TECHNOLOGY PARTNERSHIPS

LAY THE FOUNDATION FOR FUTURE INNOVATION

written by **CLEA HARRELSON '20**

"THE CLOSER THE TIES BETWEEN OUR RESEARCH COMMUNITY AND RELATED INDUSTRY, THE MORE LIKELY IT IS THAT WE WILL BE CREATING TECHNOLOGIES THAT HAVE REAL COMMERCIAL VALUE TO THE PUBLIC."

- Michael E. Katz

As a research institution where discoveries are made, the University of Rhode Island (URI) is an economic engine for the state, and a key element of the URI Research Foundation (URIRF) mission is to enhance URI's contribution to economic development in Rhode Island and beyond.

"The closer the ties between our research community and related industry, the more likely it is that we will be creating technologies that have real commercial value to the public," says Michael E. Katz, associate vice president for URI Intellectual Property and Economic Development and executive director of URIRF.

URIRF — created by the Rhode Island Legislature through the University of Rhode Island Research Foundation Act in 2007 as a 501(c)(3) — provides research programs, promotes education, and obtains and protects intellectual property rights arising from the creative work of the University's faculty,

THE URI RESEARCH FOUNDATION

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students and staff. URIRF advances URI technology commercialization and has helped faculty form eight companies to bring their discoveries to market.

While not all ideas generated through research have the potential to be developed into commercial products or services, Katz and his research foundation team are always on the lookout for ways to translate discoveries from URI faculty and labs into products that could benefit the public.

During the COVID-19 pandemic URIRF assisted URI's Pharmacy Professor Angela Slitt and Associate Research Professor Margaret Teasdale launch URI's RAM Lab. Slitt developed an innovative saliva-based test for SARS-CoV-2, the virus that causes COVID-19. Unlike most tests on the market, Slitt's test is not polymerase chain reaction (PCR) based, does not require a nasal swab and aims to differentiate between variants of SARS-CoV-2 without detecting viruses with similar symptoms (article on page 30). Seeing that this new test might be important for URI as the University managed its way through the global pandemic, URI's vice president for research and chair of the URIRF board of directors, Professor Peter Snyder, redirected the expertise and personnel of the foundation to drive the development of this new COVID-19 test as if it were a private business on campus. As a result, the test moved rapidly from being a bright idea within the URI College of

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Pharmacy, to bench research, and to a human clinical trial that validated the test as being highly sensitive in detecting the virus — in just nine months.

URIRF is a key intermediary in connecting URI faculty with companies and investors across the state, region, and nation. To Katz, achieving this mission starts with forging close partnerships across URI's departments, and raising awareness among faculty and students about the potential for their ideas to be assessed and, if appropriate, licensed to be developed for commercial use.

URIRF helps students, faculty, and the University overall navigate the details of invention disclosures, patent applications, and the licensing of intellectual property. This work has resulted in the development of multiple successful startups led by URI faculty, (article on page 10) including VeloBit, Inc., an information storage technology company created by engineering Professor Qing "Ken" Yang. URIRF is also supporting the creation of a new company co-founded by URI Physics Professors Oleg Andreev and Yana Reshetnyak (alongside Yale University Professor Donald Engelman) called pHLIP Inc., which produces a nanotechnology tool to deliver anti-cancer drugs and imaging agents preferentially to diseased tissues.

URIRF additionally facilitates industry funded research at the University in collaboration with URI's Business Engagement Center and the Office of Sponsored Projects.

Katz describes industry connections as critical. He emphasizes that the URIRF's work to integrate industry with the URI research community directly benefits students through exposure to real-world business challenges as part of research collaborations, internships, and entrepreneurial training.

"We're partnering with the URI College of Business, with mentors across the state, and with Rogue Venture Partners (article on page 24), and through these partnerships we hope to grow a pool of entrepreneurial talent, so that when we have technology that looks like it could be the basis of a startup, the resources exist to support the formation of a new company," Katz says.

Although supporting URI's research community is one of its central objectives, URIRF through its division, Polaris MEP (article on page 34), is also increasingly focused on supporting the larger landscape of manufacturing and technology development

companies across the state.

Katz emphasizes that what's good for URI is great for Rhode Island and the region as a whole.

"We've helped expand URI's role to grow the economy of the state and the region," says Katz. "Economic development is a key part of the University's mission."

URIRF tackles this charge through engagement with a multi-layered network of organizations supported by state and private investments that work together to train future business leaders, foster successful startup ventures, and support industry growth. The Innovation Campuses, a $20 million initiative funded by a Rhode Island Higher Education Bond passed in 2016, is one mechanism driving these activities forward. URIRF is closely involved in the development of three current Innovation Campuses: 401 Tech Bridge, Rhode Island Agriculture Technology, and RIHub (article on page 18).

Katz describes these Innovation Campuses as an exciting chance for the University and the state to lay the foundation for future technological advances, saying, "The ultimate goal is to build a more robust, high-tech industrial ecosystem in the state."

As each Innovation Campus develops, the benefits will be felt across the state, providing hubs for industry investment as well as opportunities for more internships and research collaborations across URI departments and local businesses.

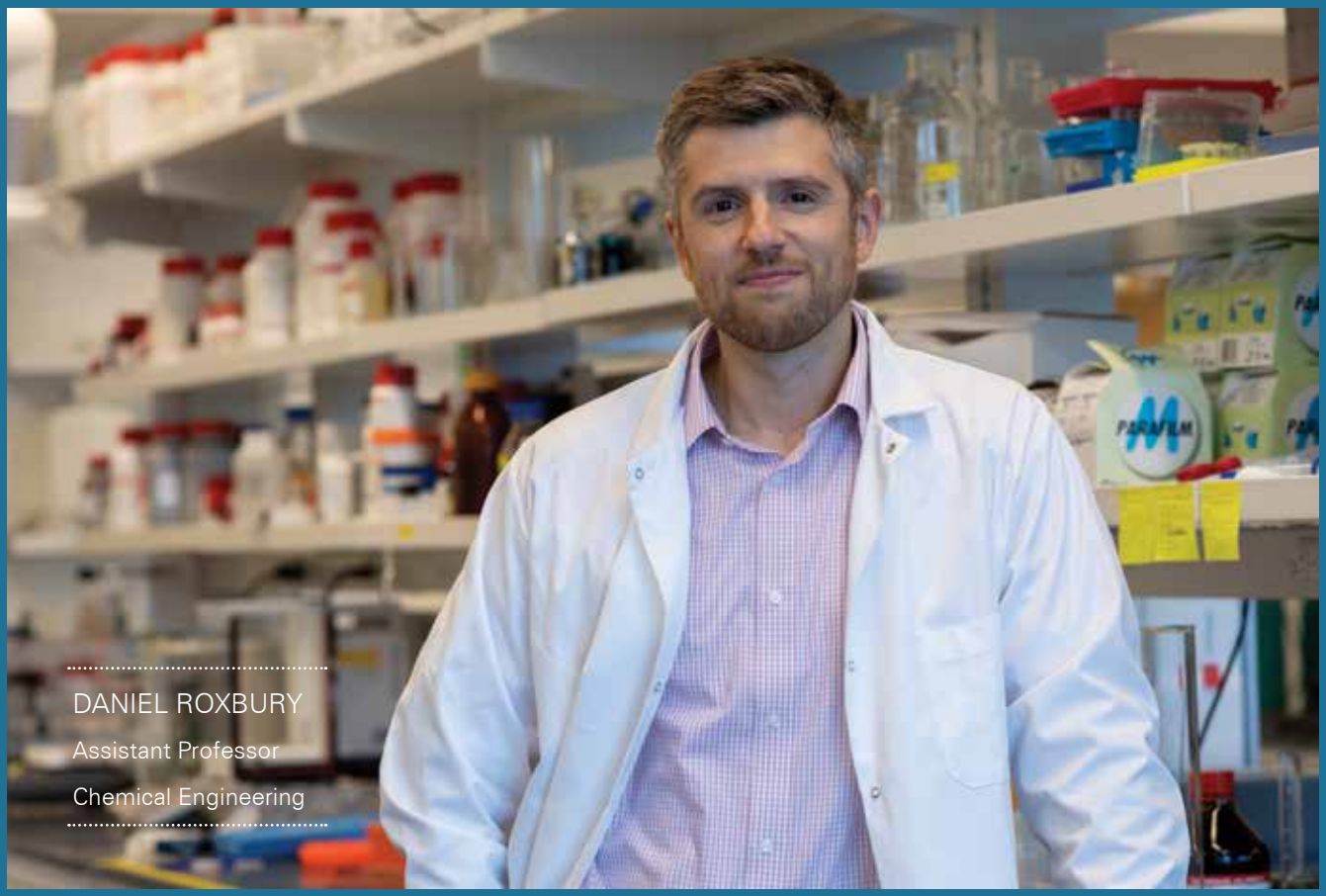
Katz sees URIRF involvement in collaborations such as the Innovation Campuses as one of multiple examples of its expanding role on campus and in the state.

"We're taking on more, we're doing more, we're growing," says Katz.

As part of its growth URIRF recently hired Colonel Erik Brine to be the first director of defense sector research and development initiatives. Jointly reporting to the URIRF, the vice president for research, the director of the Business Engagement Center, and the dean of the College of Engineering, Col. Brine plays a unique role that spans the University to build and manage new partnerships with the U.S. Department of Defense, national security agencies, and related companies. His mission is to create new opportunities and to advance defense-related research and initiatives (article page 26).

Katz underscores the importance of innovative people in technology development, saying, "URIRF is situated within a dynamic web of university, government, industry, and private partnerships. There is much we can accomplish for the University and the Ocean State."

In partnership with Katz, the foundation's board chair, Dr. Peter Snyder has been hiring the talent and aligning the URIRF's new initiatives to pair well with the University's high priorities, including increasing activities in creating ocean-based technologies and companies, clean energy, and in waste plastics mitigation.



DANIEL ROXBURY
Assistant Professor
Chemical Engineering

HELPING
FACULTY NAVIGATE INDUSTRY PARTNERSHIPS AND LAUNCHING COMPANIES

written by **CHRIS BARRETT '08**

Chemical engineering undergraduate students Lauren Hubert and Aidan Kindopp, performing image processing on data.

Professor Daniel Roxbury developed "smart bandages" that he hopes will prevent amputations and potentially save lives by detecting chronic wound infections before they fester. However, his lab at the University of Rhode Island (URI) lacks the scale to produce and ship millions of bandages worldwide.

He needs an industry partner and such potential companies desire the equivalent of a prenup agreement.

Enter The URI Research Foundation: An independent nonprofit affiliate of URI that provides support to University researchers in protecting intellectual property and shepherding new discoveries through the long process of commercialization.

"If you do get an industry partner, the first thing they ask is what kind of intellectual protection do you have," says Roxbury, an assistant professor of chemical engineering. "If they're going to invest millions of dollars to commercialize your product, they need to have some guarantee of a return on investment."

Founded in 2007, URIRF works with about 50 to 75 faculty annually and manages 54 license agreements. It provides a suite of services to URI researchers from refining research ideas to legal advice to tips on talking with venture capitalists.

A frequent client is computer engineering Professor Qing "Ken" Yang, who has worked with URIRF to form multiple companies over the years. One, VeloBit, sold software that increased the speed computers could access information on solid-state drives. After raising more than $5 million in investments, VeloBit was acquired by HGST, a Western Digital company, to incorporate Yang's inventions into their product offerings.

Yang's most recent venture, Fast Bus, develops technology that sits on interfaces of a computer or memory chip to detect physical attacks. Along

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Chemical engineering Ph.D. candidate Matthew Card, observing the smart bandage textiles through a hyperspectral fluorescence microscope.

Circuit board from Prof. Yang's lab.

with fellow computer engineering Associate Professor Tao Wei, the research led to three patents and piqued the interest of major computer chip manufacturers. URIRF now holds a place on Yang's speed dial.

"These are really nice and experienced professionals, they know what they are doing, and they are very good at intellectual property and technology transfer," Yang says.

He says URIRF plays an important role protecting the University and its researchers. Under the institution's intellectual property policy, faculty must disclose inventions supported by University resources. URIRF and the University share in proceeds garnered from licensing deals and plow that back into additional research investments. Faculty rest easy knowing their work is protected from theft or misuse and follows export control laws.

"Research is exciting and fun for us," Yang says. "That's our job as academics. That's what we love. We are not trained as scientists to attend to these legal processes, contract negotiations and other such activities."

URIRF takes on the "red tape," some of which faculty never knew existed. When the national media picked up Roxbury's smart bandage, he found himself on the phone almost daily with URIRF. They coached Roxbury on what to share publicly and what was better left unsaid. Professors typically aim to publish and share their work, so Roxbury found himself in unfamiliar territory.

"If I was on my own it would have been much more difficult," he says. "Intellectual property is a black box. It is sometimes difficult to know what is protected and what is not."

URIRF plays an important role protecting the University and its researchers.

So, when executives at a major medical supply company rang, Roxbury wasted little time calling URIRF Executive Director Michael E. Katz. The former pharmaceutical executive arranged a tour for the potential investors and met them at Roxbury's lab to field questions about patents and licensing while Roxbury stayed focused on the technology.

Since then, other companies also have expressed interest in the bandages and see a potential for them to treat chronic open wounds experienced by diabetics or burn victims. It all puts Roxbury's idea one step closer to the patient.

"We wear many different hats as faculty," Roxbury says. "I've always enjoyed the research and striving to make products that help people. But I think the invention is much less than half the battle. Getting that invention in the right hands, that's the tricky part."

He'll happily leave that part of the process to URIRF.

QING "KEN" YANG

Professor

Electrical, Computer and Biomedical Engineering