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RESEARCH & INNOVATION

2012-2013

THE
UNIVERSITY
OF RHODE ISLAND
DIVISION OF RESEARCH &
ECONOMIC DEVELOPMENT

URI RESEARCH
IMPACTING RHODE ISLAND
ECONOMIC DEVELOPMENT





DAVID M. DOOLEY, Ph.D.
President

Research and innovation have been University of Rhode Island hallmarks for decades, but at no other time in our history have these activities been more critical to URI's academic enterprise. As you read this issue of *Research & Innovation*, consider that contributions are featured from professors at seven URI colleges and schools: Arts & Sciences, Engineering, Environment & Life Sciences, Human Science & Services, Nursing, Pharmacy, and the Graduate School of Oceanography. Consider too that all six 2013 Rhode Island Science and Technology Advisory Council (STAC) Research Alliance Collaborative Research grants, which were announced in mid-June, funded work involving URI professors. I also invite you to check out our latest YouTube video, Innovation, Design, and Invention, which features additional exciting research developments at the university.

STAC has honored URI faculty, not only for their rigorous research efforts but also for their focus on collaboration. Whether in the area of environmental sustainability, elder care, aquaculture, national security, or effective use of marine resources, as Peter Alfonso states in his introduction here URI researchers collaborate with each other and with private sector companies to address state, regional, national, and international challenges. We do so because we believe partnerships are the key to economic growth, robust academic exploration, and fulfillment of our mission as Rhode Island's only land grant public university, to translate research in ways that will improve lives.

In future issues of *Research & Innovation* we will continue to highlight the wonderful – and unexpected – discoveries that our faculty, undergraduates, and graduate students are experiencing day in and day out. In our increasingly global village, what happens in Kingston doesn't stay in Kingston.

Sincerely,

David M. Dooley, Ph.D.

President



PETER ALFONSO, Ph.D.
Vice President for Research
and Economic Development

Welcome to the 2013 edition of *Research & Innovation*, the research magazine of the University of Rhode Island. The mission of the University of Rhode Island's research enterprise is twofold: first, to engage in a wide range of disciplines to seek solutions to a host of critical issues that not only affect our state but also our region, nation, and the world; and second, to enhance economic development in our state by the commercialization of the products, technologies and processes that stem from our research. Indeed, we are doing exceedingly well on both of these accounts. Research expenditures for FY2012 exceeded \$100 million for a second consecutive year. In fact, research expenditures increased 33 percent during the four-year period FY2009-12 at \$377.0 million compared to the previous four-year period FY2005-08 at \$284.7 million. The corresponding economic impact of these dollars is increasingly significant. An economic analysis of the \$98.5 million in awards received in fiscal year 2011 estimates an economic impact of \$154.1 million, which represents new money to the state that we would not have otherwise and in turn creates an additional 1,467 jobs at an annual salary of \$64,973 and \$25.8 million in federal, state, and local taxes. And these numbers do not include the revenue and resultant economic impact that accrues with the commercial enterprises that stems from URI research generated inventions.

The theme of this year's magazine reflects URI's mission as the State's Land and Sea Grant university and how that status contributes significantly to Rhode Island's economic well being. For example, you will find articles that highlight the College of the Environment and Life Sciences collaborations with the private sector in development of biotechnology applications to aquaculture, the ongoing work in the College of Pharmacy on drug development, the College of Arts and Sciences nationally acclaimed research in national security in the areas of explosive detection and mitigation, as well as cyber security, and a variety of ongoing research programs in the URI Graduate School of Oceanography on sustainable marine resources that bear on the state's economy. These and the remaining articles tell the story of how our researchers are engaged in a myriad of ways to sustain our planet and enrich our lives.

I trust that the 2013 edition of *Research & Innovation* will convey that the research enterprise at the University of Rhode Island is definitely on the move, and that our multiple research programs bring resources to bear on the problems facing Rhode Island, our country, and the world.

Sincerely,

Peter Alfonso, Ph.D.

Vice President for Research and Economic Development



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THE UNIVERSITY OF RHODE ISLAND

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RHODE ISLAND'S KNOWLEDGE BASED ECONOMY: THE ROLE OF PHARMACEUTICAL SCIENCE

In the pharmaceutical world, the phrase “bench to bedside” refers to the process of creating a new drug, manufacturing it, and getting it to the patients who need it, a series of often complicated tasks that includes everything from basic research to knowing how the laws of intellectual property and federal regulations apply to new product development.

This is David Worthen's area of expertise. This innovative thinker is balancing teaching, research and business development while collaborating extensively with industry.

Worthen holds a joint appointment as an assistant professor in the Department of Biomedical and Pharmaceutical Sciences and in the Department of Chemical Engineering at the University of Rhode Island (URI). This South Kingstown native and URI alum worked in the pharmaceutical and consumer products industries before coming to URI. In addition to his scientific education, Worthen earned his law degree from the University of Kentucky. A founding member of URI's new Interdisciplinary Neuroscience Program, he is using his experience in industry and law, as well as scientific research, to help further URI's programs in pharmaceuticals, cosmetics, and medical device development.

The pharmaceutical science program had a significant boost with the opening of the new \$75 million College of Pharmacy building on the Kingston Campus. The new building is part of an energy efficient, three-building science complex.

Eventually, the five-story pharmacy building will include a manufacturing facility where, with the approval of the United States Food and Drug Administration and other regulatory bodies, URI's innovative research scientists and professors will be able to manufacture their new drugs under controlled conditions for eventual administration to patients in clinical trials. The facility should provide opportunities for manufacturing and contract work as well. But, in the meantime, the building signifies the importance that URI and the state's residents, who approved a \$65 million bond for the project, are placing on pharmaceutical sciences as a path to regenerate Rhode Island's flagging economy.

“We have a proud history of textiles, machine tools, and other manufacturing in Rhode Island, but those industries have mostly matured and relocated,” noted Worthen.

In the place of those fading industries, state officials hope Rhode Island will develop a knowledge-based economy, where biomedicine, pharmaceutical sciences, and technology will all play major roles in creating new jobs for highly skilled workers. Doing its part, URI has created a new four-year bachelor's degree in pharmaceutical science, in addition to its six-year pharmacy degree program. Worthen enthusiastically embraces this vision for his home state and he teaches his students at URI with the goal of preparing them for jobs in this new economy.

“I love mentoring students as best I can in their studies and in their careers,” said Worthen.



David Worthen, Ph.D., J.D., Assistant Professor, Biomedical & Pharmaceutical Sciences and Chemical Engineering
(second from the right, with some of his graduate and undergraduate students)

The students energize him and since he has been at URI he has mentored over two dozen undergraduates, several of whom have won research grants, presented at international research meetings, and published their findings in scientific journals. Several of his former students have since acquired jobs with Genzyme, Davol Bard, Glaxo Smith Kline, Bristol-Myers Squibb, and other large health care companies.

"We have some very bright, dedicated students here at URI they are getting hired by industry, even in a down economy," he said.

STATE OFFICIALS HOPE
RHODE ISLAND WILL
DEVELOP A KNOWLEDGE-
BASED ECONOMY, WHERE
BIOMEDICINE, PHARMACEUTICAL
SCIENCES, AND TECHNOLOGY WILL ALL
PLAY MAJOR ROLES IN CREATING NEW
JOBS FOR HIGHLY SKILLED WORKERS.

As for his own research, Worthen focuses on developing new drugs and natural products and methods to deliver them for people suffering from nervous system disorders, cancer, infectious diseases, inflammation, and nutritional deficiencies. His research areas include new molecule development and the design of new and improved methods for targeting and delivering drugs and natural products to the body, as well as the development of biocompatible polymers and medical devices. Worthen has received support from several industry sources in the pharmaceutical, medical device and polymer industries, including BASF, Shin-Etsu, Nisso America, Novartis, and Foster Polymedex.

"I've worked in industry large, small and start-up and I love bringing that experience into my teaching," said Worthen.

His prior career in industry was "awesome" because he was able to work very closely with the patients and people he served, Worthen said. But in academia, in addition to working with and mentoring students, he is able to more easily pursue his own areas of research interest, a freedom he finds very gratifying.

"There are so many opportunities and so many challenges to be addressed. As long as you have funding and the right people, you can study anything you want."

THE SMALLEST STATE OFFERS BIG CYBER PROTECTION

Investigators combed a Massachusetts landfill in the weeks following the Boston Marathon bombings hoping to find a laptop belonging to one of the suspects in the terrorist attack.

They figured information on the laptop might answer vital national security questions such as did the suspects act alone? If not, with whom were they working?

How to investigate computer data to help solve crimes is known as digital forensics and the University of Rhode Island's (URI) Victor Fay-Wolfe has been at the forefront of this growing field for almost a decade now. As a professor of computer science he was instrumental in creating URI's Digital Forensics and Cyber Security Center (DFCSC). His big idea is paving the way for URI to receive national recognition in the information security field. During this time he not only created the DFCSC, but also worked with Lisa DiPippo, an associate professor of computer science, to expand URI's program to include a concentration in cyber security.

A National Science Foundation (NSF) grant for \$300,000 helped Fay-Wolfe to create the DFCSC. Soon after, he won grants from the U.S. Department of Justice totaling \$600,000 to help law enforcement fight child pornography. URI now offers a minor in digital forensics, a graduate degree in digital forensics, a minor in cyber security and graduate certificate programs in both fields.

Fay-Wolfe has also trained Rhode Island state police and other law enforcement officers in how to detect and fight cyber crime, developing software that can help them more easily identify pornography and safeguard computer evidence so that it is admissible in court.

Workforce development has also been a priority for Fay-Wolfe and DiPippo, who routinely place URI students in valuable professional internships and

high-paying jobs. "There is a staggering lack of professionals in the cyber security field," said Fay-Wolfe.

URI aims to fill that gap by attracting more students to the fields of digital forensics and cyber security, then providing them with the training they need to be successful, he said.

Workforce development was the theme of a cyber security conference on May 2, 2013 at URI, which drew more than 450 attendees and featured speakers from the top echelons of the cyber security field. This was the third annual symposia organized by Fay-Wolfe and DiPippo, who said URI now has a national reputation in the field. They credit the support of Rhode Island's congressional delegation in Washington, D.C. with URI's rapid success.

"Cyber security continues to present serious national security challenges and excellent opportunities to foster an innovative, dynamic pool of expertise within Rhode Island. I am proud to support the excellent work of URI and others in the state, particularly with regards to the urgent need to educate the next generation of cyber professionals with the right skills to flourish in future economic and national security environments," said U.S. Congressman Jim Langevin.

Following these 10 busy years, the symposium and the support of the congressional delegation URI has been designated as a National Center of Academic Excellence in Information Assurance Research and as a National Center of Academic Excellence in Information Assurance Education by the Department of Homeland Security and the National Security Agency. There are only 37 institutions in the country with both designations.

And yet, according to Fay-Wolfe, who has been a principal investigator on



Victor Fay-Wolfe, Ph.D., Professor and Lisa DiPippo, Ph.D., Associate Professor, Computer Science and Statistics

over \$10 million in federal research grants, this is just the beginning for URI's program. As the world's business continues to move on-line, and computer hackers increasingly pose a threat to the country's economic and national security, the field of information security is certain to grow and increase the economic development potential for Rhode Island.

The economic benefits for the state include being able to offer large companies a trained workforce in cyber security, a significant draw when a company is considering a move to Rhode Island. In addition, at least two small companies have been formed in Rhode Island using software developed and licensed by URI.

"For a small state we have a lot of cyber security capability," said Fay-Wolfe.

For the past two years, he has served on a consortium with representatives of local industry, government and academic institutions whose goal is to take the state's cyber capability and translate it into economic growth and jobs. Even though the cyber security minor at URI is relatively new, as are the post-graduate certificate programs, the private sector has already come knocking.

"A lot of companies have already told us they want interns," DiPippo said.

Why wouldn't they? Computer hacking and other cyber crimes are estimated to cost U.S. businesses billions of dollars each year. Finding the perpetrators of these attacks is the function of digital forensics, while URI's cyber security program focuses on preventing the attacks from happening in the first place.

Currently, with \$500,000 in NSF funding, Fay-Wolfe and DiPippo are developing a computer platform that will enable high school teachers and

other instructors to create cyber challenges for students. The educators will be able to use the platform for free. One goal of the research project, according to Fay-Wolfe, is to entice more high school students into the fields of cyber security and digital forensics by showing them how exciting it can be.

The URI researchers have also developed an introductory course in cyber security which they plan to make available to Rhode Island high school students in the fall of 2014. The materials, which will include video lectures by URI professors, will be provided free of charge and for a small fee, students will be able to earn URI college credit.

When students realize they can help solve crimes and defend their country with technology, "their faces light up," Fay-Wolfe said.

Fay-Wolfe and DiPippo's big ideas are helping Rhode Islanders fill a critical gap in the workforce while defending the country against domestic and international threats in today's cyber world.

THE ECONOMIC BENEFITS FOR THE STATE INCLUDE BEING ABLE TO OFFER LARGE COMPANIES A TRAINED WORKFORCE IN CYBER SECURITY, A SIGNIFICANT DRAW WHEN A COMPANY IS CONSIDERING A MOVE TO RHODE ISLAND.

ADDRESSING THE NEEDS OF OLDER ADULTS: WAY BEHIND WHERE WE NEED TO BE



Now that baby boomers are starting to reach age 65 in unprecedented numbers, the country has a big challenge to face – namely, the capacity of health care and human service systems to meet the medical and psychosocial needs of an aging population.

The issue of aging is in the news more than ever before.

“It’s about time,” says Phillip Clark, professor and longtime head of the University of Rhode Island’s (URI) Program in Gerontology.

“Every day on average in the United States, nearly 10,000 people turn 65,” said Clark, citing a recent statistic to show the enormous impact the baby boom generation is expected to have on society and the economy.

“That’s going to continue for the next 17 years,” he said.

This graying of the population isn’t confined to the United States. “The whole world is aging,” says Clark, the result of advances in medical care that enable people to live longer. And yet, “health care professionals remain poorly trained in how aging affects the mind and body,” Clark said, calling into question the readiness of society to cope with this change. For example, he noted that it has only been in recent years that geriatrics has even been taught in some of our country’s medical schools.

“We’re way behind where we need to be,” Clark said.

A Harvard educated professor of URI’s Human Development and Family Studies, Clark has devoted his 32-year career to studying the health related aspects of aging, while developing the university’s esteemed Program in Gerontology. Launched in 1958, when the field was still relatively new, the program today offers an undergraduate major, minor and graduate certificate and has received more than \$15 million in state, federal and foundation grants over the last 25 years.

Among the grants was \$5.3 million from the National Institutes of Health to fund a 12-year study of older residents in East Providence, R.I. Called the SENIOR Project (Study of Exercise and Nutrition in Older Rhode Islanders), the study used a model of behavior change developed by URI’s Professor of Clinical Health and Psychology, James Prochaska, to see if older people could be persuaded to increase exercise and include more fruits and vegetables in their diet. More than 1,000 older adults were involved in the study, which ended in July 2012.

“We were successful in changing both behaviors,” said Clark.

But, he noted, it was easier to get people to eat more fruits and vegetables than it was to get them to exercise.

Clark said he and his research team are working to get a follow-up grant to continue the research. But, in keeping with URI’s status as a land grant university, Clark said it is equally important that the Program in Gerontology seeks grants to support education and community

outreach. To that end, with \$4.6 million from the federal Bureau of Health Professions, it launched the Rhode Island Geriatric Education Center (RIGEC) in 1996, which offers educational programs for health care students and professionals. It is based at URI's Kingston Campus.

In addition to other programs, the center offers five continuing education workshops a year for health care and human service professionals. The workshops are interdisciplinary in nature and encourage collaboration among health care providers. This team approach to elder care has earned URI national and international attention.

In addition to RIGEC, in recent years the Program in Gerontology has made a major effort to improve the lives of all older Rhode Islanders by offering lifelong learning classes and programs in a wide variety of topics. With \$425,000 in start-up funding from the Bernard Osher Foundation, it launched the Osher Lifelong Learning Institute (OLLI) in 2009. Today, OLLI has well over 600 members, who take classes on the Kingston Campus. This year, the OLLI at URI received a \$1 million endowment gift from the Osher Foundation in recognition of its successful growth and development. Its goal is to integrate lifelong learning and intergenerational programs into the URI campus community.

Noting that Rhode Island ranks near the top nationally in the percentage of people age 65 or older, and has the highest proportion of people over age 85 in the U.S., Clark said the state has a huge stake and economic opportunity in gerontological research.

His big idea is that "we could turn the whole state into a laboratory for the development of products and services that enhance the health and well-being of our growing older adult population," Clark said.

He called the economic development potential for Rhode Island "huge."



THE STATE HAS A HUGE
STAKE AND ECONOMIC
OPPORTUNITY IN
GERONTOLOGICAL
RESEARCH.

GRADUATE STUDENT CONFERENCE: TALKING BEYOND DISCIPLINES RISING TIDES AND SEA CHANGES



To the layperson, the job of a college professor may seem obvious: lecturing, correcting exams, and publishing research from time to time. But, in fact, a career in higher education involves much more than that. Among other things, it also requires being able to present research papers to professional peers and organize academic conferences, two skills graduate students learn at URI's annual graduate student conference.

Held in the spring on the Kingston Campus, the conference is organized by URI graduate students to generate and showcase the research of their peers. Sponsored in part by a \$3,000 grant from URI's Division of Research and Economic Development, the one-day event is an opportunity for serious students to mingle, learn and get a taste of the real world of academic conferences and university life.

In addition to presenting papers, the students are critiqued by faculty.

"The basic purpose is to bring together graduate students from across the university, and even from across the world," said Katelyn Burton, a graduate student in URI's Writing & Rhetoric Program, who organized the 2013 conference with fellow student, Jamie Remillard.

Participants in past conferences have come from as far away as California and even India, courtesy of presentations on Skype, Burton said.

Each year, the conference has a theme and this year it was "Talking Beyond Disciplines: Rising Tides and Sea Changes." The conference's call for research noted that this theme included obvious ecological issues associated with global warming but, in addition, students from other disciplines were invited to submit research on less literal ideas associated with change. The threat of rising tides can come from a shift in the natural environment, but also technological advancement or paradigm shifts, Burton said.

The concept of talking across academic disciplines was important to the conference organizers. Also important was highlighting URI's location near the ocean and the whole idea of place, Burton said. The result? Approximately 60 people attended the conference on April 13, 2013. In addition to graduate students, the participants included two guest speakers, URI faculty members and intellectually curious members of the public who just come to listen, said Burton.

This was the seventh annual graduate student conference at URI. Past conferences have generated enthusiastic responses.

"At the conference, I was impressed with the rigor the faculty used in critiquing the current graduate students," wrote Sarah Kruse, who traveled from Oregon to Rhode Island to present at the "Bodies in Motion" conference. "I also found much of the work the students were doing new and intellectually stimulating."



THE BIG DIFFERENCE FIVE MINUTES CAN MAKE

(c) phakimata

Some time along the way in the history of birthing babies, doctors decided it was best to cut the umbilical cord that connects the mother and child immediately after the infant emerged from the womb, leaving up to one third of the baby's iron-rich blood behind in the placenta.

Why the cord came to be clamped so quickly isn't fully understood, but it was probably done in the name of efficiency, and it is standard operating procedure now in most delivery rooms, said Debra Erickson-Owens, an assistant professor of nursing at the University of Rhode Island (URI).

But Erickson-Owens and a colleague at URI, fellow nursing Professor Judith S. Mercer, have three little words that are a big idea for the ob-gyn community when it comes to clamping umbilical cords: "Not so fast." By delaying cutting the cord for just a few minutes, a baby receives more blood, which in turn can have significant health benefits for the child during the critical, early stages of development. Improving the health of Rhode Island's infant population can be significant to the cost of health care in these difficult economic times.

"If we delay clamping, we know that a baby at four to six months has higher iron stores," noted Erickson-Owens.

While scientists still don't know precisely what that means for the child, it would appear to be a positive development since iron deficiency in babies has been linked to cognitive and behavioral impairment, she said.

The Bill & Melinda Gates Foundation and the National Institutes of Health (NIH) last year awarded Erickson-Owens and Mercer grants totaling over \$2.5 million to continue their research into delayed cord

clamping. Working with Women & Infants Hospital and Dr. Sean C.L. Deoni, director of the Advanced Baby Imaging Laboratory at Brown University, the URI professors will study the effects of the timing of a five-minute delay in cord clamping as opposed to no delay, following 128 babies from the time they are born until they turn two years old.

The research project is called the Infant Brain Study and it will pick up where an earlier study by Mercer, which also was funded by the NIH, left off. In the prior \$2 million study, Mercer studied the effects of delayed cord clamping in premature infants. That study showed that just a 30 to



Debra Erickson-Owens, Ph.D., CNM., R.N., (featured right) Assistant Professor and Coordinator, Masters Nursing Education Concentration

45 second delay helped with premature birth issues such as sepsis and bleeding in the brain, Erickson-Owens said.

In the new study, the focus will be on a full five-minute delay in clamping. In addition to looking at the expected increase in iron supply, the researchers want to see whether or not the delayed clamping enhances the process of myelination, the process by which the brain forms the myelin sheaths that are critical to nervous system health.

“Our hypothesis is that the children who get more blood will probably have better brain myelination,” said Erickson-Owens.

Both nursing professors believe the babies benefit from skin-to-skin contact with their mothers after birth. By placing the baby on the mother’s abdomen, with the cord intact, the placenta can continue to nourish the newborn while he or she adjusts to a new world. Erickson-Owens has also studied the practice of “milking” umbilical cords by using the hand in a stripping motion to move the blood more quickly into the baby. The old term for the practice is “cord stripping.” Erickson-Owens wrote her doctoral dissertation on milking for which she designed studies that demonstrate its efficacy.

“All my studies showed it worked,” she said.

Delayed clamping and cord milking are simple, low-tech measures that can enhance the birth process for both mothers and babies, Erickson-Owens said. The practice of delayed clamping got a bad reputation in the mid-1970’s due to a study that showed too many red blood cells in an infant’s blood can cause jaundice, but recent large studies suggest this is not likely, she said.

Low-tech birthing practices complement Erickson-Owens’ basic philosophy about the birth process, which is that women instinctively know how to have babies and the role of the medical community is to assist, she said. This philosophy led her to become a midwife early on in her career and to teach midwifery at URI, until the program came to an end in 2007.

A retired officer in the United States Air Force, Erickson-Owens said she is still passionate about helping mothers and babies, even after helping more than 1,500 babies be born. She served as director of the U.S. Air Force Nurse Midwifery Program in conjunction with Georgetown University and is proud about the fact that she helped to bring midwives into the Bethesda Naval Hospital in Maryland.

At URI, in addition to research and teaching, she serves as coordinator for the master’s concentration in nursing education. It is critical to support nurses who want to be educators, said Erickson-Owens, who describes her mentoring of graduate students as midwifery of a different sort.



A PASSIONATE ADVOCATOR

Leslie Mahler, Ph.D., CCC-SLP, Associate Professor, Communicative Disorders

Life can be difficult and isolating for people who have lost the ability to communicate effectively, a fact most people don’t think about because they don’t have to. Or, as University of Rhode Island (URI) Associate Professor of Communicative Disorders Leslie Mahler put it, “Communication is something everyone takes for granted until something goes wrong.” Helping people to regain their lost communication ability or to at least be able to improve it has been the focus of Mahler’s innovative research, a goal she finds rewarding given recent research about the principles of neuroplasticity.

Neuroplasticity refers to the brain’s ability to respond and change over time, as opposed to being thought of as a static organ.

“The exciting thing about neuroplasticity is that for years people thought there was limited potential for people with damaged brains to improve but in the last 10 to 12 years we’ve learned that behavioral treatment can make a positive difference,” said Mahler.

With new information from brain imaging technology, it is now accepted knowledge that not only can old brains change but damaged brains can change also, she said.

In her own research, Mahler has worked with survivors of traumatic brain injuries and strokes using therapy that tailors the tasks to the person’s needs and embraces the principle of “use it or lose it.” She is also working with adults with Down syndrome, a group whose speech many assumed couldn’t be helped, but whom Mahler believes can be improved.

“I see myself as an advocate for people who have communicative disorders and can’t advocate for themselves,” she said.

Mahler can be found at The Gateway Café weekly in the URI Department of Communicative Disorders Speech and Hearing Center.

The Gateway Café, located in the Independence Square Building on URI’s Kingston Campus, is a gathering place for people with communication disorders resulting from acquired brain injuries. Whether their difficulties stem from strokes, Parkinson’s disease or traumatic brain injuries due to accidents, the participants who visit once a week now have a place, where they can practice speaking in a lively social setting under the guidance of Mahler, and students from the URI Departments of Kinesiology; Nutrition and Food Sciences; and Communicative Disorders.

“I have students from multiple disciplines so participants can address multiple goals including communication, diet, and physical activity. A multidisciplinary approach targets the whole person and is similar to an outpatient treatment model, in which students might work after graduation,” said Mahler.

The result is a valuable learning experience for the students, some of whom may not get the opportunity to work with these types of patients during their academic training, therapy for the participants that wouldn’t be otherwise available, and an enjoyable afternoon for all involved, she said.

Initially funded with a modest grant from the Rhode Island Department of Human Services, the Café has continued its work despite the fact that state budget cuts caused it to lose its funding last year. Mahler noted that it was so popular by then, she just couldn’t stop it. As such, the Café has become a working model of how to sustain an effective health care program in economically challenging times, a model that clearly has relevance in today’s health care climate and local economy.

For Mahler, a key ingredient of that sustainability is passion for a project that benefits URI students and the community.



ENHANCING ECOSYSTEM SERVICES FOR RHODE ISLAND FARMERS

The intersection of economics and natural resources, particularly how the two sciences work together to help lift people out of poverty, is where Emi Uchida focuses her research.

An associate professor in the Department of Environmental and Natural Resource Economics, who came to the University of Rhode Island (URI) in 2006 after earning a Ph.D. in Agricultural and Resource Economics from the University of California, Davis, Uchida looks at how people in rural communities respond to policies aimed at managing natural resources, such as providing economic incentives to adopt resource management practices that sustain the environment.

This line of inquiry includes quantifying the services an ecosystem provides, such as clean water or storm protection, in order to calculate payments to people for conserving these services. It's an innovative research field that is very interdisciplinary in nature, said Uchida, requiring the insights of ecologists and hydrologists, as well as economists, such as herself, she said.

"My research is to understand what kind of policies and incentives work to sustain and conserve natural resources while promoting economic development," said Uchida, who also serves as associate director of URI's Coastal Institute.

This substantial work has taken her around the world – to Tanzania and China, among other places – and includes a four-year research project currently underway in Rhode Island. Funded by the United States Department of Agriculture, the project involves working with livestock owners to see what kind of incentives are needed, if any, to encourage them to manage manure in an environmentally safe manner.

In recent years, the number of small farms in Rhode Island, as well as the number of people keeping livestock, has increased, said Uchida, the result of consumer preference for locally grown food, among other factors. This can be viewed as a positive development, but livestock such as cows and hogs can generate a lot of manure and this, in turn, can impact water quality, among other natural resources.

"Many of them want to do things right," Uchida said of the farmers and other livestock owners.

But doing things right may mean changing the ways they do things, or maybe even stopping altogether a certain practice, which is where the incentive comes in. Uchida and her research team first look at how farming practices affect water quality depending on the location in a watershed and other factors. Then they solicit bids from livestock owners for changing their manure management practice, just like an auction. Then, they ask the public how much people want to pay livestock owners for improving water quality. In economic terms, this is sometimes called creating "environmental markets."

It's important to know who should get the incentives to "get the biggest bang for the buck," said Uchida.

A similar project in Jamestown, Rhode Island, developed an environmental market for the habitat of the bobolink, a declining species of grassland nesting bird. In that project, which was funded by a \$600,000 Conservation Innovation Grant from the Natural Resource Conservation Service, as well as matching funds from URI and Providence-based EcoAsset Markets, Inc., local residents were asked how much they valued creating habitats for the bobolink. Did they value them enough



to help pay local farmers to delay harvesting their hay until the after the nesting season?

In the end, nearly 200 of the 350 people surveyed “invested” from \$5 to \$200 in six hayfields with nesting bobolinks to postpone hay mowing by farmers. The money was used to buy replacement hay for the farmers, whose delay enabled the bobolinks to hatch, mature and eventually fly away.

“The Jamestown residents and farmers experienced one of the first experiments in the U.S. to use a market approach to enhance ecosystem services,” Uchida said.

Since then, Uchida has traveled to the east African nation of Tanzania in an effort to understand poverty and the roles of mangrove forests, which provide a variety of goods and services for poor villagers. With \$76,000 in seed funding from the National Science Foundation, and an interdisciplinary team that included URI’s Arthur Gold, a professor in the Department of Natural Resources Science, Uchida interviewed villagers about their use of the forests, which are declining.

The results were surprising, she said. Before the interviews, it was believed that the villagers cut down the mangroves to use the poles for house construction and firewood. But the villagers told the researchers that they only harvested branches that had already fallen. The biggest threat to the forest may come from people “outside” the villages, who cut down significant amounts of wood to make charcoal. “They understand the ecological and economic importance of the mangrove forests,” she said.

In addition to understanding how humans impact the forests, the researchers are also examining the effects of climate change and sea level rise on the value of mangroves. The forests provide important services for the poor villagers, among them reducing the impact of coastal storms, which can wipe them out and keep them in poverty.

“How can we prevent people from getting trapped in poverty, while also sustaining the environment?” This is the question that drives her research, Uchida said.



Emi Uchida, Ph.D., Associate Professor, Environmental and Natural Resource Economics



EXPLOSIVES EXPERT

As a scientist, she finds everything interesting, said Jimmie Oxley, a professor of chemistry at the University of Rhode Island (URI).

But her particular field of expertise, the one that has made her sought out by governments, police departments and industries around the globe, is explosives, a timely field in this age of terrorist bombs and improvised explosive devices.

For the past five years, URI has served as a Center of Excellence for Explosives Detection, Mitigation and Response, a designation awarded by the U.S. Department of Homeland Security following a competitive grant process. Under a five-year grant, URI and the center's co-leader, Northeastern University, have each received \$2 million to \$3 million per year to continue work deemed vital to this nation's security and the international war on terrorism. The award reflects the outstanding team of scientists and engineers involved in the center, over half of whom are based at URI.

Oxley came to URI in 1996 after earning a doctorate in chemistry from the University of British Columbia. Oxley had collaborated with the FBI on simulations of the 1993 World Trade Center bombing and with the British on preventing the use of fertilizer bombs in ongoing United Kingdom terrorism.

Closer to home, Oxley has worked with the Rhode Island and Massachusetts state bomb squads and several New England-based technology companies on security issues. Her laboratory, which she jointly supervises with her husband, Professor James Smith, is a

fascinating place where, at any given time, graduate students might be mixing up a batch of explosives or determining how to keep terrorists from doing so. Visitors are required to wear goggles, and in one room there is a museum of sorts, where Oxley displays bullet casings, pipe bombs and other artifacts from her years of research. "It's never boring," said Oxley.

There are usually five or so projects underway in her laboratory simultaneously, some of them generated by military and government agencies, but others by companies seeking to improve their line of security products. The steady stream of work has included everything from seeing if baby powder can be made to explode, to testing hair for explosives residue. Oxley and her team have also been compiling an explosives database used by forensic and government scientists throughout the world.

Of primary interest to Oxley's research team is improving the stability and safety of highly energetic materials. These include military explosives, improvised explosives, energetic salts, such as ammonium nitrate, and reactive chemicals. Other research interests include hazard analysis, developing improved small-scale predictive tests, explosive detection and preventing terrorist attacks.

The Center of Excellence for Explosives Detection has assembled an international team of scientists, with whom Oxley collaborates. The academic partners include CalTech, Purdue, Illinois, New Mexico State, and Hebrew University Jerusalem, Israel. The center's goal is to protect society from "catastrophic damage" as a result of explosive terrorism.

To achieve that goal, the center has embraced a three-pronged approach: Identifying and neutralizing the materials used to make explosives, detecting explosives and IEDs and mitigating the blast damages to people and infrastructure caused by explosives.

Needless to say, this isn't dull work. "The best part of the job is that things are constantly happening," said Oxley.

The flip side of that intense level of activity for Oxley is that it is sometimes hard to finish all the work she has on her plate. But that may be because in addition to teaching and research, Oxley has assumed other significant responsibilities at URI, among them helping to develop a forensic science minor and forensic chemistry major. She is also a founding member and co-director of the Rhode Island Forensic Science Partnership, collaborators with Rhode Island's Crime Laboratory, which is located at URI.

Oxley co-organizes the Forensic Science Seminar Series. A popular attraction at URI, no doubt due to the influential visitors who speak, the seminars have developed a devoted following. The talks are free and open to the public. "There are several people who have been coming for 10 years," she said.

Oxley is one of URI's innovative researchers whose work benefits the safety of our community near and far. Media interviews have become part of the workload; she is frequently interviewed by journalists and last year the Oxley/Smith group was featured in the magazine Popular Science. Oxley has also appeared on Good Morning America, 48 Hours, and the Huffington Post.

As Oxley is watching out for our safety, the world is seeking her unique expertise.



Jimmie Oxley, Ph.D., Professor, Chemistry

ENHANCING RHODE ISLAND'S COMMUNITY: THE STAGE IS THE THING!



Paula McGlasson, Professor and Department Chair, Theatre

If you are a theatre major at the University of Rhode Island (URI) under the watchful eye of Paula McGlasson, a professor of stage and theatre management and the chairperson of URI's esteemed Theatre Department, here's what's in store for you: Hours upon hours of rehearsals – much of it in the evenings and on weekends; hours upon hours of research into the history of plays and the times in which they are set to achieve authentic productions; a structured core curriculum that distinguishes URI's Theatre Department from other universities by making students study all aspects of theatre production, not just acting or another favorite activity.

"This is a very disciplined, very rigorous program," said McGlasson, who has produced more than 60 plays since she came to URI in 1985.

URI's 80 or so undergraduate theatre majors work very hard, but they also have a blast, which is one of McGlasson's criteria for success. They hold dozens of big performances throughout the year in a 550-seat theater in the Fine Arts Center.

"I love my kids. That's why I do this," she said.

Unlike many other schools, whose programs of theatre studies result in a Bachelor of Arts, URI awards a Bachelor of Fine Arts (BFA), a significant difference which reflects the program's demanding curriculum and conservatory training. A BFA is preferred to pursue a Master's in Fine Arts. Students study acting, directing, stage and theatre management, plus theatre design and technology, graduating with an array of skills that makes it easier for them to find jobs.

"Some schools allow you to follow only one path, but the more you know, the more you will find work," McGlasson said.

Contrary to the popular perception of theatre as an impractical field of study, McGlasson maintains that the major prepares students for a wide variety of occupations with its interdisciplinary philosophy and emphasis on public speaking and research skills. Not only that, URI's theatre department plays a significant role in Rhode Island's arts community and economy by providing high-quality entertainment for the public at a very reasonable price.

In 2012, the department opened its season with *Marvin's Room*, a play by Scott McPherson that raises provocative questions about how people deal with illness. The production was part of URI's Honors Colloquium series on health care.

"Whether we're reaching senior citizens or freshmen in high school, it's our job to be part of the community," she said.



INNOVATIONS IN AQUACULTURE FROM RHODE ISLAND TO ASIA

Understanding the effects that fish farming can have on a community – and its ecosystem – has been the goal underlying much of David Bengtson's innovative research.

A professor in the Department of Fisheries, Animal and Veterinary Science at the University of Rhode Island (URI), Bengtson shuttles between the Mekong Delta of Southeast Asia and the salt ponds of southern Rhode Island to explore questions such as what is the capacity of the environment to handle an aquaculture industry before it becomes ecologically harmful, and can soy safely replace fish in the pellets used to feed fish in aquaculture farms?

Rhode Island has long had an interest in aquaculture, viewing it as a way to use the state's natural resources – in this case, its renowned coastal waters – for economic development. URI, too, has long recognized aquaculture's potential; begun in 1969, URI's aquaculture studies program is one of the oldest in the northeastern United States.

But just because a state is called the Ocean State, it doesn't necessarily follow that it's easy to devote huge swaths of coastal waters for aquaculture ventures. Many people like to use Rhode Island's waters for different purposes, such as boating and shell fishing, Bengtson noted. As a result, the aquaculture industry in Rhode Island mostly consists of small oyster farms in South County's coastal ponds.

At one time, it was thought that Rhode Island could only set aside about 5 percent of its coastal real estate for oyster aquaculture before the ecosystem's carrying capacity would be reached. That phrase refers to the ability of an ecosystem to handle an activity before it harms the environment. But Bengtson and colleagues decided to test that assumption.

"I just kind of suspected that 5 percent would be too low," he said.

Using a two-year, \$150,000 grant from the National Oceanic and Atmospheric Administration, Bengtson and colleagues applied a computer model designed to estimate the eco-system's carrying capacity. Their research discovered that the ecological carrying capacity of Rhode Island's coastal ponds and Narragansett Bay is really closer to 40 percent, not five. However, the social carrying capacity, based on space conflicts with other users, such as shellfishermen, probably is about 5 percent.

Bengtson, who joined URI's faculty in 1996, has been teaching students about aquaculture and the environment for 15 years. He has also advised the state on various issues involving its aquaculture industry. His research over the years has spanned a range of topics. He has studied the culture of larvae and early juveniles of summer flounder.



Bengtson has also had a longstanding interest in environmental toxicology and the use of silversides, a small fish, in toxicity testing.

Aquaculture research takes place in laboratories at the Graduate School of Oceanography on URI's Narragansett Bay Campus, in laboratories at URI's East Farm, and also on the Kingston Campus.

But in the past year, Bengtson has found himself far away from URI and its aquatic laboratories – half a world away, in fact – yet still, his focus has remained aquaculture research. With funding from the United States Agency for International Development, through the Aquaculture Collaborative Research Program, he has traveled to Vietnam and Cambodia to advise fish farmers there.

Bengtson's research has found that as much as 50 percent of the fish meal can be replaced with soy without negative consequences on the farm-raised fish. Working with scientists in Southeast Asia, he has

convinced an estimated 1,000 farmers to switch to soy-based pellets, thereby saving a food source for the local residents and making the aquaculture industry there more benign. The basic research about the soy pellets took place at URI.

"We took what we learned here and applied it abroad," he said.

Another overseas project involves educating regulators in Southeast Asian countries about carrying capacities. These countries have a tremendous need for the sort of computer modeling that enabled him to figure out what Rhode Island's ecological carrying capacity was for aquaculture, but they lack the raw data needed to plug into the computer model to make it work, Bengtson said.

Back at URI, the future of Bengtson's innovative aquaculture research is likely to focus on the improvement of feeds, the development of non-traditional aquaculture species, husbandry techniques, disease treatments and the development of the capability of offshore aquaculture.

Collaborations with companies that want to engage biotechnology applications to aquaculture will continue as will international industry collaborations, Bengtson said.

His big idea in Rhode Island aquaculture could help improve economic development for the Ocean State.

COLLABORATIONS WITH COMPANIES THAT WANT TO ENGAGE BIOTECHNOLOGY APPLICATIONS TO AQUACULTURE...

HIGHLY TRAINED WORKFORCE: VITAL TO RHODE ISLAND ECONOMIC DEVELOPMENT



The future of health care in this country is anyone's guess, with science and technology reshaping medical treatments almost every day and a great divide, politically, over the government's role in providing health care.

But one outcome seems certain – the big need for nurse practitioners is only going to grow. The University of Rhode Island's (URI) College of Nursing is poised to fill that need in Rhode Island's workforce.

At least this is the view of Denise Coppa, an associate professor of nursing at URI who has spent years fighting for the recognition of nurse practitioners, an elite class of nurses with master's degrees, who can diagnose illnesses and write prescriptions.

Noting that millions of Americans still don't have health insurance, and that there is a shortage of family doctors nationwide, especially in rural areas, Coppa said nurse practitioners will inevitably be needed to fill the gap. Doctors simply can't take care of all of the people who need health care, Coppa noted, "There's plenty of work for all."

Coppa speaks from personal experience. A certified nurse practitioner, as well as the director of URI's Family Nurse Practitioner Program, she sees patients weekly at the Rhode Island Free Clinic in Providence, which serves people without health insurance, and also the Teen Tot Clinic at Hasbro Children's Hospital, which provides care for mothers under age 17 and their babies.

To some extent, Coppa – and other nurse practitioners in Rhode Island – have to work since state law requires them to provide care eight to 10 hours a week in order to stay licensed. And for Coppa to

teach at URI, she has to stay licensed. The result is a hectic schedule that involves considerable travel between URI's Kingston Campus and Providence's inner city, where much of Rhode Island's medically underserved community reside.

Coppa has worked at the Rhode Island Free Clinic on Broad Street in Providence since it opened in 1999. Now, she supervises URI nursing students, who are assigned there, and conducts a faculty practice clinic one day a month. In 2011, the clinic logged 8,000 patient visits, attesting to the need for an array of medical providers, in the city's health care network.

Nurse practitioners pride themselves on treating the whole person, not just the person's injury or disease, within a framework of health promotion and disease prevention. Coppa calls them "patient advocates." URI launched its nurse practitioners degree program in 1975 and has since expanded it to include concentrations in family health, acute care and elder care.

The program in elder care was launched with a \$750,000 grant from the U.S. Department of Health and Human Services. Coppa was a principal investigator on the grant, which was designed to attract minority and disadvantaged students to the specialty with an educational component that reaches out to these students when they are in middle school and high school.

The gerontology specialization meets a demand she has observed in some students who wanted to specialize in elder care but still had to take all of the components of the family nurse practitioner's degree, including, pediatrics, Coppa has said. It also distinguishes URI's



Nurse Practitioner Program, since only a handful of master's degree nursing programs in New England offer a gerontological specialty.

In October, 2012, the federal government again recognized the excellence of URI's College of Nursing by awarding its faculty \$3.8 million in grants. The grants will bolster URI's nurse practitioner programs, which were hailed by U.S. Senator Jack Reed when he announced the funding from the U.S. Department of Health and Human Services.

“URI DOES AN
OUTSTANDING JOB
PREPARING THE NEXT
GENERATION OF NURSES...”

- U.S. SENATOR JACK REED

“URI does an outstanding job preparing the next generation of nurses and the scholarships and grant funding for new advanced education programs will help ensure we have a highly trained and diverse health care work force.” Reed said. It's this highly trained workforce that is vital to Rhode Island's economic development.

Coppa earned her B.S. in nursing from URI in 1972, a master's degree in nursing with a nurse practitioner specialization from the University of Colorado and a Ph.D. from URI. She has taught in URI's nursing program for 20 years. In addition to her clinical and teaching responsibilities, she is an avid researcher and practitioner in the field of therapeutic touch, an alternative health modality that uses energy channels to ease pain and suffering.

In addition, Coppa serves as the legislative liaison for the Rhode Island Nurse Practitioner Council, which lobbies for the advancement of nurse practitioners in the state. She often testifies at the State House on behalf of legislation that would make it easier for nurse practitioners to work in Rhode Island. According to Coppa, one of the biggest obstacles to this goal are health insurance companies, which typically require nurse practitioners to be supervised by a physician. Coppa said this is an unnecessary requirement, not only because nurse practitioners are highly trained, but also because they believe in a team approach to providing care, which includes consulting doctors.

Said Coppa, “We're definitely collaborators.”



WHY INVEST IN RHODE ISLAND MARINE RESOURCES?

The type of research Jeremy Collie, University of Rhode Island (URI) professor of oceanography, pursues is important to Rhode Island's economy. Not only has the fishing industry played an important role in the state's economic history – employing nearly 7,000 in 2010, according to researchers – but also it has figured prominently in Rhode Island's culture. Point Judith, Galilee and Newport are tourist attractions as well as fishing ports, making the future of fishing a vital state concern.

If a product, such as tuna, bears a label saying it was harvested in an ecologically safe manner, what effect does that label really have? Will consumers pay more for the tuna, showing that they value the environment? Will the fisheries, which have to pay for eco-safe certification, realize more for their investments?

These are among the big questions Collie is studying, hoping to better quantify the advantages of eco-labeling which, in turn, could encourage more fisheries to seek the certification.

"What we're trying to do is demonstrate the benefits of it," said Collie, who received research funding from Rhode Island Sea Grant.

The theory is that eco-labeling helps to create sustainable fisheries, conserving those species that are not over fished and rebuilding stocks that have been depleted. But what is the measurable impact of these labels? Collie, a quantitative ecologist, said it is important to put numbers on the value of labeling to convince more fisheries to seek certification.

"The fisheries have to see it's to their benefit," he said.

Collie received his Ph.D. from MIT and the Woods Hole Oceanographic Institution in biological oceanography and worked in Alaska before coming to URI. He specializes in fish population dynamics, an area of study that looks at why some fish species are declining while others are making a comeback. Jokingly, he reduces his career to a three-word sentence: "I count fish."

But, of course, it is not as simple as that. The reasons for fluctuations in fish populations are varied. They include climate change, predation, habitat loss and last, but surely not least, fishing. Collie looks at all of these causes, often using computer modeling and carefully collected data to reveal a better understanding of what's going on beneath the sea.

Since 1998, Collie has supervised the Fish Trawl Survey, a signature undertaking by URI's Graduate School of Oceanography, which has been gathering information about the varied fish and shellfish species in Rhode Island's waters since 1959. As such, it is one of the longest continuous studies of marine ecosystems anywhere, Collie said. Once a week, URI's research vessel *Cap'n Bert* leaves Wickford harbor, where it is docked, and trawls the waters of Narragansett Bay. Then Collie, his students and other researchers analyze the findings.

"It is a really important data set that is used locally and internationally," he said.

The trawl has pulled up 140 species over the years and has revealed, among other things that there are very few species whose populations



remain relatively the same over a long period of time. On the contrary, most species increase or decrease significantly, creating an underwater life and death drama that most people never see.

In recent years, Rhode Island has seen a decline in winter flounder to the point where there is some question whether it can be sustained, Collie said. No single factor is responsible for the species' decline; rather, the cause seems to be a combination of fishing and warmer water temperatures, which have altered the food web and increased predation by sand shrimp, as well as other fish, birds, and seals.

Some of Collie's research has helped to rebuild depleted species. One of his recent projects has involved assessing rebuilding plans for fisheries for the National Research Council. There are 85 such plans in the U.S.

To help understand fish populations, Collie studies their ecosystems and engages in comparative ecosystem analysis. He was involved in the 15-year, U.S. Global Ocean Ecosystem Dynamics (GLOBEC) study of how climate change and variability will translate into changes in marine ecosystems and in fishery production.

Closer to home, he helped to create Rhode Island's new Ocean Special Area Management Plan (SAMP), which is a blueprint for developing Rhode Island's coastal waters. One of the reasons for developing the Ocean SAMP is that potential offshore development, such as wind turbines, could harm the environment if not done properly. The years-long process, which involved several URI scientists, proved to be very beneficial for the university and the state. URI became a "key player by

design," Collie said.

The thread that ties all of Collie's research together is his love for the natural world and the need to preserve it.

"There's a big conservation angle here," he said.

People take the environment – and its multifarious species – for granted, but concerted conservation efforts are needed if they are to survive. Collie's big message to policy makers: "We have to invest in our marine resources in order to sustain them," he said.



Jeremy Collie, Ph.D., Professor, Oceanography

ENGINEERS FOR A SUSTAINABLE WORLD



When she is working in the highlands of Guatemala, Vinka Oyanel-Craver can see in a very tangible way the need to create water and wastewater treatment technologies that are affordable and efficient.

The people who live in San Mateo Ixtatan, the town she visits as a faculty advisor to the University of Rhode Island (URI) chapter of “Engineers for A Sustainable World,” are very poor. The community of 30,000 or so people lack basic sanitation facilities, and the river that runs through the town is thoroughly contaminated.

“They don’t have anything to solve this situation,” said Oyanel-Craver, an assistant professor in URI’s Department of Civil and Environmental Engineering.



Last summer, Oyanel-Craver, seven URI students and Stephen Andrus, Project Manager at GZA GeoEnvironmental, Inc. volunteered their energy and skills for two weeks in San Mateo Ixtatan to build a septic tank that will service a local school. Without the septic tank, the school’s new toilets would have flushed directly into a nearby river. The students not only designed the system and installed it; they also helped to raise money for the project. Oyanel-Craver described it as a satisfying, eye-opening experience for everyone involved. “They worked very hard,” Oyanel-Craver said.

The hands-on experience exposed the students to a way of life and level of poverty they had never seen before, she said. This experience also provides a valuable training for the students on solving complex problems and real life situations.

To be effective, wastewater management systems need to be designed to match the education level and economic status of the communities they serve, Oyanel-Craver said. A native of Chile, who came to URI in 2008 after earning her doctorate in Spain, Oyanel-Craver is interested in creating sustainable water and wastewater treatment technologies for developing global communities, many of whom still lack a clean water supply.

To that end, Oyanel-Craver has collaborated with Potters for Peace and Potters Without Borders, global nonprofit organizations which train developing communities around the world to use simple ceramic water filters. The ceramic filters are made by local potters from clay mixed with rice husks or sawdust. They are very inexpensive and have been proven to remove 99.99 percent of water borne disease agents.

The filters are coated with silver nanoparticles, which act as a disinfectant. Back in her laboratory at URI, Oyanel-Craver researches



Vinka Oyanedel-Craver, Ph.D., Assistant Professor, Civil and Environmental Engineering

the disinfection effectiveness of silver nanoparticles, which today are commonly added to clothing, plastics and medicines, among other products, to prevent the growth of bacteria. More than 240 products are known to contain silver nanoparticles.

With a three-year \$250,000 grant from the National Science Foundation (NSF), she has been looking at how different environmental conditions, such as water chemical characteristics, affect the disinfection performance using silver nanoparticles, which is not completely understood even though they are widely used. On the other hand, it is essential to evaluate the possible negative effect of this novel material once released in the environment, which is also one of the priorities of Oyanedel-Craver's research. "We cannot solve a problem with something that could be adverse for the environment in the future," she says. Her research in this area could help the development of cheap and easy to use point-of-use water treatment technologies that could be deployed during emergency situations.

Other current research projects in which Oyanedel-Craver is participating include trying to produce a more environmentally safe surfactant for oil,



which can be used in the aftermath of oil spills. With \$50,000 in NSF funding, Oyanedel-Craver is also studying the behavior of nanoparticles in rare earth, which could be used in MRI's to improve the definition of images, among other purposes.

Past research projects have included looking at salt water recycling for brine production at road salt storage facilities and studying the environmental implications of using chemical compounds to remove graffiti from Rhode Island's highways. Underlying all of them is the same motivation: The desire to ask the questions no one else is asking.

"I want to know how we can limit our effect on the environment," she said.

TO BE EFFECTIVE, WASTEWATER
MANAGEMENT SYSTEMS NEED
TO BE DESIGNED TO MATCH
THE EDUCATION LEVEL AND
ECONOMIC STATUS OF THE
COMMUNITIES THEY SERVE.



Humans have been fascinated by science for thousands of years. Is the Earth flat? How deep is the ocean? What kind of environmental effects will we see from climate change? But at times, the big questions get lost in a sea of confusing jargon, and without an expert translator their fascinating answers are unintelligible. Communicating science is a difficult business.

In the Office of Marine Programs (OMP) at the University of Rhode Island's (URI) Graduate School of Oceanography (GSO) a team of dedicated professionals has been addressing this issue for nearly four decades. What began as an outreach arm of Rhode Island Sea Grant has since blossomed into an internationally recognized center for science communication.

"We've really developed an international niche for communication and engagement," said Sara Hickox, OMP director. "We work with a variety of audiences, including scientists, journalists, educators, and students, to ensure complex ideas are communicated in the best way possible."

OMP's reputation in the field of science communication has led to its involvement as public engagement specialists in several high-profile endeavors, including most recently the Census of Marine Life. OMP's participation in this 10-year project received \$4 million from the Alfred P. Sloan Foundation to help meet the lofty goal of cataloging the diversity, distribution, and abundance of all living organisms in our oceans. The Census, which involved 2,700 scientists from more than 80 countries, was a huge success, leading to the identification of 6,000 new species.

The Sloan Foundation was so impressed with the work of OMP that it has come back for more. Like the Census, the Deep Carbon Observatory is a

10-year initiative, and was formed to generate a detailed understanding of how much carbon there is on Earth, and how it cycles between the planet's core, the atmosphere, and myriad living organisms. Between now and 2019, OMP will work with scientists around the world to communicate complex ideas in geology, chemistry, physics, and biology both within the scientific community and to the public.

"Public engagement with the Census of Marine Life research program attained extraordinary levels thanks to the creative and tireless efforts of the team at URI, led by Sara Hickox," noted Jesse H. Ausubel, Science Advisor, Alfred P. Sloan Foundation. "The program received accurate, frequent global news coverage, produced a best-selling book and award-winning film, innovated in open access publication, and contributed to improved management of marine biodiversity from the Antarctic to the Arctic."

Another major OMP program is the Metcalf Institute for Marine and Environmental Reporting. The Institute fills a national need for improved news coverage of environmental topics by organizing year-round training opportunities for journalists from across the nation and the globe. Communicating science to the public requires more than journalists trained to understand the scientific method; however, scientists also need to be trained how to clearly convey their research to the public. Recognizing this fact, Metcalf Institute, with support from RI NSF EPSCoR, provides training, support, and a variety of outreach opportunities for faculty, research staff, and graduate students throughout the state.

Metcalf Institute also offers URI faculty a novel mechanism for satisfying the broader impacts requirements of federal granting agencies such as



THE OFFICE OF MARINE PROGRAMS: IMPACTING RHODE ISLAND

Sara Hickox, Director, Office of Marine Programs; Sunshine Menezes, Ph.D., OMP, Associate Director and Metcalf Institute Executive Director

the National Science Foundation. The Institute is currently partnering with URI faculty, such as Arijit Bose in the College of Engineering, where Metcalf is developing science-training programs for journalists that will ultimately help the public understand their research. “We are eager to extend our collaborations with URI scientists to more departments,” said Sunshine Menezes, the executive director of Metcalf Institute and OMP associate director.

OMP remains a significant resource for the GSO community and the state of Rhode Island. The office hosts several free public lectures throughout the year, including the Metcalf Annual Public Lecture Series, which focuses on timely issues in environmental science and policy, as well as how those issues are covered by the press, and the Annual Charles and Marie Fish Lecture. And in a continued effort to reach the broadest possible audience, OMP collaborates with art students and faculty from the Rhode Island School of Design and URI to generate visual communication tools. A permanent exhibit of their science-inspired art, Studio Blue, is housed in the Coastal Institute on URI’s Narragansett Bay Campus.

For local educators, OMP also offers the Rhode Island Teacher-At-Sea Program, through which Rhode Island teachers are embedded within a team of URI scientists to participate in a research cruise aboard the *R/V Endeavor*. Through OMP’s Narragansett Bay Classroom, teachers, schools, and the general public can make the most of the Bay Campus location and Rhode Island’s coastal environment, with programs including historic walking tours, family beachcombing excursions, interpretive programs, and field trips lead by URI graduate students trained by OMP as Outreach Scientists.

“It is a pleasure to showcase and encourage the communication skills of URI graduate students,” commented Hickox. “They serve as wonderful ambassadors for science and for URI as they share their knowledge and expertise with teachers and students across the state through OMP’s educational offerings.”

Forty years on, OMP is a vibrant hub of public engagement, making the smallest state in the union a focal point for scientific progress the world over. And its commitment to improving science communication to a broad array of audiences through a variety of activities makes it a valuable resource to our local community.



photo by Trimmel Gomes



RHODE ISLAND SCIENCE AND TECHNOLOGY COUNCIL COLLABORATIVE RESEARCH GRANT AWARDS

The Rhode Island Science and Technology Council (STAC) Collaborative Research Grant Awards provide seed funding to help Rhode Island scientists, businesses and research institutions work together to advance ideas that can eventually create new products, companies and quality jobs in the state while growing our innovation and technology driven industries.

Funding for the Collaborative Research Grant Awards represents the match requirement for the \$20 million five-year NSF EPSCoR grant to Rhode Island. These awards illustrate the value of the state's investment in the integration of teaching and research. The scientists receiving these awards stand as models of collaboration and student training. They are preparing the next generation of scientists to secure jobs and to be fully prepared for their careers in research.

In addition to the remarkable gains in research and education, these collaborative grants also enhance the state's economy with follow-up funding and growth of our job base. They help drive competitive efforts to secure strong partnerships while providing for the future success of our citizens, schools, businesses and industries.

To date, \$8.5 million of STAC investments in collaborative research have yielded a return of nearly \$36 million back to the state in the form of grants for continued research, new equipment, commercialization of new products and venture funding for new companies.

The 2012 and 2013 award recipients include academic and industry scientists pursuing research in aquaculture diseases, climate change, chronic wound healing and other areas of cutting-edge exploration. The awardees represent 32 scientists from nine research organizations pursuing projects in marine life sciences, nanotechnologies and medical device development. The scientists are from the University of Rhode Island, Brown University, Rhode Island College, Roger Williams University, Salve Regina University, Rhode Island Hospital, Narragansett Bay Estuary Program, U.S. Environmental Protection Agency, and two private companies.

STAC 2012 COLLABORATIVE RESEARCH GRANT AWARDS EIGHT TEAMS TO SHARE \$1.4 MILLION

1. New Tools and Mechanisms to Combat Aquaculture Diseases

This team is working to develop new commercial products to promote fitness and prevent disease for finfish and shellfish in aquaculture facilities. The overall goal of the project is to develop new tools to promote animal health in aquaculture by building on recent discoveries of marine bacteria that demonstrate impressive protective properties against disease.

Collaborators: David Rowley, Marta Gomez-Chiari, David R. Nelson, University of Rhode Island; Dale Leavitt, Roxanna Smolowitz, Roger Williams University.

2. Revealing Active Responses of the Ocean State's Marshes to Climate Change

Salt marshes store carbon at the highest rates per area of any ecosystem. Using equipment in the EPSCoR core labs, the team will study if changing environmental conditions due to human activities are changing marshes from "sinks" into "sources" of gasses. The team will also train undergraduates and one high school teacher.

Collaborators: Serena Moseman-Valtierra, University of Rhode Island; Breea Govenar, Rhode Island College.

3. Understanding Coastal Environmental Change Past, Present and Future

This team will work to better understand future environmental change at our nation's coastlines. This project will study an important class of organic biomarker produced by algae that are thought to record past sea surface temperatures and will produce a marine-based, local climate history of Narragansett Bay against which future patterns and rates of modern global change can be compared.

Collaborators: Timothy Herbert, Linda Amaral-Zettler, Brown University; Tatiana Rynearson, University of Rhode Island.

4. Climate-Driven Impacts on the Formation and Persistence of Macroalgal Blooms

This team will use genomic data to predict and monitor harmful macroalgal blooms. This team will use state-of-the-art equipment in EPSCoR core facilities to assess the ecological and genomic aspects of the formation of harmful macroalgal blooms that develop in response to climate change in Narragansett Bay.

Collaborators: Carol Thornber, University of Rhode Island; J.D. Swanson, Salve Regina University.

5. Characterization of Novel Anaerobic Nitrogen-fixing Bacteria Isolated from Narragansett Bay

This team will work to better understand nitrogen cycles in the Bay with the goal of improving water quality practices. The team will determine the environmental factors that control Nitrogen fixation within the sediments of Narragansett Bay and predict how microbial activity in bay sediments will respond to future environmental impacts.

Collaborators: Bethany Jenkins, University of Rhode Island; Chris Deacutis, Narragansett Bay Estuary Program.

6. Enhancement of Chronic Wound Healing with Non-invasive Local Skin Vibratory Stimulation

This team is working to demonstrate the proof of principle of the effectiveness of vibratory stimulation on wound healing. They will test the effectiveness of a medical device that uses mechanical vibratory stimulation to increase blood flow and tissue oxygenation to improve wound healing and decrease the pain and suffering of burn patients.

Collaborators: John Reichner, Rhode Island Hospital; Shai Schubert, Perfuzia Medical Inc.



7. Lab on Paper Technology for Immunodiagnostics

The team is working to produce new point-of-care immunodiagnostic devices. This team is an academic-industry collaboration to accelerate development of an enzyme based diagnostic device on paper that will improve on existing lateral flow technology. With funding, they will produce new point-of-care immunodiagnostic devices that perform multi-step assays, are easier to read and can be used by a wider patient population.

Collaborators: Mohammed Faghri, University of Rhode Island; C.N. Anagnostopoulos, Labonachip, LLC.

8. Graphene-Polymer Composite Materials

This team is working to develop a uniquely functional graphene-polymer composites. The goal of this project is to improve practical use of graphene, a recently discovered, essentially 2-dimensional material with unprecedented tensile strength, electrical and thermal conductivity, optical transparency and gas impermeability. The team hopes to develop composites that can produce “crumpled graphene” a potential game-changer for producing graphene-polymer composites. In turn, they hope that will lead to commercial opportunities that can establish R.I. as a leader in this field.

Collaborators: Robert Hurt, Brown University; Arijit Bose, University of Rhode Island.

STAC 2013 COLLABORATIVE RESEARCH GRANT AWARDS SIX TEAMS TO SHARE \$810,000

1. RI Seaweed Biodiversity Project

This team is using genomics to identify and catalogue invasive species of algal marine bio-invasers to improve coastal management and biosecurity in Narragansett Bay.

Collaborators: Christopher Lane, University of Rhode Island; Brian Wysor, Roger Williams University.

2. Temperature-Mediated Changes in R.I.’s Benthic Community

This team will work to return winter flounder to R.I. waters through better understanding of the evolving population dynamics of the blue crab and summer flounder, two of its natural predators.

Collaborators: David Taylor, Roger Williams University; Jeremy Collie, University of Rhode Island.

3. The Pathogenic Cause and Impact of the Local Sea Star Wasting Disease

This collaboration will bring together six researchers with ecological, veterinary, molecular, microbial and aquaculture expertise to determine the mysterious cause of a deadly infectious disease attacking starfish from New Jersey to the Gulf of Maine.

Collaborators: Gary Wessel, Brown University; Roxanna Smolowitz, Roger Williams University; Marta Gomez-Chiari, Edward Baker, Niels-Viggo Hobbs, University of Rhode Island.

4. Estimating the Potential for Evolutionary Adaption of Marine Organisms to Climate Change

This team will use native shrimp to study the evolutionary potential of marine species to adapt to warming waters.

Collaborators: Jason Kolbe, Carol Thorber, University of Rhode Island; Jason Gear, U.S. Environmental Protection Agency.

5. Electric Microcable Bacteria in Narragansett Bay Sediments

Working in the new area of electro-microbiology, this team will pursue their hypothesis that microbial bacteria are evolving to detoxify sediment in coastal dead zones.

Collaborators: Jeremy Rich, Brown University; Bethany Jenkins, University of Rhode Island.

6. Ocean Acidification Effects on Plankton Community Composition and Food Web Energy Flow

This team will look at how whole marine communities respond to ocean acidification.

Collaborators: Susanne Menden-Deuer, Tatiana Rynearson, University of Rhode Island; Breea Govenar, Rhode Island College; Jason Gear, U.S. Environmental Protection Agency.

**STAC INVESTMENTS IN
COLLABORATIVE RESEARCH HAVE
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\$36 MILLION BACK TO THE STATE
IN THE FORM OF GRANTS FOR
CONTINUED RESEARCH.**

THE JOY OF JAZZ

Jazz has often been called a uniquely American music genre, one that fuses all the pain and pride of this country's experience with the fast pace of the 20th century. It is sometimes said that without America, there would be no jazz. Similarly, without Professor of Music Joe Parillo, there'd be no jazz education at the University of Rhode Island (URI).

Parillo is an accomplished jazz pianist and composer, who grew up in Providence, traveled the world playing music with the famed Glenn Miller Orchestra, among other bands, and then came back to Rhode Island to share his knowledge with students. Parillo has been teaching jazz in higher education in Rhode Island for 32 years. He started the Jazz Program at CCRJ in 1981 and came to URI in 1985.

"I was attracted to jazz because of the improvisation," said Parillo, a Steinway Artist, who has performed at Boston's Symphony Hall, and produced five CDs.

The joy of improvisation is that in each moment the music can be different, he said.

Parillo created the URI Jazz Degree Program 10 years ago. The URI Jazz program has a Jazz Minor, Bachelor of Arts in Jazz Studies and a Bachelor of Music in Jazz Performance.

His love of jazz led to the URI Jazz & World Music Festival, an event that began in 1993 and brought music lovers from far and wide to the Kingston Campus. Among the well-known performers who came to the Festival, and worked with URI students, were Gary Burton, Slide Hampton and the Duke Ellington Orchestra.

In addition, Parillo serves as coordinator of the Rhode Island Music Educators High School Jazz Festival, an event funded by the National Endowment for the Arts and the Rhode Island State Council for the Arts, among other sponsors. Held in February at the URI Fine Arts Center, the festival brings together 12 of the state's top high school jazz ensembles to compete before a jury. It is open to the public and a popular staple at URI.

To the layperson, the idea of being a jazz musician has a certain romance to it, one that conjures up images of smoke-filled nightclubs in New York and Chicago and the hippest of characters. But, in fact, being a jazz musician is work, said Parillo, adding that's what he tells his students time and again. "It's a job. Don't forget it's a job." Parillo said

About 100 music major and minors at URI take courses in Jazz Studies. The program allows them to play in the URI Jazz Big Band, which has performed at New York's Lincoln Center and one year took the first place prize at the New England Intercollegiate Jazz Festival at MIT. They can also play in smaller ensembles, which perform regionally and play everything from Dixieland Jazz to Jazz Fusion.

As for Parillo, he will continue to compose, play, teach and share with students what he believes is the best art form out there.

"It's just the best way for me to express myself," he said.



Joe Parillo, Professor and Department Chair, Music

BOOKS AND ELECTRONIC MATERIALS, PUBLISHED BY UNIVERSITY OF RHODE ISLAND FACULTY MEMBERS 2012

Compiled by Margaret J. Keefe, Professor, University Libraries

Not all disciplines lend themselves to publishing in book format. University of Rhode Island faculty publications include journal articles, technical reports, performance reviews, etc. For the complete list of faculty publication please see:
www.uri.edu/library/faculty_publications/index

COLLEGE OF ARTS AND SCIENCES

Communication Studies

Houser, Catherine, Jeannette E. Riley and **Kathleen Torrens**. *Writer/Citizen*. Kendall Hunt. 2012. 328p.

Computer Science and Statistics

Carrano, Frank M. *Data Structures and Abstractions With Java*. 3rd ed. Prentice Hall. 2012. 781[198]p.

English

Anderson, Wanelle, William Pace, **Daniel Pearlman** and Annie S. Perkins. *Introduction to World Literature: Rites of Passage*. Kendall Hunt. 2012.

Barone, Dennis and **Peter Covino**. *Essays on Italian American Literature and Culture*. Bordighera Press. (Saggiistica 8) CUNY. 2012. 93p.

Covino, Peter. *The Right Place to Jump*. New Issues Press. 2012. 75p.

Dalessio, William R. *Are We What We Eat? Food and Identity in Late Twentieth-Century American Ethnic Literature*. Camber Press. 2012. 203p.

Faflik, David. *Boarding Out: Inhabiting the American Urban Literary Imagination, 1840-1860*. Northwestern Press. 2012. 374p.

Stein, Karen F. *Rachel Carson: Challenging Authors*. Sense Press. 2012. 194p.

Gender and Women's Studies

Glen, Emilie and **Brett Rutherford**. *The Poems of Emilie Glen 1: Poems From Chapbooks*. Poet's Press. 2012. 330p.

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Library and Information Studies

Adams, Suellen. *Crash Course in Gaming*. Libraries Unltd. 2012.

Gilton, Donna L. *Lifelong Learning in Public Libraries: Principles, Programs, and People*. Scarecrow Press. 2012.

Modern and Classical Languages and Literature

Heining-Boynnton, Jean L. LeLoup, Gluynis S. Cowell and **Megan Echevarria**. *Letras for Andar! Curso Intermedio*. 2d ed. Pearson College Division. 2012. 72p.

Heros Diez Canseco, Susana de los. *Utopía y Realidad: Nociones Sobre el Estanxdar Linguístico en la Esfera Intelectual y Educativa Pervana*. Vervuert. 2012. 229p.

Music

Berney, Mark. *Eternal Echoes: Songs and Dances for the Soul*. Sony Masterworks. September 2012. (CD).

Buttery, Gary, Composer. *Prelude and Groove*. Alchemy. 2012. (CD).

Monllos, John. *Pop the Cork* (Single) 2012. (CD).

Zinno, Dave, Bass. *...to Carmen With Love*. Whaling City Sound. 2012. (CD).

Philosophy

Krieger, William Harvey. *Processual Archaeology*. Oxford University Press. Continually Updated Online Resource. 2012.

Mollgaard, Eske. *An Introduction to Daoist Thought: Action, Language, and Ethics in Zhuangzi*. Routledge. 2012. 1 vol. (Originally Published 2007).

Schwarz, Stephen D. With Kiki Latimer. *Understanding Abortion: From Mixed Feelings to Rational Thoughts*. Lexington. 2012. 215p.

Physics

Wujcik, Evan K., **David Heskett** and **Arijit Bose**. *Co-Electrospun Lead Selenide/Titana-Core/Sheath Nanowires for Photovoltaic Applications*. University of Rhode Island Transportation Center. (URITC No.500-2301-0000-0001891) 2012. 10p.

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Wiley, James. *Theory and Practice in the Philosophy of David Hume*. Palgrave Macmillan. 2012.

Psychology

Faust, David. *Honest Questions, Honest Answers*. Standard Pub. 2012. 224p. (Reprint Edition).

Groden, June, Ayelet Kantor and Cooper Woodard. *How Everyone on the Autism Spectrum, Young and Old, Can ... Become Resilient, Be More Optimistic, Enjoy Humor, Be Kind, and Increase Self-Efficacy – A Positive Psychology Approach*. Jessica Kingsley Publishers 2012. (Computer File).

Groden, June and Titia Ram. *Positieve Psychologie Bij Autisme: Maak Gebruik Van Humor, Optimisme en Flexibiliteit*. Pica. 224p.

Weyandt, Lisa L. and George J. DePaul. *College Students With ADHD: Current Issues and Future Directions*. Springer. 2012. 122p.

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Druschke, Caroline Gottschalk, Evan Dunphy, **Linda Green**, **Elizabeth Herron** and Molly Hunt. What Is a Watershed? University of Rhode Island Watershed Watch. (URI WW-5) March 2012. 6p.

Reynolds, Nedra, Jay Dolmage, Patricia Bizzell and Bruce Herzberg The Bedford Bibliography for Teachers of Writing. 7th ed. Bedford/St. Martin's. 2012. 336p.

Schwegler, Robert A. Patterns of Exposition. 20th Edition. Pearson. 2012. 584p.

COLLEGE OF BUSINESS ADMINISTRATION

Dholakia, Ruby Roy. Technology and Consumption: Understanding Consumer Choices and Behaviors. Springer 2012. 211p.

Glynn, Mark S. and **Arch G. Woodside**. Business-to-Business Marketing Management: Strategies, Cases and Solutions. Emerald Group. 2012. 355p.

Hyde, Kenneth F., Chris Ryan, **Arch G. Woodside**, Anne-Marie Hede and John Hall. Evoked Emotions: Textual Analysis Within the Context of Pilgrimage Tourism and Gallipoli. Emerald. (Advances in Culture, Tourism and Hospitality Research. Vol.6) 2012.

Hyde, Kenneth F., Chris Ryan and **Arch G. Woodside**. Field Guide to Case Study Research in Tourism, Hospitality and Leisure. Emerald. (Advances in Culture, Tourism and Hospitality Research. Vol.6) 2012. 568p.

Murphy, Kevin E. and **Mark Higgins**. Concepts in Federal Taxation 2013. South-Western. 2012. 1v. + 1 Computer Optical Disc.

Murphy, Kevin E. and **Mark Higgins**. Professional Edition Concepts in Federal Taxation 2013 + H&R Block @ Home. South-Western. 2012. 1v and 1 Computer Optical Disk.

Wrenn, W. Bruce, David Loudon and **Albert J. Della Bitta**. Fundamental Consumer Behavior: Putting the Theory Into Practice. Routledge. 2012 (Pb).

COLLEGE OF ENGINEERING

Chemical

Wujcik, Evan K., **David Heskett** and **Arijit Bose**. Co-Electrospun Lead Selenide/Titania-Core/Sheath Nanowires for Photovoltaic Applications. University of Rhode Island Transportation Center. (URITC No.500-2301-0000-0001891) 2012. 10p.

Electrical, Computer and Biomedical

Kay, Steven M. Intuitive Probability and Random Processes Using MATLAB. 4 corr. Version of the 5.print. Springer. 2012.

COLLEGE OF THE ENVIRONMENT AND LIFE SCIENCES

Environmental and Natural Resource Economics

Johnston, Robert J. and **Stephen K. Swallow**. Economics and

Contemporary Land Use Policy. Taylor & Francis. 2012. 337p. (Ingram Digital eBook Collection).

Christou, Paul, Roxana Savin, **Barry Costa-Pierce**, Ignacy Misztal and Bruce Whitelaw. Sustainable Food Production. Springer. 2012.

MacMillan, Beverly C., **John A. Musick** and Anne Bouin. Les Oceans. Larousse. 2012. 64p.

MacMillan, Beverly C., **John A. Musick**. Zralaci. Slovart. 2012. 64p. (Czech)

Fisheries, Animal and Veterinary Science

Carrier, Jeffrey C., **John A. Musick** and Michael R. Heithaus. Biology of Sharks and Their Relatives. 2d ed. Taylor & Francis. 2012. 633p.

COLLEGE OF NURSING

Kirk, Jo Anne, **Mary Louise Palm**, Lynn D. Bickely and Barbara Bates. Student Laboratory Manual for Bates' Nursing Guide to Physical Examination and History Taking. Lippincott Williams & Wilkins. 2012. 200p.

COLLEGE OF PHARMACY

Biomedical and Pharmaceutical Sciences

Kalgutkar, Amat S. Reactive Drug Metabolites. Wiley-VCH. (Methods and Principles in Medicinal Chemistry v.55) 2012. 385p.

Smith, Dennis A., **Amit S. Kalgutkar**, Hon Waterbeemd and Don K. Waker. Pharmacokinetics and Metabolism in Drug Design. 3d ed. Wiley-VCH. 2012. 269p.

GRADUATE SCHOOL OF OCEANOGRAPHY

Ballard, Bob. Alien Deep. National Geographic. 2012. 2 Videodisks (225 min.)

Ballard, Robert D. Secrets of the Titanic: 100 Year Anniversary Collection. National Geographic, Distributed by Vivendi Entertainment. 2012. 1 Videodisc (96 min.)

Hurley, Graham and **Robert D. Ballard**. Secrets of the Titanic. National Geographic. 2012. Videorecording.

Hurley, Graham, **Robert D. Ballard**, Alex Dunlop, John Benjamin Hickey and Peter Guinness. Titanic: 100 Jaar: De Herdenkingseditie. National Geographic. 3 DVDs (150 min) 2012.

Ien, Marci, Beverly Thomson, Jennifer Burke, Hugh Brewster, **Robert D. Ballard**, Alan Steward Nursali and Dan Conlie. Titanic at 100. McIntyre Media. 1 Videodisc. (ca.68min.)

Lynch, Don, Ken Marschall and **Robert D. Ballard**. Titanic la Grande Histoire Illustree. Nouvelle Presentation. Glenat. 2012. 228p.

Noxon, Nicholas, **Robert D. Ballard** et al. Secrets of the Titanic: Seconds From Disaster. Madman Entertainment [Distributor] 2012, 1986. (DVD) (ca.99min)

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Public Services

Keefe, Margaret J., Compiler. Faculty Publications 2012. http://www.uri.edu/library/faculty_publications/index.html

THE UNIVERSITY OF RHODE ISLAND RESEARCH HONORS & AWARDS 2012

Compiled by the College Deans Offices



UNIVERSITY OF RHODE ISLAND AWARD

The Digital Forensics and Cyber Security Center: The National Security Agency and the Department of Homeland Security have selected URI as a National Center of Academic Excellence in Information Assurance Education.

COLLEGE OF ARTS AND SCIENCES

CAROLINE GOTTSCHALK DRUSHKE, assistant professor in writing and rhetoric, was named a Rhode Island Campus Compact Engaged Scholars Statewide Faculty Fellow.

JASON DWYER, assistant professor of chemistry, received an NSF CAREER Award, and U.S. provisional patent application for “Novel Process for Electroless Plating of Gold on a Surface.”

TIMOTHY GEORGE, professor of history, received a Fulbright research grant to Japan.

RENEE HOBBS, founding director of the Harrington School of Communication and Media and interim director of the graduate program in library and information studies, was designated the Digital Literacy Fellow by the American Library Association (ALA). She worked with the ALA Office of Information Technology Policy to design and implement a national series of public and online conversations to explore how to define and assess digital literacy competencies among public, school and academic librarians and the users they serve.

GALEN JOHNSON, philosophy professor and department chair was appointed as an Inaugural member of the Honorary Advisory Board for

the Simon Silverman Phenomenology Center, Duquesne University. He was also appointed to the jury for the Habilitation à Diriger des Recherches (HDR), Université Paris IV – Sorbonne, Paris, France for Dr. Emmanuel de Saint Aubert. [Jury for French holders of a Doctorat to qualify to occupy a university chair, formerly titled Doctorat d’État [Doctor of State].

ERIK LOOMIS, assistant professor of history, won the Grey Towers Scholar in Residence Fellowship from the United States Forest Service (USFS). This was a writing fellowship from the USFS to work for three weeks in January at Grey Towers, the home of former USFS head Gifford Pinchot in Milford, Pennsylvania.

BERNICE LOTT, emeritus professor of psychology, was the winner of the American Psychological Association’s “Distinguished Contributions to Psychology in the Public Interest, Senior Career Award.”

BRETT LUCHT, professor of chemistry, was issued a patent for “Novel Electrolyte for Lithium Batteries.” He was also elected as Member at Large to the Board of the Battery Division of the Electrochemical Society.

ANNU P. MATTHEW, professor of art, was awarded a Fulbright Fellowship for travel, research and teaching in India.

RONALD ONORATO, professor and chair of art and art history, was awarded a Swan Point Cemetery Private Grant for research and survey of major grave monuments.

JIMMIE OXLEY, professor of chemistry, received a Distinguished

Lecturer Award from the Chemistry Graduate Student Association at the University of Nevada, Reno. Along with **JAMES SMITH**, they received three provisional patents with students.

YANA RESHETNYAK and **OLEG ANDREEV**, associate professors of physics, and Donald Engelman, professor of biochemistry and biophysics (Yale University), received a U.S. patent for "Selective Delivery of Molecules into Cells or Marking of Cells in Diseased Tissue Regions Using Environmentally Sensitive Transmembrane Peptide."

ANDREA RUSNOCK, professor of history, was awarded an American Council for Learned Societies fellowship. She also received a National Institute of Health/National Library of Medicine award for Scholarly Works in Biomedicine and Health. Her current research focuses on the early history of vaccination and the deliberate global spread of cultivated cowpox as a preventive against natural smallpox.

STEPHEN STIFANO, lecturer in communication studies, Harrington School of Communication and Media, received a Top Paper Award from the Mass Communication Division of the National Communication Association for his paper, "Rational and Emotional Communication between Filmmakers and Audiences in a Narrative Feature Film: A Developmental-Interactionist Theory of Film Communication."

COLLEGE OF BUSINESS ADMINISTRATION

CYNTHIA BLANTHORNE, associate professor of accounting, was invited to serve on the Editorial Board of Issues in Accounting Education, the top educational journal in accounting.

DOUGLAS HALES, associate professor of supply chain management, **DEBORAH ROSEN**, professor of marketing, **HENRY SCHWARZBACH**, professor of accounting, **TONY WHEELER**, associate professor of management and **CHRISTOS XENOPHONTOS** received a 3rd place finish in the best applied research paper award at the Transportation Research Arena 2012 Conference in Athens, Greece.

BINGXUAN LIN, professor of finance, was honored to serve as a visiting professor at the School of Business at the Sun Yat-sen University in China.

DARA GALE SCHNIEDERJANS, assistant professor of supply chain management, Yang Yu and Qing Cao received the BEST INTERDISCIPLINARY RESEARCH PAPER award from the 2012 Decision Sciences Institute's Annual Meeting.

TONG YU, professor of finance, was honored to serve as a visiting professor at the School of Finance at the Shanghai University of Finance and Economics in China. Dr. Yu also serves as an associate editor for the Journal of Insurance Issues and an editor for the China Journal of Accounting Studies.

COLLEGE OF THE ENVIRONMENT AND LIFE SCIENCES

PAUL S. COHEN, professor of cell and molecular biology was issued a U.S. patent for "Live Attenuated Aldolase-Negative Bacterial Vaccine." This vaccine invention will be useful for the prevention of microbial pathogenesis and the manufacture of vaccines.

ANNE DE GROOT, professor of cell and molecular and director of the Institute for Immunology and Informatics, was named a "Smith Medalist" in September, 2012. The Smith College Medal is awarded

to alumnae who, in the judgment of the trustees, exemplify in their lives and work the true purpose of a liberal arts education. She was elected to the International Society of Vaccines Executive Board and to the Editorial Board of Current Opinion in Immunology.

ANNE DE GROOT and **DENICE SPERO**, co-directors of the Institute for Immunology and Informatics, have been honored for their contributions to higher education by the Association of Rhode Island Women in Higher Education. De Groot and Spero work together at the Institute, also known as iCubed, to apply immunoinformatics tools to vaccine design. They were recognized for their influential roles in education and research. iCubed focuses on creating newer and safer vaccines to help accelerate the development of treatments and cures for a number of diseases.

LINDA GREEN and **ELIZABETH HERRON**, research associates in natural resources science and directors of the URI Watershed Program, received the Technical Merit Award from the North American Lake Management Society in recognition of their efforts in creating The Extension Volunteer Monitoring Network, a unique and comprehensive support system for citizen science and volunteer water quality monitoring efforts across the country.

LAURA MEYERSON, professor of natural resources science, was awarded a Fulbright Scholarship that supported a sabbatical at the Institute of Botany in Pruhonice, Czech Republic. There she explored the genetic qualities of a reed, *phragmites australis*. This reed is found in wetlands and is considered to be both a native plant to North America and an invasive species. Meyerson's global research project is helping to develop better understanding of invasive species.

COLLEGE OF ENGINEERING

WALTER BESIO, associate professor of electrical, computer, and biomedical engineering gave a keynote address at the Latin American Society for Medical Physics 2012 annual conference in Oaxaca, Mexico. Dr. Besio was appointed to the International Program Committee, 6th Institute of Electrical and Electronics Engineers (IEEE) Engineering in Medicine and Biology Society (EMBS) International Conference on Neural Engineering; as the IEEE EMBS Chair of the Technical Committee on Wearable Biomedical Sensors and Systems; as the IEEE EMBS representative to the IEEE Sensors Council; for a four-year term to National Institutes of Health Center for Scientific Review Neuroscience and Ophthalmic Imaging Technologies permanent study section. He was also elected as an IEEE EMBS North American Administration Committee member.

MICHAEL GREENFIELD, associate professor of chemical engineering, was awarded the Global Road Achievement Award in Research by the International Road Federation. The award honors his work on "Simulating Asphalt on the Molecular Level."

OTTO GREGORY, professor of chemical engineering, received a U.S. patent for "Low TCR Nanocomposite Strain Gages."

MUSA JOUANEH, professor of mechanical, industrial and systems engineering was elected as a Fellow Member of the American Society of Mechanical Engineers.

VINKA OYANEDEL-CRAVER, assistant professor of civil and environmental engineering, along with James Smith and Erin Kallman from the University of Virginia, received the 2012 ASCE Rudolph Hering Medal for the paper "Ceramic Filters Impregnated with Silver Nanoparticles for Point-of-Use Water Treatment in Rural Guatemala" Published at the ASCE Journal of Environmental Engineering. The

THE UNIVERSITY OF RHODE ISLAND RESEARCH HONORS & AWARDS 2012

(Continued)

Rudolph Hering Medal recognizes outstanding papers that contribute to the advancement of the environmental branch of the engineering profession.

RESIT SENDAG, associate professor of electrical, computer, and biomedical engineering, received a U.S. patent for his invention "System and Method for Branch Misprediction Prediction Using a Mispredicted Branch Table Having Entry Eviction Protection."

ARUN SHUKLA, professor of mechanical engineering, received the C.E. Taylor Award from the Society for Experimental Mechanics, for the distinguished technical contributions to the field of experimental mechanics and for the good citizenship that he has repeatedly demonstrated as a loyal and dedicated member of the society. He received the F.G. Tatnall Award from the Society for Experimental Mechanics, for his long and distinguished service to the society. He received the Best Paper Award along with his student Erheng Wang, at the SEM Annual Conference-Dynamic Failure.

YING SUN, professor, **FREDERICK VETTER**, associate professor of electrical, computer, and biomedical engineering, **RUMEI DONG**, and **SALVATOR CHIARAMIDA**, received a U.S. patent for their invention of "Integrated Finite Element and Circulatory Model for Predicting Hemodynamic Effects of Left Ventricular Impairment, Resynchronization and Remodeling."

DAVID TAGGART, professor of mechanical, industrial and system engineering, **PETER DEWHURST**, professor of mechanical engineering, and **ARUN NAIR**, received a U.S. patent for their invention "Systems and Methods for Finite Element Based Topology Optimization."

QING YANG, professor of electrical, computer and biomedical engineering, received a U.S. patent for his inventions of "System and Method for Maintaining Redundant Storages Coherent Using Sliding Windows of Eager Execution Transactions", "Data Retrieval System and Method That Provides Retrieval of Data to Any Point in Time" and with **WEIJUN XIAO**, "Systems and Methods for Recovering Information from NAND Gates Array Memory Systems."

COLLEGE OF HUMAN SCIENCE AND SERVICES

MARTIN BIDE, professor and co-chair of textiles, fashion merchandising, and design was recognized for his research contributions in technology and textiles as he received the Olney Medal at the 2012 American Association of Textile Chemists and Colorists. Established in 1944 in honor of Louis Atwell Olney, the founder and first president of the association, the Olney Medal recognizes outstanding achievement in textile or polymer chemistry or other fields of chemistry of major importance to textile science.

DISA HATFIELD, assistant professor of kinesiology, was selected as the keynote speaker for the Michael H. Stone Sports Science Lecture, a prestigious lecture given at the National Strength and Conditioning Association's National Conference.

JING JIAN XIAO, professor of consumer finance in human development and family studies, who publishes extensively in areas of consumer finance and economics, was appointed as Editor and Chief of the Journal of Family and Economic Issues.



COLLEGE OF NURSING

PATRICIA BURBANK, professor of nursing and associate dean of academic affairs was selected as a Fellow of the American Academy of Nursing. This esteemed honor recognizes nurses who have made exceptional contributions to nursing through practice, education, service and research.

DENISE COPPA, associate professor of nursing and the coordinator of the graduate nurse practitioner programs, received the Sigma Theta Tau, Delta Upsilon Chapter-at-Large Research Grant for her proposal entitled “The Impact of Nurse Practitioner Practice on Health Care Outcomes and Health Behaviors of Medically Uninsured Adults.”

LYNNE DUNPHY, professor of nursing and the Routhier Endowed Chair for Practice, completed the Robert Wood Johnson Foundation Executive Nurse Fellows program. This is a three-year advanced leadership program is awarded to uniquely qualified nurses who aspire to lead and shape health care locally and nationally. She was also selected as a Fellow of the American Academy of Nursing.

GINETTE FERSZT, professor of nursing and internationally known for her scholarly work in the health care of women in prison, was selected as a 2012-2013 Fulbright Senior Specialist by the Fulbright Scholar Program and worked with the Institute for Health and Care Sciences, University of Gothenburg, Gothenburg, Sweden. She was also recognized as a 2012 American Nurses Foundation Scholar and received grant funding for her highly innovative research on interventions to improve sleep and reduce anxiety in incarcerated women.

COLLEGE OF PHARMACY

ERICA ESTUS, clinical assistant professor of pharmacy, was elected as chair for the AACP Geriatrics SIG and co-chair of the Educational Advisory Council for the American Society of Consultant Pharmacists.

STEPHEN KOGUT and **BRIAN QUILLIAM**, associate professors of pharmacy practice, received the AMCP Journal of Managed Care Pharmacy Award for Excellence for their article “Evaluation of a Program to Improve Diabetes Care Through Intensified Care Management Activities and Diabetes Medication Copayment Reduction.”

NORMA OWENS, professor of pharmacy, **CELIA MACDONNELL**, clinical associate professor of pharmacy **MARILYN BARBOUR**, professor and department chair of pharmacy and **EUNSUN NOH** received the AACP Excellence in Assessment Award for: Yearly Progress Exams: An Analysis of Correlation between Knowledge and Skills.

KEYKAVOUS PARANG, professor of biomedical and pharmaceutical sciences, and **YOUSEF AHAMDIBENI** received a U.S. patent for their invention of “Polymer-Bound Phosphitylating Reagents for the Synthesis of Organophosphorus Compounds.”

GRADUATE SCHOOL OF OCEANOGRAPHY

REBECCA ROBINSON, associate professor of oceanography was named a “Consortium of Ocean Leadership Distinguished Lecturer.”

The Impact of Funded Research by the University of Rhode Island on the Rhode Island Economy in Fiscal Year 2011

By Professor Leonard Lardaro, Ph.D., Department of Economics, University of Rhode Island

The highly significant economic contributions that funded research at the University of Rhode Island (URI) makes to Rhode Island's economy are all too seldom either quantified or acknowledged. The benefits of that research have become ever more critical to Rhode Island's economic success, as its economy continues to evolve as a post-manufacturing economy following a structural change that occurred 25 years ago. The significance of that structural change cannot be overstated: not only did it forever alter the "rules" of the economic game; the highly dynamic nature of information-based economies requires that they continually adapt to the numerous and ongoing changes required for success in the information-age.

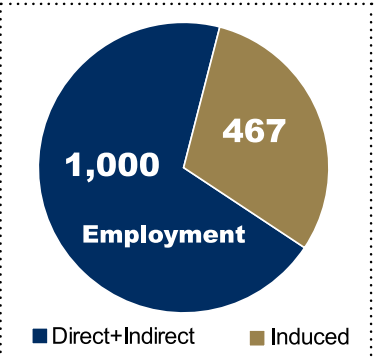
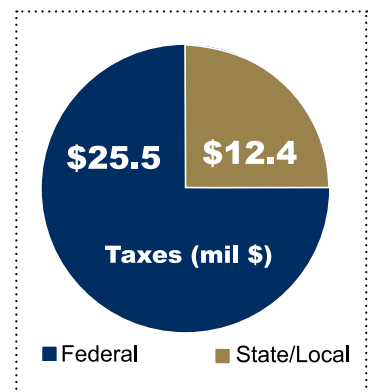
While the effects of the recent recession were felt by every state, Rhode Island suffered more than almost any other state. Rhode Island went into recession in early 2007, well before either the U.S. or almost any other state. Rhode Island's recovery, which began in February of 2010, has also been fairly weak by historical standards, not unlike what has happened nationally. This has made a return to pre-recession levels of economic activity both long and difficult.

One of the few bright spots for the State of Rhode Island over this period has been funded research at the University of Rhode Island. While that research cost nothing to Rhode Island tax payers, it has generated highly significant increases in the levels of income, employment, and tax revenue. Those positives were especially important during this period of economic weakness, both during the recession and subsequent recovery, as they helped to offset the numerous downdrafts to economic activity that Rhode Island experienced during that period. While aggregate employment in Rhode Island fell sharply during the recession, the gains generated by this research added close to two thousand jobs annually over that period, numbers against which actual employment change here often paled in comparison to. Had it not been for the economic gains from URI's funded research, the toll of the recession for Rhode Island would have been considerably worse.

The Rhode Island Economy in FY11

Rhode Island's population continued its longer-term decline that began in July of 2004, as its total resident population fell by another 0.1 percent during FY11. Along with this, its labor force declined as well, by 0.5 percent. In spite of this, however, real (inflation adjusted) personal income rose for the first time in several years, by 2.8 percent, to just above \$47 billion (in 2012). This benefitted retail sales, which rose by 1.5 percent for the fiscal year.

Rhode Island's payroll employment rose by only 0.5 percent, or 2,300 jobs, in FY11, the result of continued weakness in the number of jobs in both its goods-producing and service-producing sectors. Rhode Island's goods-producing sector was particularly hard hit during the recession, as there were large declines in both construction and manufacturing employment. New home construction remained at highly depressed levels in FY11, with only 629 units built throughout the entire state. As a result of this depressed level of home building, construction employment declined by another 3.4 percent in FY11. Rhode Island's manufacturing sector fared a bit better, even though manufacturing employment was flat, as the length of the workweek increased by 1.2 hours, or 3 percent, as the workweek moved toward more "normal" levels. Service-producing employment also began to rise again in FY11. A total of 2,900 jobs were added in this segment of Rhode Island's economy, a modest rise of 0.7 percent. Two important elements of this segment, professional and business services, saw a 1.9 percent gain in employment, while employment services, a segment that includes temporary employment, increased by a strong 7.7 percent, certainly some welcome news.



As Rhode Island's economy began to move forward once again, layoffs, as measured by new claims for unemployment insurance, improved (they declined) significantly, falling by 8.1 percent. Long-term unemployment, in terms of benefit exhaustions, also fell sharply, by 18.9 percent. Finally, Rhode Island's unemployment rate changed very slightly over this period, falling by 0.2 percentage points, from 11.6 percent in FY10 to 11.4 percent in FY11.

The good news, which helps to offset some of the negativity reflected in these overall statistics, is the economic contribution made by the \$98.5 million of funded research at the University of Rhode Island in FY11, which increased overall employment, income, and tax revenue for that year, adding to the momentum of Rhode Island's economic recovery.

It is important to keep in mind that while this study focuses only on the overall impact of URI's funded research on Rhode Island's economy, the very substantial amount of non-funded research that regularly occurs at URI also has a significant positive impact on Rhode Island's economy. Therefore, the economic values reported below should be viewed as being somewhat conservative estimates of the total influence of this research on the Rhode Island economy.



The Economic Impact of Funded Research at the University of Rhode Island in FY11 on Rhode Island's Economy

- In total, every \$1 in funded research the University of Rhode Island received in FY11 created \$1.63 in terms of total output, the combined result of the direct, indirect, and induced impacts of this research on the Rhode Island economy.
- While the economic benefits of URI's funded research extended to all of Rhode Island's counties, the primary beneficiaries in order, were Washington County, Kent County, and Providence County.
- In FY11, the \$98.5 million of funded research received by the University of Rhode Island generated an increase in output of \$154.1 million. The gain in employment associated with this was 1,467 jobs, which is highly significant given the fact that during this same period, Rhode Island's payroll employment rose by only 2,300 from its recession-depressed level in FY10 (an additional 0.5 percent). The employment stimulated by this research generated a total increase in labor income for Rhode Island of \$95.3 million.
- The majority of the jobs created by funded research resulted from the direct and indirect impacts of this research. The income created from these generated further income and spending (induced spending), which resulted in an additional 467 jobs. The average income of all the jobs created was \$64,973, a value well above Rhode Island's median income. The labor market effects of this research alone were therefore highly significant and instrumental in helping Rhode Island recover from the severe job loss it experienced prior to FY11.
- Rhode Island is a small business state. According to the Rhode Island Department of Labor and Training's most recent Quarterly Census of Employment and Wages, as of March, 2011, 81.9 percent of Rhode Island's private sector employers had labor forces of from 5 to 9 workers, while 90.4 percent employed 19 or fewer persons. Relative to these figures, the employment gains resulting from funded research at the University of Rhode Island in FY11 would have generated sufficient employment to staff either 293 five-person employers, 210 seven-person companies, or 163 nine-person firms. However, unlike the actual earnings for the employees of these firms in FY11, the value of labor earnings averaged over the total number of jobs created by funded research at the University of Rhode Island, a proxy for average earnings, was significantly higher, equal to \$64,973.
- The leading sectors of Rhode Island's economy that were impacted by URI's funded research in FY11, in terms of the value of output created, were Medical-Related fields (\$8.4 million), Rhode Island's Trade sector (Retail and Wholesale Trade, \$7.8 million), Finance, Insurance and Real Estate (FIRE, \$3.6 million), and Transportation-Related (\$0.8 million). The highest two of these, Medical-Related and Rhode Island's Trade Sector, added \$4.6 million and \$3.3 million in labor income, respectively.
- This funded research resulted in substantial increases in the amount of taxes paid by individuals and businesses in FY11. The total of all new tax revenue generated was \$25.8 million, of which \$6.6 million was for state and local taxes, while \$19.2 million was for federal taxes.

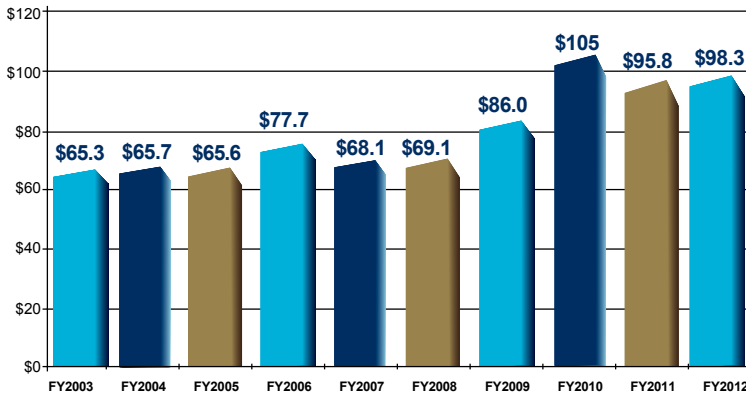
As the above statistics show, the overall contribution made by funded research at the University of Rhode Island in FY11 was very substantial. That research made a significant and desperately needed contribution to Rhode Island's economy as it began the transition from recession into an economic recovery. The employment effect of the \$98.5 million in funded research alone, the result of the direct, indirect, and induced effects of this research, was an employment gain of 1,467 jobs, which stacks up very favorably to the ultimate net change in employment for Rhode Island that fiscal year of only 2,300, or 0.5 percent. Thus, had it not been for FY11 funded research at the University of Rhode Island, payroll employment growth would have been even smaller, closer to actually being unchanged for the year.

Along with the added employment, this funded research also raised both personal income and tax revenue in Rhode Island. So, absent this FY11 funded research, Rhode Island's personal income growth would have been less, retail sales would have been weaker, Rhode Island's unemployment rate would very likely have been higher, and the FY11 deficit would have been larger than it actually was. In other words, URI's funded research in FY11 not only helped Rhode Island transition from recession into recovery, it was instrumental in its ability to sustain the early momentum of that recovery as well.

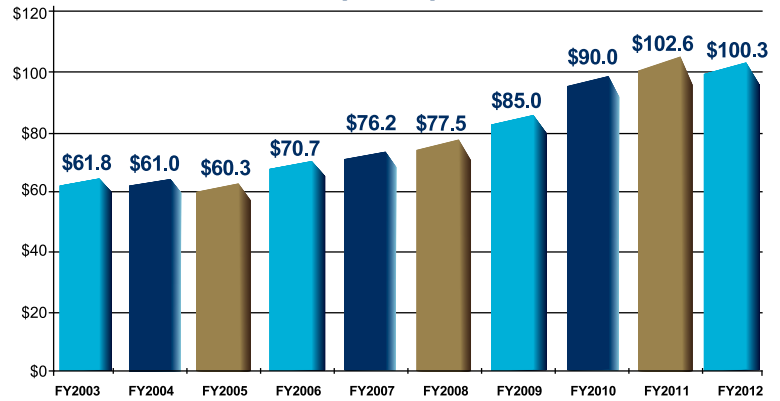
THE UNIVERSITY OF RHODE ISLAND

RESEARCH ENTERPRISE AT A GLANCE

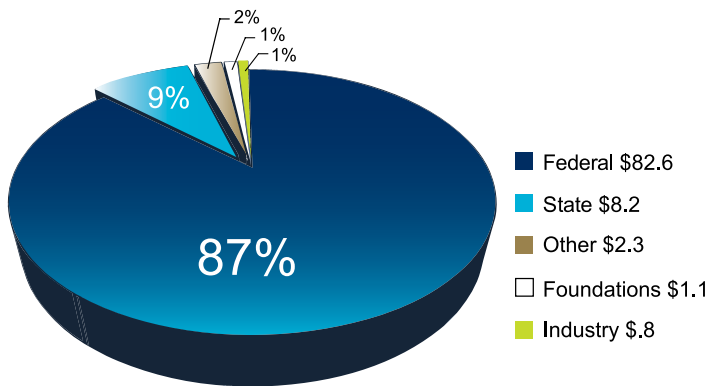
SPONSORED PROGRAMS AWARDS FY2003 TO FY2012
[\$millions]



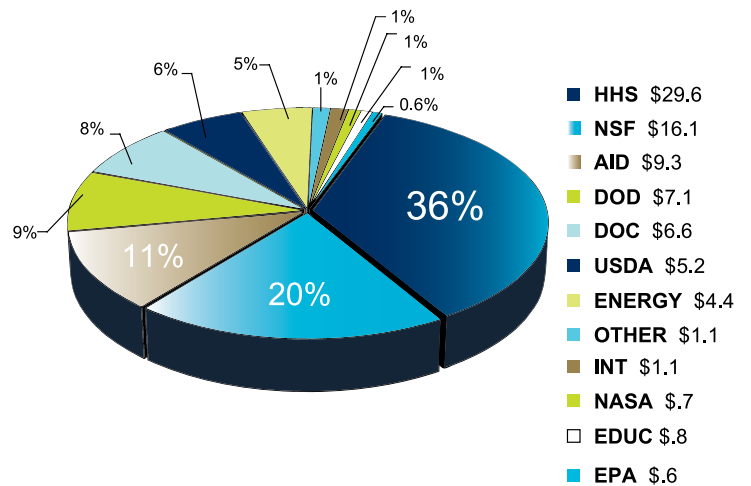
SPONSORED PROGRAMS EXPENDITURES REPORTED TO THE NATIONAL SCIENCE FOUNDATION FY2003 TO FY2012
[\$millions]



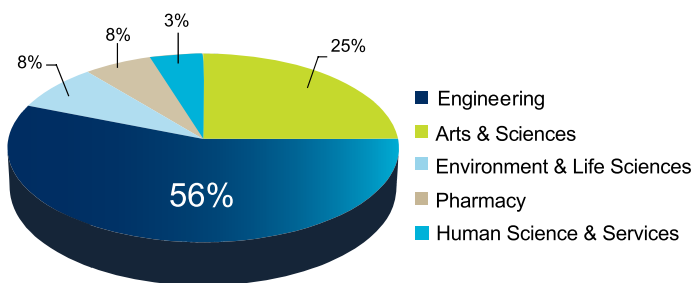
SOURCES OF SPONSORED PROGRAMS FUNDING FY2012
[\$95 MILLION TOTAL]



SPONSORED PROGRAMS AWARDS BY FEDERAL AGENCY FY2012
[\$82.6 Million Total]



DISTRIBUTION OF ISSUED PATENTS AND REGISTERED TRADEMARKS FY2008 TO FY2012



PATENT & LICENSING ACTIVITY, FY2008 TO FY2012

	Disclosures Received	New Patent Applications ¹	US Patents Issued
2012	17	25	10
2011	17	17	10
2010	21	20	4
2009	26	5	6*
2008	17	11	4*

¹ New category for 2010. First filing of patentable subject matter in world includes US provisional, US non-provisional or PCT designating US.

*Correction to record



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