Summer 2017 NEWSLETTER

Rhode Island INBRE

IDeA Networks for Biomedical Research Excellence

NEWS AND EVENTS

2016 Summer Undergraduate Research Fellows (SURF) Conference

Laura Arrighi

The 9th Annual SURF Conference was held on Friday, July 29, 2016 at the University of Rhode Island's new $68 million Richard E. Beaupre Center for Chemical and Forensic Sciences. As in the past nine years, this conference was held in collaboration with the RI NSF EPSCoR Program which also offers a SURF program.

The conference marked our largest participation with 140 students presenting posters from institutions throughout Rhode Island. The presentations by the RI-INBRE students summarized their research accomplishments over the past 10-week period. Posters were divided by topic areas and were presented in two sessions so the students had an opportunity to visit other posters. Informational tables were set up by CoresRI, various graduate programs at the University of Rhode Island (URI) and Brown University, and Brown's MRI Research Facility. The annual event attracted over 400 students, their families, faculty and administrators representing URI, Brown University, Bryant University, Providence College, Rhode Island College, Rhode Island School of Design, Roger Williams University, Salve Regina University, and the Community College of Rhode Island.

Dr. Brenton DeBoef, RI-INBRE Training Core Coordinator, opened the conference and stated "The students who are presenting today are the real stars of this program. They are some of the brightest young minds that our State has to offer." He encouraged the guests to tour the posters and said "while you may not understand the intricacies of the science they are presenting, you will surely be impressed by their knowledge and enthusiasm for cutting-edge research."

David Dooley, President of the University of Rhode Island welcomed the standing-room only audience and shared his thoughts on "the power of research" and discoveries that "have a bigger impact…and make the world a better place." He praised the students and faculty for their research efforts. Scott Jenson, Director of RI Department of Labor and Training offered congratulatory remarks on behalf of Governor Gina M. Raimondo.

The RI-INBRE Program Director, Dr. Zahir Shaikh and the past and current directors of the RI EPSCoR program, Dr. Carol Thornber and Dr. Geoffrey Bothun welcomed the participants on behalf of their respective programs.

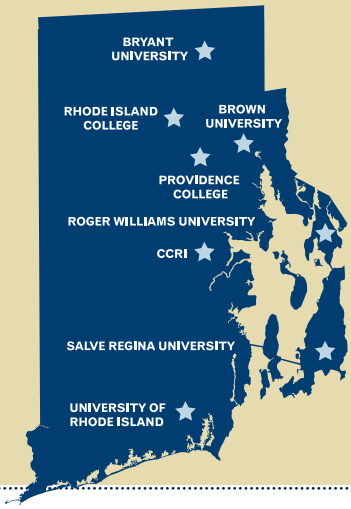
The goal of the RI-INBRE SURF Program is to provide talented undergraduate students with laboratory research experiences and motivate them toward future careers in the biomedical sciences. These SURF students generate a pipeline of skilled individuals that are prepared to enter master's, doctoral, and professional degree programs and the Rhode Island workforce.

2016 SURF Conference

In this Issue

OUR MISSION

The Rhode Island network, one of the 24 INBRE networks nationwide, supports and develops talented scientists, especially junior investigators, trains students and postdoctoral fellows as future workforce, and builds a multi-institutional program for collaborative research in molecular toxicology, cancer biology, and neuroscience.



FROM THE DIRECTOR

Our program completed its 16th year in April. During the past year, the RI-INBRE program provided financial support and mentoring for 40 faculty members, 5 teaching postdoctoral fellows, and 107 undergraduate students at the 7 institutions in the network. Various support mechanisms were employed to support research in the three scientific focus areas: cancer, neuroscience, and molecular toxicology. New assistant professors received the 2-year Early Career Development (ECD) Awards. More established junior faculty at the primarily undergraduate institutions (PUIs) received the 2-year Collaborative Proposal Development Awards along with their research mentors at URI and Brown University. Additional undergraduate research experiences were provided through the SURF Program. At URI and Brown University, innovative 6-month Pilot Projects for junior faculty were also supported to develop proposals for external funding.

The SURF Program provided research experiences to undergraduates not only at the PUIs, but also at URI and Brown University. This high impact program was organized once again in collaboration with the RI EPSCoR Program. At the SURF Conference, which remains the largest of its kind in the state, students presented 140 posters. The RI-INBRE students and their mentors also participated at the Rhode Island and National IDeA Symposia.

This issue of the Newsletter highlights recent publications by the RI-INBRE investigators Drs. Deyu Li, Susan Meschwitz, Geoff Stilwell, and Jennifer Van Reet. It also features two of our Teaching Postdoctoral Fellows and two of the Bridges to Graduate School Award recipients.

Dr. Zahir Shaikh

Several investigators have obtained multi-year research funding from the NIH, NSF, and other agencies as listed on the last page of this Newsletter and have graduated from the RI-INBRE program. I am very proud of their achievements in this highly competitive funding environment and congratulate them on behalf of the RI-INBRE program. I hope to report successes of additional investigators in the next issue of this Newsletter.

In April, our fiscal coordinator, Patricia Murray, left to become the business manager of the Academic Health Collaborative at the University. Our thanks to Pat for her years of dedicated service to the RI-INBRE program. We wish her the best in her new position where she will continue to interact with our program. I am pleased to announce that this essential vacancy has been filled. We welcome Laura Bellavia as our new business manager. She brings prior INBRE experience from another New England state to our program.

The present 5-year grant that supports the RI-INBRE program is in its 4th year (17th year since the program's inception). To competitively renew the program for another five years, we will be submitting our grant application to the NIH next March. The planning for this major undertaking is already underway.

THE 2016 SURF CONFERENCE

PROGRAM UPDATES

Centralized Research Core Facility

Al Bach

In the Centralized Research Core Facility we try not to let technology stand still for very long. Over the last year we have made additions to the Facility to expand our capabilities and allow more efficient use of our existing instrumentation. Some of these new capabilities are described below.

We added reagent pumps and special optics to our BMG Labtech POLARstart Optima plate reader to perform state-of-the-art BRET and FRET assays in a 96-well plate. BRET and FRET assays use the real-time measurement of bioluminescence or fluorescence.

These assays detect dynamic changes in energy levels as the reactants are combined. The BRET and FRET assay systems use enzyme substrates containing bioluminescent or fluorescent tags and quenchers to suppress their glow. As the substrate is cleaved, the tags become visible. FRET assays can be used to study many types of protein interactions. BRET assays have become more popular because they do not induce photo bleaching. BRET assays also work in live cell assays.

The Core Facility upgraded our BD Biosciences FACS flow cytometer to measure the response of up to eight fluorescent dyes simultaneously. The response from all the fluorophores is used to characterize each cell. The trend in flow cytometry is to use more lasers and more fluorescent dyes to study more cell markers in a single sample to address more questions. Our FACS instrument can now excite fluorophores at 405, 488, and 640nm.

We also purchased two additional fluorescent light cubes for our EVOS imaging system. This computerized microscope can do bright field and fluorescent imaging. It is very simple to use and is the first microscope new users are trained to operate. The additional cubes are in the near-infrared region (Cy7) and in the red region (RFP). If you use fluorescent microscopy, you should try the EVOS imaging system in the Core Facility.

The Core Facility purchased accessories to run 384 well-plate Taqman array micro fluidic cards on our ThermoFisher Viia7 real time qPCR instrument to measure gene expression, and rapidly confirm a set of biomarkers is present. Pre-made arrays are available to measure hundreds of genes, or customized arrays can be created. One to eight duplicate samples can be run against any of the expression assays. The amount of gene expression is determined by the Viia7. To learn more about the Core Facility, contact us at 401-874-5731 or by email at inbrelab@etal.uri.edu.

Bioinformatics Core

Christopher Hemme

It's been a busy time at the Bioinformatics Core. We have been working on several projects for our clients including ChIP-Seq and RNA-Seq analyses, as well as in natural products and human microbiome research. In addition to our standard analysis and consulting services, several INBRE researchers have been granted access to our INBRE server to carry out their own analyses. As part of our goal of helping INBRE researchers with their bioinformatics projects, we have been evaluating our computational resources and whether those resources meet the needs of our clients.

In addition to our local INBRE server at URI, which several off-site INBRE researchers have made use of, we are evaluating additional resources for larger-scale projects. Services we are evaluating include the new computing cluster at URI and Illumina's BaseSpace and QIAGEN's IPA systems for bioinformatics analyses. We also maintain close contacts with representatives from Illumina and PacBio to help evaluate our sequencing needs. We welcome the input of RI-INBRE community on these evaluations and would especially like to know about anticipated requirements of such resources.

Another goal of the Bioinformatics Core is to expand the Core's scope beyond sequence analysis. To this end, we have partnered with the 3D Visualization group at URI led by Dr. Bongsup Cho, the RI-INBRE Program Coordinator. This expansion to the Core will include access and help with 3D visualization software and access to the 3D printer in the URI College of Pharmacy. We presently employ freeware visualization software (e.g. Chimera) and are open to commercial software (e.g. Discovery Studio) based on demand. We would also like to hear from those who might be interested in cheminformatics software for in silico drug discovery applications. For more information contact me at 401-874-9862 or hemmcl@uri.edu.

RI-INBRE INVESTIGATORS

DEYU LI

University of Rhode Island
Todd McLeish, *Contributing Writer*

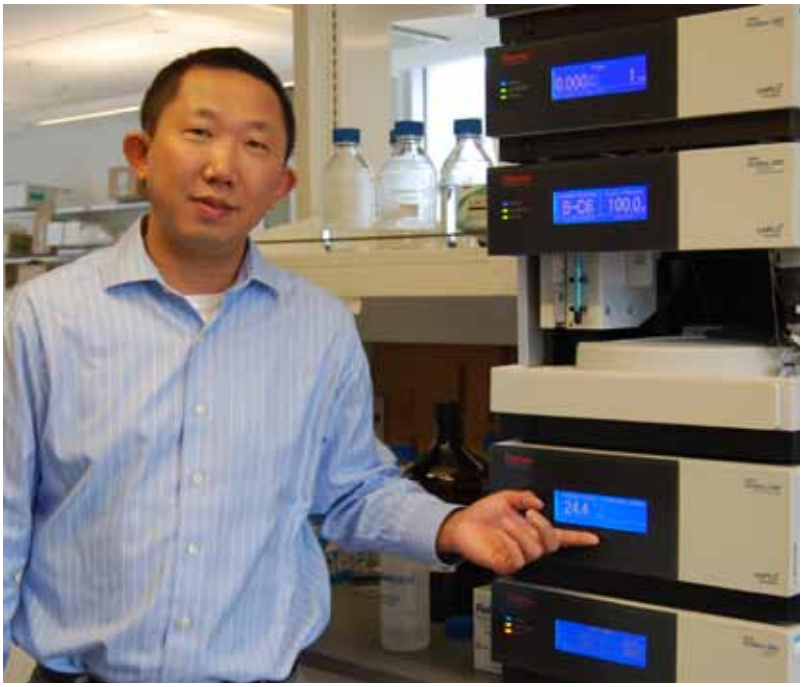


Photo by Todd McLeish

The 2015 Nobel Prize in Chemistry was awarded to three scientists who pioneered the study of how cells repair damaged DNA. It's a discipline that is growing in importance because of the many ways that DNA can become damaged – from ultraviolet light, environmental pollutants, inflammation, infection and many other causes. "If we didn't have a repair system for damaged DNA, people would die very quickly," said Deyu Li, assistant professor of biomedical and pharmaceutical sciences at the University of Rhode Island, whose research is revealing new DNA repair pathways. "Most of the time our body is very good at repairing DNA; we're fixing it every moment of the day. But any deficiency in this process may lead to certain diseases."

Li pursued research into DNA damage and repair following a post-doc at the Massachusetts Institute of Technology, where he studied DNA repair and drug development, especially how the novel molecule KP1212 kills the HIV virus. He earned a doctorate in organic chemistry at Brown University.

The focus of his present research is on an enzyme called AlkB, which can help to restore damaged DNA. "There are many different repair pathways, and we're focusing on a direct repair that doesn't touch the backbone of the DNA," Li explained. "Many other mechanisms cut and remove things from your DNA, which may introduce additional harm."

Collaborators on his latest INBRE-funded research include post-doc Fangyi Chen, graduate students Qi Tang and Ke Bian, and SURF fellow Zachary Humulock. Published in the journal Chemical Research in Toxicology in February 2016, they revealed the preferential pathways that AlkB uses to repair different kinds of DNA damage. By studying AlkB in E. coli, he found that the enzyme prefers to repair weak substrates in double strands of DNA rather than in single strands, as other researchers had reported previously. "We think this is a mechanism that allows the enzyme to fix damage in all different situations," Li said. "Some damage is more easily fixed than others, and it appears that AlkB is adaptable to a variety of different situations." His results were more diversified when Li studied the human homologs of AlkB, which are called ABH2 and ABH3. ABH2 prefers to repair damage in double strands while ABH3 prefers to work in a single strand context. "AlkB does everything in E. coli, but humans have specific enzymes to fix different situations," Li said. "We're more evolved." The next step in his research is to examine the many varied processes that can interfere with DNA repair, including how humans sometimes develop resistance to chemotherapeutics and other drugs administered to damage DNA. He is also studying the molecular process that lead to cancer following exposure to several environmental pollutants, including aminobiphenyl, the only known carcinogen for bladder cancer. The overarching goal of his lab, he said, is to study the molecular mechanism of diseases and develop drugs.

Li credits INBRE funding and access to the Core Facility at URI for much of his early research success. "When I came to URI in the summer of 2014, I got two grad students almost immediately and they were quickly doing experiments in the Core Facility," he said. "It would have taken a lot longer to get started on my research without that facility, and because there are professional people maintaining the equipment there, it makes the whole research process very productive and efficient." Based on his INBRE research projects, he recently received the Academic Research Enhancement Award (R15) from the National Institutes of Health entitled: "Inhibitory Effect of Nitric Oxide on DNA Repair Enzymes."

SUSAN MESCHWITZ

Salve Regina University
Todd McLeish, *Contributing Writer*

Bacterial resistance to antibiotics, due largely to the misuse and overuse of antibiotics, is considered by the World Health Organization to be one of the top three threats to human health around the globe. The failure of existing antibiotics to control infection has made it crucial to find alternative ways to treat infections that won't promote resistance. That's the focus of the INBRE-supported research by Susan Meschwitz, assistant professor of chemistry at Salve Regina University. She said that currently-used antibiotics work by killing the bacteria, and as a result the bacteria have evolved ways to become resistant.

"To come up with new drugs that bacteria don't become resistant to, the drugs are going to have to work a different way," she said. "We're looking to target pathways in bacteria that aren't essential for their growth, but rather are pathways that bacteria use to establish an infection or to become pathogenic." Her research team includes Teaching Post-doc Stephanie Forschner-Dancause and undergraduate student Emily Poulin, is targeting a pathway called quorum sensing that bacteria use to communicate with one another and to regulate the expression of virulence genes.

According to Meschwitz, quorum sensing is the way bacteria signal to each other that they have reached a high enough population density or "quorum" to overpower a host's immune system and establish an infection. "We're trying to scramble that communication system," explained Meschwitz, who earned a bachelor's degree in chemistry from Stonehill College and a doctorate from Brown University. "We're doing that by designing compounds that mimic the bacterial signaling molecules by binding to their target receptors. However, once bound our compounds inhibit the expression of genes necessary for bacteria to establish an infection."

Photo by Todd McLeish

Meschwitz and her colleagues published their latest research results in the open access journal Molecules on July 25, 2016. In that paper, they reported on their discovery that a class of compounds called aryl beta-keto esters inhibit quorum sensing in bacteria. "This class of compounds had never been found to inhibit quorum sensing before," Meschwitz said. "But by knowing what the structure of the signaling molecules look like in bacteria, and looking at other molecules that have been designed to be quorum sensing inhibitors, we hypothesized that this class of compounds was likely to be good inhibitors." The researchers used biosensor strains of bacteria that use quorum sensing to bioluminescence, which enabled the researchers to see when the bacteria were actively quorum sensing. When they tested the aryl beta-keto esters, the bioluminescence decreased. "Because the molecules don't actually kill the bacteria – they just make them less virulent – chances are that the bacteria wouldn't develop a resistance to these molecules because they won't feel as threatened," Meschwitz said.

Meschwitz started her research thanks to a two-year INBRE Pilot Grant in 2012, which was followed by a two-year Early Career Development Award that enabled her to hire a post-doc and purchase the necessary instrumentation to conduct her research. She continues to receive SURF Awards to further this work and to study other classes of compounds that may also be quorum sensing inhibitors. "INBRE funding has been instrumental in everything I do here," she said.

RI-INBRE INVESTIGATORS *continued*

GEOFF STILWELL

Rhode Island College
Todd McLeish, *Contributing Writer*

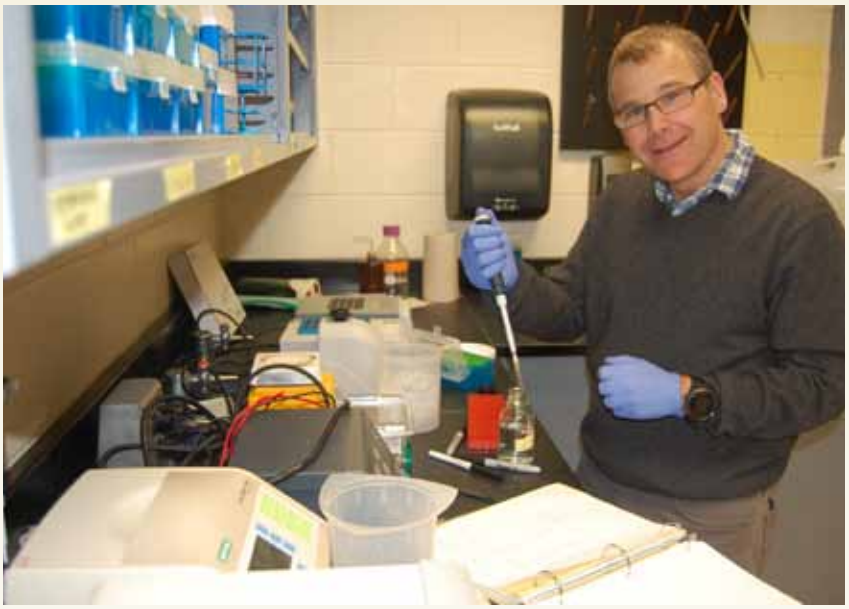


Photo by Todd McLeish

Geoff Stilwell worked in the biotechnology industry for nearly a decade before becoming an assistant professor in the Biology Department at Rhode Island College in 2013. His industry work focused primarily on drug development, but as a student he was most interested in toxicology and how anthropogenic inputs into the environment affect biological systems. He earned a doctorate in environmental toxicology at the University of Wisconsin by studying the evolution of insecticide resistance, and furthered his toxicology studies as a post-doc at the University of Washington.

His research focus has almost always centered on insects, so it comes as no surprise that his laboratory is filled with flasks of growing fruit flies. "There has been more than a century of research at the genetic and cellular level using fruit flies as a model system for all kinds of biological questions," he said. "They're easy to maintain, cheap to grow and raise, and about 50 percent of the known genes that mutate and cause disease have a functionally similar component in fruit flies." Stilwell, a geneticist, is using fruit flies to better understand the biological processes that lead to neurodegeneration, especially the neurodegeneration that causes ALS. "Beyond that, if we understand what processes go awry and cause disease, we might then be able to define a way of intervening therapeutically."

A paper he published in December 2016 in the journal Genetics set the stage for the next steps in his research. In the paper, Stilwell reported on how he created and characterized the first a fruit fly model of ALS. He said that one of the most common ways of creating animal models often results in an over-expression of the total amount of protein, which can be a confounding factor. His model has found a way around this problem by replacing the normal fruit fly sod gene with a mutant version instead of adding extra copies of mutant sod genes, as other researchers have done. According to Stilwell, one of the hallmark features of many neurodegenerative diseases is that mutant forms of proteins tend to aggregate and form complexes inside neurons, and that high protein concentration is thought to lead to the death of that cell. But high concentrations of non-disease causing proteins can also kill the cell.

"We really want to understand the critical effects of the disease at a cellular or molecular level that lead to the death of the neurons, but we couldn't do that with other animal models that rely on an overexpression of protein because that's so different from the human disease state," he explained. His new model becomes a valuable new tool for future research, enabling scientists to identify new mutations that suppress or enhance ALS symptoms. "By doing that, we can get a handle on what other genes are essential for creating these symptoms," he said. Using his model, he is now screening other genes for those that exacerbate the symptoms when they become mutated. Stilwell's INBRE-funded research has greatly benefitted from a strong collaboration with Professor Robert Reenan in the Brown University Department of Molecular and Cellular Biology and Biochemistry. Post-doc Toni-Marie Achilli and undergraduate students Victoria St. Amand and Anthony Agudelo also played important roles in this research. "INBRE provides not only the financial resources, but also expertise in core facilities, networking connections and advice – both scientific and practical – to really get off the ground as a new investigator," he said. Stillwell is writing a grant seeking funding from the NIH to continue work on the next stages of his research.

JENNIFER VAN REET

Providence College

Todd McLeish, *Contributing Writer*

Jennifer Van Reet described her first research experience in a child development lab at the University of Texas as "a good fit from the beginning." It inspired her to earn a doctorate at the University of Virginia in developmental psychology and pursue answers to some of the big questions in the field of cognitive development. As an associate professor of psychology at Providence College, she is investigating how people think about things that aren't real by focusing on pretend play among children.

"There are lots of ways you can think about things that aren't real," Van Reet explained, "but I'm interested in the mental process that takes place when individuals pretend. What process kicks in that allows you to understand that it's not real?" She often uses the example of someone pretending to use a banana as a telephone. What's happening in the mind to allow you to understand that? She said the question has been studied theoretically, but few experiments have been conducted because of the difficulty of studying thought processes, especially the processes that takes place when thinking about things that aren't real. My guess is that it involves inhibiting or partially inhibiting reality," Van Reet said. "Put reality aside for a moment – that's not a banana, it's a telephone – and allow that alternative reality to pop out. To understand a pretend action, do you use your inhibitory control? And is it the same for children as it is for adults?"

In a paper published in late 2016 in the Journal of Genetic Psychology, she and her students attempted to measure a pretend representation using reaction times, a method never tried before to address this question. In a computer-based experiment using groups of preschoolers, elementary students and undergraduates, she got them to think about a pretend representation – a banana as a telephone, for instance – then showed them an image of a banana, telephone or an unrelated object and had them quickly shout out what the object was. Software recorded in milliseconds how long it took them to respond.

Photo by Todd McLeish

"As expected, the very young kids were much slower to respond to the banana; it seemed like they were inhibiting reality," Van Reet said. "For them to wrap their minds around what was happening, they had to put reality aside. The adults were fastest to reality, showing the opposite pattern of the kids. "What I take from this is that inhibition is really important early in development. When children are still learning what pretending is, it's important to keep reality and non-reality separate," she said. "But the older you get, it's not so important, probably because when you're older there's no chance you're going to confuse a banana and a telephone. Your mind doesn't need to put up a strong inhibition of reality."

This kind of research isn't often considered part of the biomedical discipline, but it has important implications for public health. Van Reet said that individuals on the autism spectrum rarely pretend, so understanding how children pretend can highlight some of the differences in mental processing between children with and without autism. "I see my role as charting typical development, making it really clear what usually happens so those with clinical expertise can know where the deviation is," she said. Van Reet said the three INBRE grants she has been awarded were vital to launching her research. She is now seeking funding from other sources and has secured a grant from the Caplan Foundation for Early Childhood to fund a new project about play in science learning.

RI-INBRE TEACHING POST-DOCS

TONI-MARIE ACHILLI

Rhode Island College

Todd McLeish, *Contributing Writer*

As a doctoral student studying biomedical engineering at Brown University, Toni-Marie Achilli was inspired to consider a career teaching undergraduates. So she enrolled in some teaching classes and soon became an adjunct professor at the Community College of Rhode Island. "When I got my Ph.D., I knew my next step was to teach at a small college," she said. "That's when I heard about the INBRE Teaching Post-Docs. I knew immediately that was exactly what I wanted to do."

Achilli had earned an undergraduate degree in chemical and biomolecular engineering at Johns Hopkins University because of a desire to not only learn basic science but to also apply that science in a useful way. That has become the emphasis of her teaching as well. "So many classes focus on memorizing all of the facts, but I really try to foster the critical thinking and application skills," she said. "In today's age, when facts are so accessible, you really have to be able to apply those facts to succeed." She has taught introductory biology and genetics courses several times, and this semester she is teaching physiology.

Achilli also worked at RIC, in Assistant Professor Geoff Stilwell's neurodegeneration lab studying fruit flies to gain a better understanding of the genetic form of ALS. With her engineering background, she is focusing her research on the integrity of the neuromuscular junction and how it degenerates throughout the course of the disease. The most challenging – and the most beneficial – part of the post-doc experience, according to Achilli, has been combining the teaching and research elements. "I've learned a lot about teaching and about research, but I've really learned how to have a balance and have success in both," she said.

Achilli recently accepted a full time lecturer position as an Adjunct Assistant Professor, in the department of Molecular Pharmacology, Physiology, and Biotechnology, at Brown University. She is responsible for teaching biotechnology and medicine and a lab course in regenerative medicine, advising undergraduates, and mentoring masters' students in research.

BRAD HAUBRICH

Bryant University

Todd McLeish, *Contributing Writer*

For the first time ever, Bryant University is offering an Organic Chemistry II course this semester, and INBRE Teaching Post-Doc Brad Haubrich was chosen to teach it. He is excited about the opportunity, after having taught Organic Chem I Laboratory in the fall – his first semester on campus -- and a Winter session course in general chemistry in January. "I enjoy teaching. I like getting people excited about new material, whatever it may be," he said, noting that he often helps at science fairs, high school science programs and other science-related events for children. "I like getting people excited about the fact that chemistry is everywhere by incorporating everyday things and fun anecdotes into my lessons."

Haubrich worked as a synthetic chemist in industry after earning a bachelor's degree in natural science from Muhlenberg College. He then earned a doctorate at Texas Tech before taking a post-doctoral position at a drug discovery institute in California.

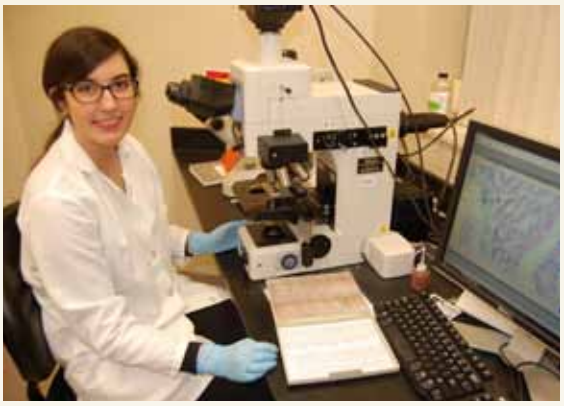
With a goal of becoming a university professor, he was pleased to be selected for an INBRE Teaching Post-Doc to gain more experience teaching. But he hasn't left his interest in research behind. Working with mentor Christopher Reid, an associate professor in Bryant's Science and Technology Department, Haubrich is seeking new bacterial enzymes that can be targeted by the next generation of antibiotics. "We need to develop new antibiotics because bacteria are developing resistance to current treatments," he said. "A large majority of drugs target enzymes; they try to disrupt the enzyme from doing what it's supposed to do. If we can come up with a novel enzymatic target, we may be able to circumvent that resistance."

BRIDGES TO GRADUATE SCHOOL FELLOWS

HEATHER CONBOY

Brown University

Todd McLeish, *Contributing Writer*



An early love of science and two childhood mentors inspired Heather Conboy to study chemistry at Salve Regina University, but it was her three consecutive SURF fellowships that launched her toward graduate school.

In her first two summers, under the direction of Associate Professor Steven Symington at Salve Regina, she worked on the development of a new in vitro assay system for testing the effects of pesticides on the nervous system. The following summer she collaborated with Wei Lu, associate professor at the URI, on the use of hollow gold nanospheres as a drug delivery system to treat cancer and rheumatoid arthritis. She used that experience to gain admittance to Brown University's doctoral program in Molecular Pharmacology, Physiology and Biotechnology, and the Bridges to Graduate School program offered her an early head-start on the three research rotations the University requires before selecting a lab in which to work.

"I was very eager to start at Brown, and the Bridges program let me get started early," Conboy said. "It allowed me to get comfortable in the environment and with the faculty and other grad students without also having to worry about classes and other obligations." She spent that summer working with Brown Assistant Professor Nicolas Fawzi on a project to identify the structure and function of a protein found in the plaques in the brains of ALS patients. Eventually Conboy hopes to work in the pharmaceutical industry conducting studies of pharmacology and toxicology. "I'm really interested in how drugs have the potential to harm us, and I'm especially interested in how drugs affect a woman's reproductive system," she said. "There's a long way to go to make sure that drugs are safe for everyone, and I want to be part of that."

SHELBY JOHNSON

University of Rhode Island

Todd McLeish, *Contributing Writer*

Shelby Johnson has had a long-term fascination with biology and chemistry. "I like that it helps me find answers to questions," she said. "I like to piece things together to figure out where they fit." That fascination was recognized when, as an undergraduate at Salve Regina University, she was selected for the SURF program following her junior year. She spent that summer in Professor Navindra Seeram's Bioactive Botanical Research Laboratory at URI, conducting studies about how the consumption of several varieties of common berries may reduce oxidative stress, which could lower the risk of contracting diabetes, Parkinson's disease, and Alzheimer's disease.

Her experience in Dr. Seeram's lab opened her eyes to the possibility of enrolling in graduate school at URI. Funding from the Bridges to Graduate School program, which provided 10 weeks of research experience for the summer after earning her bachelor's degree, made the leap into a doctoral program much easier.

"I learned so many new lab techniques that summer, like cell culturing and C. elegans modeling," she said. "And that's when I started to come up with my original research project." Her research aims to reveal how an extract from a bean native to China and India can reduce inflammation on the brain in patients with Parkinson's disease. "I have several relatives that have Parkinson's, so that's what drew me to the project," Johnson said. "The plant has been documented to reduce Parkinson's symptoms in a variety of ways, but the specific compounds and mechanisms are unknown." She eventually hopes to work in the pharmaceutical industry. "But I can also see myself teaching or working for a small start-up," she added. "With this degree, I'll be able to do almost anything."

NEWS AND EVENTS *continued*

RI-INBRE Seminar Series

The summer 2016 Seminar Series featured Dr. Stacey Wetmore, University of Lethbridge, and Dr. Gentry Patrick, University of California at San Diego. In the fall, we featured Dr. Craig McClain MD, University of Louisville School of Medicine, Dr. Seann Mulcahy, Providence College, Dr. Neil Sarkar, Brown University, and Dr. Graham Walker, Massachusetts Institute of Technology.

6th Biennial National IDeA Symposium of Biomedical Research Excellence (NISBRE)

The NIH, NIGMS 6th Biennial National IDeA Symposium of Biomedical Research Excellence took place on June 26 – 29, 2016 at the Marriott Wardman Park Hotel in Washington, DC. The program contained a high level of scientific presentations, enthusiastic participants, and a friendly atmosphere with open discussions and exchanges of ideas on science and training. A number of RI-INBRE investigators and students presented their research at this event.

RI-INBRE Retreats

The 2016 Summer Retreat for the RI-INBRE investigators was held on July 29 at URI's College of Pharmacy and the topic of the Panel Discussion was "Faculty Mentoring Faculty: Sharing Experience and Expertise." The Panel Members included faculty mentors Dr. Amit Basu, Brown University, Dr. Geoffrey Bothun from URI, and Dr. Robert Reenan from Brown University and their respective faculty mentees'. Dr. Christopher Reid from Bryant University, Dr. Geoffrey Stilwell from Rhode Island College, and Dr. Samantha Meenach from URI. The 2017 Winter Retreat took place on January 27 at Providence College. Welcoming remarks were provided by Rev. Kenneth Sicard, Providence College's Executive Vice President and Treasurer. He was introduced by Dr. Charles Toth, RI-INBRE Steering Committee Member and Chair of the Biology Department at Providence College. Dr. Bongsup Cho, RI-INBRE Program Coordinator, followed with opening remarks. The invited speaker was Sharon O'Connor from the Dartmouth College Center for Program Design and Evaluation who presented the results of recent surveys in her talk entitled "RI-INBRE Internal Evaluation: Tying It All Together." This presentation provided a summary of the experiences of our investigators and students and ideas for further improvement. Additionally, scientific presentations were given by Dr. Deyu Li from URI, Dr. Brett Pellock from Providence College, Dr. Geoffrey Stilwell from Rhode Island College, and Dr, Ashley Webb from Brown University. Dr. Zahir Shaikh, RI-INBRE Program Director, closed out the retreat with Program Updates.

Annual R.I. IDeA Symposium

This event, with participation from the COBRE, INBRE, and CTR programs, was held at the Alpert Medical School of Brown University on June 2, 2017. Dr. Stephen Kennedy from RI-INBRE gave a platform talk. Several other investigators from the program presented posters at the one-day event.

The 2016 SURF Conference

Seann Mulcahy, Providence College

Samual Spink, SURF Conference, 2016

IMPORTANT DATES

January 12, 2018 – SURF Mentor Applications Due

February 23, 2018 – SURF Research Fellows Applications Due

June 8, 2018 – RI IDeA Symposium, Warren Alpert Medical School, Providence, RI

June 24-26, 2018 – National IDeA Symposium of Biomedical Research Excellence, Washington, DC

July 27, 2018 – SURF Conference and Summer Retreat, University of Rhode Island

RI IDeA Symposium, 2016

Total Extramural Grant Awards (2001 – 2017)

Our investigators have received 4 R01, and 1 R15 awards from NIH. An additional 6 awards were received from NSF and 3 from other external funding agencies. The total extramural funding received by the RI-INBRE investigators is ~ $59 million thus far.

University of Rhode Island

Dr. Jodi Camberg was awarded a $1,419,000 R01 grant from the NIH entitled "Mechanism of cell division in prokaryotes." Dr. Camberg chaired the session "Remodeling reactions in the ring: Assembly and disassembly of the FtsZ network in E. coli" at the 2016 American Society for Microbiology's national meeting in Boston.

Drs. Stephen Kennedy and **Geoffrey Bothun** were awarded a $325,000 NSF grant entitled "Remotely activated biomaterial scaffolds for flexibly directing the recruitment and differentiation of bone progenitor cells". Dr. Kennedy was awarded a $45,000 non-Tenured Faculty Award from 3M. He also received the Best Poster Award at the 2016 ACEA Biosciences Symposium on Leaders in Cancer and Immunotherapy for his work entitled "Magnetically responsive materials for localized and temporally dynamic deliveries in cancer chemotherapies and immunotherapies".

Dr. Matthew Kiesewetter received a $255,100 NSF CAREER award entitled: "Stereoselective and rate-enhanced H-bonding catalysts for ring-opening polymerization". Dr. Kiesewetter's student and SURF mentee (2015-2016) Sam Spink was awarded the Barry M. Goldwater Scholarship, the nation's most prestigious undergraduate scholarship for those interested in careers in science and engineering.

Dr. Deyu Li received a $411,000 R15 award from the NIH entitled: "Inhibitory effect of nitric oxide on DNA repair enzymes". His student Kerri Bradshaw was recognized by the ACS's Rhode Island Section as the Outstanding Chemistry Student in 2016.

Dr. Kunal Mankodiya received a $175,000 award from the NSF entitled: "Brain-body sensor fusion: merging neuroimaging with full-body motion capture". He also received a NSF CAREER award entitled "Internet of wearable e-textiles for telemedicine" for $524,000.

Brown University

Dr. Amit Basu received a NSF award for $499,000 entitled "Chemical probes for studying plant arbaniogalactan proteins".

Dr. Peter Belenky and his graduate students Damien Cabral and Aislinn Rowan published an article in Microbial Cell entitled "Bactericidal antibiotics induce programmed metabolic toxicity".

Dr. Alexandra Deaconescu received a $1,680,000 R01 award from the NIH entitled "Mechanisms for stress-induced transcriptional reprogramming via anti-adaptors". Dr. Deaconescu and Postdoc Dr. Margaret Suhanovsky published an article in Photochemistry and Photobiology entitled: "From Mfd to TRCF and back again – a perspective on bacterial transcription-coupled DNA repair".

Dr. Alexander Jaworski received a $25,000 grant entitled "Multiple functions of the cell adhesion molecule TAG-1 in motor circuit development" from the RI Foundation.

Dr. Karla Kaun received a NIH R01 award for $1,789,000 entitled "Notch dependent microcircuit regulation of alcohol reward memory".

Dr. Ashley Webb received a $1,250,000 R01 award from the NIH entitled "Molecular mechanisms that promote cell cycle exit in glioblastoma". She also received a $25,000 grant entitled "Regulation of human neural stem cell function by the pro-longevity FOXO transcription factors" from the RI Foundation. Her graduate student Sun Y. Kim received the AFAR/ Glenn Foundation scholarship.

Bryant University

Dr. Christopher Reid, collaborator Dr. Amit Basu, and students Drew Phelan, and Keyana Roohani, published "Diamide inhibitors of the Bacillus subtilis N-acetylglucosaminidase LytG that exhibit anti-bacterial activity" in American Chemical Society Infectious Diseases.

Providence College

Dr. Seann Mulcahy received a NSF RUI grant entitled "Synthesis of isomeric carbolines by tandem palladium catalysis" for $191,000.

Dr. Yinsheng Wan was recognized as an Honorary Professor by the Guiyang Medical University. Dr. Wan's student Benjamin Gallant received the American Association for Cancer Research's Student Presentation Award.

Rhode Island College

Dr. Jayson Spas received a Clinical Research Loan Repayment Award from the NIH.

Salve Regina University

Dr. Susan Meschwitz published an article with her postdoc Stephanie Forschner-Dancause and student Emily Poulin in Molecules entitled "Quorum sensing inhibition and structure-activity relationships of ß-keto esters".

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The RI INBRE Program is supported by a grant from the National Institute for General Medical Sciences, National Institutes of Health