was a commencement speaker at WPI. He told the Class of 2014 that they were "well-positioned to become the agents of change that our planet needs." I joined the EWB Corporate Leadership Council that year, later became a member of the Board of Directors, and in 2018 was named president of the Board.



Can you share a memorable experience from your service?

In 2017, as president-elect, I toured project sites in Guatemala and Nicaragua. Our last stop was in Joyabaj, Guatemala, where the mayor joined us on a tour of the ongoing projects. These included a water supply system, a suspension bridge over a creek that turned

into a river in the wet season, repair of a small hydro-power plant built many years ago, and repair of a school damaged by an earthquake. The day was topped off with a stop at a local school where students dressed in bright colors performed a traditional dance and provided us with colorful shirts. I'll remember that day forever.

What motivated you to take on leadership at the national level? What did you find satisfying in your service?

During my career at MWH, I traveled to more than 30 countries all over Europe, Asia, Latin America, and Africa. Most of my work involved very large civil engineering projects, such as the Third Set of Locks in the Panama Canal. But in many countries, one didn't get very far away from the project site or city to be exposed to abject poverty. I hoped that my experiences would be valuable in helping shape the direction of EWB in meeting the world's basic human needs.

What has your involvement with WPI's student chapter been like?

At the 2017 annual convention in Milwaukee, I had the privilege to present the top chapter award to the leadership of the WPI student chapter. It was a thrill not only in my role as EWB president but also as a WPI alumnus. I try to meet with the WPI chapter for pizza or burgers when I'm in Worcester for WPI trustee meetings. (It also helps me remember how much pizza college students can devour.)

What's your advice to the new EWB president?

The biggest challenge is to keep the momentum going. My advice to her would be the same I would give to the leader of any nonprofit: "Lead by listening."

Join these WPI Fund supporters in making an impact on students and faculty!



“WPI gave me the foundation to live my best life and made me into the individual that I am today. I have lifelong friends, a job I love, and the ability to pay it forward. Giving back to WPI means allowing someone else the opportunity to embark on their own journey of realizing their fullest potential. No donations go unnoticed or unappreciated.”

—*Diana Nguyen '14*

“I give to WPI because I received scholarships from WPI when I was a student. I want to make sure that current and future students can receive the same quality education I did. Donating to the unrestricted fund allows the school administration to use the money where they see fit to give students the best WPI experience.”

—*Jared Drake '11*



“For our son, Andrew, music is a very important part of his life, and the Pep Band is an important part of his student life at WPI. We wanted to share that with more people.”

—*David Moore P'20*

Photo: Andrew Moore '20

“I give to WPI because WPI has given so much to me. It gave me a world-class education and amazing career opportunities. Most importantly, however, it gave me lifelong friends and my partner in crime, Alex.”

—*Morgan Mitchell '17*



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WPI



PHOTO MATT HEALEY

WPI's Office of Disability Services (ODS) Ambassador **Jared Grier '19** suffered a devastating spinal cord injury in 2015, at the end of his freshman year.

For the next year he progressed through multiple surgeries, medical appointments, physical therapy, and a few online courses to return as a sophomore in a motorized wheelchair. Grier has gone on to conquer a path to a mechanical engineering degree with fierce grit and determination.

As he embarked upon this newly refocused journey, he contemplated all he had experienced through re-entry to college life with a mobility issue, including the backing of his brothers in Lambda Chi Alpha (who fundraised through a GrierStrong campaign, mapped out a pathway to his classes, and renovated a first-floor bathroom in the fraternity house on Dean Street). He decided to reach out to ODS and offer himself as a resource for those without this built-in support network.

"Jared has been an amazing advocate and is one of two of our inaugural ODS Ambassadors," says Laura Rosen, director of Disability Support. The new upperclass peer support program helps students better understand what ODS services are available on campus, and helps connect peers with resources. "He has a natural ability to create genuine connections, whether it be through mentoring others or in his role as a Peer Learning Assistant (PLA)."

Grier explains that his presence on campus over the last three years, along with other disabled students, "has helped to normalize disabilities and force the community to be more aware and acknowledge that there are people out there with various levels of ability—but with the right help we can all succeed."

When he returned to WPI with

a new viewpoint, assistive technology and rehabilitation engineering became a fresh topic of interest.

"Having a new perspective while maintaining my inventive and problem-solving mind has given me an advantage that in any issue I encounter I can quickly come up with a solution," he says. "My acquired disability has also opened up a number of opportunities, such as research projects and panel discussions that previously would not have been available."

A trait that has served this soon-to-be-alumnus well throughout this experience is his natural drive. "I've come across countless things where I thought I couldn't do it, or was hesitant about trying, but once I did it turned out much better than expected—or I found I could actually do it without any problem," he admits. "When I began to plan for returning to college I had a number of worries and questions that ended up not being as big of a deal as I thought they would."

For instance, although he struggled slightly with calculus and differential equations and was leery about his upcoming engineering courses, Grier says he surprised himself time and time again. "I ended up having no issue with statics, stress, dynamics, thermodynamics, or heat transfer," he gladly shares.

He says he's ready for what's beyond the university's frontiers. With his injury came setbacks, such as the lack of available summer internships that could work for his situation, but he is already thinking about graduate school and applying to companies from coast to coast.

As for advice to others who may see a student on campus with a disability, Grier brings it right down to equality. "At the end of the day we are all just human."

HONORABLE MENTIONS

ME1800 PLA • ODS AMBASSADOR • GRIERSTRONG • 2018 HUA KRANICH PRIZE
DEAN'S LIST • LAMBDA CHI ALPHA



BY MICHAEL DORSEY | PHOTOGRAPHY PATRICK O'CONNOR
ILLUSTRATION VALENTINA BROSTEAN

pamela weathers

HARVEST OF HEALING

In the eastern Democratic Republic of Congo, physicians observed a troubling trend a few years ago. A small number of patients who'd been treated for malaria were not responding to the standard medication. Some lapsed into severe malaria, an often fatal form of the disease.

In one clinic, 18 patients, aged 14 months to 60 years, lay seriously ill; among them, a five-year-old child who'd fallen into a coma. When intravenous drips of artesunate, the best drug for severe malaria, brought no improvement, one doctor decided on a last-ditch effort.

He began administering green tablets he'd recently received for use in a clinical trial. Five days later, every patient had fully recovered. What's more, laboratory tests showed no evidence of parasites in their blood. Having been near death, 18 men, women, boys, and girls left the clinic and resumed their lives.



Those green tablets contained one simple ingredient: the dried, powdered leaves of a plant some consider a weed. The tablets were prepared by Pamela Weathers, professor of biology and biotechnology at WPI, who has been studying the plant, *Artemisia annua*, for more than four decades.

In that time her research has taken her from the lab to the front lines of a global health crisis. Today her work is helping fuel a quest to win recognition for the potential of *Artemisia* to help win the war against one of the world's most deadly diseases.

An Ancient Remedy

Written references to malaria date as far back as the sixth century BC, but it was less than 150 years ago that scientists discovered its cause: a parasite, of the genus *Plasmodium*, transmitted to people by female *Anopheles* mosquitoes. Today the disease affects about 200 million people each year, primarily in large swaths of Africa and Asia, resulting in over 400,000 deaths.

Malaria parasites, in a form known as sporozoites, first infect the liver, then attack red blood cells. Many of malaria's symptoms—including anemia, chills, fatigue, fever, and muscle pain—stem from the destruction of these cells. Some parasites differentiate into a sexual stage known as gametocytes. When a mosquito ingests

blood from an infected person, the gametocytes reproduce inside its body, producing new sporozoites that can begin the infection cycle anew.

Modern medicine's battle against malaria has been a game of cat and mouse. Starting with quinine, a drug made from the bark of the cinchona tree, a series of antimalarial medications have been rolled out, only to lose their effectiveness as the parasites became resistant to them.

The current frontline drugs date to the late 1960s. At the request of North Vietnam, which was losing more soldiers to malaria than to combat, China assigned a team of scientists, led by Youyou Tu, to comb through records of herbal remedies looking for potential antimalarials. Learning that people had for centuries been treating fever with an infusion made from *Artemisia annua*, Tu produced extracts from the plant and ultimately isolated a compound that worked against malaria in animal and human trials. Her discovery of artemisinin won her the Nobel Prize for Medicine in 2015.

Today artemisinin, combined with one or two other antimalarial drugs to guard against resistance, is the first-line treatment recommended by the World Health Organization (WHO). But artemisinin combination therapy (ACT) is too expensive for many poor patients, and it is not infrequently in short supply in the areas where it is

most needed. More worrisome, resistance to ACT has emerged in Asia, and may be appearing in Africa, as well.

Plants as Medication

Weathers, a plant biologist, joined WPI in the late 1970s. "One of the things I discovered right away was that, as a plant person, it was hard to get students to work in my lab—particularly undergraduates," she says. "They thought plants were boring."

By the 1990s her research revolved around turning plants into living factories for commercially valuable chemicals. She had co-invented a bioreactor, the Mistifier, which used ultrasonic energy to generate a nourishing mist to feed plants through their exposed roots, and was using a microorganism known as *Agrobacterium* to genetically transform the plants so their roots grew tiny hairs, which increased the surface area from which chemicals could be extracted.

While looking for interesting plants to grow in the reactor, she recalled reading about *Artemisia annua* and the antimalarial it produces. She thought that might be the hook she needed to lure students looking for research opportunities. "And it worked," she says. "They were interested because it was an important medical problem, and not just



fundamental work.”

Despite the international focus on artemisinin, Weathers found there was a dearth of literature about the organism that makes the drug, a plant more commonly known as sweet wormwood or sweet annie. She and her students quickly expanded that literature by becoming the first team to genetically transform *Artemisia annua* and to show that artemisinin can be extracted from its roots, potentially paving the way toward a new, more economical way to produce the drug.

“Our focus was on making artemisinin, and lots of it,” she says, “but in retrospect that was absolutely the wrong way to think about it, because malaria is a disease of poor people, and it’s costly to make drugs in a bioreactor.”

In 2015 Weathers and WPI biochemist Kristin Wobbe attended a Gordon Conference on synthetic biology, where the buzz was about a team at UC Berkeley that had inserted the gene for producing artemisinin into the yeast genome.

“We had a lightbulb moment,” Weathers says. “We wondered, what if we could put the gene in an edible plant, and then people could get the drug by eating the plant.” PhD student Patrick Arsenault worked on that challenge for two years, “but in the end,” Weathers says, “it proved to be a monumental task and too technically challenging for our small group.”

In the midst of that project,

Weathers completed a sabbatical in the lab of biologist Carole Cramer at Arkansas State University. “It was Carole who wondered, instead of putting the gene in another plant, what would happen if you just ate the leaves of *Artemisia*?” Weathers recalls. “We thought, people have been making a tea infusion with this plant for 2,000 years, so it must be safe. We did some research and determined that, in fact, it is quite safe to consume.”

Plant vs. Drug

That revelation was a turning point. Since then, Weathers and her team have focused on using the *Artemisia* plant, itself, as a medication. They have bred cultivars that produce high levels of artemisinin, and they have determined how best to grow, harvest, and dry the plant. And they have learned to grind the leaves to produce a fine powder that can be poured into capsules or pressed into tablets. They call this material dried leaf *Artemisia*, or DLA.

They have also studied the chemistry of those leaves, which are veritable living pharmacies. Like all of the members of the *Artemisia* genus, *Artemisia annua* produces a complex mixture of chemicals, including other bioactive compounds like terpenes, flavonoids, and polyphenolic acids, along with essential oils. Some of these compounds have shown antimalarial activity, though they are far less

Tablets or Tea

One of the open questions about *Artemisia* therapy is how best to administer it. The international group Weathers has worked with on two clinical trials prefers tea infusions, the traditional way to consume the plant, because many African cultures are used to making medicinal teas and because it is a simple and cheap way to produce a therapy from locally grown plants. Also, the growing issue of counterfeit medications in Africa argues for making one’s own remedies, they contend. Weathers believes tablets and capsules made with the dried, powdered leaves of the plant may have important advantages over tea. For one, tea infusions are difficult to make correctly, raising concerns about whether they will deliver sufficient amounts of the active compounds, whereas the potency of tablets and capsules can be carefully controlled. Tablets and capsules also have a shelf life and can be stored for some time, whereas tea must be made fresh each time it is needed. Also, many people find *Artemisia* tea to be quite bitter, and one must consume a lot of it—making compliance a concern—while taking tablets or capsules is simple, and the capsules can even be used as suppositories for young children.

A Wonder Drug?

In addition to its effectiveness against malaria, artemisinin, and by extension, *Artemisia annua*, have shown activity against a large number of human and livestock diseases (including leishmaniasis, tuberculosis, toxoplasmosis, hepatitis B and C, Lyme disease, a variety of cancers), though some of these effects have been more robustly studied than others. A clinical trial in which Weathers participated showed that *Artemisia* tea cured the tropical parasitic disease schistosomiasis twice as quickly as the standard drug. And a study by Weathers and former WPI PhD student Dina Rassias found that dried leaf *Artemisia* showed promising results, compared with artemisinin, against tumor growth and cancer cell migration in small cell lung cancer.

potent than artemisinin.

From a pharmacological viewpoint, the activity of each individual chemical is less important than what happens when they are all ingested together. As Weathers's research has shown, the synergistic interactions of the ingredients in that phytochemical stew create a therapy that actually surpasses artemisinin and ACT in important ways.

For example, they found that 40 times more artemisinin gets into the bloodstream when it is contained in DLA than when it is administered as a pure drug (pharmacologists call this bioavailability). This may be due, in part, to the fact that the compound dissolves in the plant's essential oils, which may help it move more readily through the intestinal lining.

Working with Stephen Rich, a molecular parasitologist at the University of Massachusetts Amherst, they showed that DLA reduces blood-borne malaria parasites more completely than does pure artemisinin, which is almost certainly a function of that greater bioavailability, but is also likely due to antimalarial effects of the plant's other phytochemicals.

In other work, Weathers and Rich fast-forwarded through the evolutionary process that can produce drug-resistance by following parasites through multiple generations of mice that were treated with either DLA or pure artemisinin. With a single dose of artemisinin, resistance appeared after 16 generations; a double dose warded off resistance for another 24 generations. But with

DLA-treated parasites, Weathers and Rich stopped the experiment at 49 generations having observed no apparent sign of resistance. Weathers says DLA's mix of antimalarial compounds – it's a natural combination therapy, she notes – likely accounts for its resistance to resistance.

Building a Case

Better bioavailability, greater potency against the malaria parasite, and a built-in shield against resistance make DLA a promising candidate for the next frontline antimalarial medication. But there are other reasons Weathers and an international alliance of scientists, doctors, and non-governmental organizations are enthusiastic about *Artemisia*.

For one, the plant can easily be grown where malaria is prevalent. And the processes involved in transforming it into a drug can become local business. And without the high-end pharmaceutical manufacturing practices needed to extract, purify, and package artemisinin, the cost of DLA will be far less than ACT. In fact, it is a therapy tailor-made for the poor populations who most need it.

Lucile Cornet-Vernet, founder of La Maison de l'Artemisia in Paris, goes a step further, promoting *Artemisia*, in the form of tea infusions, as a home-grown malaria remedy. An orthodontist, she first learned about *Artemisia* when a friend who contracted a near-fatal case of malaria on a trip to Africa

used tea infusions to cure himself.

Today, Cornet-Vernet's NGO works with agronomists to select *Artemisia* variants well suited to the local soils and climates, and sets up centers (42 in 20 countries, at last count) to teach people to grow the plant. "Everywhere, we start small," she says, "with just one person, then it grows exponentially until we have hundreds."

Like many advocates for *Artemisia*, she says she is frustrated with major global health organizations, particularly WHO, which continue to promote ACT over *Artemisia*. "We believe we will succeed, because we know it is effective," she says, "but we still have a problem, and it is WHO. They have to be convinced."

Convincing WHO will take good science, she says, and her interest in the science of *Artemisia* therapy led her to Weathers. Cornet-Vernet and Weathers agree that, as important and groundbreaking as Weathers's research on DLA has been, it will take more than the accumulation of positive findings to sway the skeptics. "WHO wants to see good, well-controlled clinical trials in peer-reviewed journals before they are even going to think about *Artemisia*," Weathers says. "That is our goal, to get those out."

The results of one such trial was recently published in *Phytomedicine*, the leading journal on plant-based medicine. It was co-authored by Cornet-Vernet and Weathers, along with an international team that included Melissa Towler, a

postdoctoral researcher at WPI who has been studying *Artemisia* with Weathers for several years, and Chen Lu, a recent PhD graduate in mathematical sciences.

The study compared the efficacy of tea infusions of *Artemisia annua* and *Artemisia afra* to ACT in a group of over 950 malaria patients in the Democratic Republic of Congo. In a nutshell, the *Artemisia* teas (even those made with *A. afra*, which produces almost no artemisinin) were much more effective than the current drug in clearing parasites from the blood, and did so faster (and with no apparent side effects). "The ACTs failed miserably," Weathers says. "At the end of the treatment period, many of the patients treated with ACTs still had parasites, while virtually none of the patients who'd consumed the tea did. We don't fully understand why the ACTs did so poorly, but it was very striking."

Just as significant, unlike the patients who'd received ACT, those who'd consumed the *Artemisia* tea infusions had no detectable gametocytes in their blood after treatment. A mosquito biting these individuals could not ingest the parasites needed to continue the life cycle, effectively breaking the cycle of infection.

Growing Acceptance

The clinical trial was a milestone, but will it be enough to erase WHO's reservations? Weathers

and Cornet-Vernet aren't sure, but they want to see more clinical trials done, regardless. In particular, Weathers would like trials focused on DLA, which, she says, may work even better than tea.

But even as the scientific studies continue, support for *Artemisia* is growing. "A lot of countries in Africa are looking at *Artemisia* quite seriously," Weathers says. "I think we may see ministers of health taking this up as an alternative treatment."

At the same time, the advocacy of Cornet-Vernet and others is gaining notice. *Malaria Business*, a new Belgian documentary about *Artemisia* that also features Weathers's research, was recently shown at the French National Assembly, and favorable articles have appeared in *Le Monde* and *Paris Match*, both focused, in part, on Weathers's findings.

While the global conversation about *Artemisia* plays out, Weathers will keep her focus where it has always been, on advancing the science. She is particularly interested in exploring other applications for the plant and its collection of phytochemicals. "It's bioavailable, it gets through to all the organs—it even crosses the blood-brain barrier—and it has antimicrobial activity," she says. "It could be used to treat lots of things. And it can be grown just about anywhere. I think there could be huge demand for such an inexpensive and versatile therapeutic." **J**





UJ Dallaire '94

BY JOAN KILLOUGH-MILLER | PHOTOGRAPHY MATT FURMAN

Safeguarding the Nation's Capitol

When it comes to safeguarding the nation's capital, **Laurence "LJ" Dallaire** is more Smokey Bear than Daniel Webster. While Webster heroically helped douse a blaze that threatened the Library of Congress in 1825, LJ's approach to fire safety is a bit less sensational – and much more strategic.

It's worth noting that when Webster went into action, the officer on duty did not have a key to the library. It took some time to locate the firefighting equipment, and Webster (who was then a member of the U.S. House of Representatives from Massachusetts) had to break into a locked shed to get it.

That wouldn't happen on Dallaire's watch.

On a good day, his best work goes unnoticed. No one summons the D.C. Fire Department or the U.S. Capitol Police. The code-compliant smoke detection and sprinkler systems invisibly retrofitted into 200-year-old architecture remain silent. Workers, government officials, and visitors – more than 30,000 in a typical day – flow in and out of the 39 buildings and stroll freely along the 570 acres of gardens and grounds.

Even in somber times, such as December 2018 when the body of President George H.W. Bush lay in state in the Capitol Rotunda, mourners don't give a thought about the safety planning that goes into such enormous gatherings – because Dallaire does.

A SERVANT, NOT A SHERIFF

Since 2009 he's held the title of fire marshal at the Architect of the Capitol (AOC), the 2,100+ employee organization that serves as builder and steward of the landmark buildings and grounds of the Capitol campus. "The perception is that the fire marshal is there to put things out," he says, but his job is more about upper-level engineering. Much of the work goes into adapting fire codes and standards to accommodate for the building's unique features. His beat encompasses everything from on-site daycare to the Capitol Power Plant's new cogeneration facility.

Dallaire defies the image of the stern guy who comes down hard when there's popcorn burning in the lunchroom microwave. Laughing at that, he concedes, "People make popcorn. Popcorn gets smoky. It's not my job to tell our constituents or clients what they can and can't do. It's more about me recognizing what they *do* do. And making sure we can deal with that and support their needs."

LJ came to WPI fired up about the F-14 fighter planes that Tom Cruise flew in the 1986 hit *Top Gun*. His aim was to major in mechanical engineering and concentrate in aerospace. "I wanted to fly those planes, but I'm colorblind," he says. "I figured, OK, if I can't fly, I'll build the darn things. That's cool too." His daily route to his ME classes in Higgins Labs took him right past the office of David Lucht, founding director of WPI's Center for Firesafety Studies (the progenitor of the Department of Fire Protection

Engineering). Curiosity drew him in for a chat, and he came out a convert.

From there, he made the most of project opportunities, bridging from aero to fire protection engineering (FPE). For his MQP, he did microgravity combustion research at NASA. "After I had satisfied my NASA advisor, I had to come back and satisfy Professor [Vahid] Motevalli. He pushed for more and drove me to get deeper answers." Amused that WPI held him to higher standards, Dallaire mimics his beloved professor's demands. "What is the critical Reynolds number, and what does this mean to your flow? Is it laminar or not laminar? You've got to find that out." He adds, modestly, "I think my project later wound up flying on the space shuttle."

His IQP assessed possible safety systems for astronauts stationed on the Moon. Speaking by phone from the Ford House Office Building, he jests, "I'm sure there's a yellowing copy of 'Lunar Base Fire Detection Systems' somewhere in my office." Within minutes he's got his fingers on it. He beams a cellphone shot of the executive summary, dated 1993, back to WPI. "It was a little aspirational at the time," he admits.

PUBLIC VS PRIVATE OWNERSHIP

With a BS in ME and a master's in FPE from WPI, Dallaire's career has taken him back and forth between private firms and the government sector. In his commercial jobs, he's worked on everything from luxury hotels and casinos to the "bathtub projects" at the base of the World Trade Center redevelopment project. A favorite project was New York City's High Line walking path, an elevated aerial greenway built on former railroad track. He oversaw computer modeling on the complex problem of evacuating crowds safely from a narrow railroad bridge 30 feet off the ground.

In an earlier Federal post, Dallaire spent seven years as a fire protection engineer for the Department of State. The job took him to 25 countries to supervise the installation and support of sprinkler and fire alarm systems at U.S. embassies. In some parts of the world, he encountered a very different level of FPE awareness. "I don't mean to be disparaging," he says, "but the reality is that in some countries local workers aren't necessarily exposed to the standards and safety features we have in the U.S." In addition, the systems had to be operable for someone whose first language was not English. When tech support couldn't iron out a problem by phone, someone had to get on a plane to fix it. That took to him to Senegal ("Love that place!"), Uganda, Burundi, and some lesser-known places he claims most people would have to look up on a map.

Working in the private sector brought interesting projects, he admits, but government work offers a unique satisfaction. "In consulting, you give your advice and move on," he says. "If you did a good job, they might call you back. Whereas in government, if I do a good job, I live with it. And if I don't do such a good job, I live with that too."

Now, as a guardian of the seat of American government, Dallaire has returned to that ethic of civic responsibility. "The decisions you make, you



DALLAIRE, AMONG THE COLUMNS INSIDE THE LIBRARY OF CONGRESS.





own,” he says. “Many of these buildings are historical landmarks.” It’s a challenge to uphold modern fire protection standards in structures that were built before the new nation had fire codes—some were designed in the 1700s. They feature precious artwork, such as the frescoes of an Italian painter who’s been called the Michelangelo of the Capitol.

“You don’t just start drilling holes in Constantino Brumidi’s ceilings so you can drop sprinklers in,” Dallaire declares. “And you can’t just shove modern fire-protected stairwells into 100-year-old historic buildings.” Many Capitol Hill buildings feature sweeping marble staircases that are visually stunning, but would not protect crowds fleeing a fire. Dallaire has worked with building managers, designers, and outside regulators to develop alternatives with horizontal fire barriers and other features that provide safe passage through a protected escape route. “We can’t just throw up a big old block wall in what’s supposed to be a beautiful open corridor,” he says. “You’ve got to find alternative ways to provide a level of safety while preserving the historic fabric of the space.”

The solutions are created in collaboration with design engineers and architects, and implemented by the AOC’s specialized carpenters, electricians, plumbers, and craftsmen. “Some of the highest-risk areas are actually their shops, and we have to mitigate risks there as well.” Pointing out that AOC safeguards the enduring symbol of the republic, he says, “We’re not designing for a 40-year life cycle for these buildings. They’re a couple of hundred years old, and we want them to be working for another couple of hundred years.”

It’s not so much an aesthetic challenge, he says, as a people challenge. “Nothing is more important than the people who come here, and the business of Congress. If a fire alarm goes off at the wrong time, or if construction is causing excessive disruption, that’s a problem. We work hard to make sure that doesn’t happen.” It’s a complex responsibility to keep government running, unobstructed.

Asked to name the most important object he safeguards, Dallaire’s answer is surprising. Instead of irreplaceable archives or precious artwork, he names a rather plain structure: “The one we construct every four years: the Inaugural grandstand.”

That wooden structure is over 10,000 square feet in area and seats more than 1,500 dignitaries. They’re flanked by thousands of standees, looking out at a sea of spectators. Dallaire watches out for all those lives, as well as the workers doing the construction and the fire department personnel charged with response. It becomes a number one priority to ensure that the project is safe—and on time.

“It’s a hard deadline,” says Dallaire. “We can’t have a safety mishap during the construction, or even a small fire. There’s no room for error.”

While many Americans look forward to watching the next president take the oath of office in January 2021, Dallaire expects to be on the job, as he was for the last two ceremonies, making sure that all systems are go. “The whole world is watching,” he observes. “Even though it’s not a physically historic feature, like the Capitol dome or the works in the Library of Congress, it’s something we do to show the world what America is about. I have a small role in that peaceful transfer of power, to make sure that from a fire and safety perspective, everything goes as it’s supposed to.

“It’s hard not to be inspired when I walk from my office to anywhere on the Capitol campus, and I see the dome, the grounds, and all the changes. I think of what’s gone on here for 200 years. I feel blessed, every day, working here.” **J**



EYE TRACKING WALL
THIS IS OUR THINKING WALL. WE USE IT TO SEE THE WHOLE PICTURE OF OUR RESEARCH, AND COME UP WITH OUTSIDE-THE-BOX SOLUTIONS. THIS EXAMPLE IS OF AN EYE TRACKING PROJECT, WHERE WE ARE TRYING TO SEE THE IMPACT OF TWO DIFFERENT DESIGNS ON HOW PEOPLE PROCESSED THE INFORMATION THAT WAS PROVIDED TO THEM.

PHOTOS: WATT HEALEY

Soussan Djamasbi

ASSOCIATE PROFESSOR, INFORMATION SYSTEMS, USER EXPERIENCE AND DECISION MAKING (UXDM) RESEARCH LABORATOR

STUDENT RESEARCHERS

THE MOST VITAL REPRESENTATION OF MY WORK WOULD BE MY STUDENTS. HERE YOU SEE SOME CURRENTLY ENGAGED IN INNOVATION WITH UX RESEARCH. THEY WORK ON DIFFERENT PROJECTS THAT USE TECHNOLOGIES SUCH AS EYE TRACKING AND AUGMENTED REALITY. THEY UTILIZE THE DESIGN THINKING FRAMEWORK AND UX THEORIES TO DESIGN NOVEL DECISION SUPPORT TOOLS FOR SMART AND CONNECTED ENVIRONMENTS.

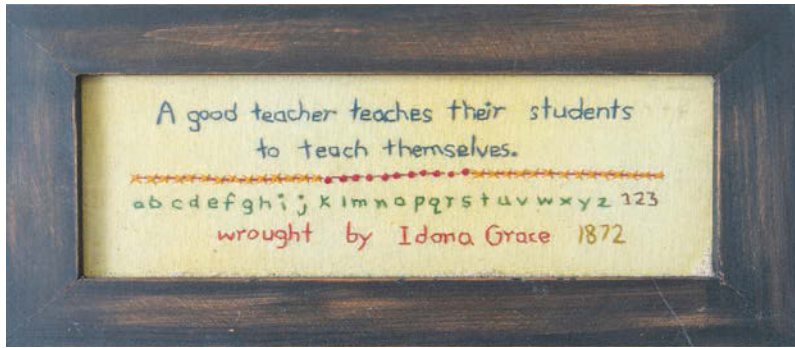


SAMPLER

A TREASURED GIFT (AND MESSAGE) I RECEIVED FROM A FORMER STUDENT AND HIS FAMILY.

CERTIFICATE

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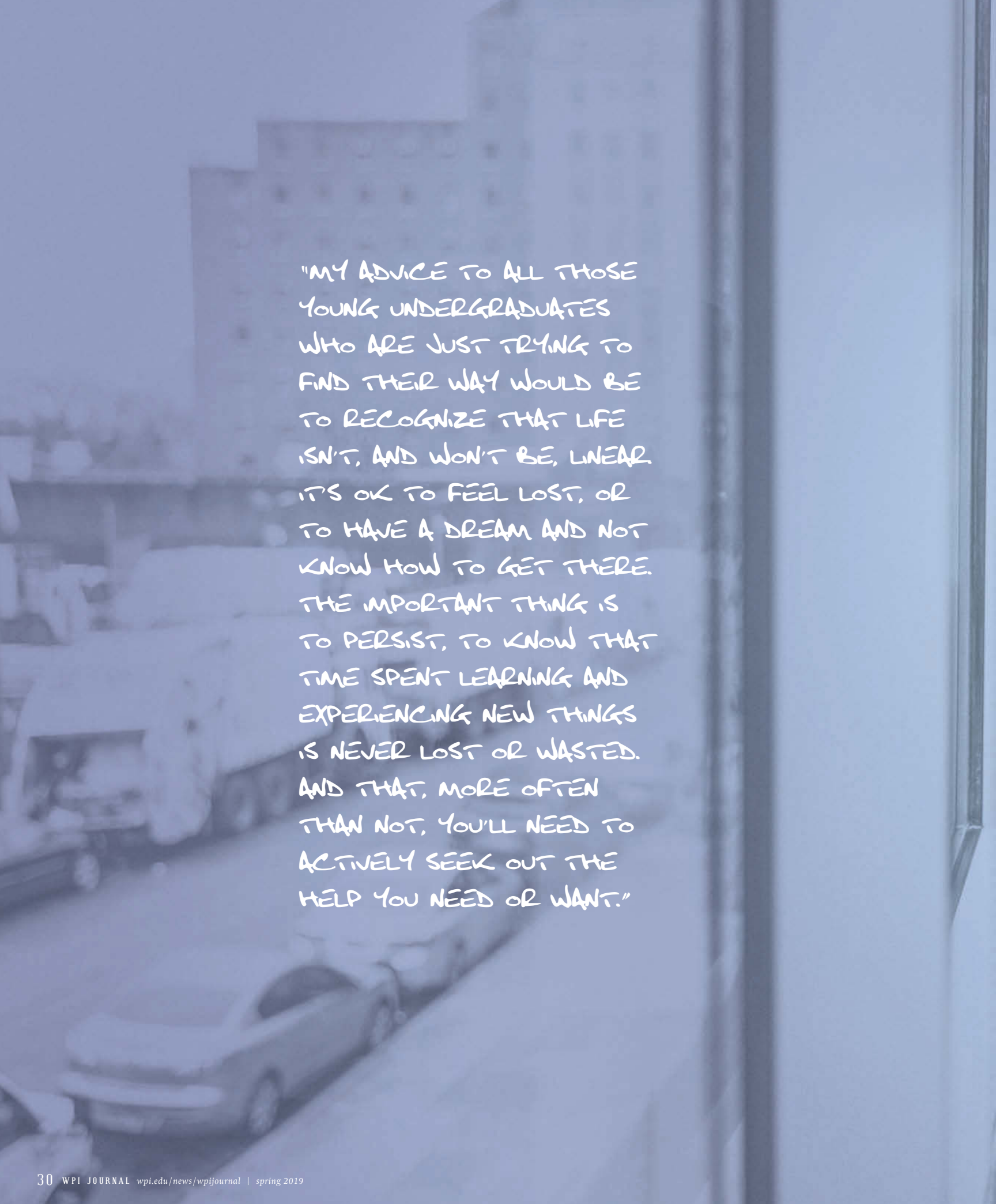
MY TEAM

THE OPEN HOUSES AND OTHER LAB EVENTS REQUIRE A GREAT DEAL OF PREPARATION AND WORK—THE STUDENT/ALUMNI TEAM PUT IN MUCH TIME AND ENERGY TO MAKE THEM SUCCESSFUL. THEIR DILIGENT CARE AND TEAMWORK MEANS SO MUCH TO ME AND TO SEE THEM WORK TOGETHER IN SUCH HARMONY IS ABSOLUTELY DELIGHTFUL.

BUSINESS CARDS

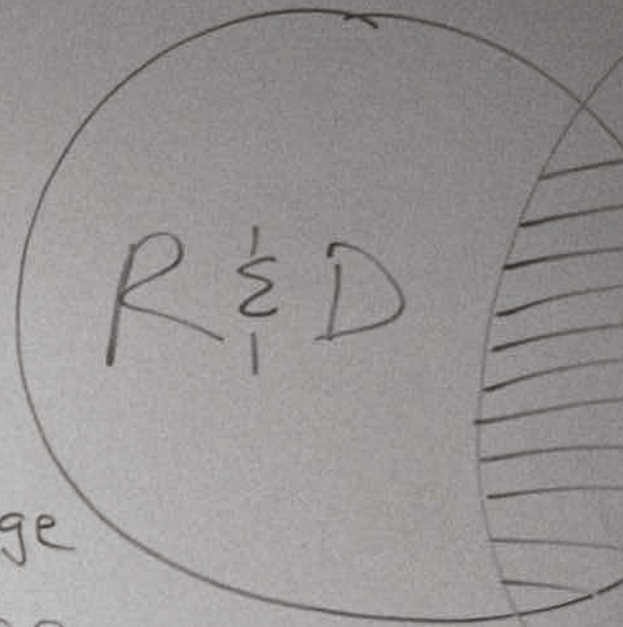
THESE CARDS REPRESENT JUST A HANDFUL OF OUR STUDENTS WHO HAVE DECIDED TO FORM THEIR OWN BUSINESSES. SEEING HOW OUR STUDENTS ARE MOTIVATED TO DREAM BIG IS INDEED WHAT MAKES TEACHING A GREAT JOY FOR ME!





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THE IMPORTANT THING IS
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HELP YOU NEED OR WANT."

BY JOHN MARTIN | PHOTOGRAPHY MATT FURMAN | ILLUSTRATION LAPW



Cartilage
Engineering
the Future

↳ OA
↳ EpiBone

Clinical
Translation



TERRI
-ANN
KELLY
'98

a Journey
to PURPOSE

TERR-ANN KELLY

came to WPI uncertain about how to differentiate among all the choices. But she found her way, within the school's unique culture, to her passion. It's not unlike what she does today as lead cartilage tissue engineer at biotech innovator EpiBone – growing stem cells in a special culture, from undifferentiated state to bone and cartilage, and finding their function as individualized replacement parts for the human body.

"I bounced around among different interests before settling on biotechnology," she says. "My advice to all those young undergraduates who are just trying to find their way would be to recognize that life isn't, and won't be, linear. It's OK to feel lost, or to have a dream and not know how to get there. The important thing is to persist, to know that time spent learning and experiencing new things is never lost or wasted. And that, more often than not, you'll need to actively seek out the help you need or want."

Kelly got much of that help from Jean King, now WPI's Peterson Family Dean of Arts and Sciences. "Though her work was in neuroscience, I worked in her lab [at UMass Medical School's Center for Comparative NeuroImaging] throughout my undergraduate years and beyond, benefiting from her mentorship," she says. "Her support and encouragement remains one of the most pivotal influences in my career, for which I will always be in her debt."

Kelly was born in Kingston, Jamaica, and spent the first 11 years of her life on a small farm in St. Catherine, an area now part of the city of Portmore, on the island's southern coast. It was a hardscrabble life amid the sugarcane fields, with no running water, electricity, or indoor plumbing.

She sees the sunny side. "The two houses on the property were

teeming with my family as well as my extended family, so I always had someone to play with," she says. "From swimming in the irrigation canals that supplied our sugarcane fields to eating fresh fruits straight from the trees, my childhood was rather idyllic and fueled my curiosity to know more about the natural world."

Good schooling nurtured that curiosity. She attended basic and primary schools modeled on the British school system, which prioritized math and science "at an accelerated pace compared to the U.S. school system," she says. "Luckily, these were the subjects in which I excelled."

She moved to Springfield, Mass., in 5th grade; in high school she concentrated on honors courses in math and science, and developed a love for biology and physics. This led to her participating in Science Olympiad, and eventually to WPI, where she earned her BS in biology.

Her academic strengths notwithstanding, the move from secondary education to college took some adjustment. As a woman and a minority, she participated in the inaugural cohort of the Excellence in Mathematics Science and Engineering Program (EMSEP), designed to help underrepresented students transition into the overall WPI community.

"This was a defining experience for me, highlighting issues of race and gender in higher education, which are still very much a challenge in academia to this day," she says. "I owe a great deal of thanks to Blanche Pringle, director of the program. She was a mentor who pushed me to seek leadership roles, in addition to being a source of emotional support."

Kelly is a leader now. When she was first hired at Brooklyn, N.Y.-based EpiBone, she and her research technician did most of the cartilage research and product development

themselves. Now, as lead engineer, she oversees research and development of the company's cartilage tissue products.

"In the two years I've been at EpiBone my role has evolved," she says, "and I now provide guidance to our team of technicians, research associates, and scientists who perform the day-to-day work."

Being at a start-up means that role continues to be fluid, and she wears many hats. A typical day includes mentoring direct reports, meeting with members of other research teams to resolve cross-functional issues, and working with the chief scientific officer and assistant director of research to plan out upcoming projects and milestones. She also manages cartilage project workflow, negotiates with vendors and suppliers, interacts with thought leaders, presents research plans and results, and writes grants, regulatory documents, protocols, and reports.

Collaboration is central to her work. "It's no secret that it takes a Herculean effort to bring any biotech product to market, and we are no exception," she says. "At a minimum, collaboration begins and ends with effective communication, and that is something that must be a constant company-wide priority."

While fostering that collaborative environment, Kelly and her company take a no-nonsense approach to talent recruitment and external networking. "To maximize our payroll dollars, we hand-select only those employees who bring a multitude of skills to the table," she says. "Looking outward, we have crafted a diverse network of relationships with academic institutions, physicians, regulatory experts, hospital systems, and government agencies, strategically selected to further our corporate objectives."

Kelly, who earned her PhD in biomedical engineering at Columbia University, was a visiting research scientist at Queen Mary University

of London and has co-taught a module on cartilage tissue engineering at the MIT Media Lab. She relishes that mix of scientific pursuit and business engagement.

"I have found that I really enjoy working in a biotech start-up," she says. "I can use my scientific expertise in a way that has a clear commercial goal, and that will also help an entire population of patients who are in desperate need of new, innovative solutions. In this arena you are forced to evaluate your work not just from a scientific perspective but from angles of scalability, regulatory challenges, and market adoption. This adds an entirely new element of risk and challenge."

Toss in a strong dose of humanity and you get a clear picture of the kind of person the stem that sprouted on a Jamaican farm has matured and grown into.

"Ultimately, like everyone else at EpiBone, I hope to at least play a small part in something that might eventually have a meaningful and lasting impact on the lives of those who might one day use our products," Kelly says.

She and her colleagues at EpiBone are part of a wave of personalization cresting over the healthcare industry. She explains that as we move away from the assembly line-era way of thinking, a consensus has emerged, especially in medicine, that "one size fits all" is a fallacy.

"I feel very comfortable stating definitively that bioengineered products and personalized solutions are the future of medicine," she says. "Ushering in this new era will undoubtedly bring with it uncharted and unforeseen ethical and societal challenges, while in the same turn it will drastically change the quality and trajectory of the average human life."

As an eager participant in this era, Kelly's got her own rallying cry: "History is being made now, and I don't plan to watch from the sidelines!" **J**



THE BEST VERSION OF YOURSELF

I have most definitely had to overcome barriers and challenges that have come my way simply because of my race and/or gender, especially in the notoriously slow-to-change realms of science and academia. Also keep in mind that I faced these obstacles long before the current cultural awareness that has been brought about by movements like #MeToo and Black Lives Matter. Unfortunately, there is often little recourse when faced with the subtle discrimination that pervades professional environments, even to this day. I've found that oftentimes the best solution is to find a place where you can be accepted for who you are, and if that's not immediately possible, to be the best version of yourself you can be, and let your skill and talent speak for themselves. Thankfully, I've been fortunate enough to have found a place at EpiBone, where despite the small size of our team, we have purposefully cultivated diversity across race, gender, nationality, sexual orientation, and age.





ON THE BIOTECH FRONTIER

The human body is a hardy warrior, but sometimes traumatic injury, genetic defects, or illness can create conditions that exceed its natural capacity to repair bone. “EpiBone’s mission is to use groundbreaking research to transform skeletal repair,” Kelly says. “Using adult mesenchymal stem cells, EpiBone has developed a unique three-step process: imaging and stem cell extraction, customized graft and bioreactor design, and tissue growth. Our technology is based on the PhD work of Sarindr Bhumi-ratana, our chief scientific officer and co-founder; the work in bone and cartilage tissue engineering emerged from Gordana Vunjak-Novakovic’s laboratory at Columbia University.”

The process begins with a computed tomography (CT) scan that defines the exact 3D size and shape of the bone a patient needs in order to create a personalized, anatomically precise model, or “scaffold.” Stem cells are isolated and expanded from a patient’s adipose (fatty) tissue sample and seeded onto the scaffold, which incubates inside a customized bioreactor that mimics bodily conditions like nourishment, temperature, and pressure that enable bone to grow. This biomimicry encourages the stem cells to differentiate into osteoblasts – cells responsible for the synthesis and mineralization of bone – that remodel the scaffold into living bone. (The process is also being developed for cartilage and osteochondral applications). EpiBone’s proprietary method is designed to create new, fully functional tissue without the multiple surgeries, graft rejection, and lack of long-term integration that characterize current treatments, potentially allowing patients to heal quicker and with an improved quality of life.

“The final product is a living graft ready for implantation, which we expect will seamlessly grow and integrate with the patient’s native tissues,” Kelly says. “This work is made possible through our developments in bioreactor design, media optimization, and countless experiments to quantify and standardize graft quality. From design to implantation, the entire process can be completed in just five weeks.”



Joe Quinlivan '95



The man behind the machines

BY ERIN PETERSON | PHOTOGRAPHY MATT FURMAN



If you do a search for Amazon warehouse robots, the results will eventually lead you to a short video that has been viewed more than three million times.

In it, hundreds of orange robots that look like heavy-duty Room-bas whirl across a cavernous warehouse floor. Their job is to lift and transport yellow storage pods, roughly the size and shape of old-school phone booths, that are filled with individual totes crammed with products ranging from waffle irons to football helmets.

The machines' movements are so precise and coordinated that it looks like a mechanical ballet. The video title itself perhaps sums it up best: Amazon Warehouse Robots: Mind-Blowing Video.

Even **Joe Quinlivan**, who has more than 100,000 of these robots under his purview as president and COO of Amazon Robotics, admits that there are moments when seeing that synchronization still feels nothing short of magical. "You see all of these robots working seamlessly and flawlessly to help fill customer orders on [a massive] scale, and it's pretty amazing," he says. "You can see even the nuances of the robots' behavior change over time if you hone your vision."

In a world that increasingly relies on the purposeful collaboration of humans, robots, and artificial intelligence, there is no question that Amazon will be one of the companies at the forefront. And Quinlivan will have an outsize influence on determining that direction.

A promising start

If he couldn't possibly have predicted where he'd be when he graduated (in 1988) from the University of Massachusetts Dartmouth with an engineering degree – Amazon was years away from launching – he did stand out as a leader early on.

He recalls being quickly promoted at Stratus Computer, his first job out of college. "I was maybe 24 or 25 and managing teams of technical people who had 30 years of experience," he says incredulously. "I felt like I was doing it by the seat of my pants."

It was that sense of uncertainty, along with a willingness to grow, that ultimately led him to WPI to get a master's degree in business administration and management, and then another in computer science. He was eager to learn more about systems engineering and leadership, and WPI offered both the practical programs and the part-time schedule he needed as a busy adult with a career.

Quinlivan's work at WPI stretched over a decade, 1992–2002, and it was anything but easy. "I'd work, then I'd go to school at night," he recalls. "Then on weekends, I'd go to the WPI library and get all my work done. It was hectic. It was demanding. But I loved it."

After a few years at Stratus, he landed at Nexion, a start-up that developed data networking products. When that company was acquired by Fujitsu Network Communications, he headed to Telica, another start-up that worked on Voice over Internet Protocol (VoIP) solutions. As a member of the executive team, he guided the company's strategy and helped scale up the engineering team from 5 to 150.

He remembers the impact of the work – for example, the moment



that Teleca's 3G VoIP product launched in New York City. "I happened to be walking around New York the following day," he says, "and I saw people talking on their cell phones. And I thought: those phone calls are going over the Voice over IP switch [Teleca] just turned on yesterday."

If his workdays at the start-up were busy, Quinlivan's nights at home were no cakewalk. While he was at Teleca, his wife gave birth to their first set of twins; just 18 months later, she gave birth to their second set. (They're now seniors and sophomores in high school.) He still marvels at that moment in his life. "We had four kids in diapers, I was doing a start-up, and Kim was still working," he says. "It was a difficult time."

Building a (human-friendly) behemoth

Eventually, Quinlivan landed at Kiva Systems. The company, which designed and manufactured mobile robots, was later sold to Amazon, where he has since taken the helm.

Today his job includes leading its hardware, software, finance, and manufacturing teams while making sure that the thousands of robots deployed across Amazon worldwide are working as efficiently and effectively as possible. (When your company promises to get a world's worth of products to almost anyone's doorstep in two days – sometimes in an hour or two – every second of boosted efficiency counts.)

While the mobile robots zipping around the warehouse floor have earned plenty of press, the organization's work also includes everything from software development to machine assembly. Quinlivan and his team have worked relentlessly to find ways to fulfill customer orders more efficiently in warehouses. They make sure the most popular purchases are physically closer to the associates picking the orders than are the rarely purchased items; they make sure that when one machine learns something important, it seamlessly communicates that lesson to its 99,999 robot peers.

But even more than that, Quinlivan seeks to help his team think bigger: an engineer who solves one specific problem might, with a bit of tweaking, be able to use that same approach to solve related problems in different areas of the organization.

Scott Dresser, director of product and systems at Amazon Robotics, says that Quinlivan stays focused on solving problems in ways that have the largest and longest impact. "Joe's guidance has focused [our] team on making the right decision to develop a platform, not just on the product at hand," he says. "[At times] the team could have easily taken the approach that would have served the specific needs of that product but would have limited the opportunity to leverage the underlying robotic technology in new applications."

If Quinlivan is focused on finding new ways to make the most of the robots' skills, he's hardly one to imagine an all-robot future. (Amazon's employment numbers, which are skyrocketing rather than diminishing, seem to bear this out.) Instead, he sees humans not as extraneous to our robot future, but essential to it. "Humans are really good at certain things. They're weird and they're wildly creative," he says. "We shouldn't be trying to box them into some sort of bounded behavior that limits their true capabilities. We need to make sure that robots empower humans to do what they really want to do and adapt to it."

For example, humans still tend to be better at picking up individual items and moving them around – a seemingly simple grasping motion

for humans turns out to be brain-crushingly complex to program. Similarly, humans are sharp enough to notice a leaking container of laundry detergent and make sure it doesn't get shipped to a customer.

But humans also have their quirks. For example, testing has shown that people tend to have blind spots when they're putting away inventory – for example, an individual might consistently fail to notice open spots in the lower section of an inventory pod, even if they've been told there's space. (If you've ever searched tirelessly to find a specific item in the grocery store, for example, only to have an employee point out that it's almost literally right in front of you, you're already familiar with the idea.)

Instead of trying to train people to fix their biases, Quinlivan makes sure the robots are designed to work around people's idiosyncracies. "We learn, over time, where people like to put inventory," he says, "and then we make sure we only bring over pods that have space where they like to put it. The robots learn individual associates' behaviors and adapt to them."

Quinlivan's ability to see where robotics needs to head to be most effective – and to speed forward to that future at Amazon's scale – has earned admirers including Matt Lyman, director of software engineering at Amazon Robotics. "Joe has been able to take a robotic product from a small Boston-based start-up company to meet the scale and demand of Amazon's fulfillment network," he says. "He doesn't often speak publicly, but he should be recognized as a real leader in the robotics revolution going on around the world."

For Quinlivan, the real joy of his job isn't about the robots themselves – it's about the positive impact they have on those who work with them. "You start with nothing more than a sheet of paper, you put so much energy into it, and then eventually you see [the solution] go live across the globe and have an impact on the business and the end customer," he says. "There's nothing better than seeing your work go live and watch it work incredibly well." **J**

The WPI-to-Amazon Robotics pipeline

The university and the company have built a solid connection, thanks in part to Quinlivan's support.

Though it's been nearly two decades since he last stepped on the campus as a student, Joe Quinlivan continues to maintain a connection to WPI. He says Amazon has benefited from the knowledge of professors, the support of administrators, and the energy and talent of students and alumni. "[At Amazon,] we recruit heavily out of WPI, because [students and graduates] are incredibly smart and capable from day one. WPI's project-based curriculum prepares them to be successful early in their careers."



PHOTO KATHLEEN DOOHER

When **Elena Ainley '12** was inducted into Alpha Psi Omega National Theatre Fraternity, it was in front of a large cross that happened to be onstage for a production of *The Crucible*. She had no idea that this would foreshadow her present role as a cloistered contemplative Benedictine novice, now appointed as Sr. Maria Mechtilde, OSB (Order of St. Benedict), at St. Scholastica Priory in Petersham, Mass.

Elena came to WPI for an IMGD and Humanities and Arts (with a concentration in Theatre) double major, having visited the campus for the first time on the way back from a spiritual retreat at a local contemplative monastery.

"Just from walking around the grounds, I knew that it was where I wanted to go to college," she recalls. "The school was beautiful and well-established, and the students were nerds like me so I knew I'd have no problems fitting in."

Typical of many freshmen, she wasn't entirely sure what her major would be, only that she hoped to combine her love of technology, art, and video games. "In the back of my mind I knew I wanted to do something involving my faith as well," she explains. "I think I imagined that this would take the form of some kind of faith-themed video game once I was

well-established in my career, but God had other plans, as they say."

After graduation she worked at a small web development/gaming company, yet had a major reawakening of her faith in 2015 that shifted her course. Knowing that her Catholic faith was the most important thing in her life, she realized that she'd been trying to shoehorn a life of faith into her world. "I was praying in a nearly empty church one day and asked God how I could love Him better, when I got a very distinct call from God to give up everything that was important to me to come follow Him—everything from my phone to my loved ones. I knew that this meant joining the religious life but, admittedly, I was petrified," she recalls.

Cautiously she began to research and talk with sisters in religious orders. After a quick Google search, she discovered St. Scholastica Priory's Monastic Experience Weekend, held twice a year for young women interested in becoming contemplative nuns. "I was totally bowled over by how balanced and beautiful their life of simple, holy joy was! After taking a month of unpaid leave from my job to spend at the priory, I knew that this was for me," she explains.

Sister Mechtilde says she's grateful for her theatre major, because singing in front of people

every day can be daunting. She also says WPI's seven-week courses developed her ability to learn quickly, which she calls "a huge blessing" in her current work. Professor David Adams's cell bio class experience comes in handy with the priory's new cheese making endeavor, and her technical background is beneficial to her role in keeping the priory's computers running smoothly. In IMGD, she learned how to sustain engagement through a "difficulty curve."

"To my surprise, all of these things crop up in a life of prayer with God," she says.

As a novice, she and her fellow sisters gather seven times a day to chant psalms in church; they have set times throughout the day for reading the scriptures, private prayer, meals, manual labor, and study. The goal, says the sister, is to cultivate a sense of silence and solitude conducive in the presence of God.

As she explains, "The positive difference it makes from how my daily life used to be is astounding. Even the worst day here is better than the best day in my old life, because everything that I do—even taking out the trash every day—is being used by God to send graces to the whole world."

—Doreen Manning



WPI



"I credit the fine educational experience I received at WPI as the basis for my professional success and personally fulfilling career in civil engineering and have long felt an obligation and deep sense of gratitude to the university. With a gift through my estate to establish an endowed scholarship, I am able to help civil engineering students prepare for their start in a rewarding, professional career."

Richard J. DiBuono '62

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OVER
[EARLEbridge]



FROM THE DESK OF

David Wheeler '93, '04 MS

Alumni Association President

TO DO-

- ✓ Register for Alumni Weekend: May 30-June 2, wpi.edu/+alumniweekend. Fun for everyone-special anniversary events for classes ending in 4 and 9.
- ✓ Sign up for WPI TechConnect-the new online portal just for WPI alumni-wpi.edu/+techconnect.
- ✓ Be part of WPI's tradition of giving-wpi.edu/+give.

CONGRATS-

TO THE COMPUTER SCIENCE DEPARTMENT-

on its 50th Anniversary, celebrated by alumni and friends on March 16

TO GRADUATES OF THE LAST DECADE-

on another packed GOLD Winter Social in February

COMING SOON-

- ✓ April 6: The Women of WPI and Women's Impact Network co-host a special day of events for alumnae, faculty, and staff-more info and updates via email
- ✓ May 30 (Alumni Weekend): Grand opening of the Alumni Center at Higgins House-details in the summer issue of WPI Journal

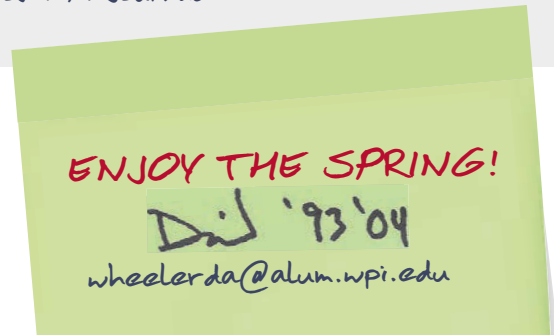




ILLUSTRATION MICHAEL MULLAN

More than four decades after Jim Fowler '78 sang his last note as a student member of the WPI Men's Glee Club, the music—in all its ethereal tonality—continues to stir deep passion and joy.

"There was something, and still is something, about the sound, particularly of male voices in four parts," he says. "That music speaks to me."

It's why the retired engineer from Virginia Beach, like so many Glee Club alumni who came before him who have since graduated, regularly returns to campus to sing with the 50-member group. Alumni involvement is a longstanding tradition that's played out over the 145-year history of the Glee Club—one of the oldest in the country.

"Most people don't realize that engineers have that creative side to them," says Fowler, who has performed a dozen times on campus since graduating.

For Joshua Rohde, director of choral activities, alumni participation is an acknowledgment of the deep fraternal bonds forged by students over song and shared academic journeys. About 30 former members typically return to sing during Choral Alumni Weekend each spring.

"The Glee Club is such a community of brotherhood, and it's more than just singing," he says. "Many people develop lifelong friends and memories here. A lot of alumni return to reminisce or reflect on their time when they were undergraduates and to encour-

A GLEEFUL BROTHERHOOD

age and show their support of the current students."

There's no shortage of memories among Glee Club alumni. During his student days, Fowler performed with the group in England, Germany, and Austria. The Glee Club also has released recordings of its glees, or short songs, that include spirituals, sea shanties, and classical pieces such as Edvard Grieg's anthemic *Brothers, Sing On!*

The group will perform eight concerts in Worcester this year with its female counterpart, Alden Voices, in addition to touring Germany and the Czech Republic. The Glee Club is releasing a disc this year, "World War I Remembrance

Concert," a compilation of English music that includes works by Ralph Vaughan Williams.

As a "non-audition group," previous singing experience isn't required to join. Some members "have never sung a note before," Rohde says, but they were drawn to the Glee Club for its strong sense of community.

They included Nick Hewgley '15, a humanities and arts major who sang in the group all four years. He enrolled at WPI from his home state of Texas, "which means I pretty much knew no one when I went up there.

"The Glee Club was the organization that really got me into the

WPI culture right off the bat," says Hewgley, the Director of Communication and Development for Alpha Chi Rho National Fraternity. "It gave me a sense of family. It's one of the things I credit for giving me such a great experience at WPI."

He plans to return to campus to sing in March, for the second time since graduation. The Neptune, N.J., resident is making the trip, in part, to visit younger members he knows from his student days. "I want to catch up with them, see what they're doing with their lives, and sing with them."

Among Hewgley's favorite pieces of choral music to sing is "Steal Away," a Negro spiritual that contains hidden messages for slaves who embarked upon the dangerous journey to freedom along the Underground Railroad.

Many Glee Club singers say performing is an effective way to the leaven the stress of their rigorous coursework.

"Without a doubt, they'll say there's no way they could do their studies if they didn't have the music," Rohde says. Up to 500 WPI students take musical coursework every term, he notes.

In the meantime, the Glee Club will continue working its almost century-and-a-half-long recipe for success.

If the music doesn't move you," Fowler says, "then we're not doing the right music. It's all about moving people to feel what's in there."

— Andrew Faught

A photograph of Michael Mazzuco '86 and Jena Mazzuco '17 sitting on dark grey bleachers. Michael is on the left, wearing a blue suit, white shirt, and a colorful patterned tie. Jena is on the right, wearing a red dress and black high-heeled shoes. Both are smiling at the camera. The background shows the rows of bleachers in a dimly lit setting.

MICHAEL MAZZUCCO '86 AND JENA MAZZUCCO '17

SHARED EXPERIENCE

Michael Mazzucco was a first-generation college student and the first among his seven siblings to earn a degree. Money was tight when he was growing up, so he went to a less-costly two-year technical college before transferring to WPI. Once there, he squeezed three years of academics into two, graduating with a BS in civil engineering. If he has any regrets, it's that his grueling schedule didn't leave time to play sports or immerse himself in college life.

But then he got a do-over in the form of his daughter, **Jena '17**.

"When she went [to WPI], I got more involved," says Mazzucco, who is a member of the President's Circle, WPI's leadership group of annual donors, and frequently attends university events. "That's been a great experience for me, to sort of make up for the stuff that I didn't do when I went to school."

Mazzucco was expected to join his father's construction business after high school. He was a gifted

student, so his father agreed to let him attend the local technical college instead. After earning an associate's degree, he visited WPI and "fell in love" with the school. Worried about money, he overloaded on classes and spent summers back home in Connecticut, working two jobs, six days a week. After earning his BS, he received a professional engineer license and formed his own civil engineering firm in Danbury, Conn., Michael J. Mazzucco PC.

From the time his two kids were small, he emphasized the importance of education and hard work. But he also encouraged his children to find their own passion. He hired Jena and her older brother, Anthony, to help out at his civil engineering firm, just as Mazzucco and his siblings had worked for their own father's construction company while they were growing up.

Anthony gravitated toward business while Jena excelled at science,

technology, engineering, and math. But going to school at WPI wasn't a given for her. It wasn't even necessarily a goal. She just wanted to go to a college where she could play Division III field hockey and major in biomedical engineering.

Jena ended up applying to several schools, including WPI. While she considered her options, her dad was careful not to influence her choice.

"I swore to myself I would never pressure her in this decision," he says. "The last thing I wanted to do was sway her to go to a school that she didn't like."

It wasn't until Jena attended Accepted Student Day that she knew WPI was where she wanted to be. She got to know the field hockey coach and players. She saw the people she would be interacting with each day. She felt that WPI would be a home away from home. Her decision was confirmed her first day on campus when the entire field hockey team turned out

to move her into her dorm.

Jena pledged Phi Sigma Sigma and changed her major to chemical engineering. She played field hockey all four years at WPI. She traveled to New Zealand for her IQP and with her team earned a President's IQP Award for their project, "Stakeholder Study: Resource Management of Wairarapa Moana." Upon graduation, she took a job as a materials engineer with Brooks Automation in Chelmsford, Mass.

In short, she has made her father very proud.

"I see how happy he is when he talks about me and WPI, and I know that he never, ever pressured me, and I never felt that I had to go to WPI or I had to do this for him," Jena says. "It was completely my decision. But now that I've graduated—now that I've gone through it—it's been an awesome bond between us because we have this thing that we share now."

—*Sharron Kahn Luttrell*



CHARLES DICKENS ON THE HILL

Dan Ryan donates impressive collection to WPI

Dan Ryan was a freshman at Hotchkiss, a boarding school in Connecticut, looking forward to going home over winter break, when his English teacher assigned a small blue book. Dan cracked the cover that weekend and settled in to read *A Christmas Carol* by Charles Dickens. By the time he got to the visit from the Ghost of Christmas Past, he was hooked.

“Scrooge returned to his boarding school and saw his young friends on a stagecoach leaving to go home for Christmas,” says Dan, “and that made an impression because I was in the same position in a way – waiting to go home.”

Sixty-five years later he has amassed an impressive collection of Dickens letters, first editions, original artwork, and memorabilia. Though he earned his undergraduate, master’s, and PhD from Yale University, he has bequeathed his Dickens collection to WPI, where he feels it will have a sizable impact. The Daniel and Alice Ryan Collection on Charles Dickens, together with the Robert D. Fellman Dickens Collection, makes WPI a

world-class destination repository for the study of Charles Dickens, according to Arthur Carlson, assistant director for archives and special collections at WPI.

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

Dan continued reading Dickens through boarding school years and in college. He was studying chemical engineering at Yale when his mother unknowingly seeded her son’s collection. The family had moved into a new home with a fully stocked library that included a complete set of Dickens’s works—about 30 volumes in all. Naturally, his mother gave the set to her son, setting him on his decades-long pursuit of rare Dickens artifacts.

Dan married Alice Castle in 1961, then went to work as a process research engineer with Exxon in 1965 after completing his

graduate studies. The couple had two sons and over the decades, the family bounced between Houston and Baton Rouge, packing up and transporting their growing Dickens collection with each move. When Dan retired from Exxon-Mobil, the couple settled on Cape Cod, installing the collection in a climate-controlled setting.

One of Dan’s favorite pastimes is sitting quietly among the collection, enjoying a good book.

He never gave much thought to what would eventually happen to the collection until David Paroissien, editor of *Dickens Quarterly*, visited from Oxford, England. Paroissien put Dan in touch with WPI professor and Dickens scholar Joel Brattin, who showed him the Fellman Collection and introduced him to the WPI Plan. Both impressed Dan and Alice. Dickens’s works contain deep lessons about the social and human costs of the Industrial Revolution. WPI’s strong emphasis on humanities is designed to encourage students to reflect on such lessons.

“There are a lot of parallels you

can draw between a post-industrial world and a post-Information Age world,” Carlson says. “I think our students are going through the same thing. They’re the first generation to have been born of the Information Age.”

The Dan and Alice Ryan Collection includes a dozen letters signed by Charles Dickens and several written to him—rare finds, given that Dickens burned many of the letters he received, Dan says. There is also an unused ticket to a Dickens reading in London, artwork by Dickens’s original illustrators, and steel plates used for printing first editions. The collection also includes hundreds of letters signed by the author’s circle of friends. But the item most treasured is perhaps the least valuable of the collection.

“I still have that little blue book,” Dan says. “It’s sort of like *Citizen Kane*’s ‘Rosebud.’ It’s in a prized location.”

—Sharron Kahn Luttrell

OVER
[EARLEbridge]



GIVING DAY

More than 1,300 alumni, parents, students, faculty, staff, and friends made Giving Day 2018 WPI's biggest day of philanthropy of the year. The entire WPI community—on campus and around the world—rallied to support the university and unlocked over \$100,000 of additional support for WPI students and faculty. While the donor total is the focus of the day, Giving Day is about something more.

"It's really about building a culture of philanthropy—or building upon a culture of philanthropy because WPI was founded on philanthropy," says Bill McAvoy, vice president for University Advance-

ment. "It was John Boynton's initial gift that created what we now know as WPI."

The entire community was involved through Giving Day Challenges: The Greek community and GOLD alumni exceeded their challenges, as did faculty and staff, who met a challenge put forward by Frank Hoy, Beswick Professor of Entrepreneurship and director of the Collaborative for Entrepreneurship & Innovation. Students in Club Athletics got behind the effort, rallying nearly \$2,000 in support from close to 30 alumni, parents, and friends; the Student Alumni Society (SAS) spent the day in the

Rubin Campus Center encouraging students to write thank-you notes to donors in exchange for a root beer float.

Stephanie Smieszek '19, SAS Student Engagement Chair for 2018 who led the "Notes and Floats with Grateful Goats" activity, says Giving Day was a great opportunity to talk with students, faculty, and staff about the importance of philanthropy at WPI.

"Any type of donation that goes toward a scholarship can really help," she says. "For example, I have a scholarship, and it's really helping me pay for college and all these great opportunities at WPI."

WPI community members wrote over 250 personal notes of thanks to WPI donors throughout the day. The Student Call Center was busy all day with students calling alumni, parents, and friends for the WPI Fund.

"Philanthropy is very important to the institution because it's what helps students receive financial aid, scholarships, and all the great facilities at the end of the day," says Harry Ramachandran '19, graduate student and Student Call Center manager. "All these things that students notice comes from alumni and their generosity."

the naval engineer life, but learned firsthand in Vietnam that I should not have been there. Now I am finding out the delights of meeting new friends all the time and learning their life's story."

1957

Boakfar Ketunuti writes, "My freshman year at WPI, I was looking at our new generation. Many still can speak their mother tongue of the old countries, and many are ready to make changes of this old world. Such drives have given me my BS CE degree and have brightened the path to success. I have never looked at us as a class of a new generation, or as immigrants in the country of Engineers. We are only trained engineers who are doing our professional work wherever and whenever we are called. We have done our best and are doing that now."

1958

Bill Rabinovitch wrote a tribute on the death of one of his early mentors in December. "I worked for the genius astrophysicist Riccardo Giacconi in 1962 as lead project planner for some of his most audacious groundbreaking space projects at American Science & Engineering in Cambridge, Mass. That was the year *Time* magazine put him on its cover. There was a point when we had a struggle over a new military project he was taking on that I considered unethical for the company and the world. Though he did everything to dissuade me, I quit in protest to become a full-time artist. Fortunately Congress got involved over rising public concerns over atmospheric radioactivity fallout from a planned new round of hydrogen bomb tests over America and it was cancelled at the last moment.

"Perhaps I played a small part. Riccardo was a giant figure leading projects like the Hubble Space Telescope and many others relating to deep space in expanding our fundamental knowledge of the universe. He won a Nobel Prize in 2002. My intellectual bent to expand the limits of what art might be in terms of consciousness-raising for humanity stems from those days I spent with Riccardo. RIP."



KAREN HUNTER, COURTESY THE SANDWICH ENTERPRISE

1940

Russell Lovell's niece Rebecca writes to inform us of his passing in December, two weeks after his 100th birthday. The month before, a story in *The Sandwich Enterprise* honored his upcoming centennial and his devotion to maintaining the town's history. Interviewed along with Rebecca, his devoted caretaker, he reminisced about growing up in Worcester and working for Standard Oil (now ExxonMobil) in the Far East. After retirement, he and his wife, Penelope (who predeceased him), moved to Cape Cod, where he became the town historian for Sandwich. His 525-page book, *Sandwich: A Cape Cod Town*, is now in its fourth printing.

1946

Bob Appenzeller writes, "I am still active doing what comes naturally: Living in Dayton, Ohio, ("Birthplace of

Aviation") among Buckeye trees and cornfields. I appreciate receiving the *Journal* that keeps me up-to-date on WPI happenings. We wish you all the best – happy holidays and future prosperity."

1950

News of the passing of **Bill Carpenter** in October was shared by his grandson Luke. Bill worked at Foster Wheeler Corp. (later, Foster Wheeler Energy Corporations) from 1951 through 1987. He was a past president of the Niagara Mohawk Alumni Chapter of WPI, and was very active in his local church and Boy Scout troop. In September Bill got to meet his great-granddaughter Finley, daughter of **Luke Marron '06** and **Katie (Hall) Marron '07**. (See photo, page 54.) Bill is survived by his wife of 68 years, Audrey, four children, ten grandchildren, and nine great-grandchildren.

1953

David Hathaway shares, "At our ripe old age the mission is to stay alive and healthy to fully enjoy ourselves. After drinking coffee all my life, until age 55, I had a chance to choose to change that habit to hot water. Besides feeling better, I have found that I have the bone density of a 50 year old." He adds, "Life is even better if you find the perfect senior retirement facility near your kids. Harriet and I have one right next door to our last home of 45 years. Before that we lived outside of the country in the Panama Canal Zone and Taipei. My travels have taken me to Europe, Africa, and Australia, with visits to Russia, New Zealand, China, Japan, and Vietnam, as well as India, Canada, Mexico, Costa Rica, Hawaii, Brazil, Argentina, Peru, Nicaragua, Honduras, Thailand, and Myanmar. The military took me to Morocco, Spain, Puerto Rico, New Brunswick, Iceland, Guantanamo Bay, Cuba, and Portugal. I loved

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– Natalie Grace '97

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1961

Henry (Hank) Alessio sends the following report, titled “Fraternity Forever.” In photo from left, **Dave Carlson, Hank, Svend Pelch, John Powers, Norm Noel, Len Johnson, Dan O’Grady, Bill Calder, and Jerry Mullaney**, enjoying the recent gathering.

Phi Sigma Kappa brothers from the Class of 1961 continue a tradition of mini-reunions. Early October 2018 found them on the shores of Lake Winnepesaukee, N.H., and on the Mount Washington cruise ship. Since graduation, every two or three years the Phi Sigs locate a pleasant corner of the world to renew the friendships that started in 1957 on the grassy quad in front of Sanford Riley Hall. Weddings, expanding families, and more serious life events have solidified the personal bonds.

Get-togethers have plenty of tall tales and memories to digest, but the highlight is a limoncello tasting competition. From scratch, brothers each produce a batch of limoncello, which is subjected to a blind tasting competition. This year’s trophy winner was the team of Beverly and **Jerry Mullaney**. (Beverly has deep Italian roots.)

The brew is formed from large lemons that are zested, stewed, steeped, stirred, and strained in a five-week process. (Reminiscent of Chem Lab!) During the delicate aging process frequent brewer tasting is required to ensure that the sweet flavor peaks at the time of competition. (Oh, not to be forgotten is the effect of grain alcohol.) Calendars are now being fixed for the next Phi Sig party.

1963

Warren Standley writes, “Barbara and I find it hard to believe that we have been at home in the quiet of Virginia’s Shenandoah Valley for 11 years, after trading the bustle, congestion, and traffic of suburban DC for the quiet forest and wildlife along the Shenandoah River. We keep busy with our family, which, over 56 years of marriage, has grown from four children to include 12 grandchildren, and six great-grandchildren. (Yipes!!!) We keep busy with civic, environmental, and conservation causes—for example, through membership in the local chapter of the Izaak Walton League of America. I enjoy fly fishing for the smallmouth that inhabit the river. Our



creative interests find expression in photography and woodworking, with ‘time off’ to enjoy our neighbors, as well as the deer, wild turkey, and black bear that roam our property. Life is good!”

1964

Dick Healing writes, “On Nov. 9, 2018, President Trump appointed me to the National Commission on Military Aviation Safety that was created in the 2019 National Defense Authorization Act. The NCMAS’s mission is to review aviation accident information and accident rates, which have been rising since 2013; determine causes; and recommend changes needed to reduce the loss of life and national assets. In 2003 I was appointed by President Bush (43) to be a member of the National Transportation Safety Board, following nearly 20 years as director, Safety & Survivability, for the Navy Department.”

David Stone sends this recap. “Retired from Cooper Power Systems (now Eaton) in 2012 and continued to support IEEE and IEC industry standards for them in a consulting role for five more years. Now ‘fully’ retired and living in Reading, Mass., I spend my time with two children, four grandchildren, and enjoy model railroading as a member of

the Boston Metro Hi-Railers (O-gauge), located in Wilmington.

1967

Bill Hyatt writes, “In October 2018 my wife, Alice, and I were honored to have Marcia and **Steve Cotter** visit us in Colorado. As we toured a few sites in Denver, we compared notes about our grandchildren. When the women shopped, the men took walks. Steve is the same weight as in our college days. (As for me—sort of.) Within the past year Steve renewed his pilot’s license and started flying for pleasure. He notes that his current passengers are more compliant than the passengers on Eastern and Southwest. Marcia and Steve’s daughter has been a partner in their interior design and construction business for 13 years. Along with **John Fiore**, we agreed to attend the 2019 Alumni Weekend.”

1968

Jerry Cronin writes of his gatherings with a group of alumni, including **John Harvey ’77**, president of Francis Harvey & Sons. “John and I meet regularly with others for our morning coffee at a small local coffee shop. Sharing stories and activities, we were all pleased to hear of John’s success in Connecticut, where

he had been awarded a large building contract for the State. The family construction business in Worcester has also done building and renovation at WPI.”

1971

John Marino received the Italian of the Year award from the Norwich (Conn.) Italian Heritage and Cultural Committee. After working for Westinghouse Electric’s large turbine division and United Nuclear Corp., he joined Pratt & Whitney in Middletown, working in various management positions for 25 years before retiring in 2015. He was lauded for his civic service in the town of Preston, including coaching youth sports, volunteering with Boy Scout Troop 75, and serving on the steering committee for a new senior activity group. He also founded an instrumental music program. He and his wife, Patricia, have three children and two grandchildren.

1972

Stephen Wilkinson reports, “After retiring from Gillette and Amgen, we moved temporarily to Fort Myers, Fla. Looking forward to a home purchase perhaps in The Villages. Will be doing some lean consulting.”



1973

WorldLifestyle, a digital media platform, included **Dean Kamen** in its list of “Billionaire College Dropouts,” along with Bill Gates, Steve Jobs, Mark Zuckerberg, and about 25 others. The item noted, “Obviously the experiences of rich people like Steve Jobs, Bill Gates, and, recently, Mark Zuckerberg show us that sometimes you just have to leave school to pursue your dreams.”

1975

Donald Confrancesco is president, chief financial officer, and treasurer of All Around Town Home Care, a business he created in 2013. He holds a master of public health degree from Yale. His community service and his credentials in health care administration were noted in *Marquis Who's Who*. He is included in national, regional, and career-focused editions of the publication.

Classmates **Allen Downs** and **John Greenstreet**, with their wives (**Donna Downs** and **Ann Bender**) reunited in

Cambridge, England, in October for a holiday in the locale where Allan once lived, prior to his retirement.

1978

Richard Bielen ('84 MS FPE) and **Hazel Fotheringham '85** were married on Sept. 2, 2018, at the Ocean Edge Resort in Brewster, Mass. “About 50 family members and close friends attended,” they report, “with a total of nine WPI friends – some from as far away as Utah and India.” Although Rich and Hazel were on campus at the same time, lived in the same town after graduating, and had mutual WPI friends, they didn't meet each other until 2017. They currently reside in Woburn.

John Bourassa reports that he just completed his first fantastic year with Polaris Alpha in Aberdeen, Md.

The Worcester Telegram & Gazette reported on **David Hawley's** family's sheet metal business, Howard Products, Inc., founded in 1948 by his great-uncle, Donald Ayres Howard. David, who is

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currently president, was credited with adding troubleshooting to the firm's services. The article noted, "Mr. Hawley, a fifth-generation Worcester Polytechnic Institute graduate, uses his background in mechanical engineering to help customers solve sticky problems they may have with a product." The company celebrated its 70th anniversary last year.

1980

Elizabeth (Roth) Benson is cofounder and CEO of B & G Educational Innovations and its wholly owned subsidiary, ReaLifeSim (RLS), based in Jacksonville, Fla. RLS designs and develops healthcare training tools that provide realistic experiences for future nurses, medics, doctors, veterinarians, and other clinical staff to practice their skills safely on a real person or animal while relating to their "patient" as they would in real-life situations. With the company's wearable products, clinical learners can safely "treat" each person, while the companion RLSimApp uses IOT technology to record and cloud-sync individual performances for remote instructor review. Elizabeth has more than 35 years' experience as an RN and higher education specialist. Learn more at bgei-educational.com.

1983

Derek Speed is a senior software engineering manager at Intel in Hudson, Mass. He has recently taken on a new role as lead for the Compiler Quality Engineering (CQE) team in the Intel Compilers and Languages (ICL) group. Derek recently celebrated his 35th anniversary with Intel, which includes the 15 years he spent at Digital Equipment Corp. after graduating from WPI. He joined Intel in 1998 when the company acquired DEC's Semiconductor business unit. Derek and his wife, Jennifer, live in Westborough, Mass., and have three daughters. His personal website is derekspeed.com.

1985

Paul Chodak, previously executive vice president – Utilities at American Electric Power, took office as executive vice president – Generation in January. He joined the company in 2001 and had served as president and chief operating officer of the AEP subsidiaries Indiana Michigan Power and Southwestern Electric Power Co. He holds a doctorate in nuclear engineering from MIT and a master's degree in civil engineering from Virginia Polytechnic Institute

and State University. He also completed MIT's Reactor Technology Course for Utility Executives and the Harvard Business School Advanced Management Program.

1986

Sharon Measer Lessne writes, "My husband, Eric, and I became grandparents on Oct. 2, 2018. Brycen Oliver was born to our oldest daughter, Jaime, and her husband, Andrew. We are so happy to be able to spend time with our grandson and watch him grow!"

1987

Lisa (Anderson) Barton, previously executive vice president of AEP Transmission at American Electric Power, recently became executive vice president–Utilities. She joined AEP in 2006 and has held several leadership positions in AEP Transmission. She holds a juris doctor degree from Suffolk University Law School and has completed the Harvard Mediation Program for the Instruction of Lawyers, the Executive Program of the Darden School of Business at the University of Virginia, and the Nuclear Reactor Technology Program at MIT.

Paul Musto is director of marketing for Mentor's Graphics' Board Systems Division, a Siemens business. He was interviewed for the July 2018 issue of *Design007 Magazine* on the company's effort to draw more students into PCB design. He also commented on the ways that young people are already beginning to revolutionize the industry.

Jack Vaughney writes, "I was recently named an AAAS Fellow in Chemistry for my work in solid state chemistry, materials design, and energy materials." He has been a member of the U.S. Department of Energy's Argonne National Laboratory since 1997, where he specializes in the design, synthesis, and characterization of advanced materials for energy storage. His research involves beyond-lithium-ion cathode materials and next-generation lithium-ion anode materials. In a DOE press release he said, "My work in materials chemistry has been a 30-year journey, coming from high-temperature superconductors to thermoelectrics and fuel cells, and to the many pathways and concepts

within energy storage that have allowed me to explore my evolving scientific interests."

1988

Stephen LeBlanc was elected governor for the Florida District of Kiwanis.

Carleen Maitland writes, "I'm pleased to announce the release of my book, *Digital Lifeline? Information and Communication Technologies (ICTs) for Refugees and Displaced Persons* (MIT Press, 2018). The book analyzes the use of ICTs in refugee affairs, drawing on experiences and research on Syrian refugees in Europe and Jordan, and Burundian refugees in Rwanda, among others. It examines a range of technologies, from biometrics to information systems and Big Data. It concludes with a research agenda to shape future technologies in ways that will enhance their benefits and mitigate potential harms."

Lt. Col. **Nicole (Bartek) Yingling** serves as a 193rd Special Operations Medical Group dentist. She is also a board-certified civilian root canal therapy specialist. She and her husband own and operate Mason-Dixon Endodontics in Gettysburg, Pa., and a second private practice in Chambersburg.

1990

Michelle (Petkers) Gass was number 21 on *Fortune's* list of Most Powerful Women. As CEO of Kohl's, *Fortune* reports, she presided over a rebirth for the department store, resulting in the best holiday seasons in 2017 of any retailer. The magazine credits her with bringing about partnerships with Under Armour and Amazon, as well as improving the company's shopper loyalty program. *Money Inc.* also published "10 Things You Didn't Know about Kohl's CEO Michelle Gass," number 3 being "Has a Bachelor of Science from Worcester Polytechnic Institute."

Patti Newcomer recently became vice president of marketing within ProConnect, Intuit's business that serves professional tax preparers. She is responsible for all aspects of marketing for ProConnect Tax Online, Lacerte, and ProSeries. In an interview in *Authority Magazine* she recapped her career,

[CLASSnotes]

which included 10 years at Procter & Gamble developing antiperspirants and soap, followed by five years at Capital One, in addition to more than 12 years with technology and financial services companies. She concludes, "Although I'm not in a traditional chemical engineering role, I believe my education and experience has trained me to think and solve problems analytically, which has served me well and differentiated me from others for my entire career."

1992

April (Lusk) Butterfield holds the post of VP of Technology for the Engineered Solutions Group at Jabil.

1995

Kenneth Mongeon was promoted to financial consultant at the Shrewsbury, Mass., Fidelity Investments office. "I work with local investors and their families to make more informed decisions about their financial situation," he writes. Ken lives in Shrewsbury with his wife of 19 years, **Tanya (Macek) Mongeon '96**, and their two boys, Connor (15), and Owen (11).

1996

Rich Person and **Elana (Kingsbury) Person '98** recently celebrated their 20th wedding anniversary. "It was a summer-long celebration that included dinner at The Boynton, mini vacations to Mt. Washington and Cape Cod, capped off with a trip to Missouri to watch our youngest son play in the Cal Ripken 12U World Series," they report. Rich works in product development at All-Star Sporting Goods, and Elana is a UX manager at MathWorks. They live in Hudson, Mass., with their four children.

Michael Golden ('02 MS FPE), a New York City firefighter, came to Worcester in December to pay respects to fallen firefighter Christopher Roy. The *Telegram & Gazette* reported that he visited the Worcester Department as a student and remains friends with some of the personnel.

1997

Col. **Lee Gentile**, previously vice wing commander of the 71st Flying Training Wing at Vance Air Force Base, has

been named to head the 47th Flying Training Wing at Laughlin Air Force Base. From WPI's ROTC program he went on to specialized undergraduate pilot training at Columbus Air Force Base in Mississippi, graduating in 1999. His decorations include the Bronze Star, Defense Meritorious Service Medal, Meritorious Service Medal with three oak leaf clusters, Air Medal with two oak leaf clusters, and Aerial Achievement Medal with three oak leaf clusters.

2001

Adam Fairbanks is founder of Fairbanks Energy. His previous employment includes management and technical leadership positions at Bluestone Energy Services and Cisco Systems. He earned his MBA at Babson College's F. W. Olin Graduate School of Business.

Jennifer (Cooper) Forsythe earned a promotion and is now the Survivability and Lethality Master Analyst at the U.S. Army's Materiel Systems Analysis Activity. She writes, "This significant step is one of the very first for women in weapon performance analysis," and adds that she plans on doing a lot of mentoring to bring up the next group of leaders. "While away from work, my son, husband, and in-laws keep me busy. My in-laws struggle with Alzheimer's and mobility issues. I also help teach my faith to elementary students." She recently finished the Across the Bay run and is working toward run/walking a half marathon. "I also love playing in the dirt of my garden and traveling the world."

2002

Gene Ananiev is core facility manager at University of Wisconsin Madison, Carbone Cancer Center, where he focuses on high throughput molecular screening in the development of cell based and biochemical assays.

Craig Daniels writes, "I work in the rail industry for Alstom, a company that produces the rolling stock (trains), as well as the systems that keep trains safe. Right now there is a lot of focus on these safety systems, including a new government mandate that all passenger and freight railroads that share track must implement Positive Train Control technology to ensure safety. I sort of fell into the rail industry, but have found it to be very interesting. High speed rail seems to be starting to penetrate the U.S. The Brightline/All Aboard Florida project my company is involved in is the first private high-speed rail project in the U.S."

2003

Matthew Cote, an associate at Sherin & Lodgen, was selected as a Rising Star for his practice in real estate in the 2018 listing of Massachusetts Super Lawyers. The list is published both as a special supplement in *Boston* magazine, and in the New England edition of *Super Lawyers*. The Rising Stars designation recognizes attorneys who are either 40 years old or younger, or have been in practice for 10 years or fewer.

Nina Simon posted an invitation to "Apply Now for the World's Best Museum Job: Mine," on her Museum 2.0 blog. She writes that she will be transitioning out of her role as executive director of the Santa Cruz Museum of Art & History (MAH) to focus full-time on leading OF/BY/FOR ALL, an emerging global movement to build more inclusive community institutions. "We're planning for a slow and thoughtful transition; you can read more about it on the MAH website." For the personal side of her decision, see Nina's own blog at museumtwo.blogspot.com.

2004

Ian Love is a senior business insights analyst in the Infectious, Niche, and Rare Diseases department at Decision Resources Group. He specializes in atopic dermatitis and a diverse group of rare diseases. He previously taught in the Department of Internal Medicine at Virginia Commonwealth University.

2006

Luke Marron and **Katie (Hall) Marron '07** share news of a birth and a death. Luke's grandfather **William (Bill) Carpenter '50**, passed away in October at the age of 92. "In September, Bill got to meet his new great-granddaughter—our daughter, **Finley**. We captured this photo of Katie (holding Finley, born in April 2018), with Grammie Audrey, Luke, Grandpa Bill, and Jane (Bill's daughter/Luke's mom)."





2008

Lisa Lee joined Andrus Wagstaff PC, as an associate attorney in the firm's Boston office. She has represented thousands of clients in civil litigation against high-powered corporations in the healthcare industry. A large part of her practice has focused on injuries from defective medical products used exclusively by women, including a female permanent sterilization device and transvaginal meshes. She was named one of the Top 40 under 40 in Massachusetts for 2018 by The National Trial Lawyers.

Theo McDonald manages the Raptor test program based at SpaceX rocket development facility in McGregor, Texas. Raptor is a new methane engine being developed by SpaceX for use on its next generation vehicle, BFR. Before that, Theo worked on the first Draco engines that power SpaceX's Dragon spacecraft.

2010

Steve Hanly ('12 MS ME) is vice president of sales and marketing for Midé Technology Corp., where he's worked since graduation. He's also working towards an MBA from UMass Amherst.

2011

Lily (Clark) Jeznach and Chris Jeznach '10 write, "We welcomed our daughter, Mabel Evelyn Jeznach, into the world on Nov. 2, 2018. We're loving getting to know her and being parents! WPI Class of 2040?!"



2012

Julie (Bliss) Mullen is cofounder and CEO of Aclarity Water. The company's water purification device disinfects and removes metals by using low levels of electricity, with no need for filters or chemicals. She was named to the *Forbes* "30 Under 30" list for 2019 in the Science category.

Paul Ventimiglia and Jeremiah Jinno '07 once again led the Bite Force team to victory in the 2018 BattleBots World Championship. Media coverage included an interview on Charter TV3's *Worcester News Tonight*, and a *Telegram & Gazette* article on WPI's standing-room-only viewing party in the Rubin Campus Center. In the newspaper coverage, President Laurie Leshin commented, "We really think of robotics as a sport here."

2013

Ijeoma Ezenonyebuchi is a quality assurance engineer at National Public Radio, where she works on the NPR One app for podcast followers, testing and verifying new features. She also serves as Java & Android lead for Women Who Code DC.

Georgi Kardzhaliyski shares, "I completed the Scotiabank Toronto Waterfront Marathon in October! This was my first marathon."

2014

Divya Shivakumar writes, "Hello to the Graduate Class of 2014 MSIT. It is great that I have been in touch with my grad class, and thank you, WPI, for that!"

2015

Lauren O'Connor and Logan Roche were married on Sept. 1, 2018, beside the Hudson River in upstate New York. Lauren and Logan met while living in Morgan Hall their freshman year, and stayed together to always have a chem eng partner and a formal date. They celebrated with Alpha Xi Delta sisters, Sigma Alpha Epsilon brothers, IQP friends, and freshman year B-Term Buds. Needing a break from Worcester's winters, they currently live in Houston, Texas.

2018

Katherine Tattersall joined Fuss & O'Neill in Manchester, Conn., as a structural engineer. Originally a math major, she was lured by her fascination with historic buildings to architectural engineering. Now she is using math as a tool for application to ensure the longevity of our communities' structural history. In an article in *New England Real Estate Journal* she commented, "I'm fascinated by historic preservation and adaptive reuse. It's challenging, rewarding, and important to save historic buildings."

FREDERICK L. HART,

longtime professor of civil and environmental engineering, and former department head, died Dec. 20, 2018, at his home in Jefferson, Mass. He was 73. An advocate for safe drinking water and sound wastewater treatment, he taught at WPI for almost 40 years, serving as head of the Civil and Environmental Engineering Department for more than 20. He retired in 2016.

A pioneer in collaborative learning and teamwork, Hart was an early advocate for and an active supporter of WPI's project-based curriculum. He served as IQP coordinator for his division, and he advised MQPs on water systems, ponds, and dams throughout New England, bringing students out into the field to solve environmental problems for communities.



After completing his service as department head in 2007, he went on to launch WPI's Stantec Project Center, which provides opportunities for students to complete their MQPs at the company's engineering offices in the United States and Canada. Throughout his career he

remained an active supporter of the WPI Global Projects Program, traveling to centers in Venice, Morocco, and Puerto Rico to advise projects.

"He was instrumental in growing the department, especially the environmental engineering graduate program," notes current department head and professor Tahar El-Korchi. "Fred was an outstanding teacher and mentor, a valuable advisor to students, and a wonderful colleague and friend."

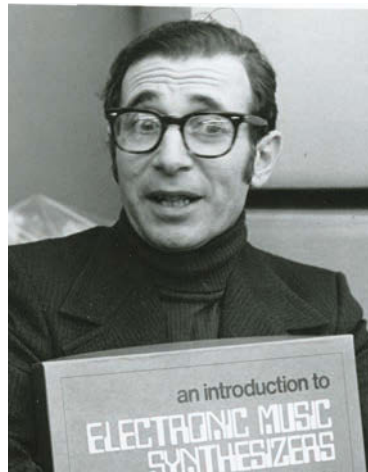
Survivors include his daughter, Carina L. Hart '04, and his former wife, Linda (Vasquez) Hart. His family requests that friends consider making a donation in his memory to charity: water (charitywater.org), an organization that works to provide drinking water to places in need throughout the world.

ALAN R. PEARLMAN '48,

inventor of the "ARP" line of synthesizers, and an early innovator in electronic music, died Jan. 5, 2019, leaving his wife, Buena Alcalay Perlman, and daughter, Diana. He was a member of Alpha Epsilon Pi fraternity and a recipient of the 1978 Robert H. Goddard Alumni Award for Outstanding Professional Achievement.

As an electrical engineer major at WPI in the 1940s, Pearlman created an experimental model of an electronic "touch sensitivity" system that could vary effects, such as volume, tone, and duration of notes, in a way that corresponded to the pressure applied by a human player striking a piano key.

As a senior, Pearlman presented a paper called "A New Approach to Electronic Musical Instruments" at the Northeast District meeting of



the AICC (now part of IEEE) in New Haven. In it he expressed the prescient goal of moving beyond experimental novelty and creating versatile and expressive instruments.

Pearlman co-founded Nexus Research Labs, which designed

and manufactured the analog amplifiers used on the *Gemini* and *Apollo* space missions. He was best known as founder, president, and chairman of ARP Instruments. ARP synthesizers were used (and endorsed) by musicians such as Stevie Wonder, Edgar Winter, Paul McCartney, and Elton John. ARP synthesizers were also used to create memorable sound effects in popular movies in the 1970s: in *Close Encounters of the Third Kind*, to invoke the five-note sequence that symbolized contact with aliens, and in *Star Wars* to give expressive "voice" to R2D2 and other robots.

Pearlman became a dedicated runner who completed his first Boston Marathon at age 50. He also loved to play the piano, and at 93, too weak to speak, he still managed to play up to the morning of the day he died, his daughter relates.

- RUSS LOVELL '40 PH
 - JAMES SHEEHY '42 ME, ALPHA TAU OMEGA
 - JOHN KNIBB '46 ME, LAMBDA CHI ALPHA
 - JOHN MULLANEY '49, PHI KAPPA THETA
 - LES REYNOLDS '50 CHE, PHI GAMMA DELTA
 - JAMES SULLIVAN '50 ME
 - HARV HOWELL '51 ME, SIGMA ALPHA EPSILON
 - MANNY PAPPAS '52 ME, THETA CHI
 - VITO SARLI '52 CHE, MS CHE, PHI KAPPA THETA
 - PETE FORSBERG '53 EE, PHI SIGMA KAPPA
 - JOHN HERZ '54 ME
 - DAVE MAYNARD '58 CE, MS CE
 - CLESSON ROBBINS '59 SIM
 - ALBERT SCANSAROLI '60 ME
 - TED SUNDBURG '61 PH, LAMBDA CHI ALPHA
 - LEONARD FELDMAN '65 CHE, ALPHA EPSILON PI
 - HARVEY ROSENFELD '65 MS EE
 - GEORGE CRONK '66 SIM
 - GERALD PORTER '68 MNS
 - GEORGE ROCHA '70 MNS
 - KEVIN DONAHUE '71 CE, ME CE, SIGMA ALPHA EPSILON
 - DAVE KULCZYK '73 ME, PHI SIGMA KAPPA
 - JOHN MCCARTHY '74 MNS
 - BILL RUTTER '75 CHE, PHI GAMMA DELTA
 - JOHN CAMMUSO '79 SIM
 - BENNETT FINI '79 CHE, LAMBDA CHI ALPHA
 - JEFF ALEXANDER '81 MGE
 - ELLIOTT NADEAU '89 SIM
 - HORATIO NICASTRO '96 MNS
 - PAUL DIETTE '97 MG
 - DAVE MORAN '02 MG
 - JOHN UPTON '10 CE
- THE WPI COMMUNITY ALSO NOTES THE PASSING OF FORMER AND RETIRED STAFF MEMBERS **ARLINE KOONTZ** AND **WILFRED NICHOLAS**, AND **IRENE DEBOER** (FRIEND OF THE UNIVERSITY).

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

Accelerating Faculty Research—*One alumnus's legacy:*

A leading industrialist in early 20th century Worcester, William B. Smith, Class of 1908, began his career as a manufacturer of textile machinery and ended as a tireless, civic-minded leader and generous philanthropist. He died in 1952. In 2016 WPI accepted a \$7.5 million gift from the William Binns Smith Estate. His legacy is now making an impact on WPI faculty members, like Professor Fischer, who have been named William B. Smith Professors and are receiving support for their research from the endowed fund his estate established.



“ It’s an honor to have been named the William B. Smith Dean’s Professor. Mr. Smith’s legacy is helping make significant advances in improving people’s lives and bringing new healthcare technologies from bench to bedside. ”

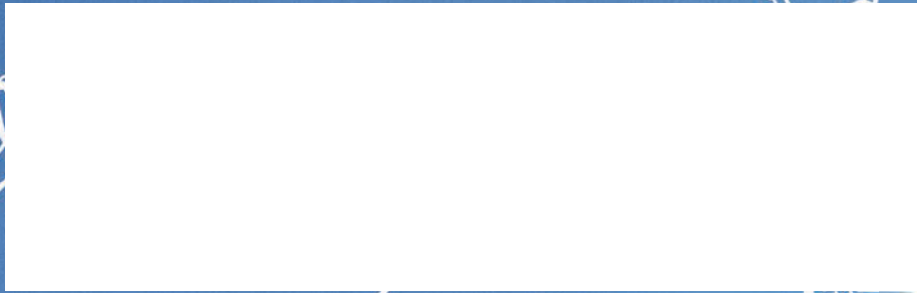
—Gregory S. Fischer, Associate Professor of Mechanical Engineering
William B. Smith Dean’s Professor
Director, Automation and Interventional Medicine Laboratory (AIM Lab)
Director, PracticePoint



WPI

Worcester Polytechnic Institute
100 Institute Road,
Worcester, MA 01609

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