THE UNIVERSITY OF RHODE ISLAND
DIVISION OF RESEARCH AND ECONOMIC DEVELOPMENT

Momentum

Research & Innovation

FALL 2022

INSIDE

Cover photo: URI's College of Business, Ballentine Hall.

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Oyster Farm, Matunuck, Rhode Island

FROM THE VICE PRESIDENT

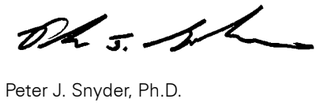
One of the most important items we are including in this Fall 2022 issue of *Momentum*, is our annual snapshot of how our University is performing with respect to external research funding and our growth as the state's public research university. Our research endeavors are vital to our mission, essentially being the "other side of the coin" for our ever-important purpose of providing the best, most cutting-edge education for our undergraduate and graduate students. We can deliver the best education, specifically because we are also conducting critically important research – across all disciplines, including within the humanities and the arts – that advances our knowledge and leads to improvements for the benefit of our community and for the planet on which we live. As you will see in this financial snapshot, URI has had the most successful year on record in terms of external grant funds from all sources. *However, we are not content with this success*. As I write this essay, we are laying plans to grow our infrastructure and supports to our faculty to better help them to achieve even greater accomplishments in the years to come. As has become standard in recent years, we will continue to publish our financial data within each fall issue of this magazine as we want to be accountable to you, our faculty, staff, students, alumni, volunteers, donors, and supporters of Rhode Island's flagship research university.

I hope you also enjoy the other features in this issue, including a fascinating article describing how our Department of History (College of Arts & Sciences), in collaboration with faculty and students from other social sciences and humanities departments, has created a truly novel program to ensure that an accurate understanding of our past will inform the decision-making that impacts our future. To my mind this is a revolutionary approach to both the teaching and application of history as a social science, and we should all be proud that this is happening on our campus. I am convinced that the Applied History Lab will become a national model that will be replicated by other universities around the country and around the world.

You'll see that we are continuing to report on the vital work of URI's Plastics: Land to Sea COLAB, launched this past year and now under the direction of engineering Professor Vinka Oyanedel-Craver. If you are still unsure of what URI's first "signature research initiative" is, which has brought together the combined work of nearly 50 faculty from across the University, please explore https://plastics.uri.edu.

Other articles in this issue include a farewell to retiring geology Professor David Fastovsky – whose entire career has been at URI – he rose to international acclaim as one of the most influential paleontologists in the world. Despite his tremendous accomplishments as a scientist and scholar, he has been beloved on campus for his hugely popular undergraduate lecture courses.

Please enjoy and savor this issue, and be proud of what we are accomplishing as a vibrant university community.



Peter J. Snyder, Ph.D.
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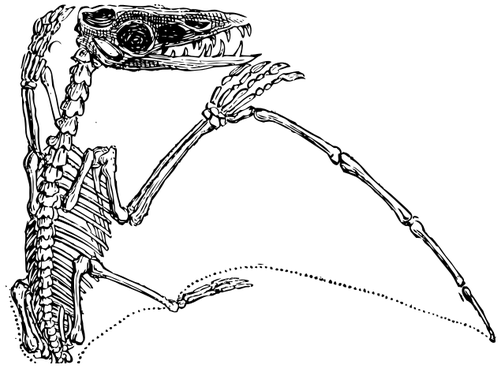


THE BLUE FUTURE

written by **MICHAEL BLANDING**

The Greatest Economic Opportunity for the State of Rhode Island.

Galilee, Rhode Island

Newport Rhode Island harbor.

A partnership of private and public entities has set in motion a plan to grow Rhode Island's ocean-based economy on multiple fronts.

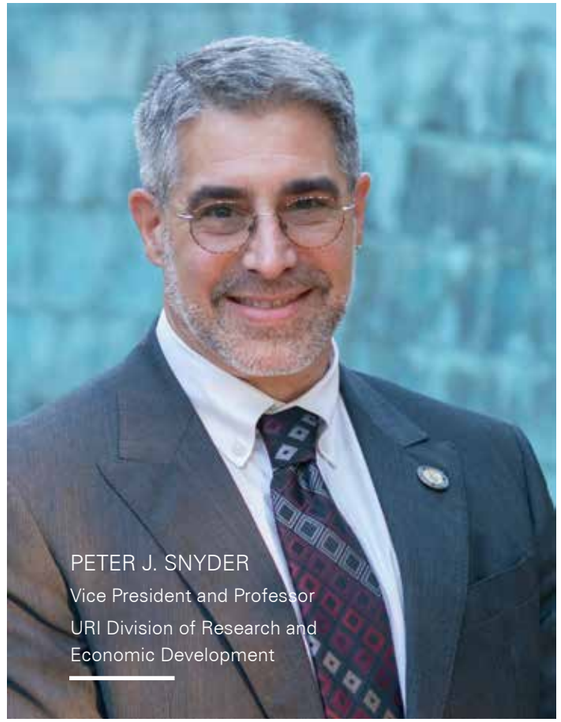
The ocean has always been the lifeblood of the Rhode Island economy. No matter where you are in the state, you are not far from the 400-mile coastline, where a container ship, fishing trawler, or sailing yacht is inevitably visible on the water. All those vessels are part of the so-called Blue Economy, which employs more than 36,500 people and brings in at least $5 billion annually, 10 percent of the state's gross regional product (GRP).

Now a diverse coalition of public and private entities has targeted the ocean as the new frontier in research and development with hopes of expanding the already vibrant maritime economy.

"The Blue Economy really is the area of greatest opportunity for the state," says Peter J. Snyder, University of Rhode Island (URI) vice president for research and economic development. "Although this is already a large portion of our economy, we think we can more than double it."

During the last several years, the team has put together an ambitious plan to add more than 50,000 ocean-related jobs and increase the economic output three- to five-fold, to $15 billion to $25 billion within the next 10 years.

"It's an economic number, but it's so much bigger than that," says Jennifer McCann, director of U.S. Coastal Programs at URI's Coastal Resources Center and Rhode Island Sea Grant, who spearheaded the 2020 report *The Value of Rhode Island's Blue Economy*. "It's who we are—it's what makes Rhode Island and it's what makes Rhode Islanders."



PETER J. SNYDER
Vice President and Professor
URI Division of Research and Economic Development

"The Blue Economy really is the area of greatest opportunity for the state."

- Peter J. Snyder

Commercial fishing vessel returning to port in Galilee, Rhode Island.

The report identified seven industries as part of the Blue Economy—ports and shipping; defense; marine trades; ocean-based renewable energy; aquaculture; fisheries; and tourism and recreation. With expertise in marine affairs, oceanography, ocean engineering, and climate science, among other areas, URI has made contributions to all these industries and is uniquely poised to lead the charge for the future.

"It's part of our commitment as a land- and sea-grant institution to foster economic development for the state and do it in a way that's responsible and environmentally sustainable," says Snyder. "We're duty-bound to provide value and impact to the state and our community that transcends educating our undergraduate and graduate students."

The new drive to grow the state's maritime economy has its roots in the passage of a 2016 state referendum of a $20 million bond to create innovation campuses in the state. While those funds led to the creation of innovation centers in technology and life sciences, it also spurred conversations

Oyster Farming

"We stopped competing and started collaborating, and then suddenly magic started to happen."

- Peter Rumsey

about a "blue tech" innovation center, says Peter Rumsey, who helped implement that effort for the state under then-Governor Gina Raimondo. In May 2021, he became chief development officer of the URI Research Foundation, a nonprofit affiliated with the University, convening a Blue Economy Working Group along with the economic development agency Rhode Island Commerce to explore how various groups in the state could work together.

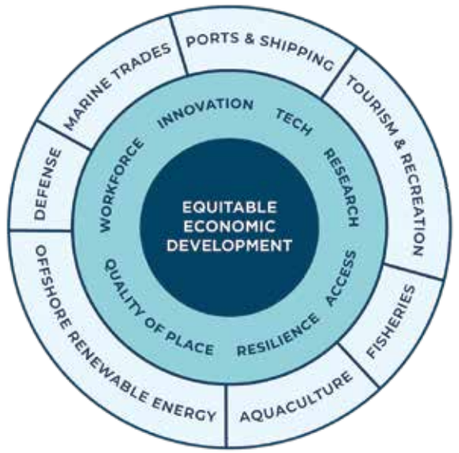
"For a long time, we've had a proud history as the Ocean State, but the assets have been pretty siloed," Rumsey says. "What we've seen happen in the last two years is everyone coming together as a coalition and creating a vision. We stopped competing and started collaborating, and then suddenly magic started to happen."

The coalition grew to 125 partners, including private industry, educational institutions, nonprofits, and state and local government agencies—eventually calling itself the Blue Economy Technology Cluster (BETC). The group has converged around several projects of mutual benefit, including a *SmartBay,* which would coordinate advanced sensing equipment throughout Narragansett Bay, and a Blue Technology Innovation Center, housed on URI's Bay Campus to incubate ocean-based startups.

The effort coalesced around an application for a Build Back Better Challenge grant from the federal government—part of the American Rescue Plan passed under President Joe Biden—that promised up to $100 million to coalitions to grow their state's economies. BETC proposed a $70 million plan with nine separate projects focused on the Blue Economy, and in December 2021 beat out 500 applicants to become one of 60 finalists for an award, receiving $500,000 to further develop its application.

Ultimately, the proposal wasn't one of the 21 winners of the grants announced in March 2022—but after all the work it did in developing

Warren, Rhode Island harbor.

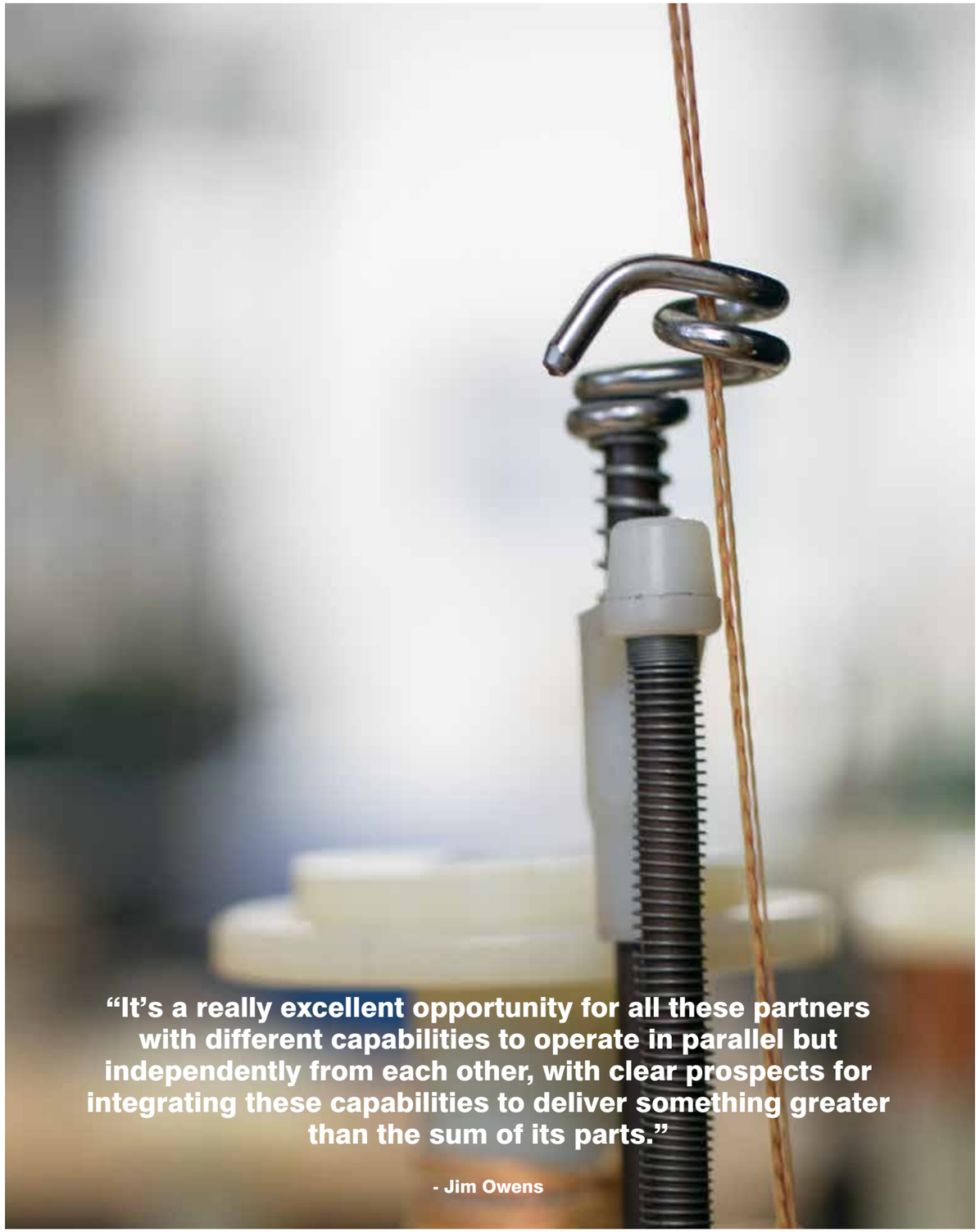


the application, the coalition has vowed to forge ahead in supporting the key projects that had been proposed.

"Although we're disappointed in the outcome, the past year has been incredible in bringing together more than 120 partners around the state, including our own state government in a way that has never been done before," says Snyder.

BETC has currently identified $23 million in state and

PETER RUMSEY
Chief Development Officer
URI Research Foundation



Braider bobbins loaded with structural and functional materials.

The braider shown is building a braid that integrates 138 insulated 50 micron conductors (wires). URI Engineering Professor Helio Matos is actively integrating these into composite test samples for evaluation within a 401 Tech Bridge-supported project. This is connected to work Nautilus and URI have done with the U.S. Air Force.

private funds, including in-kind support, and is going after other federal and state grants, including money left over in the innovation campus bond, to make the vision a reality.

At the heart of the effort is the SmartBay initiative, which will employ sensors deployed throughout Narragansett Bay to measure a variety of attributes, including temperature, salinity, tidal flow, and wave height across the bay in real time. In some cases, it will knit together existing monitoring systems from the Naval Undersea Warfare Center (NUWC), the Department of Environmental Management (DEM) and other sources. At the same time, it will develop new technological enhancements including mobile underwater vehicles and undersea cameras to provide a complete picture of the surrounding ocean.

“We will basically create a living research and development, and deployment and testing, platform for use by researchers, corporations, the Navy and international partners who have expressed interest in such a capability,” Rumsey explains.

One of the leaders of the effort is Jim Owens, a Warwick, Rhode Island native and principal of Nautilus Defense, a company that creates smart textiles by integrating electronics and optical sensors into fabrics. Previously, Owens worked

URI patented deep-sea camera and light array, fabricated using a 3D printer and low-cost internal components encased in epoxy. The system can broadcast live video from depths exceeding 1,000m underwater through a fiber optic micro tether (patent pending).

as a contractor for the U.S. military to help develop and deploy the Indonesian Integrated Maritime Surveillance System, a smart sensing program in the Strait of Malacca. He returned to his native state to launch his new company, taking advantage of the tight-knit entrepreneurial community here.

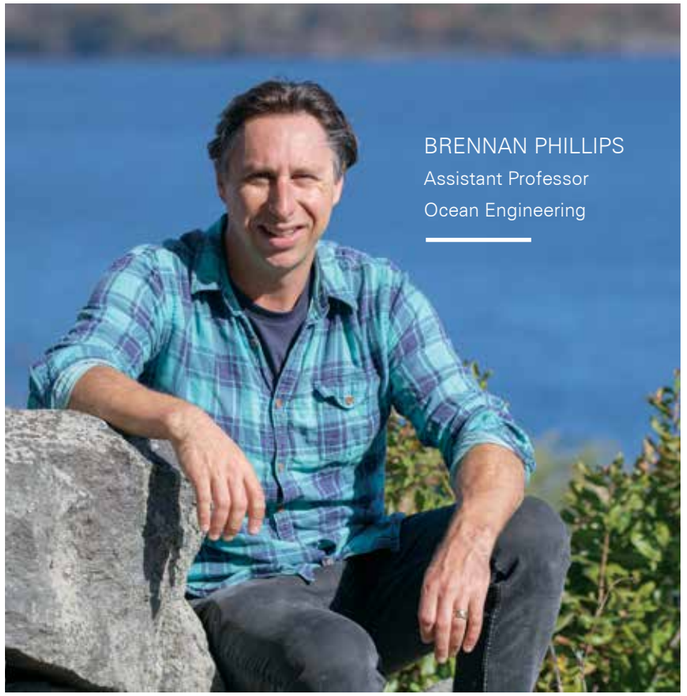
“As a small company trying to do ambitious things with technology, it’s not always easy to allocate time for outreach, marketing, and business development activities,” he says. “There is a real efficiency in a state where everyone is two steps removed from everyone else. Barriers to collaboration are very low.”

For the SmartBay project, he’s worked to coordinate larger organizations such as MIT Lincoln Laboratory and Advanced Functional Fabrics of America and startups such as Juice Robotics, Current Lab, and Jaia Robotics to integrate various technologies that will ultimately create a meaningful model of the undersea environment, both allowing real-time monitoring of the bay, and the ability to virtually simulate changing conditions.

“It’s a really excellent opportunity for all of these partners with different technologies to independently execute and demonstrate in parallel, with clear prospects to integrate their capabilities to deliver something greater than the sum of its parts,” Owens says.

The result will have wide-ranging implications both for research and for practical applications for ocean-based companies.

“For a small business, it’s not easy to take a technology or prototype and move it to maturity in an operational environment,” Owens says. “A PowerPoint will only get you so far—you need people to be able to touch it, feel it. SmartBay represents a great opportunity for us to allow customers to see what we are doing.”



Another case in point, says Rumsey, is the startup Regent Craft, which is building the world’s first sea-glider transport, recently relocated from Massachusetts to Rhode Island because they see the potential of the planned SmartBay system: “They can use all of those data to help run their hydrofoil seacraft better.”

When operational, the SmartBay will be complemented by the proposed Blue Technology Innovation Center (BTIC), which is slated to be housed in a building at URI’s Bay Campus that was slated for demolition—but Vice President Snyder imagined new possibilities for this building, which will now be transformed into an incubator for ocean-focused companies.

“It will be the front door to the SmartBay,” Rumsey says, “with people and programs to help companies access research and development.”

The center will have classrooms, offices, a lecture hall, and a high-tech engineering space complete with a machine shop, 3D prototyping lounge, and full electronics lab.

“Such a center could be instrumental in both attracting startups and helping students launch their own companies,” says Brennan Phillips, an assistant professor of ocean engineering who works on deep-sea robotics. Phillips has worked to create innovative techniques for getting cameras and robotic systems more than 1,000 meters underwater. Recently, he collaborated with Owens’ Nautilus to create a fiber optic camera system that runs on electric fishing reels to allow researchers to film “deep and cheap”—dramatically shrinking the size of deep-sea equipment and reducing costs tenfold from $20,000 a day for a large research vessel to $2,000 a day for a smaller boat. While

Tackling all these initiatives together will ensure all the various sectors of the ocean-based economy will thrive, solidifying Rhode Island's connection to the ocean for future generations, and ensuring that the blue economy will continue to be a major source of resiliency for decades to come.

JENNIFER MCCANN
Director of US Coastal Programs
URI's Coastal Resources Center and Rhode Island Sea Grant

such as system might help scientists photograph underwater creatures, it also has applications for commercial fisheries monitoring and undersea defense.

While URI does a good job of spurring students to create new technologies with classes such as Entrepreneurial Engineering and *Hacking for Oceans*, Phillips says, they still face the daunting hurdle of funding a nascent company to the commercialization stage.

"At the University, someone else pays the bill for faculty salaries, graduate student stipends, and office space," he says. "When you are a startup, you have to pay for all that yourself—that's often what stops innovation."

Having a center on campus where young companies can continue to develop with University support Phillips says, "is going to grease the wheels and see technologies and companies take off. Students will see this as a place encouraging that sort of thing. It's a paradigm shift in terms of how you approach commercialization."

The third major project in BETC's Blue Economy initiative is an equitable workforce initiative to help develop the state's workforce. While Rhode Island has low unemployment, its workforce is also aging, and high-paying jobs are unequally distributed. The initiative would help to train a new generation to take advantage of new high-tech jobs in the ocean economy, focusing on economically disadvantaged areas of the state.

"If we're trying to build a more resilient and sustainable economy for Rhode Island, and grow it quickly, we are going to make sure we have the people needed to propel it forward and make sure we can really fulfill that vision," says Rumsey.

The effort would start with the K-12 curriculum, he says, integrating familiarity with ocean industries in younger grades, and continue with high school certificate programs and job pathways in trade schools, community colleges, and universities.

Some of the most crucial jobs to develop will be those around offshore wind, which Rhode Island has led the nation in developing. The state still has the first and only operational offshore wind farm in the Block Island Wind Farm and is now in the process of developing the much larger Revolution Wind project in Rhode Island Sound, with an eventual goal of 100 percent renewable power.

To make that dream a reality, BETC has proposed a multimodal transport and training center at Quonset to help train workers to operate a range of vehicles, from helicopters to surface vessels, needed to build and service the offshore wind platforms.

"Our need for renewable resilient energy is profound, and forecasted to grow exponentially," says Rumsey. "The greatest constraint to that growth is having a workforce there to build, maintain, and operate it."

URI has been a crucial partner in the balanced development of offshore wind, with the University playing a significant role with the state in siting, permitting, and studying impacts and opportunities from offshore wind. The Rhode Island Sea Grant and the Coastal Resources Center at the Graduate School of Oceanography, was and continues to be instrumental in doing research, policy development, and education to ensure that offshore wind energy does not adversely affect commercial fishing and other stakeholders, serving as an honest broker to help the state make informed decisions.

"It's part of our commitment as a land- and sea-grant institution to foster economic development for the state and do it in a way that's responsible and environmentally sustainable."

- Peter J. Snyder

"URI is a trusted entity," says McCann. "We can listen to all sides and bring the best science and management practices to the discussion. We can make sure the science being done is understood by decisionmakers and, hopefully, integrated into decisions that are made."

Given Rhode Island's success with offshore wind, the state is looking beyond its own borders to help develop the technology for the region. Its location gives the state the perfect opportunity to service wind farms anywhere from New Jersey to Maine. For that reason, BETC has proposed a project to take advantage of the opportunity with the development of a deep-water port at South Quay in East Providence. The project, which broke ground this past September, has begun with the creation of a 525-foot berth that would allow docking by ocean-going vessels, which could be loaded directly with massive offshore wind equipment, which could then be transported along the Atlantic seaboard without the need to transfer to a new vessel.

Other projects proposed by the Blue Economy coalition focus on the state's aquaculture and fisheries. Rhode Island has seen a boom in oyster production, up to 10 million last year, compared to 8 million in 2020 and 6 million in 2019. One limiting factor, however, has been the availability of seed, the tiny-sized shellfish babies that must be "planted" in the bay to grow to full-size oysters or scallops.

A unique partnership underway between oyster producer Matunuck Oyster Farm—run by URI alum Perry Raso '02 MS '07—the University, and the state, will create an oyster hatchery to provide reliable seed not only for Matunuck, but also for other state producers, and potentially even to export to other states. URI researchers will assist with know-how to help produce genetically robust and disease-resistant shellfish, while the state will provide funds, and Matunuck will contribute workers and hands-on growing expertise.

And lastly, yet another project will focus on the state's commercial fishing industry, which provides some 80 percent of the nation's squid catch, mostly from Point Judith. Despite Rhode Island's centrality in that industry, fishermen send the majority of their catch overseas for processing due to a lack of wastewater processing facilities. Processing seafood can be a stinky, biologically intense process, requiring substantial chemical treatment before water can be returned to the bay. The project would upgrade the existing Scarborough Wastewater Treatment Facility in Narragansett to process an additional 20 million pounds annually, creating hundreds of jobs and tens of millions in additional revenue for fishermen.

Taken together, the various projects proposed to develop the Blue Economy in Rhode Island represent a seminal moment for the Ocean State. Tackling all these initiatives together will ensure all the various sectors of the ocean-based economy will thrive, solidifying Rhode Island's connection to the ocean for future generations, and ensuring that the blue economy will continue to be a major source of resiliency for decades to come.

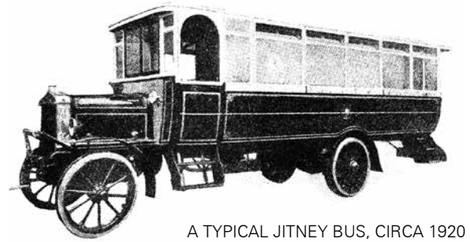
MAXIMIZING THE VALUE OF HISTORY

written by **DIANE STERRET**

What single research entity at the University of Rhode Island (URI) touches on topics as diverse as shipwrecks and abortion rights? The Applied History Lab in the History Department, affiliated with URI's Social Science Institute for Research, Education, and Policy (SSIREP). The foundation of the lab's work is that history bears significant importance for today's decision-making.

History Professor Rod Mather, and director of the archaeology and anthropology master's program, says the Applied History Lab's directive is: "To interrogate the past to inform public policy debates in the present. Sometimes that clarifies them, sometimes it adds new dimensions to them, sometimes it helps rephrase the questions. Often it helps identify potential solutions."

Mather was hired in 1998 to teach Atlantic maritime history and serve as an expert diver with experience working on archaeological sites including Bermuda's outer reefs. He



A TYPICAL JITNEY BUS, CIRCA 1920

also offered to teach underwater archaeology. In 2012, he and John Jensen, a research associate professor, were studying the way environment shapes people's lives and decided to form the lab.

"We started to think about the importance of history in public policy," Mather says. "One thing that struck us early on is that if you look at public policy papers, they often only include one paragraph about the history of the topic, and it is often wrong and almost always inadequate. It's almost like they are trying to make decisions without good memory."

The pair applied for grants to support the lab and began the work of centralizing ideas about history and policy and the connections between history and archaeology. Three co-directors now run the lab: Mather; Catherine DeCesare, assistant history professor; and Bridget Buxton, associate professor of history. They recently were joined by Chris McCabe a GIS expert and former state underwater archaeologist for Georgia.

Their work is divided into two broad categories–history and public policy, and underwater and coastal archaeology–both of which include research and teaching components.

HISTORY AND PUBLIC POLICY

The Applied History Lab's goal is to illuminate public policy and to possibly effect better-informed decisions for challenges facing Rhode Island and Southern New England. Many of the big issues the region faces today – from wind farms to corporate monopolies – previously have been addressed by public policy initiatives.

New York City Jitney

The Applied History Lab's directive is: "To interrogate the past to inform public policy debates in the present."

- Rod Mather

"Applied history can help policy makers consider historical analogues and parallels to evaluate what worked in the past, to compare and contrast policy details, and reflect upon which polices didn't work," DeCesare says.

The result, she says, brings context, meaning, and a better understanding of the world in which we live. Among the topics they have tackled are education, race, equity, rideshares, abortion rights, monopolies and big tech, and the environment.

Mather points to *rideshare* as an example of a modern service with important precedents, and that is similar to the current debate around Uber and Lyft. In the early 20th century when people started to own private cars, citizens began offering people lifts and charged them a nickel. The cars became known as jitneys, an early 20th century word originally denoting a five-cent piece. Municipalities aggressively regulated jitneys out of existence because they undermined urban trolley systems. Jitney drivers were independent workers. Today, rideshare companies face similar questions about regulation and also driver status – independent contractor versus employee. Mather's and DeCesare's HIS300 Applied History and Policy class illuminates the parallels between jitneys, later taxi cab history, and modern rideshare companies.

More recently, DeCesare worked with honors students to explore the complexities of the land upon which URI sits and some of the University's history. The class was a pilot for a new Grand Challenge general education course called *A Walk Through Time* and was a collaboration with Mather; Kristine Bovy, chair of the Department of Sociology and Anthropology; and Lorén Spears, executive director of the Tomaquag Museum in Exeter.

"Students learned about the history of the campus, ways of knowing about the past, and the cultural landscape," DeCesare says. "They wrote a Justice Equity Diversity and Inclusion (JEDI) report, which was designed to help inform University administrators considering JEDI policy initiatives for our campus community."

Another example of applied history in action comes from former Applied History Fellow Autumn Guillotte, who is currently a lobbyist for the R.I. American Federation of Labor and Congress of Industrial Organizations (AFL-CIO).

"As a fellow in the lab in 2019, Autumn collaborated with Planned Parenthood to support the R.I. Reproductive Privacy Act, which was passed and signed into law by then-Governor Gina Raimondo," DeCesare explains. "The act codified *Roe v. Wade* into state law in anticipation of the Supreme Court decision."

The advocacy aspect of the work is just beginning, Mather says. "We are looking into how we can be more effective in incorporating the work we're doing into debates about public policy and actually changing or influencing it."

"One thing that struck us early on is that if you look at public policy papers, they often only include one paragraph about the history of the topic, and it is often wrong and almost always inadequate. It's almost like they are trying to make decisions without good memory."

-Rod Mather

Among the topics they have tackled are education, race, equity, rideshares, abortion rights, monopolies and big tech, and the environment.

Block Island Wind Farm

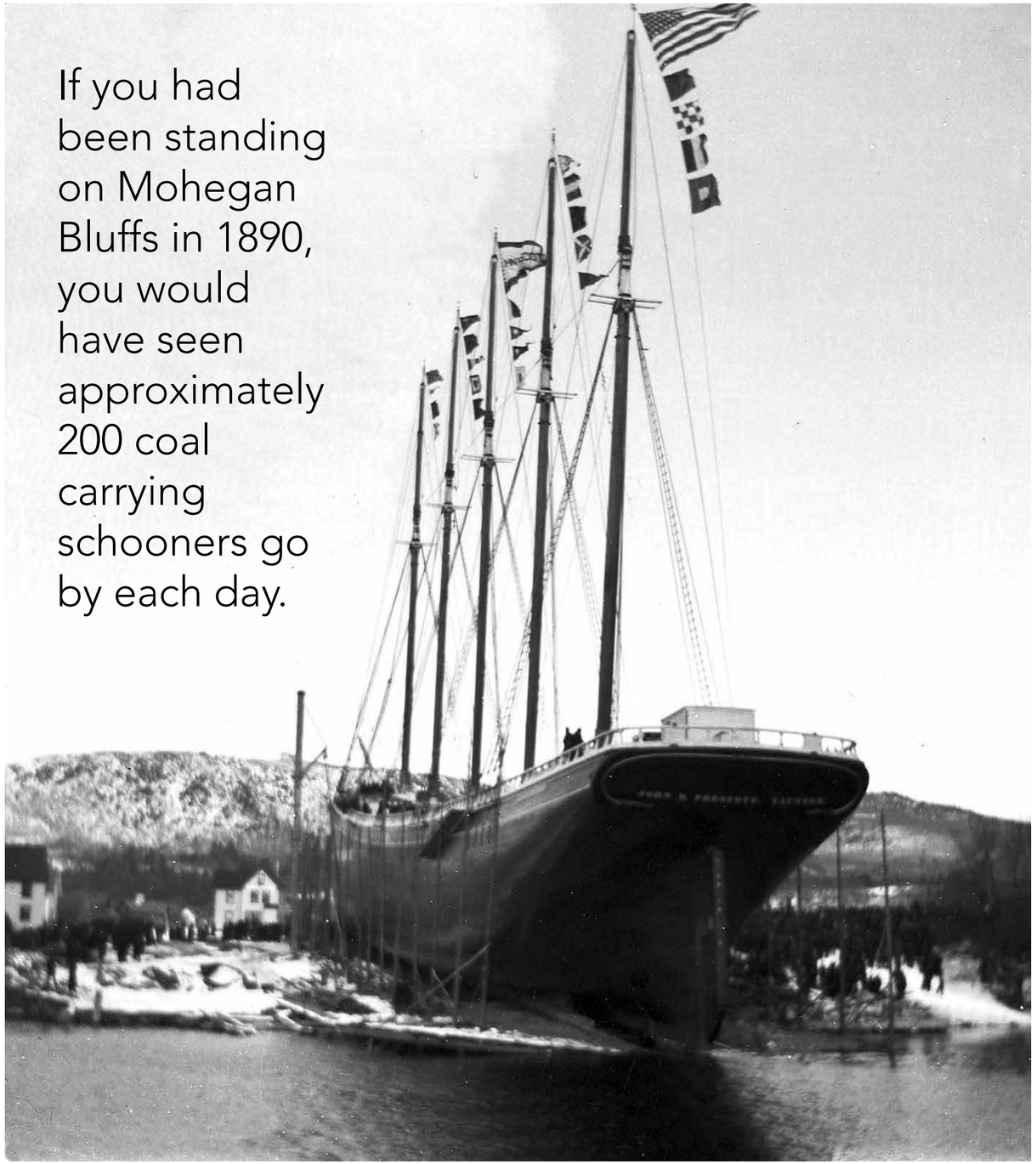
Both Mather and DeCesare teach undergraduate history classes and team-teach an applied history class and an applied history capstone based on domestic public policy topics.

"The historical analogues we study and supporting documents we use in class are meaningful for students and emphasize how historical research methods can help inform contemporary public policy decisions," DeCesare says. "I think we raised awareness on several key issues, including stigma and mental illness, gender equity and plastics pollution."

COASTAL AND UNDERWATER ARCHAEOLOGY

The Applied History Lab also studies coastal and underwater archaeology, including cultural landscapes. A local example of applied history in action revolves around Block Island Wind Farm's Special Area Management Plan (SAMP), to which Mather and Jensen contributed archaeological and historical perspective.

"People were concerned about extracting energy from that landscape," Mather recalls. "So we said, if you look at the history, this area has always been



Launching of the 5-masted schooner John B. Prescott on January 13, 1899. The largest schooner in the world at that time, she was built to carry 4,300 tons of coal. More than 10,000 people turned out for the launching at the Bean shipyard in Camden, ME. The vessel was 282 feet long, weighing 2249 tons with masts 168 feet tall. The vessel was sheathed in iron to protect it from the ice.

associated with energy. If you had been standing on Mohegan Bluffs in 1890, you would have seen approximately 200 coal carrying schooners go by each day. It was so high-volume that coal spilled out over the ocean floor and the area became known as the mariner's coal mine.

"If you go back further in time, people on Block Island cut down trees and extracted peat for energy. The wind farm in many ways intersected with that historical trend. We also looked at fishing, military activity, shipwrecks we knew were there and others we thought might be there. That all went into the big melting pot of decision-making about where to place the turbines and whether to approve it in the first place."

Mather and the Applied History Lab are currently working on a grant for the Bureau of Ocean Energy Management in a collaborative project with URI's Inner Space Center at the Graduate School of Oceanography and Woods Hole Oceanographic Institution, studying shipwrecks and the biological community in the Gulf of Mexico.

"The bureau is required by law to assess the impacts of oil and gas and wind development to ensure they are not destroying something historically or archaeologically important," Mather explains. "We are comparing the biological communities on shipwrecks with those on the hard bottom close to shipwrecks and also evaluating the state of archeological preservation."

Between Mather and Buxton, the Applied History Lab conducts far-reaching work underwater, and every expedition is a new adventure. Buxton has ongoing research collaborations in Israel, the Indian Ocean, Croatia, Turkey, Greece, and with OceanGate in the Atlantic on the *RMS Titanic*. Mather and Buxton also are collaborating on a project examining four historic submarines sunk in Rhode Island waters.

Buxton also is working with assistant history professor Ximena Sevilla, URI students and foreign colleagues on The Alcantara Project with research conducted in Portugal, Colombia and Spain. The project was formed in anticipation of the discovery of European shipwrecks containing scientific collections and cultural artifacts obtained from indigenous peoples, especially in the Americas. For example, the *San Pedro da Alcantara* – which sank off the coast of Portugal in 1786 with a trove of gold and silver coins, cultural objects and scientific samples from the Peruvian Andes – draws attention to the fate of culturally significant material obtained from indigenous peoples, usually by coercion.

"There are no international guidelines or best practices established for involving indigenous stakeholders in the management of underwater cultural heritage or addressing their legal rights," Buxton says. "Together with our European colleagues, we have begun to collect historical data that can help archaeologists craft a white paper to ensure that indigenous stakeholders have a seat at the table when governments and courts decide the fate of historic shipwrecks."

"URI's exclusive collaboration with the Israel Antiquities Maritime Unit means that our divers are sometimes 'first on the scene' with the Israel Antiquities Authority when new sites are exposed and threatened."

- Bridget Buxton

The Applied History Lab's work is vital due to the devastating effects of climate change, Buxton says.

"Unique shipwrecks and Neolithic sites, including sites that preserve valuable data about the evolution of today's killer diseases, are being uncovered and destroyed at an alarming rate," Buxton notes. "URI's exclusive collaboration with the Israel Antiquities Maritime Unit means that our divers are sometimes 'first on the scene' with the Israel Antiquities Authority when new sites are exposed and threatened. Our need for additional help and resources to support these rescue efforts right now is critical."

Putting the Right Plastics to the Right Use

written by **CLEA HARRELSON '20**

VINKA OYANEDEL-CRAVER
Professor
Civil and Environmental Engineering
Associate Dean of Research
College of Engineering

Vinka Oyanedel-Craver wants to give plastics new life.

A professor of civil and environmental engineering and associate dean of research for the University of Rhode Island (URI) College of Engineering, Oyanedel-Craver aims to find ways to recycle plastics while limiting greenhouse gas emissions produced by the process.

"We want to make educated decisions, not just about one stage of a product, but about plastics from start to finish," she says. "When you are in the process of developing technology, it's much easier to change things."

Oyanedel-Craver is the Director of the *URI Plastics: Land to Sea* COLAB (co-laboratories) initiative, launched under URI's Division of Research & Economic Development, and part of a group interested in combining innovation in recycling, textiles, and sustainability to ensure sure the right plastics get put to the right use.

She says she first started thinking about plastics as part of her work in wastewater treatment.

While developing new methods to remove microplastics from wastewater, she prioritized using existing infrastructure. According to Oyanedel-Craver, by removing plastics we add material extractions to build new equipment. If the solution requires new energy costs and shifts the burden somewhere else, you must account for that. This inalienable fact led her to explore circular economies and life cycle assessment.

Life cycle assessment is a methodology for assessing environmental impacts through the whole life cycle of a product or service, guided by international standards. Oyanedel-Craver describes the standards issued by International Organization for Standardization an independent, non-governmental organization, as critical reference points that help establish common ground for how industries and researchers can approach thinking about their impact.

"Nothing is zero-impact," she says. "There will always be a trade-off, but what we can do is minimize the negative impacts."

Fully assessing the life cycle of a product requires merging many different skill sets. This type of work can also help save time and money.

"That's why the COLAB is so important," Oyanedel-Craver explains. "Working together across the University, we can deliver more than the sum of our parts. We are working to connect all our areas of expertise together."

Alongside Associate Professor Karl Aspelund and Assistant Professor Izabela Ciesielska-Wrobel, both in the Department of Textiles, Fashion Merchandising and Design (URI College of Business), Oyanedel-Craver is exploring how recycled plastics and life cycle assessment might be integrated into textile production.

"We are thinking about how to build a circular economy for textiles," she says. "Since textiles shed plastic particles while being washed, we are hoping that we can take waste and put it in a new manufacturing cycle."

One of the challenges the group faces is that not all plastics are the same nor can they be treated and reused the same way.

Oyanedel-Craver explains, "Plastics are much more than just polymers, they also contain many additives such as plasticizers, flame retardants, dyes, and many others. But the composition of

"We want to make educated decisions, not just about one stage of a product, but about plastics from start to finish."

- Vinka Oyanedel-Craver

Plastics recycling centers processing raw materials for transformation.

plastics from the 1950s is very different from today, and it's possible that we'll have to deal with banned substances in some materials. So, if we're collecting large amounts of plastic from the ocean, not all of that can be used in the same way."

According to Oyanedel-Craver, this is why it's so important to have COLAB team members like Seray Ergene, assistant professor of management in the URI College of Business, who can help connect future research findings to real companies who are interested in changing their practices.

"That's what makes our goals unique," she says. "We want to combine life cycle assessment with risk assessment to channel plastics into the recycling and manufacturing processes most appropriate for that material."

In March of 2022, the United Nations Environment Assembly adopted a resolution that will initiate a process to negotiate a legally binding global agreement to end plastics pollution, to be finalized by 2024. This resolution specifically highlights the need to address the full lifecycle of plastics.

Life cycle assessment is a methodology for assessing environmental impacts though the whole life cycle of a product or service guided by international standards.

THE UNITED NATIONS ENVIRONMENT ASSEMBLY ADOPTED A RESOLUTION THAT WILL INITIATE A PROCESS TO NEGOTIATE A LEGALLY BINDING GLOBAL AGREEMENT TO END PLASTICS POLLUTION.

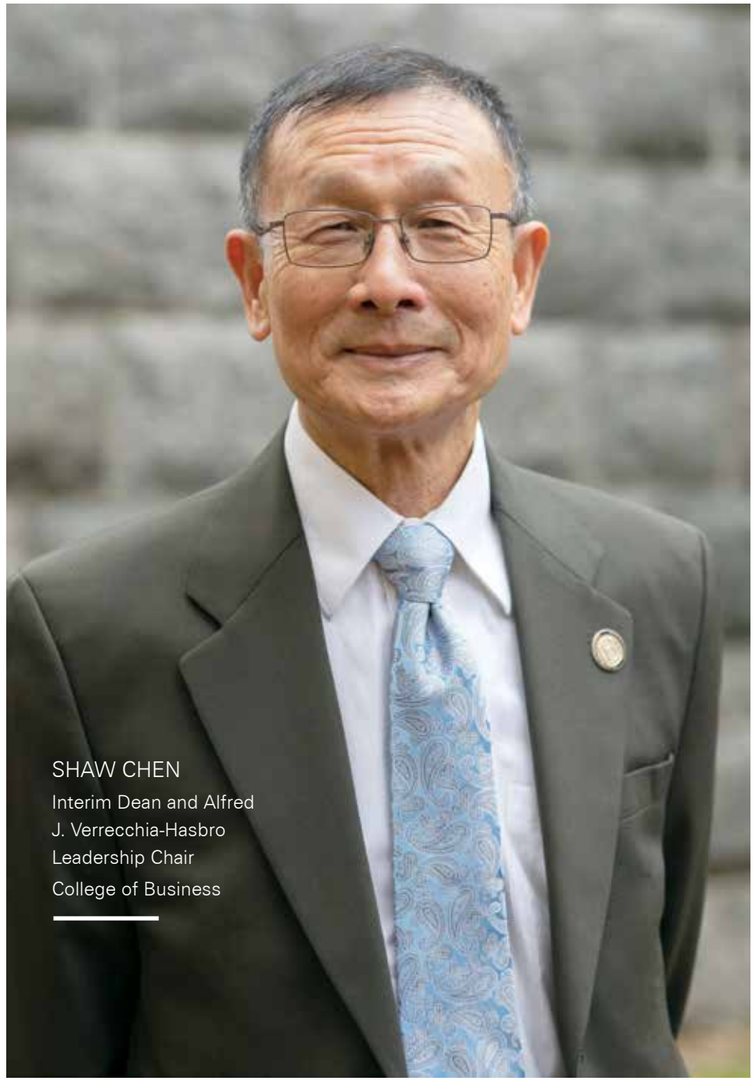
"The timing of this work is particularly important given the international treaties being negotiated," Oyanedel-Craver adds. "This will likely impact businesses directly, and our work can add to this type of international conversation."

While Oyanedel-Craver and the COLAB team are still in the process of applying for funding to support future projects, she says she is excited by the growing momentum of conversations related to circular economies for plastics.

"That's the vision," she says. "That one day this will be standard, and all companies will be tracking their materials and impact."

THE COLLEGE OF BUSINESS CELEBRATES 100 YEARS

written by **ALLISON FARRELLY '16**



SHAW CHEN
Interim Dean and Alfred J. Verrecchia-Hasbro Leadership Chair
College of Business

During the past 100 years, the College of Business has grown from the business administration program established at then-Rhode Island State College in 1923 to a modern business education college. Historical innovations, like creating graduate MBA and Ph.D. programs, founding the Ram Fund (a student investment group), and establishing connections with local industry partners, have laid a solid foundation for the college's next century as a top business program oriented toward strong graduate and research programs, according to Chen.

In the past decade alone, the College of Business has distinguished itself by adding online graduate programs in supply chain management and health care management. The college expanded the MBA program to Europe, added a professional doctoral degree in business administration (DBA), undergraduate courses examining social responsibility and business. The college also has added a business analytics and artificial intelligence (AI) program – one of very few in the United States.

The University of Rhode Island's (URI) College of Business celebrates a massive milestone this year: its centennial anniversary. As faculty and staff honor the college's history, their sights are set on building a future that will serve students for the next 100 years.

"You have to constantly ask what we are lacking and what will be good for our students as lifelong learners," explains Shaw Chen, College of Business interim dean and Alfred J. Verrecchia-Hasbro leadership chair. "We have to be innovative in the way we offer programs, our curriculum, and in our pedagogical design."

"Our programs make our students unique and desirable."

- Maling Ebrahimpour

"We have to be innovative in the way we offer programs, our curriculum, and in our pedagogical design."

- Shaw Chen

"There are many schools that have business analytics. But they do not have AI," says Maling Ebrahimpour, professor of supply chain and former dean of the College of Business. "We planned this program with the purpose of making it unique by adding AI.

"This program will put our students in a very competitive position as this major is not only a stand-alone major, but it helps all students in every major in the college to be knowledgeable about the important role of artificial intelligence in the business and its application in all business fields."

And as the college's offerings have grown, so has the student population, with the incoming freshman class increasing from 386 students in 2013 to 662 students in 2022. Strategic faculty investments will enable the college to make a global impact through research in FinTech, artificial intelligence, and pursuit of the UN's sustainable development goals, and will bring cutting edge thinking to the classroom. Experiential learning will help bring these lessons to life, as the college cultivates relationships that support career opportunities, economic

MALING EBRAHIMPOUR
Professor and Former Dean
College of Business

development, and community engagement.

“The changes are all focused on the students – how we can serve the students better in the next 100 years,” says Ebrahimpour.

He says the key to the college’s success are students and alumni.

“Our programs make our students unique and desirable,” says Ebrahimpour. “The quality of students that come here, the quality of the education they receive – put them together and you create quality alumni.”

The College of Business prepares students to enter the workforce through a mix of business training, experiential learning, internships and career planning, according to Chen.

“It’s more than just career training,” Chen says. “In traditional business training you come in and have the math, writing, and communication and then you go from there. But now, we are changing the approach. As the business world is always changing, we want to develop the next generation of business leaders through business education, thought leadership, and scholarly research that makes an impact on the business community and beyond.”

> “As the business world is always changing, we want to develop the next generation of business leaders.”
>
> - Shaw Chen

TIMELINE 100 YEARS

1923
A Business Administration program is established by President Howard Edwards

1926
The first business student, Alexander Paterson, graduates

1928
The first woman, Elsa Gramelsbach, graduates

1967
Ballentine Hall (named in honor of former dean George Andrew Ballentine) opens to house the College of Business Administration

1984
The Executive MBA program launches

1990
The Ph.D. program is established with a grant from Senator Claiborne Pell

1995
The first Ph.D. student, Nancy L. McIntyre, graduates

1996
Public fundraising for the Ballentine Hall renovation project is secured through two higher education bond referenda

1998
The College celebrates its 75th Anniversary, and the Verrecchia-Hasbro Leadership Chair in Business is created from a $1 million donation

2001
The Ram Fund is established with $100,000 of capital from the URI Alumni Association

2003
Ballentine Hall is renovated and expanded to better serve the College of Business Administration

2018
College’s name officially change to College of Business

2019
The college receives its single largest gift: a $15 million gift from Alfred J. Verrecchia ’67, MBA ’72, Hon. ’04 and Geraldine Verrecchia.

2020
The college launches an Executive Doctorate of Business Administration and the college’s first two online master’s degree programs – Supply Chain Management and Healthcare Management.

Advancing URI Research with A HIGH PERFORMANCE COMPUTING CENTER

written by **CLEA HARRELSON '20**

Researchers on campus can plug in to the High Performance Computing Center via a 10-gigabits-per-second fiber optic network, or 9,400% faster than the average internet speed in the United States.

From left: Michael Puerrer (computational scientist, ITS), Cecile Cres (graduate student, biological and environmental sciences), Kevin Bryan (HPC manager, ITS), Ian Bishop (graduate student, Graduate School of Oceanography), Michael St. Pierre (graduate student, physics), Gaurav Khanna (director, Research Computing, ITS), Christian Vye (advanced application specialist, ITS).

No one adores sluggish computers, especially researchers running millions of calculations for an experiment. To provide University of Rhode Island (URI) scholars with more brute power, the University signed on to join a regional high-performance computing center.

Developed by a consortium of Bay State research universities, the Massachusetts Green High Performance Computing Center (MGHPCC) welcomed URI into its fold late last year. Together with the University of Massachusetts Amherst, URI announced

a $1.2 million strategic investment to create a computational cluster of some 300 servers available for advanced data analysis and artificial intelligence. That will come in addition to the center's data storage and high-speed computing capabilities. Researchers on campus can plug in to the center via a 10-gigabits-per-second fiber optic network, or 9,400% faster than the average internet speed in the United States.

URI Research Computing Director and Professor Gaurav Khanna, says the new cluster promises to accelerate discoveries. Plus, it reduces the need for physical space, materials and personnel to manage it all. Take, for example, lab work to develop a new polymer for use in the marine environment, an area where URI holds expertise.

"You may have to do thousands of lab experiments to build a new material," Khanna says. "But with simulation through computing, you haven't spent a single penny on infrastructure or time."

For this reason, Khanna, a physics professor, says researchers increasingly turn to high-performance computing to advance their work. And as researchers leverage artificial intelligence, machine learning and quantum computing, URI is building resources to support such initiatives.

"The landscape of computing is changing," Khanna says. "More and more researchers are applying

computing to their work, and this investment will give URI a seat at the table."

The investment comes thanks to a $1.2 million federal grant spearheaded by U.S. Sen. Jack Reed and smaller grants won by Khanna and colleagues. The investments should reduce the need to rely on infrastructure at other institutions and two antiquated computing clusters housed at URI.

To support the new cluster and larger academic computing initiative, Khanna is assembling a team. He arrived in late 2020 as the founding director of research computing at URI Information Technology Services (ITS). Today, he counts three IT professionals and four student facilitators working across campus disciplines. Student facilitator Cécile Crès assists URI researchers with data transfer and related needs.

"Most fields are dealing with a lot of data," she says. "Now that we have better tools, I think a lot of people will be interested in using computing."

Crès points to her own research as an example. The doctoral student in biological and environmental sciences develops computational models to process genomic data of bacterial species in Narragansett

The new cluster promises to accelerate discoveries.

Bay. Training her algorithms can sometimes take a month, so faster computing resources, Crès says, means better data processing speeds, and that's good for research.

Also good for research: putting researchers together to tackle big problems. The partnership with the Massachusetts center promises just that. Built and managed by Boston University, Harvard University, Massachusetts Institute of Technology, Northeastern University and UMass, the facility encourages collaboration through events, conferences, publications and internships. This fall its High Performance Computing Day conference at UMass featured URI oceanography Professor Isaac Ginis.

"We're already beginning to see some connections forming," Khanna says. "And that's the hope, to enable better collaborations that enable research."

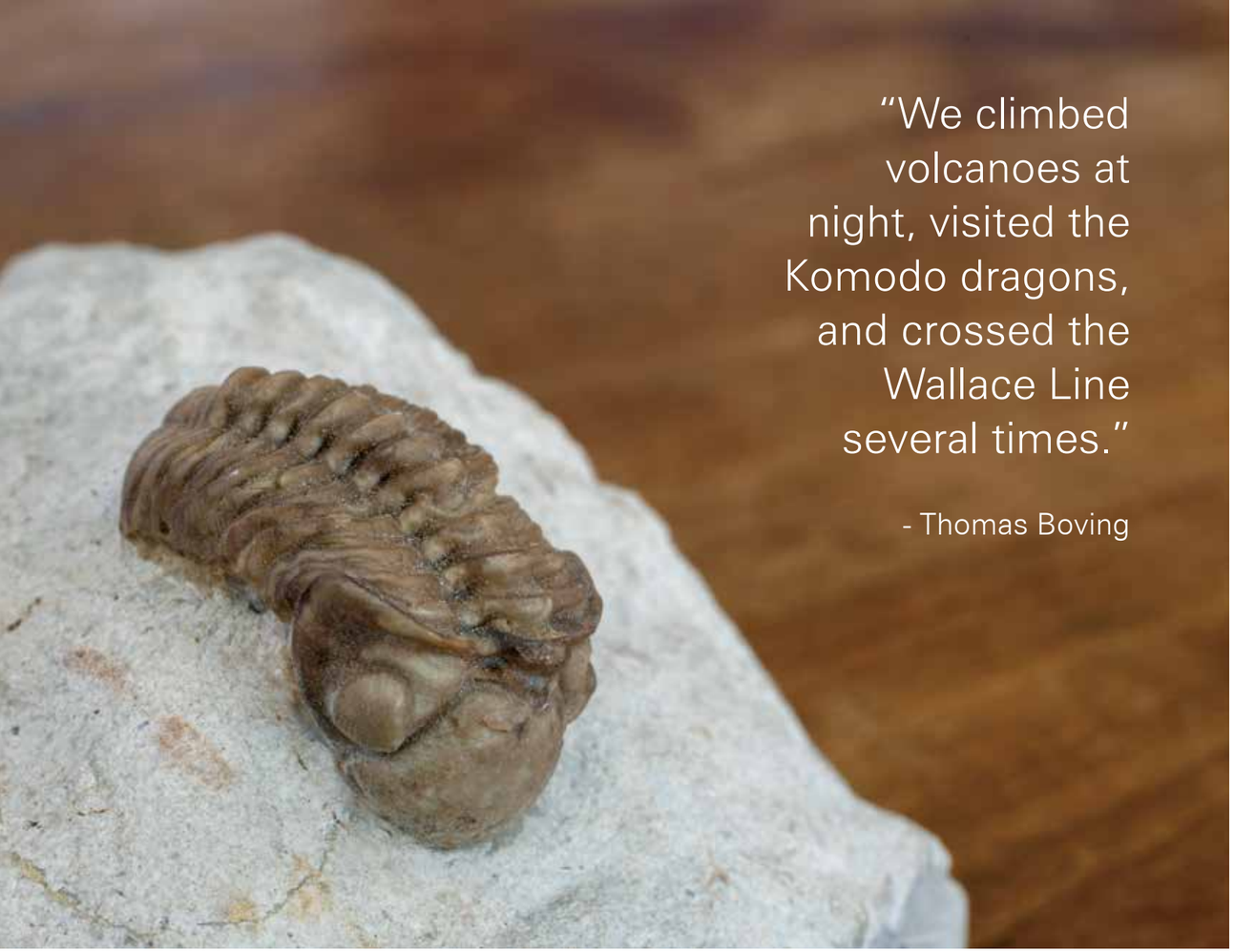
DIG THIS:

RENOWN PALEONTOLOGIST LEAVES URI AFTER STORIED CAREER

written by **CHRIS BARRETT '08**

In 1991, David Fastovsky redrew our understanding of the dinosaur extinction.

Fossil skeleton of dinosaur Tyrannosaurus Rex.



"We climbed volcanoes at night, visited the Komodo dragons, and crossed the Wallace Line several times."

- Thomas Boving

David Fastovsky accepted the first professional job anyone ever offered to him while he was still writing his Ph.D. thesis in graduate school. Thirty-six years later, he'll retire from the University of Rhode Island (URI) after a distinguished career that brought him international acclaim in paleontology.

"I wanted to be a paleontologist when I grew up, and URI let me be a paleontologist," says Fastovsky, a geosciences professor.

During his time at URI, Fastovsky discovered first-of-their-time fossils, published the best-selling undergraduate dinosaur textbook, and edited scientific publications, among many other things – all while teaching tremendously popular courses.

Fastovsky combined his sedimentology expertise and love of dinosaurs to study the geology around fossils. That let him paint a picture of the Earth's environments hundreds of millions of years ago. And in 1991, he redrew our understanding of the dinosaur extinction.

At the time, conventional wisdom held that the non-avian dinosaurs that went extinct 66 million years ago experienced a gradual decline. Fastovsky and colleagues showed evidence that pointed to a more sudden death, startling even him. But he found support at URI, especially at the Graduate School of Oceanography.

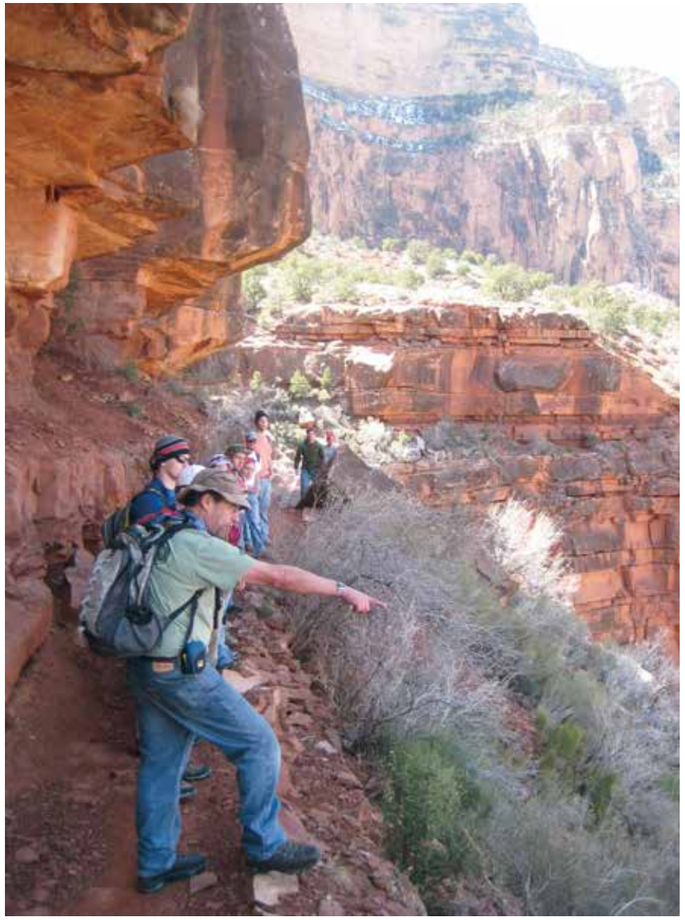
"I really felt like I was comfortable; I had people to talk to about the work I was doing," Fastovsky says of URI.

Most paleontologists eventually embraced Fastovsky's findings. The Milwaukee Public Museum even created a diorama that features a wax likeness of him.

Fastovsky's research didn't stop. A 2004 Fulbright Scholarship sent him to Mexico, and he now conducts annual fieldwork there. One memorable Mexico trip brought him to Huizachal Canyon where 189-million-year-old volcanic ash deposits contain fossils.

On the other side of the world in Mongolia in 2011, he described a 70-million-year-old nest containing the fossilized remains of 15 baby *Protoceratops andrewsi* dinosaurs in a first-of-its-kind discovery.

Then in 2015, Fastovsky traveled to Europe on his second Fulbright Scholarship. He taught about mass extinctions at the University of Vienna and sifted through French deposits to look for clues to the dinosaur extinction.



Professor Fastovsky and his students on the Hermit Trail in the Grand Canyon.

In between field work, Fastovsky wrote a book about, not surprisingly, dinosaurs. Turned into a textbook, it's now in its fourth edition with talk of a fifth. He's also served as science editor for three geosciences academic journals.

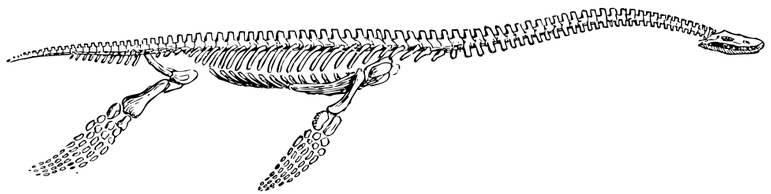
He also teaches. His first URI dinosaur course fit in a regular classroom. By his sixth year, administrators assigned him to Edwards Auditorium to accommodate 540 students. Fastovsky notes that he taught without teaching assistants and even once contended with a horse ridden into the building. The rider sought a woman whom he suspected was in the class, but eventually took his exit when no one rose to his calls. That specific young woman later told Fastovsky that she was indeed in the auditorium at the time, but she had no romantic interest in the rider.

Students also tell the professor the stereotypes that pop culture perpetuates about paleontologists and Fastovsky rectifies them. Unlike paleontologists in the movies, Fastovsky wears his shirt in the field - the sun is real danger – he does not carry a knife, he never battled a chamber of snakes, and he does not "dig" for fossils, but searches along the surface for exposed objects.

Fastovsky knows a thing or two about the sands that cloak fossils. URI geosciences Professor Thomas Boving recalls a trip to Indonesia with Fastovsky and his students.

"URI has been, in my experience, a really humane institution, the playing field has always been level and people try to do the right thing."

- David Fastovsky



"We climbed volcanoes at night, visited the Komodo dragons, and crossed the Wallace Line several times," Boving says. "David not only impressed me and our students by his immense knowledge about all kinds of things geological and non-geological, but he also turned out to be a healer and shaman. If it weren't for him, we would have lost several of our students to various illnesses - real or imagined - including occasional emotional breakdowns."

Most recently, Fastovsky and his students faced the COVID-19 pandemic. When administrators called back his annual spring sedimentology class field trip to Arizona and Utah, he pivoted to online teaching. The professor is quick to say that URI is a compassionate university that created a safe environment during the pandemic.

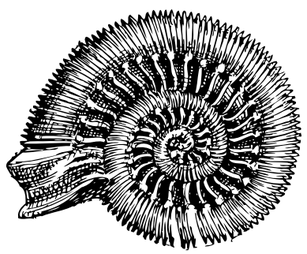
"URI has been, in my experience, a really humane institution," he says. "The playing field has always been level and people try to do the right thing."

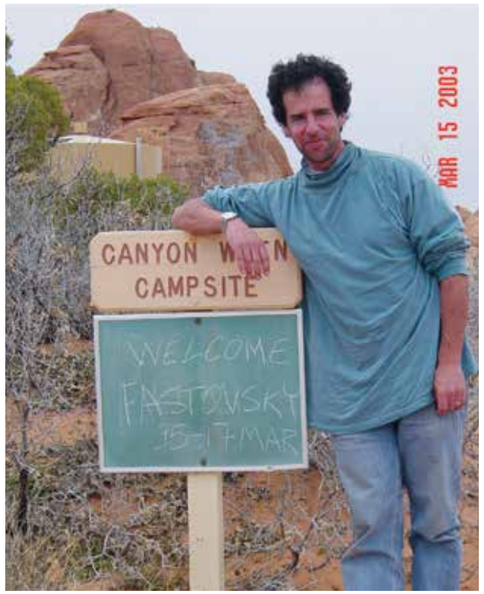
Professor Fastovsky and his students in Arizona.

Photo provided by Milwaukee Public Museum The Milwaukee Public Museum created a diorama that features a wax likeness of Fastovsky and colleagues.

When he walks out the door of Woodward Hall in December, Fastovsky will not leave the institution entirely. He lives nearby - he bikes to work year-round - and plans to continue to partner with one of his students to publish a book about social justice as part of evolutionary biology, as well as work on that fifth edition of his textbook. Plus, there's the occasional coffee breaks with his dear colleague, Professor Boving, and also responding to dinosaur listservs where some theories call for the patient, educated response of a professor.

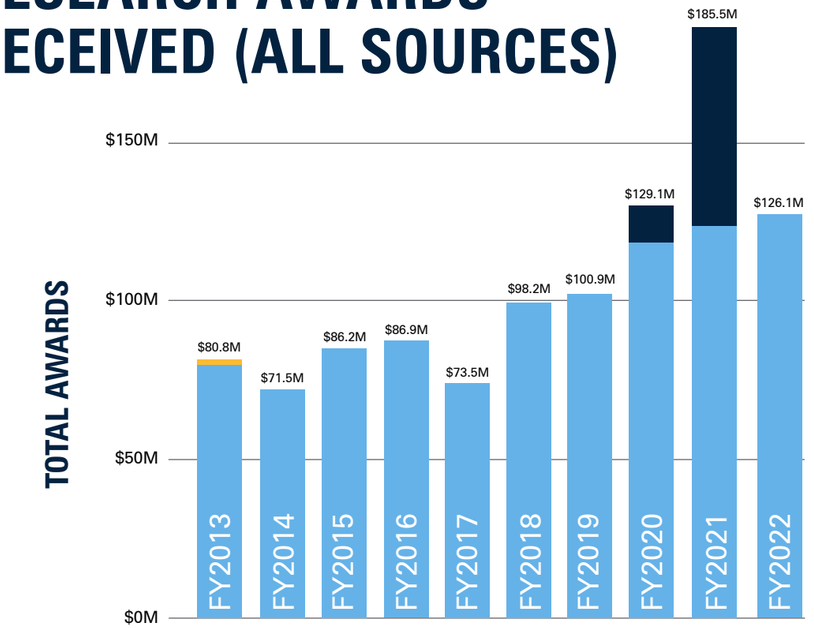
But Fastovsky won't just be thinking about dinosaurs. A local bicycle shop extended a part-time job offer, so Fastovsky did what he did last time someone offered him a job. He accepted.





ANNUAL REPORT FISCAL YEAR 2022

RESEARCH AWARDS RECEIVED (ALL SOURCES)



FY2013- FY2022 in millions

COVID-19 Related								11.2	62.5	
ARRA Awards	0.8	0.1								
Awards Non-ARRA	80.0	71.4	86.2	86.9	73.5	98.2	100.9	117.9	123.0	
Total Awards	80.8	71.5	86.2	86.9	73.5	98.2	100.9	129.1	185.5	126.1

Research Proposals Submitted FY2022

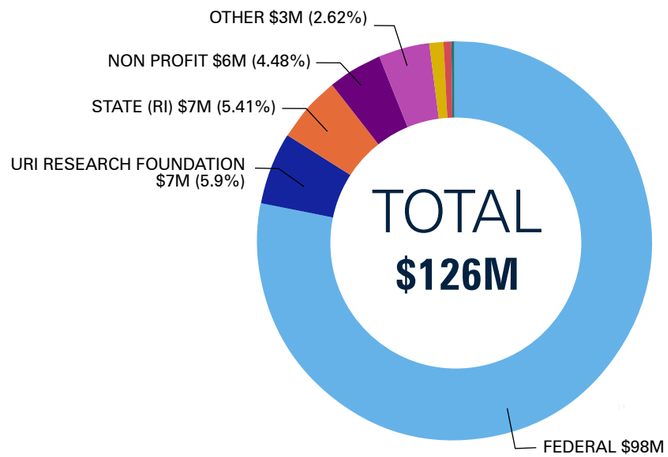
$426.7 Million

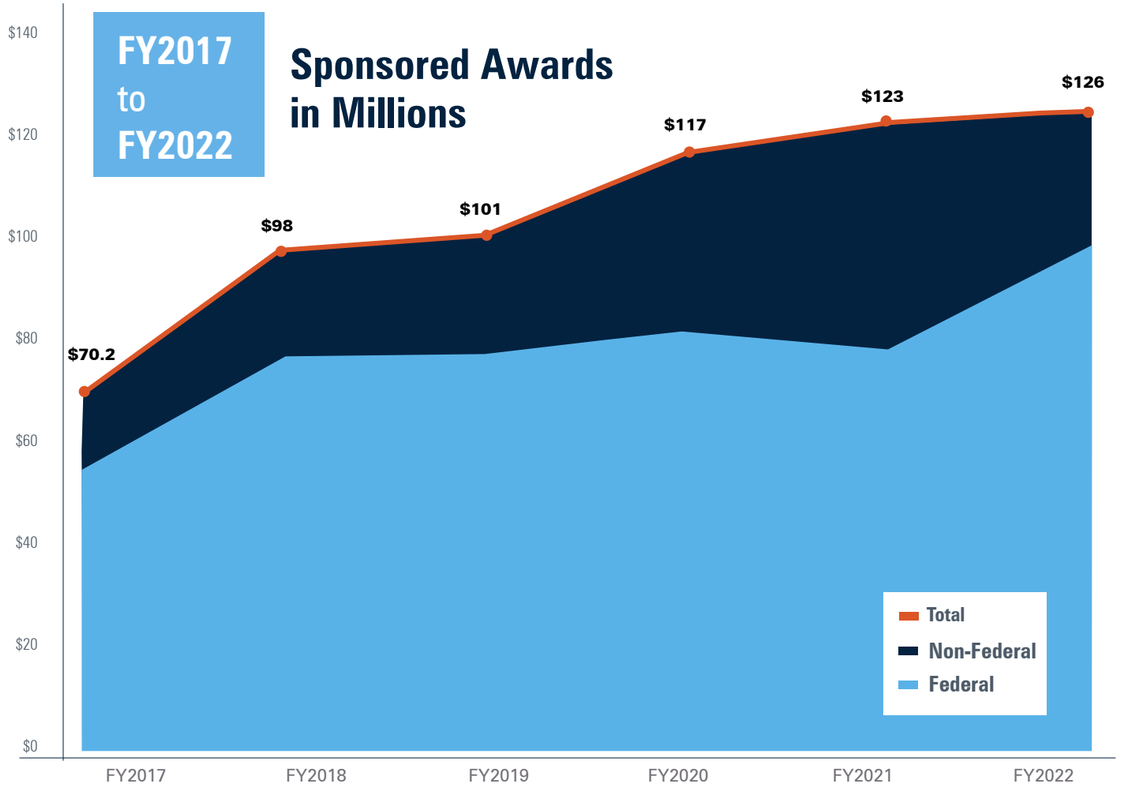
Expenditures FY2022

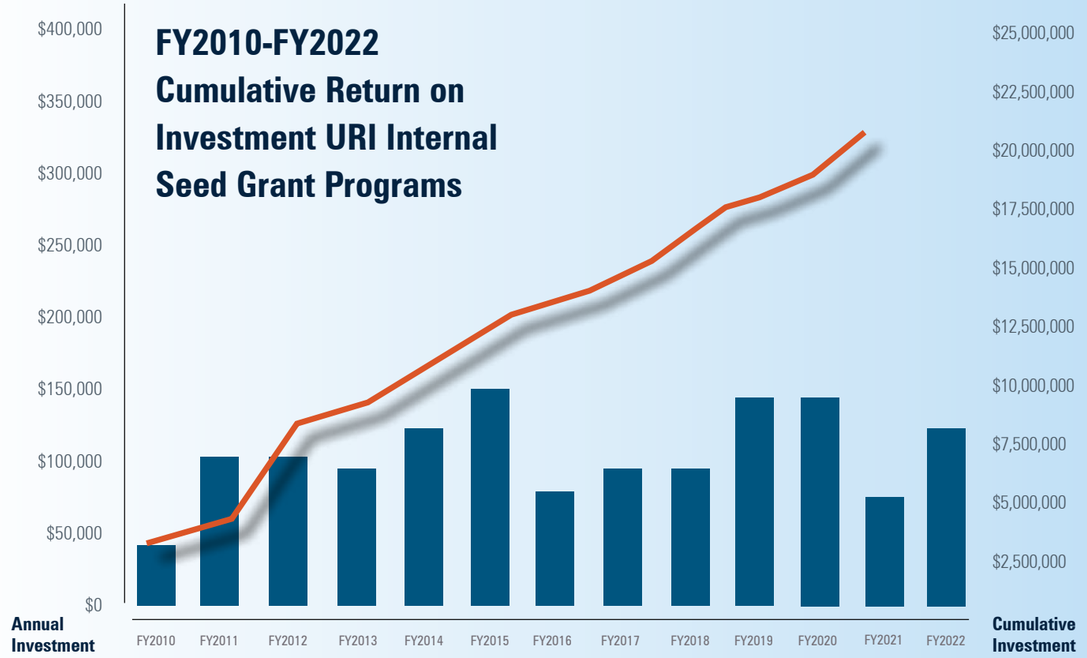
$94.4 Million*

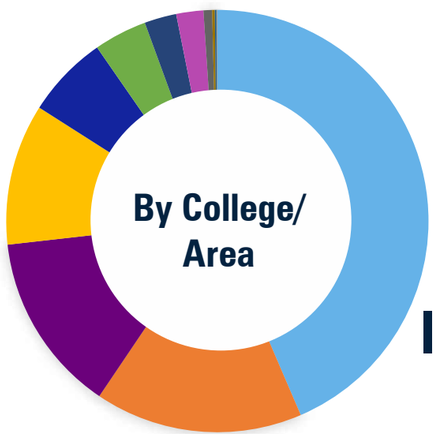
*Excluding HEERF funds

FY22 AWARDS BY SOURCE OF FUNDS

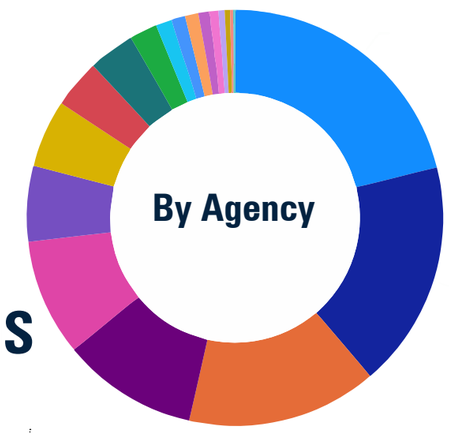








FY2022 AWARDS IN MILLIONS



- Graduate School of Oceanography
- College of Engineering
- College of the Environment and Life Sciences
- College of Pharmacy
- College of Health Sciences
- College of Arts and Sciences
- College of Education and Professional Studies
- College of Nursing
- Division of Research and Economic Development
- Library Services
- Academic Health Collaborative
- Information Technology Services
- College of Business Administration
- Division of Student Affairs

- DDOC
- DHHS
- NSF
- DOD
- USAID
- STATE
- USDA
- NON PROFIT
- MISC
- DOE

401 TECH BRIDGE-RISBDC-POLARIS-IP

IMPACTING THE RHODE ISLAND ECONOMY

URI INTELLECTUAL PROPERTY TOTAL ENTERPRISE

395 U.S. and Foreign Issued Patents
914 U.S. and Foreign Patent Applications
608 Invention Disclosures
8 Companies Formed: CREmedical, pHLIP, Velobit, Burbank, Labonachip, Plant Advancement, Audiance, Inc., and Modius Techwear

URI IMPACTING RHODE ISLAND BUSINESS POLARIS MANUFACTURING EXTENSION PROGRAM (MEP) FY2022

$13.5 Million in New Sales
$3.5 Million in Cost Savings
974 Jobs Created or Retained
$83.5 Million Retained Sales

RHODE ISLAND SMALL BUSINESS DEVELOPMENT CENTER (FROM 10/1/21 - 9/30/22)

707 Client Served; 45% self-identified as minorities, and 48% identified as women
4,907 Business Counseling Hours
$19,086,786 Capital Formation
(amount of funding from all sources that RISBDC staff has assisted clients in obtaining)
31 training events with 877 registrants

401 TECH BRIDGE FY2021

$1.1 Million Funding Secured
$2 Million Industry Economic Impact
2 Accelerator BlueTech Cohorts supporting 260 companies
More than 900 company engagements

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OF RHODE ISLAND

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AND ECONOMIC
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