

THE
UNIVERSITY
OF RHODE ISLAND

DIVISION OF RESEARCH
AND ECONOMIC
DEVELOPMENT

Momentum:

ANNUAL REVIEW OF URI'S RESEARCH IMPACT



SPRING 2026

Message from the Vice President for Research and Economic Development

Research is more than discovery. It is preparation. It is partnership. It is progress. And at the University of Rhode Island (URI), it is the foundation upon which we build impact for our state, our nation, and our world.

This *Annual Review of URI's Research Impact* illustrates the transformative power of research through the impact across disciplines and across lifetimes. From nanotechnology to detect disease at its earliest stages to coastal resilience strategies to protect Rhode Island communities from sea level rise, URI research improves lives in tangible and measurable ways. Just as importantly, research shapes the thinkers, innovators, and leaders who will carry this work forward.

This year marked a defining milestone for our research enterprise. In 2025, we achieved a record \$165.2 million in research funding. This funding translates to economic impact. A recent study shows URI's research enterprise results in \$520.4M in economic impact to our regional economy and supports 6,350 jobs. The funding signals that our work addresses urgent challenges and advances solutions that matter—locally, nationally, and globally.

Research is not conducted in isolation. Scientific investigation strengthens the educational experience of our students, who work alongside faculty mentors to ask meaningful questions and develop practical skills. Through research, students become innovators, problem-solvers, and leaders prepared to navigate a complex world. Whether in laboratories, field sites, design studios, clinics, or community settings, experiential learning through research equips our graduates with the resilience and critical thinking demanded by today's workforce.

At URI, research thrives in laboratories, in field settings, on farms, in coastal communities, in our cities and towns, and in partnerships with not only industry and government but with the people of Rhode Island. Our faculty and students connect chemistry to entrepreneurship, artificial intelligence to user experience, marine science to fisheries policy, engineering to sustainability, and humanities scholarship to ethical engagement. Their efforts bridge theory and application—an embodiment of our Land-Grant and Sea-Grant missions.

The stories in this issue remind us that research changes trajectories. Alumni such as Patrick McCarthy, Tong Sun, and Aria Mia Loberti demonstrate how immersive research experiences cultivate intellectual agility, resilience, creativity, and comfort with ambiguity—qualities that fuel innovation across sectors. Whether launching companies, leading AI development at global firms, shaping public policy, or building careers in the arts, they credit their research foundations at URI as the catalyst for their success.

Our commitment to student research remains central to our mission. Programs such as NSF-supported Research Experiences for Undergraduates (REU) and Summer Undergraduate Research Fellowships provide students with opportunities to tackle real-world challenges—from microplastics in Narragansett Bay to sustainable recycling solutions—while developing critical skills in experimentation, collaboration, and problem-solving. These experiences do more than train scientists; they cultivate informed citizens and strengthen Rhode Island's knowledge economy.

At the same time, URI's faculty continue to push the boundaries of discovery. Research awards support high-risk, high-reward research that advances nanotechnology, biosensing, coastal adaptation, and socio-ecological resilience. Through interdisciplinary collaboration and community engagement, our researchers co-generate



knowledge that informs public policy, strengthens industry, and enhances quality of life.

As Rhode Island's only public R1 land-grant university, URI holds a distinctive responsibility. The Morrill Act established a model of higher education rooted in accessibility, practical impact, and service. Today, that legacy endures through programs active in all 39 municipalities, through connecting science with our community partners, and through agricultural and environmental research that safeguards both livelihoods and landscapes.

Research matters because it fuels economic growth. It matters because it informs evidence-based policy. It matters because it prepares students not only for careers, but for leadership. And it matters because the most pressing challenges of our time—climate change, public health, sustainable energy, food security, and technological transformation—demand rigorous inquiry paired with public purpose.

This issue celebrates the momentum we are building together. It reflects a university community committed to curiosity, collaboration, and consequences. The work shown here is ambitious, interdisciplinary, and deeply connected to the needs of our communities.

As we look ahead, we remain steadfast in our belief that research is not an end in itself. It is a catalyst—for opportunity, for resilience, and for a more equitable and sustainable future.

Together, we will continue to advance discovery, empower students, and deliver impact.

Bethany D. Jenkins, Ph.D.

Vice President URI Division of Research and Economic Development

Professor, Department of Cell and Molecular Biology and Graduate School of Oceanography

Photo Jam-Packed Micromussa
by Michael Corso '24
Department of Aquaculture and Fisheries Science



“This issue celebrates a university community committed to curiosity, collaboration and impact.”

- Bethany D. Jenkins, Ph.D.

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FEATURED INSIDE

- 6 URI Research By The Numbers
- 8 Economic Impacts of URI's Federal Research Funding
- 10 The Impacts of Student Research Lay the Foundation for Entrepreneurial Success
- 14 Inspiring Student Research Leads to a Career at Adobe
- 18 Spreadsheets to Stardom: How Undergraduate Research Experience Prepared Actress and Author Aria Mia Loberti
- 22 RI Sea Grant Connects Communities to Critical Coastal and Ocean Science
- 28 Engaging Students in Real World Research
- 34 Detecting Disease Earlier for Better Outcomes
- 38 A Debt to History, Why URI's Land-Grant Mission Still Matters
- 46 URI Researchers Bringing Innovations from Lab Bench to Market
- 52 Prototyping Accessibility
- 55 Unlocking the Mystery of Gravitational Waves Light Years Away to the Phone in Your Pocket
- 58 URI Research and Scholarship Photo Contest Winners 2025

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NOTABLE NEW AWARDS 2025

LEONARD KAHN, College of Arts and Sciences

Funding Source: National Science Foundation

Project Title: URI-PQI Collaboration: Application of Quantum Fundamentals to Advance Research and Workforce Development

SAHELI GOSWAMI, College of Business

Funding Source: Cotton, Inc

Project Title: Cotton, Consumers, Businesses, and New Sustainability Regulations

YOSHITAKA OTA, College of the Environment and Life Sciences

Funding Source: Nippon Foundation

Project Title: Ocean Nexus: Bring together scholars from around the globe to foster a new paradigm of ocean equity that prioritizes the perspectives of historically marginalized communities.

SARA SWEETMAN, College of Education and Professional Studies

Funding Source: GEMS-Net Districts

Project Title: Guiding Education in Math and Science Network: GEMS-Net

NICOLE WEISS, College of Health Sciences

Funding Source: National Institutes of Health

Project Title: Examining transactional relationships between sensor-derived alcohol use data and acute suicide risk in daily life

DANIEL ROXBURY, College of Engineering

Funding Source: National Science Foundation

Project Title: E-RISE RII: Socio-ecological Impact of Microplastics in Coastal Ecosystems (SIMCoast)

RAINER LOHMANN, Graduate School of Oceanography

Funding Source: Environmental Protection Agency

Project Title: Great Lakes Fish Monitoring & Surveillance Program: Trends of contaminants in Great Lakes Top-Predator Fish

ANGELA SLITT, College of Pharmacy

Funding Source: Department of Defense

Project Title: Use of bile acid binding resins to decrease systemic per- and polyfluoroalkyl substance (PFAS) levels and improve serum lipid profiles in Veterans

ANN MARIE MORAITIS, College of Nursing

Funding Source: RI Foundation

Project Title: Understanding Physical Activity and Symptom Changes in Young Adult Cancer Survivors

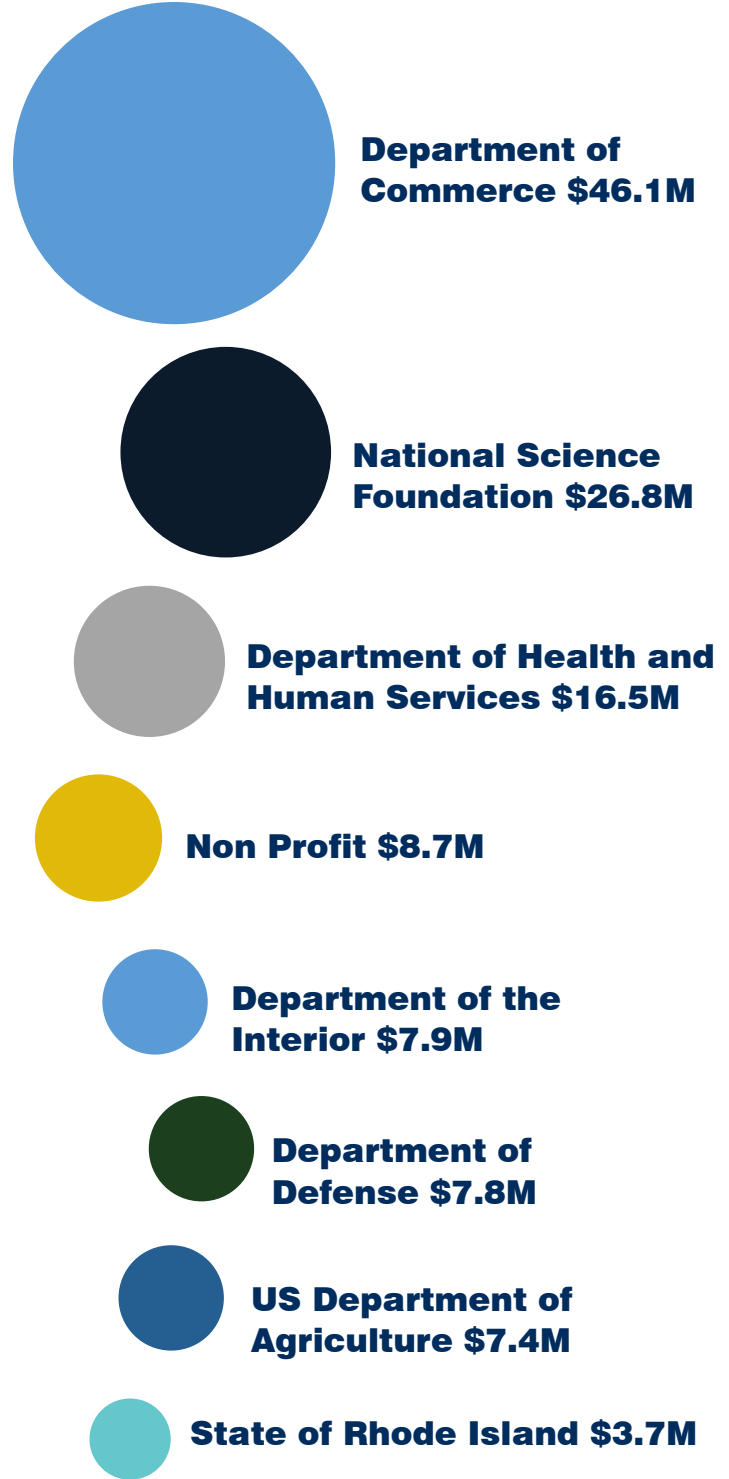
BY THE NUMBERS

FY2025 SIGNIFICANT SOURCES OF FUNDING TO URI

TOTAL AWARDS
IN MILLIONS

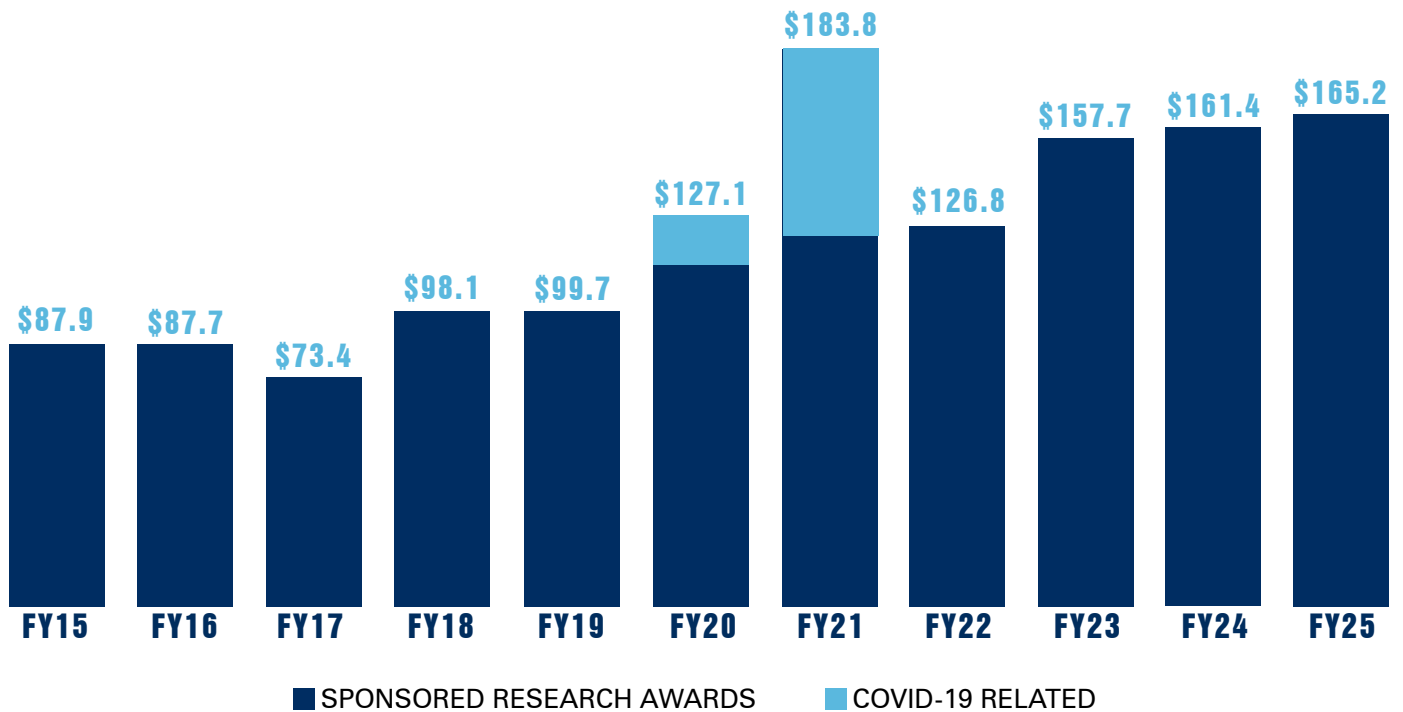
\$165.2M

RESEARCH
EXPENDITURES
IN FY25 WERE
\$159M, A 16%
INCREASE FROM
LAST YEAR



2025 AWARDS BY COLLEGE/UNIT

- \$68.5M**
GRADUATE SCHOOL OF OCEANOGRAPHY
- \$22.6M**
COLLEGE OF THE ENVIRONMENT AND LIFE SCIENCES
- \$13.8M**
COLLEGE OF ENGINEERING
- \$11.3M**
COLLEGE OF HEALTH SCIENCES
- \$9.1M**
COLLEGE OF PHARMACY
- \$8.0M**
COLLEGE OF ARTS AND SCIENCES
- \$5.8M**
DIVISION OF RESEARCH AND ECONOMIC DEVELOPMENT
- \$3.6M**
COLLEGE OF EDUCATION AND PROFESSIONAL STUDIES
- \$1.2M**
COLLEGE OF NURSING



FY2015-FY2025 AWARDS RECEIVED (ALL SOURCES), IN MILLIONS

ECONOMIC

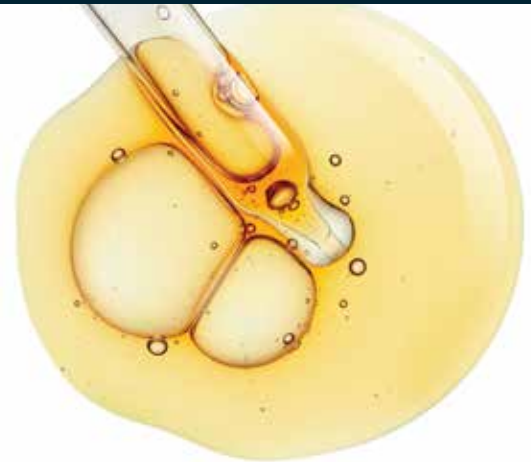
IMPACTS

OF URI'S FEDERAL RESEARCH FUNDING

FEDERAL FUNDING:

For every **\$100M**, URI generated an additional **\$80M** in economic activity.

For every **10** people directly employed by federal funding at URI, an additional **4** were hired elsewhere in the economy.



\$180M

IN ECONOMIC OUTPUT

\$130M

ADDED TO STATE GDP

\$6.5M

IN STATE AND LOCAL TAXES

URI's research enterprise is a powerful driver of long-term economic growth and competitiveness in Rhode Island. A separate economic impact study found that in FY25, URI's total research activity – not limited to federal funding – generated \$520.4 million annually. This includes \$205.9 million in direct spending and \$314.5 million in indirect and induced effects. Together, these figures underscore URI's vital role in advancing the state's innovation ecosystem.

QUICK FACTS:

47% of URI students are from in-state.

Only 13% of students are from in-state at the average New England private college.

42% of URI graduates were working in the state 5 years post-graduation.

Only 17% of graduates from the average New England private school remain in-state 5 years later.

RI-INBRE

(The Rhode Island IDeA Network for Biomedical Research Excellence)

\$21 MILLION GRANT

In current funding from the National Institutes of Health to support biomedical research and training in Rhode Island.



23 YEARS

RI-INBRE

supported 802 research projects involving 218 faculty, training 2,210 under-graduate, graduate, and postdoctoral students.

QUANTUM INFORMATION SCIENCE CAREERS

- URI selected by the National Science Foundation for the new program in Experiential Learning for Emerging and Novel Technologies, (ExLENT) that will support hands-on learning and workforce development at URI.
- Launched one of the country's first masters in quantum computing in 2021.
- Partnered with IBM to grow quantum computing research.

OCEAN EXPLORATION COOPERATIVE INSTITUTE

A NOAA-funded research project exploring, mapping and characterizing our ocean territory with six years of research, five partner institutions, 96 expeditions, 354 ROV dives, 29 university students supported, and 72,820 K-12 students reached.

Developed new technologies that can obtain preserved tissue and high-resolution 3D images within minutes of encountering fragile animals in the deep ocean.

The *Impacts* of Student Research

LAY THE FOUNDATION FOR ENTREPRENEURIAL SUCCESS

By Chris Barrett '08

Patrick McCarthy ('01) brings scientific breakthroughs to market. He's the rare executive who is just as comfortable discussing first-quarter financials as he is explaining the finer points of chromatography. And his success all started as a doctoral chemistry student at the University of Rhode Island (URI).

"URI gave me a strong foundation in science. This foundation gave me judgement, judgment I wouldn't have if I had just taken an MBA," says McCarthy, who later earned an MBA from Carnegie Mellon University. "As an entrepreneur most of the time you're making a decision without full information. If you have the full information, you're probably too late and you've already lost. A science foundation gave me the ability to understand technology risk closer in on a decision curve."

After graduating from URI, McCarthy faced complex decisions as an executive and later business founder. At each step of his career, he can point a clear line back to his URI research days.

During his first semester at URI, McCarthy enrolled in a required physical chemistry class taught by chemistry Professor Sze Yang, whose research group leveraged concepts and processes from biology to create synthetic materials. McCarthy, seeing endless possibilities, abandoned his initial plan to research therapeutic drugs from natural sources and joined Yang's lab brimming with young researchers and sophisticated equipment.

Yang created a culture that "allowed you the freedom and creativity to explore any topic," McCarthy says.



Patrick McCarthy '01
CEO, McCarthy X Enterprises

"A research foundation gave me the ability to understand technology risk closer in on a decision curve."

- Patrick McCarthy

He's the rare executive who is just as comfortable discussing first-quarter financials as he is explaining the finer points of chromatography. And his success all started as a doctoral chemistry student at the University of Rhode Island.



Separate color by column chromatography

"It gave you the opportunity to be in an environment that's similar to an early-stage startup."

Yang specialized in electrically conducting polymer complexes like paint that prevents rust on cars, boats or military fighter jets, or polymers that adjust how light filters through windows or eyeglasses.

McCarthy quickly became an expert, and with a group of peers, adapted the technology for chromatography—a process scientists use to separate the parts of a mixture so they can study each one. Industries like pharmaceuticals, semiconductor processing, paint, food, and environmental protection all depend on chromatography to improve their products.

"It was exciting because we were working on things that could change the world," he says.

McCarthy's research drew the attention of chromatography analysis company Dionex Corp. Then research executive Chris Pohl saw potential in both the research and McCarthy and offered him a position.

Pohl recalls McCarthy as a proactive and persistent researcher engaging with scientists across the industry as he worked to make stationary phases

using the conductive polymer he studied at URI. His proposal represented an entirely new approach to ion-exchange materials, or substances made of special resins or membranes that trade ions to purify or separate substances. They're a vital tool in clean water systems, energy storage, and chemical manufacturing.

Although the project didn't reach the market, McCarthy leveraged the experience to design devices—still in use today—that make it easier to separate and purify ingredients used in modern medicines.

"He was a major contributor to our team while he was with us," Pohl says.

McCarthy then took a leap to start ATRP Solutions, which focused on the commercialization of a novel polymerization technique for making highly custom polymer structures possible. But before he took the leap, he made one call. His former doctoral advisor Yang told him to go for it. It was a giant risk, but McCarthy says URI prepared him. While at URI, McCarthy estimates at least half, if not 70 percent, of his 1,000 or so chemical reaction experiments failed.

“More failures mean more learning and ultimately a strong foundation,” he says. “If you’re going to be in the business of building businesses, you will be constantly building your foundation.”

McCarthy built ATRP Solutions and invented polymers to improve personal care and cosmetics products, home care products, and oil and gas additives. After a decade he sold ATRP Solutions to Pilot Chemical Co. and became its vice president of technology and innovation.

Later, he took a similar role at Corning Inc., an S&P 500 company with a relentless focus on innovation, that asked McCarthy to spearhead its program to build early-stage businesses. McCarthy found the company, like the environment in Yang’s lab where being unsure of the next step was embraced.

“If you’re at all uncomfortable with ambiguity you will really struggle with early-stage business building,” he says. “The URI research environment really made you feel like ambiguity was OK and to be comfortable with it. Don’t force the solution but allow the creative process to reveal the solution.”

In 2024, as artificial intelligence started to muddy the scientific waters, he branched out again and started his second company, McCarthy X Enterprises, with a focus on incubating startups, consulting, and weaving AI into today’s businesses.

Today, McCarthy is substantively giving back to URI with his time and expertise, helping URI researchers find pathways to commercializing their intellectual property.

“Dr. McCarthy has been so generous with his time and expertise and has stepped up to be an incredible mentor to URI researchers and leaders to help us holistically support our community members who seek commercialization outcomes of their URI research. We are so appreciative of his engagement,” says URI’s Vice President for Research and Economic Development Bethany Jenkins.





“It was exciting because we were working on things that could change the world.”

- Patrick McCarthy



INSPIRING **STUDENT RESEARCHERS**

LEADS TO CAREER AT ADOBE

By Chris Barrett '08

People open half a trillion Adobe PDFs a year, and Tong Sun ('96) and her team at Adobe want to reinvent how millions work with them using artificial intelligence (AI). The goal puts Adobe squarely in the hyper-competitive AI race, but Sun started the race three decades ago at the University of Rhode Island (URI).

Recruited to URI in 1992 by Professor Qing “Ken” Yang, Sun joined a lab studying high-performance computer systems processing massive amounts of scientific data like nuclear reactions, physics simulations and weather forecasts. Under Yang’s guidance, his student researchers aimed to make computers think and calculate faster to solve problems quicker.

“It wasn’t AI yet but the way you focused on the pioneering design, how you designed the computer on the front lines, it was very inspiring,” Sun says.

For decades, creative use of mathematics has underpinned advancements in computing and allowed the mining of larger and larger datasets. At URI, Sun found her doctoral advisor at the forefront of applying mathematical concepts to computing.

Yang applied the concept of prime numbers—numbers divisible only by 1 and themselves—typically used in number theory to computer memory design. By using these numbers to reimagine how data could be stored and retrieved, he created a cache memory architecture that dramatically reduced chip area and improved performance. That simple act of connecting dots—linking a concept from mathematics to a hardware challenge—led to patents and a successful company.

“That experience shaped how I think about invention,” Sun says. “Connecting existing solutions to a new problem is invention. Framing the problem is important, but seeing unexpected connections is what moves technology forward.”

Now director of Adobe’s Document Intelligence Lab, Sun works to advance the pioneering software company into the AI era. She likes to say that she wants computers to be smarter, not just faster. Her team members do not seek incremental change; they aim to reinvent how people interact with PDFs. Instead of reading a summary of a hundred drab PDFs, you could have a conversation with documents or ask the Adobe AI Assistant to generate a video summary that uncovers the emerging opportunities and risks across financial reports.

“URI was very rigorous and always challenged me. That’s the kind of environment that shapes you for life.”

- Tong Sun



To deliver the technology Sun oversees a team including young engineers. She often reminds the team of the mindset she learned at URI.

“Sometimes we already have the right solution,” she says, “we just haven’t discovered the problem it can solve.”

Sun says she learned how to inspire emerging researchers from Yang. Each week, he asked her to read a scientific paper and present it without him having read it first. The exercise forced her to anticipate tough questions and think critically about the paper’s methods and results. And, vitally, the process led her to think about how to define a problem and find a solution without a benchmark and when others tried and failed.

Today, she asks her interns to take the same approach. And through such mentorships and her work with the Grace Hopper Mentoring Networks, Sun hopes to encourage more young women to stay in science and enter a computer industry that needs their voices.

One such researcher is Wei Peng. She credits Sun’s mentorship with helping launch her career while

an intern at Xerox's Data Analytics Research Lab where Sun served as director. The center developed social media mining tools powered by state-of-the-art machine learning models, similar to models used by today's AI. Peng says her experience with Sun broadened her research perspective and encouraged her to speak up, take initiative and lead.

"She has a rare ability to connect the dots between academic research and real-world impact," says Peng who went on to become a Xerox researcher and publish with Sun.


Sun urges researchers to explore full-stack thinking by looking at technology from the chip level all the way up to the user experience. Her holistic approach that helps lead to better technical optimization and efficiency and, ultimately, meaningful technological innovation.

"That holistic view started for me at URI," Sun says. "Even in the early '90s, URI faculty were connecting electrical engineering, signal processing, and computer architecture into what became the foundation of high-performance computing."

In the three decades since, URI has continued to build on that holistic view. The University has launched undergraduate and graduate programs in analytics and artificial intelligence, data science, and data analytics. In 2025, the Institute for AI & Computational Research opened to bring together researchers from across campus to position URI as a leader in AI, data science, high-performance computing, and quantum computing.

Together, the initiatives and new facilities like the Fascitelli Center for Advanced Engineering give the next generation of URI students the same opportunities as Sun.

"URI was very rigorous and always challenged me," Sun says. "That's the kind of environment that shapes you for life."



“She has a rare ability to connect the dots between academic research and real-world impact.”

- Wei Peng



Spreadsheets to Stardom:
**HOW UNDERGRADUATE
RESEARCH EXPERIENCE
PREPARED ACTRESS
AND AUTHOR
ARIA MIA LOBERTI**

By Molly Stevens '20

**WOMEN'S LEADERSHIP
COUNCIL**

Supporting the personal and professional growth of URI women through:

- Empowerment
- Enrichment
- Commitment
- Inclusivity
- Community



LEARN MORE

alumni.uri.edu/wlc



“Without my research background I wouldn’t have known where to begin.”

- Aria Mia Loberti

Acclaimed actress, newly published author, and UNICEF Ambassador Aria Mia Loberti ('20) is still at the beginning of her career. But the University of Rhode Island (URI) alumna credits much of her success to the plethora of her cross-disciplinary research opportunities as an undergraduate student.

At URI, Loberti’s focus was to research as much as she could, in as many subjects as she could. Her resume features academic awards, conference presentations, and peer-reviewed papers in academic journals—all before she graduated URI in 2020. Her efforts earned her a prestigious US/UK Fulbright Award, which funded her master of research in ancient rhetoric at Royal Holloway, University of London. Upon completion of the program, she began a doctorate in the same subject at The Pennsylvania State University (Penn State). It seemed as if Loberti was on a fast-track to an academic career.

But shortly into her time at Penn State, Loberti’s path shifted. She was chosen from a global search to play the lead role in Netflix’s adaptation of the Pulitzer Prize-winning novel *All The Light We Cannot See*. Loberti’s performance was widely praised by critics. The World War II set miniseries, which also starred Mark Ruffalo and Hugh Laurie,



Aria Mia Loberti '20

Aria Mia Loberti ('20) University of Rhode Island, alumna credits much of her success to the plethora of her cross-disciplinary research opportunities as an undergraduate student.



went on to be the number one show in 50 countries and was celebrated with Golden Globe and Emmy nominations. For her role, Loberti won a Rising Star Award at the Toronto International Film Festival and an Entertainment Weekly Breaking Big Award. She was nominated for Best Breakthrough Performance at the Film Independent Spirit Awards.

“Without my research background,” Loberti says, “I wouldn’t have known where to begin. I had never acted, and I had no acting training. So, I prepared the way I knew how: with a visit to the library and a couple big spreadsheets.”

Loberti researched historical accounts of the Nazi occupation of France, where the story is set. She listened to radio recordings from the period and dug up archival photographs and interviews. She also spent time understanding the psychology and development of her character.

“We all have foods or scents or even phrases that trigger a core memory or experience that shaped us,” she says. “On top of my historical research, I tried to find these for my character. When I got to set, I let all of my research go so I could embody a character without overintellectualizing. I’ve streamlined this process quite a bit now, but all characters think, respond, even walk differently than I do, since their experiences and upbringing are different to my own.”

In just two years, Loberti transitioned from a

budding academic to a breakout actress. After *All The Light’s* success, she went on to star in the Children’s and Family Emmy award-winning *The Spiderwick Chronicles* in 2024 and appeared in the series *Grey’s Anatomy*. Loberti also uses her platform for advocacy, working as a UNICEF ambassador to promote children’s literacy.

According to Loberti, her new career path is more tightly connected to her research background than one might think.

“As an undergrad, all I knew was that I was interested in understanding what makes us human, why we do the things we do, why our culture is the way it is,” Loberti says. “I had so many questions that could be tackled by biology, philosophy, communication, math, politics, physics... I couldn’t pick just one lens to examine the world through.”

Loberti’s research projects at URI reflected this, ranging from understanding paradigm shifts in the higher education system, bridging the work of philosophers Martin Heidegger and Charles Sanders Pierce, studying human-guide dog relations, designing inclusive pedagogy for biology students, analyzing classical liberalism in economics, and studying how deep machine learning models can assist malaria vector surveillance. Four of these projects yielded co-authored papers published in peer-reviewed academic journals. Loberti was a URI coastal and environmental fellow, a URI Arts and Sciences fellow, and a URI science and engineering



fellow. She received the URI Excellence Award for Undergraduate Research—the only student to receive the award as a sophomore.

When it came time to apply to graduate school in 2020, Loberti decided to focus on rhetoric since it felt like an amalgamation of everything she studied.

“I am interested in how our words have power to shape the world around us,” she says. “I hoped that focus would help me answer my questions, but it wasn’t until I got cast in *All the Light* that I realized I could use my research background to reach people around the world.”

Her work transcends the screen. In October 2025, Loberti launched her first children’s picture book, *I Am Ingrid*, through Scholastic Publishing, the largest publisher of children’s books in the world. The same research-based practice she uses to approach acting applies to her writing, too.

I Am Ingrid is a heartwarming, funny story that educates kids about service animals. While at URI,

Loberti researched the bond between service animals and their human partners through a communication lens. To prepare for writing *I Am Ingrid*, she revisited that research.

“Writing was always my biggest childhood dream,” says Loberti, “and it is now a major part of my business plan. I have multiple manuscripts in the works that are close to my heart.”

Loberti still, however, feels insecure about her unconventional start to her career. She tries to use her unique perspective as a strength.

“What helped me change careers so abruptly was being able to understand people,” she says. “Acting and writing are both all about understanding humanity, as a collective and individually. When I tell people my acting and writing career has been built on the back of my research background, they often look surprised. But the truth is that every role I inhabit or book I write owes something to my work as an undergraduate researcher at URI.”

“When I tell people my acting and writing career has been built on the back of my research background, they often look surprised. But the truth is that every role I inhabit or book I write owes something to my work as an undergraduate researcher at URI.”

-Aria Mia Loberti



RI Sea Grant Connects Communities to Critical **COASTAL AND OCEAN SCIENCE**

By Monica Allard Cox





The University of Rhode Island was designated one of the first four Sea Grant Colleges in the U.S., thanks to the leadership of Rhode Island Senator Claiborne Pell and URI's founding Oceanography Dean John A. Knauss.

"Dr. John Knauss and Senator Claiborne Pell were visionaries who teamed up to create the National Sea Grant College Program, understanding that Rhode Island's way of life is intertwined with the health of our coastal and marine resources," says Senator Sheldon Whitehouse. "Rhode Island Sea Grant has since been integral in helping Ocean State communities adapt to climate change, while nurturing countless leaders to take on the biggest oceans and coastal issues facing our nation. I'm always so pleased to support Sea Grant and all

the wonderful work being done at the world-class Graduate School of Oceanography at URI."

The small crowd clustered in the dirt parking lot of Jamiels Park in Warren, RI. High tide waters swirled up through the storm drain behind them, running from Belchers Cove and under the parking lot into the adjacent field.

Butch Lombardi, a member of the Warren Conservation Commission says, "I was here for Hurricane Carol, and this whole area was underwater. If you look at the topography of Warren, there's not much elevation anywhere ... I think the Hurricane Carol flooding is probably symbolic of what's going to be normal around 2050."

Lombardi was referring to the 1954 hurricane that unleashed a devastating storm surge up Narragansett Bay.

"Projects like this, I think, will hopefully get people to understand that, you know, this is real. It's going to happen, and it won't happen in my lifetime, but it's going to happen in my grandkids' lifetime," he says.



Lombardi spoke to the group gathered this past fall for the Warren Resilience Walk, an event sponsored by Rhode Island Sea Grant, the University of Rhode Island Coastal Institute, and other partners. Participants compared at locations threatened by sea level rise with those developed with resilience in mind. Walk leaders talked about URI research and outreach projects taking place in Warren, including the National Science Foundation-funded “Risks, Impacts, and Strategies for Coastal Communities: Advancing Convergent Science to Support Climate Change Adaptation and Resilience” project.

Emi Uchida, professor and chair of the Department of Environmental and Natural Resource Economics and principal investigator of URI’s \$1.5 million portion of the grant, said in a press release that “finding solutions to this very complex problem requires ... a range of expertise” to support communities in decision making.

Rhode Island Sea Grant coastal resilience specialist Eliza Berry, one of the co-leaders of the walk, is the outreach specialist for that project. She synthesizes

the experiences and points of view of Warren residents from varying backgrounds, business owners, nonprofit organizations, and municipal leaders.

Berry connects with groups like the East Bay Community Action Program’s Warren Health Equity Zone (HEZ). The HEZ Safety and Community Resilience Work Group consists of residents engaged in conversations around flooding and community resilience. Berry worked with the group to bring URI researchers, community members, and town employees to their August meeting to weigh in on flood mitigation strategies they would like to see further evaluated through URI research.

“Warren and its residents are still trying to get their hands around the scope of the flooding problem along Market Street,” says HEZ director Kristin Read. “It is the heart of the city’s business district. Our workgroup has been trying to understand the complexities of sea level rise, wetter weather, and inadequate drainage, and how can we share knowledge about adapting to living in a flood zone. Eliza and her colleagues are committed to listening carefully to the knowledge and experience of our neighbors, which is evident in the way they have matched technical support to available resources.”

Berry and Casey Tremper, also a Rhode Island Sea Grant coastal resilience specialist, are often tapped to serve as liaisons between researchers and communities. In another NSF-funded multi-institution research project, Brown University’s Sol Cooperdock, research associate in Earth, Environmental, and Planetary Sciences, developed sensors that detect even slight increases in water levels and can be placed over rivers, parking lots, or roads to help identify flood-prone areas. Tremper talks to community groups about the project and the sensors to identify places that could benefit from their installation.

“Rhode Island Sea Grant plays an essential role in bridging the research conducted at URI and Brown with community needs.”

- Austin Becker



Austin Becker, URI Department of Marine Affairs professor and chair says, “Rhode Island Sea Grant plays an essential role in bridging the research conducted at URI and Brown with community needs. Tremper and Berry understand the technical side of the research efforts around coastal resilience and help researchers understand how our work can best be tailored to address the challenges Rhode Island decision makers face in emergency management and long-term resilience planning.”

Rhode Island Sea Grant, one of the 34 university-based programs around the U.S. that make up the National Sea Grant College Program, supports a healthy coastal environment and economy through funding top-notch research, extension, workforce development, communications, and a legal program that is based at Roger Williams University School of Law.

In addition to coastal resilience work, other extension team members focus on fisheries and aquaculture and the blue economy—that part of the economy that relies on marine resources for business and industry, research and development, energy resources, national defense, culture, or recreation.

Rhode Island Sea Grant also provides students with the opportunity to have hands-on experience in research, extension, communications, and policymaking.

One of those students was Joe Langan, who completed his Ph.D. with Graduate School of Oceanography Professor Jeremy Collie, a fisheries scientist funded by Rhode Island Sea Grant to study the decline of winter flounder in Narragansett Bay. While at URI, Langan also completed an M.S. in statistics with Associate Professor Gavino Puggioni.

“We found that the population decline of winter flounder in Rhode Island was due largely to increasing juvenile mortality. We were able to identify a few different factors that appear to be involved, most having to do with climate change. Our research became part of a broader suite throughout the region that was actually used to change how the regional winter flounder stock was managed,” Langan says.

Langan says this opportunity gave him a chance to “work with state biologists, biologists from other states, other universities, as well as interface directly with fishermen, which I thought was also really valuable to get their perspective.”

His research assistantship led to a National Marine Fisheries Service/Sea Grant Population and Ecosystem Dynamics Fellowship, and from there to a staff position at the National Oceanic and Atmospheric Administration (NOAA), where he is currently a research fish biologist.

Rhode Island Sea Grant also provides students with the opportunity to have hands-on experience in research, extension, communications, and policymaking.

Emily Patroliia, founder and CEO of ESP Advisors, a Washington, D.C.-based consulting firm, also forged her career with Sea Grant support. Patroliia came to URI’s Marine Affairs program for a Rhode Island Sea Grant-funded research assistantship with Professor Rob Thompson to study human uses of Rhode Island’s coastal salt ponds through observational mapping and interviews. The goal of the project was

“The research we fund is rigorously reviewed not only for scientific merit, but also for relevance. Our home at URI, as a Land Grant and Sea Grant university and an R1 institution, allows us to call on world-class experts to address issues from the seafood supply chain to sea level rise, and to bring them together with communities to effect real change.”

- Tracey Dalton

to support state policymaking around aquaculture and mixed uses of the salt ponds.

Patrolia received her M.A. in marine affairs in 2016 and followed that up with a Sea Grant Knauss Fellowship, which gives highly qualified graduate students an opportunity to spend a year working in Congress or the legislative branch on federal policy issues affecting marine and coastal resources.

She worked for Sen. John Thune, the chair of the Commerce Committee, which oversees NOAA. She was given the opportunity to draft what she calls a “small” piece of legislation on illegal fishing that eventually made its way into a larger maritime security bill and became law.

After her fellowship, Patrolia worked at large firms on sustainability issues for major corporate clients, but her heart was still with the nonprofit organizations in the coastal and ocean world that couldn’t afford to work with D.C.’s premier lobbying agencies. This led her to start her own smaller firm, ESP Advisors, “to see if I could bring some of the more sophisticated lobbying activities back to the ocean space at a more approachable price point for those groups.”

She encourages graduate students to consider Knauss Fellowships, “if you want to grow and learn and change the way you think and see the world.”

“What you learn,” she adds, “is context.”

Context is key to Sea Grant work as well.

“The research we fund,” says Rhode Island Sea Grant Director Tracey Dalton, “is rigorously reviewed not only for scientific merit, but also for relevance. Our home at URI, as a Land Grant and Sea Grant university and an R1 institution, allows us to call on world-class experts to address issues from the seafood supply chain to sea level rise, and to bring them together with communities to effect real change.”

“We’ve been at URI for more than 50 years, and we look forward to many more to come.”



Emily Patrolia
Founder and CEO of ESP Advisors

ENGAGING STUDENTS IN REAL WORLD RESEARCH



RIEU



Lindsey Reimels '25

Fitting a whale into a lab might sound impossible, but University of Rhode Island (URI) student Lindsey Reimels '25 found a way to study a whale's unique filtering system far from the ocean.

Instead of a massive whale, she built a model using acrylic and palm tree wood fiber to investigate how baleen plates in a humpback whale's mouth filter out microplastics—no whale required.

“The program not only helps you grow as a scientist but also as a citizen.”

- Lindsey Reimels



A model of acrylic and palm tree wood fiber used to investigate how baleen plates in a humpback whale's mouth filter out microplastics

“I am able to do solution-based research on marine fishing gear waste, so that we may upcycle it into construction bricks.”

- Joalys Rivera Castro



Joalys Rivera Castro

Reimels, a marine biology major, knows that whales capture a large percentage of plastics in water flowing through their mouths.

Eager to discover the impacts of plastics on whales, Reimels received funding from the National Science Foundation (NSF) Research Experiences for Undergraduates (REU) program, specifically from the Established Program to Stimulate Competitive Research (EPSCoR) program that supports URI’s Summer Undergraduate Research Fellowship (SURF). This initiative offers students stipends and a chance to participate in real-world research.

Organizers welcome students during the summer to join the URI Plastics: Land to Sea research initiative to explore and develop methods to manage locally generated plastic waste, focusing on reducing its impact on coastal communities.

There’s no shortage of interest—more than 160 students from across the United States applied for the 10-week program that linked them with professors in



Rowan Bixler



“This gave me the opportunity to put to practice my degree and lab skills in this context in real world applications.”

- Joalys Rivera Castro



Elle Desmarteau

engineering, oceanography, fisheries, pharmacy, textiles, and natural resources.

During the summer Rowan Bixler worked on developing an optical microscopy method to identify and characterize different types of microplastics in environmental samples. The method involves tracking interference patterns created from light scattered by microparticles, which could make analyzing microplastics in samples more efficient and accessible.

“This research project has provided invaluable experience with scientific experimental design, microscope operation, and data analysis,” Bixler said. “I am excited to contribute to sustainability

“URI is an incredibly collaborative research institution, where I’m able to pop over to the machine shop to get my pipette tips cut off one moment, then get help from scholars at the AI Lab with image analysis techniques the next. I am extremely grateful for this amazing opportunity to learn more technical research skills, expand my network, and explore a whole new state with the support and resources of the URI Plastics Initiative REU program.”

- Elle Desmarteau

efforts. I am interested in pursuing a career in sustainable energy engineering, particularly in the wind or nuclear field.”

Elle Desmarteau worked with URI Engineering Professor Irene Andreu to observe how glitter as a primary microplastic degrades under various stressors, such as mechanical forces and particle-particle collisions as well as UV aging.

“Already, I have gotten the opportunity to learn and independently operate many machines: an ultra-micro hardness tester, UV aging chamber, and Raman, FTIR, and XRF spectrometers,” said Desmarteau. “One of my favorite parts of this internship has been working with a wide range of professors, graduate students, and other undergrads.

“URI is an incredibly collaborative research institution, where I’m able to pop over to the machine shop to get my pipette tips cut off one moment and get help from scholars at the AI Lab with image analysis techniques the next. I am extremely grateful for this amazing opportunity to learn more technical research skills, expand my network, and explore a whole new state with the support and resources of the URI Plastics Initiative REU program.”

After gaining overall experience in the waste industry Joalys Rivera Castro became fascinated with the recycling process and materials science. Joining engineering Professor Vinka Oyanedel-Craver’s lab allowed her to focus on innovating in that field while contributing to sustainability goals.

“I am able to do solution-based research on marine fishing gear waste, so that we may upcycle it into construction bricks.” Castro said. “This gave me the opportunity to put to practice my degree and lab skills in this context in real world applications.”

Castro shared the example of assessing product quality and the environmental challenges that could impact recycling facilities going forward.

“In utilizing particulate sampler and sensors and being able to have hands on in the shredding, grinding, extrusion, and melting process of mechanical recycling I’m putting my research to practical use.”

Reimels said she benefited from the program’s stipend, which meant she didn’t have to find a minimum-wage summer job and instead focused on learning and building connections for her future.



Vinka Oyanedel-Craver

Associate dean of research
College of Engineering

“It’s an undergraduate opportunity to give students a glimpse of what is coming if you pursue research,” said Oyanedel-Craver, associate dean of research at the College of Engineering. “It will give you a chance to build your strengths.”

The program benefits students because it provides them with experience and a research avenue they may want to pursue as a professional career.

“The program not only helps you grow as a scientist but also as a citizen,” Reimels said. “You learn so many different skills beyond science.” The REU program runs through 2027, Oyanedel-Craver and her colleagues hope the students will leave the experience impressed with the University, decide to attend URI for graduate school and ultimately stay in Rhode Island, strengthening the state’s knowledge economy.

“It’s an undergraduate opportunity to give students a glimpse of what is coming if you pursue research.”

- Vinka Oyanedel-Craver

THE RIPPLE EFFECT OF **RESEARCH FUNDING FOR BETTER OUTCOMES**

By Shaun Kirby '07

Daniel Roxbury is used to developing sensors that help us explain complex environments, such as cancer cells in the body or chemical pollutants in seawater. Studying microplastics, however, presents a whole new challenge, one new initiative funded by the U.S. National Science Foundation (NSF) aims to overcome.

“It’s been really eye-opening to see how much we don’t know about microplastics,” says the associate professor of chemical, biomolecular, and materials engineering at the University of Rhode Island.

Roxbury is the principal investigator of SIMCoast (Socio-ecological Impact of Microplastics in Coastal Ecosystems), a \$7 million, four-year grant building Rhode Island’s research capabilities to measure and study the impacts of nano- and microplastics (NMPs) throughout the Narragansett Bay watershed, an area spanning approximately 1,700 miles in Rhode Island and Massachusetts and home to nearly two million people.

Scientists consider any fragment no greater than 5mm in size as a microplastic, while nanoplastics are less than 1 micron, similar in size to a speck of dust. As plastic materials like water bottles and fishing gear enter the state’s rivers and coastlines, they break down into what’s called *secondary plastics*. They then move through water bodies in unknown ways and with varying shapes like microfibers, films and jagged particles.

SIMCoast, a grant awarded through NSF’s Established Program to Stimulate Competitive Research (EPSCoR), is trying to better understand how, and to where, microplastics are moving throughout the watershed.

“There’s all different kinds of sizes and compositions of NMPs,” Roxbury says. “It’s a monumental technical challenge to be able to detect these plastics.”

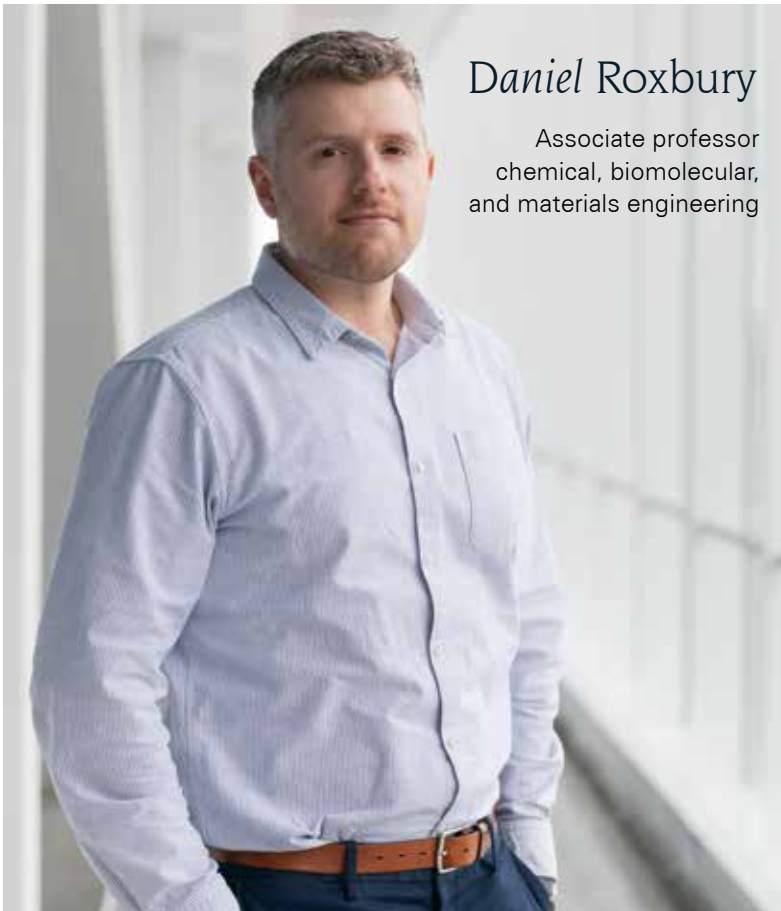
The project is split into three research themes with faculty from institutions across the state. One group is developing new methods for sampling microplastics in diverse water environments, including from the sediments of Narragansett Bay, areas of outwash from rivers, freshwater lakes and stormwater basins.



“A large part of our economy relies on the bay and the ocean, and we wanted to pick a topic that critically affects it. We chose to study the socio-ecological impacts of microplastics within coastal ecosystems as the theme of our E-RISE project.”

- Daniel Roxbury





Daniel Roxbury

Associate professor
chemical, biomolecular,
and materials engineering

Through this work, Roxbury and his team seek to establish standardized practices for studying micro and nanoplastics in Rhode Island and beyond. Current techniques to detect and image plastics at such small sizes are very limited, as well as being time-consuming and cost prohibitive. New methods from SIMCoast investigators work could provide better information to communities and policymakers about the potential impacts of these nearly invisible particles.

"What we're finding is that no approach is perfect," he says. "How much do you want to sample versus how accurate do you want to be? New techniques are coming down the pipeline, and we're seeing if they're suitable to our needs."

The ways in which microplastics move through water bodies, in rivers and wastewater canals all the way to Narragansett Bay and out into the Atlantic Ocean, are complex and understudied. Scientists don't currently know, for example, where microplastics are more likely to accumulate in coastal habitats.

A second group of investigators are developing computer models to bring these flow patterns to light, as well as forecast where hotspots for collected plastics may be occurring.

"Even if we have all the proper sampling, we need to develop empirical models about how these microplastics are being

transported," says Roxbury. "We're creating models that will predict how plastics are making it into the watershed and then all the way down to the bay and ocean."

"One of the main goals here is to try to create that level of model that you can actually run time backwards to see where microplastics are originating from."

Critical to understanding microplastics in the Narragansett Bay watershed is how the impact marine and terrestrial species. Which animals are ingesting microplastics and being harmed by them? Which species seem unfazed? How do microplastics travel through the food web to impact human health? SIMCoast is answering such questions by supporting researchers in multiple areas of study, from wildlife conservation to aquaculture.

But why conduct all this research and build Rhode Island into a go-to resource for studying microplastics? Who should know, and benefit from, this progress? SIMCoast has gathered a team to engage with local community members, state agencies, and industry to ensure that decision-makers are well-informed about how microplastics are impacting their cities and towns. This group will also develop inclusive approaches and programs to increase accessibility of SIMCoast research findings.

"We are saying that microplastics are bad, right?" says Roxbury. "But when you go to local communities and say something like that, they'll list 10 problems that are actually affecting their daily lives, and microplastics isn't on that list."

"We don't want to push this science onto them, but if we can understand their perspectives, we can hopefully relate this work to their daily lives."

Roxbury has reflected often in the past year about what he's learned from colleagues all trying to tackle the problem of plastics at such fine scales and how humans are, and will be, impacted by them. He hopes that the SIMCoast team can advance our knowledge of these pollutants, one particle at a time.

"Being on this team of such diverse perspectives has been enlightening," he says. "My job is to facilitate synergies where I can, making sure all rudders are heading the same direction."

SIMCOAST COLLABORATORS:

Anabela Maia, Co-Principal Investigator, Associate Professor of Biology, Rhode Island College

Baylor Fox-Kemper, Co-Principal Investigator, Professor of Earth, Environmental, and Planetary Sciences, Brown University

Stephen O'Shea, Co-Principal Investigator, Professor of Chemistry, Roger Williams University

Katherine Lacasse, Co-Lead, Professor of Psychology, Rhode Island College

Daniel Hewins, Co-Lead, Professor of Biology, Rhode Island College

Lillian Jeznach, Associate Professor of Engineering, Roger Williams University

Mara Freilich, Assistant Professor of Earth, Environmental, and Planetary Sciences, Brown University

Emanuele DiLorenzo, Albert Davis Mead Professor of Earth, Environmental, and Planetary Sciences, Brown University

Karianne Bergen, Assistant Professor of Earth, Environmental, and Planetary Sciences and Data Science, Assistant Professor of Computer Science, Brown University

Carla Narvaez Diaz, Assistant Professor of Biology, Rhode Island College

URI @SIMCOAST:

Daniel Roxbury, Principal Investigator, Associate Professor of Chemical, Biomolecular, and Materials Engineering

Vinka Oyanedel-Craver, Co-principal Investigator, Associate Dean of Research, Professor, Civil and Environmental Engineering

Andrew Davies, Co-Lead, Professor of Biological Sciences

Lewis Rothstein, Co-Lead, Professor of Oceanography

Coleen Suckling, Co-Lead, Associate Professor of Aquaculture/Fisheries

Melva Treviño Peña, Co-Lead, Assistant Professor of Sustainable Agriculture/Food Systems

Emily Diamond, Co-Lead, Associate Professor, Director of Communication Graduate Studies

Peter Rumsey, Co-Lead, Chief Business Development Officer

Geoffrey Bothun, Chester H. Kirk Professor and Department Chair of Chemical, Biomolecular, and Materials Engineering

Matthew Kieseewetter, Professor, Department Chair of Chemistry

J.P. Walsh, Professor of Oceanography

Sarah Davis, Postdoctoral Fellow

Animesh Pan, Research Associate

Ali Akanda, Associate Professor of Civil and Environmental Engineering

Scott McWilliams, Professor of Natural Resources Science

Katrina Vickery, Doctoral Student

PARTNERS:

The Narragansett Bay Commission

401 Tech Bridge

Rhode Island Commerce

RI Department of Environmental Management

Woonasquatucket River Watershed Council

“Being on this team of such diverse perspectives has been enlightening. My job is to facilitate synergies where I can, making sure all rudders are heading the same direction.”

- Daniel Roxbury



A Debt *to*

Why URI's Land-Grant Mission *Still* Matters

By Anna Vaccaro Gray '12, M.S. '16

This story was originally published in University of Rhode Island Magazine; Vol. 7, No. 3; Summer 2025. Amended and reprinted with permission. Photos: Seth Jacobson; Nora Lewis; Courtesy URI Master Gardeners Program

History



The University of Rhode Island embodies the three-pronged land-grant mission of education, research, and outreach focused on practical service to the state. Today, 163 years after the Morrill Act established land-grant universities—this piece asks: What does it mean to be a land-grant university today? And why does it matter?

Summer farm crew members at the Greene H. Gardner Crops Research Center on URI's Kingston Campus. From left, Grace Connolly '26, wildlife and conservation biology major; Aislin Aylward '26, environmental science and management major and a Cooperative Extension agriculture and food systems fellow; Tricia Lourenco Boucher '23, program facilitator for URI's Boots to Bushels program, with her dog, Rosie; and Grace Chasanoff '25, animal science major.

The passage of the Morrill Land-Grant College Act in 1862 transformed public education in the United States. At the time, universities were largely elite and exclusive. The land-grant system aimed to make higher education accessible to a broad range of people and to deliver a practical education.

In addition to research and teaching, land-grant universities have a third mission: outreach, often called extension—a commitment to connecting knowledge with real-world application that directly benefits the state in ways that contribute to strong economies and quality of life.

The University of Rhode Island, the state's only land grant institution, engages with this legacy through a variety of disciplines, from nutrition and education to the humanities and sciences, with a focus on serving communities statewide.

Cooperative Extension, Then and Now

Kenyon Butterfield, URI's shortest-serving president from 1903 to 1906, felt strongly about outreach. He organized an extension department in 1904—a decade before other land-grant colleges—and employed agents to liaise between the school and the public, translating evidence-based research into practice while keeping a finger on the pulse of people's needs.

In 1914, Butterfield's system was formalized when the Smith-Lever Act established Cooperative Extension programs at land-grant universities nationwide. As society's needs changed, Cooperative Extensions adapted. During the social and economic turmoil of World War I and the Great Depression, they helped people learn practical skills.



Rebecca Brown, URI professor of plant sciences and entomology, at the Greene H. Gardner Crops Research Center on the Kingston Campus. On the tractor is summer farm crew member and animal science major Simon Tetreault '25.

“It’s gratifying to see students find jobs in agriculture, and to see farmers stay in business.”

- Rebecca Brown, URI Professor of Plant Sciences and Entomology

URI’s Cooperative Extension is now active in all 39 municipalities in Rhode Island and partners with state and local agencies to address environmental, social, and economic concerns.

The scope is extensive: from the Aquaculture Extension program, which connects the state’s aquaculture producers to science-based, sustainable, and profitable aquaculture practices, to the Onsite Wastewater Resource Center, which provides education on best practices for protecting water quality and public health and encourages sustainable development.

Cooperative Extension programs deliver impressive results. In 2024, among other programs, the Food Recovery for Rhode Island program gleaned and rescued 231,785 pounds of food, which was donated to feed Rhode Islanders, and diverted an additional 8,196 pounds of food from the landfill; volunteers with the Watershed Watch program regularly monitored 220 fresh and marine water bodies; and the Plant Diagnostic Laboratory identified more than 500 plant, insect, and disease samples.

of Agriculture. The land-grant system’s focus on agriculture has helped protect Rhode Island farmland and support the local economy. According to the Association of Public and Land-Grant Universities, recent data indicates that for every \$1 in public investment, food and agriculture research and development from land grants has returned \$20 to the American economy.

Today, URI’s Agricultural Experiment Station includes three farms and several greenhouses on the Kingston Campus and at East Farm. The Greene H. Gardner Crops Research Center, also called Agronomy Farm, hosts research and teaching plots as well as 4 acres used to grow produce for URI Dining Services, the Free Farmers Market, and Rhody Outpost, a food pantry for students. East Farm is used for research in aquaculture, ornithology, entomology, wildlife habitats, and more. Peckham Farm is home to URI’s animal science program, a variety of livestock used for teaching and research, and 18 acres of hayfields and pastures.

“We have a mission to teach and support agriculture across the state,” says Rebecca Brown, URI professor of plant sciences and entomology.”

Staying Focused on Farms: URI’s Agricultural Experiment Station

In 1887, the Hatch Act established Agricultural Experiment Stations at land-grant schools focused on improving food production and agribusiness. They continue to be important components of land-grant institutions.

Rhode Island has about 59,076 acres of farmland, according to the 2024 Census



“We have a mission to teach and support agriculture across the state.”

- Rebecca Brown, URI Professor of Plant Sciences and Entomology

IMPACT BY THE NUMBERS

How URI Cooperative Extension helped Rhode Island in 2025.

»241,960

pounds of wasted food gleaned or rescued and donated to feed Rhode Islanders

»57,041

pounds of food diverted from the landfill waste stream

»2,000+

phone, email and walk-in inquiries fielded through the URI Gardening and Environmental Hotline

»500+

plant, insect and disease samples identified through the URI Plant Diagnostic Laboratory

»220

fresh and marine water bodies monitored regularly since 1988

»All 39

municipalities served in Rhode Island

David Weisberger, an agricultural extension agent for URI's Cooperative Extension, meets regularly with farmers, nonprofits, and state agencies, like the Division of Environmental Management and the Northeast Organic Farming Association of Rhode Island. "What I find most worthwhile about working for a land-grant institution is being a civil servant for the farmers of Rhode Island," Weisberger says. "Industries can play an important role, but because we are public sector workers, we aren't selling anything. We're just sharing information and feedback with farmers to help them solve problems."

Science Education: Working Symbiotically

Sara Sweetman, Ph.D. '13, URI associate professor of education, directs the Guiding Education in Math and Science Network (GEMS-Net), a program that advances science education by helping Rhode Island teachers implement innovative science curricula developed by researchers.

GEMS-Net brings teachers and administrators from 13 public school districts together with URI researchers and educators for workshops, professional development, and mentoring. The programming often takes place in the schools. Sweetman's own research on topics such as teaching science through media and outdoor education informs—and is informed by—her interactions with teachers in the GEMS-Net program.



Sara Sweetman, Ph.D. '13, URI associate professor of education, directs the Guiding Education in Math and Science Network (GEMS-Net)



Christina Broomfield '09, an elementary school teacher in North Kingstown, R.I., says that her participation in GEMS-Net has made science her strongest teaching area.

"Research is only important if it's useful," she adds. "We need it to be translatable."

An elementary school teacher in North Kingstown, R.I., Christina Broomfield '09 began attending GEMS-Net workshops early in her career. "I appreciated that it was the same team of workshop facilitators every time, and not a company sponsoring the curriculum," she says. As GEMS-Net staff co-present workshops with teachers and researchers, Broomfield says she also appreciates the emphasis on collaborative expertise.

Science is Broomfield's strongest area of teaching, she says, because of the professional development and ongoing support she's received from GEMS-Net.

"GEMS-Net has been a constant in my career," she says. "I know I'm always going to get support from the team. It makes me feel really empowered."

Liberal Arts: Ethical and Engaged Work

One of the architects of the 1862 Morrill Act, Jonathan Baldwin Turner, wrote that the land-grant system was meant to "extend the boundaries of our present knowledge." The liberal arts are a necessary component of that pursuit. While applied scientific research produces measurable impact, the liberal arts fortify land-grant work.

Madison Jones, URI assistant professor of professional and public writing and natural resources science, sits between two worlds: liberal arts and applied sciences. "Humanists do land-grant mission work in a way that has typically gone unseen or unacknowledged because it isn't

**"Research is only important if it's useful;
we need it to be translatable."**

- Sara Sweetman Ph.D. '13, URI associate professor of education



Cheryl Foster, URI professor of philosophy and political science, and Madison Jones, URI assistant professor of professional and public writing and natural resources science, say the liberal arts perspective helps researchers understand the people and communities they serve.

necessarily a product," he says. "But we need the humanist perspective to ask: Why are we doing this? What is it going to do for humans? How is it going to affect our democracy?"

Jones founded the DWELL (Digital Writing Environments, Location, and Localization) Lab at URI to advance innovative approaches to science communication. The lab considers how humans interact with places through deep mapping, which layers media and information to represent not only a place's physical characteristics, but also its history, the lived experiences of its inhabitants, and more.

One of DWELL's project sites is North Woods, a 300-acre parcel of unmanaged forests and wetlands next to URI's Kingston Campus. Jones' team created an interactive experience about the relationship between URI and the land it uses. They worked with an artist from the Narragansett Indian Tribe to create a walking tour of North Woods based on a traditional Narragansett ecological story about how birds got their song.

"One of the most important things we can do to

respond to the world we're living in is to foster interdisciplinary and transdisciplinary work," he adds. "It can be an exhausting approach, but it's a rewarding one, and it brings us toward more ethical and engaged work."

An Invitation to Respond

The land-grant system epitomizes a fundamental contradiction. "The 'public good' [that land-grant] institutions purported to promote was only possible because of violence and dispossession of ancestral Indigenous land, and acknowledging this dissonance is important for true understanding," wrote URI student Jenny Sullivan '21, M.A. '24, in her master's thesis, "Origins and Consequences of Rhode Island's Land-Grant Institutions."

Confronting this history is, according to Jones, something that "compels and invites our response." Essential to our response are the values at the core of

the land-grant mission itself: working and collaborating meaningfully with communities to improve and enrich our shared reality.

“In my experience, people at URI are willing to ask questions and to learn,” says Dinalyn Spears ‘95, director of community planning and natural resources for the Narragansett Indian Tribe. “They want to be educated about our history, and they are proactive in working with the Tribe.”

Spears teaches Indigenous uses of native plants and the Narragansett Indian Tribe’s food sovereignty efforts in URI Cooperative Extension’s Master Gardener program, which trains and certifies people to become community educators who teach Rhode Islanders about environmentally sound gardening practices. Spears completed her Master Gardener training in 2015. She has a farm in Westerly, R.I., where she grows vegetables and medicinal and culinary herbs for tribal citizens.

Spears notes that at URI, there are growing efforts toward achieving a more fully realized version of the



Dinalyn Spears ‘95 is director of community planning and natural resources for the Narragansett Indian Tribe and a URI Master Gardener. Spears serves as an instructor for the Master Gardener program, offering traditional ecological knowledge around the indigenous uses of native plants. URI Master Gardener program leader Vanessa Venturini ‘08, M.E.S.M. ‘11, calls Spears “a true community leader, a respected elder in the community, and a connector to URI Cooperative Extension, where she now sits on our advisory board.” Spears is pictured (left) with fellow Master Gardener Maria Rivera-Saillant.

Essential to our response are the values at the core of the land-grant mission itself: working and collaborating meaningfully with communities to improve and enrich our shared reality.

accessibility and inclusivity promised by the original land-grant legislation. A scholarship was established for undergraduate students who are citizens of the Narragansett Nation. URI’s land acknowledgement, a public statement recognizing that the University occupies the land of the Narragansett Nation and the Niantic People, was written in collaboration with John Brown, the Narragansett Indian Tribe’s tribal historic preservation officer. And the Tomaquag Museum, one of the oldest tribal museums in the country, is slated for a new location on URI’s Kingston Campus.

While there is more that can be done, Spears points to these examples as emblematic of the current climate. “The past is important,” she says, “but there is a time to come together, move forward, and build new relationships.”

The complexity of the land-grant system’s history, not unique to URI, is not lost on faculty engaged in land-grant work; rather, it fuels their desire to contribute to the public good through equitable, engaged work.

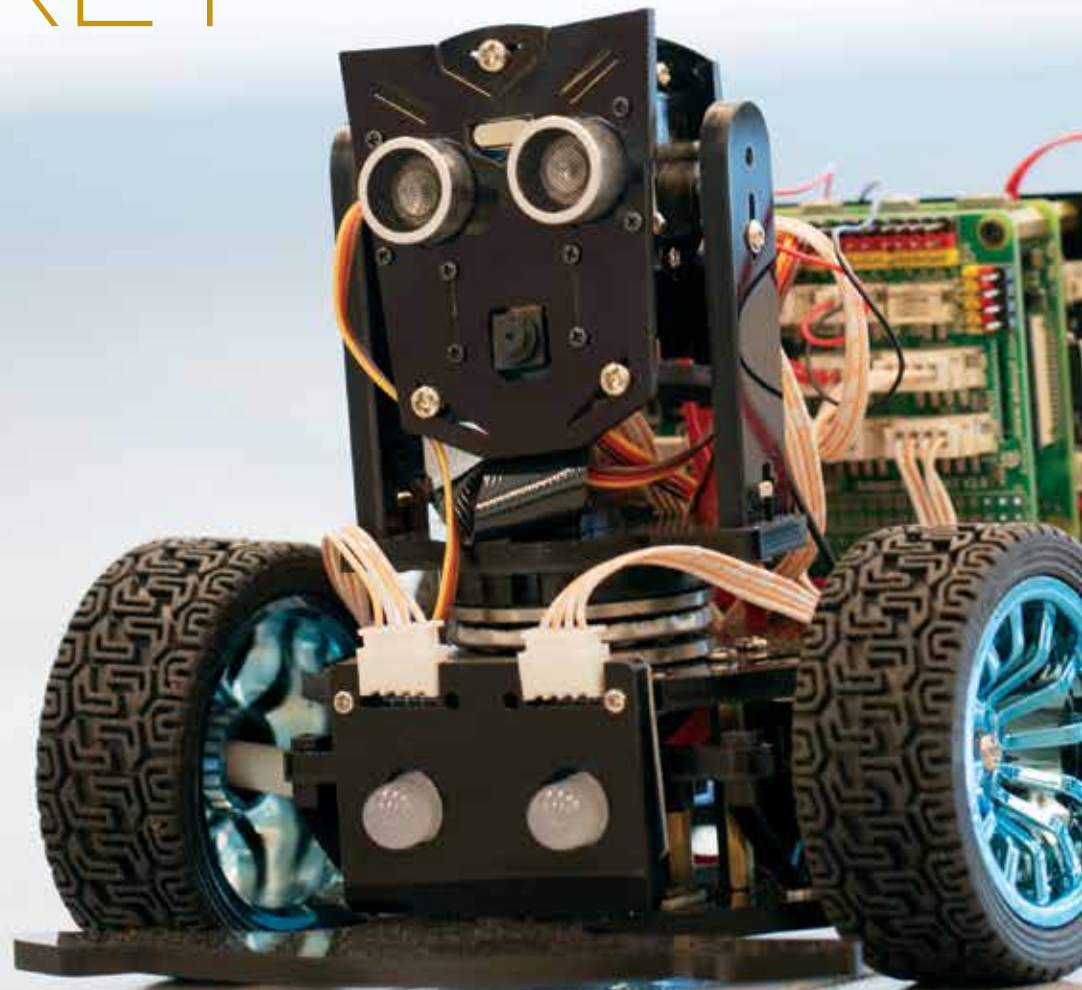
Being part of a land-grant university carries with it a debt born of a complicated history. “It’s a debt,” Jones says “that we owe to taxpayers in the state, to the communities that call Rhode Island home, and to each other. It’s an obligation and an exigency.”

Scan QR code to view the full article.



URI RESEARCHERS
**BRINGING
INNOVATIONS**
FROM LAB
BENCH TO
MARKET

By Michael Blanding



Scientific breakthroughs don't just explain the world—they change it.

Through both basic research grants and awards targeted towards innovation and entrepreneurship, the federal government enables new discoveries that drive economic growth when scientists move their inventions out of the lab and into the hands of real-world users. At the University of Rhode Island (URI), three engineering professors have taken paths to transform basic research into life-altering technologies—and the companies to deliver them.

Reading—and Rewiring—the Brain

Walter Besio can read your thoughts. A URI professor of electrical, computer, and biomedical engineering, Besio developed a device called a tripolar concentric ring electrode, which essentially is a set of tiny, closely spaced rings stacked like a bullseye. The design allows him to pick up clean, high-frequency brainwave signals from the scalp—signals that conventional electrodes can't reliably detect.

"It allows you to see things you wouldn't necessarily be able to see without cracking the hood," he says.

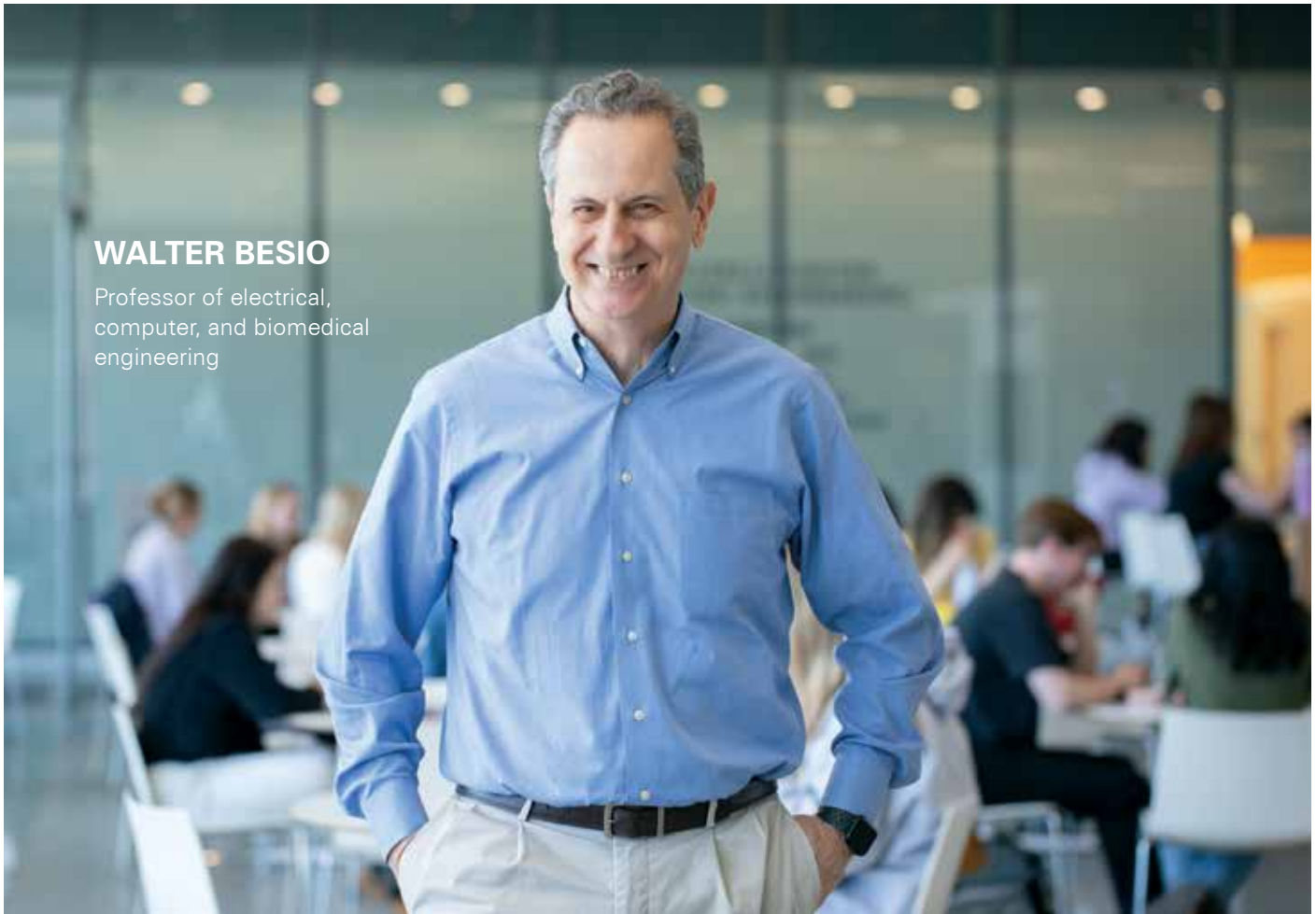
But Besio's breakthrough isn't just about sensing. The same device can also deliver precisely targeted electrical stimulation to the brain to treat epilepsy, potentially stopping seizures before they begin, as well as noninvasively treating other neurological disorders.

"My goal has always been to prevent disease, disability, pain, and suffering. We've got our first trials in humans showing it's safe and it's working. Now I'm starting to look for big, big funding to move it along more quickly."

Besio was working on a dairy farm in Florida when his brother was paralyzed from the neck down in a car accident. Determined to help him, he went back to school to study engineering, earning a master's at the University of Central Florida and a Ph.D. at the University of Miami. His graduate student research led him to an innovative idea. His insight was surprisingly simple—traditional EEG (electroencephalography) electrodes pick up interference from electrical signals in the environment, like those in building walls. But if multiple electrodes are placed close together in concentric rings, they all register that interference equally.

"So, with simple math—one minus one—I take the difference of the electrodes, and it automatically cancels it out, leaving only the thing that's directly beneath it," Besio explains.





WALTER BESIO

Professor of electrical,
computer, and biomedical
engineering

What remains are high-frequency oscillations directly beneath the electrode on the scalp, which are considered markers for seizure activity.

Besio's work drew the attention of a neurosurgeon who saw the potential for treating epilepsy. After joining URI in 2009, Besio secured a \$350,000 grant from NSF's General and Age-Related Disabilities program to further develop the technology. To prepare for necessary Food and Drug Administration (FDA) approval, he has conducted years of studies. In 2011, he received a \$50,000 NSF Innovation Corps (I-Corps) grant and joined the program's first cohort—an eight-week boot camp in commercialization hosted at Stanford University.

With help of the program, Besio launched a company, CREmedical, and earned additional Small Business Innovation Research (SBIR) grants in 2013 and 2014. In 2015, a \$6 million NSF grant supported the development of a cap-like device that both records and stimulates brain activity.

Research trials showed that targeted electrical therapy could significantly reduce the dosage of anti-seizure drugs, minimizing drug side effects like dizziness and fatigue. After 22 years and nearly \$10 million in federal funding, the system is now in clinical trials at Boston Children's Hospital and the Barrow Neurological Institute. Researchers already can purchase the system for investigational use, even before FDA approval. And, Besio is seeking venture capital to expand access and explore new applications, from Parkinson's to ADHD to stroke rehabilitation.

Ultimately, he hopes the technology could one day help people with paralysis—like his brother—control a computer, wheelchair, or robotic limb using only their thoughts.

"My goal has always been to prevent disease, disability, pain, and suffering," Besio says. "We've got our first trials in humans showing it's safe and it's working. Now I'm starting to look for big, big funding to move it along more quickly."

Speeding Up the Digital World

For decades, the bottleneck in computer speed wasn't processing power, but memory.

"The CPU was fast, but the memory was slow. It would always lag behind," says Distinguished Engineering Professor Ken Qing Yang.

Engineers solved the problem in part by buffering data in a cache, but memory still lagged. Yang developed with an innovative mathematical technique that reduced conflicts to map memory to the cache, significantly speeding up the process. He followed up with another technique that dramatically sped up access for hard drives, resulting in a commercial company VeloBit that revolutionized storage efficiency.

Yang studied at Huazhong University of Science and Technology before earning a master's at University of Toronto and a Ph.D. in computer engineering at University of Louisiana.

"The NSF grants that paid my stipend and tuition during my graduate studies were critical to my research," says Yang. "They built a foundation for my entire research career. My work has produced graduates who are now research leaders in top U.S.

universities and computer companies such as Intel, Cisco, Meta, Western Digital, and more."

He joined URI in 1988, receiving a \$60,000 NSF Research Initiation Award, that allowed him to set up his lab.

Since then, he has been continuously funded by the NSF for 36 years, receiving more than a total of \$4 million. His disk cache research began in the early 2000s, when he came up with the concept of "content locality" to access data most important to a user.

"Let's say you watch a Celtics game, and afterwards you want to know everything about Jayson Tatum or Jaylen Brown, the popular scorers," he explains. "But you are not as interested in less popular players."

Yang's system prioritized frequently accessed data, placing it in faster memory for quicker retrieval. Rather than relying solely on hard disk drives (HDDs) that use magnets to store data on a spinning disk, requiring the system to wait every time the disc spun around to access it, Yang's technology placed that popular data on solid state drives (SSDs) that store data in semiconductor chips, achieving a balance between speed and cost.



KEN YANG

Distinguished professor,
electrical, computer, and
biomedical engineering



KUNAL MANKODIYA

Professor of electrical,
computer, and biomedical
engineering

“We basically use a fingerprint of data and find how often it’s accessed,” Yang explains. “We cache the popular data in high-speed memory, so you can access it in terms of microseconds instead of milliseconds—a three-order magnitude of difference.”

With URI’s support, Yang patented the technology in 2007, and partnered with Boston-based venture capitalist Duncan McCollum, who became CEO of VeloBit when launched in 2010, with graduate student

“I would not have accomplished anything without federal and state research funding. It essentially changed my life.”

- Kunal Mankodiya

Jin Ren ‘11, the company’s first employee. Because of the market potential of the new technology, the team raised \$5 million in venture capital, releasing a product the following year.

Since then, hundreds of companies adopted the technology to speed up access to customer data, inventory, and financial records, often extending the life of existing hardware and saving money. In 2013, Western Digital acquired VeloBit for an undisclosed amount.

In all, Yang helped launch three more startups, all based on his patented inventions. In a distinguished career, Yang has been granted over 20 U.S. patents, authored more than 130 papers, and was named a Fellow of the Institute of Electrical and Electronics Engineers—one of the highest honors in his field. In addition to the research and products themselves, Yang says, the research grants he has been awarded during his career have helped support a dozen Ph.D. students, who have gone on to create their own innovations.

“They are professors at top U.S. universities, research leaders and engineers at big companies such as Intel, WD, Meta, Xerox, and Adobe etc.,” he says. “That’s what I’m most proud of.”

Weaving Medical Treatment into Everyday Life

Growing up in a small town near Ahmedabad, India, Kunal Mankodiya was surrounded by his family's textile business. At the same time, he was drawn to biology and medical sciences in his studies. As a graduate student in Germany, he found a way to combine the two, integrating sensors into fabric to create wearable health devices.

Now a professor of biomedical engineering at URI and director of the Wearable Biosensing Lab, Mankodiya creates clothing that can help doctors diagnose and monitor diseases in daily life environments. A \$600,000 NSF CAREER award in 2017 helped him grow the lab and long-term vision.

"I would not have accomplished anything without federal and state research funding," he says. "It essentially changed my life."

His first project was a smart glove, designed for people with Parkinson's and other diseases that cause mobility issues. Patients wear it at home to complete finger exercises, generating data that an app transmits to physicians.

"You don't need to wear the gloves 24/7," he says. "You perform exercises two or three times a week—just for a few minutes at a time. We use signal processing and algorithms to define the severity of symptoms through telehealth."

Later, his team expanded to smart shoes as well.

The data from gloves and shoes can help doctors titrate medications more accurately, avoiding overdoses and missed doses between clinic visits.

With help from a 2019 NSF Partnerships for Innovation Tech Transfer grant, the project became the foundation for a startup, WellAware. One of his former Ph.D. students, Nicholas Constant '15, MS '17, PhD '21, now leads the company full-time, aiming to bring early cognitive screening tools to rural and underserved communities. WellAware received a couple of SBIR and other state funds for clinical validation, helping towards commercialization.

His lab has also helped inspire other students to spin off several other companies, including Pison, co-founded by David Cipoletta '14 MS '19, which uses wrist-worn chips to detect electrical muscle signals for gesture control, recently striking a deal with Timex.

Another company, WellFit Wearables, spearheaded by current doctoral student, Vignesh Ravichandran MS '21, Ph.D. '26, focuses on gastrointestinal monitoring for endurance athletes using a sensor belt. The project recently took advantage of an NSF I-Corps award to conduct customer discovery interviews with more than 110 health professionals about knowing the real-world problems associated with gut health and how the device could be useful.

Most recently, his lab has partnered with undergraduate business alum and URI rowing captain Nicole Jones '24 on AnalytIQ, which aims to monitor cardiovascular stress in rowers.

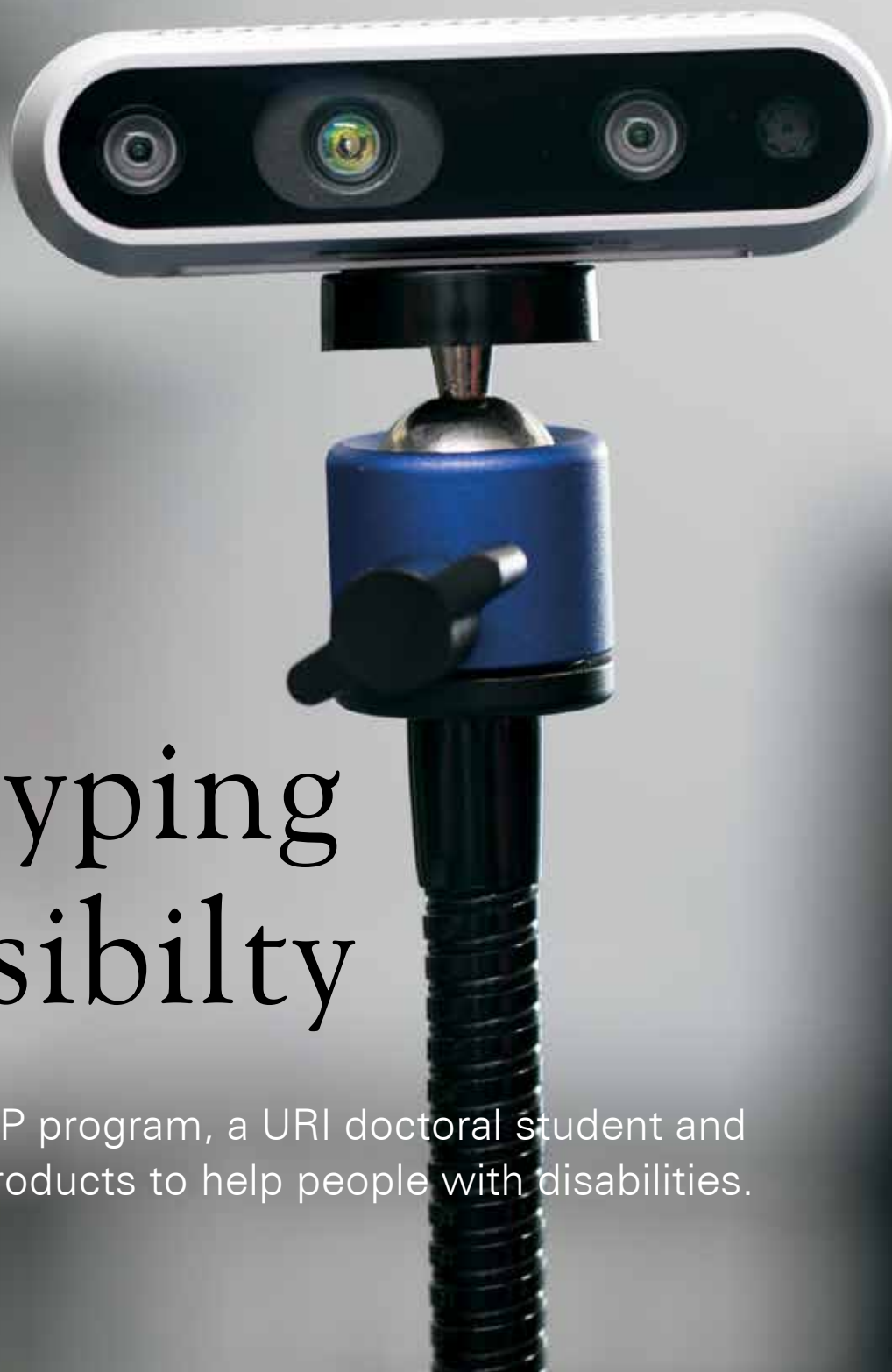
"We work closely with doctors and clinicians," says Mankodiya. "As a technologist and engineer, we can propose thousands of things, but they're not going to help anybody if their requirements are different and not met."

With nearly \$16 million in NSF funding the lab is expanding to cover the full human lifespan, from neonatal monitoring to stroke rehab and chronic kidney disease.

"Pursuing translational research constantly pushes you to think differently—which is a good thing—because in the scientific world you want to find ways to make impacts through translation and entrepreneurship and serve societal needs." Mankodiya says. "In the process of technology translation, you are challenged to think beyond boundaries and learn real problems existing in outside lab environments such as patients homes, clinics, and hospitals. That mindset—of thinking beyond boundaries—is something I strive to pass on to my student innovators and entrepreneurs."



Mankodiya (pictured left) and his students in his research lab.



Prototyping Accessibility

Through the RISE-UP program, a URI doctoral student and alum are creating products to help people with disabilities.

By Michael Blanding

Prototype created by Chan Young Koh Ph.D. '26

When he first arrived in the U.S. a decade ago, Chan Young Koh Ph.D. '26 developed a habit of walking as a way to reduce stress and loneliness.

"I walk around the city all the time," he says, "and when I do, I often see people struggle to use pedestrian walkways and sidewalks."

Cracked and uneven surfaces cause people to slip or trip, and overgrown trees or snow block access. Those issues especially affect those with wheelchairs or other disabilities. Witnessing them got Koh thinking—what if there was a system that could detect hazards and report them to municipal authorities.

A doctoral student in computer science, Koh has been working the past few years on a system he calls "sidewalk intelligence," consisting of a remote sensor attached to an autonomous robot that can patrol a municipality and use machine learning to identify and report dangers.

"It's not AI, it's SI," he quips.

He's been helped along the way by RISE-UP (Regional Innovation by Scaling Entrepreneurship via University Partnerships), a unique program by the U.S. Office of Naval Research to help students create companies to address real-world challenges.

Started in 2022, the program is a partnership between URI, the University of Hawaii, the University of Alaska—three states with a strong naval presence. It includes a one-year fellowship called Patents2Products, which connects students to faculty and industry mentors to help launch their ideas. A semester-long course called Ideation Studio, teaches essentials to help students develop a business plan.

"URI helped me immensely at every point in the process," Koh says, "from conjecturing the idea to the changes I've made along the way. I'm the kind of person who can go down every rabbit hole. URI helped me stay focused on my goals."

Initially, Koh envisioned a system that would collect data and bring them back to a central

command center for analysis. Realizing that would be inefficient, however, he has shifted gears to a model that would constantly monitor sidewalks and feed into an app in real-time.

That change in focus caused him to reconceive his target customer to include not only municipalities, but everyday people including runners and wheelchair users who can use it to re-route their course.

He has been testing a prototype, adapting a microcomputer unit equipped with LIDAR and infrared sensors and printing a 3-D casing that can be attached to an autonomous robot, hoping to have a demo version by spring he can showcase to municipal officials. In the future, he says, the device could potentially be made smaller and lighter to be carried by an aerial drone.

Koh hopes to become a professor after earning his Ph.D. this spring, while continuing to develop the sidewalk intelligence system into a commercial product.

"Research at URI has been a joy for me," he says. "URI places such a strong emphasis on helping students become better researchers and turn their ideas into practical, marketable solutions. RISE-UP helped me gain the confidence to reach out and share the vision I have for this project and carefully improve it to better accommodate the group I am trying to help."

In that goal, Koh is joined by another RISE-UP participant, Charles Johnson BA/BS'98, who participated in the program as an alum, and has been working on a video game controller for people with disabilities. After observing his cousin, who was born with one hand, struggle to play a game on Xbox, he found that current one-handed controllers were clunky and expensive, and became determined to create an elegant and affordable alternative.

Johnson, an education and history major at URI who has taught in Providence schools, 3-D printed a prototype. RISE-UP mentor Joe Loberti BS'88, MBA'90 connected him with a Rhode Island-based

"URI places such a strong emphasis on helping students become better researchers and turn their ideas into practical, marketable solutions."

- Chan Young Koh

“I want to focus on something that can help vulnerable people.”

- Chan Young Koh

manufacturer, International Precision Assemblies, with factories in the Philippines that were able to turn it into a product.

“The RISE-UP classes have been phenomenal,” Johnson says. “They’ve taught me how to write a pitch, understand legal aspects and taxes, figure out a go-to-market strategy—everything somebody without a business degree would need to start a business.”

In 2023, Johnson received a boost when he won the \$100,000 prize from Rhode Island Business Competition for his company, Nhuad Controllers, named in homage to a one-armed Celtic warrior, allowing him to start production.

So far, he’s sold several hundred controllers at a price of \$199. He’s now hoping to find an investor who can help him take the product to scale, putting in an order of 1,000 controllers or more to help bring the cost down.

In addition to video games, he would like to find alternative uses for the technology and has proposed using the controller for everything from piloting drones to controlling home electronics and lighting systems. Johnson has also spoken with another

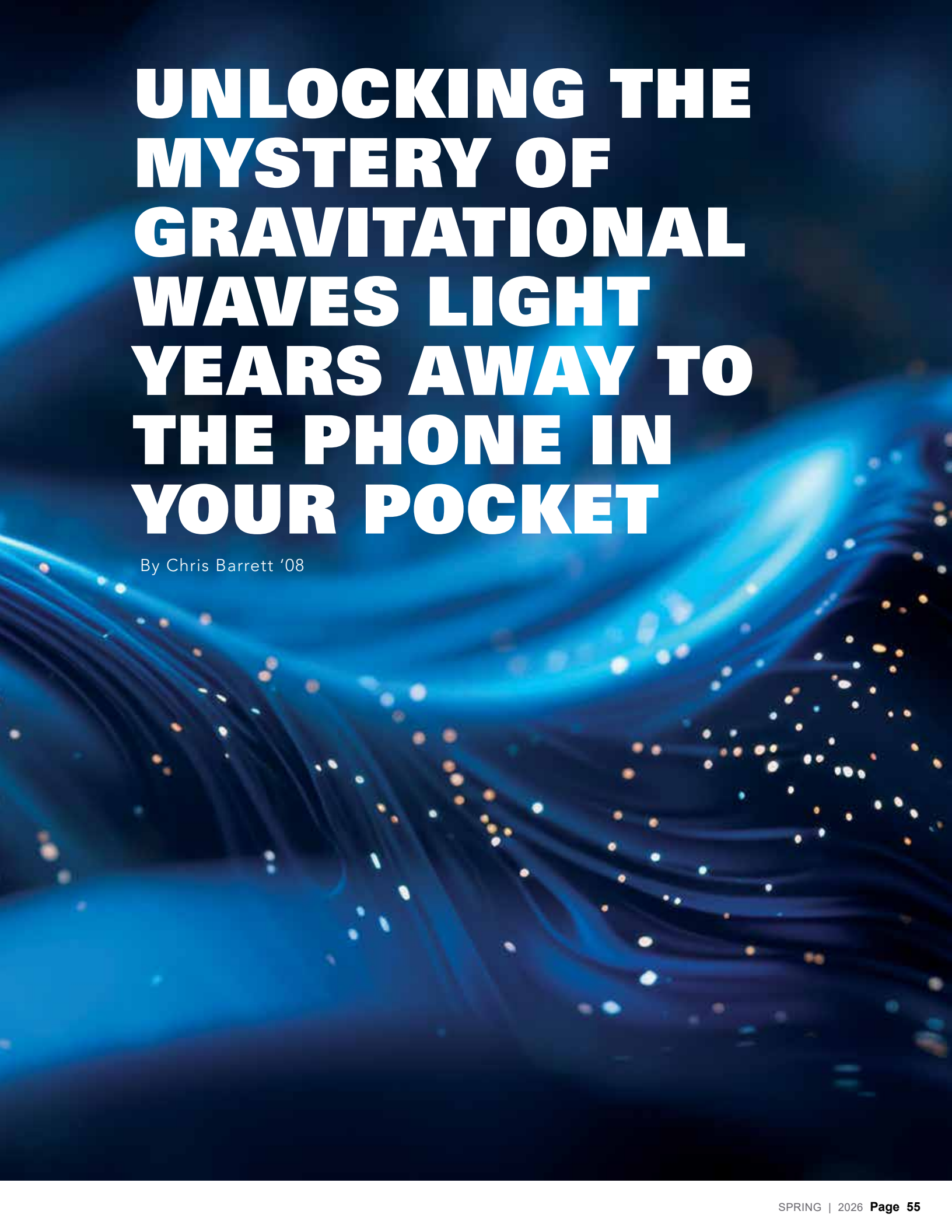


Koh and colleague testing prototype.

company about using the controller to pilot undersea robots, and occupational therapy nonprofit Respawn, which is exploring bringing it into hospitals.

While all of these uses are enticing, Johnson says the most satisfying part of creating the company has been receiving joyful messages from users all over the world who are able to play their favorite games.

“I’ve heard from a woman from Australia whose son is about to have his arm amputated, and a gentleman from Canada who has cancer and can’t wait to play video games,” Johnson says. “Stories like that,” he says, “definitely hit close to home.”



UNLOCKING THE MYSTERY OF GRAVITATIONAL WAVES LIGHT YEARS AWAY TO THE PHONE IN YOUR POCKET

By Chris Barrett '08

To unlock the mysteries of the galaxy, you need computing power, and lots of it. And if you want to develop the next generation of artificial intelligence, you need even more computing power.

Research initiatives and projects across the country fuels discoveries that answer not only the big questions of today, but spill into everyday use.

Take, for example, the Laser Interferometer Gravitational-Wave Observatory or LIGO for short. This multi-institutional research project received support more than 40 years ago from National Science Foundation (NSF). In 2017 University of Rhode Island (URI) researchers joined the LIGO Scientific Collaboration as the only member from the Ocean State.

Earlier this year Michael Pürrer, a URI adjunct professor in physics and Collaborative member, co-authored a study that presented a way to quickly analyze gravitational wave data to study the merger of binary neutron stars. Using new machine learning algorithms, Pürrer and the team slimmed what took an hour down to a second.

While that opens the doors to learning more about the galaxy and physics, it's not a large jump to apply the same lessons to artificial intelligence.

Robert Coyne

ASSOCIATE TEACHING PROFESSOR IN PHYSICS

Robert Coyne, URI associate teaching professor in physics, points to how rapidly AI has become woven into everyday experiences. With AI models such as ChatGPT and many others, machine learning has moved from a curiosity directly into today's society. As LIGO Scientific Collaboration's Communications and Education Division chair, he sees the similarities between the lab's research on large language models analyzing gravitational waves and the AI-powered assistant on a smartphone.

"We are all now interacting with large language models like ChatGPT... that produce real-time feedback because of extremely well-trained machine learning frameworks," Coyne says. "We now see inherently the value of this computational technology, but this sort of work has been going into science much like what we have been doing at the LIGO Scientific Collaboration for decades."

So, while Coyne and his students may study galaxies light years away, he says the underlying research can

answer remarkably more down-to-earth questions involving big data.

"The skills that students gain from working in this field are infinitely transferable," Coyne says. "From measuring fluctuations on the stock market, to getting better walkability in neighborhood areas, to tackling big data in complicated systems."

And you don't necessarily need a massive supercomputer to develop the research.

Gaurav Khanna

ASSISTANT VICE PRESIDENT FOR RESEARCH
COMPUTING AND PHYSICS PROFESSOR

URI Assistant Vice President for Research Computing and Physics Professor Gaurav Khanna once used PlayStations. At the time he was working at the University of Massachusetts Dartmouth and realized the gaming console came fully loaded.

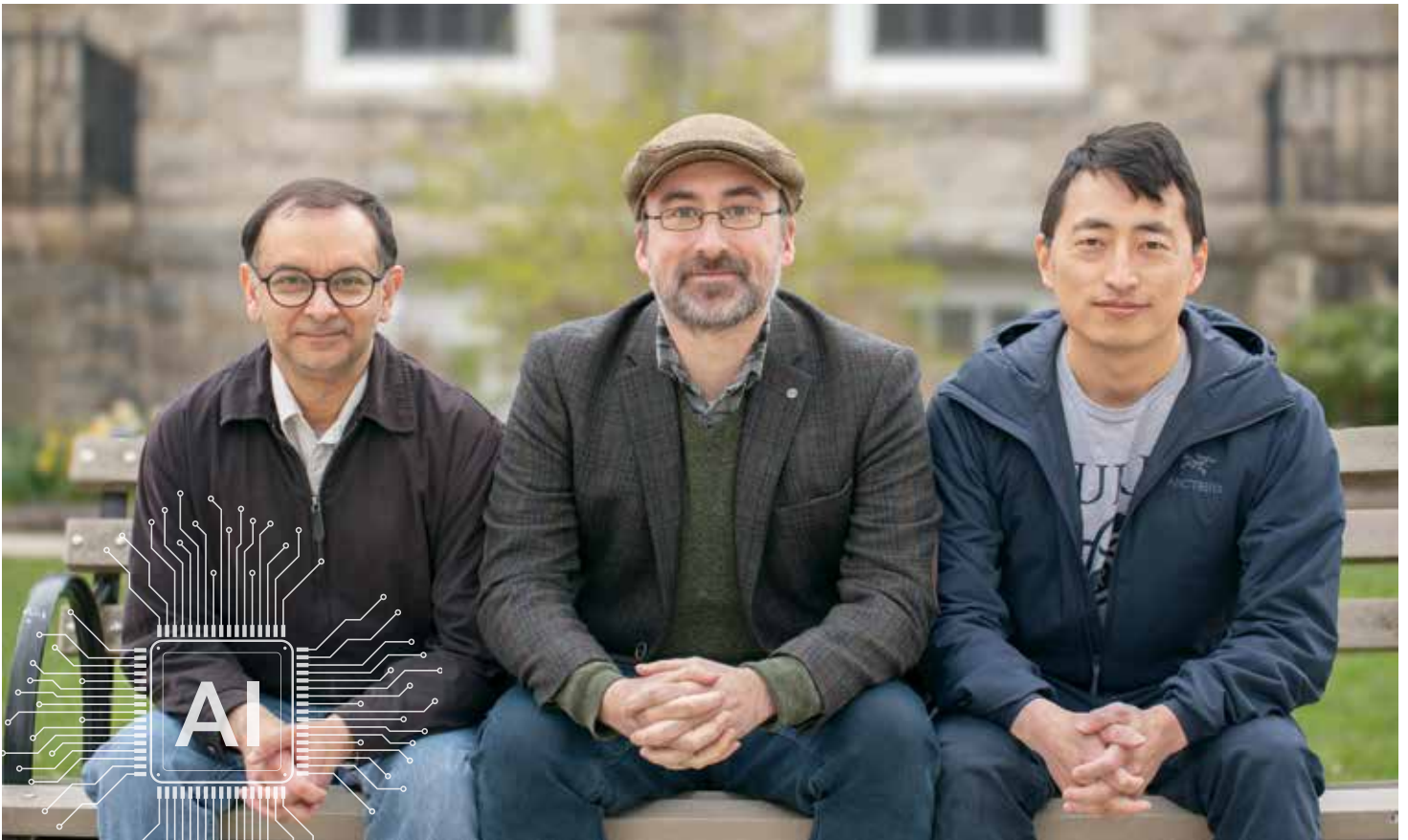
"Sony was releasing the PlayStation 3...marketing the machine as a supercomputer on a chip at an affordable price," Khanna says. "So, I bought eight PlayStations, wired them together, and showed that this could work as a supercomputer."

NSF provided \$300,000 to fund a proof of concept that supercomputers could be built for far less than the normal millions of dollars. And with further support from the Department of Defense, the collection of PlayStations – at its peak around 400 – showcased the power of supercomputing at a reasonable scale.

Today, Khanna applies the same lessons at URI as head of the High-Performance Research Computing facility. It provides computing power to researchers across campus, many drawn to the promises of AI to unlock today's scientific mysteries.

"The skills that students gain from working in this field are infinitely transferable."

- Robert Coyne



From Left: Gaurav Khanna, assistant vice president for research computing and professor of physics, Robert Coyne, associate teaching professor of physics, Wenchao Ge, assistant professor of physics

“There’s not much you can do without high performance computing in regard to large language models like ChatGPT as they require a massive amount of computational resources,” Khanna says. “So supercomputing is critical for further development of AI.”

One of the main focuses of researchers chasing the next generation of computing is quantum computing. While traditional computers use bits – zeros and ones – quantum computers use qubits, meaning they can simultaneously store a zero and a one. That makes them much, much faster, positioned to power AI and churn through major data sets across an array of industries.

Wenchao Ge

ASSISTANT PROFESSOR OF PHYSICS

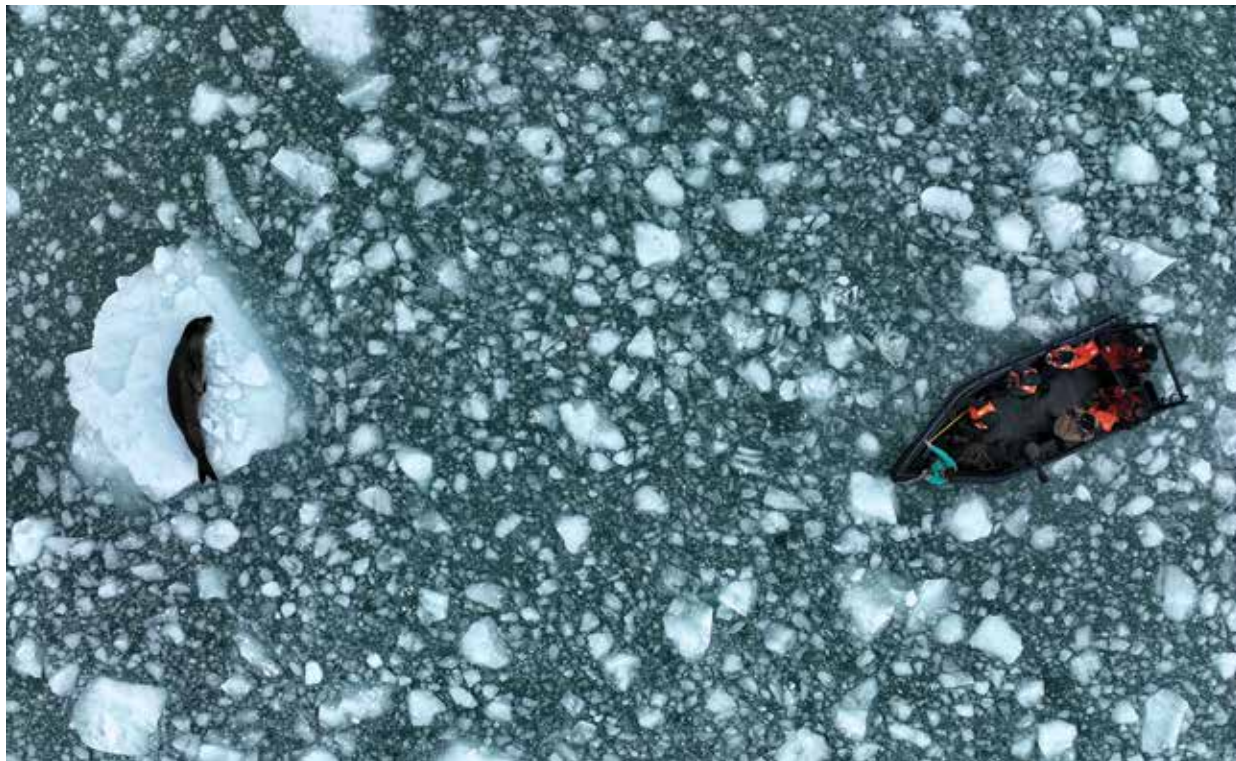
To investigate the possibilities, URI Assistant Professor of Physics Wenchao Ge received \$800,000 from NSF. With the money and access to computing resources at industry partners like IBM, Ge is exploring the algorithms used to solve complex optimization problems that answer real-world questions.

“Using quantum sensors which rely on these quantum states, we can better increase the sensitivity of things such as global positioning systems,” Ge says. “In addition, using quantum computation we can also optimize travel times for delivery companies such as UPS.”

The NSF’s contributions to Ge’s work does not stop at his lab. The state of Rhode Island belongs to the NSF’s Established Program to Stimulate Competitive Research (EPSCoR), which aims to reinforce the competitiveness of scientific research. To that end, the NSF holds conferences for EPSCoR researchers to drive collaboration.

“I attended an NSF workshop on quantum computing for EPSCoR states, which has allowed for connections within the community,” Ge says. “It takes time trying to find people who share similar interests. But the NSF and EPSCoR play a huge role in making that happen.”

And with that, scientists can bring lessons from gravitational waves light years away to the phone in your pocket.



1st Place “Working Hard–Hardly Working”

Renato Borrás-Chavez, *Postdoctoral Researcher Department of Natural Resources Science, College of the Environment and Life Sciences*



2nd Place: Aurora Borealis Dancing Over the URI Bay Campus Beach”

Amirali Momeni, '27, *Doctoral Student, Department of Natural Resources Science, College of the Environment and Life Sciences*

3rd Place
“Misty-Eyed
Long-Tailed
Macaque”

Paige Hojdar '27, *Departments
of Marine Biology and
Marine Affairs, College of the
Environment and Life Sciences*



Honorable Mention “The Glow of the Neuromasts”

Gus Bienenfeld '25, *Departments of Marine Biology, and Aquaculture and Fisheries Science, College of the
Environment and Life Sciences*

Check out the full photo
contest winners online by
scanning the QR code.



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