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## Momentum: Research & Innovation for Spring 2018

University of Rhode Island

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THE  
UNIVERSITY  
OF RHODE ISLAND  
DIVISION OF RESEARCH  
AND ECONOMIC  
DEVELOPMENT

THINK BIG  WE DO<sup>SM</sup>



# Momentum

Research & Innovation

## Cover Story

UNDERSTANDING  
THE CHALLENGES OF  
BREEDING OYSTERS

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COLLABORATING  
ON BIG DATA

PAGE 24

THROUGH THE LENS  
OF DOCUMENTARIES

PAGE 20

Spring 2018



“URI is overflowing with creativity, novel insights, talent, and research that have the potential to improve and protect our society and our planet. Likewise, the University is populated by dedicated educators and mentors, scientists, engineers, artists and scholars across nearly every conceivable academic domain.”

- Peter J. Snyder, Ph.D.

# From the Vice President

To my new administrative and faculty colleagues, staff, students, alumni and supporters of URI — greetings! I am honored and grateful for the opportunity to serve as this University's new vice president for Research and Economic Development. I am looking forward to the opportunities and challenges ahead.

I am writing this essay, my first editorial for *Momentum*, at three o'clock in the morning. Yesterday, I completed my first day on the job as a state employee, and I am now unable to sleep as I replay in my mind all of the information, issues, ideas, concerns, offices and people that I met with today. This University is a complex, highly inter-connected, physically lovely and fascinating institution. Across its Kingston, Narragansett Bay, West Greenwich, and Providence campuses, URI is overflowing with creativity, novel insights, talent, and research that have the potential to improve and protect our society and our planet. Likewise, the University is populated by dedicated educators and mentors, scientists, engineers, artists and scholars across nearly every conceivable academic domain. I look forward to working under President Dooley's leadership, in close partnership with Provost DeHayes, my administrative colleagues, and with the faculty, staff and students of this institution to advance the multiple missions of the University of Rhode Island.

The advancement of research, across the physical and natural sciences, the health professions, and across the humanities and the arts, is one of arguably two primary sets of goals for any university; the other set of goals of course pertain to its multiple educational and public service missions. I intend to ensure that our University meets its mission of advancing scholarship and pushing the boundaries of knowledge – that we further translate our advancements into the services, products, therapeutics, policies, arts and perspectives that will benefit the citizens of our state and broader communities.

I am particularly delighted to lead the division, offices, labs, centers and mission that give rise to this gorgeous magazine. In the coming months we will be exploring how to expand the audience, reach and objectives of *Momentum*. In future issues I plan to use these two pages to explore a variety of topics that either relate to current stories within this magazine's pages, or that are prominent on my mind and/or within our public discourse. We will also use this publication to engage in a conversation with our readers about the University's plans for growth of our research infrastructure, our efforts to grow the economy of our state, and to report on our research funding and many successes. This is our state's land-grant, sea-grant and urban grant research institution, and we have much to be proud of!

Sincerely,



Peter J. Snyder, Ph.D.

Vice President for Research and Economic Development,  
Professor of Biomedical and Pharmaceutical Sciences  
University of Rhode Island

Adjunct Professor of Neurology and Surgery (Ophthalmology),  
Alpert Medical School of Brown University

Scholar-in-Residence,  
Rhode Island School of Design

Editor-in-Chief,  
Alzheimer's & Dementia: Diagnosis, Assessment and Disease Monitoring  
An Open Access Journal of the Alzheimer's Association



# Momentum

## Research & Innovation



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"I intend to ensure that our University meets its mission of advancing scholarship and pushing the boundaries of knowledge – that we further translate our advancements into the services, products, therapeutics, policies, arts and perspectives that will benefit the citizens of our state and broader communities."

- Peter J. Snyder, Ph.D.



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# Early Detection of Alzheimer's Disease

written by **TODD MCLEISH**



Artist's depiction of pompons of toxic beta-amyloid protein plaques on the surface of cortical neurons. The abnormal build-up of these plaques in the brain are well-associated with the development of Alzheimer's disease and related conditions, such as cerebral amyloid antipathy which is the central focus of Professor Van Nostrand's laboratory.





Regina Kim, research assistant, George & Anne Ryan Institute for Neuroscience.

“The challenge now is to identify individuals developing the disease when they are younger so interventions can have a more meaningful impact on the process and prevent further progression.”

- William Van Nostrand

---

William Van Nostrand’s career as a neuroscientist started by accident.

As a graduate student studying biochemistry at the University of California, Irvine, he successfully worked to isolate and characterize an unknown protein. Simultaneously, research into Alzheimer’s disease had begun to take off, and researchers made an important discovery about a protein implicated in causing the disease — the same protein that Van Nostrand was studying.

“I started out working on a protein that nobody was interested in, and it became a protein that everyone was interested in,” he recalls. “That became my side-door entry into the field of neuroscience.”

He’s been studying that protein ever since, first as a postdoctoral researcher and faculty member at UC Irvine, then as a professor of neurosurgery at the Stony Brook University School of Medicine for 22 years. And as of last

summer, joined the University of Rhode Island (URI) George & Anne Ryan Institute for Neuroscience, as URI’s Hermann Professor of Neuroscience.

Like his neuroscience career, his decision to relocate his lab to Kingston — including four lab staff, a student and four NIH grants totaling \$1.7 million — was not something he anticipated.

“I wasn’t looking to leave Stony Brook,” says Van Nostrand. “But [Ryan Institute Executive Director] Paula Grammas invited me to come for a visit, and I was impressed with what I saw. It was an intriguing opportunity to help grow the institute and start some new collaborations.”

He studies the amyloid precursor protein that generates amyloid-beta, which accumulates in the tissues and blood vessels of the brains of Alzheimer’s patients and contributes to the memory loss and cognitive decline



## William Van Nostrand

Herrmann Professor of Neuroscience  
George & Anne Ryan Institute  
for Neuroscience  
Biomedical & Pharmaceutical Sciences

“WE’RE GETTING BETTER AND BETTER AT GETTING EARLIER INTO THE PROCESS. I’M FEELING OPTIMISTIC THAT THE TREATMENTS THAT HAVE ALREADY BEEN TRIED WILL BE MORE SUCCESSFUL WITH THE EARLIER IDENTIFICATION OF THE DISEASE.”

- WILLIAM VAN NOSTRAND

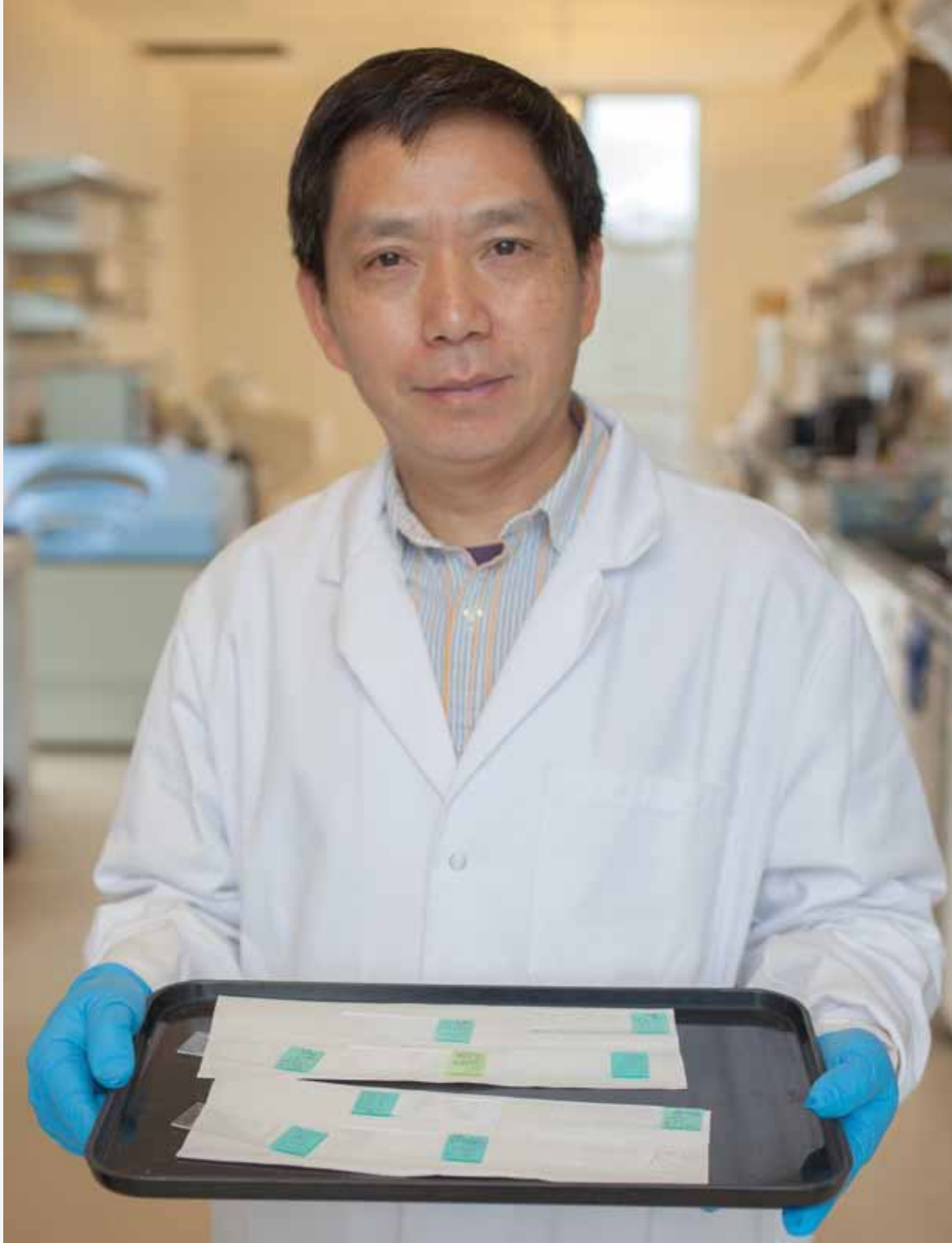
associated with the disease. Van Nostrand is trying to understand why the amyloids accumulate in the blood vessels and what they do that is so detrimental to the brain.

“We’re studying it at a very basic level in a test tube to learn how the proteins interact together,” he explains. “We also use brain blood vessel cells we grow in the lab to see what happens when we add amyloids. We also have experimental model systems we developed in our own laboratories. It’s all to understand how the Alzheimer’s process happens and to test ways to block it from happening.”

Alzheimer’s disease is a tremendously difficult disease to cure because it develops extremely slowly throughout a long period of time.

“Alzheimer’s starts decades before you begin seeing clinical signs of it,” Van Nostrand says. “There’s probably a 30-year window of development of the disease. Amyloid accumulates over those decades, and then gets to a tipping point where enough damage occurs in the brain that you then see the clinical signs.

“The problem is that once you identify patients with Alzheimer’s, there’s so much damage that has occurred to the brain that to intervene is like throwing a bucket of water on a forest fire,” he adds. “The challenge now is to identify individuals developing the disease when they are younger so interventions can have a more meaningful impact on the process and prevent further progression. But how do you identify people 20 years before they have symptoms?”



Feng Xu, Ph.D., Research Associate, George & Anne Ryan Institute for Neuroscience.

“We also have experimental model systems we developed in our own laboratories. It’s all to understand how the Alzheimer’s process happens and to test ways to block it from happening.”

- William Van Nostrand

If scientists could answer that question, many millions of people would benefit. According to the Alzheimer’s Association, an estimated 5.7 million Americans currently are diagnosed with Alzheimer’s disease, and their care costs exceeds \$277 billion each year. As the baby boomer generation ages, those numbers are projected to increase dramatically.

Van Nostrand’s research is making important progress. Using lab models, he is identifying diagnostic biomarkers that may help to detect the amyloids earlier

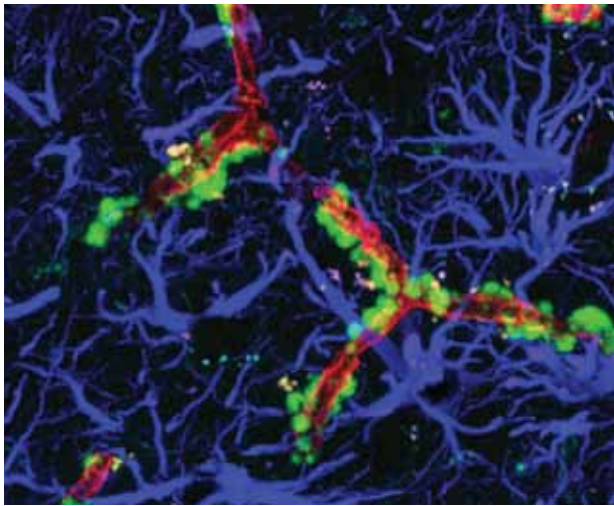


Image of blood vessels in the brain (red) with amyloid deposits around them (green) in an experimental model developed in the lab.

in the disease's development. And he is identifying lifestyle factors like exercise that may aid in preventing the disease or slow its progression.

"In the future, there will probably be multiple interventions necessary because there are probably several processes going on in the Alzheimer's brain to target," he says, "and lifestyle interventions will be one of them."

He is collaborating with Professor John Robinson, who also joined the URI neuroscience faculty from Stony Brook, on a study of the efficacy of exercise in preventing or reducing the impact of amyloid accumulation in blood vessels.

"Trials of elderly patients doing exercise haven't been successful in the past," Van Nostrand says. "But the benefit of using experimental models is that we can study them as a population and ask what dose of exercise is beneficial. And then maybe we can translate that information to real world studies."

As challenging as it is to gain ground in studying Alzheimer's disease, Van Nostrand remains optimistic because knowledge of the disease has grown exponentially in the last 20 years.

"We're getting better and better at getting earlier into the process," he says. "I'm feeling optimistic that the treatments that have already been tried will be more successful with the earlier identification of the disease. The problem remains how to help those who already have signs of dementia. But once we get an earlier indication of Alzheimer's, we can then start to suppress some of the things associated with the disease, and you're going to reduce those signs later in life."



Microscope focusing on brain blood vessel cells growing in tissue culture for experimental treatments.

# TRANSFORMING THE HEALTH CARE LANDSCAPE


written by **TODD MCLEISH**



Transforming health care to better serve people's needs — that is Betty Rambur's mission. It's a mission that has taken her in multiple directions, but all stem from her core focus on health policy and the changing needs and skills of the health care workforce.

The Routhier Endowed Chair for Practice in the University of Rhode Island (URI) College of Nursing,

Rambur recently turned her attention to the topics of health and payment reform, and her insights have been well received. Rambur's 2017 guide to understanding the Affordable Care Act was — within 10 days — the most downloaded article in the history of the journal *Policy, Politics, and Nursing Practice*, with the editor calling the manuscript, "one of the best overviews ever written on this complex and often controversial topic."

A photograph of two healthcare workers in blue scrubs and hairnets standing in a hospital hallway. The worker on the left is wearing a pink hairnet and has their back to the camera. The worker on the right is wearing a white hairnet and is facing the camera. They are standing in front of a glass door. In the background, there is a green wall, a computer monitor, and a metal cart with a blue bag. The floor is highly reflective.

Rambur's 2017 guide to understanding the Affordable Care Act was — within 10 days — the most downloaded article in the history of the journal *Policy, Politics, and Nursing Practice*, with the editor calling the manuscript, "one of the best overviews ever written on this complex and often controversial topic."

Value-based payment reform, the transition from fee-for-service for reimbursement to one in which health care providers are accountable for the outcomes and cost of care, is an area in which Rambur holds particular expertise. She views the transition as not only an economic imperative for the nation, but also an ethical one.

“As a nation, we use too much health care that is of little value,” Rambur says. “A third of the \$3.2 trillion we spend on health care each year represents waste, including overuse and low value, high cost services.

“Overtreatment is not without consequences,” she adds. “As health professionals committed, above all, to do no harm, we have a particular obligation to assure that people are neither overtreated nor undertreated.”

Rambur’s growing reputation as a leading voice in workforce and health care transformation has made her a popular guest speaker around the country. She has delivered potent messages about overtreatment, over-diagnosis and over-utilization of health care to many audiences, and she has proposed alternative cost-effective models for value-based health care delivery.

Her research also is leading to the redefinition of nursing curricula and the competencies needed for safe and effective nursing care. Her two most recent studies found that payment reform resulted in more nurses working in ambulatory care settings and a surprisingly large proportion employed in telehealth – care delivered remotely by means of telecommunications rather than face-to-face.

“Payment reform is creating fresh opportunities for primary care and virtual care, with some organizations even developing virtual hospitals that provide remote patient monitoring and consultations,” she explains.

Rambur highlights the particular importance of better understanding needed competences for safe and effective virtual nursing care: “After all, if a person is hospitalized, it is because they need nursing care, otherwise they would be outpatients. So what are the nursing skills and competencies needed in a virtual hospital setting?”

Rambur joined the URI faculty in 2016 after leading health and payment reform efforts in North Dakota and Vermont. As chair of the Department of Nursing at the College of Mary in her home state of North Dakota, she led a statewide health financing reform effort, which led to omnibus health reform legislation that enhanced access to care. At the University of Vermont, she led the merger of the School of Nursing and School of Allied Health Sciences to establish the College of Nursing and Health Sciences and served as its first dean.

As a member of Vermont’s Green Mountain Care Board, she helped lead the state’s transition from fee-for-service to value-based care as well as other aspects of health reform, with a particular emphasis on population health, reducing disparities and cost containment. She also authored a textbook, *Health Care Finance, Economics and Policy for Nurses: A Foundational Guide*, which has been hailed as essential reading for every nursing student.

After these successes, she relocated to Kingston because, she says, “URI and the Routhier Chair are a perfect match for my background.”

The University’s investment in its interdisciplinary Big Data Collaborative has helped her initiate a study with Prabhani Kuruppumullage Don, URI assistant professor of computer science and statistics, on the impact of physician market consolidation on the prices and quality of care.

“Health reform has spurred many mergers and acquisitions, with some studies finding higher rather than lower cost of care,” Rambur says.

At the same time, her reputation as a compelling voice for health reform also led to national recognition. In 2016, she was named a fellow of the American Academy of Nursing, and a year later she received a State Award for Excellence from the American Association of Nurse Practitioners.

With more than 50 manuscripts, one book, and three book chapters to her name, what’s next for Rambur?

“I want to help nurses think of themselves as innovators and entrepreneurs,” she says. “Vexing health and health care challenges will only be solved by disruptive innovation, yet nurses have traditionally been socialized to be people who first and foremost take orders. To produce a next generation nursing workforce that thinks differently, who can lead innovation and create solutions, fits well with everything else taking place at URI.”

“If a person is hospitalized, it is because they need nursing care, otherwise they would be outpatients.”

- Betty Rambur



**Betty Rambur**

Professor and the Routhier  
Endowed Chair for Practice  
Nursing



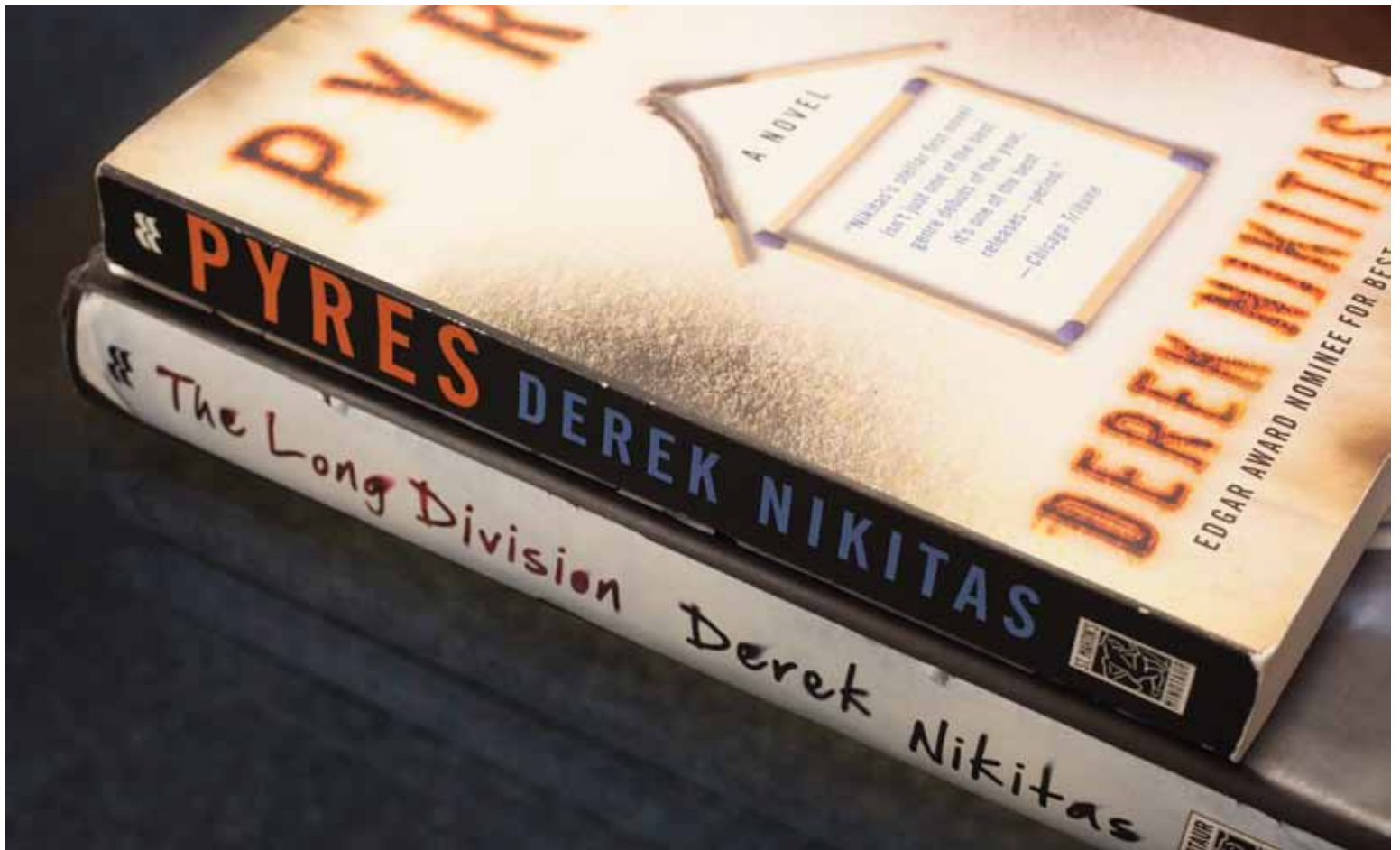
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“TO PRODUCE A NEXT GENERATION NURSING WORKFORCE THAT THINKS DIFFERENTLY, WHO CAN LEAD INNOVATION AND CREATE SOLUTIONS, FITS WELL WITH EVERYTHING ELSE TAKING PLACE AT URI.”

- BETTY RAMBUR

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# The Inherently High Stakes of the Thriller Genre

written by **ALEX KAHN**

Derek Nikitas, novelist and University of Rhode Island (URI) assistant professor of creative writing, describes himself as someone who is cautious by nature and not prone to making extreme decisions. The same, however, does not hold true for the people Nikitas weaves into his novels, short stories and scripts.

"I like putting people in extreme situations to test their mettle as characters," Nikitas says.

Rather than focus on a single character, crime scenario, or news phenomenon, the author of three novels methodically cultivates ideas.

"I think of story elements like oil on the surface of soup – those little individual circles of oil on top of the soup, and you can connect them with a fork and they become one big thing," he says. "That's kind of what it is for me."

Until the ideas can be connected, Nikitas says he keeps them in his thoughts rather than writing them down. He subscribes to Stephen King's adage that nothing that you have to write down to remember is worth remembering.

Nikitas' ideas originate from two sources. First are ideas created from his experience, from growing up with a single mother in New Hampshire to adolescence in suburban New York to an academic career spanning the Eastern seaboard. Nikitas attained his bachelor's degree in English at SUNY (State University of New York) Brockport, before venturing to the University of North Carolina, Wilmington for his master's degree, and Georgia State University for his doctorate.

The environment is a reason Nikitas chose to be a professor at URI. "I wanted to be back in New England, my home region and an environment that inspires me as

Nikitas reinvented the classic story through enriched language, complexity, and the influence of academic research he explored in Lovecraft's home state of Rhode Island.

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a writer," says Nikitas. "I was also eager to mentor creative writers at the highest level in our field – those who are attaining a doctoral degree in English with a 'creative dissertation,' meaning their dissertation is a combined creative and scholarly project. URI is one of the few institutions offering such an option for the English Ph.D."

Nikitas's early short stories and first two novels – *Pyres* and *The Long Division* – center on themes of class. The background of *The Long Division* mirrors his footsteps through New York State and Georgia.


Nikitas's second source of ideas is from a fascination of examining the impact of social issues on individuals. Academic research influences his writing but does not dominate it. Instead, he develops rich characters who are connected to, and are in concert with, their backgrounds but unburdened by preconceptions. Nikitas challenges himself with regular self-reflection to ensure that the characters are authentic.

Nikitas's extensive development of characters, plot and language have garnered merit in literary circles. His infusion of poetic tradition and mastery of prose resulted in accolades. His novel *The Long Division* was a 2009 "Book of the Year" pick by the *Washington Post*, and *Pyres* received an Edgar Award nomination for Best First Novel. His work is characterized as 'literary thrillers.'

He crafts his writing through the influence of genre standard-bearers such as Anne Rice and Stephen King; literary heroes like Joyce Carol Oates, Toni Morrison and Denis Johnson; as well as poets Philip Larkin, Gerard Hopkins, and John Berryman.



Derek Nikitas  
Assistant Professor  
English



“I wanted to be back in New England, my home region and an environment that inspires me as a writer. I was also eager to mentor creative writers at the highest level in our field.”

- Derek Nikitas

Nikitas’s most recent collaborator, James Patterson, is affectionately called the ‘Henry Ford of Books’ by Vanity Fair for his frequent rate of production. Patterson has built a literary empire, his novels are published as quickly as online bestseller lists can be refreshed.

The collaboration began with Patterson’s ebook series “BookShots,” which are pulse-pounding thrillers under \$5 and 150 pages or less. Nikitas has published two BookShots: *Diary of a Succubus* and *You’ve Been Warned: Again*.

“I was interested in the challenge. I wanted to learn from him,” says Nikitas, of hearing from Patterson’s team and building his relationship with the literary giant.

“Working with Patterson has been a remarkably creative exercise for me.”

With the goal to capture audiences who do not typically read, Nikitas had to examine his tone, characters, and plotline for BookShots.

Nikitas’s process is driven by methodical planning. A framework is generated by two or three ideas, through which Nikitas creates, explores, and pushes characters and plot. He develops extensive outlines chronologically, which he revises until he is ready to write the novel.

“The system creates momentum, efficiency, and a cure for writer’s block,” Nikitas says. “Outlines are a way of



avoiding having to rewrite a novel numerous times. Once I have that outline solid, I try to write the book quickly.”

Having this system in place allows Nikitas to accept challenges from a variety of directions. The Patterson collaborations focused Nikitas on tone and form. His third novel, *Extra Life*, was written with the self-imposed challenge of writing for a young adult audience and focusing on a single main character.

Meanwhile, Nikitas’s adaptation of H.P. Lovecraft’s *The Call of Cthulhu* for the anthology *Cover Stories* proved a lateral challenge. Nikitas reinvented the classic story through enriched language, complexity, and the influence of academic research he explored in Lovecraft’s home

state of Rhode Island.

Nikitas’s efficient system provides time to explore other mediums. The success of television series like *Ozark* and *Better Call Saul* have revealed an appetite for complex characters and intertwining narratives – two facets of storytelling that Nikitas has long utilized. While developing a fourth novel, he is simultaneously advancing a script adapted from *The Long Division*.

“The stakes are inherently higher,” says the professor of the thriller genre. Nikitas’s characters would be wise to take after their author, whose determination and perspective continues to trend towards success.







# Through the Lens of Documentaries

written by **LIANNA BLAKEMAN '19**



## Kendall Moore

Professor

Departments of Journalism  
and Film Media

Harrington School of  
Communication and Media

pictured with undergraduate  
student Gyasi Alexander, majors:  
marine biology and journalism.

“THE COMMUNITY SAW DOCUMENTING THEIR CULTURE ON FILM AS A WAY TO ENSURE THE CONTINUATION OF SOME OF THEIR RITUALS AND PRACTICES. AT THAT MOMENT, I COULD SEE THE POSITIVE IMPACT OF MY FILM WORK, AND I WAS HOOKED.”

- KENDALL MOORE

Kendall Moore, University of Rhode Island (URI) journalism professor and filmmaker tackles difficult social and political issues around racism, health, gender, and the environment in her films.

Since joining the department in 2003, she has released numerous films including: *Song in the Crisis* (2007), *Sovereign Nation/Sovereign Neighbor* (2006), *The Good Radical* (2009), *Sick Building* (2014), *Philosophy of the Encounter* (2015), and *Jalen and Joanna: A Lead Paint Story* (2017).

Moore says that both of her parents encouraged her creativity as well as her focus on social issues. Her stepdad served in the Peace Corps, in Ecuador, and worked closely with Quechua speaking indigenous communities. Her mother, an organizational psychologist, was one of the first African Americans to graduate from the University of Maryland.

“Both of my parents have always had a lot to say about power and inequality,” Moore says. “I see my focus on certain problems as an extension of serious conversations I had with them starting in my early childhood.”



Journalism undergraduate students (left to right) Allie Lewis, minors in political science and marine biology; Stone Freeman; Ciara Bishop; Natalie Muscarella, communication studies major, journalism minor; and Professor Moore.

Moore began telling visual stories, with still photography, at the age of eight. By high school, she had inherited her sister's old darkroom equipment and was one of her Maryland high school's student yearbook photographers. Around the same time, she developed an interest in television journalism and began interning for a local cable TV station.

Heading into college at Syracuse University she couldn't decide if she wanted to pursue international reporting or diplomacy – either way she wanted to work overseas. At that time, her parents moved to Bolivia to work for USAID, Moore spent summers and holidays working there. She had a chance to feel out both diplomacy and journalism by working for the U.S. Embassy in La Paz, as well as for local Bolivian journalists, doing voice-over work.

"I fell in love with the idea of international journalism, in earnest, while living in Bolivia," says Moore.

During some time off from college, Moore worked with a local Afro-Bolivian group to help document a dance called *The Saya* that the community feared would be forgotten.

"The community saw documenting their culture on film as a way to ensure the continuation of some of their rituals and practices," she says. "At that moment, I could see the positive impact of my film work, and I was hooked."

Since then, Moore has traveled and worked on various projects in South and Central America, the Caribbean, Africa, and throughout the U.S.

At URI Moore encourages her students to lean into difficult subjects that may make them feel uncomfortable.

"There is nothing like seeing a journalism major become

possessed by finding an answer...when they can't put a story down, especially when it gets challenging, always puts a smile on my face," she says.

This spring, Moore's investigative documentary film class has been working hard on several projects that she hopes will air on PBS. The film topics include emerging contaminants in Rhode Island's Narragansett Bay; the lack of diversity in STEM fields; differing views on climate change; an investigation into noise pollution in the Westerly area; and different life experiences on the autism spectrum.

Although Moore has won multiple awards and honors for her documentaries, including two Fulbright Scholarships, The Rhode Island Film Fellowship for Outstanding Filmmaking (2007) and the Metcalf Award (2015), she says, that is not what drives her.

"I'm mostly interested in listening to people and stories that we don't often get to hear. That drives me the most," she says. "If my stories can be helpful to people and causes that can benefit from my skills as a journalist and filmmaker, I feel like I have managed to accomplish something."

Last year's documentary class worked with Moore to help produce several documentary shorts that aired on PBS. The stories examined an algal bloom that shut down part of Narragansett Bay, the recent Gypsy Moth infestation, and lead paint contamination. The lead paint film, *Jalen and Joanna: A Lead Paint Story*, was selected for the first Rhode Island Black Film Festival, which opened in April 2018.







# Collaborating on **Big Data**

written by **ALLISON FARRELLY, '16**



## COMPUTER SCIENCE PROFESSOR JOAN PECKHAM HAS TAKEN OVER THE HELM TO FACILITATE THE UNIVERSITY OF RHODE ISLAND'S (URI) NEXT STEP TOWARD THE FUTURE – A FUTURE DICTATED BY DATA.

“There’s a huge industry demand for students trained in data science,” Peckham says. “URI is in a position to fill that need.”

Peckham is the coordinator of URI’s Big Data Collaborative, a community of more than 100 faculty and staff across campus interested in promoting collaboration to enhance the study of big data and data science.

The goal of these faculty members — from computational statistics, machine learning, signal processing, mathematics, oceanography, epidemiology, English, psychology and philosophy among other disciplines — centers on developing tools to synthesize and understand data. Though less than a year old, the program already has brought a multitude of exciting new research and partnerships to the University community.

The Big Data Collaborative works closely with URI’s newly formed Social Science Institute for Research, Education, and Policy (SSIREP), which was created to stimulate and support research that informs and improves public policy. Within its first year, SSIREP awarded grants for 10 research projects on topics ranging from creating an undergraduate policy research certificate program, strengthening the resilience of coastal communities, and understanding how educators can stimulate positive intergroup relations in schools. DataSpark is another new entity at URI supporting interdisciplinary research through quantitative data analysis. DataSpark maintains the RI DataHUB, a statewide longitudinal data system that holds linked information from Rhode Island state and local government agencies and community organizations.

One such interdisciplinary project supported by DataSpark is researching the association between maternal exposure to teratogenic medications and children’s long-term adverse outcomes, such as developmental or academic challenges. DataSpark is linking the Rhode Island Department of Health data with academic records from the Rhode Island Department of Education for the analysis.

“There’s a huge industry demand for students trained in data science. URI is in a position to fill that need.”

- Joan Peckham



Meng Wei, assistant professor, Graduate School of Oceanography; Maya Vadiveloo, assistant professor, nutrition and food sciences; Joan Peckham, professor, computer science and statistics, coordinator, Big Data Collaborative; Lubos Thoma, associate professor, mathematics; Harrison Dekker, associate professor, University Kingston Library.

In another data-driven project, Oceanography Professor Yang Shen capitalizes on the Big Data Collaborative to synthesize the large data sets he obtains from underwater sensors that detect earthquakes and differentiates them from nuclear explosions.

“One of the biggest assets of the collaborative is the resources it aggregates,” according to Peckham. “It’s interdisciplinary in that we bring people from different programs to work together to solve problems.”

In the fall of 2016, the provost and academic deans helped increase this diversity with the placement of nine new data research-oriented faculty at URI. These new faculty members help feed the demand from students and industry for data science skills. The interdisciplinary curriculums Peckham helped design include data science BA and BS majors and a minor, intended to teach students the “skills they need in order to wrangle data.” She says graduate data science programs and a Data Science Institute may be on the horizon at the University as well.

“There are a lot of people with large data sets, and of course, it’s a challenge today,” Peckham explains.

“Part of the reason we’re developing the study of data science is that we’ve learned how to collect huge volumes of data and we haven’t really developed viable techniques for analyzing the data and understanding what the data is saying.”

People commonly assume that so-called big data refers to large data sets, but, according to Peckham, that is not always the case. Rather, the term refers to any data set for which there does not yet exist viable techniques for managing, analyzing and understanding the data – from small and complex to incomplete sets of data. This aspect of modern big data sets will drive research and scholarship in data science going forward.

Though less than a year old, the program already has brought a multitude of exciting new research and partnerships to the University community.



**Joan Peckham**

Professor, Computer  
Science and Statistics

Coordinator, URI Big  
Data Collaborative

As part of her transition to the Big Data Collaborative, Peckham reports to the Dean of University Libraries Karim Boughida.

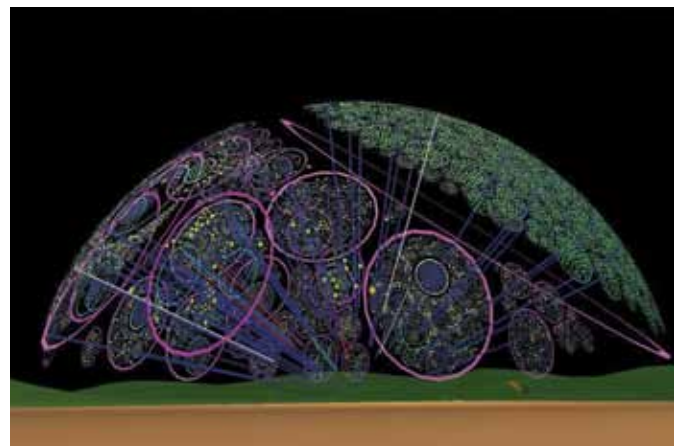
The teamwork of the collaborative includes faculty and students from all of the URI colleges. The URI Library now includes DataSpark, a makerspace, and a new Artificial Intelligence Laboratory. In these spaces students can create and explore with machine learning, visualization, 3D printers, and the Internet of Things, among other 21st century technologies. A complementary Design Thinking laboratory is now being planned. Additionally, new data and technology librarians are working to provide research, training, consulting, and outreach services.

“The library is transforming itself for the future,” Peckham explains. “It’s not just STEM majors who need to know this stuff, students across the University need these modern skills.”

Philosophy Professor Cheryl Foster, also a member of the University’s AI initiative, believes that it is imperative to study data from a variety of viewpoints, including those of ethics and logic.

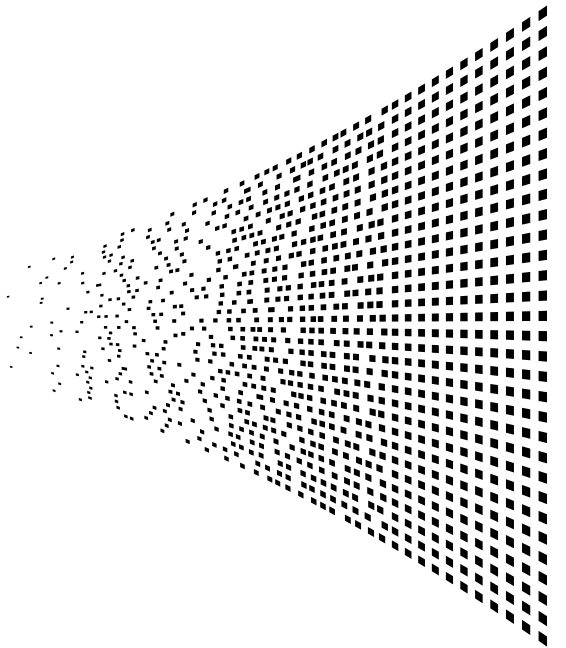
“I would argue that in order to be a good citizen and informed voter, people need to make sense of data,” Foster says, stressing the importance of understanding data while participating in democracy.

“Our job at the University is to teach people how to think,” Peckham says. “This is really interesting because it has to do with all of us.”



Data visualization from the URI Maker Space.

# Big Data Projects



## Project:

## CALCULATING DIFFERENCES AMONG GENOMES TO UNDERSTAND EVOLUTION

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### RESEARCHERS:

- Rachel Schwartz, assistant professor, biological sciences
- Noah Daniels, assistant professor, computer science and statistics
- Yara Hrytsenko, graduate student, computer science and statistics

### ABOUT:

By examining patterns in the differences among genomes, Rachel Schwartz hopes to better understand how species can change over evolutionary time. The existing methods for analyzing data from genomes were not designed to enable the type of comparative research Schwartz is conducting.

“It’s not the way people planned to process this data,” she says. “And it pushes us into some pretty complex calculations.”

Schwartz collaborates with Daniels and Hrytsenko in the Department of Computer Science and Statistics to develop algorithms to compare genomes efficiently. Daniels is also developing methods to visualize these comparisons, which occur in multi-dimensional space, in a way humans can work with. Ultimately, Schwartz would like to apply these novel approaches to understand both fundamental processes in evolution, and how genomes change when they become cancerous.



Schwartz hopes to better understand how species can change over evolutionary time.



## Project:

# ARTIFICIAL INTELLIGENCE LAB (AI) IN THE LIBRARY

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## RESEARCHERS:

- Kunal Mankodiya, assistant professor, electrical, computer and biomedical engineering
- Cheryl Foster, professor, philosophy
- Karim Boughida, dean, University Libraries
- Harrison Dekker, associate professor, University Kingston Library
- Joan Peckham, professor, computer science and statistics, and coordinator, Big Data Collaborative
- Angelica Ferria, curator, Media Resource Center, University Kingston Library
- Bohyun Kim, associate professor, University Kingston Library

## ABOUT:

In fall of 2018, the University will open an AI lab in the URI Kingston Library – quite possibly the first such space in a library in the USA – a literal space for learning about the future of AI, but also a conceptual one that will encourage conversation about the ethical dilemmas surrounding emerging technology.

The literal and conceptual spaces will occupy different zones. The first zone will offer machines where students can complete self-teaching tutorials to learn coding and master basic AI techniques. The second zone will be equipped for higher-level technical projects, such as designing robotics or smart cities. The third zone, located nearby the lab space itself, will be a conceptual space where people can gather to discuss and debate the implications of big data and emergent technology.

“In modern times, it has become very difficult to project the impact of AI,” says Kunal Mankodiya, “You always hear or see the positive or negative perceptions of AI. Our aim is to see AI from various angles and encourage rational thinking with the development of AI-based solutions. We strongly believe that our students will cultivate and carry the new collaborative thinking approach.”

URI has developed a collaboration with the

humanities specifically for this purpose. “Institutes that consider AI and the future of life and humanity are already established at MIT and Oxford,” philosophy Professor Cheryl Foster says. “Here at URI, we will draw on the work of those institutes to consider some of the same questions, while also developing classroom opportunities that bring Big Data, AI, and the humanities together practically and theoretically.

“You can’t talk about the uses and abuses of artificial intelligence without talking about the ethics of big data,” Foster says.



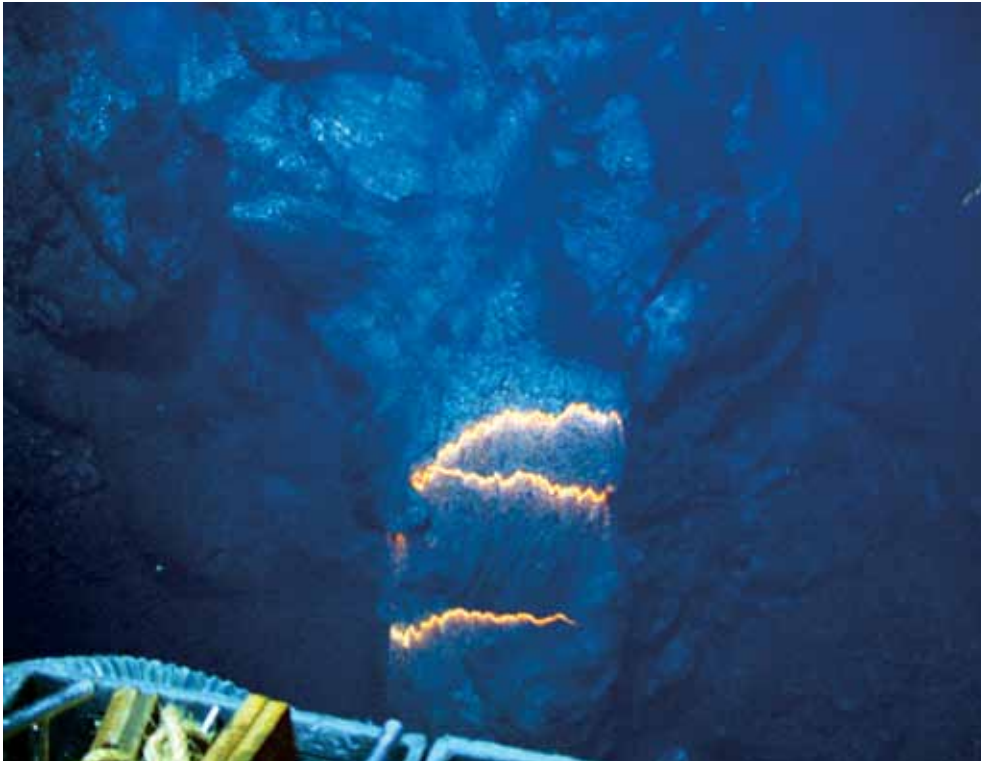
“Our aim is to see AI from various angles and encourage rational thinking with the development of AI-based solutions.”

- Kunal Mankodiya

## Project:

# UNDERSTAND DEEP SEA EARTHQUAKES

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Submarine explosive eruption and lava flow from the West Mata volcano in the western Pacific Ocean.

## RESEARCHERS:

- Meng Wei, assistant professor, Graduate School of Oceanography
- Randolph Watts, professor, Graduate School of Oceanography
- Kathleen Donohue, professor, Graduate School of Oceanography
- Tao Wei, associate professor electrical, computer and biomedical engineering
- Yang Shen, professor, Graduate School of Oceanography
- Bing He, graduate student, Graduate School of Oceanography

## ABOUT:

The 2004 Indian Ocean and 2011 Japanese earthquakes and tsunamis were a wake-up call as to how dangerous an ocean earthquake can be. The Cascadia subduction zone (where the two tectonic plates collide) in the Pacific Northwest is overdue for a major earthquake. A key question regarding natural hazards is whether such an earthquake can generate a large tsunami. Our ability to answer this question is limited by the lack of deformation measurements near the shallow portion of the subduction zone in the ocean.

Supported by the National Science Foundation, Meng Wei and his collaborators are developing tools and sensors to make the collection of this research data easier, and will enhance the understanding of tectonic deformation near the ocean trench.

“To understand earthquakes, we need to use tools from math, physics, remote sensing, engineering, and computer sciences,” Wei says. “Remote sensing and engineering provides the observations. Math and physics provides the theoretic framework. Computer sciences provides the software and hardware to simulate earthquakes, which are used to compare with real observations and test different theories on how earthquakes work.”

Wei collaborates with colleagues in the Graduate School of Oceanography and the College of Engineering to develop instruments that can be used to collect data necessary to understand the difference between tremors caused underwater by earthquakes and those caused by nuclear events.

“The big data collaborative encouraged me to think about my research in a bigger scope and search for new collaborations,” Wei says.



## Project:

# BIG DATA OF THE NUTRITION FIELD

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## RESEARCHERS:

- Maya Vadiveloo, assistant professor, nutrition and food sciences
- Stephen Atlas, assistant professor, marketing
- Ashley Buchanan, assistant professor, pharmacy practice
- Xingtong Guan, graduate student, marketing

## ABOUT:

Though her data sets may not be huge in comparison, Maya Vadiveloo's research is considered the big data of the nutrition field. With the help of several colleagues, she is examining purchasing habits of shoppers at grocery stores and encouraging healthier purchasing with targeted coupon codes.

"Consumer psychology and customer analytics are used by marketers to target coupons and other messages to consumers to purchase various products," Vadiveloo says. "We plan to use a similar analysis to develop a set of targeted coupons that incentivize healthier food purchases for different groups of consumers, with the goal of using this type of tailored nutrition intervention to gradually improve the quality of consumers' overall diet."

Purchase data is already automatically collected by the point of sales system at checkout, and Vadiveloo hopes to develop algorithms to analyze this data. She will then be able to offer, for example, customers who buy high sugar yogurt coupons for lower sugar options.



"We plan to use a similar analysis to develop a set of targeted coupons that incentivize healthier food purchases for different groups of consumers.



# Tracking Toxins Around the Globe:

\$8 Million Grant to Research  
Pollutants in Drinking Water

written by **TODD MCLEISH**



TOXIC CHEMICALS RELEASED INTO THE ENVIRONMENT HAVE TURNED UP IN SOME RATHER UNEXPECTED PLACES – DEEP IN THE OCEAN, IN THE BREAST MILK OF FUR SEALS, IN ANTARCTIC GLACIERS, NEARLY EVERYWHERE IN THE ARCTIC, THROUGHOUT THE GREAT LAKES AND THE NARRAGANSETT BAY WATERSHED, AND EVEN ON GRILLED STEAK. AND THOSE ARE JUST THE PLACES THAT RAINER LOHMANN HAS FOUND THEM.

A professor of chemical oceanography at the University of Rhode Island (URI) Graduate School of Oceanography, Lohmann has long been worried about the chemical pollutants that drift into waterways and travel around the globe in the world's oceans, contaminating food webs and sometimes lingering for decades. He has made it his life's work to study and monitor man-made chemicals, from pesticides and PCBs to mercury and flame retardants, that are harmful to humans and the environment.

"We study old compounds in places that still haven't been remediated, as well as many new chemicals that have been created to replace the old ones," says Lohmann, who grew up in Germany and joined the URI faculty in 2004. "And we don't necessarily know which are the new bad compounds."

Many of the chemicals Lohmann finds in the environment today were banned more than 40 years ago but continue to be detected at harmful levels, especially in the Arctic. Thousands of untested new chemicals are introduced to the environment every year through industrial processes, with little regulation or government oversight. In 2013, he worked with fellow scientists to demand stricter regulation of these chemicals, and he was invited to testify before Congress about proposed legislation that he says would do little to improve the situation.

"Within the Toxic Substances Control Act (TSCA), chemicals are all considered innocent until proven guilty," he told the House Energy and Commerce Committee. "While this approach is appropriate for U.S. citizens accused of a crime, from my perspective it is a dangerous approach to use with chemicals in commerce... The current platform from which TSCA operates holds the American public hostage to the chemical manufacturers."



ANNA ROBUCK  
PH.D. CANDIDATE, OCEANOGRAPHY

When Anna Robuck studied the effect of storm water on tidal creeks for her master's degree at the University of North Carolina in Wilmington, she came across research papers by Professor Rainer Lohmann, which led her to enroll at the University of Rhode Island (URI) Graduate School of Oceanography for her doctorate.

As part of Lohmann's Superfund Research Program, Robuck is studying how fluorinated compounds affect the food web in the Stellwagen Bank National Marine Sanctuary in Massachusetts Bay by assessing whether the contaminants are found in seabirds. To accomplish this work, she first had to develop a new methodology for detecting the compounds found in livers.

"Creating that new methodology was more time intensive than I expected, but it looks like what we've come up with is viable," Robuck says.

This research, which will be featured in two chapters of Robuck's dissertation, is funded by a Nancy Foster Scholarship, a prestigious award from the National Oceanic and Atmospheric Administration (NOAA) that facilitates student research with NOAA's Office of National Marine Sanctuaries. The third chapter of her dissertation will focus on halogenated natural products, chemical compounds that are similar to man-made toxins but are produced naturally by many marine plants and other organisms.

"Working at URI has been such a formative experience — I've fallen in love with contaminant research and have learned so much in a short period of time," Robuck says. "I look forward to engaging in contaminant work well into future, as there seems to be a never ending supply of concerns and questions about new and existing environmental pollutants."



Polypropylene sampling tube.

“THE NEW CENTER WILL WORK CLOSELY WITH COMMUNITIES AND SCIENTISTS TO SHARE OUR KNOWLEDGE AND HELP INFORM PEOPLE AND AGENCIES ABOUT THIS GROWING PROBLEM. THESE FLUORINATED CONTAMINANTS ARE PRESENT IN THE BLOOD OF ALMOST EVERY ADULT IN THE UNITED STATES.”

- RAINER LOHMANN

“It’s been interesting to find that the concentration of some pollutants in Antarctica haven’t decreased as much as we would have expected, which is probably because the melting glaciers are releasing pollutants from the 1970s and ‘80s back into the water.”

- Rainer Lohmann



Rainer Lohmann  
Professor  
Oceanography

While little has improved in the regulation of chemicals released by U.S. industries since he made his first public plea, that hasn’t stopped Lohmann from continuing to advocate for better legislation and improved monitoring. His wide-ranging research continues unabated as well, and he continues to find chemical pollutants everywhere he turns.

For instance, he has traveled back and forth across the Atlantic from the U.S. to Africa and found low concentrations of pollutants in even the most remote locations. In the Southern Ocean he found pollutants accumulating in the tissues of animals up and down the food web, including seals, killer whales, and plankton. In the Arctic he discovered mammals from polar bears to humans exposed to harmful chemicals at fairly high levels.

Lohmann also made several unexpected observations.

“In some cases, because the atmosphere has become cleaner – thanks to efforts to reduce some of the worst emission sources – we see that the oceans are releasing pollutants back into the atmosphere,” he says. “It’s been

interesting to find that the concentration of some pollutants in Antarctica haven’t decreased as much as we would have expected, which is probably because the melting glaciers are releasing pollutants from the 1970s and ‘80s back into the water.”

Last year, Lohmann launched a major new project with an \$8 million grant from the National Institute of Environmental Health Sciences (NIEHS) to establish a URI-based research center on chemical pollutants in drinking water. The five-year program is part of a national network of Superfund Research Program (SRP) centers designed to generate new insights into specific chemical pollutants.

Lohmann is leading an interdisciplinary team of URI researchers, including Geoffrey Bothun, professor of chemical engineering; Bongsup Cho, professor of biomedical sciences; Alyson McCann, water quality coordinator at the Cooperative Extension; Martha McConnell, project coordinator; Angela Slitt, associate



Filtering water (left to right) Yuxin Ma, Ph.D., Shanghai Ocean University; Christine Gardiner and Anna Robuck, URI graduate students of oceanography.

professor of pharmaceutical sciences; and Judith Swift, professor of communication studies and director of the Coastal Institute, along with the Institute's assistant director Nicole Rohr and digital media specialist Amber Neville. They will be joined by researchers from Harvard University and the Silent Spring Institute to focus on fluorinated pollutants commonly used on non-stick cookware and firefighting foam known to contaminate drinking water.

The researchers will examine to what degree groundwater in towns near the Joint Base Cape Cod military training site is contaminated with the chemicals, which were present in firefighting foam used during training exercises. The chemicals have been linked to kidney and testicular cancers, thyroid disease, colitis, and suppression of the immune system – maladies that lend urgency to the study.

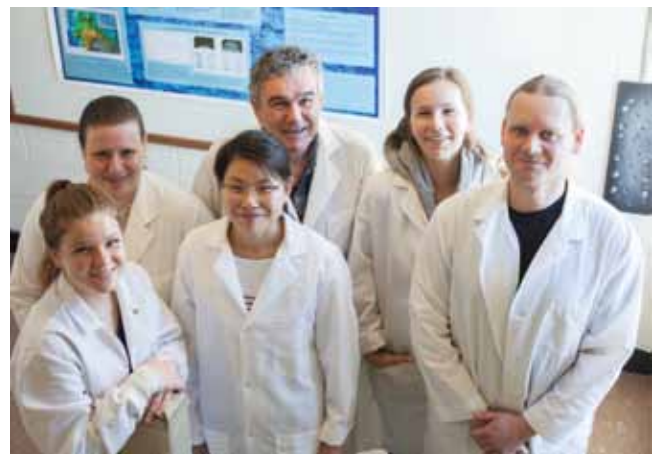
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back row (left to right) Jitka Becanova, Ph.D., oceanography postdoctoral fellow; Dave Adelman, oceanography lab manager; Anna Robuck, oceanography graduate student.

front row (left to right) Christine Gardiner, oceanography graduate student; Yuxin Ma, Ph.D., Shanghai Ocean University; Simon Vojta, Ph.D., oceanography postdoctoral fellow.

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Many of the chemicals Lohmann finds in the environment today were banned more than 40 years ago but continue to be detected at harmful levels.





Extraction and sample cleaning-up step in preparation for trace contaminant analysis.

Bothun will focus his efforts on how the chemicals travel from blood into human cells; Cho will lead a training program for graduate and post-doctoral students working on the project; McCann will conduct community outreach with Cape Cod communities; Slitt will study what the chemicals do to animals; and Swift, Rohr and Neville will create communication materials to educate the public on Cape Cod and at similarly contaminated sites throughout the country.

In addition to leading the project, Lohmann will study new ways of detecting the contaminants in the environment using a method he started using a decade ago that involves the use of what he calls “passive samplers,” small sheets or tubes of polyethylene that absorb many types of chemicals that are dissolved in water.

“As one of the few national SRP centers in the country the new center will work closely with communities and scientists to share our knowledge and help inform people and agencies about this growing problem,” Lohmann says. “These fluorinated contaminants are present in the blood of almost every adult in the United States.”

Because these and other chemicals are persistent in the environment over long periods of time, Lohmann says that they could be used to trace human activity back to the time they were made: “If we could switch off the release of PCBs today, for instance, someone will still be able to trace those chemicals back to us in a thousand years.”





# Understanding the Challenges of Breeding Oysters

written by **ALLISON FARRELLY '16**

People can't seem to get enough oysters, whether on the half shell or in stuffing, stewed, fried, or barbecued. And, farms are happy to keep up with demand.

One key challenge, though, is disease. In Rhode Island, oyster populations can succumb to any of five diseases. In some cases, an infection can almost wipe out a farm's entire supply.

In an effort to better understand what makes oysters

resistant to disease, Marta Gomez-Chiarri, University of Rhode Island (URI) professor and department chair of fisheries, animal and veterinary science, managed a project sequencing the Eastern oyster genome, one of the few genomes available for the many tasty species from our oceans that have two shells.

Gomez-Chiarri studies infectious disease in marine organisms and how to combat them.

"There are a lot of things you have to pull together to



KNOWLEDGE OF HOW TO CULTIVATE STRONGER OYSTERS AND KEEP THEM HEALTHY IS PARTICULARLY IMPORTANT TO BUSINESS PEOPLE.



REBECCA STEVICK '19  
PH.D. CANDIDATE, OCEANOGRAPHY

Oysters harbor bacteria in their gut that process nutrients, which helps clean up their surrounding water. Rebecca Stevick, University of Rhode Island (URI) oceanography Ph.D. candidate, calls their natural processing of harmful chemicals “ecosystem services for the community.”

Under the mentorship of URI Professor Marta Gomez-Chiarri, Stevick is examining exactly how microbial communities associated with oysters may influence the oyster’s health, fitness, and value; work that closely links to Gomez-Chiarri’s exploration of oysters and their diseases.

“I look at how microbial interactions affect the oysters so we can get a better understanding of how the environment influences oysters and vice versa,” Stevick says.

At URI, Stevick has been surprised to find how widely applicable her methods are for gathering and analyzing information. For example, she has been able to apply protocols she developed to study land organisms to examine the function of oysters.

The unique nature of the National Science Foundation Graduate Research Fellowship Program funding Stevick’s research allows her to explore diverse areas of research, rather than focusing on a single professor’s research project. This flexibility is, in part, what led her to work with Gomez-Chiarri.

When applying to graduate schools, she knew professional relationships had the potential to “make or break grad school.”

“She’s one of the reasons I’m at URI, she’s a wonderful advisor,” Stevick says. “It’s really an honor to get to work with her.”





Rebecca Stevick, NSF Fellow, Ph.D. candidate, oceanography; Melissa Hoffman, graduate student, Biological and Environmental Sciences (BES), Sustainable Agriculture and Food Systems (SAFS) program; Evelyn Takyi, graduate student, BES, Cell and Molecular Biology (CMB); Professor Gomez-Chiarri; Erin Roberts, Ph.D. candidate, BES SAFS; Sam Hughes, graduate student, BES CMB; URI Visiting Scholar Murni Karim, Senior Lecturer at the University of Putra Malaysia.

“WE HAVE TO HAVE GOOD HUSBANDRY TECHNIQUES AND MAKE SURE WE’RE NOT OVERSTOCKING OR OVERSTRETCHING OUR RESOURCES. THAT MAKES HAVING SOMEONE LIKE MARTA IN THE MIX VERY VALUABLE.”

- PERRY RASO, OWNER, MATUNUCK OYSTER BAR

understand these diseases and why they happen,” explains Gomez-Chiarri, who is part of a consortium of researchers at URI and across the country investigating what makes oysters so unique.

The first step in counteracting diseases is identifying them, Gomez-Chiarri explains. Then once a disease is identified, tools need to be developed to monitor the disease and overcome it.

“You can select oyster strains that are resistant to disease through the process of selectively breeding those oysters that survive disease outbreaks,” Gomez-Chiarri says. “But it is a long drawn-out process.”

Oysters are a highly adaptable species that live in diverse environments, from the warm estuaries in Louisiana exposed to periods of low salinity, to the cold and more saline waters of coastal New England. Even if a disease-resistant strain of oysters can be selectively bred in a particular location or region, it does not mean that it will perform well in another ecosystem because the performance of disease strains varies based on environmental conditions.

“Oyster breeding centers could breed much faster if they knew what they were looking for,” Gomez-Chiarri explains.

The Eastern oyster genome the consortium sequenced, however, has the potential to change the way all oysters are studied and understood. Gomez-Chiarri is working with the USDA Agricultural Research Services Laboratory in Shellfish Genetics to figure out what genetic signatures make oysters resistant. This research will help speed up the process of breeding disease-resistant oysters by looking at which oysters are well adapted to a specific region and have the genetic signatures characteristic of disease-resistant oysters.

Another tool Gomez-Chiarri is researching to manage disease involves the application of probiotics — bacteria with health benefits — to prevent disease in shellfish hatcheries. She collaborates with researchers at URI specializing in microbiology and natural product chemistry to investigate how probiotics can be applied to manage disease outbreaks that affect larval oysters in hatcheries. Currently they have developed two effective probiotic strains.



## Marta Gomez-Chiarri

Professor and Chair  
Fisheries, Animal, and  
Veterinary Science

"We're looking, at a basic level, how probiotics interact with the larval oysters and the pathogens that can kill them," she says. "At the practical level, the goal is to figure out how to use these probiotics in a hatchery to make sure the oyster larvae don't die."

This knowledge of how to cultivate stronger oysters and keep them healthy is particularly important to business people like Perry Raso, owner of Rhode Island's Matunuck Oyster Farm and the Matunuck Oyster Bar restaurant.

When Raso founded the seven-acre farm in 2002 on Potter Pond in South Kingstown, Rhode Island, he remembers that there were around 15 other oyster farms in Rhode Island. Today, there are upwards of 60.

"The value of the oysters has grown year after year," says Raso, who sells more than a million oysters per year between his restaurant and wholesale accounts.

Raso met Gomez-Chiarri when he was a student in one of her classes at URI, and says she has been instrumental in the success of his career. Raso plans to open an oyster hatchery in South Kingstown in the summer of 2018, which will allow him to keep all his production in southern Rhode Island, rather than relying on oyster seeds from other hatcheries. The effort will require tremendous knowledge

on how to keep young oysters healthy, he says.

"We have to have good husbandry techniques and make sure we're not overstocking or overstretching our resources," Raso says. "That makes having someone like Marta in the mix very valuable."

Gomez-Chiarri is applying her research on oyster populations in URI's backyard, Narragansett Bay, as part of a large initiative through the National Science Foundation's Established Program to Stimulate Competitive Research (EPSCoR) grant program in Rhode Island.

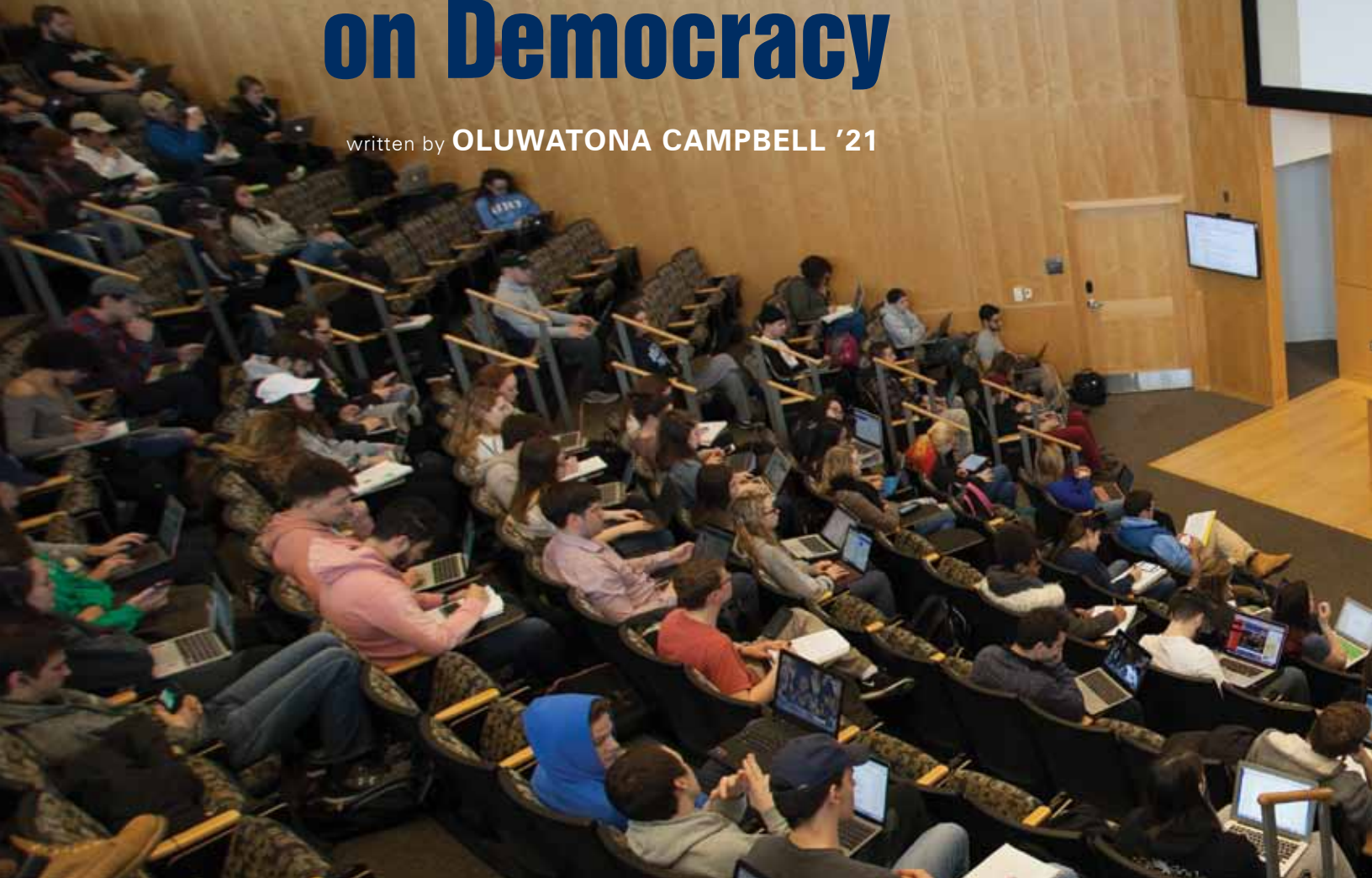
The funding will allow Gomez-Chiarri to research the impact of climate change in Narragansett Bay, including changes in the foods that organisms, particularly oysters, are eating and in the pathogens to which they are exposed. The funds will enable the development of underwater sensors to record data and to integrate all the information gathered from physical and biological interactions into models. The models will try to predict what will happen in the future.

"URI is the right size to encourage collaboration," Gomez-Chiarri says. "I work with a lot of people, and I love learning new things and exploring new questions. It's exciting here."



# The Effects of Persistent Terrorism on Democracy

written by **OLUWATONA CAMPBELL '21**



HUTCHISON SOUGHT TO FURTHER EXPLORE THE RELATIONSHIP BETWEEN PERSISTENT TERRORISM AND POLITICAL TOLERANCE, TO TRY TO FIND THE POINT WHERE TERRORISM MIGHT CAUSE A DEMOCRACY TO BACKSLIDE TOWARD AN AUTHORITARIAN GOVERNMENT.

University of Rhode Island (URI) Associate Professor Marc Hutchison has spent a significant part of his career studying the influence of terrorism and conflict on political tolerance.

“We had September 11, and it was a massive attack,” Hutchison says. “One of the things the United States has struggled with since then is what kind of impact terrorism has had in changing our idea of democracy, our attitudes and our values?”

National and global politics illustrates the adverse consequences terrorism has had on political attitudes in a post-9/11 world.



# State-level Theories

## Regime Type

- Democratic Peace Theory

## Expected Utility Theory


- War occurs when utility of war > peace
- Explains why states start wars even when odds of winning are low
  - War can be rational even if aware they will lose
  - Highest expected utility > successful strategy
- Persian Gulf War
  - Saddam wanted to keep power in Iraq
  - Losing war < making weakening concessions

Hutchison's research in 2014, on the effects of terrorism and other forms of civil conflict on domestic political tolerance, studied data from the 1995 through 1997 World Values Survey. Hutchison concluded that civil conflict reduces the public's willingness to extend basic political rights to non-conformist groups throughout society. Hutchison's study illustrates one of the dangers terrorism poses to society by chipping away at foundational democratic values and norms.

"Political tolerance is the application of our civil liberties, even for people that we don't like," he says. "That's at the fundamental basis of democracy."

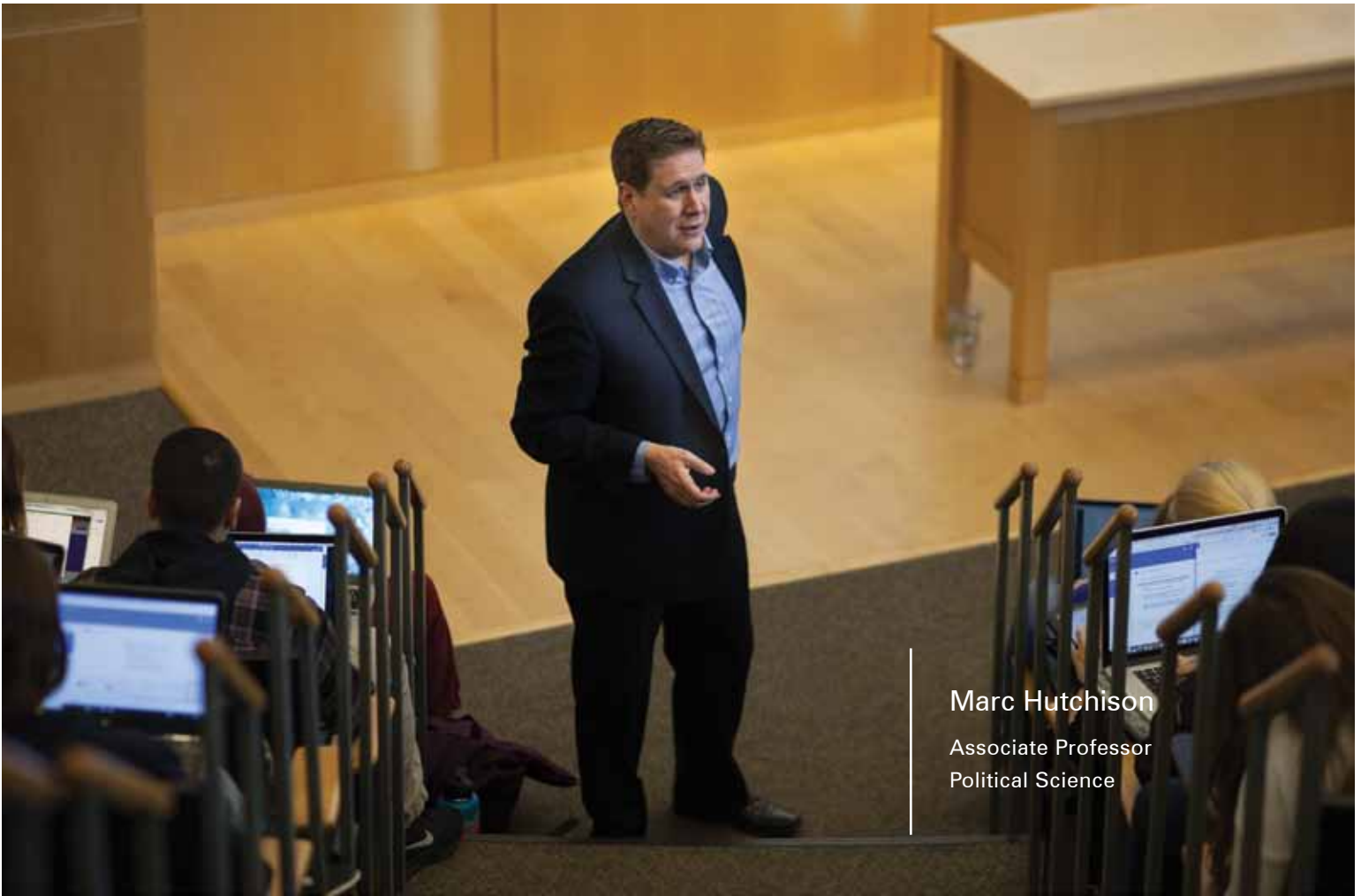
Hutchison sought to further explore the relationship between persistent terrorism and political tolerance, to try to find the point where terrorism might cause a democracy to backslide toward an authoritarian government. Before Hutchison's work, there had been little research examining the effects of persistent terrorism on democratic attitudes and behavior. Instead this research focused on the impact of a single large attack, like September 11.

Hutchison and his colleagues from the University of Kentucky and Tel Aviv University, turned their attention to Israel to study this relationship of persistent terrorism and political tolerance.

A row of international flags flying in front of a modern building under a blue sky with light clouds. The flags include those of Ghana, Ethiopia, Haiti, Honduras, Iceland, India, and Italy. The building has a grid-like facade of windows.

“WE ARE ABLE TO CAPITALIZE ON DATA THAT DOES NOT EXIST ANYWHERE ELSE IN THE WORLD. NO OTHER COUNTRY HAS MEASURED POLITICAL TOLERANCE SO CONSISTENTLY OVER SUCH A LONG PERIOD OF TIME.”

- MARC HUTCHISON



Marc Hutchison

Associate Professor  
Political Science

"We are able to capitalize on data that does not exist anywhere else in the world," he says. "No other country has measured political tolerance so consistently over such a long period of time."

Hutchison hypothesized partisanship would be the factor that would moderate a person's response to persistent terrorism and, subsequently, level of tolerance. He and his colleagues were able to use unique data collected from 18 different surveys measuring tolerance attitudes of Israeli citizens from 1980 through 2011. They analyzed it alongside the occurrences of terrorist attacks to conclude that persistent terrorism reduced levels of tolerance of those on the political right, whereas tolerance levels on the left remained relatively the same.

Similarly, in the United States, in the case of the 2015 San Bernardino, CA shooting, it was perceived through the lens of partisanship. Those on the left were quick to underscore the need for new gun control laws that prevent individuals on the terror watch list to purchase and own weapons. Whereas those on the right called for the need for stricter immigration laws.

People that held their tolerant beliefs in the face of persistent terrorism were products of what Hutchison refers to as the "democratic learning" process in which

citizens internalize democratic values over time.

"Democratic learning ultimately helps undermine a central goal of terrorism," Hutchison says. "Which is to sow societal divisions by increasing intolerance. Democratic learning can mitigate this effect by instilling and reinforcing the value of political tolerance."

Hutchison remains optimistic that the long history of democracy and democratic learning in United States will help citizens withstand the dangers of persistent terrorism.

"I feel that our democratic learning process can still help shield our democracy from the worst forms of intolerance and people who take advantage of low hanging political incentives to inflame tensions," Hutchison says.

Hutchison hopes that his research as well as the adverse consequences of our current political climate will underscore the need of greater civic education and engagement.

"I still have faith in the democratic values of the United States," Hutchison says, "I still think they will continue to play a critical role in our society."





Cheryl Foster

Carnegie Professor  
of Philosophy

# Finding Patterns Through **PHILOSOPHY**

written by **ALLISON FARRELLY '16**

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“URI HAS VALUED AND ENCOURAGED THE WORK I AND OTHERS DO AS APPLIED HUMANISTS AND CREATIVE SCHOLARS. FOR THAT, I AM DEEPLY GRATEFUL.”

- CHERYL FOSTER

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University of Rhode Island (URI) Carnegie Professor of Philosophy Cheryl Foster has an aptitude for detecting patterns – a skill that she exercises with diverse groups of people, picking up on and then knitting together their common values to identify collective goals.

Foster strives to extract the most compelling points among their observations and then shape those into a cohesive framework that can be applied to achieve the group’s goals.

“I hear patterns in the way groups of folks are trying to work together and can provide a framework for how people can articulate their ideas,” she adds.

Foster has utilized philosophical pattern detection for many years to empower organizations as they address problems in the arts, the environment and education.

“I think of myself in this phase of my life as an applied humanist. I’m taking the capacities I’ve developed as a philosopher, a scholar, a strategist, and a writer and extend these capabilities to the classroom, the community on campus, and in contexts well beyond the University,” Foster says. “In the past I have worked with organizations like the North American Nature Photography Association and WaterFire Providence, over the last decade or so, I’m doing a lot more work locally.”

## OUTDOOR ENVIRONMENTS

Sari’s Sanctuary Outdoor River Classroom sits on the banks of the Saugatucket River in Wakefield, RI, and serves countless school children in the area, as well as public events and nature lovers who wish to linger along the river. But completing the commemorative outdoor space, named for a local student who died of cancer in 2005, was a costly task.

Compelled by the project, Foster helped identify and write grants to support the existing coalition of Wakefield Elementary School



## MIKE GRENIER '18

UNDERGRADUATE STUDENT  
DOUBLE MAJOR: MUSIC AND PHILOSOPHY

By the end of a philosophy course on existentialism taught by Professor Cheryl Foster, Mike Grenier, then a jazz performance student, found himself inspired enough to declare a second major in philosophy.

When Grenier, a member of the Rhode Island National Guard and U.S. Army Band, earns his degree he will have had deconstructed the self-published music performance manual used in the instruction of Army Musicians, revealing it’s insufficiency in properly developing effective military musicians.

“The manual needs to be improved to treat the issues of performance and audience with the necessary gravitas,” Grenier says. “When looked on as a complete work, my research seeks to hold pedagogical texts to high scrutiny so as to maximize their effects. It is ultimately a cry for change in how we treat musical performance education.”

To make the analysis, he distinguished the implicit aesthetic claims written in standard Army Regulations. He then related these values to predominant audience reception theories to establish grounds for how the military manual should be designed. While the manual had some good practical advice for musicians in general, it lacked many points of consideration for those who perform on behalf of the Armed Services, including those who have fallen in the line of duty.

“With Professor Foster’s help, I’ve identified that, in accordance with the implicit and explicit claims of Army regulations, in order to accomplish the mission of Army Music one must engage authentically with their craft through the embodiment of both technical and tactical mastery treated with musical sensibility,” Grenier says. “With this authentic engagement, the work produced will have the highest potential to deliver the audience into an ideal aesthetic experience.”





Sari's Sanctuary Outdoor River Classroom, Wakefield, RI.

teachers, Saugatucket River advocates, and community stakeholders. They had already raised some funds, but with Foster's help, the coalition was able to secure funds from the Champlin Foundation, a local organization that funds nonprofit projects. The classroom is open to students and the public, and is maintained by the Town of South Kingstown.

## ARTS FOR ALL

Foster also lends her skills to advance local diversity-driven arts programs. She has spent several years working with Rhode Island-based GEAR (Give Everyone A Role) Productions, facilitating strategy meetings, securing funding, and supporting the artistic director as she trains other communities in the GEAR method.

The nonprofit theatre company puts on large-scale, high quality school-based performances where students of all abilities cast themselves in roles, but also mounts yearly plays featuring actors of all abilities.

"I'm very inspired by that work because GEAR offers inclusive opportunities for aesthetic enrichment to individuals with cognitive and physical disabilities from all over the state, opportunities that they may not have otherwise," she says. "Actors with disabilities perform alongside those with conventionally-abled backgrounds; the results are inspiring and of exceptional artistic quality."

## SCHOLARSHIP OF TEACHING

Some faculty members find their way to teaching as a requirement alongside their research. But for others, like Foster, teaching becomes the research.

"The teaching I do is an intentional form of applied scholarly practice," she says.

Foster has partnered with URI's Office for the Advancement of Teaching and Learning (ATL) to pursue a series of projects that examine how teaching affects student interaction and learning. This past fall, Foster



tracked student engagement and learning in a large, entry-level philosophy lecture designed specifically for first-year students.

"I was very interested in teaching students in their first semester because they face so many changes in their lives; having a bit of philosophy to anchor that experience can be useful for them," she says.

Foster and her colleagues incentivized students with extra credit to attend a workshop on study skills, led by visiting speaker Sandra McGuire, a nationally known expert on student learning. ATL tracked the performance of students who had attended the workshop while simultaneously tracking an anonymous control group of students who didn't participate.

ATL is currently crunching the data and hopes to analyze the results to create journal articles that could influence how professors guide engagement in large lectures.

Beyond such research-based endeavors, Foster feels that she has an ethical obligation to conduct research

"I think of myself in this phase of my life as an applied humanist. I'm taking the capacities I've developed as a philosopher, a scholar, a strategist, and a writer and extending these capabilities to the classroom, the community on campus, and in contexts well beyond the University."

- Cheryl Foster

that supports the study of the humanities in a public university setting. She believes it is a duty, due to both the gravity of the potential impact on individual lives and the issue of equitable access to the liberal arts for all.

As she conducts research through teaching, she says it is crucial to keep in mind the diversity of students with whom she and her colleagues interact, students who differ by race, ethnicity, gender, disability, sexual orientation, and economic stability. Among Rhode Island students who attend the University, 40 percent are Pell Grant recipients, typically meaning their families are at or below the federal poverty level.

"Students come to us with wild variations in their readiness for the demands of college, and with radically different levels of exposure to education," Foster says. "In my mind I do political work to try to address the economic and educational disparities that our students often represent."

## WHY URI

Foster recently returned to her position as a full-time faculty member in URI's Philosophy department after five years as an administrator in the University's Honors Program.

"I felt called back to my home department in this particular cultural moment, where the liberal arts are often under siege in the media and by some in public life," Foster says. "Preserving access to a liberal education for students in public institutions is an absolute priority in my work."

Foster has found URI to be an ideal environment in which to pursue her particular vein of research. "URI has valued and encouraged the work I and others do as applied humanists and creative scholars. For that, I am deeply grateful."



# The Impact of Concussions on Young Athletes

written by **OLUWATONA CAMPBELL '21**



Although most parents could identify basic symptoms, others misidentified foot pain, clinched fists, and various other unrelated indicators as concussion symptoms.

Young athletes playing semi to full-contact sports make up a sizeable share of the estimated 3.8 million sport and recreational concussions each year. This reality has motivated all 50 states to adopt laws mandating specific concussion awareness standards for coaches, parents, players and even health care providers.

"In one sense, we have done a good job of educating stakeholders about the symptoms associated with a concussion since regardless of what level, there is a high rate of underreporting of concussions," University of Rhode Island (URI) physical therapy Professor Jeff Konin says. "The athletes know they will not be able to play if they report their concussions."

Although there has been much research into the long-term impact of frequent concussions, and even the effectiveness of protective gear, there has been little research into the effectiveness of concussion education and awareness programs. This lack of research led Konin to study what parents of local youth hockey players knew about concussion symptoms and protocols.

With the assistance of URI student Delaney Horsley '15, Konin surveyed 45 parents of ice hockey players between 7 and 10 years old who attended their children's hockey practice. They developed a 12-question survey to gauge the parents' knowledge. Parents who acquired knowledge through programs such as live presentations, online



Model which demonstrates areas of the brain used for teaching students, patients, athletes and parents about concussions.



Without the accurate concussion education, players go undiagnosed, and those with concussions are allowed to return to the game.

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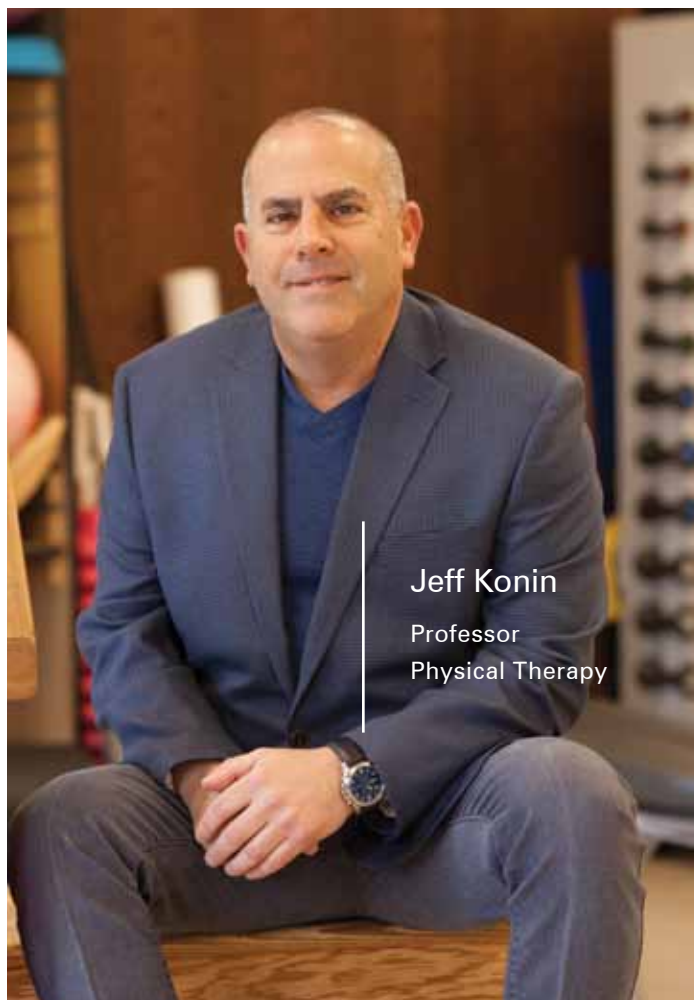
tutorials, and printed resources were studied on how well they retained this knowledge and applied it to their children.

Konin and Horsley uncovered that the overwhelming majority of surveyed parents knew a majority of clear diagnosable symptoms of concussions such as headaches, difficulty with concentration and blurred vision.

"We found that they were fairly educated on the science and the symptoms of concussions," he says. "The results of this study were published in *The Internet Journal of Allied Health Science and Practice* in 2017."

Although most parents could identify basic symptoms, others misidentified foot pain, clinched fists, and various other unrelated indicators as concussion symptoms. Additionally, more than half of all parents were unaware of the youth hockey organizations' concussion policy, let alone the state and international guidelines.

This inconsistent understanding places young athletes at risk. Parents of these players are often best positioned to first notice signs of a concussion but without the accurate concussion education, players go undiagnosed, and those with concussions are allowed to return to the game. If nothing is done to remedy this knowledge gap, players face the long-term effects of undiagnosed and repeated concussions, in mild cases, making it harder to focus in school or on basic tasks, with some severe cases stunting cognitive brain development and function for these young athletes.



Jeff Konin  
Professor  
Physical Therapy



Cameron Macdonald, '19, Ph.D. candidate, physical therapy, demonstrates balance assessment for concussion.

"The international rules are if you sustain a concussion, you must immediately leave the game, and you cannot re-enter the game until you have been examined by a physician," Konin says. "But a majority of parents, in that circumstance, if there are only two minutes left in the game in the championship, just let them play," he says.

**"THERE IS SO MUCH MORE LEARNING THAT PARENTS, ATHLETES, AND EVEN US AS PHYSICAL THERAPISTS CAN DO."**

- CASSIE CATLOW

Konin says he is confident that his research and the future research by his colleagues will prompt parents, players, coaches and health care providers to demand more effective concussion education.

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Konin believes that parents and coaches' willingness to allow concussed youth players to jeopardize their health and safety further reflects of the ineffectiveness of current concussion education programs.

Konin's findings have helped drive other researchers, including Konin's graduate students Cassie Catlow '18, Kelley Johnson '18, Sam Kushner '18, and Tyler McCarthy '18 to study the effectiveness of physical therapy graduate programs concussion curricula.

They surveyed physical therapy graduate programs around the nation on how many hours they spent on clinical concussion education, and how confident their students were prepared to make "return-to-play decisions."

Surveys went to 233 physical therapy programs, and of the completed responses nearly all were confident that their students were qualified to make this critical decision. This despite the fact that few programs actually taught concussion content within their curriculum or included any form of required clinical experience assessing and managing sport-related concussions.





One method of assessing processing functions of the brain following a sport concussion.

## CASSIE CATLOW GRADUATE STUDENT, PHYSICAL THERAPY

“We think in the future the Commission on Accreditation in Physical Therapy Education should consider adding new guidelines on required content and clinical experience related to concussion,” Caslow says.

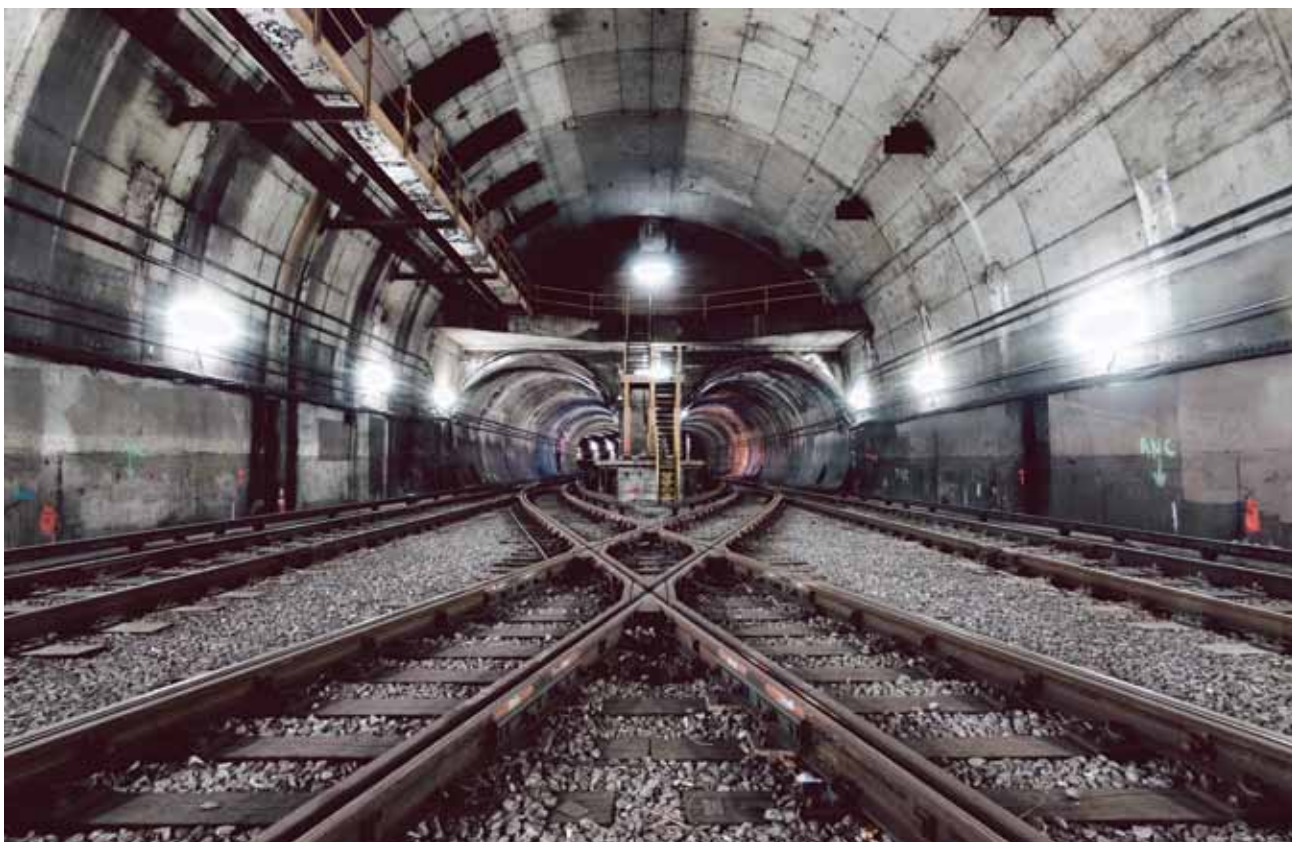
Increased clinical concussion education standards would require physical therapy students to gain more clinical experience assessing and treating concussions, ultimately increasing the clinician’s level of competence and leading to a greater protection of the athlete’s health.

“Ultimately what I take away is that there is so much more learning that parents, athletes, and even us as physical therapists can do,” Catlow says.

Despite the inconsistent concussion awareness, Konin says he is confident that his research and the future research by his colleagues will prompt parents, players, coaches and health care providers to demand more effective concussion education. Konin trusts that sports-medicine experts will work together with parents, coaches, and players to create better education programs and spread more awareness to make sports safer for all.

“There is an inherent risk with everything you do, whether you choose to play football today, there is an inherent risk associated with getting a head injury or an ankle injury,” Konin says. “It is our job as sports medicine experts to educate you on those inherent risks, and you are supposed to make a decision based on that information.”

# PHOTO CONTEST



**1ST PLACE:** Art/Communication undergraduate student Temitope Ogunwumi '18 of Cumberland, R.I., for "Train Tracks," shot in Chicago for a photography class assignment in January 2017 and exploring themes of lines and symmetry in urban architecture. Ogunwumi took the photo for an advanced photography class. "It's primarily a 35mm class, but my professor knew I liked digital photography as well, so she allowed me to do both," Ogunwumi relates. "My friends and I usually spend our free time traveling and exploring large cities. We use photography as an outlet to document our adventures. This happened to be my second time visiting Chicago. One night during our stay we decided to explore one of Chicago's many train stations. After a little while of exploring we wound up stumbling across this area. I was intrigued by the tunnels and the way the tracks intersected one another. I quickly set my tripod up and took a couple photos before leaving."



**2ND PLACE:** Oceanography master's student Megan Lubetkin '19 of Cape Elizabeth, Maine, for "Deepstaria Medusa," a photograph of a *Deepstaria enigmatica* jellyfish taken by a Woods Hole Oceanographic Institution MISO time-lapse camera system mounted on Remote Operated Vehicle *Hercules* during an Exploration Vessel *Nautilus* expedition in November 2017. The dive was part of thesis research into the deep-sea slopes of the Barcena underwater volcano, which lies in a Mexican marine national park and UNESCO World Heritage Site, the Revillagigedo Archipelago. "After completing my master's, I hope to further pursue ocean exploration and applied research," Lubetkin said.



**3RD PLACE:** Marine Affairs Ph.D. student Jessica Vandenberg '20 of Huntington Beach, Calif., for "Afternoon Tea," a photograph of an Indonesian jungle guide making tea for clients in the Malino Highlands, South Sulawesi, Indonesia, in July 2017. Vandenberg, who is co-advised by Associate Professor Carlos Garcia-Quijano and Assistant Professor Amelia Moore, has been doing dissertation fieldwork that mainly concentrates on small islands in the Spermonde archipelago; this photo was taken on a side trip to mainland Sulawesi to observe hill communities and their relationship to tourism and development. After graduation, Vandenberg "would like to remain in development and conservation in Indonesia, either working for an IGO, NGO, or in academia."

**HONORABLE MENTION:** CELS Natural Resources Science Professor Yeqiao Wang for "The Bay is Supposed to Be Frozen By Now," a photo of a mother polar bear and her two cubs standing on the shores of Hudson Bay in the Arctic Ocean October 21, 2016. After a lean summer, the bears were waiting for ice to form so they could go out and hunt for their primary food source, ringed seals.



**HONORABLE MENTION:** Master's candidate Charlie Scott, who's in the College Student Personnel track in Human Development and Family Studies, for "Ghost," a photo of juniper berries taken in early January, 2018, at Canyon Del Muerto on the Navajo Nation reservation in Arizona as part of a study of aesthetics through an indigenous lens. The berries may be dried to form "ghost beads," providing peace, protection and good fortune to the wearer.

**HONORABLE MENTION:** Wildlife Conservation Biology/Film and Media undergraduate student Noah Rivard for "Security Guard," a photo of a guard behind his desk, separated from the viewer by glass, taken during a August 2017 URI Photography Club-sponsored trip to Boston, Mass.





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