



Momentum:

Research & Innovation

COVER STORY

MAKING WAVES
IN OCEAN TECHNOLOGY

featured inside

URI'S INTERDISCIPLINARY
NEUROSCIENCE PROGRAM

HARRINGTON SCHOOL OF
COMMUNICATION & MEDIA

PORTRAIT OF AN ARTIST
AS A WOMAN

Momentum:

Research & Innovation

"As soon as you start reading this article, your brain begins a journey that allows you not only to recognize symbols and groupings that form words, but also to comprehend information and ideas. How does this happen? How do you remember to enjoy your favorite food? How do you develop a taste for spinach after hating it during your childhood?"

These words are taken from the article chronicling the story of the George and Anne Ryan Institute for Neuroscience, one of the most transformational developments in URI's history. The catalytic gift from Thomas M. Ryan '75 and his wife, Cathy, launched a new era in brain science teaching and research at the University of Rhode Island. This is but a glimpse of what you will find in our brand-new edition of URI's research magazine, *Momentum: Research and Innovation*. Along with Vice President for Research and Economic Development Gerald Sonnenfeld, I am delighted to present this thoroughly re-conceptualized and redesigned vehicle for sharing compelling stories of research and scholarship at URI.



The articles you will read here reflect the cutting-edge work of URI faculty, graduate, and undergraduate students in the Colleges of Engineering, Environment and Life Sciences, Human Science and Services, and Pharmacy, as well as the Graduate School of Oceanography. But research does not only happen in the STEM fields of science, technology, engineering, and math. The College of Arts and Sciences is equally represented in this issue. Director of the Center for Humanities Annu Palakunnathu Matthew's brilliant photographic take on cultural identity and Professor of Music Mark Conley's journey to the impoverished Manda Wilderness of Mozambique to lead a transformative choral and dance festival are just two reminders that research and creative work are endemic to all academic pursuits.

You will also find eye-opening examples of collaboration and interdisciplinary research in these pages. Engineering and chemistry professors have formed a practical partnership around the use of nanoparticles to combat oil spills. The Rhode Island Experimental Program to Stimulate Competitive Research (EPSCoR), led by Associate Professor of Biological Sciences Carol Thornber, leverages relationships among nine of the state's colleges and universities, bringing multiple perspectives and disciplines to bear on the challenges of climate change.

If you haven't guessed by now, we're thinking big about research and discovery at URI. That's why this rich collection barely scratches the surface of what's happening at the University today – and why we intend to bring you two issues annually of *Momentum: Research and Innovation*. Enjoy this inaugural edition.

David M. Dooley, Ph.D.
President



Welcome to the new Research and Economic Development magazine. Everything is new, including the name of *Momentum: Research and Innovation*. The magazine is designed to highlight exciting new activities in research, scholarly activity and economic development at the University of Rhode Island. We hope that this will make our readers, both at the University and around the state, country and world, be aware of the fascinating and remarkable discoveries and creations occurring at our wonderful institution. We hope you will enjoy *Momentum: Research and Innovation* and come back to future issues. All of the writing has been done by University of Rhode Island faculty, staff and graduate students. The contents were chosen and assembled by our editor. I thank and congratulate all of those involved in developing a great magazine.

Gerald Sonnenfeld, Ph.D.
Vice President for Research
and Economic Development

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URI'S INTERDISCIPLINARY
NEUROSCIENCE PROGRAM
&
The George & Anne Ryan
Institute for Neuroscience

by John Pantalone



As soon as you start reading this article, your brain begins a journey that allows you not only to recognize symbols and groupings that form words, but also to comprehend information and ideas. How does this happen?

When you see a friend, why do you immediately recognize her no matter where you are, but if you see a clerk from your favorite grocery store in an unexpected place, why don't you immediately recognize him?

How do you remember to enjoy your favorite food? If that's too obvious a question, how do you develop a taste for spinach after hating it during your entire childhood?

The answers to these simple questions lie in the puzzle of the brain, a complex system of tissue housing an astonishing electronic network that scientists have only just begun to understand. At the University of Rhode Island (URI), the effort to unlock the secrets of the brain has taken a quantum leap forward with the establishment of the George and Anne Ryan Institute for Neuroscience, funded by the largest gift ever made to URI.

GAME-CHANGING GENEROSITY

Thomas M. Ryan, a 1975 URI alumnus and former chairman, president and CEO of CVS Health, made the unprecedented \$15 million gift in 2013 along with his wife, Cathy, extending their generosity in what has been called by URI Foundation President Michael J. Smith, "a transformational gift for URI."

Hailed by URI President David M. Dooley, state government and health leaders, and scientists at URI who have been studying aspects of the brain for decades, the Ryan Institute is named for Tom Ryan's parents. He has described the gift as a personal gesture borne of his family's experience in dealing with his otherwise healthy father, who suffered a stroke and then developed Alzheimer's disease.

Ryan says neurodegenerative diseases such as Alzheimer's, Parkinson's and Amyotrophic Lateral Sclerosis (ALS) have reached epidemic proportions, and he sees the potential impact of the Institute in dealing with Rhode Island's aging population.



"As the population ages, not only in the United States, but globally, it's going to get worse," Ryan notes. "I saw what it did to my father, what it did to my mother and our family. The economic costs are one thing, but the personal, emotional costs are another."

The Ryan Institute helps position URI to contribute significantly to research, product development, therapies, and treatments for brain disorders and to collaborate with institutions such as Brown University, Rhode Island Hospital, and others where brain research efforts have expanded.

continues on next page

PARTNERING: THE INSTITUTE AND THE UNIVERSITY

Ryan points out that his family foundation made this contribution to URI because the University expanded its facilities for research and included more collaborative research in neuroscience involving upwards of 30 faculty in a dozen disciplines across six colleges. He was referring to the Interdisciplinary Neuroscience Program (INP), established in 2011, which grants master's and doctoral degrees and has opened opportunities for researching the brain from all angles.

With the Ryan Institute, the chance of compounding funds for research and clinical work increases, and so does the opportunity to attract top students and faculty in the related fields of biochemistry, biomedical engineering, psychology, biomedical science, cell and molecular biology, communicative disorders, computer engineering, pharmacy, and more.

Scientists in the INP are studying aspects of dementia, epilepsy, ALS and other diseases in hopes of learning their exact causes and discovering possible treatments. Some are directly studying the brain to see how it works to find innovative ways of manipulating it for the benefit of people who lose speech, locomotion, vision and other functions controlled by the brain. Others are studying brain function in an effort to build computers that can mimic human intelligence and problem-solving.



NASSER ZAWIA, dean of the Graduate School, and professor of pharmacology and toxicology

Nasser Zawia, professor of pharmacology and toxicology, dean of the URI Graduate School and executive director of the INP says, "This investment could not have come at a more opportune time. Over the last decade or so there have been major advances in our understanding of the brain that have allowed for innovative therapeutic solutions and treatments not possible with our previous limited knowledge."

The academic value of the Ryan Institute and the INP excites Provost Donald DeHayes, the University's academic vice president.

"It has been wonderful to see faculty discover colleagues in other departments with similar interests," he says, referring to the INP. Forming the network has resulted in faculty bringing in \$12 million to \$13 million in external research funds. The Ryans' gift to form the Institute will enhance this even more.

"I believe we can bring in new faculty with a neuroscience background and expertise in different disciplines to complement the faculty we have now," DeHayes says. "The University is making a substantial investment in this area. So this effort will just continue to grow."

THE IMPACT OF NEUROLOGICAL DISORDERS

The urgency of the research becomes clear when considering the statistics on brain-related disorders. According to the World Health Organization, hundreds of millions of people worldwide are affected by neurological disorders. Scientists estimate that more than 35 million people have dementia and seven million new cases develop each year. Alzheimer's, the most common cause of dementia, possibly contributes to more than two-thirds of those cases. Further, more than 65 million people have epilepsy, with more than 70 percent of the people suffering from epilepsy living in underdeveloped countries.

In the United States there are 5.2 million Alzheimer's cases. The Alzheimer's Association says that national costs related to Alzheimer's reach as high as \$214 billion a year. It is the sixth leading cause of death in the country with more than 5 million Americans diagnosed with Alzheimer's.

One in three Americans is estimated to suffer from a neurological or a neuropsychiatric disorder in their lifetime, according to the National Institutes of Health (NIH). Epilepsy is more than twice as common in the United States as cerebral palsy, muscular dystrophy, multiple sclerosis, and cystic fibrosis combined.



Electrode used by Professor Besio.

FINDING COLLABORATORS AMONG COLLEAGUES

Under those circumstances, there is plenty for scientists to study. At URI, faculty involved in the INP are looking at everything from brain chemicals to pharmaceutical treatments, brain computer interfaces, therapeutic plant foods, brain image sensors, micro-scale disease detection devices and much more.

"The people in the INP are committed to growth of the field," Zawia says. "If we hadn't formed this program, people working in related areas wouldn't know one another. This raises the visibility of biomedical and health sciences on campus."

Zawia's work on Alzheimer's disease has attracted national attention. In his lab, he and his students have gathered evidence that suggests early life exposure to lead and other heavy metals has connections to the development of Alzheimer's later in life. It took years of research to find evidence that lead exposure causes overexpression of genes related to Alzheimer's.

"Our work showed that 95 percent of Alzheimer's cases may be triggered by environmental factors," he explains. "Our work focuses on epigenetics, how genes are re-programmed during development because of these exposures. The key here is if we can understand the environmental risks and diagnose the disease early, we might be able to minimize the disease's effects."

After nearly a decade of research, Zawia is about to test a therapeutic drug on humans he has been developing. "The INP and the Ryan Institute have raised the agenda of neuroscience on campus and helped us advocate for it," Zawia says. "It's a hot field that is getting a lot of publicity."

THE PROFESSOR WHO CAN READ YOUR MIND

One of the URI faculty members who Zawia drew in when first discussing an interdisciplinary network in 2008 was Walter Besio, associate professor of electrical, computer and biomedical engineering. His innovative research is personal since his brother was paralyzed in a car accident. It served as motivation for him to become a biomedical engineer.

Besio needed a collaborator on his NIH proposal to show he could analyze brain tissue proving that the noninvasive electrical stimulation through the unique electrode he was developing didn't damage brain tissue. He says, "Finding Nasser Zawia helped me obtain my first NIH grant, and my postdoctoral student was able to work with Zawia's people in his lab while we were stocking our lab."

Besio has since perfected the electrode and instrumentation, which can "read" a person's thoughts and translate them into electrical impulses. The hope is that with this electrode, a paralyzed person can operate a phone, a television, a computer, a robot, and other devices to enhance their lives. His electrode also can play a role in detecting where seizures originate in the brain. He has developed a system that detects brain electrical activity from seizures and automatically sends electrical pulses to control seizures. It is estimated that prolonged seizures, which Besio studies, cause 22,000 to 42,000 deaths in the United States each year.

"My hope is that we will attract other neural engineering faculty," says Besio. "Having a cluster of researchers in neural engineering would give URI the critical mass to work together on collaborative research, grants, manuscripts, etc. In particular, I would love to see people either doing epilepsy or brain computer interface work."



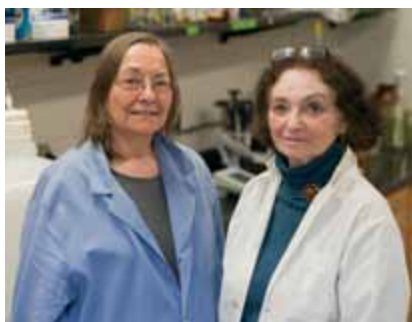
WALTER BESIO, associate professor of electrical, computer and biomedical engineering

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AT THE UNIVERSITY OF RHODE ISLAND, THE EFFORT TO UNLOCK THE SECRETS OF THE BRAIN HAS TAKEN A QUANTUM LEAP FORWARD WITH THE ESTABLISHMENT OF THE GEORGE AND ANNE RYAN INSTITUTE FOR NEUROSCIENCE AND URI'S INTERDISCIPLINARY NEUROSCIENCE PROGRAM.

Hydra

As part of their collaborative research, Kass-Simon and Hufnagel study a small freshwater animal called a Hydra. It turns out that this tiny creature has a simple central nervous system that has characteristics in common with higher animals, including people.



LINDA HUFNAGEL, professor of cell and molecular biology and GABRIELE KASS-SIMON, professor of biology

USING SMALL FISH TO SOLVE BIG PROBLEMS

Linda Hufnagel, a cell and molecular biology professor, found personal motivation for becoming a scientist at a time when few women considered it. Her father died in 1956 of ALS, commonly known as Lou Gehrig's disease after the famous baseball player who struggled with the disease. Hufnagel and her colleague, biology Professor Gabriele Kass-Simon, have collaborated for nearly 40 years on researching neuronal processing in a

simple model nervous system with the aim of understanding fundamental concepts in neuronal functioning. This central nervous system research has implications for ALS, Alzheimer's and other diseases.

The two were among a core group, including Zawia and Besio, as well as Professor of psychology Lisa Weyandt, Associate Professor of communicative disorders Leslie Mahler and Assistant Professor of biomedical and pharmaceutical sciences and chemical engineering David Worthen, who were the principal organizers of the INP. Soon after that, Alycia Mosley Austin became the coordinator of the INP. Austin received her doctoral degree from UC-San Diego in neuroscience and brought the most current knowledge into managing the INP. She plays a vital role in the day-to-day management of the program.

Hufnagel recalls being surprised at how many faculty turned out for an initial meeting. "I only knew a few of the people who were there," Hufnagel says. "It was an eye-opener, and I immediately saw that we could form a cross-fertilized program. From the start of the INP, students have been learning varied research methods, and it has allowed us to try procedures we weren't really able to before."

As part of their collaborative research, Kass-Simon and Hufnagel study a small freshwater animal called a Hydra. It turns out, this tiny creature has a simple central nervous system that has characteristics in common with higher animals, including people. Using behavioral, electrophysiological and microscopic methods, Kass-Simon and Hufnagel work together to determine how the Hydra performs its simple tasks such as somersaulting toward light and using its tentacles to capture prey. In the process, they are analyzing nervous systems, looking for clues that might answer questions about the "higher animals" and how their systems work.

Hufnagel, using an electron microscope, is tracking proteins in the Hydra's nervous system. She does it with new methods such as fluorescent tagging of anti-bodies, so that a cell's movement can be tracked.

Hufnagel says, "Basically we showed that Hydras could be a good model system for asking questions about all these issues. It's easier to make a discovery with Hydra than with human beings."



LISA WEYANDT, professor of psychology

The professors' research of the Hydra's nerve network has shown more evidence of centralization than was believed to be the case. They study the functional organization of the nerve network and map portions of it to identify synaptic connections focusing on neurotransmitters, the neurons that send signals to receptors that control motion and activity.

"Ultimately we are after the receptors and proteins involved in these nerve systems," Hufnagel says. "Receptors are important factors in drug dependency, for instance, so there is a lot of practical application from all this."

UNDERSTANDING THE BRAIN

INP faculty work in clinical areas as well as in lab research. Mahler and her graduate students, for example, employ therapeutic techniques to help Parkinson's patients improve speech capability. With more than two decades of experience as a speech pathologist in hospitals, Mahler is breaking new ground to make simple, practical gains in improving the lives of patients with neurological disorders. Her work is designed to improve brain function through principles of motor learning. The result is not just improved speech, but better brain function in controlling that speech.

Yet another area of research and clinical application happens with

Weyandt's work on pharmacological and nonpharmacological treatments for attention-deficit hyperactivity disorder (ADHD).

"There are obvious connections with collaborating with faculty in the College of Pharmacy," Weyandt says. "Our current work combines a clinical approach with basic science. I am working with Tara White, assistant professor of behavioral and social sciences at Brown University on a study to explore whether prescription stimulants such as Ritalin and Adderall are truly neuro-cognitive enhancers."

In other words, would medications prescribed to treat ADHD have a positive effect on learning and cognition for persons who don't have the disorder?

"If we're truly going to understand the brain and clinical disorders, we need multiple perspectives: chemical, molecular, physiological, cognitive, behavioral,



LESLIE MAHLER, associate professor of communicative disorders

neuropsychological," Weyandt says. "In that kind of environment, not only do faculty collaborate, but students learn to think from an interdisciplinary perspective. This is the future of research and clinical treatment of the brain."

The first Ph.D. student from the INP, Kyle Scully, graduated in 2014. He worked on a collaboration funded by the NIH that supported development of new drugs for treatment of epilepsy, which is Worthen's primary area of research.

"I have worked with a few other faculty before, but this creates more opportunities for collaboration," Worthen says. "This particular work is an anti-convulsant screening program. We have compounds

that NIH is excited about. Having the INP makes it easier to do what we want to do because we have many different experts here who can communicate and work together."

While much of the research and product development being done by faculty in the INP focuses on disorders and disease detection and treatment, others complement the brain research in intriguing ways that might not be so obvious. Haibo He, an electrical, computer and biomedical engineering associate professor, and a colleague of Besio's, focuses on the development of computer intelligence that can replicate aspects of human intelligence.

"With the recent development of brain research and modern technologies," he says, "scientists and engineers will, hopefully, find efficient ways to build brain-like complex systems that are highly robust, adaptive and tolerant to certain environments."

He explains that ideas have been borrowed from intelligent systems to develop robots to perform certain tasks, but scientists and engineers have not been able to design "truly brain-like, general purpose intelligent machines."

He and his colleagues work on the challenge of developing complex mathematical formulas that might some day achieve an intelligent machine that could think like a person to solve risky problems in a safer manner than humanly possible.

Zawia says, "URI had a strong biomedical presence, but needed a similarly strong neuroscience one as well. Once we started to meet, collaborations began even before we formed the graduate program. There is unlimited growth potential with this."





Bringing Neuroscience and Diversity *Together*

by John Pantalone

SERENDIPITY ARRIVED ON CAMPUS WITH ALYCIA MOSLEY AUSTIN IN 2010. She earned her doctoral degree in neuroscience just as the University of Rhode Island (URI) faculty completed a proposal for a graduate Interdisciplinary Neuroscience Program (INP). The Graduate School hired her as the director of graduate student recruitment and diversity initiatives.

Austin also is an adjunct assistant professor in biological sciences. She “fell into” her third job as coordinator of the INP because she has experience in recruiting students from underrepresented groups and the science background to fit the INP.

“Austin made the big difference for the program,” says Nasser Zawia, dean of the Graduate School and the driving force behind the INP. “She was a recent graduate with a background in neuroscience. She understood all of it. We were lucky to have her when we established the INP.”

Though she hadn’t expected the opportunity when she took her job at URI, Austin became the critical link between prospective graduate students and the innovative neuroscience program. Three years later, as coordinator, she recruits students and mentors them as they go through the program. She meets regularly with faculty to review various aspects of the program and to work on the curriculum.

“It was happenstance,” Austin says, but in hindsight she seems to have been heading in this direction all along.

Born in New York, and raised in New Jersey, Austin had her initial Rhode Island experience as an undergraduate in neuroscience at Brown University. She earned her master’s degree and her doctorate at the University of California at San Diego, a path she determined for herself when she was a junior high school student.

“I was always interested in science, and I had done pre-college programs when I was in high school,” she says. “I found that I really enjoyed research in the lab and fieldwork.”

She moved in the direction of brain science, partly from reading about President George H.W. Bush declaring the 1990s the “decade of the brain.” Her natural interest in science combined with publicity about brain research led her to Brown University and neuroscience.

“Discovering how the brain works is an end in itself,” Austin says. “Once you know how it works, you can relate it to all sorts of disorders and diseases.”

That, of course, is the focus of the research being done by URI scientists in the INP.

ALYCIA MOSLEY AUSTIN,
director of graduate
student recruitment
and diversity initiatives;
adjunct assistant professor
of biological sciences;
coordinator of the INP



"As an undergraduate I was fairly certain that I would pursue a Ph.D., but I wasn't sure what type of neuroscientist I wanted to be," she says. "I decided I needed to gain more research experience before deciding my path for neuroscience in graduate school."

She spent two years investigating zebrafish models of muscular dystrophy in the lab of Dr. Louis Kunkel at Boston Children's Hospital before starting graduate school. Her later work focused on brain cells with an abnormal number of chromosomes but still functioning neurons (cells that activate the brain). The research studied how they develop in embryos.

While she has not abandoned her science, Austin says she wants to work in a setting where she can balance work and family life, a combination that took her in the direction of academic administration. Through the INP, she is able to indulge both interests and find satisfaction.

The INP has 11 doctoral students, seven master's degree students, and five students pursuing certificates in neuroscience. Austin and Zawia say the program has a goal to increase those numbers until they reach a critical mass of 25. The first two doctoral students and two master's students in the INP graduated in 2014.

Many of the current students come from underrepresented groups, close to 34 percent, are women. This is a higher percentage than in many graduate programs and better positions the INP to attract federally supported research, which holds diversity as a priority when deciding on projects to fund.

Student, Priscilla Villa, a native of Central Falls, RI, describes Austin as a mentor and adviser who is always available, "She's who I go to for every question I have," she says.

Where does Austin find underrepresented students? Her experience as an African American administrator serves her in this regard.

"I regularly go to conferences where there are upwards of 1,000 people of color in the STEM disciplines [Science, Technology, Engineering and Math]," she says. "The pool is not as small as people think. One of the keys to attracting students is to have a track record of diversity from the beginning, which we have."

These conferences include the Annual Biomedical Research Conference for Minority Students and conferences sponsored by

the Society for Advancement of Chicanos and Native Americans, which has a chapter at URI. Austin attends poster sessions at conferences where students present their research, and she recruits students by matching their research interests to the work being done by URI faculty.

This is how another INP graduate, Octavia Miller, describes meeting Austin, "I had an immediate connection with her," Miller says. "She helped with the entire process."

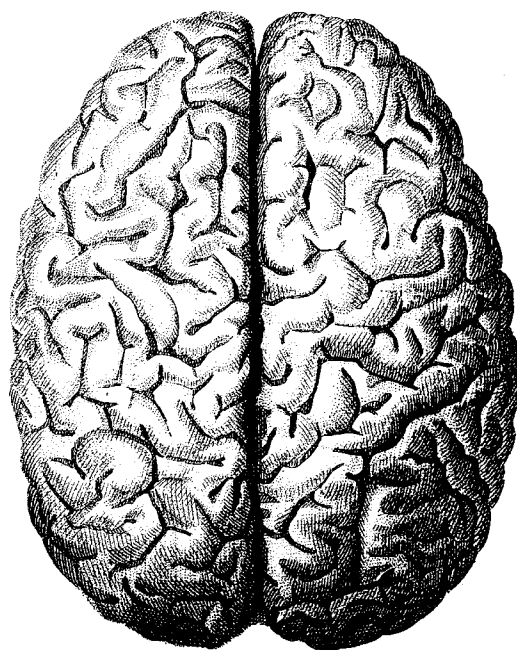
"Austin is doing a great job for us," Zawia says. "Students understand that she knows the process because she has been through it."

Villa is working with Leslie Mahler, an associate professor in communicative disorders, in a clinical setting applying therapies for loss of speech motor control, which fits her professional goal of working in a speech and hearing clinic. She will be exposed in an interdisciplinary way to numerous aspects of neuroscience. This is a big advantage of the INP.

"It's what I want," says Villa, who majored in psychology and minored in biology as an undergraduate at Salve Regina University. "I eventually want to go to medical school and focus in psychiatry, but I want exposure to all different aspects of neuroscience."

"Austin became the critical
link between prospective
graduate students and the
innovative neuroscience
program."

-Nasser Zawia





WE ARE ONE WITH OUR *World*

Drilling a new well. | Timothy S. George

by Amy Dunkle and Holly Tran

HIGH UP IN THE MOUNTAINS OF MIYAZAKI PREFECTURE ON THE JAPANESE ISLAND OF KYUSHU, THE TINY MOUNTAIN HAMLET OF TOROKU SITS TUCKED INTO A NARROW VALLEY WITH LITTLE MORE THAN 30 HOUSEHOLDS AND NO STORES.

The description evokes a quaint picture of a remote village off the beaten path, but that notion belies a tragic past embedded deep in the small community's soil.

"Toroku reminds us that our bodies are part of the environment, so when we put poisons into the environment they eventually end up inside us," says Timothy George, professor and chairman of the University of Rhode Island (URI) history department.

According to George, a leading expert on modern Japanese history, miners dug into the Toroku landscape to excavate silver in the late 16th century. The mining company processed the ore

by burning, he explains, which produced emissions of arsenic in the smoke.

"While there are no specific records of damage, there are accounts of a white powder, or 'frost,' falling in the summer and making young women's black hair look white," he says.

The intentional mining of arsenic came later, in the 20th century. George says the arsenic was released into the air when arsenopyrite, or arsenic ore, was burned to produce the chemical element. Arsenic tailings were dumped on hillsides and in the river and arsenic also precipitated out of the smoke, contaminating drinking water and food sources such as rice, which concentrates the level of contamination. Ultimately, the

people of Toroku paid a terrible price for the mining operation.

Ingestion of 0.1 grams of arsenic can cause death, says George, and half that can cause acute poisoning. Long-term exposure at lower levels causes skin problems, general weakening, digestive system disorders, deterioration of internal organs, confusion, and several kinds of cancer.

Arsenic was, of course, known to be poisonous. George says arsenic collected from silver mines in some places in Japan other than Toroku, especially in the Tokugawa period (1600-1868), was actually sold as rat poison.

"But, clearly, they did not realize how severe

and dangerous the pollution would be,” he says. “When they did, shortly after arsenic mining began in Toroku in 1920, government authorities did little about the harm to people, but sent a veterinarian out of concern for harm to cows and horses.”

Toroku arsenic poisoning victims and their supporters suffered in obscurity until pollution awareness developed in the 1960s and exposure of pollution cases such as Minamata disease mercury poisoning, about which George published a book, gained attention.

The people of Toroku protested, petitioned and sued. Yet, each victory in their favor drew appeals and strung-out the process. Still, the case worked its way through the courts and ultimately led to a settlement imposed by the Japanese Supreme Court in 1990. That decision provided payments from the mining company to victims officially certified as Toroku arsenic poisoning patients.

“Environmental history is becoming an important field of history,” George says. “I would like to show how any full history of a place, time or theme has to take environmental history into account. I’d like to raise awareness of how all parts of the world are connected, how pollution in one place affects others.”

A Lifelong Connection

George has spent 17 years in Japan, and his ties to the country extend back to his childhood, when his father’s job with 3M landed the family in Japan for four years. Early on, George says he wanted to be an astronaut and focused his studies on mathematics and science. That changed during his junior year in high school. George signed up for an innovative, team-taught, U.S. history course.

“History was appealing because there were no simple, right-or-wrong answers,” recalls George.

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Closed mine and cart, Toroku, Japan. | Timothy S. George

*“Environmental history
is becoming an important
field of history.”*

-Timothy S. George



Safe water from a well provided
by the Asia Arsenic Network,
Bangladesh. | Timothy S. George

He later studied U.S. history at Stanford University and fulfilled his language requirement by taking Japanese.

"I decided to take Japanese to see how much I could remember from when I had lived in Japan from second through fifth grade of elementary school," he says. "I had forgotten many vocabulary words, but retained my pronunciation and a sense for Japanese grammar."

George's pursuit of the language prompted him to find his way back to Japan. He eventually worked with Volunteers in Asia, spending six months during his junior year of college teaching English in Japan. That service learning experience led George to enroll in courses in Japanese history, a move that would shape his travels and future studies.

As a Ph.D. student at Harvard University, George received a Fulbright grant and spent two years in Japan researching Minamata disease. The neurological syndrome was first reported in 1956 and the name stems from a mercury poisoning incident in Minamata city, Japan.

In Minamata George met the photographer Akutagawa Jin, who has published books of photographs of both Minamata and Toroku, and was active in the citizens group supporting the Toroku victims.



Toroku, Japan | Timothy S. George

However, George says he did not learn much about Toroku until he was seeking a new subject to research for a 2008 conference in Montana, the first large academic conference in North America on Japan's environmental history. He received grants from the Association for Asian Studies, URI's Council for Research, URI's Center for the Humanities, and the URI Foundation, and went to Toroku and other sites in Japan to study the history.

"The pattern was similar to that in other pollution cases in Japan, including Minamata," notes George. "Because the period of activism, mostly in the 1970s, is so similar to what I and others have written about in the well-known pollution incidents, I focus in my Toroku study on what came before and after."

Environment Weaves Common Thread

George says he first attempts a *longue durée*, or long-term, environmental history of Toroku, from Neolithic times to the 20th century. Then, he looks at how the support group, instead of fading away after the 1990 settlement, morphed into the Asia Arsenic Network, applying its knowledge and expertise to the arsenic poisoning mainly in Bangladesh.

"The points I make include, first, the idea that because human bodies are part of the environment, by poisoning the environment we are poisoning ourselves; and second, the idea that there is no such thing as a history of just one little place because the environment ties every place to the broader world in many surprising ways," explains George.

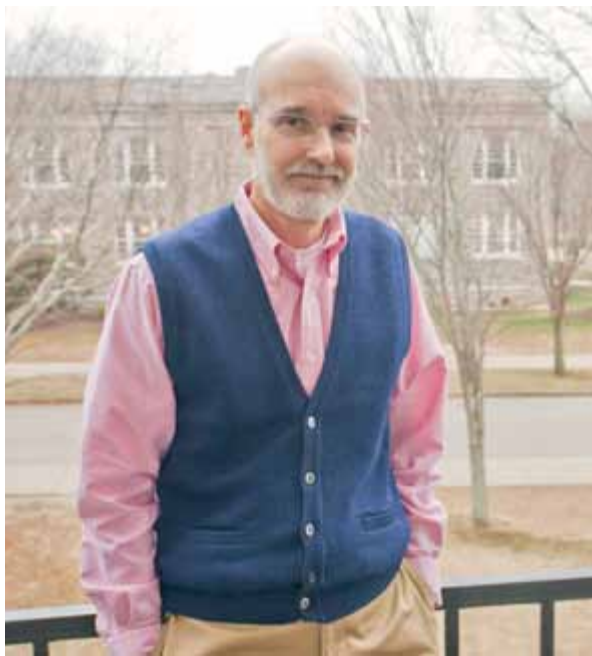
To reconstruct Toroku's story, George traveled to the region, conducted interviews and took photographs. He



Map of Toroku, Japan mining operations at their peak before World War II, drawn from memory by a resident.



Bangladesh: District water officer testing well water for arsenic; water samples collected for testing by the Asia Arsenic Network; old mine entrance. | Timothy S. George



TIMOTHY S. GEORGE, professor and chair of history

says he, "often simply spent a great deal of time walking the land, 'getting to know it with my feet,' according to a saying in Japanese."

Most of the individuals affected by the Toroku arsenic poisoning have since passed away, making interviews of residents conducted in the early 1970s, oral histories, and other documents key primary sources for his research.

In 2008, George published a chapter titled, "Toroku: Mountain Dreams, Chemical Nightmares," in a collection of essays, *Japan at Nature's Edge: The Environmental Context of a Global Power*. He was awarded a second Fulbright grant in 2012 to continue his research on the arsenic incident in Toroku and its aftermath, and is currently working on a book based on his research in Japan and Bangladesh.

Explaining why he is drawn to Japan, George says he sees larger lessons to be learned in Japan's history.

The first non-Western country to industrialize, and the first to have a constitution and a modern governmental system, Japan successfully avoided colonization and then became an

aggressive colonizer itself, until its disastrous invasions in Asia and the Pacific ended in its defeat in 1945.

"Japan then transformed itself into a vibrant and very pacifist democracy, and expanded its economy spectacularly," George says. "In the process it polluted itself terribly. In 1968, its economy became the third largest in the world, and virtually all of that production was condensed into the small part of its area—less than 20 percent of Japan, a country that in total is about the size of California—that is not steep mountains."

George points out that Japan also is exceptionally safe, and has a literacy rate and life expectancy among the highest in the world.

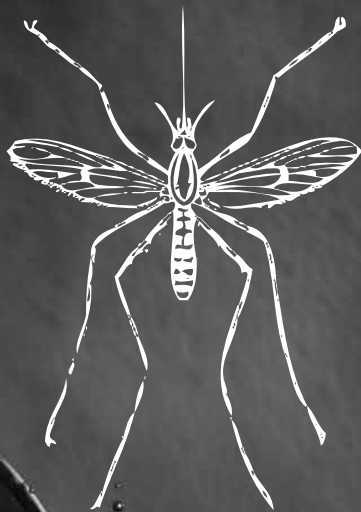
"After having been the country that showed many other developed countries the sorts of problems they might also face with urban crowding and with pollution," says George, "it has, in recent decades, been showing us the sorts of challenges we might face with an aging population and a stagnant economy."



Irrigation ditch dug in the mid-19th century to supply water for rice paddies in Toroku; the water was polluted after arsenic mining began in 1920. | Timothy S. George

DENGUE FEVER

Prevention through Vaccination



by Holly Tran

LIKE MANY OF HIS COLLEAGUES AT RESEARCH INSTITUTIONS, Dr. Alan Rothman, both physician and professor of cell and molecular biology, leads a double life that keeps one foot planted in academics and the other in ground-breaking discovery.

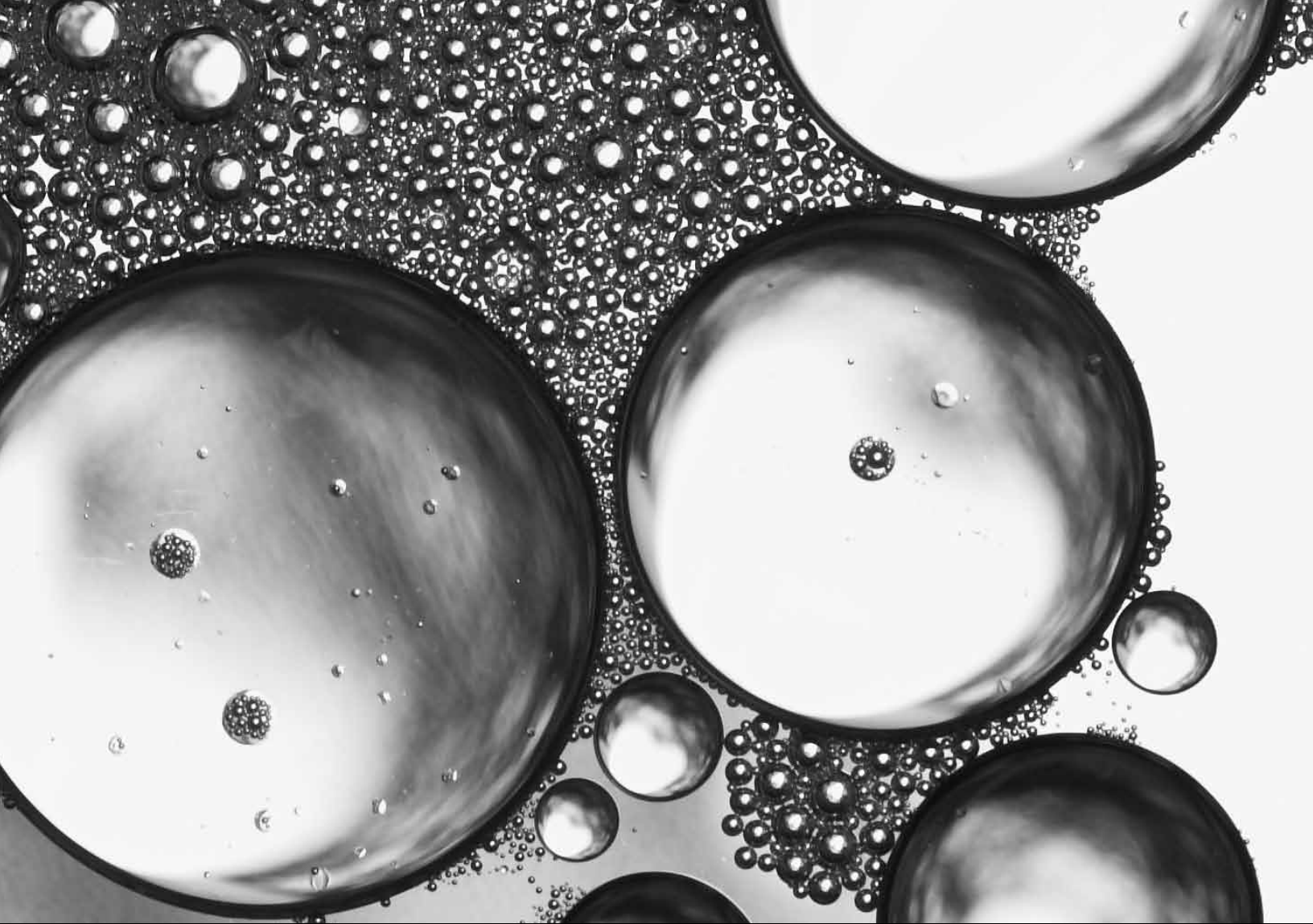
Each year finds Rothman listed in the course offerings at University of Rhode Island (URI), where he teaches a junior level immunology course. Outside the classroom, Rothman can be found in the lab, mentoring students and pursuing immune responses to dengue virus.

"The feeling that this research is taking us in new directions—it's incredibly interesting, but also fulfilling," he says. "You feel like you're working on an important problem and it's something

that people do care about worldwide."

Rothman describes his connection to dengue research more through happenstance than by design. Following medical school, he completed his residency in internal medicine and applied for a research fellowship in infectious disease. In the following three years, he learned about the clinical aspects of infectious diseases immunology and immunological responses to dengue virus in mice.

He also joined a collaborative effort with U.S. Army researchers in Bangkok, Thailand, that eventually set him on a path to becoming a partner of an internationally recognized biotechnology company and the recipient of an \$11.4 million grant, the second-largest National Institutes of Health (NIH) grant URI has ever received.



DENGUE AND ITS SIGNIFICANCE

Dengue fever is a mosquito-borne virus transmitted by the female *Aedes aegypti*, a mosquito partial to tropical environments. The World Health Organization estimates that each year there are approximately 50 million to 100 million cases of dengue virus infection—half a million of which escalate into hemorrhagic fever and about 22,000 cases that result in death¹.

The flu-like symptoms of dengue usually manifest about four to seven days after infection and commonly include high fever, body aches and rash. While symptoms usually will subside after a week, those with repeated infection are at a greater risk to develop blood plasma leakage from the capillaries and go into shock. Rothman is now studying the result of what is believed to be triggered by that immunological phenomenon.

Although dengue often is referred to as one virus, there are four serotypes in existence. Infection with one type of dengue virus may allow for the development of immunity to that specific type, but future infection with any of the other three serotypes may still occur. People with antibodies from an earlier dengue virus infection appear to experience a unique immunological response.

For a small percentage of affected individuals, the period of febrile relief escalates into a deteriorating condition where plasma leakage occurs, a condition known as Dengue Hemorrhagic Fever. A few may worsen and go into shock, developing a condition known as Dengue Shock Syndrome.

Dengue is extremely well adapted for transmission in the human population. The *Aedes aegypti* mosquito preferentially inhabits large crowded urban areas, making for easy transmission in numbers. Couple population growth and poor sanitation conditions—especially those in underdeveloped countries—and the result is a growing public health issue.

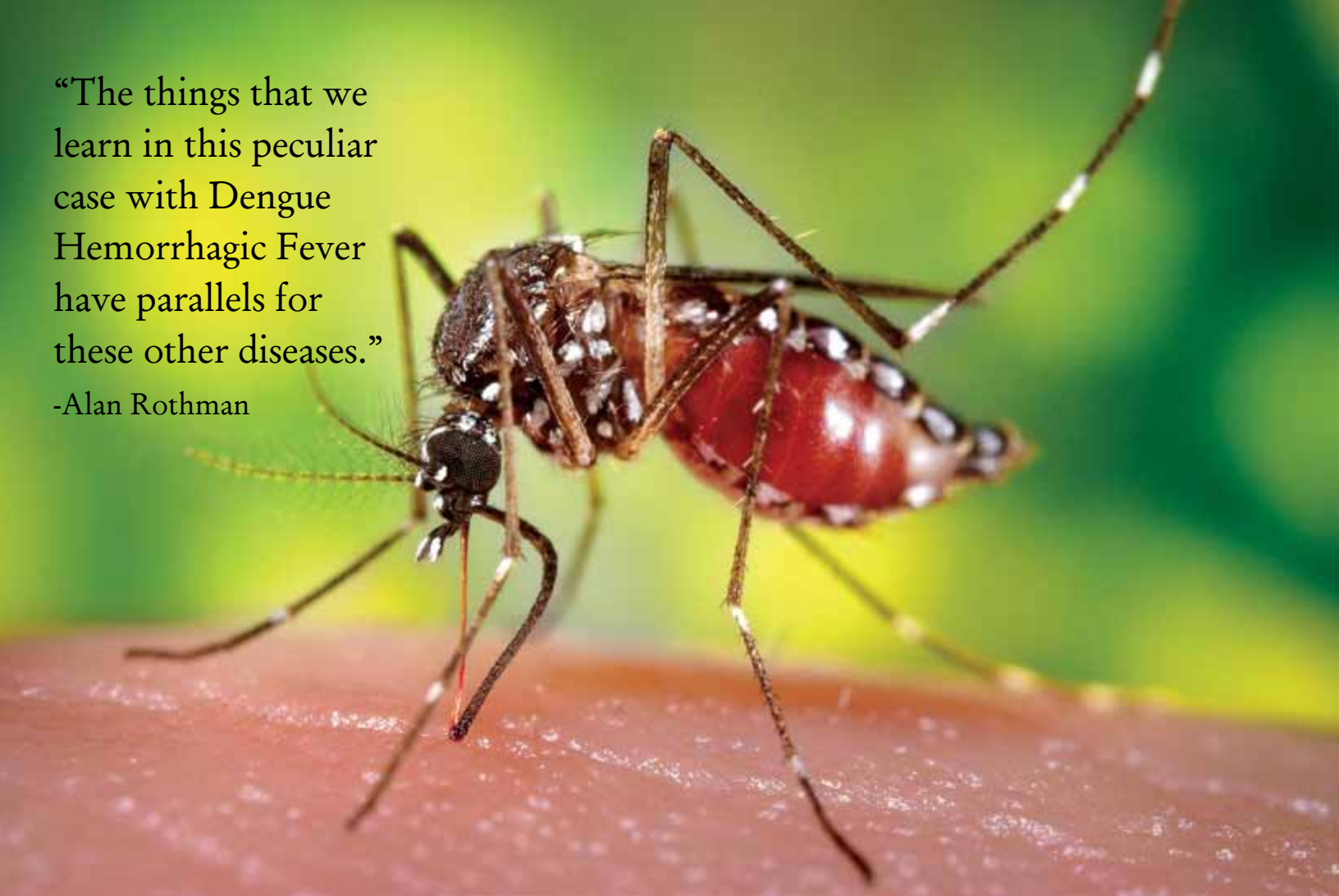
“The observation has been that the number of cases of dengue worldwide has risen dramatically in the past several decades,” Rothman says. “This combination of a virus that can make people very sick and can cause very large outbreaks due to these population changes has created the scenario where the number of these cases has been increasing tremendously over time.

“It’s a huge public health burden in parts of the world that don’t really have the capability of coping very well. It has a big impact on the health care system. A lot of people get hospitalized and a number of them are children.”

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“The things that we learn in this peculiar case with Dengue Hemorrhagic Fever have parallels for these other diseases.”

-Alan Rothman



BREAKTHROUGH RESEARCH TOWARD A DENGUE VACCINE

Medication to treat dengue virus does not exist. Most disease conditions are managed by administration of intravenous fluids to prevent severe shock.

Rothman explains the problem, “Some people don’t get to medical care fast enough, so that’s where some people get into serious complications. If you have a huge outbreak, even if the management is very simple, you can fill up your entire hospital.”

Rothman’s research involves collaborations with at least half a dozen institutions including URI, Brown University, University of Massachusetts Medical School in Worcester, State University of New York Medical School in Syracuse, State University of New York at Albany, Walter Reed Army Institute of Research, and with collaborators in Thailand. Rothman and

his collaborators take a multi-pronged approach in studying dengue.

The research constitutes three separate projects that involve children, adults, and a group of families affected by dengue. The aims are to: study how dengue is transmitted within a community, determine which people show the most severe signs of the illness, and analyze the development of immunity throughout time. A component of the research also will include vaccination trials to determine how the immune response to the vaccine relates to that obtained from natural infection.

People accumulate immunity as they get older, which explains why fewer adults get sick with dengue than children or teens, according to Rothman. By the time people age beyond their teen years, they have been exposed to dengue several times so they are less likely to get dengue.

“The problem with dengue is that before you accumulate that level of protection,” says Rothman, “you have this window of time where you’re at increased risk of infection. One of the goals of the dengue vaccination is to get rid of that window of time, to build up protective immunity rapidly to all of the different types of dengue virus that are circulating.”

THE FUTURE OF VACCINES

Rothman joined the Institute for Immunology and Informatics (iCubed), a biotechnological research institute focusing on the development of new and safer vaccines, as head of the Laboratory of Viral Immunity and Pathogenesis in 2011.

He works in partnership with Dr. Annie De Groot, director of iCubed, CEO of Epivax, and research professor at URI. De Groot established iCubed in 2008. She has since made the notable discovery of Tregitope, a small peptide and component of immunoglobulin G that acts as an immune response ‘off switch.’ Her work also has offered insights into epitopes involved in the development of a universal H1N1 influenza vaccine.

De Groot says, “I think that we’re at the forefront in terms of using immunoinformatic tools to develop better vaccines. What we can expect moving forward is that basic discoveries we’re making in the laboratory and at URI will contribute to the development of more effective and safer vaccines for human and animal use.

“I see us moving toward a point where we’ll be able to make vaccines on demand using our tools. If you need a vaccine because you’re going to the hospital or you’re going into the field and there’s a new pathogen out there, and nobody knew what to do with it before, we’ll be able to sequence it, put it into a computer program, and develop a vaccine for you on the spot.”



ALAN ROTHMAN, physician and professor of cell and molecular biology

THE IMPACT OF DENGUE IN RHODE ISLAND

Although not considered an outbreak risk for people in Rhode Island, cases of dengue have been reported in the United States. For example, there have been cases in travelers returning to Rhode Island, and every year there are a few dozen cases reported in New York City. Furthermore, the research is revealing similarities in viral infections that make potential findings in this field relevant for New England residents.

Dengue is part of the family of viruses called Flaviviruses, which includes viruses such as West Nile Virus. Mechanisms involved in Dengue Shock Syndrome have been observed in other viral infections. For example, severe influenza is believed to be a disease caused by an immune response similar to dengue.



Rothman explains, “The things that we learn in this peculiar case with Dengue Hemorrhagic Fever have parallels for these other diseases. What we learn about these immunological diseases in general will have implications for the population in our state. People in Rhode Island traveling in different parts of the world do come in contact with dengue virus so there’s a need, even in the population of Rhode Island, for a vaccine that’s effective against dengue virus.”

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References: [1] CDC: Global Alert and Response (GAR) – Impact of Dengue [Internet}. c2014 Available from www.who.int/csr/disease/dengue/impact/en/



Dengue analyzer



Mixed Media:

Crossing Disciplinary Boundaries at the Harrington School of Communication and Media

by Kara Watts

How we communicate in a global society continues to evolve at breakneck speed, bringing unrivaled and monumental change to the way we live and share information. From widespread use of social media to emerging networks of technologies that power mobile devices, the world of communication as we know it today may be little recognized in just 10 or 20 years.

This unfolding reality means that we must prepare communication and media students for a world that reinvents itself in much less time than it takes to earn an undergraduate degree. As a result, the University of Rhode Island (URI) Harrington School of Communication and Media is on the front lines of curriculum innovation, ensuring that its courses are relevant and successful in preparing students for industries and careers that are inevitably expanding and evolving.

The Harrington School maintains research clusters in digital media, science communication, and global collaboration and advocacy. It is home to more than 80 faculty, 1,350 undergraduate students, and 160 graduate students in six programs: communication studies, film/media, journalism, public relations, writing and rhetoric, and library and information studies.

The goal is to prepare students for careers, life, and citizenship in the evolving communication and media fields. Students need to be able to speak and write effectively, think critically, and understand meaning and messages. They need to develop and produce content for the multiple communication platforms that exist now as well as those that are emerging. These skills have always been essential, but never more so than today and in the future.

"We want students to be versatile thinkers, ready to enter—and sometimes create—successful jobs and leadership roles," says Adam Roth, interim director of the Harrington School. "They are well-versed in cutting-edge theories and technologies, while also equipped with all of the traditional skills one would expect from students of communication and media: writing, speaking, analyzing, evaluating.

The Harrington School faculty—many of whom are award-winning teachers, writers, and filmmakers—tap into their respective expertise to provide the skills and training students need to succeed in an increasingly competitive and global communications market.

"These faculty members teach a diverse, but related set of courses. The goal is to provide students with the theoretical understanding and practical skills necessary to succeed in the world of communication and media," says Tom Zorabedian, assistant dean of the College

of Arts and Sciences and the Harrington School. "To this end, we teach students how to: practice and produce, communicate effectively, analyze media, meaning, and messages, and engage with the professional world."

Whenever possible and practical, the programs offer and encourage an interdisciplinary approach to learning. For example, film/media majors may select courses from up to 15 different academic programs to fulfill their major requirements.

HARRINGTON'S HISTORY AND LOOKING TO THE FUTURE

The idea for the Harrington School came from the vision of Dean Winifred Brownell of URI's College of Arts and Sciences, in consultation with faculty in the six academic units that now comprise the school's programs. This innovative concept was funded through a generous gift from Richard Harrington, former CEO of Thomson Reuters, one of the largest information services firms worldwide. Harrington is now managing partner of The Cueball Group.

As Brownell notes, "We recognized that several fields were converging that examined how people received,



Adam Roth, associate professor of communication studies and interim director of the Harrington School of Communication and Media; Christian Castano, Harrington School student; Joe Friedman, '85, Local Sales Manager CW28-TV; Tina Marie Castano, Harrington School executive advisory board member, VP/General Manager, CW28-TV; John Crowe, '90, Digital Director CW28-TV.

processed, archived, and shared information. We envisioned that by bringing these groups together in an interdisciplinary school, exciting synergies would emerge to enhance teaching, research and outreach programs. That has indeed happened as well as development of new experiential learning and internship opportunities, stronger connections to the public, nonprofit and private sectors and more."

Though Brownell, a longtime proponent of the liberal arts and sciences, first saw the opportunities made possible by a school that explores problems from multiple disciplinary perspectives, she praises others in the Harrington School's development, including the faculty, Zorabedian and Roth.

In addition to the faculty and administrators that shape the Harrington School is the executive advisory board—a distinguished group of approximately 40 alumni and friends in business, media, technology, nonprofits, government, education, and human services.

Headed by Richard Harrington, the board includes local, national, and international, leaders in communication, business, and media including Christiane Amanpour, CNN's chief international correspondent and anchor of Amanpour, a nightly foreign affairs program; Tina Castano, vice president/general manager of WLWC-TV, the CW network affiliate in Providence, RI; Tom Cerio,

executive vice president of cable sales at Warner Brothers; John King, CNN's chief national correspondent; Steven Malkiewicz, director of communications at IBM; Nancy McKinstry, CEO of Wolters Kluwer, a large global information services firm based in the Netherlands; Michael Moore, senior vice president and global head of communications at Thomson Reuters, and Paul Verbinnen, president of Sard Vebinnen & Co., the global strategic communications firm with several offices in the United States and England.

The board meets each semester to provide guidance for the school in terms of marketing and branding, internships, and the curriculum. The members are regularly in touch with the Harrington School throughout the year.

"Members of the executive advisory board keep us abreast of the latest industry trends as well as the skills and knowledge that employers in communication and media are looking for in college graduates," says Zorabedian. "Many of them offer internship opportunities for our students through their companies. In addition, the board meets with our faculty and students at meetings, events, and by visiting Harrington School classes."

Roth says the Harrington School's greatest asset is its people: "We have incredible human power and potential that lends us a tremendous unity and cohesiveness."

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Roth has guided Harrington School colleagues to achieve one of its most recent milestones. In September 2014, URI's Graduate School of Library and Information Studies, in partnership with the Providence Children's Film Festival and the Rhode Island Office of Library and Information Services, received \$475,000 from the Institute of Museum of Library Services.

U.S. Senator Jack Reed (D-RI) says, "We live in a digital age, and our libraries are right there at the intersection of community and technology. This federal funding will help URI use innovative digital media and programming to connect with the community through movies, media, and technology to increase literacy and help students succeed."

The Harrington School's future also holds the possibility of a new, interdisciplinary major in integrated media; a new tenure-track position in the business of media; and January term courses. These developments will allow students to network with and learn from communication professionals who work in public relations, marketing, corporate communications, and other communication-intensive positions. A highlight of the program will give students the opportunity to travel to New York City and Stamford, Connecticut, or on a trip to Belize for film work. There are also global initiatives, including a partnership with Southern China

University of Technology that encourages faculty and student exchange. And they have proposed a global communication research center in the Harrington School. The faculty are also excited about a \$6.2 million renovation of Ranger Hall, which will become the physical home of the Harrington School state of the art learning spaces. Groundbreaking for this project is scheduled for June 2015.

FACULTY PROFILE: ADAM ROTH

THE NATURAL FUSION OF RHETORIC & MEDICINE

In addition to his position as the Harrington School's Interim Director, Adam Roth, is an associate professor of communication studies. For Roth, the interdisciplinary work of the Harrington School remains integral to its mission and to his research.

Pointing to his work as an example of fusing together study areas and embarking on a cross-disciplinary path, Roth says, "My research involves the rhetoric of other disciplines. The two disciplines that have been unique in my work are the rhetoric of medicine and the rhetoric of education."

At first glance, these subjects seem to have little in common with one another. But, as Roth notes, there exists a natural connection. His research looks at the ways rhetoric was used to promote methods, theories, and

philosophies of medicine dating back to the Hippocratics in Greece.

Medicine ranged from herbalists to root cutters to midwives and religious healers. Convincing an audience what kind of medicine to use became its own rhetoric. Today, this concept does not sound radical as medicine and rhetoric continue to be linked in the Western world's multibillion dollar pharmaceutical industry.

Roth's current work on a book collection examines the phenomenon of using medical metaphors to educate about a variety of social and cultural phenomena. He points out the common use of medical metaphors for nonmedical subjects, ranging from literature to transportation, and particularly economics.

"When we talk about sick societies or economies—ones that are 'anemic' or 'on life support'—what are the opportunities or limitations that arise in describing these situations through medical language? What are the possibilities that become available to solve the ills of economic issues? I'm interested in why that metaphor is so prominent today," Roth says.

FACULTY PROFILE: KEVIN MCCLURE MEDIA MESSAGES

A television newscast blares loudly. People onscreen are in panic. Residents, soaked with rain, wade through muddy water and debris as emergency sirens blare in the distance. News anchorman Dan Rather appears on camera to describe the scene as a "war with nature." The city is "under siege," "fighting this thing," deemed a "monster," that threatens to engulf "mom's house" and "consume towns and livelihoods."

This scene of natural disaster may feel familiar to us, but this isn't Hurricane Sandy, Hurricane Katrina, or, in fact, any event that happened in the last few years. This newscast is a recording of a 48 Hours special on the Mississippi floods of 1993. Kevin McClure, URI Harrington School professor and chairman of the department of communication studies, published an examination of these news scenes to explore the rhetoric of natural disasters in the *Kenneth Burke Journal* (Spring 2012).



ADAM ROTH, associate professor of communication studies and interim director of the Harrington School of Communication and Media



KEVIN MCCLURE, professor and chair of communication studies

McClure's article draws upon the theories of literary critic Kenneth Burke on the approach that investigates five rhetorical elements common to all narratives: act, scene, agent, agency, and purpose. McClure uses this to intervene in modern media's disaster mongering, which diverts public attention from the realities of preventable wide-scale destruction due to natural forces.

"Not until after disasters occur do we ever begin asking questions that should have been in play all along," McClure says.

Media coverage of natural disasters, he argues, functions to close the universe of discourse and presents disasters as random and unavoidable. The rhetoric of news coverage, by focusing on human suffering and physical damage, contributes to a "technological vocabulary of motives that tends to screen out the politics of disasters and disaster management policies," McClure says.

McClure's research began in the 1990s as environmentalists were indicating the potential consequences of climate change.

"What does it take to change?" McClure found himself asking. "What's the message that this big disaster is sending, and what's the message that the media send about it?"

He found the media tended to send messages that downplayed the ability to formulate changes and instead emphasized the spirit of human survival.

The scope of McClure's research is in examining the ways in which we communicate with one another, as these choices alter how we live and think locally, nationally and globally.

"How we visualize and talk about things constructs what we think about things," McClure says. "What we think about things influences what we do about them, if we do anything. It's a rhetorical, symbolic construction of reality."

FACULTY PROFILE: MARY HEALEY JAMIEL

PROMOTE CHANGE—PROVOKE DISCUSSION

Mary Healey Jamiel, URI Harrington School associate professor in film media and communication studies, combines seemingly disparate disciplinary boundaries to investigate the worlds of crime and abuse with creativity and rhetoric through her innovative documentary filmmaking. For Healey Jamiel, every film is an opportunity to examine communication.

Filmmaking, Healey Jamiel explains, often places the rhetorical in league with the stylistic. In her documentary *Holy Water-Gate: Abuse Cover-up in the Catholic Church*, for instance, which investigates the 25 years which led up to the Catholic Church's child sexual abuse scandal, she explored the media's coverage of the cover-ups, and the subsequent effects upon litigation, policy change, and law enforcement across the country.

The film uses a cause-and-effect analysis that she says affected "many compositional and narrative decisions with respect to the filming and fact-gathering process." Moreover, documentary work requires keen communication skills to be a successful director.

"Effective interpersonal communication will make or break a project, and all the vast trusting relationships that one must build," she says.

Slated for completion in early 2015, her most recent film, *RELIANCE: The Inside Story of Search & Rescue Dogs*, follows Matthew Zarrella, a Rhode Island State Police sergeant who finds and trains abandoned dogs for search and rescue K9 teams. Healey Jamiel, who calls this type of police work both an art and a science, documented Zarrella and his search and rescue teams over the course of four and a half years on actual searches and trainings, and during the training of one of his

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MARY HEALEY JAMIEL, associate professor, film/ media and communication studies - films *Ruby* and *Matthew Zarrella*



IAN REYES, associate professor of communication studies

recent recruits, Ruby, a dog who was two hours away from euthanasia at a local animal shelter. Drawing on Zarrella's video diaries, filmmaker interviews and extensive vérité footage that chronicles missing persons searches and follows a class of trainees from their initial pairings to certification, *RELIANCE* documents the work done by these bands of humans and canines.

"Ultimately, *RELIANCE* tenders an argument for acknowledging human limitation, and argues through its story threads that not all intelligence, communication, or knowledge is human or even word-based," Healey Jamiel says.

Healey Jamiel says she is drawn to documentaries because of their capacity to mobilize change.

"During the filmmaking process, my understanding of a particular world inevitably grows wider, deeper, hopefully offers some poetic insight," she says. "In part, that is what documentaries are supposed to do for their audience—promote change, empathy, provoke discussion—and occasionally show the audience what they don't want to see."

Healey Jamiel devotes herself to difficult issues because she finds satisfaction in capturing the work of people who are passionate advocates.

"Both *Holy Water-Gate* and *RELIANCE*—although vastly different in subject matter—are essentially testament to those who never give up, no matter the circumstance, no matter the daunting obstacles they face," she says.

Beyond pre-production and production funds awarded through approximately 65,000 of competitive grants such as the RI Council for the Humanities, URI Foundation Competitive Faculty Grants, and the RI Council for the Arts, Healey Jamiel also raised \$70,000 via the online crowdfunding site Kickstarter to complete five years of work on *RELIANCE*. The pledges enabled her to complete the film's titles, animation sequences, music and post-production editing. She anticipates the first phase of the film's release in 2015, when she aims to screen the film at festivals nationwide.

She and Zarrella were featured on NBC's *Today* show in December 2013. Already in discussion with distributors and broadcasters for the possibility of formulating the many hours of *RELIANCE*'S footage into a series or a one-hour version for a broadcast/digital premiere in 2016, Healey Jamiel eagerly awaits the next steps, "We're ready to go!"

FACULTY PROFILE: IAN REYES GETTING HEARD

URI Harrington School Communication Studies Associate Professor Ian Reyes's

work gets heard—literally. His research centers on the point at which technology, acoustics, and epistemology intersect.

A trained expert in the use of sound technology and a theorist in the philosophy of sound, Reyes's work asks how culture and society shape our perception of technology. In his article, "Blacker than Death: Recollecting the 'Black Turn' in Metal Aesthetics," he challenges contemporary media theory to examine practices of listening to help interpret, evaluate, and apply academic and popular discourses on the function of recordings in music cultures.

For Reyes, the field of communication studies entails a fusion of theory with interpretation, history, and criticism.

Whether researching mediated websites of cultural production and consumption—from sound technologies to video games to online classes—or producing internationally reviewed and theoretically informed audio works, Reyes bridges the importance of theoretical knowledge with the demanding task of holding theory accountable to practical application.

Reyes considers himself a practitioner scholar, as his work ends up both focusing on how to ask the right kinds of questions and on how to apply this knowledge to real world audio work, and with how audio recordings themselves are grounds for cultural knowledge.

"Technology is always changing," Reyes says. "But techniques to mix or master it are very much the same as the older stuff—for someone coming into an undergraduate course in digital audio, they'll see that modern audio tech is based on analog tech. Maybe they've never seen an older mixing console, but when working with the digital they have to be in touch with the history of audio to fully grasp it."

While making a clear impact on the field of communication studies Reyes's work brings him across the University's academic fields, often resulting in collaborative projects.

In a web edition of a piece on the rhetoric of conspiracy theories, Reyes collaborated with faculty from another institution, Jason Smith, assistant professor of communication and media arts from Bethany College. The two shift the usual questions about conspiracy theories—instead of asking how close to the real truth a theory can reach, Smith and Reyes ask

what it means to have a good conspiracy theory, by looking at conspiracy themed entertainment.

"If you don't consider whether it is true, what is it really trying to achieve?" Reyes asks.

Reyes also has worked with faculty in the URI College of Business Administration to theorize a phenomenon called metaconsumption, a way to say that consuming the meaning of the thing is not the same as consuming the thing itself.

"The nice thing about being a theorist is that you can ask all the questions, and then work with people who are good at answering those questions," Reyes says.

Together, he's worked with business researchers to explore metaconsumption in social media. We metaconsume by following artists on Twitter, or "liking" them on Facebook. However, the consumer is not conducting a typical market transaction by providing revenue for the music industry.

Collaborating with business faculty allows colleagues to gain a rounded grasp on the idea of metaconsumption.

"The industry is moving toward streaming and away from CD or record buying. This may seem new, but is actually a model more like old radio, which is based on subscribing to services," he says.

While Reyes often sides with skeptics of new media, he also sees hopeful trends that return music to its early history.

FACULTY PROFILE: CAROLINE GOTTSCHALK DRUSCHKE CROSSING BOUNDARIES

By merging the focus of communication and media with other areas of study, Harrington School faculty are opening new lines of inquiry unique to URI.

Caroline Gottschalk Druschke, an assistant professor of writing and rhetoric, is a case in point. Druschke mobilizes her joint appointments in the Harrington School and the College of the Environment and Life Sciences to create a visible presence for science communication at URI, finding ways to deepen the University's commitment to truly interdisciplinary research and offer innovative opportunities for students



CAROLINE GOTTSCHALK DRUSCHKE, assistant professor of writing and rhetoric

inside and outside the Harrington School.

Druschke's ongoing research with the U.S. Environmental Protection Agency (USEPA) and the National Park Service are great examples of that commitment. In early 2013, she was one of very few social scientists awarded a research fellowship to work with staff at the USEPA's Atlantic Ecology Division in Narragansett, Rhode Island. As part of that project, Druschke interviewed 30 key decision-makers from federal, state, and local organizations about their work on aquatic restoration projects throughout Rhode Island.

That data contributes to a prioritization tool for local watershed groups like the Woonasquatucket River Watershed Council. It also offers key insights into decision-maker perspectives on communication with public stakeholders that Druschke utilizes to make recommendations to improve both ecological and stakeholder outcomes. Meanwhile, the Watershed Council partners with Druschke on a freshman-level Grand Challenges course. Students learn about watershed ecology and environmental communication, concluding the course by creating river-related lesson plans for fourth graders at the Paul Cuffee Maritime Charter School in Providence, Rhode Island.

Druschke carries that commitment to connecting research, teaching, and practice into funded work with the National Park Service. Druschke and her lab members in the Society, Ecology and Communication Lab—including Alison Fisher, a senior writing and rhetoric major in the Harrington School—are developing outreach and teaching materials for Fire Island National Seashore, as well as conducting original research into park-public communication about the management of a controversial barrier island breach post-Superstorm Sandy.

The Harrington School supports that sort

of crosscutting work. As Druschke explains, "One of the reasons I accepted my position at URI was the support I felt for interdisciplinary—and transdisciplinary—scholarship. I appreciate that my colleagues in the department of writing and rhetoric and in the Harrington School as a whole encourage my interdisciplinary interests in research projects, public and academic presentations, publishing venues, and teaching opportunities."

Druschke looks forward to teaching new courses in 2015, including a science writing course and graduate courses in public engagement with science and community-based writing; continuing to involve undergraduate and graduate students in her funded research; and deepening ties between the Harrington School and the College of the Environment and Life Sciences.

Explains Druschke, "Thanks to all of the efforts under way—including the development of an environmental communication track in the master's of environmental science and management and the creation of a series of international science writing workshops—I'm excited to see where this Harrington wide interest in science communication can go."





MAKING WAVES

in Ocean Technology

by Chris Barrett '08

Take an 80-story building, lay it on its side, put it in water, hammer it with waves and then land a helicopter on it. That's essentially a U.S. Navy ship, and designing one is no simple task.


A team of University of Rhode Island (URI) alumni, students and professors are helping Navatek, an ocean technology firm, design next-generation ships. In 2013, the company hired eight URI alumni and four URI student interns to staff its new East Coast office in Rhode Island. Executives say the ongoing research partnership with the University allows them to explore new fields and deliver valuable research insights to the U.S. Navy and defense and alternative energy sectors.

"We'd like to see Rhode Island become more of a hub for research activity," Lead Scientist Neal Fine says.

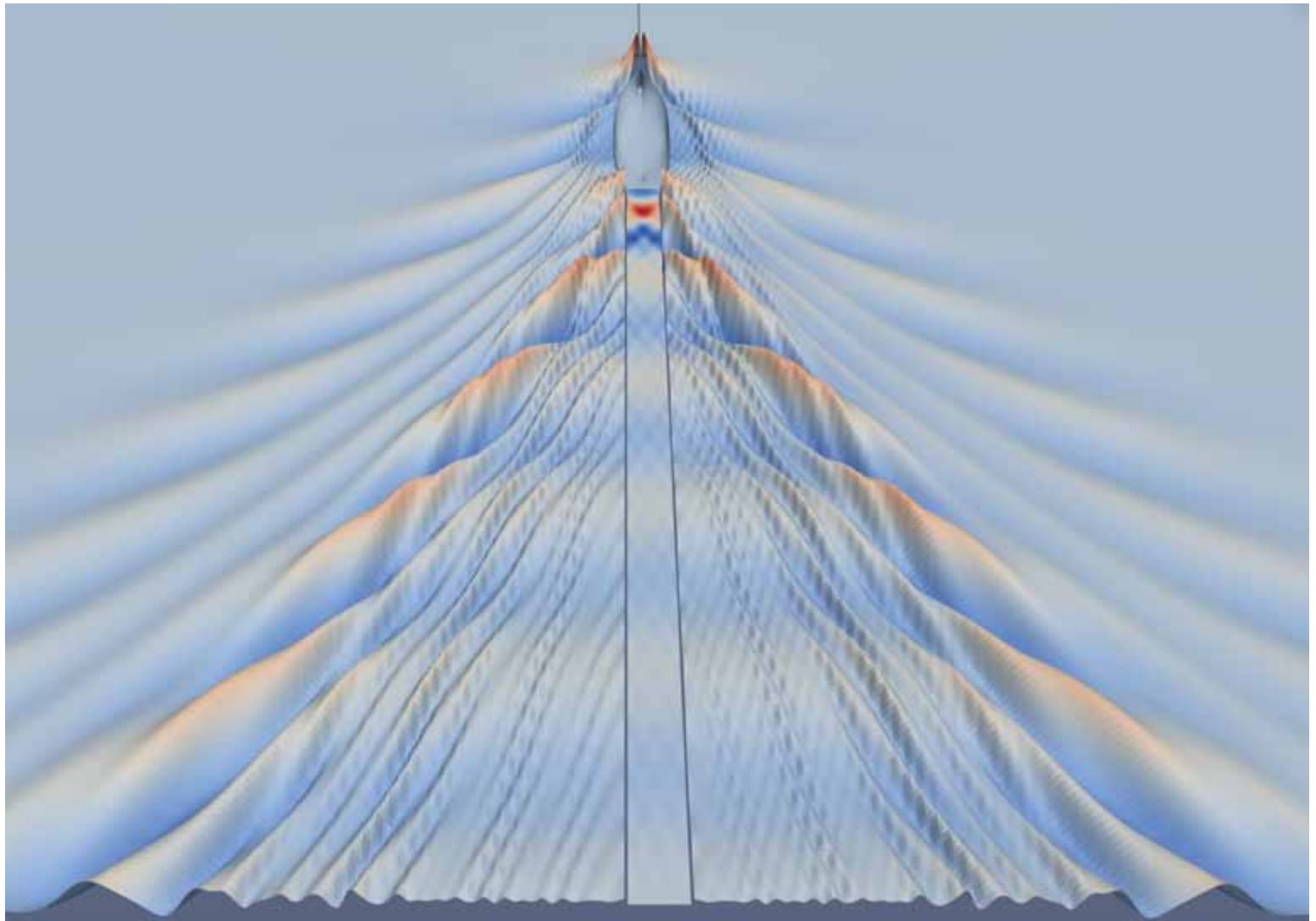
Navatek opened its East Coast office in South Kingstown, RI, in large part to tap the University's research expertise and its unique ocean engineering program. One of just eight accredited programs in the nation, the URI ocean engineering program graduates engineers with a broad understanding of ocean science. Add in the engineering faculty and the Graduate School of Oceanography, and Navatek found the perfect partner.

Much of the company's research stems from hydrodynamics, a branch of science that studies fluids in motion, such as ocean waves. While they may look simple, ocean waves are actually extremely complicated. Rogue waves and tsunamis can disrupt otherwise perfect modeling techniques.

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THE NAVATEK TEAM IS
DESIGNING SOFTWARE TO
BETTER MODEL OCEAN WAVES
AND THEIR EFFECT ON SHIPS.



Navatek software

The Navatek team is designing software to better model ocean waves and their effect on ships. Navatek plans to release the software as open source, meaning that researchers around the world may utilize its modeling capabilities.

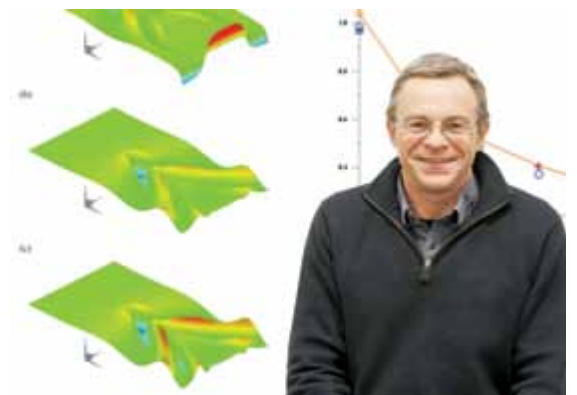
To develop the science behind the models, Navatek researchers are working closely with Ocean Engineering Professors Stephan Grilli and Jason Dahl. In 2013, the professors and company collaborated to win research funding from the Office of Naval Research to refine the software.

"This work is stimulating—it is much more rewarding and useful than just publishing research papers," Grilli says. "Just as important, we directly benefit from the industry's experience in identifying and prioritizing the key and important problems to work on. And finally, our students have immediate job opportunities."

Navatek executives say they expect to rely on URI graduates, especially from engineering, as the company expands.

"The URI alumni and interns are hard workers; they are self-motivated and they've learned to work in teams," Chief Scientist David Kring says.

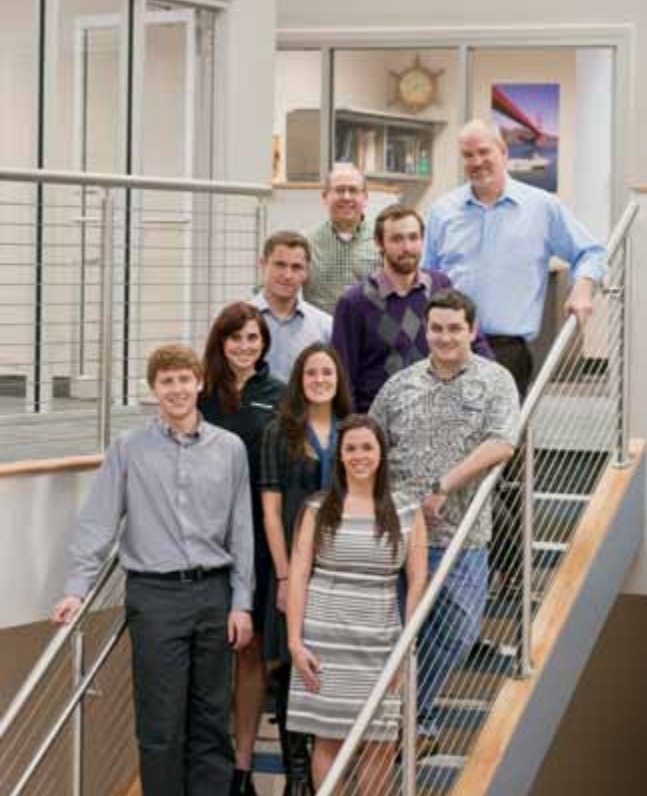
For the eight URI alumni—who comprise almost half the staff at the Rhode Island office—working together is nothing new. Seven of them graduated from the ocean engineering program, most of them together. When they collaborate



STEPHAN GRILLI, professor of ocean engineering

with URI, they often work directly with their former professors.

Navatek engineer Amanda Persichetti, who earned a master's in ocean engineering and served as a teaching assistant, says her professors have become colleagues and her former students are now peers. Together, they've built a cross between a startup company and a graduate research lab.



Navatek principals Dr. Neal Fine and Dr. David Kring, top row from left, and URI graduates from top row to bottom, left to right: Chris O'Reilly, James Doyle, Lauren Schambach, Maggie Craig, Mike Martin, Matt Murphy, and Amanda Costa.

"You have so much support here to conduct new research and discover new breakthroughs," she says.

Since arriving in Rhode Island, Navatek has expanded its research capabilities with the opening of a new, 20,000-square-foot office. Outfitted with a low-speed wind tunnel and workshop, the office was a major investment for the company.

Based in Hawaii, Navatek is looking to further scale up its Ocean State presence. The research concepts in naval architecture, especially hydrodynamics, are directly applicable to many other areas, including renewable energy.

Fine heads a small group designing devices for wind turbine blades to improve their efficiency. The concept promises to lower the cost of renewable energy and make wind turbines more attractive energy sources.

Separately, Fine and URI's Associate Dean of Oceanography David Smith, have discussed studying low-temperature plasma reactions as a way to decontaminate water. The research could be leveraged to clean ballast water, which is one of the biggest carriers of invasive species.

"Research is a snowball effect that just keeps growing," Fine says.



Maggie Craig ('13)

PASSION for the Ocean

by Chris Barrett '08

As an ocean engineer at Navatek, ocean engineering alumna Maggie Craig ('13) is designing next-generation ships.

Maggie Craig grew up sailing off the Massachusetts coast. As a child, her love of the ocean was just a hobby. These days the ocean engineering alumna is pursuing research that will have an impact on sailors around the world.

As an ocean engineer at Navatek in South Kingstown, RI, Craig is part of a research team seeking ways to improve ship design. Her research focus, modeling the impact of waves on hull bending, is so new and specialized that few people in the world study the field. For Craig, that rarity makes her work all that more exciting.

"There's always something new going on," she says. "We try and find solutions that haven't been done."

The Narragansett, RI, resident finds herself drawing heavily from her engineering courses at the University of Rhode Island. The complex nature of waves means she must combine the education she received in hydrodynamics, fluids, calculus, computer programming and more.

During college, Craig also gained firsthand experience on how ship motions affect onboard operations. On board oceanography Professor Robert Ballard's research ship *Nautilus*, she piloted a remotely operated underwater vehicle.

Craig says she appreciates that her software—being designed as open-source and available to researchers around the world—holds bigger implications than the homework assignments she delivered as a student.

"You have to get the answer right," she says. "There is no close enough."



PORTRAIT OF AN ARTIST AS A

Woman

The Life and Career
of Rosalba Carriera

by Andrea Rusnock



Rosalba Carriera, "Self-portrait"

Je prie, M^r Deleghini d'avoir bⁿgi de l'a re-
 sponse de mon cousin le General des Postes, &c.
 fric. Je m'envoie un petit portrait, comme il n'a
 rien. J'espère que M^r Deleghini ne me
 negligera point, d'autant plus, qu'il se présente
 en robe Cicisbeo. Comme il n'est pas, j'en ai
 un joint portrait, mais moi je ne change
 point, & suis toujours la constante Assuratrice.



CATHERINE SAMA, professor of Italian and film/media

In 1720, the Venetian artist Rosalba Carriera (1673-1757) traveled with her mother and two sisters by coach to Paris, where she would spend a year creating portraits of aristocrats, royals, and other artists before returning home.

Carriera pioneered a new style of portraiture using pastels instead of oil paints, rising to prominence with her artwork. In Venice, her house on the Grand Canal became a popular stop on the Grand Tour of foreign travelers, who would take home pastel portraits as souvenirs. Today, Carriera's artwork is displayed in art museums throughout Europe and the United States.

How was Carriera able to become one of the most famous artists in Europe during the first half of the 18th century, when there were so few female artists, writers and public figures?

These are some of the questions University of Rhode Island (URI) Professor of Italian and film/media Catherine Sama has considered. Fortunately, to aid her in pursuing answers, Sama can tap into Carriera's prolific letter writing; more than 600 letters of her correspondence have been preserved.

*"My project is to translate,
 annotate, and interpret
 Carriera's letters."*

- Catherine Sama

Interpretation Across Time

In 2013, Sama earned a highly competitive fellowship from the National Endowment for the Humanities to study Carriera's career through her correspondence and artwork, and to explore the connections between literary and artistic circles in 18th century Europe.

"My project is to translate, annotate, and interpret Carriera's letters, to understand how a Venetian woman from a lower middle class family established a new genre of art," Sama explains. Her book will also make most of the letters from the correspondence available to readers of English for the first time.

In her early work, Carriera helped her mother by mastering the complex patterns of fine lace and learning the business of producing luxury items. The fad for snuff—ground and flavored tobacco inhaled through the nose—provided another opportunity for Carriera.

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Luisa Bergalli

She began painting the ivory lids of snuffboxes in oil and tempera, and these miniature portraits and allegories soon became recognized works of art, especially once she began painting them on small pieces of ivory independently of the more functional snuffboxes. Most of her career was then dedicated to creating larger portraits and allegories in pastel on paper.

Most of Carriera's correspondence is gathered in a Florence library, but the vast majority are letters written to her rather than by her. Sama hopes to change that perspective.

"I am interested in finding as yet undiscovered extant letters in her own hand to get her side of the story," she says.

Like a detective following leads, Sama's

search for Carriera's letters in Italy has taken her to archives in Florence, Venice, and a cloistered convent in Modena. She also plans to visit libraries in Rome and Paris. Sama's fluency in Italian and French allows her access to the world of 18th-century European correspondence networks.

Sama's book on Carriera, *Correspondence of an 18th Century Venetian Artist* (co-translated with Julia Kisacky of Baylor University), is commissioned for "The Other Voice in Early Modern Europe" book series at the Centre for Reformation and Renaissance Studies and Victoria University at the University of Toronto. The series publishes scholarly editions in English of European women's writing from the 14th through 18th centuries. Sama will pen a new biography of Carriera that will introduce a selection of fully annotated letters from Carriera's correspondence.

Sama sees her project as part of the digital humanities, the creative use of information technology to enhance research and outreach in the humanities. She is creating a searchable database of Carriera's correspondence to accompany the book, which will include scanned images of the original handwritten letters. She also plans to add links to reproductions of Carriera's artwork along with more than 160 of her correspondents.

Women Impacting Male Dominated Fields

Carriera joins the list of other Italian women Sama has studied. Her first book, *Selected Writings of an Eighteenth-Century Woman of Letters* (2003), explored the career of Elisabetta Caminer Turra (1751-1796), a Venetian journalist who founded her own periodical in the years just prior to the French Revolution and translated and published French dramas and essays for Italian audiences.

Caminer, like Carriera, was highly successful in a field—journalism—that



Elisabetta Caminer Turra (1751–96). Engraving by Marco Comirato.



*Aloisia Bergalli Veneta
Inter Arcades Irminda.*

Elisabetta Caminer Turra; Luisa Bergalli

was traditionally dominated by men. Sama wrote a biography of Caminer, and included a selection of Caminer's letters, poems, and journalistic writing that Sama translated and annotated to bring Caminer's groundbreaking work to English-speaking audiences.

Sama's work on Caminer led her to conduct research on another Venetian woman of letters, the poet and playwright, Luisa Bergalli (1703-1779) whom Caminer greatly admired and who was a friend of Carriera's.

"It was fascinating to discover the professional and personal networking among these three middle-class Venetian women who all succeeded in making careers for themselves in

professional arenas usually reserved for men," says Sama.

Sama earned her Ph.D. in Italian studies from Brown University, and has received research fellowships from the Fulbright program and the American Association for University Women. When Sama began graduate school at Brown in the 1980s, women lacked a presence in the study of Italian literature and history. She sees herself as part of a generation of scholars who in the last 20 years have brought to light the work and success of 18th-century Italian women writers, artists, and scientists.

Sama's passion for all aspects of Italian life also stems from her Calabrian roots. She grew up making wine in Massachusetts

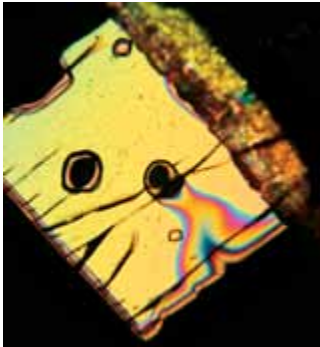
from her father's vineyard, and regularly visits relatives in Italy. Her home away from home is Venice, and Sama is spending part of her fellowship year in the storied city this fall.

"Living and working in Carriera's native city among the essentially unchanged narrow streets, bridges, and canals," Sama muses, "inspires my imagination and creativity and brings me closer to Carriera's world. *È fantastico!*"



THE EARTH'S BREATH

How the Ocean and Atmosphere
Influence Volcanoes and the Deep Earth



Crystal from the glassy exterior of
the volcanic rock.



Volcanic Rock

The object of Katherine Kelley's research lies far beneath the Earth's surface, out of reach and not fully understood, yet deeply tied to the formation of the everyday ground on which we walk.

Fascinated by the planet's breathing through volcanic eruptions, Kelley, an associate professor at the University of Rhode Island (URI) Graduate School of Oceanography says, "We know a lot less about the Earth's interior than the surface because it is very inaccessible to us."

To help yield clues and a greater body of knowledge, Kelley is participating in a global program called Deep Carbon Observatory, a massive investigative effort trying to determine

how much carbon exists in the solid parts of Earth, a few hundred kilometers beneath the surface. Carbon, of course, has an important role on Earth's surface. However, the Earth's solid interior is where probably 90 percent of the planet's carbon resides.

Much of Kelley's research looks at subduction zones where tectonic plates meet, resulting in one plate moving down beneath the other, into the planet's interior. The plate that is moving downward is heavily oxidized and hydrated by virtue of having been near Earth's surface for a long time. As the plate moves downward, the water is rendered into the mantle creating explosive volcanoes.

"I'm looking at what happens when you take material that has been on Earth's surface and put it into the deep interior," she explains, noting that the action modifies the upper part of Earth's interior.

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by Rudolph Hempe

*Out of reach
and not fully understood*



: : OLIVINE CRYSTAL IN TRANSMITTED LIGHT
crystal has been made into thin wafers so you can see through it, exposing glass inclusions inside the crystals. These inclusions helped determine the volcanic gas contents of magmas before they erupted.



:: LASER-ABLATION MICROPROBE

used to vaporize very small spots (less than 0.1 mm) to determine element abundances in glass inclusions.

In areas where tectonic plates spread apart, the lava that erupts provides valuable information, such as the composition and gas content, of Earth's upper mantle. In areas where tectonic plates converge with each other, rocks and sediments from the sea floor are thrust into the mantle, changing its composition and gas content.

Volatile elements and compounds like water and oxygen are transported from the surface into the Earth's solid deep interior, Kelley says, "As if Earth were drinking the ocean and breathing the air."

People have traced water and oxidized components through tectonic settings called hotspots, which are hypothesized at least to come from material from the very deep parts of the mantle. The island of Hawaii is a good example.

One of the ways she analyzes what takes place is to look at inclusions of glass trapped within crystals in lava. The inclusions,



KATHERINE KELLEY, associate professor of oceanography

like little time capsules, give scientists valuable evidence of what is happening deep in Earth's interior.

"The lava we get has been through a rather dramatic eruption process, releasing gases," Kelley says.

She looks at the crystals inside those explosive lavas to see the water and carbon contents of those inclusions, which provide a better portrait of what that magma was like before it lost all of its gases.

One of the driving questions of her research revolves around the extent to which the atmosphere and oceans influence the solid parts of Earth. Kelley believes advances in microanalysis techniques have pushed forward her ability to look at things on an extremely small scale.

"Our oxygen-rich atmosphere is here by virtue of biological activity. Bacteria created the atmosphere as a byproduct of photosynthesis," she explains. "If we are now taking the oxygen rich atmosphere and cycling it back into Earth's interior, creating different kinds of magmas and creating continental crust as a consequence, that is a potential biological feedback on the behavior of volcanic systems."

Kelley received more than \$200,000 from the National Science Foundation in the summer of 2014 for her work to research the oxidation process: the hydration and oxidation of Earth's interior and how it affects the creation and growth of continents. Earth is unique, no other planet in our solar system has continents.

"That is really fascinating when you think about it," she says. "That life could have that much impact on not just the environment that we have evolved to live in, but also the land beneath our feet."



Making Music & Unity in Mozambique

by Amy Dunkle
and Vanessa Quainoo



“Music is a moral law. It gives soul to the universe, wings to the mind, flight to the imagination, and charm and gaiety to life and to everything.” Plato

Mark Conley, professor of music and director of choral activities at the University of Rhode Island (URI), lives every day with the transformational power of music and the ability of song to bring people together.

In addition to teaching classes and administrative responsibilities, he instructs the Concert Choir and the smaller select choir Lively Experiment, and oversees two graduate choral conducting students and five private voice students.

A few years ago, Conley, long intrigued by the idea of sharing his life calling through service, attended the Eastern Division Conference of the American Choral Directors Association, which focused on choral music and human rights. Featured directors talked about their efforts with prisoners and special needs singers.

“Music—singing in particular—is a basic human right,” Conley says. “It is something that even oppressive regimes cannot take from an individual.”

These experiences of musical ownership and empowerment are universal, notes Conley, and the trivialization of music solely as entertainment only takes place when a society feels no threat and can afford to forget its heritage.

After the choral directors’ conference, Conley discovered an opportunity in Mozambique’s Manda Wilderness, an impoverished, remote region tucked in the country’s northwest corner, where villages of indigenous people suffered the brutality of civil war for decades.

The Manda Wilderness Community Trust, part of the Manda Wilderness Project, was looking for a guest choral director to lead an annual festival. The festival marks an ongoing effort by the Manda Trust to foster a sense of unity among the villagers and, in turn, connect the villagers to mainstream Mozambique. One of the goals is to give the people a stronger voice in the country, which

comprises numerous ethnic and indigenous groups.

The requirements of the position called for Conley to be in good physical shape so he could handle the travel—hiking from village to village. As he spent weeks considering music to bring with him and learning the language, Conley laced up his hiking boots, walking nearly every day for six weeks, logging eight or nine miles on the weekends.

His blog, *Intrepid Conductor*—intrepidconductor.weebly.com, shares his thoughts throughout the experience. Early on, Conley’s reflections make it clear that he would be as much a student on this trip as the teacher.

He arrived in the first village May 12, 2013 after hiking across mountainous terrain. The trip to Ngofi, the northernmost village of the region, would pass through three townships and take about three to four hours, not including visits with people along the way. By day’s end, Conley arrived at his destination: “I crawled into my tent. There were no pads to put under our

sleeping bags... The ground was rock hard, but I knew it wasn't going to make a bit of difference that night. Five days after landing in Africa for the first time, I found myself in one of the remotest parts of the continent, sleeping as a guest of an absent chief in a village I did not know. Choir training tomorrow."

He worked with the choir in the village, stayed overnight, left the next morning and hiked to the next village with guide and translator, Joe. This became Conley's routine as the visiting choral director for the people of the Manda Wilderness, ultimately traveling to 15 of 16 villages in the region and working with as many choirs.

One of his final trip entries, from the last village, Mala, offers yet another tiny glimpse of the vast cultural divide:

"Joe and Andrew [Conley's guides] are stunned when they learn that URI has 16,000 students... They shake their heads as I tell them the University has its own housing, many school buildings, its own police force, places for people to eat, etc. Andrew is trying to figure out where the money comes from for me to get paid, and I try to explain how a university works and how students sign up for classes."

At the end of his time working with the individual village choirs, Conley helped organize the festival. After the event, he put on a workshop for the local choral directors, exploring issues they faced and new ideas to incorporate in making music.

"Music—singing in particular—is a basic human right. It is something that even oppressive regimes cannot take from an individual."

-Mark Conley



MARK CONLEY, professor of music and director of choral activities

In hindsight, Conley says the result wasn't so much a transformation because music already plays such an integral role in the life of the Manda Wilderness people. The music would be there regardless of whether he had set foot in the villages. Instead, the work that he did with the individual choirs and the festival production represented an opportunity to share knowledge.

He says he is excited that some of the choirmasters who composed songs for the festival will have their songs published by earthsongs, an Oregon based publisher of world music.

"This is an example of the economic activity the arts produce—an endlessly renewable resource that does not involve any exploitation of the land or its inhabitants, bringing new money into the area," Conley explains. "In the developed world this goes unnoticed, but there it is, a burgeoning field with great potential for economic advancement."

He also brought the music of the Manda Wilderness people back to Rhode Island. Conley has shared videos of musical concepts with his students that

they might not have been able to witness otherwise. His students have performed some of the songs and dances.

Looking back, Conley contemplates the totality of the entire experience, noting it is impossible to truly live in another culture and not feel innate change. He says it is difficult to find the words to explain without reaching for clichés that ultimately fail to measure up to the magnitude.

He recalls, in particular, the most moving experience of arriving at a village and hearing children singing the song he had brought with him to teach to the choirs. People, especially children, sang this same song to him wherever he was, whether getting off a boat in the village of Cobué, hiding from police (a story, he says, for another day), or following him on a path.

"It looks as if I brought a song that may become part of the folk repertoire there," Conley says. "And that is more than enough for anyone to dare hope for."





TINY WEAPONS

Nanoparticles Combat Big Oil Spills

by Chris Barrett '08

After more than two years of research, engineering and chemistry professors are finding success using nanoparticles to clean up disastrous oil spills.

More than 47,000 people, 9,700 ships and 127 planes spent months mopping up oil released during the 2010 Deepwater Horizon oil spill. Yet, more than four years later, the tools to fight offshore oil spills remain remarkably rudimentary.

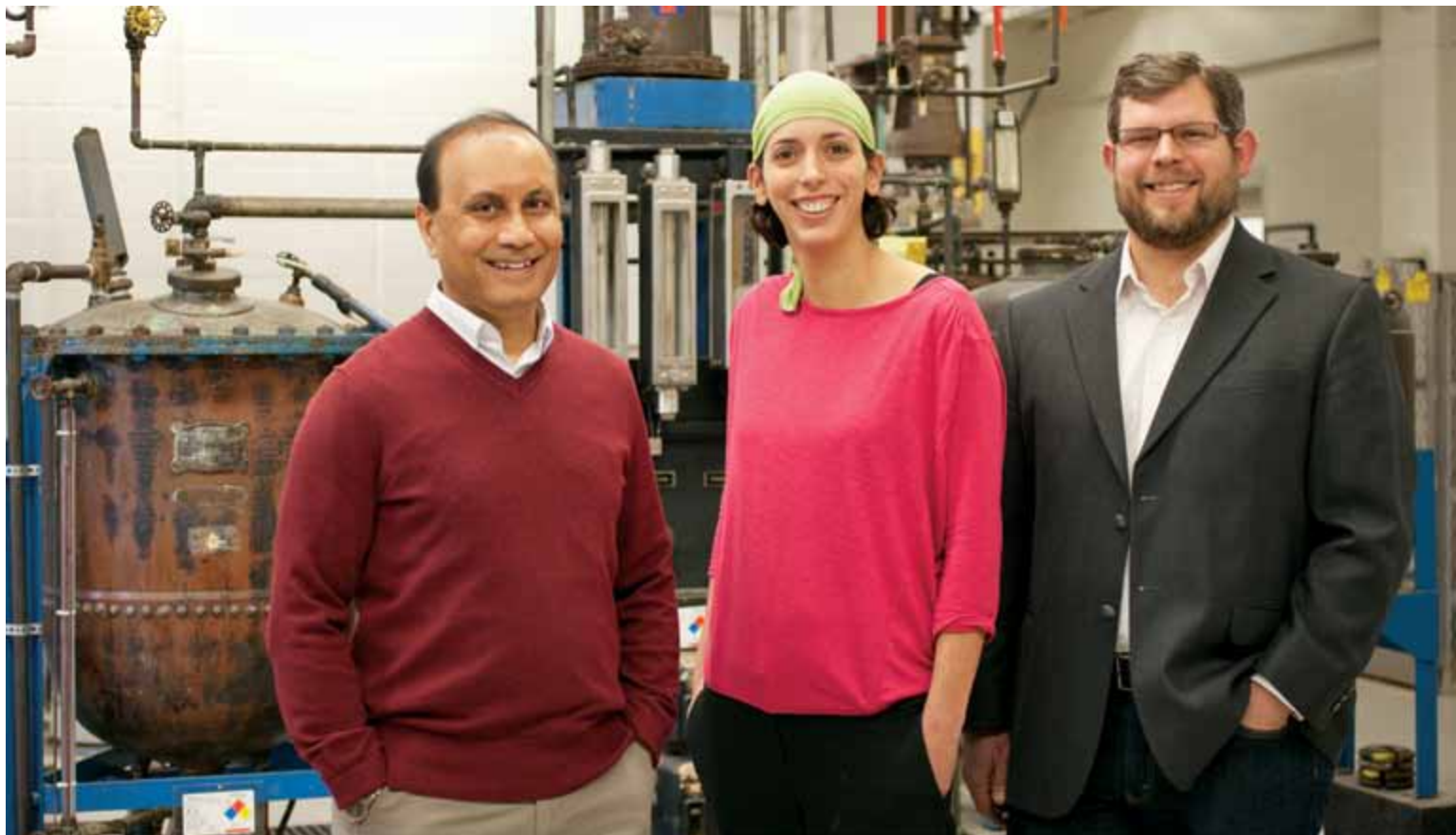
Now a team of University of Rhode Island (URI) engineering and chemistry professors is demonstrating novel approaches that could change the way we battle oil spills.

The approach relies on nanoparticles, each about a hundred times thinner than a strand of human hair. To study how these tiny particles can clean up oil, the Gulf of Mexico Research Initiative has awarded more than \$1.4 million to URI Engineering Professors Arijit Bose, Geoffrey Bothun, and Vinka Oyanedel-Craver, along with URI Chemistry Assistant Professor Mindy

Levine and Metcalf Institute Executive Director Sunshine Menezes. The team has published numerous papers in academic journals and small-scale pilot projects are being explored to evaluate the potential for commercialization.

"On the downside, the Deepwater Horizon spill happened," Bothun says. "On the upside, it motivated a lot of engineers and scientists to come up with new ways to fight oil spills."

The professors are taking complementary approaches to stop oil from forming globs that threaten wildlife and wash up on beaches. To emulsify the oil (break it into small droplets) and make it attractive to oil-eating microorganisms, Bothun has turned to silica, and Bose and Levine to carbon black, a substance produced by incomplete combustion of petroleum products.



ARIJIT BOSE, professor of chemical engineering; MINDY LEVINE, assistant professor of chemistry; GEOFFREY BOTHUN, associate professor of chemical engineering

Bothun's research seeks to turn off-the-shelf products into oil spill cleaners. Currently, responders rely on chemical dispersants such as Corexit, which is effective but of questionable safety. Looking for safer alternatives, Bothun and his team of students focused on nanoparticles of benign silica (sand) and FDA-approved surfactants, which force oil to emulsify.

Teaming up with researchers at the University of Maryland and Texas A&M International University, Bothun's group found some nanoparticles and surfactants work very well alone or in combination with traditional dispersants. The team hopes that when loaded with nutrients, the compounds stop oil from forming slicks on the surface of the ocean and attract microorganisms that eat oil.

Bose and Levine want to turn carbon black into the go-to dispersant. Generally considered safe, the particles emulsify oil, absorb toxic polycyclic-aromatic

hydrocarbons and are widely available and inexpensive.

Bose started researching the potential of carbon black to clean up oil while on sabbatical at Cabot Corporation, one of the world's largest producers of carbon black. In partnership with researchers there and at Tulane University, Bose discovered that carbon black is a powerful oil emulsifier.

"Nobody has used carbon black in this way," Bose says. "It seemed like a cool idea because it's so widely available."

While Bose studies the engineering side of carbon black, Levine and her students are working to identify the most efficient method to manipulate molecules to attract oil and break down its toxicants.

"We're using organic chemistry reactions to change the toxic molecules in the oil to nontoxic molecules," Levine says.

Using oil samples from real oil spills, Levine has tested her concept and has

found success. She's excited about the interdisciplinary collaboration that began through the Rhode Island Consortium for Nanoscience and Nanotechnology.

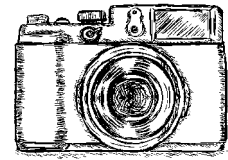
By working together, the professors say their approaches could be tweaked to assist with oil spills occurring in extremely cold water. That potential takes on new urgency as oil companies express interest in drilling in the Arctic.

"The Gulf of Mexico spill that started this research was just one spill," Bothun says. "Other spills are going to happen. Whether they're close to us or not, we're going to have to come up with ways to minimize the damage."



Carbon Black

Challenging Cultural Perceptions *through Photographs*



BY HOLLY TRAN



FEATHER INDIAN

Photographer Unknown



DOT INDIAN

Photograph by White of Matthew



TRADITIONAL AMERICAN INDIAN MOTHER AND CHILD



CONTEMPORARY INDIAN AMERICAN MOTHER AND TEENAGED



WESTERNER AND INDIAN



INDIAN AND WESTERNER

all images courtesy of Annu Palakunnathu Matthew & sepiaEYE, nyc

In the hands of world-renowned photographer Annu Palakunnathu Matthew, a camera opens a portal, through which we can step into a life; it is a tool that offers a glimpse of the underlying personal story.

Matthew, a professor of art and director of the Center for the Humanities at the University of Rhode Island (URI) and Fulbright fellowship recipient, also brings to her artwork a global perspective that lends unexpected insight and breeds deeper engagement.

She has long been interested in photography because of its connection to reality and the perceptions and assumptions about that supposed reality. Her work communicates ideas and points of view that people may not have considered, and her work seamlessly intertwines both the aesthetic and conceptual/political.

She recounts, "My undergraduate education was in the sciences in India. From what I remember, my photography class shared one camera and two rolls of film for the entire semester!"

Despite the lack of resources, Matthew credits the class with introducing her to photography and to the possibilities of communicating ideas visually.

Exploring Identities

Born in England, Matthew moved to India when she was 11 years old, which gave her an amalgamation of an accent that is faintly British, Indian and American. She says, "People often ask me where am I really from. If I say that I am a Rhode Islander, no one believes me! If I say I am an Indian, they often think I am a Native American and so I often have to clarify that I am an Indian from India."

Matthew, now living in the United States, finds that her varied background influences her point of view, opinions, and is the source of inspiration for her work.

She explains, "My work explores the experience of navigating between multiple cultures."



ANNU PALAKUNNATHU MATTHEW, professor of art
photo by David H. Wells

*A camera opens a portal, through
which we can step into a life.*

She draws on her experience as a young woman growing up in India after a childhood in England. The portfolio "Bollywood Satirized" explores her rejection of certain traditional women's roles in Indian society, after experiencing more equality in England.

This work was shown at the Watson Institute for International Studies at Brown University from November 2014 to January 2015.

"In 'An Indian from India,' I look at the other 'Indian,'" Matthew says. "I play on my own 'otherness,' using photographs of Native Americans from the late 19th century and early 20th century that perpetuated and reinforced stereotypes."

She found similarities in how the turn of the 20th century photographers of Native Americans looked at what they called the primitive natives, in ways that is similar to the colonial gaze of the 19th century British photographers working in India.

After graduating from the University of Madras in Chennai, India, in 1986, Matthew received her master's of fine arts focusing on photography from the

University of Delaware in 1997.

Matthew has presented more than 30 successful solo exhibitions and a number of group exhibitions. Her work has been shown regionally, nationally, and internationally, including exhibitions at the Rhode Island School of Design Museum, Providence, RI, Newark Art Museum, Newark, NJ, the Guangzhou Biennial of Photography, China and at the Smithsonian National Museum of Natural History, Washington D.C. Her first solo museum exhibition is scheduled for the Royal Ontario Museum, Toronto, Canada for May 2015 and a solo

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Annu Palakunnathu Matthew & sepiaEYE, nyc



NOBLE SAVAGE

Photograph by E.S. Curtis



SAVAGE NOBLE

Photograph by A.P. Matthew

exhibition at SepiaEYE, New York City in November 2015.

Among her widely acclaimed works, one project, "The Virtual Immigrant," explores the ways that customer service workers in call centers in India similarly navigate between cultures.

"They bifurcate their dress, speech and lives between the culture where they work—India—and the western workplace they exist within," she says. "They seem to virtually live between cultures without leaving their country of origin."

The Importance of a Camera

In 2012, Matthew earned a Fulbright fellowship to explore the turmoil of families affected by the partition of India and Pakistan—the result of which manifested as the collection, "Open Wound." Her work attempts to make these stories more accessible. Matthew's Fulbright work was exhibited at URI in October 2014.

She explains, "In 1947, 12 million people were displaced within three months and approximately a million died. But unlike other tragedies like the Holocaust, there is no memorial for those affected by the Partition. There is nothing to commemorate the experiences of the victims of this tragedy to help the larger public

understand the past so that it is not repeated."

In order to tell such personal stories, Matthew carefully selects her tools without sacrificing quality. She chooses her camera based on the project. In her portfolio *Memories of India*, she used a Holga, a \$20 toy camera with one shutter speed and two f-stops. Blue Sky Books recently picked this work for a book, using a new photo publishing model and an eloquent essay by New York Times art critic Vicki Goldberg.

"I chose to use this camera as no one takes me seriously with it and I am left alone on the streets in India rather than being surrounded by people," says Matthew. "The camera's focus is a single person, a group or the mountains. I liked the challenge of using such a simple tool to create beautiful, well-crafted images."

But what Matthews views as most important for this project, is that the plastic lens helps create an image that looks more like a memory, which dovetails with the aesthetic she sought to achieve in *Memories of India*. For "Open Wound," Matthew used an Olympus camera for its ability to take high-quality images in the body of a compact camera.

She explains, "The projects I work on entail me going into the homes of strangers and gaining their confidence to collaborate with me. I find the small camera less intimidating and it helps the

subjects quickly relax.”

While in India, Matthew also created new work in response to the horrific 2012 Delhi rape case, where a middle-class young woman was brutally assaulted and ultimately died from her wounds. The pieces were printed on vinyl and publicly installed on street walls of Bangalore, India.

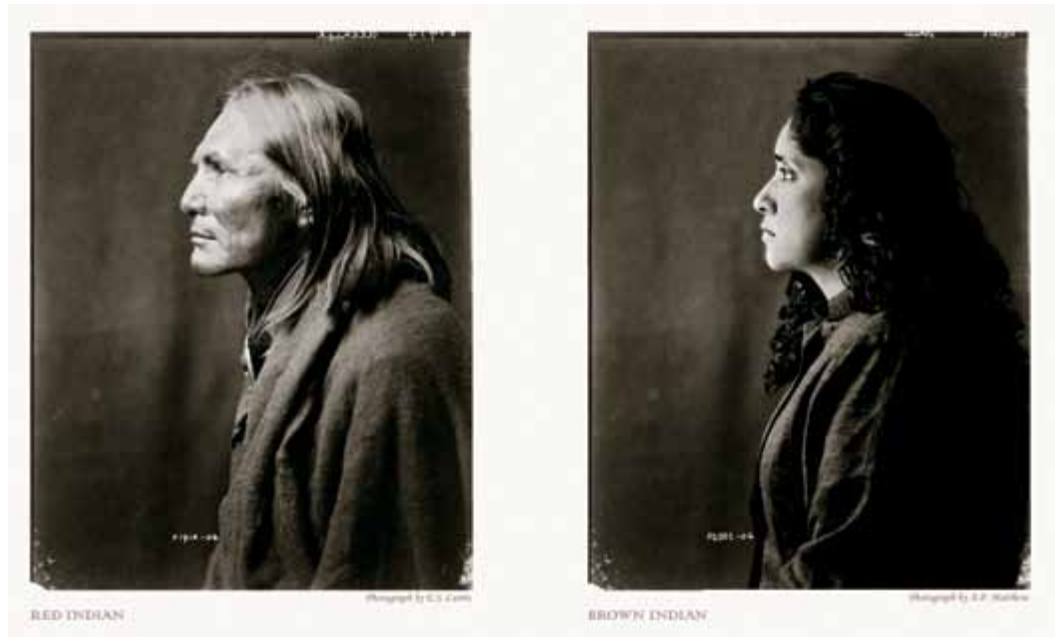
Revising a Definition

Matthew’s latest photo project started through the Society of Photographic Education inaugural Future Focus Project Grant. This grant lead to “From Immigrant to Native: Imaging the New American,” which explores the generational transition and experiences of new immigrants of the 21st century America in contrast to old images.

“The word immigrant conjures up families passing through Ellis Island or young men climbing across the southwest border fence,” she says. “It is more than that; it is the core of what America is today, as an idea and in reality. The America of yesterday, filled with immigrants of European descent is giving way to a new multi-colored and multicultural America.”



Annu Palakunnathu Matthew exhibit



Matthew continues, “By 2050, minority populations in the United States will become the majority of the population. In this new, multi-colored American, we need to reframe our understanding of our newest immigrants in terms of their cultures, religions and stories.”

She is slated to present her initial work of the evolving project at the 2015 National Conference for the Society for Photographic Education in New Orleans, LA, where she is an invited speaker. In the meantime, she is seeking area families as potential subjects for her project.

For Matthew, URI has helped to create a supportive environment for research as she continues to push the boundaries between culture and perception.

“URI has been extremely supportive for being able to have a balance between teaching and research and I hope it continues to expand ways of support for faculty in the arts and humanities,” Matthew says. “The work created from a seed funding grant from the URI Division of Research and Economic Development lead to my recent Fulbright.”



Annu Palakunnathu Matthew & sepiaEYE, nyc



by Becca Trietch

Life is an injurious thing

Every day our bodies are bombarded by harmful radiation and exposed to toxic substances that damage the DNA of our cells. If left to accumulate, this damage can result in cellular dysfunction including cancerous growth.

Luckily, the normal human body is extremely effective at repairing these DNA injuries. However, for

patients suffering from a rare inherited disease called Fanconi anemia (FA), these DNA repair mechanisms appear to be broken.

FA is a recessive, genetic disorder resulting in physical growth abnormalities, bone marrow failure, and an increased susceptibility to cancer. Although major progress in bone marrow transplant techniques can extend the life expectancy of many patients into their early 30s, few other treatments are currently available.

"This is a recessive disease, so both parents are usually completely healthy on their own, but suddenly, they end up with an extremely sick child and very few treatment options," explains University of Rhode Island (URI) cell and molecular biology Associate Professor Niall Howlett.

Motivated by patients, families, and clinicians, Howlett focuses his research on two FA proteins that are directly involved in DNA repair: FANCD2 and FANCI. FANCD2 is Fanconi



SEARCHING FOR CURES

anemia D2 protein. FANCI is Fanconi anemia I protein. These proteins undergo a process called ubiquitination that essentially tags the proteins for DNA damage repair and assists in moving them to the appropriate areas of a cell's nucleus. Unfortunately, this ubiquitination mechanism does not work in more than 90 percent of FA patients.

"If we can figure out what these proteins really do, how they are regulated, maybe we can intervene in some of these patients where clearly this process is broken," Howlett says.

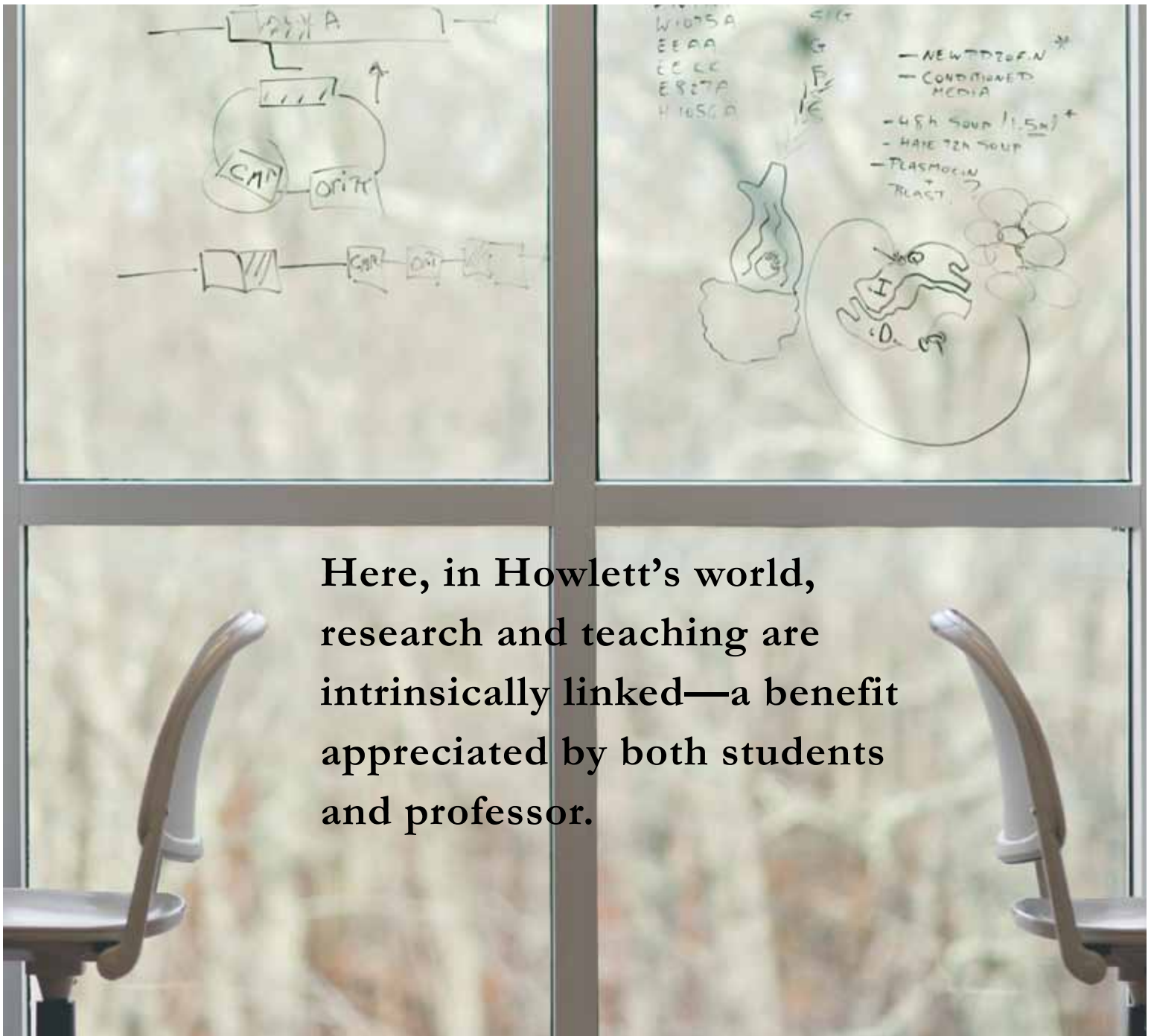
GOING ABOVE AND BEYOND

In 2007, when Howlett first started his research at URI, these two

FA proteins were classified as orphans. In other words, there were no recognizable domains—sections of the proteins—that could be linked to a known process or function. However, through the hard work and determination of his laboratory team, Howlett has successfully identified and characterized at least three protein domains and has contributed substantially to understanding how these proteins work.

Under Howlett's guidance, his team of one post-doctoral researcher, five graduate students, and two undergraduate students conducts experiments to keep the discovery ball rolling. Research procedures such as western blotting, fluorescence microscopy and liquid chromatography-mass spectrometry are employed to collect data on the molecular functions of these proteins.

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**Here, in Howlett's world,
research and teaching are
intrinsically linked—a benefit
appreciated by both students
and professor.**

"Pretty much everyone does everything within the lab," Howlett says. "The idea is that, hopefully, when students graduate they have a strong portfolio of skills. I find that's really important for job prospects. I want my students to be exposed to as much as possible."

Outside of the laboratory, Howlett remains dedicated to ensuring students receive a well-rounded education. Through his two courses, introductory biochemistry, and cancer biology, Howlett presents topics such as DNA repair, chromosome stability, and cancer chemotherapy to more than 280 undergraduates.

"It's all about trying to keep them awake," Howlett says. "The core information, which admittedly can be a bit dry, is absolutely

essential; you have to have a good grasp of it. But the key is to try to apply it to real-world situations. For instance, we cannot understand cancer without fully comprehending the fundamental processes of DNA replication and DNA repair."

Here, in Howlett's world, research and teaching are intrinsically linked—a benefit appreciated by both students and professor.

FINDING CLUES TO OTHER DISEASES

The reach of Howlett's discoveries doesn't stop with his students or potential FA treatments. Rather, his research may offer key information to the understanding of more common diseases such

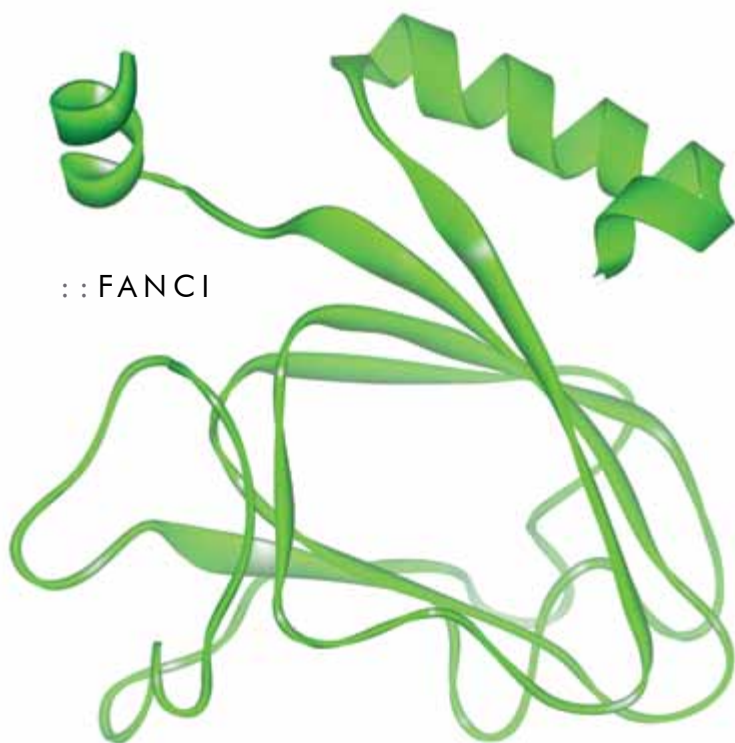
as hereditary breast and ovarian cancer. In fact, it was the diagnostic test for FA that first suggested the link between these diseases in 2002.

To test for FA, a diagnostic laboratory will expose a sample of the patient's blood to a DNA damaging agent and specifically look for radial chromosome formations—a peculiar branching pattern formed by multiple chromosomes attempting to fix each other.

These radial chromosome formations indicate an unsuccessful attempt at DNA repair. When cell lines from individuals with hereditary breast or ovarian cancer caused by mutation of the BReast CAncer gene 1 - *BRCA1* or BReast CAncer gene 2 - *BRCA2* genes underwent this same FA test, similar, high levels of radial chromosome formations were observed.

This surprising discovery indicated that the genes and proteins underlying these seemingly distinct diseases might function together. Further studies have verified this relationship. In other words, if we can figure out the molecular mechanisms by which the FA proteins operate, we may be able to gain insight into the underlying molecular processes of more common diseases.

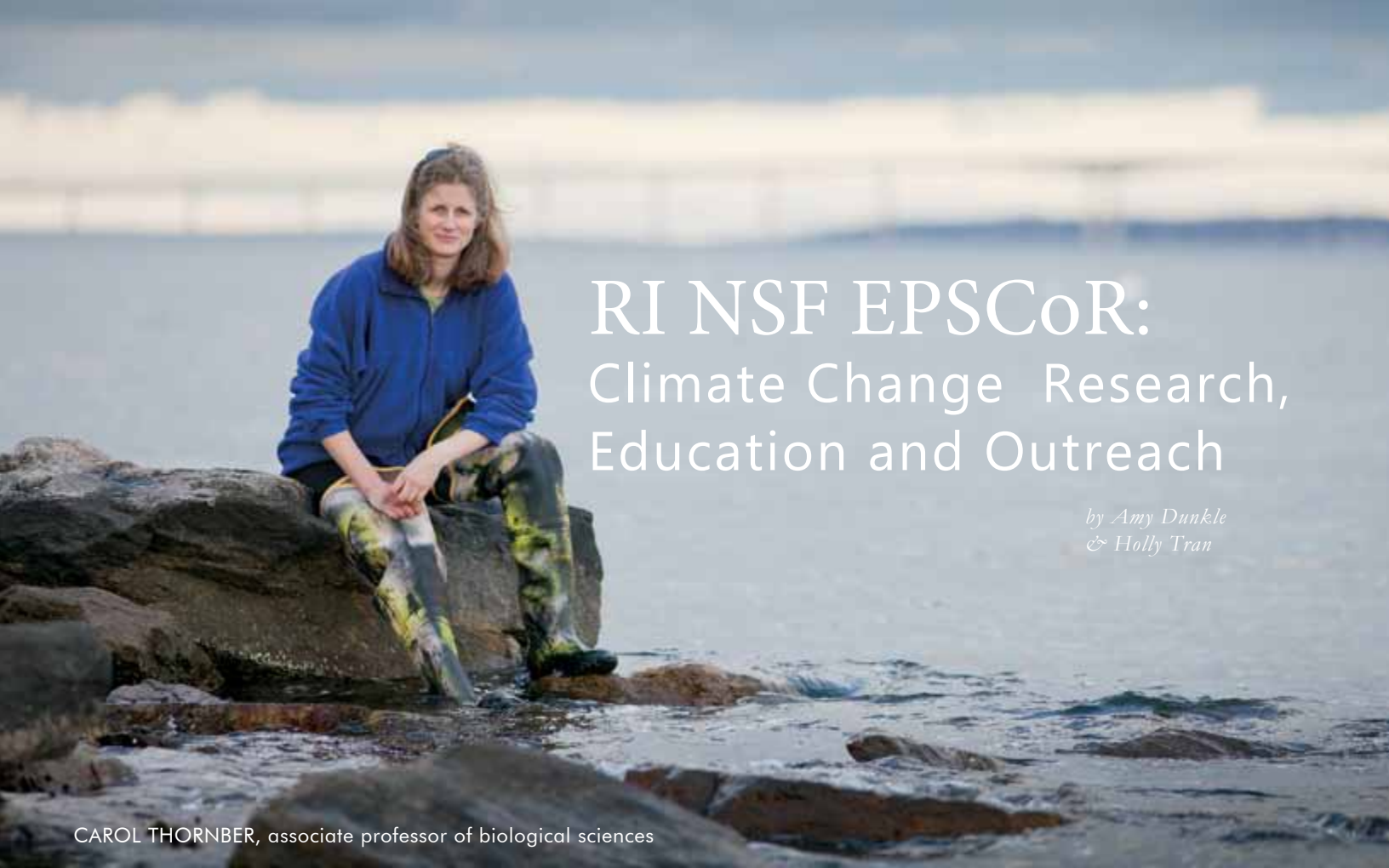
Another disease link with FA involves Phosphatase and Tensin homolog (*PTEN*), the second most widely mutated gene in cancer. Among cases of glioblastoma (brain cancer), endometrial cancer, and prostate cancer, close to 50 percent of patients have mutated *PTEN*. According to Howlett, this suggests *PTEN* has a massive influence on cancer in general, making the interactions of the FA and *PTEN* proteins that much more important.



NIALL HOWLETT, associate professor of cell and molecular biology

“If we can figure out how the FA and *PTEN* proteins interact and function together, not only will we be able to help FA patients but we’ve got this huge cohort of cancer patients that may also end up benefiting from this research,” explains Howlett.



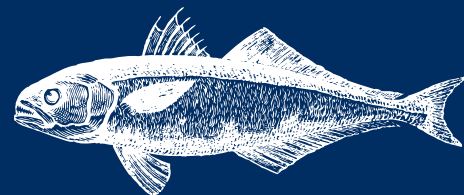


RI NSF EPSCoR: Climate Change Research, Education and Outreach

*by Amy Dunkle
& Holly Tran*

CAROL THORNBUR, associate professor of biological sciences

THE STATE OF RHODE ISLAND COVERS 1,214 SQUARE MILES, THE SMALLEST OF THESE UNITED STATES. BUT, WHAT RHODE ISLAND LACKS IN LAND MASS—ONLY 37 MILES WIDE AND 48 MILES LONG—IT MORE THAN COMPENSATES WITH A STUNNING ATLANTIC OCEAN SHORELINE AND THE GREAT EXPANSE OF NARRAGANSETT BAY.



This proximity to unique maritime features sets the stage for collaborative study on the impact of climate change on marine organisms and ecosystems, a living lab that transcends the classroom walls and campus boundaries of nine institutions of higher education in the Ocean State.

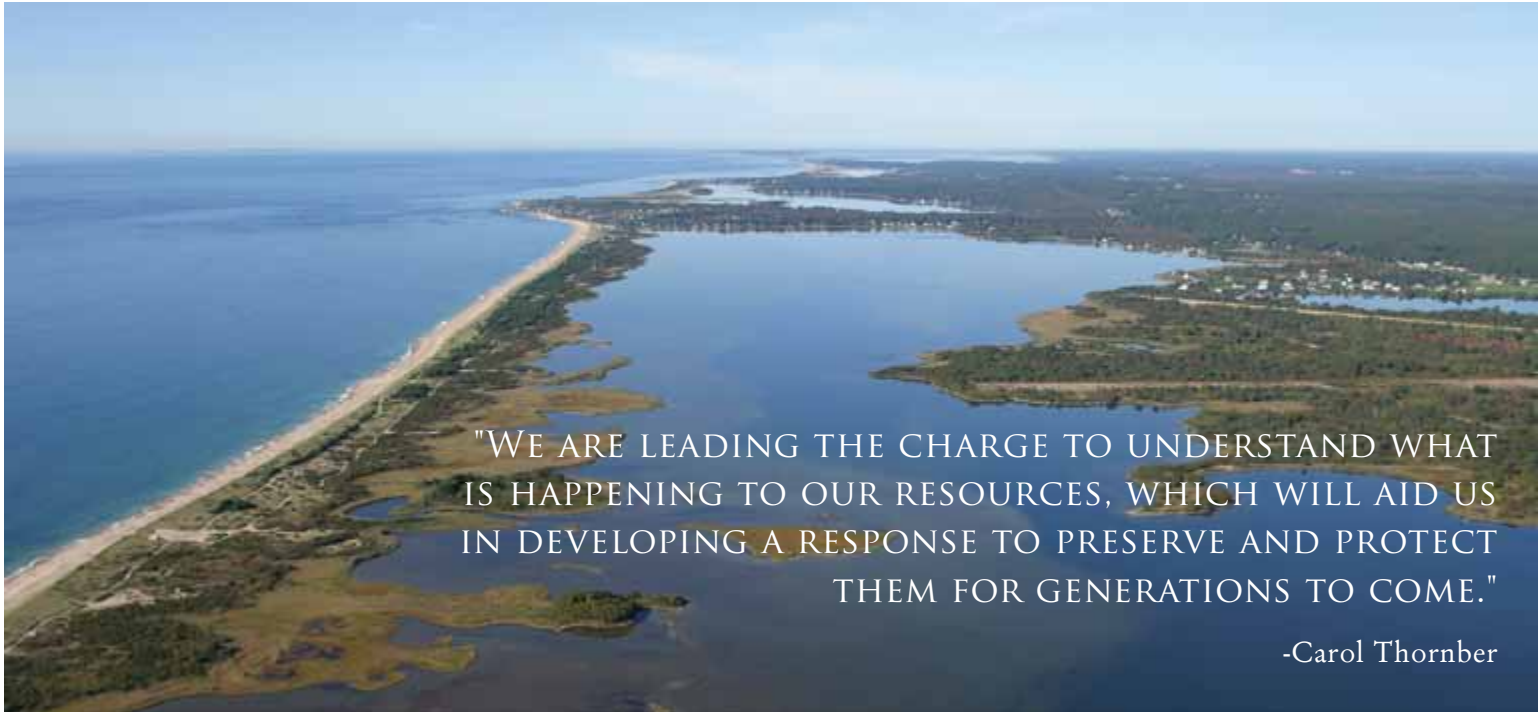
A National Science Foundation (NSF) program, the Rhode Island Experimental Program to Stimulate Competitive Research (EPSCoR) comprises University of Rhode Island (URI), Brown University, Bryant University, Community College of Rhode Island (CCRI), Providence College, Rhode Island College (RIC), Rhode Island School of Design (RISD), Roger Williams University (RWU), and Salve Regina University (SRU).

Leveraging relationships and capitalizing on cutting-edge research paves the way for partnerships across multiple disciplines, from science to art, and draws on the strength of the state's collective diversity to address the pressing issues posed by climate change.

At the helm, Principal Investigator Carol Thornber, URI associate professor of biological sciences, leads RI NSF EPSCoR as the program wraps up the fifth of its five-year, \$20 million grant and awaits word on whether the next five-year, \$20 million grant proposal gains approval.

"Our program integrates the human and capital resources of our nine campuses with support from state and federal agencies," Thornber says. "We are leading the charge to understand what is happening to our resources, which will aid us in developing a response to preserve and protect them for generations to come."

The NSF established EPSCoR in 1978 to better distribute federal funding to states that historically received less support for research and development. Today, 31 U.S. states or territories receive EPSCoR funding.



"WE ARE LEADING THE CHARGE TO UNDERSTAND WHAT IS HAPPENING TO OUR RESOURCES, WHICH WILL AID US IN DEVELOPING A RESPONSE TO PRESERVE AND PROTECT THEM FOR GENERATIONS TO COME."

-Carol Thornber

Under the current grant, RI NSF EPSCoR focuses on three key areas of advancement: research and development infrastructure capacity, science education and outreach, and economic development.

The question "What is the response of marine life to climate variability?" drives the mission, with teams of scientists across the state studying three specific questions about adaptation, food webs, and pathogens:

- **What are the stress responses** and evolutionary potentials of marine organisms in response to climate change?
- **How are the structure and function** of coastal marine food webs and biogeochemical cycling being directed in response to climate change?
- **How will global climate change** affect the ecology of marine pathogens and parasites?

The pursuit of answers is compelling on multiple fronts and extends far beyond the state's borders. Rhode Islanders work in jobs and own businesses tied to the ocean, from fishing to tourism, restaurants and retail.

Consider how warmer water temperatures affect the pathogens that cause disease in their marine organism hosts. More diseased fish means staggering economic losses because there will be fewer fish to catch, which shuts down businesses, cuts jobs, and harms quality of life. Less fish to eat also affects dietary health.

Think, too, about how Rhode Island's 400 miles of coastline make tourism the second largest industry, supporting 45,000 direct and indirect jobs and producing \$5.8 billion annually in tourism-related sales, according to data from CommerceRI. Rising sea levels and any imbalance in the coastal ecosystem pose significant environmental threats with enormous economic consequences.

INFRASTRUCTURE AND RESEARCH

RI NSF EPSCoR has invested in state-of-the-art instrumentation shared by the state's EPSCoR community to boost research capacity as scientists seek answers to how climate variability and environmental change affect marine life and habitats.

"We enhance research infrastructure through investments in facilities and cyber-infrastructure, as well as with research equipment and supplies for all partner institutions," Thornber notes, referring to the three core facilities that serve RI NSF EPSCoR researchers.

The Marine Science Research Facility at URI's Graduate School of Oceanography provides flow-through seawater with temperature-controls and space to house marine life. Environmental chambers give precision control for cold-water work on polar species.

The Rhode Island Genomics and Sequencing Center (RIGSC) at URI's College of the Environment and Life Sciences works in tandem with Brown University's Proteomics Shared Resource Facility to provide the latest specialized instrumentation to the EPSCoR community.

The RIGSC offers services in robotic sample preparation, DNA library preparation, DNA sequencing (Sanger and Next Generation), fragment analysis, quantitative PCR and the identification of microbial species and phenotypes.

Services available at the Proteomics Center include proteomic analysis such as protein gel electrophoresis, peptide fractionation, and in-gel digestion. Scientists and students across the state use the center to study proteins.

Although not an EPSCoR facility, the Center for Computation and Visualization (CCV) at Brown University is accessible to all participants and allows construction of genomes from the sequencing data. The cyber-infrastructure linking

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some campuses to the CCV gives researchers the capability to process big data without leaving their offices.

In addition to infrastructure support, RI NSF EPSCoR also maintains a strong partnership with the State of Rhode Island, which annually supplies more than \$800,000 in matching funds for competitive, collaborative research grants through the Rhode Island Science and Technology Advisory Council.

ART + STEM = STEAM

Within the national EPSCoR program, Rhode Island holds the distinction of being the only one to count an art and design school—RISD—as a major partner.

Although people typically see art's role merely in the depiction of science, RISD infuses art and design in the science, technology, engineering and mathematics (STEM) equation. The RISD STEAM initiative champions the bold concept that flexible thinking, risk-taking and creative problem solving of art and design are needed to solve society's complex and pressing challenges.

With EPSCoR support, a scanning electron microscope at the RISD Nature Lab, along with an array of microscopes and cameras, leads to interactions among scientists and designers, often producing the unexpected. Whatever the discipline, the concerns remain the same: How to respond to changes in the environment? How to prepare for rising sea level? How to engage a non-science audience and generate interest?

"The synergy between science and design research continues to be strengthened, as we've seen with the development of RISD studios in collaboration with several RI NSF EPSCoR researchers," Thornber says.

THE NEXT GENERATION OF SCIENTISTS

The RI NSF EPSCoR mission also includes a substantial effort to broaden the STEM pipeline and open doors to opportunities, particularly for schoolchildren of underrepresented racial and ethnic groups and those who will be first-generation college students.

At the undergraduate level, RI NSF EPSCoR partners with the Rhode Island IDeA Network for Excellence in Biomedical Research (RI-INBRE) to provide full-time, independent research experiences under the guidance of faculty mentors at the nine partner campuses for the Summer Undergraduate Research Fellowship (SURF) program.

Based at Roger Williams University, Jim Lemire, RI NSF EPSCoR undergraduate coordinator, says, "The SURF program plays an important role in orienting undergraduates to the nature of being a professional scientist. The idea is to provide Rhode Island students an opportunity to learn what it means to be a scientist, not just how to do science, and to help them along in their career development."

The fellowship gives undergraduates

the chance to delve deeply into a research project, an opportunity not often available during the academic year. These research experiences are markedly different from most course-based lab work in that the SURF projects are open-ended and usually a part of a much larger research program.

The students may even be involved in writing proposals for additional funding or manuscripts for publication. Finally, they present their work to their peers and to the larger community as part of the annual SURF Conference hosted by URI.

LEARNING BY DOING

The RI NSF EPSCoR reach also extends deep into the K-12 experience to engage youth and introduce them to the opportunities they might not otherwise consider.

Thornber explains, "We include a significant educational outreach component to spark interest in a diverse group of students, mainly at the middle and high school levels in science, technology, engineering, art, and math careers."



URI graduate student Abigail Bockus spent part of the 2013-2014 academic year doing research in Antarctica as an RI NSF EPSCoR fellow. Photo by Abigail Bockus



Gordon Ober, URI Ph.D. candidate, biological and environmental sciences, and former RI NSF EPSCoR graduate fellow, engages students during a Hands-on Science Experience in the waters off Fort Getty, Jamestown.

Tim Pelletier, RI NSF EPSCoR's education, outreach and diversity coordinator, based at CCRI, steers the effort with a comprehensive network of relationships, linking public and charter schoolchildren with research labs and graduate and undergraduate student outreach.

One particular program, the Hands-on Science Experiences, brings students to partner campuses for active, authentic and project-based learning that follows Rhode Island Next Generation Science Standards and aligns with classroom curriculum.

"We have students running filter feeder experiments, and conducting biopharmaceutical labs," Pelletier says. "They learn about the food web and the fragility of the ecosystem. We take them to the salt marsh and rocky shoreline at Jamestown's Fort Getty, where they can explore firsthand and learn about life in Narragansett Bay."

Many of the campus trips involve tours and admissions information, which is crucial for students who have never visited a college or university.

"A big part of what we do is showcase what Rhode Island offers in terms of research infrastructure and higher education," explains Pelletier. "Not only do students learn about the STEM fields, but they also see what is possible, that they can go anywhere they want with effort and direction."

*The synergy between
science and design research
continues to be strengthened.*

Both Lemire and Pelletier have seen RI NSF EPSCoR evolve from the beginning and attest to the program's impact on the advancement of science in the state.

Lemire says he views the program mostly from the network of faculty members, students, and administrators from all partner institutions who work together to improve not just their individual institutions, but also the level of scientific knowledge coming out of Rhode Island.

"EPSCoR has helped create an environment of collaboration and collegiality, which allows for the sharing of ideas and expertise that can lead to novel research endeavors and discoveries," Lemire says. "For me, the strength of the EPSCoR program in Rhode Island resides in the individuals involved and the professional relationships that have been built."



IN SILENCES FINDING VOICES

Investigating Social Justice on Campus

by Kara Watts

Human Development & Family Studies (HDF) graduate students Athina Chartelain, Tiffany Hoyt, Jacob Reilly; HDF Professor Emerita Barbara Newman; Annemarie Vaccaro.

Following her passion for diversity, equity and inclusiveness

ON THE UNIVERSITY OF RHODE ISLAND (URI) CAMPUS, ANNEMARIE VACCARO, ASSOCIATE PROFESSOR OF HUMAN DEVELOPMENT AND FAMILY STUDIES, IS A LEADING COLLABORATOR AMONG HER PEERS AND A ROLE MODEL FOR HER STUDENTS.

She serves on the URI Equity Council, Academic Affairs Diversity Task Force, and as co-chair of the URI President's Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ) Commission. Vaccaro teaches and mentors graduate students and presents inclusive teaching workshops for faculty members at URI and other universities.

The list of commitments sounds exhausting, but Vaccaro says, "My work isn't just what I do, it's who I am."

This philosophy—one that merges theory with practice—is precisely what Vaccaro aims to share with her students. As a scholar who investigates issues related to diversity, equity and inclusion in university environments, she emphasizes not only the need to engage with issues of social justice while in the classroom, but also for students to put that learning into practice, whether doing assigned projects, service work, or internships.

"I see my role as an adviser, really as a coach and a mentor," she

explains. "A foundational concept in the field of student affairs is to challenge and support students appropriately. I have to be an effective listener and sounding board, while also asking good questions to challenge students' assumptions, and then let students make their own decisions."

Her own research, too, combines learning with practice. Information collection on one of her current projects has been a five-year, holistic multiple case study of the Rose Butler Browne Leadership and Peer Mentoring Program for Women of Color. It's an action research project of the course HDF 291. Co-researched with Melissa Camba-Kelsay, coordinator of URI's Center for Student Leadership Development, the course was named after the first African American woman to graduate URI in 1921 and focuses on historical and contemporary experiences of women of color in the United States. The students who enroll in the course typically come from diverse backgrounds, creating a unique learning environment. Vaccaro says the demographic composition of the class makes it run differently each time.



ANNEMARIE VACCARO, associate professor of human development and family studies

Vaccaro and Camba-Kelsay are investigating student learning in the course, which Camba-Kelsay, the instructor, uses to make improvements. Their research has been presented at a variety of regional and national conferences. After the fifth year of data collection, they are now synthesizing the findings into a book length manuscript geared at current and future educators.

Through their project, Vaccaro and Camba-Kelsay have uncovered rich data about student experiences related to voice and silence, effective pedagogic strategies, the unique classroom versus the larger URI environment, and student navigation of inter- and intra-racial and ethnic conflict.

Referring to analysis of data from one class year, Vaccaro notes, “you had women of color saying that their stories are reflected in course readings, but you had others saying ‘that’s not my story,’ and they stayed silent.”

A traditional feminist argument might hold that women’s silence is an indicator of disempowerment resulting from oppression, but Vaccaro found that the silence of white women and women of color in the class was complicated by the intersection of privileged and marginalized identities such as race, ethnicity, class, gender, and religion.

At the heart of Vaccaro’s research projects is the power of narrative.

“I am a qualitative researcher,” Vaccaro says, “I believe in the power of people’s stories. The meaning-making process is a central component to my research. Qualitative studies add depth to quantitative research that gives only statistical evidence. You can’t know everything by asking closed-ended questions and using rating scales.”

Once she accumulates student stories, Vaccaro’s real work begins. “I don’t do research to further my career, or make my curriculum vitae better,” she says. “I have the responsibility, the important obligation, as a researcher to use the narratives shared by students from minoritized populations to improve educational policies and practices. If we’re going to ask them to share their stories, then we darn well better do something with them.”

Vaccaro is also working on a multi-institutional qualitative study of students with disabilities on New England college campuses to examine how they form a sense of self and subsequently develop a life purpose through the college experience. For this project, she has partnered with colleagues at Central Connecticut State University and the University of Massachusetts Amherst, along with a team of URI researchers including Assistant Professor Adam Moore from the School of Education, Professor Emeriti Barbara Newman, and three graduate students from the College Student Personnel Program.

Vaccaro and her colleagues have interviewed more than 50 students who self-identify as having a disability. Through a series of two in-depth interviews conducted a year apart, Vaccaro’s team seeks to document how students develop a sense of life purpose, including selecting a major and career.

In pursuing her research with students with disabilities, as with all of her participants, Vaccaro returns to the importance of student stories as the catalyst for enacting true change in university practices.

“By analyzing narratives from students about their campus experiences, we can create curriculum, programs and services that truly meet the needs of all of our learners,” Vaccaro says. “We can’t be satisfied with creating curriculum, programs and services that meet the needs of a majority of students, particularly privileged students, because it forces minoritized students to fit themselves into that paradigm. We need to shape our education so it’s truly inclusive.”



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