

2015

Rising Tide 2015

UNE Office of Research and Scholarship

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Preferred Citation

UNE Office of Research and Scholarship; Bilsky, Edward; Leslie, Annie; Pahigian, Josh; Aranovitch, Jennie E.; Duffy, Laura M.; and Miller, Marine, "Rising Tide 2015" (2015). *Rising Tide*. 5.
<http://dune.une.edu/risingtide/5>

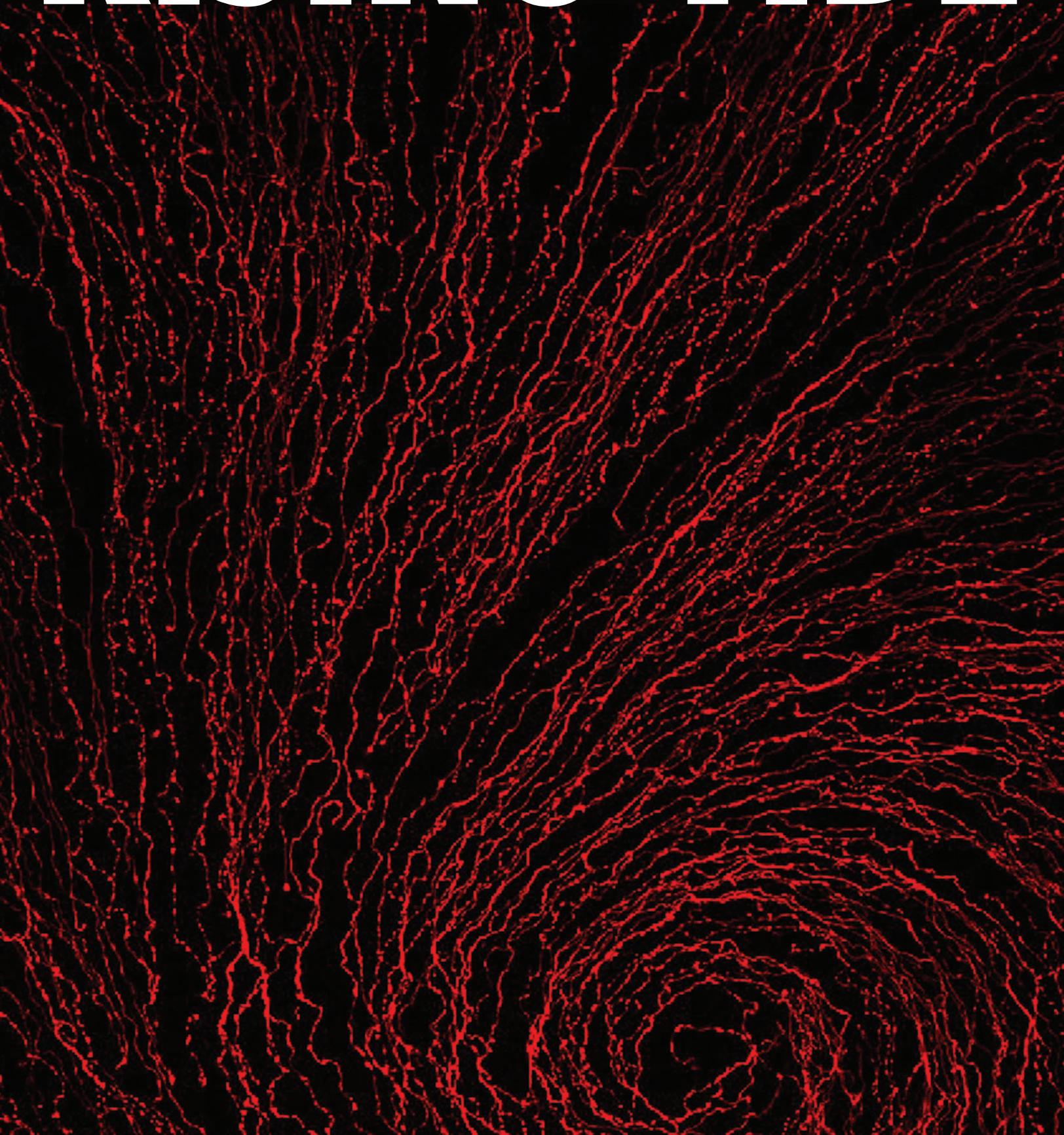
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RESEARCH AND SCHOLARSHIP AT THE UNIVERSITY OF NEW ENGLAND 2015

RISING TIDE



Convergence



The Blizzard of 2015 and a subsequent three-day snow event have helped me put the finishing touches on this year's *Rising Tide*. Not only has the magazine given me a respite from snow removal, but it has helped illustrate the power of convergence. In the case

of these historic snow events, the convergence involved low- and high-pressure systems colliding, bringing their cold and warm frontal boundaries together over southern Maine. In the case of UNE's research and scholarship endeavors, the convergence involves diverse disciplines, professions and stakeholders within and outside the University coming together to share equally in generating ideas, developing plans and achieving goals.

The idea to use convergence as the theme of this year's *Rising Tide* originated when I read a 2014 National Research Council (NRC) report titled "Convergence: Facilitating Transdisciplinary Integration of the Life Sciences, Physical Sciences, Engineering and Beyond." The committee defined convergence as "the coming together of insights and approaches from originally distinct fields." The report makes the compelling argument that opportunities enabled by this approach will make fundamental contributions to the effort to provide creative solutions to the most difficult problems facing us as a society. While focused on the STEM disciplines, the authors also stress the essential need for full engagement with the "economic, social and behavioral sciences, arts and humanities disciplines, and beyond."

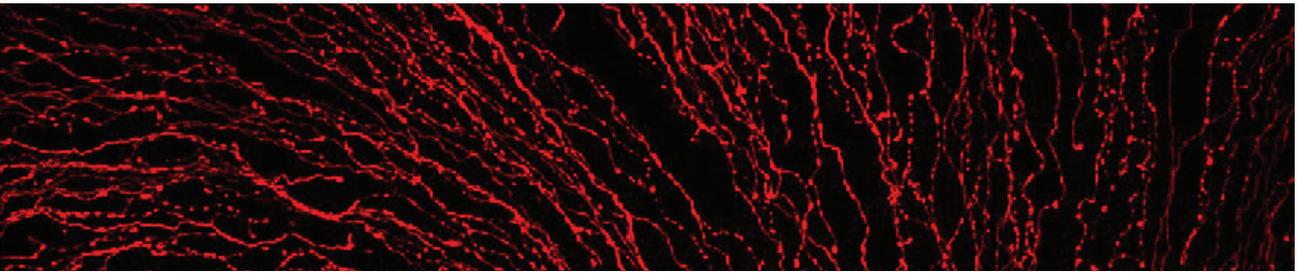
As I read through the various NRC case examples, almost all taken from the playbooks of large research universities, I was struck once again by how progressive, innovative and resourceful our university is. Whether these qualities developed out of necessity or from a Maine-centric way of approaching challenges or are just ingrained in our DNA, UNE faculty and students began using convergent approaches in the classroom and in conducting scholarship well before they came into vogue. A prime example of this may be found in

our Interprofessional Education Collaborative, which took flight 15 years ago in our Westbrook College of Health Professions. A diverse group of UNE educators saw the value in integrated interprofessional educational, research, science and service programs and in promoting patient-centered approaches for educating health care professionals across disciplines. Through the efforts of the Center for Excellence in Interprofessional Education, faculty and students are garnering honors and receiving extramural funding as they refine and assess methodologies and prepare the next generation of health care professionals.

Speaking of convergence being in our DNA, an osteopathic philosophy that combines elements of mind, body and spirit into human health and wellbeing comes to mind. While this novel approach to health and medicine dates back to the late 19th century, it is perhaps more relevant today than at any time previously. We are facing enormous challenges in the management of chronic diseases such as obesity, diabetes and pain. These challenges will be met not only with new pharmaceuticals, devices and diagnostic tests but also with innovative prevention strategies and better approaches to disease management. The Macy Foundation recently awarded UNE a multi-year grant to expand interprofessional education in the medical curriculum. This marks the first time in the history of the foundation that it has made an award to an osteopathic medical school and shows the power of collaboration across UNE's colleges and centers.

The social and behavioral sciences have a clear role to play in increasing patient participation and managing a more complex health care system. Future leaders and providers will have to be well-versed in communications, ethics, policy-making and health economics. This is one of the reasons why UNE is making complementary investments in a new health informatics program of study and in health outcomes research. These programs will connect with existing strengths in outcomes research in our College of Pharmacy and public health programs that focus on vulnerable populations here in Maine and abroad.

Exciting things are also happening in the marine sciences and the neurosciences, two areas that have historically taken multidisciplinary approaches. The National Science Foundation recently funded an



exciting new science education project led by Assistant Department Chair and Associate Professor Markus Frederick, Ph.D. It uses the Saco River watershed/estuary as a living research laboratory, while engaging students from different majors in hands-on team-based projects integrated into the curriculum. The Marine Sciences Department has developed a handful of new programs that include a double major with applied mathematics and a new major in marine entrepreneurship with business to meet the challenges of providing sustainable food and ecosystem approaches to marine resources development while protecting the environment. At the same time, the Center for Excellence in the

Neurosciences is expanding its award-winning K-12 outreach program in concert with local school systems and education specialists, accelerating partnerships with local and regional biotechnology companies in drug discovery, and advancing into clinical realms in partnership with local hospitals and health care systems.

The Center for Excellence in the Neurosciences has also teamed with the Department of Business to offer an advanced studies grant writing course that introduces the basic components of all successful applications. Students are paired with mentors and write their own grant proposals, and the breadth of proposal topics – which range from biomedical sciences, marine sciences and aquaculture to environmental sustainability and eco-label programs to athletic programs and community nonprofits – reflects the collaborative nature of the course. The course also reaches out to local nonprofit agencies including the United Way of Greater Portland and the Maine Philanthropy Center to provide guest lectures and opportunities for students to ask questions and engage with the real-life experience of grant writing.

As you read through the various highlights and stories in this issue of *Rising Tide* magazine, you will see many more examples of the convergence of disciplines and diversity of thinking that lead to outstanding scholarship. As always, our work is student-centered in its approach, informed and enlightened by the liberal arts, and it produces tangible benefits to society.



ED BILSKY
VICE PRESIDENT FOR
RESEARCH AND SCHOLARSHIP

A publication of the Office of
Research and Scholarship at the
University of New England

2015

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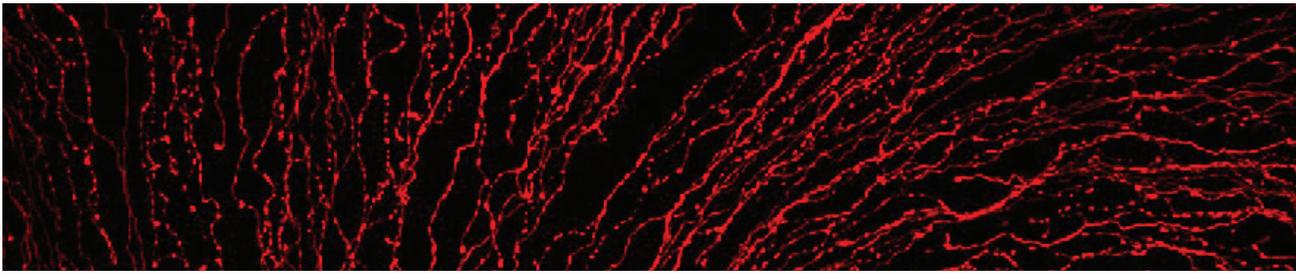
On the cover: *Eye of the Storm: sub-basal
primary afferent nerve fibers uniformly inner-
vating and surrounding the central corneal
button.* Microscope image taken by Ph.D.
student Neal Mecum.

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advances in research and scholarship for
general informational purposes.

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In Dedication to Ed and Ann Legg

This issue of *Rising Tide* is dedicated to the memory of Ed Legg and to his wife Ann, both longtime supporters of the University of New England and its scholarly mission. I met the Leggs soon after my arrival to UNE in the fall of 2001 and worked closely with Ed on many initiatives including strategic planning, securing funding to build the Biomedical Research building on our Biddeford Campus, and developing an intellectual property policy for the University.

Ed provided a clear and consistent voice in support of UNE, establishing and growing a strong regional

“Ed Legg was a builder and the research mission of UNE was always at the forefront of his plans. We would not be where we are today without the foundational work of this man.”

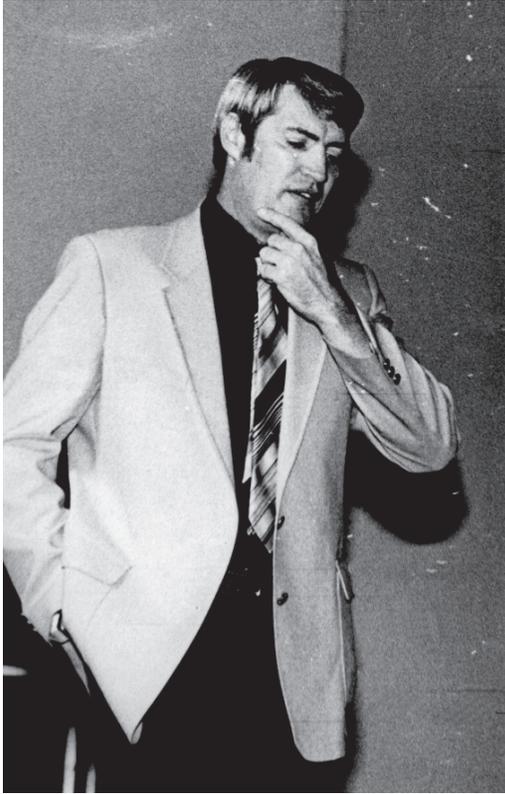
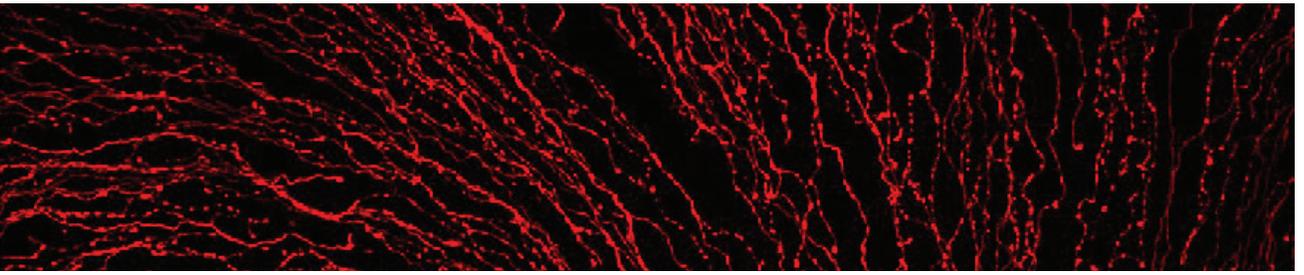
— Joint statement by
Danielle N. Ripich, Ph.D., UNE President
and Vince Fury, former Chair of
the Board of Trustees

research presence in the biomedical and marine sciences. He served in various capacities for the University including as a board member and as vice president of University Relations. His background in law and his love of politics and of the Maine outdoors made him particularly effective in building connections with key collaborators in the state and in identifying resources that played crucial roles in laying a solid foundation for the explosive growth in our research programs.

Ed’s wife, Ann, is a talented artist and an ardent supporter of the arts and humanities. She has been an inspiration to many of us, validating and supporting the importance of connecting the sciences back into the human experience and of using art, music and other forms of creative expression to inform and enhance science and the practice of medicine.

It is appropriate that this issue’s theme of convergence is dedicated to Ed and Ann Legg. We will miss Ed’s presence, advice and advocacy while being thankful that we continue to benefit from Ann’s talents, grace and deep personal connections to our University and its students.

RISING TIDE



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Writing Fellows Practicum
(Fall 2014)

Learning to Write and Writing to Learn in the College of Arts and Sciences

Supporting Writing



GROUP PHOTO OF WRITING FELLOWS: (left to right) Meghan Danley (Marine Science '15); Molly Allinson (Nursing '16); Kyli Labrecque (Animal Behavior '16); Jesse Pirtel (Environmental Studies '16); Maxwell Metayer (History '15); Kasey Rubenstein (Sports and Recreation Management '17); Josh Powers (Undeclared '17). Not pictured: Christina-Claire Georges (Sociology '17); Molly Wright (Biochemistry '17).

Students' Development

A Writing Fellows Initiative Takes Hold in the College of Arts and Sciences

MICHAEL J. CRIPPS, PH.D., ASSOCIATE PROFESSOR
CATHRINE O. FRANK, PH.D., ASSOCIATE PROFESSOR



Drafting, revision, peer review: these have long been staples of the writing classroom, and composition instructors know both the importance of intervening in the drafting process and the value of teaching students how to read critically and respond constructively to others' and their own papers. But how many small group discussions can one instructor facilitate in a single class meeting? Will she be available to conference on weekends or late at night? And can she ever really divest herself of the grade-giver's authority so that students can genuinely develop their own and engage in mindful conversation about their reading and writing?

A skillful peer reviewer can redress these problems, yet students may hesitate to credit the observations of a classmate whose knowledge and experience they feel is as limited as their own. What students need is someone who is less like a professor but more experienced than their classmates; familiar with the writing process generally as well as with the specific course material and assignments; and able to parse that perennial riddle "what the professor wants" into concrete strategies for improving their reading, critical thinking and written communication. What's needed, in short, is a writing fellow.

Writing Fellows@UNE is a project jointly funded by a grant from the Davis Educational Foundation and

the College of Arts and Sciences that embeds undergraduate peer tutors in select Core courses to support student writing. These tutors, or writing fellows, work closely with faculty and students to support reading comprehension, idea development, drafting and revision. In the fall of 2014, nine fellows worked in sections of English Composition, Explorations, Human Traditions and Environmental Studies courses.

“Fellows [...] share strategies for putting the writer in control of the writing and troubleshoot challenges that emerge in their weekly sessions....”

– Cathrine Frank

Writing fellows complete a writing-tutoring practicum course that includes both writing tutoring theory and hands-on practice in and discussion of peer tutoring. Cathrine Frank, Ph.D., associate professor of English and writing fellows coordinator, explains: “Fellows in the practicum learn, first and foremost, to distinguish tutoring the student from editing the paper. They share strategies for putting the writer in control of the writing and troubleshoot



MOCK TUTORING from left to right: Jesse Pirtel, Maxwell Metayer, Kasey Rubenstein



FACULTY from left to right: Paul Burlin, Cathrine Frank, Chris Feurt, Michael J. Cripps. Not pictured: Matthew Anderson, Jesse Miller, Eric Drown, Lisa Giles, Jen Gennaco, Tim Berrigan

challenges that emerge in their weekly sessions. Fellows aren't immediately comfortable asking a student to read her paper aloud, for example, but the opportunity to discuss their experiences in the practicum helps them adjust to their new role and develop a tutoring repertoire."

Fellows are selected on a competitive basis for this paid leadership opportunity. Guiding students through complex course texts and student writing, fellows hone their own reading and writing skills. They learn to set priorities and work towards goals by identifying areas where students most need help, and they improve their own communication skills as they address the different audiences of professor, student and fellow tutor. Environmental studies major Jesse Pirtel '16, a second-term fellow, called the experience: "... very satisfying when students seek me out and ask for my assistance on an assignment or when I am helping them and that 'aha' moment happens, when concepts just click in students' heads."

"... very satisfying when students seek me out and ask for my assistance on an assignment..."

— Jesse Pirtel

Faculty involved in Writing Fellows@UNE coordinate with their fellows by designing written assignments and structuring opportunities for fellows to interact with students in both classroom and outside-of-class tutoring environments. Paul Burlin, Ph.D., professor of history, joined the initiative to provide more

writing support for students. He notes: "Even though I have been teaching for over 25 years, during which time I have always worked hard with my students on their writing, I have never been satisfied that I was doing all I could in this area. Joining the Writing Fellow Program afforded me an opportunity not just to work on writing in one of my classes with the help of a student of advanced standing, but it also gave me the opportunity to work with several members of the English Department who know much more about the teaching of writing than I. It has been a real development opportunity for me — one I wish had existed much earlier in my career."

Assessment results from the pilot phase of the initiative, begun in English Composition, show that students in the sections that had writing fellow support made greater gains over the term than did students without such support. Michael J. Cripps, Ph.D., associate professor of rhetoric and composition and principal investigator for the project, finds this news quite encouraging.

"It has been a real development opportunity for me — one I wish had existed much earlier in my career."

— Paul Burlin

Cripps explains: "We did not plan the writing fellows pilot as a support for weaker writers, but the students in the sections of English Composition with a writing fellow began the term with lower average scores on our common start-of-term written task than students in the sections without a fellow. The exciting finding is that the writing fellow-supported students' average scores on the common end-of-term written task were statistically indistinguishable from those of students in the other sections. In other words, features of the writing fellows project enabled weaker entering students to make up ground over the term and exit the course on par with students who started at a higher level."

Faculty interested in applying for a fellow and students who may like to become one should contact Cathrine Frank at cfrank@une.edu.

Writing Fellows@UNE is part of a three-year, grant-funded effort to support student writing growth. Other initiatives funded through the grant include a mainstreaming initiative to reduce developmental writers' pre-college coursework and faculty development opportunities to design and implement digital projects in courses. The grant was received from the Davis Educational Foundation established by Stanton and Elizabeth Davis after Mr. Davis' retirement as chairman of Shaw's Supermarkets, Inc. ■

Social Entrepreneurship – Experiential Learning

BETH RICHARDSON, J.D., ASSOCIATE PROFESSOR; CHAIR, DEPARTMENT OF BUSINESS

CAS

The classroom is filled with the sights and sounds of serious entrepreneurs at work: animated voices; poster boards filled with post-it notes; laughter; pictures of mushrooms growing on logs; shouts of amazement when a particularly creative idea surfaces. A business course? Well, not your stereotypical classroom experience, certainly. Social Entrepreneurship: Organizations that Change the World debuted during the fall of 2014 as the UNE Department of Business continues to transform its curriculum to reflect the needs of the job market and the passions of its students. The important tool that the department is using in many of its courses to meet the job market demand is experiential learning: integrating actual work for outside organizations into the course curricula. The cacophony of the classroom described reflected social entrepreneurship students working on their real-world projects, preparing them for final presentations at the end of the semester to the founders of two nonprofits.

Social Entrepreneurship addresses the development, growth and effectiveness of organizations that are formed to address a social challenge. What better way to bring the course concepts to life than by conducting projects for nonprofits eager to grow, expand and scale their undertakings for new “markets”? Students in this course spent the semester working on three projects with Partners in Development (PID), addressing challenges in developing economic growth projects for its Haiti, Guatemala and Mississippi Delta region locations. In addition, Healthy Kids Brighter Futures (HK/BF), a nonprofit based in Zambia and founded by Maine native and recent Bowdoin College graduate Lonnie Hackett, provided yet another challenging project, as students worked on social media and fundraising plans that would identify and grow a new donor demographic for this fledgling nonprofit.

How are these contacts made? UNE business professors remain active in the industries of their fields of expertise. Business Department Chair and Associate Professor Beth Richardson, J.D., has been addressing social entrepreneurship challenges with PID for several years, traveling to Haiti regularly to train the PID Haitian staff in management skills, planning and performance management. Her HK/BF connection was made as a member of a Bowdoin



Kayla Hopkins (Business '17)



Social Entrepreneurship class with Lonnie Hackett, founder of HK/BF

College Rhodes Scholar preparation team that worked with Hackett as he prepared for his final Rhodes Scholar interview. Always seeing possibilities in every contact she made, Richardson approached Hackett about providing him with some “free” consulting through her Social Entrepreneurship class. Hackett joined the class in late November to see and react to the project presentation as well as to share his vision for the future of HK/BF.

Gale Hull, founder and president of PID, spoke with the class in September about the PID projects and then joined the class in early December for three presentations: a proposed business structure to support a jewelry making business in Haiti, a proposal for a mushroom production business in Glendora, Mississippi, and a decorative tin bowl business in Guatemala.

New Study Seeks to Help Individuals Experiencing Cognitive Decline Maintain Connection to Outside World

JENNIFER STIEGLER-BALFOUR, PH.D., ASSISTANT PROFESSOR

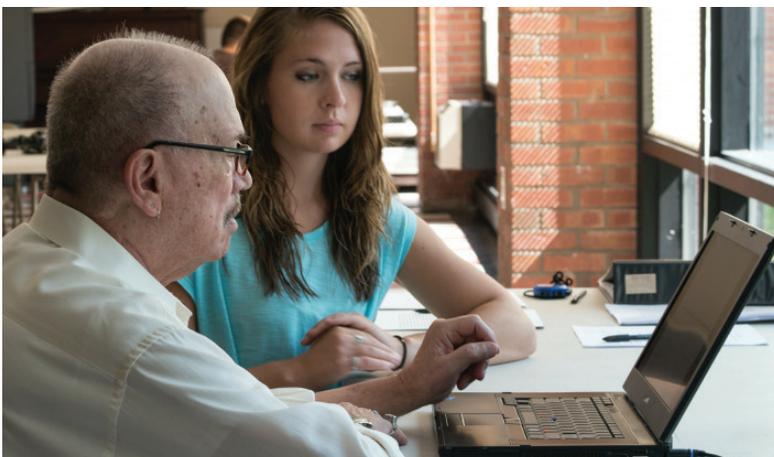
While we often think of memory loss as it relates to the deterioration of recognizing friends and loved ones, the ripple effects of Alzheimer's Disease and Related Disorders (ADRD) touch nearly every aspect of daily life. For those suffering from ADRD, the inability to read and retain information in newspapers, books or magazines represents the loss of an important connection point to the outside world.

Over the past year, two University of New England researchers and a team of undergraduate students have been working to better understand the effects of aging and memory decline on reading comprehension. Through its efforts, the team hopes to identify new methods that will enable individuals with ADRD to retain reading and comprehension skills later into their lives.

This innovative study is led by Jennifer Stiegler-Balfour, Ph.D., assistant professor of psychology, with assistance from Regula H. Robnett, Ph.D., professor of occupational therapy. An expert on the memory processes underlying reading comprehension, Stiegler-Balfour previously studied comprehension as it related to college-aged individuals. She turned her focus to an older population in order to pinpoint factors that influence the decline of reading skills as we age. With experience working with older individuals at assisted living facilities, Robnett has played an instrumental role in helping to establish access to people suffering from ADRD.

Stiegler-Balfour and her research team — which consists of students Emily Boulton (Psychology '16), Lauren Hayden (Psychology '16), Jessica Hering (Health, Wellness and Occupational Studies '15), Benjamin Katz (Psychology '17), Zoe Roberts (Psychology '18), and Elizabeth Whitmore (Medical Biology '14) — have been collecting data at various assisted living facilities in the Greater Portland area. Data collection has consisted of administering a reading comprehension task via computer in conjunction with the Montreal Cognitive Assessment (MoCA) test to determine if the participant has experienced any cognitive decline. Correlating the outcomes from the reading task and MoCA scores will allow the researchers to make inferences about which cognitive factors have the greatest impact on the ability to comprehend text effectively.

Based on data collected thus far, individuals with lower scores on the MoCA tend not to be sensitive to subtle nuances of written text, such as detecting small inconsistencies. Specifically, individuals who had lower attention spans as well as trouble with language fluency (sub-scales on the MoCA) had difficulty monitoring protagonists' goals and were unable to detect if they performed an action inconsistent with their previously stated intentions. Follow-up studies will identify the changes to text that will enable individuals experiencing some of these difficulties to comprehend it more fully and, thus, allow them to enjoy reading for a longer period of their lifetime.



Jessica Hering working on the MoCA with a participant at an assisted living facility in Portland, Maine



Jennifer Stiegler-Balfour

Tackling an Invasive Plant in the Saco River Estuary

PAMELA MORGAN, PH.D., ASSOCIATE PROFESSOR; CHAIR, ENVIRONMENTAL STUDIES
STEVEN TRAVIS, PH.D., ASSOCIATE PROFESSOR



The invasive *Phragmites australis* towers above other marsh plants.

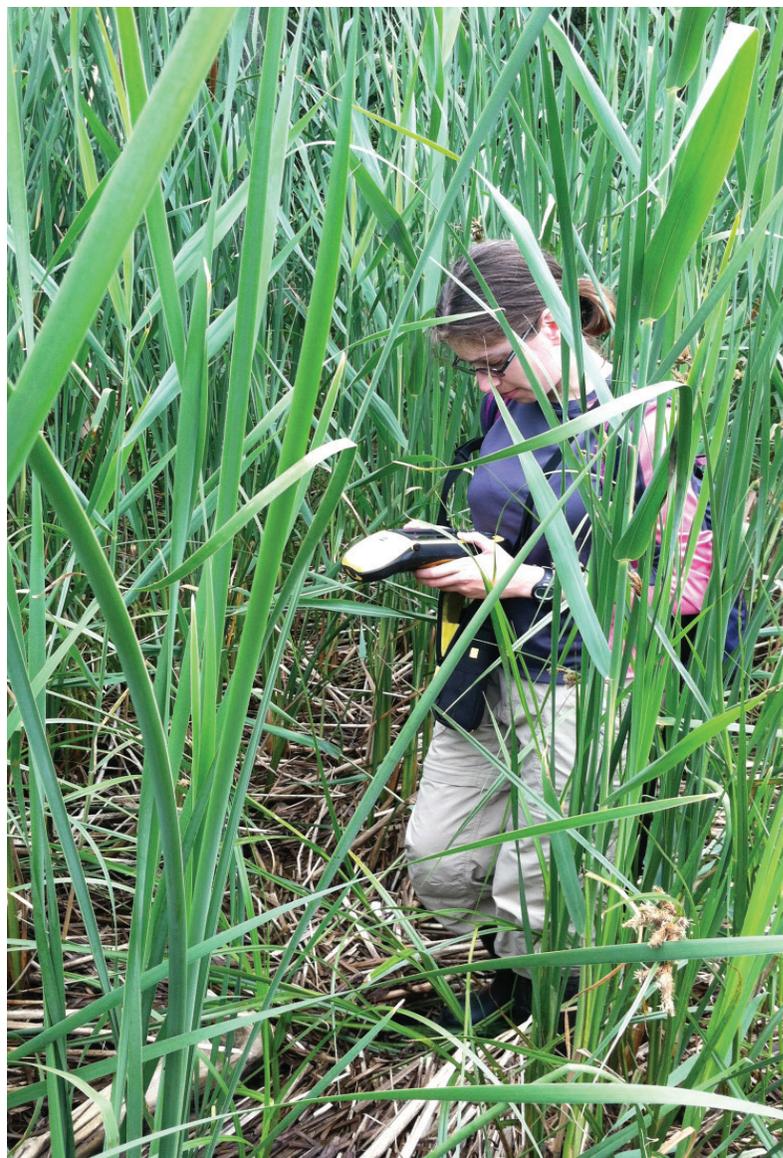
What plant grows in tall, dense strands, outcompeting native vegetation and changing the ecology of coastal marshes? The answer is *Phragmites australis*, also known as the common reed. Unfortunately, the invasive form of this species is gaining ground in the marshes of the Saco River estuary.

Beginning in 2011, undergraduate research students and Pam Morgan, Ph.D., associate professor and chair of the Environmental Studies Department, searched for patches of *Phragmites* in the tidal portion of the Saco River. They traveled by kayak, stopping whenever they saw the tall, jointed grass and then measured and mapped each patch. In all, they identified 23 patches in the river's tidal marshes. There were a few large patches but also many small patches comprising fewer than 20 stems.

Genetic research in the late 1990s showed that there were two forms of *Phragmites* in the United States: one a native and the other an introduced genetic strain (haplotype) from Europe. It was this introduced haplotype that was spreading rapidly through U.S. wetlands. Based on the physical characteristics of the *Phragmites* they had seen in the Saco marshes, Morgan

and her students believed that all of the patches were the invasive type. But how could they be certain?

In the fall of 2012, Master of Science student Michelle Slater decided to make *Phragmites* the subject of her thesis. She was very interested in understanding how the plant was spreading in the Saco River estuary and what might be done to control it. *Phragmites* can spread by seeds or by fragments that break off and float to new locations.



Graduate student Michelle Slater uses a GPS to mark the location of a sample point in a *Phragmites* patch.

Steven Travis, Ph.D., associate professor of biology, had expertise in the genetics of clonal plants, such as *Phragmites*, and agreed to join in the investigation. With his help, the research team could determine whether the patches were spreading mostly through the germination of seeds or the lateral spread of underground root systems and whether or not they were the invasive haplotype. It turned out they were the invasive type. And while many patches consisted of just a few clones, a surprising number were quite diverse, suggesting that seed dispersal may be playing the greater role in the spread of invasive *Phragmites* throughout the estuary.

Slater and a team of undergraduate researchers also created a more detailed map of the *Phragmites* patches in the estuary in 2013 using high-resolution GPS and tracked floating oranges and lemons in the currents to see where fragments and seeds were most likely to travel. Charles Tilburg, Ph.D., associate professor of

marine sciences, advised them on the hydrodynamic aspects of the investigation. The team also explored whether nitrogen in marsh soils might be contributing to the spread of *Phragmites* in the estuary.

Town officials and citizens in the communities of Saco and Biddeford are very interested in the results of this ongoing *Phragmites* research. Their interest is in protecting the scenic value of the river and its marshes as well as in the future health of the marshes, which provide food and shelter for fish and birds.

Tackling an invasive species is no easy task. It can require the expertise of researchers from different disciplines working together to clearly understand the problem and to look for potential solutions. It also helps to have a ready and willing pool of students to assist with all aspects of the research. When university researchers and local communities come together, the results of research are put to good use.



Student researchers use kayaks to locate patches of *Phragmites* in the Saco River's marshes.

Stress Relief Through Art

DAVID SANDMIRE, M.D., PROFESSOR

A recent study published by Sarah Gorham, M.F.A., M.A.T., associate lecturer in the Department of Arts and Communications, Nancy Rankin, M.Ed., L.P.C., senior lecturer in the Department of Psychology, David Grimm, Ed.D., associate lecturer in the Department of Biology, and David Sandmire, M.D., professor of Biology, was selected as one of the four best articles published in the *Journal of the American Art Therapy Association* in 2012.

This interdisciplinary group is exploring whether student anxiety can be reduced by involvement in art-making. The group is working with undergraduate students in this cross-disciplinary study prompted by the high prevalence of anxiety among college students.

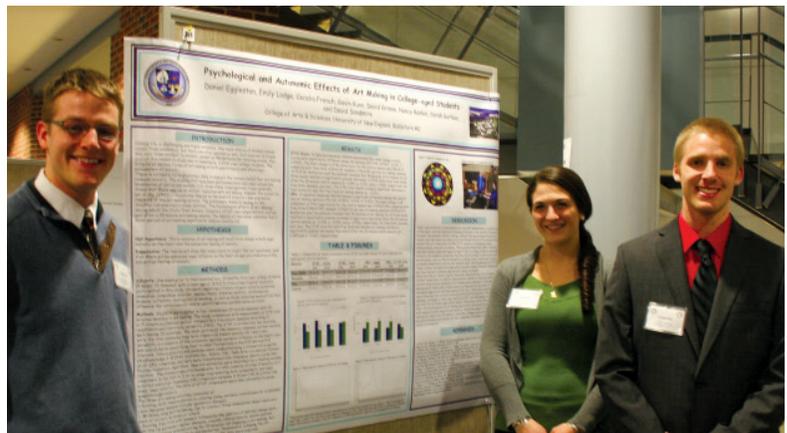
While nearly 40 million American adults report symptoms of anxiety, it has now overtaken depression as the principal presenting psychological complaint among college students who seek counseling services, according to a 2013 survey issued by the Association for University and College Counseling Center Directors. Ninety-two percent of college counselors reported that the number of students seeking help for mental health issues continues to increase at their institutions.

The UNE study, titled, "The Influence of Art Making on Anxiety: A Pilot Study," showed that even a brief, 30 minute art-making session can significantly decrease students' perception of anxiety, as measured by the State-Trait Anxiety Inventory. The second phase of the group's work, completed in 2014, examined not only one's own perception of anxiety but also one's physiological measures of anxiety following an art-making activity. Working with former UNE undergraduate students Gavin Kuns (Medical Biology '13/COM '17), Daniel Eggleston (Medical Biology '14/COM '18), Cecelia French (Medical Biology/Sociology '14) and Emily Lodge (Medical Biology '13/D.P.T. '16), and looking at beat-to-beat variability in heart rate, a commonly used measure of the activity of the autonomic nervous system, the research group found that art-making significantly calmed the body.

The group hopes to extend this line of research to assess whether a long-term regimen of art-making has

longer lasting effects on one's anxiety level and academic performance. According to findings of the 2012 National College Health Assessment, students ranked stress and anxiety as the top two factors that contributed to poor academic performance, as defined by receiving lower grades on exams and projects in the course; receiving an incomplete or dropping the course; or experiencing a significant disruption in thesis, research or practicum work.

University campuses frequently invest large portions of their budgets to build athletics facilities both for recreational and health benefits. The findings of UNE's research group may provide a compelling argument for universities to offer not only athletics facilities but also walk-in, student-centered arts and crafts studios where students can rediscover focus, realign spirit and reduce stress.



Gavin Kuns, Cecelia French, Daniel Eggleston at the 2013 NURDS Conference



David Sandmire, Nancy Rankin, David Grimm, Sarah Gorham

CAS

Collaboration Between Marine Sciences and Mathematics Supports Interdisciplinary Research

MICHAEL ARCIERO, PH.D., ASSOCIATE PROFESSOR
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Joe Langan conducts marine science research with mathematical analysis.

The Departments of Marine Sciences and Mathematical Sciences have joined to offer a unique opportunity to earn a double major in marine sciences (Marine Biology Option) and applied mathematics or marine sciences (Oceanography Option) and applied mathematics. This innovative offering is called the “MARMAT Program.” Students can earn the dual Bachelor of Science degree in the typical four years of study.

Faculty in both departments are collaborating on the design of inquiry modules in which students are introduced to problems and themes in science courses and then model and further explore them using mathematical techniques developed in concurrent or subsequent mathematics courses. The result is a truly integrated science/math program, which also offers opportunities for students who want to major-minor in the two disciplines.

The MARMAT double major is an outstanding opportunity for UNE students to integrate an undergraduate research component required by both majors. Joe Langan (MARMAT '15) is using mathematical models to study and predict cod populations in the Gulf of Maine. His research combines field work with mathematical modeling and computational analysis.

Langan works with Marine Sciences Professor James Sulikowski, Ph.D., tagging and releasing cod, and tracking their movements via sensor arrays in the Gulf of Maine. The data are then used to estimate fish mortality rates.

Under the guidance of Mathematics Professors James Quinlan, Ph.D., and Michael Arciero, Ph.D., Langan has adapted Leslie and Lefkowitz matrix population models, which incorporate these estimates and other biological parameters, and has written code to implement the models using Matlab computer software. The models are being used to predict population trajectories and to run simulations under various scenarios. Langan hopes to use these predictions to inform fisheries management policies, which historically have not been data-driven. He has been invited to apply for a National Science Foundation (NSF) research grant for graduate study in Marine Science at the University of Rhode Island.

MARMAT majors have demonstrated high academic achievement in this interdisciplinary program that provides them strong credentials for scholarships and admission to graduate programs of the highest regard across the country. Langan is one of two recent MARMAT majors who have been awarded the Barry M. Goldwater Scholarship. This scholarship is the most prestigious undergraduate award given in the sciences to college sophomores and juniors nationwide each year. Cassidy Peterson (MARMAT '13), another Goldwater scholar, and Liese Carleton (MARMAT '14) are among recent graduates of the double major currently enrolled in doctoral programs in marine sciences.

Among the new opportunities that draw on expertise in both departments is a biweekly seminar in Graph Theory and Marine Science, organized by Mathematics Professor Craig Tennenhouse, Ph.D., and Marine Science Research Assistant Professor Carrie Byron, Ph.D., in which participants study the ecology of food networks using graph theory. The seminar is open to all students.

With a focus on applied research, both MARMAT major/minor and double major students become involved in research early in their academic careers while gaining knowledge and skills that are highly valued by employers in marine science fields.

Interdisciplinary Collaboration through Human-Animal Studies

SUSAN MCHUGH, PH.D., PROFESSOR; CHAIR, DEPARTMENT OF ENGLISH

CAS



Garry Marvin and Susan McHugh

Why was Garry Marvin, Ph.D., who is professor and chair of Human-Animal Studies at Roehampton University in the United Kingdom and a world-renowned anthropologist of the Spanish bullfight, meeting with students in UNE's Jack S. Ketchum Library's new gallery this fall? The short answer is that the event was part of a Human-Animal Studies International Speaker Series organized by Susan McHugh, Ph.D., professor and chair of the English Department, and enthusiastically attended by members of her Animals, Literature, and Culture course. Christina Barton (Environmental Science and Studies '16) observed, "Dr. Marvin's lecture made me realize the real meaning of the bullfight." According to Carolina Sierra (Biology '15), alumna of UNE's Seville program, his lecture explained a uniquely

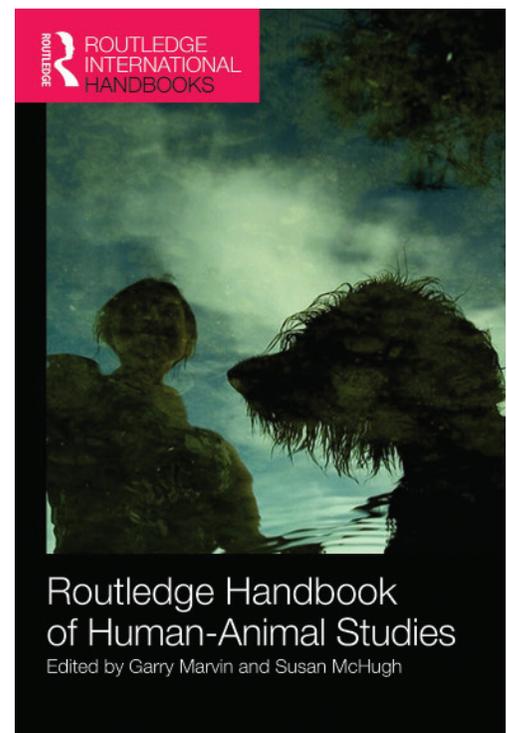
“Dr. Marvin’s lecture made me realize the real meaning of the bullfight... the matador and the bull are both players who have their own roles to play.”

– Carolina Sierra

Spanish art form in which “the matador and the bull are both players who have their own roles to play.” The series not only included talks by Marvin but also by scholars from Norway, Italy, France and even right here in Maine. But a more in-depth explanation for Marvin's talk is that it is yet another of the many wonderful results of the unlikely efforts to bridge the humanities and social sciences through collaborative research.

As scholars in the emerging field of human-animal studies, McHugh and Marvin explore the whys, hows and whats of people's relationships with creaturely life: why animals are represented and configured in different ways in human cultures and societies around the world; how they are imagined, experienced and given significance; what these relationships might signify about being human; and what about these relationships might be improved for the sake of the individuals as well as the communities concerned.

Marvin wrote *Wolf* (2012) and McHugh wrote *Dog* (2004) for the *Animal* book series, which will soon



surpass 100 volumes (and incidentally is edited by another speaker in the series, UK-based scholar Jonathan Burt). However, the two came to this area of study along very different paths.

As a field researcher in cultural anthropology working in a department of life sciences, Marvin has published books including *Bullfight* (1994), *Zoo Culture* (1998) and, in his other specialty field of tourism studies, *Coping with Spain* (1991) as well as *Venice the Tourist Maze* (2004). McHugh is mostly known for *Animal Stories* (2011), an award-winning volume in the Posthumanities book series, devoted to leading-edge cultural theory. Add the fact that the two live on different continents to their wildly different disciplines, methods and training, and it becomes even more difficult to imagine how they have worked together in order to realize the genuinely interdisciplinary potentials for human-animal studies through a co-edited project.

“*The Handbook of Human-Animal Studies is both a great read and a provocation*” — Donna Haraway

Invited by the major international academic press Routledge to create a defining volume for human-animal studies, McHugh and Marvin approached the best possible contributors from around the world to think through a tripartite structure deeply rooted in their subject: the wild, the domestic and the feral. Everyone invited was eager to contribute, and, two years after they began, the project went to press. Published in the spring of 2014, *The Routledge Handbook of Human-Animal Studies* is a collection of nearly two-dozen original essays from artists and scholars who have established themselves internationally on the basis of specific and significant new contributions to human-animal studies.

Other top scholars in the field have been quick to praise the book. “Garry Marvin and Susan McHugh have produced a collection that demonstrates the striking disciplinary reach and methodological variety of this innovative field,” notes Harriet Ritvo, the Arthur J. Conner Professor of History at MIT.

“*The Handbook of Human-Animal Studies* is both a great read and a provocation,” adds Donna Haraway, distinguished professor emerita in the Departments of Feminist Studies and History of Consciousness at the University of California, Santa Cruz.

The collaboration between McHugh and Marvin continues, as Routledge has commissioned them to produce *Human-Animal Studies*, a four-volume edited collection scheduled for publication in 2016.



Garry Marvin lectures at UNE as part of the Human-Animal Studies International Speaker Series.

Harnessing the Therapeutic Power of Marine Algae Against the Human Pathogen MRSA

KRISTIN BURKHOLDER, PH.D., ASSISTANT PROFESSOR

AMY DEVEAU, PH.D., ASSOCIATE PROFESSOR

URSULA ROESE, PH.D., ASSISTANT PROFESSOR

CAS

Staphylococcus aureus is a common and troublesome human pathogen that causes serious infections of the skin and deeper tissues. Some strains, such as methicillin-resistant *S. aureus* (MRSA) are resistant to most antibiotics; therefore there is urgent need for novel therapeutics to treat MRSA infections.

Attention has recently focused on the possible utility of marine natural products as medicinal agents due to their potential antimicrobial properties. Little is known, however, about the specific compounds present in algae that inhibit microbial growth. Similarly, little is known about whether algae extracts are useful against clinically-relevant strains of MRSA. Therefore, an interdisciplinary research team consisting of College of Arts and Sciences faculty Ursula Roese, Ph.D., assistant professor of biology, Amy Deveau, Ph.D., associate professor of chemistry, and Kristin Burkholder, Ph.D., assistant professor of biology, and their students is using tools of plant chemical ecology, organic chemistry and microbiology to study the

antimicrobial capacity of *Ulva lactuca* and *Fucus vesiculosus*, two species of macroalgae native to coastal Maine. The research team is assessing the effectiveness of algae extracts against common strains of MRSA, including MRSA USA300, the most widespread and virulent strain of MRSA circulating in the United States.

Six students have collaborated with Burkholder, Deveau and Roese on this project. In the Deveau lab, which focuses on the chemical structure and properties of medicinally-active organic molecules, students Zachary Hope (MSC graduate student '15) and Clay Bolduc (Biological Sciences '16) teamed with visiting scholar Brandon Williams (Wheaton College, Biochemistry '16) to harvest and dry *Ulva lactuca* across four different lunar phases. The liquid extraction strategy developed by the team enables testing of the postulate that surface-associated organics and those organics bound to internal plant structures will demonstrate unique antimicrobial profiles.



In the Burkholder Lab, Fallon Weiss evaluates the results of an antimicrobial disk diffusion assay, which determines the efficacy of algae extracts on inhibiting growth of MRSA.

In Roese's chemical ecology lab, chemical defense compounds of brown macroalgae have been a major research focus over the past few years. The research on algal defense compounds is not only the topic of two honors theses but also involves several undergraduate and graduate students, including, most recently, Jenna DaCosta (Biological Science '17) and Phillip Schotte (MSC graduate student '15).

“These secondary metabolites may not only affect algae specific pathogens and herbivores but may also have medicinal properties for humans.”

– Ursula Roese

Roese explains: “To defend themselves, land plants often produce compounds that fight off pathogens and herbivores. As our research over the past few years has shown, brown algae that are only distantly related to land plants are responding in similar ways. These secondary metabolites may not only affect algae specific pathogens and herbivores but may also have medicinal properties for humans.”

Using gas chromatography-mass spectrometry, Roese and her students were able to identify a number of compounds in *F. vesiculosus* that are upregulated in response to stress. The next logical step for Roese, who also teaches medicinal plant biology at UNE, was to test extracts of these algae on human pathogens in collaboration with her microbiologist colleague Kristin Burkholder.

In the Burkholder Lab, which studies MRSA pathogenesis, Fallon Weiss (Biological Sciences '16) and DaCosta evaluate anti-MRSA activity of the algae extracts by performing antimicrobial disk diffusion and minimum inhibitory concentration assays. Thus far, the results are promising. Crude extracts from *U. lactuca* and *F. vesiculosus* inhibit growth of all MRSA strains tested, and, in some cases, inhibition is similar to that observed with commercial antibiotics.

Interestingly, antimicrobial activity of *F. vesiculosus* was enhanced by pre-treating live algae with the plant hormone methyl jasmonate, which stimulates

plant defenses. Data from the *U. lactuca* study suggest that the lunar phase of harvest affects the algal antimicrobial activity. Together, these studies suggest that algal antimicrobial efficacy can be maximized by manipulating the phase of harvest or adding exogenous stimuli.

Having observed that crude extracts can inhibit a variety of MRSA strains, the team's next steps are to identify the specific compounds responsible for bacterial inhibition. Compound isolation and identification will be enabled using UNE's mass spectrometers coupled to chromatography interfaces, instrumentation purchased through 2012 National Science Foundation (NSF) funding received by Roese and Deveau as well as Amy Keirstead, Ph.D., associate professor of chemistry, Steve Zeeman, Ph.D., professor of marine science, and Teresa Dziejewczynski, Ph.D., associate professor of psychology. The team also plans to test the crude extracts and purified compounds in a mouse model of MRSA skin infection.

Overall, the research team is excited by the project's potential; information gained from these studies may prove useful for future development of antibacterial drugs. With expertise in organic chemistry, microbiology and chemical ecology, the team mines a local resource as a potential solution to a challenging human health problem and creates a synergistic, student-centered research environment.



Fallon Weiss presents her data at the UNE Undergraduate Research Symposium in October 2014.

Project TURBO

The Undergraduate Saco River Biodiversity Observatory – an Interdisciplinary Research Experience for Students in the Natural Sciences

MARKUS FREDERICH, PH.D., ASSOCIATE PROFESSOR; ASSISTANT CHAIR, MARINE SCIENCES

URSULA ROESE, PH.D., ASSISTANT PROFESSOR

STEPHAN ZEEMAN, PH.D., PROFESSOR

CAS

Science and mathematics education is increasingly important for students to succeed in today's technology-driven society. To address this, the College of Arts and Sciences is launching Project TURBO to provide authentic research experiences through a Long-Term-Ecological-Research-style project for all students in the natural sciences. The National Science Foundation (NSF) will support the project for five years with a grant of \$640,000 awarded to principle investigator Markus Frederich, Ph.D., associate professor and assistant chair of the

Department of Marine Sciences, and co-principal investigators Ursula Roese, Ph.D., assistant professor in the Department of Biology, and Stephan Zeeman, Ph.D., professor in the Department of Marine Sciences.

Frederich explains: "We will create a project-oriented learning experience using the local estuary of the Saco River. We will develop new course modules and stimulate undergraduate research projects, host an annual interdisciplinary and project-focused undergraduate student conference, and implement targeted faculty development. Our goal is that Project TURBO will increase hands-on and interdisciplinary student learning and, as a consequence, will increase student retention and persistence in the sciences."

“Our goal is that Project TURBO will increase hands-on and interdisciplinary student learning and, as a consequence, will increase student retention and persistence in the sciences.”

– Markus Frederich



Project TURBO will engage students in many different studies, for example bird migration and habitat use.



Students gain hands-on experience and become researchers in an ongoing long-term study assessing a broad range of species and processes, such as examining fish species diversity, in the greater Saco River Ecosystem.

Frederich, Roese and Zeeman will lead the project, which will involve more than 29 courses and 1,600 students. Throughout the project, students of all class years will work simultaneously on assessing, monitoring and modeling aspects of the Saco River estuary. They will investigate urban, salt marsh, intertidal and open-water habitats and apply methods of ecology, physiology, molecular biology, botany, zoology, mathematics, chemistry and physics. A central database and web portal will make the data available for interdisciplinary data-mining for those within UNE and for members of the public.

Repeated exposure to place-based education within Project TURBO over four years of undergraduate study will provide UNE students with progressive in-depth experiences in science, technology, engineering and mathematics (STEM). This will enable them to connect the process of discovery with learning and knowledge creation and will prepare them to be leaders, teachers and innovators in

emerging and rapidly changing STEM fields. A goal of project TURBO is also to examine how the hands-on curriculum affects student retention and persistence.

This newly funded project builds on UNE's strength in undergraduate research and on previous support from the NSF to establish a regional undergraduate

research conference (NURDS) at UNE; a GK-12 program that supported graduate students to participate in science education and outreach to seven school districts in southern Maine affecting more than 2,400 students; and a major research instrumentation grant that provides top-notch research equipment to undergraduate students at UNE.



Field-based activities will be complemented by student laboratory experiments contributing to project TURBO.



Several TURBO modules will make use of the UNE boats to conduct studies of plankton, seals, water chemistry and more by getting student on the water in the Saco River and coastal ocean.



An upper level chemical ecology course includes a TURBO module conducting field work on algae, coupled with state-of-the-art Mass Spectroscopy analysis in the laboratory.

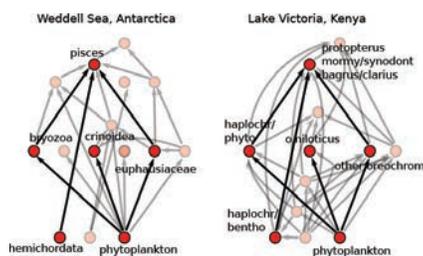
Mathematical Examinations of Marine Food Webs

CARRIE BYRON, PH.D., RESEARCH ASSISTANT PROFESSOR

CRAIG TENNENHOUSE, PH.D., ASSISTANT PROFESSOR

Food webs depict energy flow among a community of organisms through predator-prey relationships. These webs are networks that can be modeled using discrete graphs, which are mathematical structures that represent pairwise relationships among discrete objects often in the contexts of transportation systems and computer networks. The obvious pairing of discrete graphs with food webs is not lost on Carrie Byron, Ph.D., research assistant professor of marine sciences, and Craig Tennenhouse, Ph.D., assistant professor of mathematics. Once it became clear that their respective work in food webs and graph theory had a lot in common, they began looking for opportunities to enhance the study of marine ecology through a cross-disciplinary approach.

Byron and Tennenhouse are currently examining mathematical similarities among ecosystems around the world. They have discovered topological structures that are surprisingly common to food webs, irrespective of size, species or geographical differences. They also are examining a number of other mathematical metrics on these networks.



Simplified food webs from (a) Weddell Sea, Antarctica and (b) Lake Victoria, Kenya that share a common substructure.

In order to learn more about the confluence of graph theory and marine science, the two researchers have begun a reading and research group for interested members of the UNE community. At their regular meetings, Byron and Tennenhouse read and discuss current research with undergraduates, graduate students and faculty with the goal of learning more about current scholarship and developing new and interesting research projects.



The Network Ecology Group meets to discuss the convergence of graph theory and marine science.

Governed through Choice: Autonomy, Technology and the Politics of Reproduction

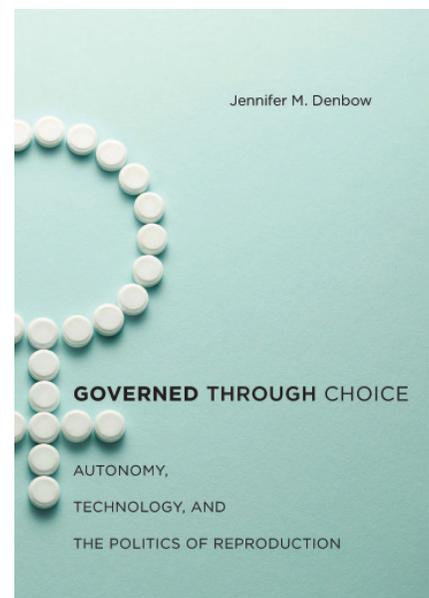
JENNIFER M. DENBOW, PH.D., ASSISTANT PROFESSOR; DIRECTOR, WOMEN'S AND GENDER STUDIES

At the center of the “war on women” lies the fact that women in the contemporary United States are facing more widespread and increased surveillance of their reproductive health and decisions. In recent years, states have passed a record number of laws restricting abortion. Physicians continue to sterilize some women against their will, especially those in prison, while other women who choose to forego reproduction cannot find physicians to sterilize them.

While these actions seem to undermine women’s decision-making authority, experts and state actors often defend them in terms of promoting women’s autonomy.

In her forthcoming book *Governed through Choice: Autonomy, Technology, and the Politics of Reproduction* (NYU Press, 2015) Jennifer M. Denbow, Ph.D., assistant professor of political science and director of Women’s and Gender Studies, exposes the way that the notion of autonomy allows for this apparent contradiction. She explores how this understanding plays out in recent reproductive law, including newly enacted informed consent to abortion laws like ultrasound mandates and the regulation of sterilization.

Denbow also shows how developments in reproductive technology, which would seem to increase women’s options and autonomy, provide even more opportunities for state management of women’s bodies. The book argues that notions of autonomy and choice, as well as transformations in reproductive technology, converge to enable the state’s surveillance of women and undermine their decision-making authority. Yet, Denbow asserts that there is a way forward and offers



an alternative understanding of autonomy that focuses on critique and social transformation. Moreover, while reproductive technologies may heighten surveillance, they can also help disrupt oppressive norms about reproduction and gender and create space for transformation. A critically important analysis, *Governed through Choice* is a trailblazing look at how the law regulates women's bodies as reproductive sites and what can be done about it.

Examining the U.S. Human Trafficking Response

ALICIA PETERS, PH.D., ASSISTANT PROFESSOR



As an anthropologist with an interdisciplinary background in public health, gender and sexuality studies, and human rights, Alicia Peters, Ph.D., assistant professor in

the Department of Society, Culture and Languages, seeks to examine the implementation of U.S. human trafficking law and policy from a multidimensional perspective. Peters' book *Responding to Human Trafficking* (University of Pennsylvania Press, 2015) provides an in-depth look at the U.S. human trafficking response through the lens of the 2000 Trafficking Victims Protection Act.

While the bulk of research on trafficking focuses on one particular group — for example, service providers, law enforcement personnel or survivors — Peters investigated the connections between all of these groups by interacting with and observing them directly, thereby capturing the complexity of the human trafficking response. In addition

to immersing herself as a participant observer at a service-providing agency for survivors of trafficking, Peters' fieldwork incorporated interviews with federal prosecutors, Immigration and Customs Enforcement (ICE) and Federal Bureau of Investigation (FBI) agents, social workers, immigration attorneys and trafficking survivors, as well as legislative and policy analysis around the law.

The result is a book that traces the U.S. human trafficking response over the course of nearly a decade — providing an overview of the historical, political, and social context of the law; clarifying how various implementers understand trafficking; and analyzing the law's implementation trajectory and the resulting effect on victims.

Due to their varying roles and priorities, implementers with distinct relationships to the law often conceive of trafficking in markedly different terms. Members of law enforcement think in terms of prosecutable cases and may prioritize cases involving forced commercial sex. However, the service providers Peters encountered viewed the conditions of work as more defining than the type of work to which victims were subjected. Peters argues that these varied conceptions result in many trafficking survivors missing out on the law's promised protections, and she offers a series of policy recommendations to strengthen the response.



Immigration and Customs Enforcement human trafficking awareness campaign billboard (Courtesy of ICE)

Community Sustainability in the Year-Round Islands of Maine

SAMUEL A. McREYNOLDS, PH.D., PROFESSOR; CHAIR, DEPARTMENT OF SOCIETY, LANGUAGE AND CULTURE; ACADEMIC COORDINATOR, OFFICE OF CITIZENSHIP AND CIVIC ENGAGEMENT

The coastline of Maine is only 250 miles; however, there are nearly 3,510 miles of tidal coastline in the state, fourth only to Alaska, Florida and Louisiana. Maine's extended tidal coastline may be attributed to the 3,170 islands along its rocky shores, more islands than in the entire Caribbean or in Polynesia.

Maine has been called the place where America really began. If that is true, then the country's first communities were on the islands of Maine. These island communities have played, and continue to play, a critical role in the history, economy, environment and social life of the state. The nature of this role and of these communities, however, is changing. The number of islands with year-round residents has dropped from 200 in the 1850s to just 15 today. In recent decades, there has been an expansion of seasonal residents and a conversion of island homes to seasonal units on all of these islands.

Samuel A. McReynolds, Ph.D., has been interested in the Maine island communities for many years and has participated in several interdisciplinary research projects on the state's islands. For over two decades he has engaged more than a dozen students in this research. His most recent study, "Community Sustainability in the Year-Round

Islands of Maine,” was published in the *Island Studies Journal*, in May of 2014. It asks whether the island communities of Maine are sustainable and whether the expansion of seasonal home ownership in Maine’s year-round islands affects this sustainability.

To address these questions, a variety of interdisciplinary data and methods were used, including interviews, state agency data and census data as well as primary data on food availability. Combined, these data provide a descriptive analysis of sustainable conditions in the island communities as a first step towards a more in-depth social and economic analysis. The findings indicate that sustainability remains problematic and that housing is a central issue in the sustainability issue.



Local Cliff Island kids participate in the island’s annual lobster crate races.

On the Path to a Treatment – Investigating the Anxiolytic Properties of an Experimental Drug

MICHAEL BURMAN, PH.D.,
ASSISTANT PROFESSOR

What can we do to help the 25 percent of Americans who suffer from anxiety disorders? That is the question being investigated by Kerri Szolusha (Neuroscience ’15), who recently won a travel award from the Faculty

for Undergraduate Neuroscience to present her research at the Society for Neuroscience’s annual meeting.

As a senior neuroscience major working in Assistant Professor Mike Burman’s laboratory, Szolusha knows that creating novel drugs that affect specific molecular targets is a resource-intensive process and a daunting challenge for a small laboratory. However, medicinal chemists are constantly creating novel psychoactive compounds in an effort to discover new treatments for neurological and psychiatric disorders.

Even if these compounds don’t make it through final approval, students like Szolusha can use them to make important contributions to understanding brain physiology and dysfunction. Indeed, Szolusha reports, “Working in the lab has been invaluable for learning critical thinking skills, collaboration and effective scientific communication. I am so excited to attend my first conference.”

Given the prevalence of speculation about the medicinal properties of cannabinoids such as marijuana right now, it is not surprising that a number of drugs that affect this system have recently been created and tested for their analgesic properties. One of these, an inhibitor of an enzyme involved in regulating levels of endogenous cannabinoids, OL-135, was synthesized by Dale Boger, Ph.D., chair of the Department of Chemistry at the Scripps Research Institute, and tested for its effects on pain by the laboratory of Edward Bilsky, Ph.D., vice president for Research and



Kerrieth Szolusha (Neuroscience ’15) prepares classical conditioning chambers for her experiment.

Scholarship and professor of pharmacology. Although they did not move forward with this compound for pain, the Burman lab believes that compounds such as this might be useful in preventing post-traumatic stress disorder (PTSD). As a first step, they set up collaborations with Boger and Bilsky to test OL-135 on the acquisition and expression of traumatic memories in an animal model of PTSD.

Szolusha and other students working in the lab administered various doses of the drug before and after exposing rats to aversive events. Subjects that received the drug prior to the trauma demonstrated significantly reduced fear upon re-exposure to the traumatic environment. Further studies showed that the drug specifically disrupts the formation of traumatic memories and does not affect other cognitive abilities. Thus, these studies suggest that endocannabinoid-affecting drugs like OL-135 may be useful for preventing or treating anxiety disorders like PTSD.

History of Distance Education Informs the Future of Online Learning

WILLIAM DIEHL, PH.D., CLINICAL PROFESSOR; CHAIR, DEPARTMENT OF EDUCATION



The UNE Department of Education currently offers online master’s degree and doctoral programs to hundreds of students across the

globe — teaching future teachers and administrators who, in turn, touch the lives of thousands of students in schools around the world.

Twenty years after the rise of the World Wide Web, online learning is now mainstream

and on the rise worldwide. Online learning has created opportunities for working adults and non-traditional learners to undertake quality higher education opportunities at a distance and to study within flexible schedules that meet their needs.

Online learning is only the latest iteration of distance education made possible by the development of new technologies. Early technologies, such as the printing press, the postal service and developing transportation systems, provided opportunities for distance learning as early as the late 1700s. Emerging technologies such as radio, television and satellites opened up additional waves of distance education initiatives in higher education, and issues that past educators faced, we encounter today.

After learning that many of the artifacts from the early days of correspondence education through radio and television were not being preserved, William Diehl, Ph.D., chair of the Education Department and coordinator of online graduate programs, founded the International Museum of Distance Education and Technology in 2007 with an aim to learn from and to preserve and honor distance educators throughout the last century. The virtual museum offers thousands of documents and has created an extensive historical timeline.

One of the collections in the museum includes the conference proceedings of the International Council for Open and Distance Education (ICDE). Founded in 1938, ICDE is celebrating its 75th anniversary, has consultative partner status with The United Nations Educational, Scientific and Cultural Organization (UNESCO), and is supported by the Norwegian Ministry of Education and Research with organizational members in more than 60 countries worldwide.

As part of ICDE's 75th anniversary year, Diehl's museum is collaborating with ICDE to provide open access online to the ICDE proceedings and is contributing artifacts for

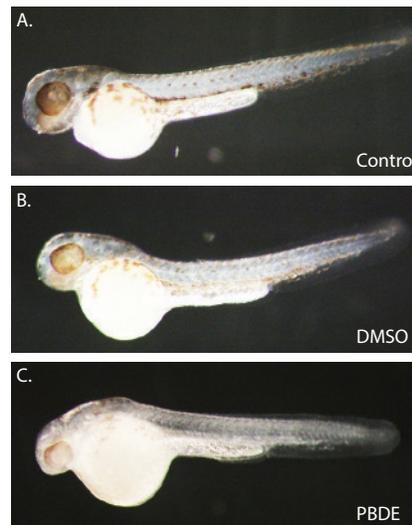
its various celebratory events. Diehl continues to research the evolution of open and distance education and is working on a strategy to research and work collaboratively with faculty and students in other departments within the UNE College of Arts and Sciences in the coming year.



Using the Zebrafish to Merge Science with Business

DEENA SMALL, PH.D., ASSOCIATE PROFESSOR

Faculty from the Departments of Chemistry and Physics, Biology, Marine Sciences and Business are partnering with New England Aquarium Services Inc. to form a small biotechnology company that will focus on



Images of Zebrafish Embryos taken by Jason Viggiano (Biology '13) show that polybrominated flame retardants interfere with normal development.

the development of products supporting the use of zebrafish and other aquatic specimens for biomedical research and the aquatic toxicology testing industry.

Principle Investigator Deena Small, Ph.D., associate professor of chemistry, was awarded a small "Tech Start" grant from the Maine Technology Institute in February 2014 to conduct a market analysis to determine the feasibility of developing and launching products that include specialized aquaria, feeds and vesicle-based chemical delivery systems for pharmaceutical and toxicology testing in marine organisms. Co-investigators Associate Professor Amy Deveau, Ph.D., Associate Professor Jeri Fox, Ph.D., Professor Thomas Leach, M.B.A., Associate Professor Beth Richardson, J.D., and Rick Oellers from New England Aquarium Services, Inc. contributed to the development of the market survey and/or product design.

The group plans to reach out to other Maine-based companies to establish future partnerships and opportunities that will support the establishment of a zebrafish facility at UNE. This facility will not only afford faculty access to a versatile animal model system to enhance their own scholarship and teaching, but it is also expected to create business opportunities that offer pharmaceutical and/or environmental toxicology testing services. Finally, this interdisciplinary venture will provide UNE undergraduates in the sciences and/or business invaluable, hands-on experiences that will enhance their entrepreneurial, aquaculture and biomedical research skills and increase their ability to compete for graduate programs and jobs after graduation.



From left to right: Amy Deveau, Jeri Fox, Deena Small and Beth Richardson. Not pictured is Tom Leach and Rick Oellers (Owner of New England Aquarium Services).

Learning by Living™

Medical Student Nursing Home Immersion Research

DAVID DROZDA, M.S. II

MARILYN R. GUGLIUCCI, PH.D., PROFESSOR, DIRECTOR FOR GERIATRICS EDUCATION AND RESEARCH



Certified Nursing Assistants use the Hoyer Lift to transfer a Learning by Living project participant from his wheelchair to his bed.



David Drozda (COM '16) remembers his first moments in a wheelchair. He had been “admitted” into Pleasant View Nursing Home in Concord, NH, as a 23-year-old medical student in good health. Within minutes, and for the next 10 days, he was to be an 85-year-old stroke patient. He would be unable to walk or use his dominant hand. He would eat and drink pureed foods and thickened liquids, conforming to the diet of someone with dysphagia, or difficulty swallowing. He was to rely completely on other people to do for him the things that he would normally do for himself. He would receive assistance getting into bed, with his toileting, and even tying his shoes. He was to become completely dependent on the people who would provide his care. He recalled, sitting down in his wheelchair for the first time, asking himself repeatedly, “Why did I agree to do this?”

“Why did I agree to do this?”

— David Drozda

Drozda was participating in the Learning by Living project, which was piloted in 2006 by Marilyn Gugliucci, Ph.D., director of Geriatrics Education and Research at the University of New England College of Osteopathic Medicine. The research project was designed to provide future health professionals firsthand experiences with living the life of an adult nursing home resident so that they could fully understand what it was like to live as an older adult nursing home resident. During their 10 day immersive experience, students are asked to reflect on the particulars of this life and to use this insight to become better physicians or health care practitioners.

Become a better physician. This is the carrot that medical school students dangle in front of themselves during their first two years. “Why should I attend this lecture?” To become a better physician. “Why am I memorizing the steps of glycolysis?” To become a better physician. Often, this leads to a binary system of decision making: “If this will make me a better physician, I will do it. If not, I’m skipping it.”

Remarkably, though, lectures with titles such as “Empathy: the Doctor-Patient Relationship” are often skipped by medical students. Does this mean young doctors are not interested in becoming empathetic? Absolutely not. In fact, Drozda reports that most of the people he has met over the course of his medical school career are genuinely compassionate and empathetic. Regardless of how empathetic a person is, though, even the best lecture is unlikely to change one’s mind or habits. And with career-defining tests on the horizon, medical students find that their time is better spent memorizing cold facts than soaking in warm concepts.



David experiences drinking thickened water, which, as a physician, he will be prescribing for patients who have swallowing difficulties.

This is why Learning by Living made the largest impact on Drozda as a future doctor. It removed him from the cycle of learning to regurgitate. There would be no test at the culmination of his immersion experience; what he got out of it would be entirely up to him. There was no way to pass or fail, and the only objective to be found was in the project title: live and learn. And so he did. The learning began in the first five minutes.

During their 10 day immersive experience, students are asked to reflect on the particulars of this life and to use this insight to become better physicians or health care practitioners.

Drozda sat in his wheelchair for the first time in the lobby of Pleasant View and immediately felt uneasy. Reflecting on times just moments earlier when he had been taller than the people around him, he now found himself staring at their waists, needing to look up to make eye contact. His ability to converse as an active participant instantly ceased, and he became a passive recipient. He couldn't see all of the speakers; quickly the conversation edged out of his consciousness as he looked around at how his world had suddenly changed.

People were coming in and out of the busy lobby, and they were looking at him. He wanted to say, "I'm okay! I'm just a medical student doing a research project; this isn't what it looks like, I'm not really..." Not really what? "I'm not really someone who belongs in a wheelchair?" It dawned on him that nobody really belongs in a wheelchair. In that instant, he knew how a stroke patient might feel. "Wait, I don't belong in this wheelchair, I've only had a stroke! This is not me."

This is not me. These words kept him going for the first couple of days. This is not me; I will be able to

Drozda reported that he owed this epiphany to the wonderful residents who became his friends during the experience and the staff who aided in his transition into the nursing home world. Over the course of the 10 days, Drozda's mindset changed from "this is not me" to "this is not about me."

be myself again once this is over. Just hold on for 10 days. And then something changed, as he allowed himself to be fully present in this new environment. Drozda reported that he owed this epiphany to the wonderful residents who became his friends during the experience and the staff who aided in his transition into the nursing home world. Over the course of the 10 days, Drozda's mindset changed from "this is not me" to "this is not about me." ■



David Drozda, in his wheelchair, with Marilyn Gugliucci



Once over the bed, David needs to be positioned so he can be lowered slowly onto the bed.

NIH Awards \$380,000 to Study Falls Prevention Program for Older Adults

ANNE COWLES, M.P.H., FITNESS DIRECTOR, U-EXCEL PROGRAM

MARILYN R. GUGLIUCCI, PH.D., PROFESSOR, DIRECTOR FOR GERIATRICS EDUCATION AND RESEARCH

The National Institutes of Health (NIH) has awarded \$380,000 to researchers at the University of New England College of Osteopathic Medicine, the University of Maine Center on Aging, and the Iris Network to study the UNECOM Balancing Act Program (referred to as Balancing Act), the Department of Geriatric Medicine's falls prevention program for older citizens with vision impairment.

Falls among older adults can lead to serious injury, loss of independence or death. The two-year project aims to inform community programs of how to provide the best falls prevention information for older citizens.

The study focuses on the effectiveness of the Balancing Act Program, a self-initiated program that aims to improve balance and reduce falls. The program requires only one training session and can then be done at home with no equipment or further instruction.

Anne Cowles, M.P.H., U-ExCEL fitness director for the COM Department of Geriatric Medicine and grant researcher, stated, "One can equate the three components that contribute to balance as a three-legged stool. Good stability tends to be associated with the combination of visual cues, vestibular cues (spatial awareness) and proprioception (sense of how our bodies are positioned). This study removes one leg, the visual cues, and we are testing if the participants can adapt and build the other two areas to maintain or improve balance."

“The UNECOM Balancing Act Program has the potential to help our elderly population live more safely in their homes and communities. This is especially important in a rural state like Maine, where easy and immediate access to medical facilities and treatment is often dependent upon location.”

– U.S. Senator Angus King



Anne Cowles and Marilyn Gugliucci

Among the 65 and older population, 30 to 40 percent experience a fall, with vision-impaired seniors nearly twice as likely to fall, according to information from the Iris Network, an organization that provides services statewide to Maine people living with blindness and visual impairment.

"In Maine and throughout the country, aging services are shifting toward community and in-home interventions, allowing older adults to age in their homes and communities," Jennifer Crittenden, fiscal and administrative officer of the UMaine Center on Aging, reported.

Through a randomized controlled trial, researchers will be able to test the effectiveness of the Balancing Act curriculum among older adults with visual impairment. The study will also examine the program's potential for adoption by community-based programs such as Maine Area Agencies on Aging as a convenient, home-based plan that is user-friendly and accessible to older adults living in rural areas.

"These funds are welcome news for medical researchers throughout the state as well as those suffering from vision impairment," U.S. Senator Angus King said. "The UNECOM Balancing Act Program has the potential to help our elderly population live more safely in their homes and communities. This is especially important in a rural state like Maine, where easy and immediate access to medical facilities and treatment is often dependent upon location."

Co-principal investigators for the study are Marilyn R. Gugliucci, Ph.D., director of Geriatrics Education and Research at the UNE College of Osteopathic Medicine, and Lenard Kaye, D.S.W., Ph.D., director of the UMaine Center on Aging and professor in the UMaine School of Social Work.

“To have the opportunity to adapt the Balancing Act program for older adults with visual impairment will aid even more Mainers who want to maintain their independence.”

— Marilyn R. Gugliucci

“The Balancing Act Program was designed specifically for community dwelling older adults,” Gugliucci stated. “Maine’s rurality makes it difficult for older adults to get to group programs, so having an opportunity to work on falls prevention independently in the home is quite important. To have the opportunity to adapt the Balancing Act program for older adults with visual impairment will aid even more Mainers who want to maintain their independence.”

Participants have been recruited from clientele of the Iris Network in York, Cumberland and Sagadahoc counties who are age 62 and older and who meet additional eligibility requirements. Participants were randomized into control and treatment groups and are taking part in a series of assessments that help researchers understand the differences in outcomes between groups.

The primary outcome measures of the study are participant balance (measured with the Tinetti Assessment) and frequency of falls (self-report). However, several other factors will also be measured, including pain, physical activity, fear of falling, perceived difficulty in performing the exercises, ability, motivation and predisposing factors for falls.

An additional aim of the study is to determine if the Social Support Inventory and intervention developed by Gugliucci and Cowles encourages participants to continue doing the balancing exercises over time.

Research findings, slated to be completed by June of 2015, and the adapted Balancing Act Program for those with low vision will be disseminated through networks such as the National Association of Area Agencies on Aging, the Association for Education and Rehabilitation of the Blind and Visually Impaired, and the Maine Gerontological Society, among others.



Anne meets with each study participant to collect demographic data and health information.



Attempting a balance exercise with impaired sight is quite challenging requiring the Anne to assist.

Students Use Science Technology to Create Art

VANESSA O'DONNELL, M.S., CONFOCAL MICROSCOPE TECHNICIAN, MICROSCOPE CORE FACILITY MANAGER

The microscopic world can reveal bottomless spectacles on common models of study, including fruit flies and neurons. On June 25, 2014, the Microscope Core Facility (MCF) held the First Annual Student Confocal Microscope Digital Image Competition. The aim of the competition was to make UNE's confocal scanning laser microscope more accessible to students of all disciplines.

The competition was broken into two categories: altered and unaltered images. Students who entered images into the unaltered category, intended for science students, were barred from changing their images in any way after collecting them using the Leica software.

Students who submitted altered images were allowed to adjust brightness, enhance color and add personal touches to their images. Vanessa O'Donnell, M.S., confocal microscope technician, MCF manager, and coordinator of the confocal competition, said the altered category was created to encourage students from all disciplines to participate, including art students.

The confocal uses lasers as a light source, which scans a sample containing fluorescent labels. Only the "confocal" fluorescent signal collected by the microscope optics and passed through an adjustable pinhole aperture is used to create an image. Off-axis and out-of-focus signals are blocked, enabling collection of thin optical sections that can be combined to generate high-resolution 3D images. Researchers may use multiple dyes within a sample to analyze cellular relationships. The MCF's confocal system can scan at video rate to allow for live cell analysis. The confocal was purchased with grant funding from the National Science Foundation.

The winners of the unaltered category were:

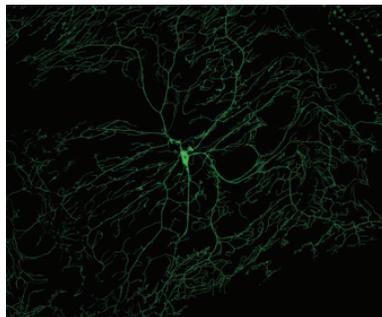
- First Place: Neal Mecum (UMaine Molecular and Biomedical Sciences Ph.D. program '16)
- Second Place: Taylor Follansbee (Master of Biological Sciences '15)
- Third Place (tied): Ian Imbert (Master of Public Health '15) and Jessica Davis-Knowlton (Master of Biological Sciences '13)

The winners of the altered category were:

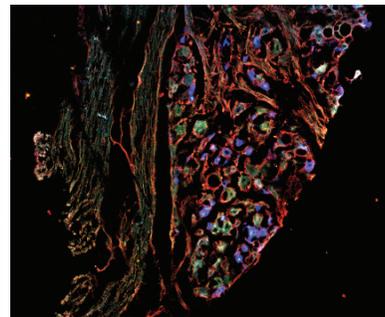
- First Place: Taylor Follansbee (Master of Biological Sciences '15)
- Second Place: Jessica Davis-Knowlton (Master of Biological Sciences '13)
- Third place: Tabea Moll (Visiting student working in Associate Professor Kerry Tucker's lab)

The judging panel consisted of Edward Bilsky, Ph.D., vice president for Research and Scholarship; James Vesenka, Ph.D., MCF director; Stephen Burt, B.F.A., M.F.A., chair and associate professor of art; Anne Leslie, executive assistant in the Office of Research and Scholarship and *Rising Tide* project coordinator; and Bethany Kenyon, Digital UNE (DUNE) repository administrator.

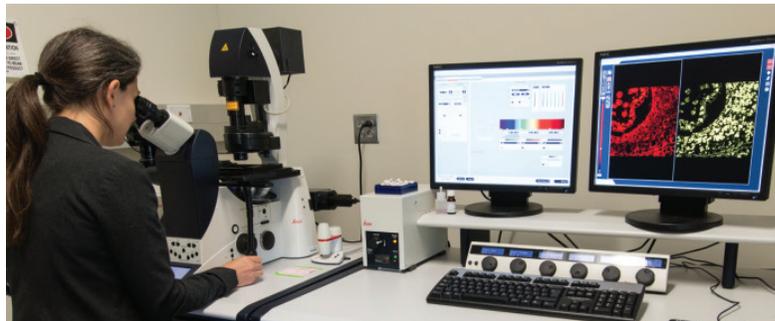
All entries were displayed at the Campus Center on UNE's Biddeford Campus. The winners from each category were published in DUNE: Digital UNE, UNE's online repository. In addition, the images were compiled into a 2014-2015 academic calendar and made available to purchase at UNE's bookstore.



First place image taken by Taylor Follansbee depicting a primary nociceptor neuron of a live *Drosophila* larva



Third place image taken by Ian Imbert showing the rat L₃ dorsal root ganglion



Vanessa O'Donnell uses the confocal microscope, which eliminates much of the typical blurriness in widefield fluorescence images and produces a sharper image.

Reaching Out for Manual Therapy Research

GEOFFREY BOVE, D.C., PH.D., ASSOCIATE PROFESSOR



Geoffrey Bove and Susan Chapelle.

While in practice as a chiropractor, Associate Professor Geoffrey Bove, D.C., Ph.D., wanted to better understand how using one's hands could affect so many human ailments. In 1990, he sold his practice and entered a Ph.D. program at the University of North Carolina. His goal was to study the effect of inflammation on nerves and axons with an eye toward understanding their control of functions of the body that we do not consciously control, such as digestion or the immune system.

Bove became an anatomist and neurobiologist, researching and publishing extensively on the effect of inflammation on sensory nerves, which help mediate pain. Bove established himself as an independent scientist at Harvard Medical School and Beth Israel Deaconess Medical Center before moving his laboratory to the University of New England College of Osteopathic Medicine.

In an odd twist of events, Bove began a collaboration with Susan Chapelle, a manual therapist from Squamish, British Columbia. Using massage therapy, Chapelle routinely treats patients with pain and digestive function problems that develop following surgeries.

Bove and Chapelle developed initial projects to determine outcomes in an animal model of postoperative ileus and adhesions, which led to two publications. In 2013 the pair was awarded a substantial grant from the National Institutes of Health to delve more deeply into the mechanisms of action of massage therapy. Their findings have already had an impact on clinical care.

In another project, Bove and Chapelle set out a few years ago to determine if cancer should be considered a contraindication for manual therapy. Given that there are close to half a million practitioners of various forms of manual therapy in the United States, the answer could have far reaching implications. They performed preliminary experiments but felt they did not have the expertise to implement a plan to move forward.

Enter Katherine Hanlon, Ph.D., a recent recruit to the COM faculty, who possesses expertise in the biology of breast cancer and metastases. Bove and Hanlon

began collaborating in the spring of 2014. After performing only two experiments, they had compelling data to support a grant application and possibly a publication. They recently applied for funding from the National Cancer Institute.

Another example of Bove's collaborative efforts can be found in his work with Mary Barbe, Ph.D., a professor at Temple University. Sharing similar interests but using very different approaches, Bove and Barbe have collaborated intermittently for approximately 15 years. Last year their collaboration became more formal. Barbe has a well-established model of repetitive motion disorders, and Bove offered to visit Temple University to train a technician to perform a combination of massage and manual therapy on rats with the goal of preventing the development of their pain and dysfunction.

The results of their initial study were astounding. The treatment prevented the normal decline in function that Barbe typically sees. Even more interestingly, the treated animals did not develop the fibrotic changes within and between their arm structures, which is thought to be the main pathophysiology in this model.

Bove and Barbe plan to continue this line of research to look at mechanisms of action of the therapies that were modeled in the initial study, which included general mobilization, skin rolling, myofascial release, joint mobilization and stretching.

“Performing biomedical research is extraordinarily challenging, and one mind is often insufficient to make satisfactory progress. My experiences with Susan, Mary and Kat give great examples of how reaching out and working together can accomplish far more than can be done alone. I am graced by the opportunity to work with these valuable colleagues and am enjoying research more than ever.”

— Geoffrey Bove

Master of Science in Medical Education Leadership Advances Research

INDIA BROYLES, ED.D., PROFESSOR; DIRECTOR, MASTER OF SCIENCES IN MEDICAL
EDUCATION LEADERSHIP



Michael L. Spear

How does a senior clinical faculty member at a prestigious medical school transition to a new career in medical education? He goes back to school, himself.

Michael L. Spear, M.D., neonatologist at Christina Care Health Services in Delaware and full professor at Thomas Jefferson School of Medicine in Philadelphia, joined his cohort of medical educators in the University of New England College of Osteopathic Medicine Master of Science in Medical Education Leadership (MMEL) and focused his medical education scholarship on pediatric palliative care education. Spear created an online neonatal educational module called "Neonatal Pain: Physiology and Management" for his MEL 639 Independent Study, which was published on the peer-reviewed, international website NICUniversity, a news and educational resource for the neonatology community.

After designing a curriculum for residents and nurses in the Neonatology Department at Christiana Care for his curriculum course assignment, Spear implemented the training and published his applied project/evaluation study titled, "The Use of Role Playing for Interdisciplinary Teaching in Palliative

“I owe my success in large part to the master’s program and its validation of my skills as an educator.”

— Michael L. Spear

Care Communication Skills,” in the *Journal of Palliative Medicine*, Volume 16.

In July of 2014, Spear accepted a new position as director of Palliative Care for Saint Christopher’s Hospital for Children in Philadelphia. He will provide care, direct the expansion of services to the entire hospital, collaborate with other hospitals in Saint Christopher’s network, and teach as part of a faculty appointment at Drexel Medical College as a professor of pediatrics.

Spear notes, “I owe my success in large part to the master’s program and its validation of my skills as an educator.”



Amina Sadik

How does an experienced international biochemist from Morocco, with a Ph.D. from a university in France, change her focus from cancer research to conducting research on teaching and learning at Touro University Nevada College of Osteopathic Medicine? She goes back to school, herself.

Amina Sadik, M.S., Ph.D., joined her cohort in the Master of Science in Medical Education Leadership program and immediately examined her teaching and the needs of the learners throughout her college. As a result, she published her MMEL applied project “How to Identify At-Risk Medical Students Based on

Learning Style, Personality Indicator and Learning Strategy Tests – a Mixed Method” in *Medical Science Educator*, the journal sponsored by the International Association of Medical Science Educators.

After being introduced to concept mapping in a master’s research methods course taught by Jeffrey Beaudry, Ph.D., Sadik incorporated this critical thinking tool into her university courses. As a result, she published a chapter titled “Teaching Critical Thinking to First-year Medical Students Using Concept Mapping” in editors L. J. Shedletsky and J. S. Beaudry’s *Cases on Teaching Critical Thinking Using Visual Representation Strategies*.

Since her MMEL graduation, Sadik continues to give presentations at national and international conferences on qualitative educational research.

Recently, Sadik’s home country recognized her success. She was awarded Morocco’s prestigious Officer of the National Order of Merit designation in July of 2014 in recognition of her international achievements as a medical educator and researcher in the field of cancer. Sadik received the medal from the King of Morocco during a ceremony at the palace.



Wilson File

How does a young physician convince the director of his pediatric oncology/hematology fellowship to let him focus his research on medical education? How

does he get a mentor to guide his scholarship in curriculum design for communication skills when his department does not have education scholars? He goes back to school, himself.

Wilson File, M.D., joined the MMEL program in his second year of a fellowship at University of Texas/Southwestern. File recently published his curriculum project for MEL 604, “Do Pediatric Hematology/Oncology Fellows Receive Communication Training?” in *Pediatric Blood and Cancer*. He and his colleagues at UT also presented an abstract on this curriculum, “Breaking Bad News in Pediatrics: Intern Curriculum,” at the eighth annual Innovation in Health Science Education Conference in Austin, Texas.

But these are just three outstanding medical educators who studied medical education at UNE...

But these are just three outstanding medical educators who studied medical education at UNE and together have published numerous articles, including ones in: *International Journal of Emergency Medicine; Teaching and Learning in Medicine; Journal of the International Association of Medical Science Educators; the African Journal of Emergency Medicine; Advances in Medical Education and Practice; Journal of Health Information Management; The Open Journal of Occupational Therapy; Medical Science Educator; the International Journal of Medical Education; and the Journal of Graduate Medical Education.*

Teamwork Leads to Advances in Understanding Chronic Pain

CHRISTINE GRAHAM, PH.D., PROGRAM COORDINATOR/EVALUATOR FOR COBRE
IAN MENG, PH.D., DIRECTOR OF COBRE; DIRECTOR OF CFN; PROFESSOR

When one thinks about major health concerns in the United States, the mind often jumps to cancer, or metabolic and cardiovascular diseases, including diabetes, stroke and heart attack. But what about pain?

An estimated 100 million people in the United States alone suffer from chronic pain. Pain poses an economic burden that amounts to approximately \$600 billion per year in the United States due to direct medical costs, disability days and lost wages. Worse still, chronic pain exacts an enormous emotional cost on patients and their families in part because pain is so poorly understood.

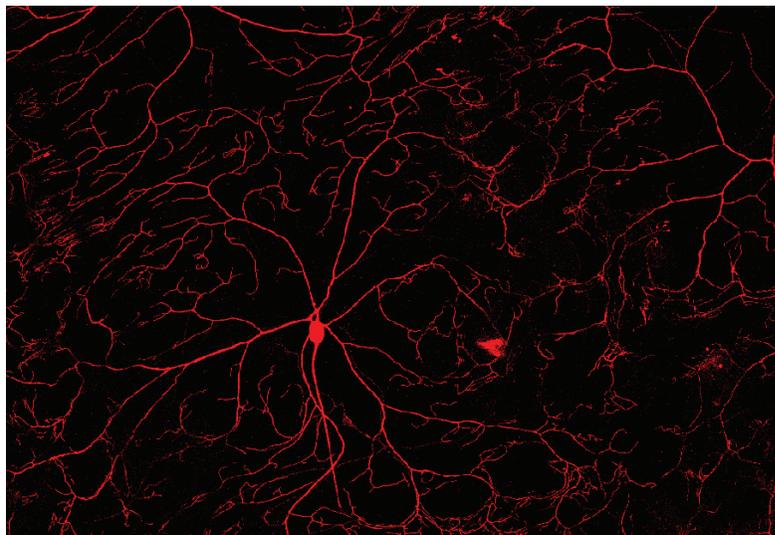
While pain is a real experience that can attain crippling severity, the underlying factors causing and maintaining chronic pain remain unclear and, in turn, available therapies remain insufficient. Current drugs used to treat pain achieve limited effectiveness while imposing numerous unwanted and potentially dangerous side effects.

An estimated 100 million people in the United States alone suffer from chronic pain. Pain poses an economic burden that amounts to approximately \$600 billion per year in the United States.

There is a critical need to direct research efforts toward finding novel therapies and treatments for chronic pain, and these are major goals of the Center of Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function at the University of New England. The COBRE was founded in 2012 following the award of a \$10 million grant from the National Institutes of Health. Led by Ian Meng, Ph.D., professor, director of COBRE and director of the Center for Excellence in the Neurosciences, collaborative research sits at the heart of the COBRE mission, and the Center is designed with the understanding that greater advances in research are achieved when people from different disciplines with different expertise come together and bring their perspectives to the table.

The COBRE funds four primary projects and three pilot projects, all of which approach the subject of pain from different angles — from neuro-immune to pharmacological to developmental and genetic — implementing different strategies including molecular, anatomical, behavioral and physiological to understand how chronic pain happens and how to treat it.

Additionally, the COBRE funds two core facilities, a behavioral core and a histology and imaging core, to enable researchers to reach beyond their own areas



Pain sensing neurons of a live *Drosophila melanogaster* (fruit fly)



Peter Caradonna (B.S. Biochemistry/Medical Biology '13) and Linda Biagini H.T., H.T.L. (A.S.C.P.) use a Leica brightfield/epifluorescent microscope to analyze staining of a rat lacrimal gland.



Back row from left to right: Geoff Ganter and Taylor Follansbee. Front row from left to right: Jenny Chiem, Kayla Gjelsvik and Sarah Libby

of expertise and conduct experiments that might not otherwise be possible for them due to lack of knowledge, training and resources.

A project spearheaded by Professor Geoffrey Ganter, Ph.D., illustrates how collaboration among different COBRE branches can push a project to new levels and open new areas for exploration. Ganter directs one of the four primary COBRE projects, using the fruit fly, *Drosophila melanogaster*, as a model organism to investigate the genetic underpinnings of chronic pain. The fruit fly provides a very powerful tool because knowledge of its genome is so complete, and, consequently, the ability to manipulate genes and understand their role in disease is so advanced.

Using such technology, Ganter and his team, including Taylor Follansbee (Master of Biological Science '15), Kayla Gjelsvik (Medical Biology '15), Jenny Chiem

The fruit fly provides a very powerful tool because knowledge of its genome is so complete, and, consequently, the ability to manipulate genes and understand their role in disease is so advanced.

(Health, Wellness and Occupational Studies '18), and Sarah Libby (Medical Biology '18), have uncovered a novel signaling pathway involved in pain sensitization, a neuroplastic process underlying some types of chronic pain. The pathway comprises Bone Morphogenetic Proteins (BMPs), a set of proteins that are highly conserved across species and are well-characterized for their role in early development. However, they have never before been identified as factors contributing to chronic pain.

Ganter and Follansbee want to move beyond the fruit fly to see if the BMPs are conserved as pain factors in higher organisms.

While the fruit fly model was instrumental in the discovery that BMP signaling plays a role in pain sensitization (and this model will continue to be useful for delineating the pathway components) Ganter and Follansbee want to move beyond the fruit fly to see if the BMPs are conserved as pain factors in higher organisms. Without any prior experience with rodent models, such a move would typically pose a tremendous obstacle.

With the help of the COBRE behavior core and Edward Bilsky, Ph.D., professor and vice president for Research and Scholarship, UNE's collective expertise in the pain field and familiarity with rodent surgeries, drug administration and behavioral assays make it possible to translate this research into a rodent model to see if BMPs contribute to pain sensitivity in mammals such as rats and mice. Moreover, the researchers can use the rodent model to test possible drug targets and apply agents that alter BMP signaling to see if these will help treat and prevent chronic pain.

Bringing together these two branches of the COBRE will open the door to new possibilities for drug discovery. With the help of other core facilities, such as the histology and imaging core and the UNE in-vitro drug discovery core as well as the continued support and mentorship of the COBRE team, this BMP project that originated with the fruit fly may uncover a set of alternative medications that will more effectively treat chronic pain in people.



Collaboration and teamwork begin in the classroom at the College of Pharmacy.

Student Collaboration, Growth and Exploration

GAYLE A. BRAZEAU, PH.D., DEAN, COLLEGE OF PHARMACY



Woori Elizabeth Kim (Pharmacy '17) recently returned from a regional conference of the American Pharmacists Association with a new perspective on research and scholarship opportunities at the College of Pharmacy. Based on her conversations with colleagues from other colleges, Kim realized UNE has a great reputation for on-campus student research opportunities. Kim remarked, "Even during the curriculum vitae workshop session, we exchanged our CVs with students from other chapters and found out that most of us have a solid CV with various research experiences, poster presentations, abstract publications and leadership positions. I was so happy that I was part of the UNE family."

“Even during the curriculum vitae workshop session, we exchanged our CVs with students from other chapters and found out that most of us have a solid CV with various research experiences, poster presentations, abstract publications and leadership positions. I was so happy that I was part of the UNE family.”

— Woori Elizabeth Kim

Faculty, staff and administrators strive to provide the best possible opportunities for student collaboration, growth and exploration with the goal of educating pharmacists that employers will want on their team. Students are searching to find their sense of place in a rigorous academic program at the College of Pharmacy. By staying true to the core values of fostering pride in the profession of pharmacy, embracing diversity and providing unique pathways for formal education, students are discovering areas where they can contribute to the excellent activities being conducted by faculty members. Students are encouraged to try their hands at research, service and scholarship.

College of Pharmacy faculty members participate in varied research and scholarship efforts, including laboratory-based studies, clinical and translational research, and the scholarship of teaching. Faculty and students have worked together to produce cutting-edge research in a variety of disciplines, and these efforts have led to numerous presentations and publications. Collaborations with community partners continue to expand as the Greater Portland

and Maine communities are taking notice of the expertise available at the College. More opportunities for faculty members to provide services and research resources to organizations outside the College result in students seeing the impact of their own contributions.

You will read in the following articles how collaboration across disciplines helps students discover their passion and prepare to be pharmacists who can effectively work on teams in a variety of settings in their professional lives. Distinctive opportunities help pharmacy students to find their place among a vibrant campus of health care profession programs at the University of New England. From collaborative efforts between infectious disease and genomics researchers to interprofessional health fair outreach events to global initiatives in Thailand, Spain and Ghana, pharmacy students are living the vision of the College of Pharmacy and University of New England. ■



Third-year pharmacy students collaborate on a group quiz in the Therapeutics II class.



Second-year pharmacy students perform research in the Pharmaceutics Lab.

Community Contributions and Networking through Independent Study

GLENN ROSENTHAL, M.A., M.B.A., ED.D., ASSOCIATE DEAN, COLLEGE OF PHARMACY;
ASSOCIATE PROFESSOR



George Allen, Pharm.D., works with Donna Park (Pharmacy '15) in the Baker Company Cleanroom Learning Laboratory.

The UNE Doctor of Pharmacy program requires students to take at least four elective courses related to health care during their three years of didactic training. Most electives are regularly scheduled courses open to students in much the same way as are other courses.

An independent study project is an alternative option for receiving elective credit that focuses specifically on a topic of interest to the individual student. Not only do these opportunities allow each student to pursue an area of personal interest, they allow for closer than usual contact between the student and the professor. This intimate working relationship leads to enhanced learning and a stronger academic experience. These student projects often produce publishable results or contribute to the College's goals in ways that cannot be accomplished through participation in a large class.

One of the goals of the College is to provide service to other programs in the University as well as to the community at large. Independent study projects sometimes involve the student performing an activity that provides a service to the community.

In one project, Associate Dean Glenn Rosenthal, M.A., M.B.A., Ed.D., worked with a third-year pharmacy

student to design a project evaluating drug use at a local hospital. The student produced a final report, which he presented to the hospital pharmacy staff, demonstrating how better purchasing practices could save the hospital close to \$40,000 per year by eliminating duplicate drug category purchases.

Independent study projects often provide students with specialized information and networking opportunities that help them pursue future employment opportunities. One highly motivated student at the College of Pharmacy was interested in understanding how investment houses develop projections and client recommendations. His goal was to pursue a career as an investment advisor with a focus in the pharmaceutical and biotechnology sectors. His Independent Study project included demonstrating an understanding of scenario planning, a planning tool useful to evaluating alternative futures, and interviewing several people currently involved in evaluating and recommending healthcare stocks and securities for clients. Upon graduation from the Doctor of Pharmacy program, the student was selected for a two-year fellowship with a large pharmaceutical company in the midwest, where he is now developing strategic plans for the company's international marketing efforts. Experience provided by his specifically focused independent projects helped prepare him for the interviews and for the work he is doing now. He is now able to help us network other students into similar industry opportunities.

These student projects often produce publishable results or contribute to the College's goals in ways that cannot be accomplished through participation in a large class.

While the independent study option is not for everyone, those students who have their own goals and are self-motivated to learn with focused faculty guidance find in them an amazing opportunity to develop their knowledge and skills in very specialized areas.

Global Initiatives

KENNETH McCALL, PHARM.D., COORDINATOR FOR OUTREACH AND DEVELOPMENT,
ASSOCIATE PROFESSOR

UNE's College of Pharmacy students have a unique opportunity to participate in global immersion experiences. Students in their final year at the College can explore their chosen profession by participating in one of three international experiences. They can opt to spend several weeks in Spain, several weeks in Thailand, or two weeks in Ghana. Each experience has a slightly different focus, allowing students to collaborate with peer health care professionals.

For the program in Spain, the UNE College of Pharmacy partners with one of the oldest and most prestigious universities in Europe, the University of Granada, in an academic exchange program. The exchange allows pharmacy students to spend several weeks each spring immersed in Spanish culture, language and in the country's health care system. While in Granada, students live with host families who provide living quarters, meals and, most importantly, a support system for integrating into the culture and language. In addition to engaging in intensive language study, students attend lectures, visit community and hospital pharmacies, tour a

“I believe that I have learned much about myself during this rotation, in addition to patient care skills. We were all challenged in one way or another and had to deal with both language and cultural barriers. I believe from this we have all learned to be more empathetic to the patients that we serve and to try to understand where they are coming from.”

— Granada, Spain, Exchange Participant

pharmaceutical distribution company, and visit the Andalusian Public Health Center. UNE pharmacy students also attend a nutrition class at the University of Granada, which helps them realize the importance of culture in health care.



Pharmacy students with UNE Professor Karen Houseknecht, Ph.D., and University of Granada Pharmacy Faculty members



Class of 2014 students at the Grand Palace in Bangkok, Thailand

The exchange also enables University of Granada pharmacy students to visit Portland, Maine, and learn about the U.S. health care system. On the UNE Portland Campus, pharmacy students from both universities learn together in an elective summer course. Granada pharmacy students also visit community, hospital, long term care, corporate and pharmaceutical industry settings. During the summer of 2014, the group traveled to Bangor to attend the Maine Pharmacy Association Fall Convention.

Twice per year students and faculty from UNE collaborate with the Ghana Health Service and local practitioners in a health care cultural immersion in the western region of Ghana. The UNE contingent works alongside the communities of Sekondi, Mpintsin and Kansawarado, providing direct health services, collaborating interprofessionally, offering

“Medications are just a band-aid. The real way to be healthy is through lifestyle. This trip changed the way I think about treating the patient.”

— Ghana Cross Cultural Health Immersion Participant

community education programs, and engaging in academic and cross-cultural exchange. Upon returning to UNE, members of the group share their stories in a public presentation. Students from all of UNE’s health professions programs are invited to participate and, in conjunction with participating faculty, work to develop, implement and evaluate health education curricula relevant to the needs of the population.

Lastly, selected students are able to spend several weeks in Thailand. Students visit hospitals and clinics, gaining a working knowledge of the cultural, social, political and health issues Thailand faces. Some of the sites they visit include Chinese Traditional Medicine Hospital, Chiang Daw Hospital, Mae Sot Clinic, Chest Disease Institute, and Chiang Mai University. The program is designed to help students attain a clear view of global health and to provide the opportunity for an in-depth exchange of cross-cultural experiences with health professionals in Thailand. They also learn about clinical diseases native to the tropics as well as traditional and alternative medicine.



Pharmacy students during the June 2014 trip to Granada, Spain

Advocating for the Profession

KENNETH McCALL, PHARM.D.,
COORDINATOR FOR OUTREACH
AND DEVELOPMENT, ASSOCIATE
PROFESSOR



From left to right: Kenneth McCall, Congressman Chellie Pingree, and Nicole Chasse at the National Association of Chain Drug Stores RxImpact Day in Washington, D.C.

In today's rapidly changing health care environment, it is critical that student pharmacists gain the experience and skills necessary to advocate for the profession and the patients they serve. The ability of the profession of pharmacy to expand its role in direct patient care and public health has been largely determined by enabling legislation and regulations across all levels of government. Advocacy by students and faculty at the UNE College of Pharmacy has significantly contributed to the advancement of the profession.

Recent advocacy efforts in Maine have culminated in expansion of scope of practice, including enhanced immunization services provided by pharmacists, allowing student pharmacists to administer vaccines under the supervision of a fully licensed pharmacist, and enabling collaborative practice agreements between a physician and pharmacist to achieve optimal outcomes.

At the national level, advocacy efforts by UNE faculty and students were highlighted in the September issue of *Pharmacy Today*. Nicole Chasse (Pharmacy '15) and Coordinator for Outreach and Development Kenneth McCall, Pharm.D., recently met with elected Maine representatives to ask for their support of HR 4190, a federal bill recognizing pharmacists as providers in the Social Security Act. Maine Representatives Chellie Pingree and Mike Michaud officially cosponsored HR 4190.

Collaborative Research on Storage and Safety of Antibiotics

CORY THEBERGE, PH.D.,
ASSISTANT PROFESSOR



Research team included from left to right: Cory Theberge, Victor Klinkerch (University of New Hampshire student), Lindsey Voigt (Pharmacy '16), Darcy Ahern (Colby College student), and Research Technician Lisa Harding, B.S.

The antibiotic gentamicin was discovered in 1963 and still gets widespread use in hospitals for the treatment of acute infections. Gentamicin is prepared in a hospital pharmacy and stored in the refrigerator until use. Members of the Maine Medical Center Acute Care Pharmacy team were looking for updated information on the

proper storage of antibiotic solutions such as gentamicin. This prompted Assistant Professor Cory Theberge, Ph.D., to begin a research study in June of 2014 in collaboration with Maine Medical Center clinicians. The goal of the study was to evaluate the stability of gentamicin solutions stored in the refrigerator and at room temperature.

"This is an extremely challenging material to evaluate because gentamicin is actually a mixture of several similar chemical structures," said Theberge, "but we're hoping to evaluate storage techniques in order to maximize both cost-effectiveness and safety when preparing and storing this crucial therapeutic product."

Theberge directed the project in collaboration with Maine Medical Center Director of Acute Care Pharmacy Jason Tremblay, Pharm.D., and his associates Kelly Hankinson, Pharm.D., and Jennifer Civello, Pharm.D. The assembled research team included the aforementioned hospital pharmacists as well as College of Pharmacy faculty and students and local college and high school researchers. Research was conducted with instrumentation and support from the UNE College of Pharmacy Genomics, Analytics and Proteomics Core facility.

Student Research Helps Maine Company

DANIEL BRAZEAU, PH.D.,
DIRECTOR OF GENOMICS,
ANALYTICS AND PROTEOMICS CORE,
RESEARCH ASSOCIATE PROFESSOR

The mission of modern universities is evolving. Traditionally, universities have been centers for the discovery (research) and dissemination (education) of knowledge.

More recently, however, society has looked to universities as a means to spur economic growth. The University of New England Genomics, Analytics and Proteomics Core (GAPC), housed in the College of Pharmacy, was created with some initial funding from the Maine Technology Institute to address these three goals. GAPC is devoted to providing students, faculty and private researchers with state-of-the-art scientific training and technical support in modern genomics, analytics and proteomics.

In this regard George Allen, Pharm.D., associate professor and chair of Pharmacy Practice, and Daniel Brazeau, Ph.D., research associate professor of Pharmaceutical Sciences, are collaborating across disciplines to work with Woori Elizabeth Kim (Pharmacy '17) and Mehdi Karamchi, vice president of Scientific Affairs for Puritan Medical Products Company. Their work is focused on the potential expansion of the utility of one of their products. Puritan, a company known worldwide as a trusted manufacturer of single-use products for the health care, diagnostic, forensic, critical environment, food safety and drug manufacturing industries, is located in Guilford, Maine.

Kim's research focuses on evaluating the efficacy of Puritan's Liquid Amies based transport system for the recovery of bacterial DNA. Puritan's Liquid Amies are a convenient, reliable choice for bacterial and viral specimen collection and transport. The goal of Kim's study is to evaluate, using DNA



Woori Elizabeth Kim, working in the Genomics Laboratory

amplification technologies, whether it is possible to identify and quantify specific bacterial pathogens in this same transport system. Specifically, Kim is using the quantitative polymerase chain reaction (Q-PCR) assay to detect and quantify the presence of the microbe *Bordetella pertussis*, the causative agent of pertussis or whooping cough.

There is eagerness to extend this initial work to examine other different clinically significant pathogens. Aside from being of service to a Maine company, this research introduces our students to state-of-the-art genomic technologies and provides an excellent research experience.

Woori Elizabeth Kim explains, "Getting involved in on-campus research at UNE has been an invaluable experience during my academic career. To me, it was more than just doing experiments, analyzing data and presenting my results; I have gained tremendous learning experiences that will last me a lifetime."

Health Education Outreach

EMILY DORNBLASER, PHARM.D.,
ASSISTANT CLINICAL PROFESSOR,
CRITICAL CARE SPECIALIST

The University of New England Student National Pharmacy Association (SNPhA) hosts an annual community health outreach event at the Maine Mall in South Portland, Maine. Set up side-by-side in the Center Court area of the mall, students from various disciplines provide health education to members of the Maine community. Pharmacy, dental hygiene and occupational therapy students provide valuable information on available public services.



Tiffany Tran (Pharmacy '15) practices a blood pressure reading on Emily Dornblaser, Pharm.D.

Collaborating on this event gives students from various health care disciplines the opportunity to work together for a common goal — much as they will work together after graduation with the common goal of providing quality patient care. This event enforces the patient communication skills students learn in class and allows identification of educational or community resource needs. Bringing the interprofessional model to this event helps students share their expertise with each other and gives them the opportunity to coach and mentor across various disciplines.

Pharmacy students provide health information on chronic kidney disease, diabetes, stroke, smoking cessation, immunizations and HIV/AIDS prevention. Under the supervision of clinical professors, students perform blood pressure and body mass index screenings at the Power to End Stroke station and help the Red Cross in collecting blood donations. Dental hygiene students provide resources on proper brushing and flossing techniques and also give out free toothbrushes and floss. Occupational therapy students promote the services that occupational therapists provide and answer questions about how they can help improve quality of life for patients.

Community partners include the Maine Mall, the American Heart Association, the Juvenile Diabetes Research Foundation, the Opportunity Alliance and Walgreens.



Malual Mabur navigating a health related issue with an Arabic speaking patient and medical assistant at the Portland Community Health Center at Riverton Park.



Translating Interprofessional Innovation in Communities

JENNIFER MORTON, D.N.P., M.P.H., A.P.H.N., ASSOCIATE PROFESSOR; CHAIR, DEPARTMENT OF NURSING



CHANNELS is an acronym that stands for Community, Health, Access, Networking, Navigation, Education, Leadership and Service delivery. It embodies the work being conducted to improve the health of immigrant and refugee communities in the Portland, Maine area.

This first-of-its-kind initiative, funded by the Health Resources and Services Administration (HRSA) Nurse Education, Practice, Quality and Retention (NEPQR) program employs a community-based approach, using nurse leaders and interprofessional teams. It includes the piloting and testing of community health outreach workers as members of health teams.

CHANNELS is directed by Jennifer Morton, D.N.P., M.P.H., chair of the Department of Nursing. Other team leaders include Karen Pardue, Ph.D., R.N., Shelley Cohen Konrad, Ph.D., L.C.S.W., F.N.A.P., Leslie Brancato, CEO of Portland Community Health Center, and Toho Somo, M.P.H., director of the Minority Health Program, City of Portland. Sharon Herrick, M.S.W., serves as research coordinator/manager for the project.

Education, training and service delivery are the outcome deliverables that make up CHANNELS. Interprofessional innovations that utilize community health outreach workers (CHOWs) as critical members of the health care team bridge relationships with individuals, communities and providers.



Malual Mabur, CHOW, collects patient information via a tablet as part of CHANNELS evaluation of IHI's Triple Aim.

Interprofessional Education for Students and Professionals

Interprofessional education is the hallmark of the CHANNELS program. UNE students are formally prepared to think and act collaboratively. UNE delivers the Interprofessional Collaboration Education (IPE) curriculum to nursing, social work, occupational therapy and physician assistant students. Pharmacy students are involved in IPE student teams at the Riverton Clinic and as part of CHANNELS' public health activities. The goal of IPE is to engage students across disciplines to work together to experience collaborative practice and to enhance their health literacy and cultural awareness.

Content of Six-Hour Curriculum:

- Team-based clinical problem solving
- Developing an interprofessional patient/client care plan
- Communication techniques among team members and with patients
- Treating patients holistically

Preliminary Findings

During the 2013-2014 academic year, 94 students from the Nursing and Social Work programs participated in the IPE curriculum. Most were female (67.8 percent). They averaged 35 to 44 years of age, and many were completing master's degrees. Short term changes in attitude were measured using a pre-post survey. Generally, participants indicated a positive attitude toward interprofessional health care teams, and the survey showed improved student attitudes toward the value of interprofessional team care for patient outcomes and efficiency. Other areas of measurement include looking at the specific longitudinal impact of interprofessional health disparity education with patients in community and clinical settings.

“The Institute was both informative and validating. One can easily forget that nurses are leaders. Helping us locate that part of our practice, or encouraging us to see that we may already have what is needed to lead/be a leader made the Institute a success.”

— Anonymous evaluation

Nurse Leader Institute

Of the 13,000 nurses working in Maine, one-third work outside of the hospital setting. The CHANNELS Nurse Leader Institute recognizes that nurses are a valuable asset to our state and play a key role in improving the health of our communities and our health care system.

“What was incredibly valuable was having the time and space to look closely at nurse leadership in the context of transformative population-based projects.”

— Anonymous evaluation

The purpose of the Population-Focused Nurse Leadership Institute is to provide a forum for community and public health nurses to build capacity and skill sets in team-based practice leadership when working with vulnerable communities.

Institute participants come from a variety of health care settings, including the following:

- Federally qualified health centers
- Home health agencies
- Public health agencies
- Schools / Universities

Training is delivered by UNE faculty and guest facilitators through group activities, mentoring, seminars, self-reflection and the development of community impact projects. The curriculum includes the following components:

- Leadership development
- Leadership among interprofessional teams
- Leadership within a community of interest

The curriculum also includes a community impact project. These projects require nurse leaders to develop a plan to better understand or transform health care delivery, fostering interprofessional collaboration, at their workplace. Past projects have included plans that incorporate the following:

- Provide customer service training to clinic staff
- Certify nurses to use specialized telehealth equipment
- Create a resource manual for immigrant and refugee services
- Address prescription drug abuse through parent education

- Conduct needs assessment and execute school-based health fairs
- Address chronic absenteeism in students with chronic disease

Since 2013, 11 nurses have graduated from the Institute and 12 nurses are enrolled in the 2014-2015 program.

Preliminary Findings

Evaluation of the Nurse Leader Institute is focused on the extent to which graduates achieve two objectives: growth of leadership skills and increased ability to work collaboratively with a team.

In the long term, the evaluation team will determine whether this program has helped improve population health, increased patients' experience of care, and reduced health care costs. These three goals are components of the Institute for Healthcare Improvement's "Triple Aims" a critical framework in measuring the efficacy of health reform.

The initial evaluation suggests that graduates have found the Institute a powerful professional development experience and have stated their feelings clearly:

“The Institute was both informative and validating. One can easily forget that nurses are leaders. Helping us locate that part of our practice, or encouraging us to see that we may already have what is needed to lead/be a leader made the Institute a success.”

“What was incredibly valuable was having the time and space to look closely at nurse leadership in the context of transformative population-based projects.”

“After meeting, I left energized and always took something away that I could use the next day.”

Service Delivery and Public Health Events

The three interrelated strategies of CHANNELS' service delivery arm include the establishment of a community based clinic at the Riverton Housing Authority, inclusion of CHOWs as part of primary care management teams, and development of health outreach events to increase the accessibility of clinical services and community education and to decrease stigma associated with accessing clinical services.

Components of Service

The Riverton Health Clinic

CHANNELS partnered with the Portland Community Health Center, a federally qualified health center, to open a satellite clinic at the Riverton Park public

housing complex. A high percentage of Riverton Park residents are refugee and immigrant families, many of whom face a number of barriers to adequate health care services. The clinic relies on interprofessional teams and focuses on delivering culturally and linguistically appropriate care. In addition to the primary care offered at the Riverton Clinic, CHANNELS works with the Smile Partners Oral Health Program to provide preventative dental care to new immigrants and refugees and works to connect them to dental homes for ongoing dental care.

Community Health Outreach Workers

CHANNELS also funds the program's CHOWs. CHOWs are community members who have specialized training in health promotion, cultural brokerage, mediation and advocacy and are core members of all CHANNELS health care delivery plans. Malual Mabur and Siyad Ahmed are representative of the CHANNELS' CHOWs hired for the project.

Mabur graduated from a medical school in Khartoum, Sudan. He obtained his master's degree in tropical medicine and international health from the University of London in the United Kingdom. Mabur received his post-graduate diploma in tropical medicine and hygiene from the Royal College of Physicians of London. He moved to the United States in 2010 and is preparing to sit for the United States Medical Licensing Exam. He has worked in different fields overseas and within the United States. He currently works as a health promotion specialist and community health outreach worker with the City of Portland, Maine. His work focuses on serving the access and navigation needs of the Arabic speaking communities in Portland. He is also a board member of the Immigration Legal Advocacy Project in Portland, and president of the Intercultural Community Center board, serving different refugees and immigrants living in Westbrook, Maine. He is preparing to start the physician assistant program at UNE in the summer of 2015.

Ahmed is a Somali speaking CHOW who spent much of his childhood and young adult years in a refugee camp in Kenya. He became trained as a CHOW in Kenya and worked in HIV surveillance, control and education while there. Ahmed has also worked to engender a sense of trust and adherence in the Somali speaking communities in Portland. Ahmed is now a nursing student in USM's four year BSN program.

Health Outreach Events

CHANNELS partners with community organizations and health centers to provide health related education and services where people live and work. These activities range from specific medication-take-back events to general Health-on-the-Move events. The latter is an initiative of the Cumberland District Public Health Council to bring health



UNE Health Professions student provides health information (translated into French, Arabic, and Somali) to a participant at a Health on the Move Event.



Community Health Outreach Workers present to students at a Martin Luther King Event organized by the Office of Multicultural Affairs and City of Portland.

services and resources directly to underserved communities in Cumberland County.

Preliminary Findings

The Riverton Health Clinic

From its inception in June 2013 to April 2014, the Riverton Health Clinic scheduled 384 appointments. Overall appointment adherence was 57.2 percent. The number of patients using the clinic as their medical home is increasing. When compared to the population served by federally qualified health centers, patients at the Riverton Clinic appear to have fewer diagnoses of chronic disease and behavioral disorders. This provides an opportunity for primary prevention. Preliminary results also indicate that patients who view the Riverton Clinic as their medical home are able to access care for well, sick and walk in appointments. Additionally, they are demonstrating adherence to an unfamiliar health paradigm.

CHOWs

The CHOWs provide a bridge between the community and clinic. They work to ensure that the services provided are culturally and linguistically appropriate. Two-thirds of their work is done in person at primary care and dental clinics; the remainder takes place over the phone. They participate frequently in public health community events.

Vision

Project partners are implementing a multifaceted pilot project to increase access to full vision care for adults and children. This project includes patient education, vision screenings, training CHOWs, providers and other health professionals to make vision care referrals, and dispensing prescription and self-adjusting eye glasses.

Opportunities to evaluate the impact of offering vision screenings, self adjusting glasses and assistance

with prescription glasses took place at two events during the summer of 2014. Health on the Move (HOTM) is an initiative of the Cumberland District Public Health Council to bring health services and resources directly to underserved communities in Cumberland County. Vision was a featured station during the June 27, 2014 HOTM event ESL HOTM, offering vision screenings and fittings and giving away Adlens self-adjusting glasses. During the course of ESL HOTM, the demand for vision services was unprecedented and unexpected.

To address the excess demand, an additional event was held on July 11, 2014. The event provided another opportunity for vision screening, to receive Adlens self-adjusting glasses, and to place online orders for prescription glasses through Zenni Optical. This event, hosted by Portland Adult Education, was staffed by CHOWs who were recruited by the City of Portland's Office of Minority Health; CHANNELS program staff; University of New England Master of Social Work student interns; Portland Adult Education staff; Portland Community Health Center staff; volunteer medical assistants, nurses and physicians; and Maine Access Immigrant Network staff and CHOWs. In addition to vision services, the event also had a station for primary care.

The July 11 vision event served at least 76 people, including 49 people who had some form of vision impairment. This service demonstrated a demand for vision care across ages and nationalities. Future HOTM events or other community initiatives can continuously refine data collection tools and processes to improve data accuracy and ensure that data is representative of the event. Potential refinements could include translating the surveys into a greater number of languages and implementing a system for staff to verify that surveys are complete before they are collected. In order to achieve a greater description of the target audience, staff members are encouraged to consider seeking additional information on demographics, such as language preference and insurance coverage, and to apply quality of life measures related to low vision. It would also be useful to evaluate the social and economic impact of the provision of eye glasses to people.

Summary:

The CHANNELS project has served as an exemplar in community based interprofessional education and care. To date, the team has been invited to present the model and preliminary findings at the Institute of Medicine, UNE's Macy Summit, the National Center for Interprofessional Education, and Collaborating Across Borders IV. The team is currently busy preparing manuscripts for publication. ■



Participant at a Vision Care event held at Portland Adult Education is fitted for a pair of Adlens Self Adjusting Glasses.

Public Health is Your Health

CLAY GRAYBEAL, PH.D., ASSOCIATE DEAN; INTERIM DIRECTOR, SCHOOL OF COMMUNITY AND POPULATION HEALTH



SCPH faculty and staff at UNE's annual Fun Run

The faculty and staff of the School of Community and Population Health (SCPH) are committed to identifying innovative, evidence-based, sustainable strategies for improving the psychological, sociological and clinical health outcomes of populations in Maine, the United States and abroad. The pioneering work SCPH engaged in over the past year includes the following:

Maine Prevention Research Center: The traditional approach to improving health behavior focuses on the individual. However, the evidence-base for more progressive policy, systems and environmental (PSE) change is growing, and it supports PSE change as a more effective and sustainable approach to improving health at the population level across demographics.

In 2014, Associate Professor Michele Polacsek, M.H.S., Ph.D., received a Robert Wood Johnson Foundation Healthy Eating Research grant to study the food and beverage marketing environments in Portland schools and the efforts and resources needed to bring school environments into compliance with the new federal Smart Snacks in School standards for school-based marketing. Her study aims to provide critical information and resources for advocates and policymakers across the nation to improve policies targeting school food marketing implementation and, ultimately, to provide healthier nutrition for students.

Health Literacy Institute: The UNE Health Literacy Institute provides health literacy and plain language training, consulting and materials development services to medical care and public health institutions in Maine and beyond. Sue Stableford, M.P.H., M.S.B., director of the Health Literacy Institute, also participates in external research projects, publishes in peer-reviewed journals, and collaborates with colleagues across the country. She was the plain language writer for a series of 27 private well water tip sheets developed with the University of Rhode Island. These tip sheets won three Clear Mark awards from the National Center for Plain Language in 2014.

The institute works closely with the UNE Maine Geriatric Education Center on a Health Resources and Services Administration (HRSA) funded, statewide health literacy learning collaborative. The institute is also the contracted trainer for both the Maine Center for Disease Control and Prevention Office of Health Equity and the Maine Health system.

Maine AHEC Network – Improving the Care of Veterans and their Families: The mission of the Maine Area Health Education Center (AHEC) Network is to alleviate health care worker shortages in rural and underserved communities. A main AHEC strategy is to provide health care workers in those communities with timely continuing education programs.

Over the past two years, addressing the needs of veterans has been a national AHEC focus. In September of 2014, the Maine AHEC Network, in collaboration with the Northern Maine AHEC, held a Veterans' Mental Health Training at Northern Maine Community College in Presque Isle. Health care providers heard members of the Maine National Guard discuss military culture, post-traumatic stress and how to provide culturally competent care to veterans and their families. Participants rated the session very highly and appreciated the directness of the presenters. Many participants who had found that their usual approach with patients would not work well with many military members learned about the importance of asking all patients about their military service. This was the third AHEC-supported Veterans' Mental Health training in Maine in the past two years.

Public Health Workforce Training: The University of New England was part of a successful application by the Boston University School of Public Health to create the New England Public Health Training Center. Other partners in the center are the Dartmouth Institute of Health Policy and Clinical Practice, the University of Massachusetts Amherst School of Public Health and Health Sciences and Yale University.

The purpose of the center is to strengthen the skills and competencies of the current and future public health workforce. Training programs will be developed based on the needs identified in Maine’s Public Health Workforce Training Plan. Maine will benefit by having access to the online training programs developed by the center that will target state and local health department staff as well as those working in community coalitions across the state. One area that is of great interest to the training center and to Maine is the development of a training program for community health workers. This is a four year cooperative agreement with HRSA.

UNE’s SCPH: The SCPH conducted an impact evaluation to explore relationships among tobacco prevention and reduction strategies implemented by local Healthy Maine Partnerships (community coalitions) to study youth smoking behavior and exposure and to examine the environmental and psychosocial factors expected to mediate them. Ruth Dufresne, M.S., research associate, and Allison Morrill, J.D., Ph.D., research associate professor, presented results from this evaluation at the 2014 American Public Health Association Annual Meeting on November 17, 2014 in New Orleans, La. The presentation also discussed implications for future youth tobacco prevention strategies.

The Maine Supplemental Nutrition Assistance Program – Education (SNAP-Ed): SNAP-Ed aims to improve the likelihood that individuals eligible for the Supplemental Nutrition Assistance Program (SNAP) will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current dietary guidelines for Americans and the U.S. Department of Agriculture’s (USDA) food guidance. Maine SNAP-Ed uses evidence-based curricula and multi-level approaches to improve the likelihood that low-income families will have the knowledge and skills to be able to make healthier food

and physical activity choices on a limited budget. The Maine SNAP-Ed program provides nutrition education activities, implements social marketing campaigns, and helps create environmental supports to enable low-income families to establish and sustain healthy eating behaviors. SNAP-Ed is funded by the USDA. In Maine, SNAP-Ed is administered by the Maine Department of Health and Human Services (DHHS) and implemented by the UNE School of Community and Population Health.

The Maine SNAP-Ed plan is a decentralized model administered by UNE, whereby the majority of grant funds go directly to the Healthy Maine Partnerships (HMPs), a statewide network of community health coalitions that form Maine’s public health infrastructure. The HMPs hire qualified nutrition educators to deliver



Faculty and staff are involved in community efforts to promote physical activity and injury prevention norms among children.



Junk food marketing found in a Maine High School is found to be noncompliant with the state ban.

nutrition education programming to youth and adults who are eligible for SNAP benefits. SNAP-Ed nutrition educators reach low-income families through new and long-standing partnerships created with local community organizations. Maine SNAP-Ed provides nutrition education services in settings that are most accessible to individuals eligible for SNAP, including schools, food pantries, Head Starts and other child care settings, grocery stores and regional DHHS offices.

In federal fiscal year 2014 (FY 2014), UNE was awarded \$3,755,039 for SNAP-Ed program implementation. By the end of FY 2014, the Maine SNAP-Ed obesity prevention and nutrition education programming had reached approximately 31,889 youth and adults living in poverty. The majority of the programming takes place in schools and after school settings, with approximately 75 percent of the program's total reach affecting children. The classes for adults focus on shopping, cooking and eating healthy on a budget. These classes have reached over 8,000 adults.

The SNAP-Ed program was recently approved for FY 2015 with a total award of \$4,193,888.

The University of New England Maine Geriatric Education Center (UNE-MGEC): The UNE-MGEC is one of 45 HRSA funded geriatric education centers throughout the nation. The mission is to train health professionals, health professions faculty and students around the unique issues that older adults face. The UNE-MGEC is involved in several ongoing projects. A Geriatric Health Literacy Learning Collaborative training model focuses on health literacy, plain language and teach-back. This model formally links community health care systems and academic health professionals.

The UNE-MGEC also partners with the Maine Arts Commission and Cultural Resources Inc. to bring to Maine communities the "Living Art Living Well Studio." This is a model learning series for health professionals, faculty and students, designed to increase awareness and knowledge around and provide education about the intersection of art and health in older adults and how creativity matters to the health of the body, mind and spirit of older adults.

Rural Health Care Services Outreach Grant Program – Downeast Community Healthcare Worker Program

The Downeast Community Health Regional Partnership (DCHRP), established by Mount Desert Island Hospital in collaboration with the UNE SCPH, obtained a three year U.S. Department of Health and Human Services Administration Outreach Grant to implement a comprehensive care program for diabetes and pre-diabetes, addressing prevention, detection and treatment of Type II diabetes.

The partnership involves community organizations, primary care providers and hospitals in Hancock and Washington counties. This area has the highest rate of diabetes mortality in Maine. Using a Community Care Worker model and evidence-based diabetes prevention services, trained volunteers employ the Centers for Disease Control and Prevention (CDC) National Diabetes Prevention Program's evidence-based lifestyle change curriculum, which teaches participants how to lead healthier lives and prevent the onset of diabetes. To date, the pre-diabetes prevention program has succeeded in weight and BMI reduction in several rural communities in Maine, including Swans Island, Trenton, Southwest Harbor and Northeast Harbor.

The UNE School of Public Health plays a leadership and evaluative role in the program. The evaluation includes collection and analyses of biometric data from participants that measures their progress towards weight and blood sugar reductions. Early returns from the diabetes prevention groups have been promising, showing statistically significant weight loss at six months and at one year after the start of the program.



SCPH faculty and staff gather to plan the school's research agenda.

Stronger When Combined: Interprofessional Service Learning at the Cumberland County Jail

SHELLEY COHEN KONRAD, PH.D., L.C.S.W., F.N.A.P., ASSOCIATE PROFESSOR

KERRY DUNN, J.D., PH.D., ASSISTANT PROFESSOR

TRISHA MASON, M.A., COORDINATOR OF SERVICE LEARNING

Long recognized as a means for enhancing student awareness of social justice and responsibility, service learning is now also being explored as a means for helping students develop interprofessional teamwork skills. The Westbrook College of Health Professions Service Learning Program is on the cutting edge of designing interprofessional opportunities for our health profession students. One such project is the UNE-CCJ Collaboration, a partnership between WCHP students and faculty and inmates and staff from the Cumberland County Jail. Since the summer of 2012, more than 100 occupational therapy, physician assistant, physical therapy, social work and nursing students have designed and implemented wellness projects at the jail. Using open-ended student surveys, faculty mentors have begun to identify key learning outcomes in this unique learning opportunity.

The clearest indication from the surveys was the value students placed on hands-on learning: learning through engagement with other students, onsite workers and members of the target population. Elements of the project that they identified as key to their learning experience were working with students from other professions, interacting directly with inmates and hearing their stories, working with an especially stigmatized population, and being exposed to the lack of resources in the jail.

When asked about the most important lesson they learned at the jail, several students mentioned the overwhelming need for, and glaring lack of, services

at the jail. Students identified key health challenges they witnessed, including limited access to healthy occupations such as work and recreation, nutritious food, exercise, information about infectious and chronic disease prevention, and social support. Students from each profession brought their discipline's particular lens, highlighting different needs, and giving the UNE group a full picture of all the kinds of services that could benefit inmates.

When asked about the most important lesson they learned at the jail, several students mentioned the overwhelming need for, and glaring lack of, services at the jail.

Students described shifts in their perceptions as they began to see inmates as human beings, "just people." Students appreciated the opportunity to meet with inmates in the planning workshop and "talk with them as equals."

This aspect of the program allowed students to get a better sense of the people incarcerated, and of their trajectories, strengths and vulnerabilities. Students experienced a one-two punch of awareness, realizing that inmates have many unmet needs and that they deserve to have those needs met because they are human.

Students responded to the needs at the jail by recognizing and sharing the impact their profession could have. Instead of feeling overwhelmed, many embraced the opportunity to develop creative ways to bring UNE resources to the inmates. Perhaps most importantly, they felt a responsibility to play a role in the change they envisioned.

Almost all of the students mentioned the value of working on interprofessional teams. Many cited the interprofessional nature of the program as its greatest strength. In the words of one student, "We are stronger when combined." Together they learned that making a difference is best done in partnership with clients, communities and colleagues from their own and other professions.



UNE faculty and students discuss sleep hygiene with inmates at CCJ.

Physical Therapy's Role in Interprofessional Promotion and Disease Prevention

MICHAEL SHELDON, P.T., PH.D.,
PROGRAM DIRECTOR; ASSOCIATE
PROFESSOR

Michael Sheldon, P.T., Ph.D., associate professor and program director, Department of Physical Therapy, and William McCormick, M.S., P.T., co-owner of the Medically Oriented Gym (MOG) in South Portland, presented "Preparing Physical Therapy Students to Deliver Interprofessional Community-Based Health Promotion/Disease Prevention Programs: Collaboration Between a D.P.T. Program and Medically-Oriented Gym" at the American Physical Therapy Association's Educational Leadership Conference in Kansas City, Mo.

The focus of the conference was to share innovative educational practices in physical therapy education, and Sheldon and McCormick's presentation highlighted some of the innovative, interprofessional teaching and learning activities, community health programs and research projects developed through the robust partnership between the department and the MOG. Feedback from conference attendees affirmed that UNE is doing cutting-edge work that reflects the increasing focus on health promotion,



Michael Sheldon and William McCormick at the American Physical Therapy Association's Educational Leadership Conference

prevention and wellness in the United States, while preparing physical therapy students to participate in evolving community-based and interprofessional health care delivery systems.

Interprofessional Tele-Teaching with Maine Medical Center

MARY BETH PATNAUDE, M.S., OTR/L,
ASSISTANT CLINICAL PROFESSOR



OT and PT students at UNE took part in a tele-teaching class in the WCHP Lecture Hall.

On September 12, 2014, more than 100 students gathered in the Westbrook College of Health Professions lecture hall to watch a live treatment session, involving occupational therapy and physical therapy, for a critically ill patient at Maine Medical Center. The event was coordinated by Amy Litterini, D.P.T., P.T., assistant clinical professor of physical therapy, and Mary Beth Patnaude, M.S., OTR/L, assistant clinical professor of occupational therapy. The students were part of Litterini's Foundations of Physical Therapy class and Patnaude's Biopsychosocial Dimensions of Adults occupational therapy class. The event was facilitated by Elizabeth Crampsey, M.S., OTR/L, an occupational therapist at Maine Medical Center, who joined the Department of Occupational Therapy as a full-time faculty member in October of 2014. Assistant Professor Jim Cavanaugh, Ph.D., P.T., N.C.S., provided technical support.

The students were given a case report of the medically complex patient before attending and were divided into interprofessional teams. They watched the live treatment session, interacting in real time with both the treating therapists and the patient.

Following the session, they engaged in a discussion with the treating therapists. They also discussed the roles of the different team members and answered questions. Cavanaugh reflected afterwards, "I can't think of a clearer example of teaching excellence."

What Should I Do After an ACL Injury?

ERIN HARTIGAN, P.T., D.P.T., PH.D.,
A.T.C., O.C.S., ASSISTANT PROFESSOR
KERRY DUNN, J.D., PH.D., ASSISTANT
PROFESSOR

Erin Hartigan, P.T., D.P.T., Ph.D., A.T.C., O.C.S., assistant professor in the Department of Physical Therapy, and Kerry Dunn, J.D., Ph.D., assistant professor in the School of Social Work, have been awarded a UNE mini-grant to investigate the status of shared decision-making after injuring ligaments in the knee.

After rupturing the anterior cruciate ligament (ACL), patients are faced with many decisions. They must decide whether to receive physical therapy to resolve impairments like knee swelling or whether to schedule surgery as soon as possible. They must determine when they will be able to return to work or sports.

Patients who have completed the decision-making process after ACL injury and health care providers who commonly treat ACL injuries will be asked to share their perspectives on how to best implement shared decision-making. Recognizing the time limitations that affect a physician's ability to engage in the decision-making process, Dunn and Hartigan are asking patients and providers: Who would

be best suited to engage in this shared process? The goal is to create an evidence-based systematic process for facilitating the shared decision-making process after individuals injure their ACL. The second phase of the project will involve testing the process on individuals who have recently injured their ACL and getting feedback on the utility of this newly informed approach.

Self-Care Pilot Project

NANCY MACRAE, M.S., OTR/L,
FAOTA, ASSOCIATE PROFESSOR



Private Practitioner in Counseling and Mental Health Linda Doyle, Ed.D., speaks to the group during the first session of the self-care project.

A pilot self-care project for faculty and staff was conducted on UNE's Portland Campus during the spring of 2014. The project emanated from the Labyrinth Committee, composed of like-minded faculty and staff dedicated to creating a labyrinth on campus. The interprofessional committee included members of the Departments of Occupational Therapy, Physician Assistant, Counseling and Art as well as staff from two of UNE's colleges. Committee members emphasized the importance of modeling for students the importance of taking care of themselves during their preparation to become health care practitioners.

The group focused on self-care within seven domains (emotional, spiritual, physical, social, intellectual, occupational and artistic), and compared pre and post quantitative

data, as well as qualitative data collected at the end of the project.

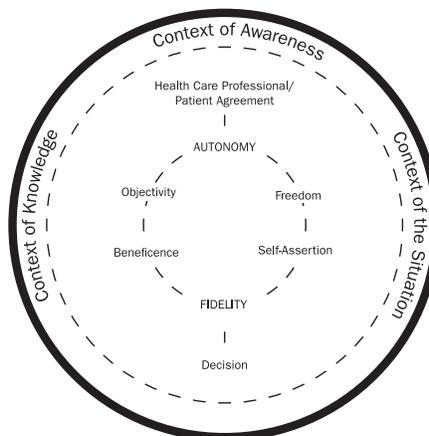
The hope is that the template for this project can be used for future endeavors focusing on nearly graduated students in the form of a one, two or three credit course. The participants of the pilot project are continuing to meet.

Civility in Health Professions

DEBRA KRAMLICH, M.S.N., R.N.,
C.C.R.N., ASSISTANT PROFESSOR

Debra Kramlich, M.S.N., R.N., C.C.R.N., assistant professor of nursing, recently published and presented work on civility, specifically as it applies to nursing faculty and collaboration among members of the health care team. She and her classmates in the Duquesne University nursing Ph.D. program applied the bioethical theory of symphonology, developed by Husted and Husted, to guide civil interactions among nursing faculty and enhance the practice of nursing education.

Symphonology incorporates a practice-based decision-making model that values agreements, maintains respectful and professional



Husted's Symphonological Bioethical Decision Making Model

interactions, and assists in determining when and what actions are appropriate for health care providers and patients. The standards encompass ethical principles familiar to health care professionals, including benchmarks for purposeful decision-making. Kramlich and her collaborators then applied the model to the issues of effective communication and team dynamics among health care professionals, aligning it with the goals of interprofessional education and practice to provide safe, quality, patient-centered care.

Kelley Strout Receives Fellowship to Attend Research Institute

KELLEY STROUT, PH.D., R.N.,
ASSISTANT PROFESSOR

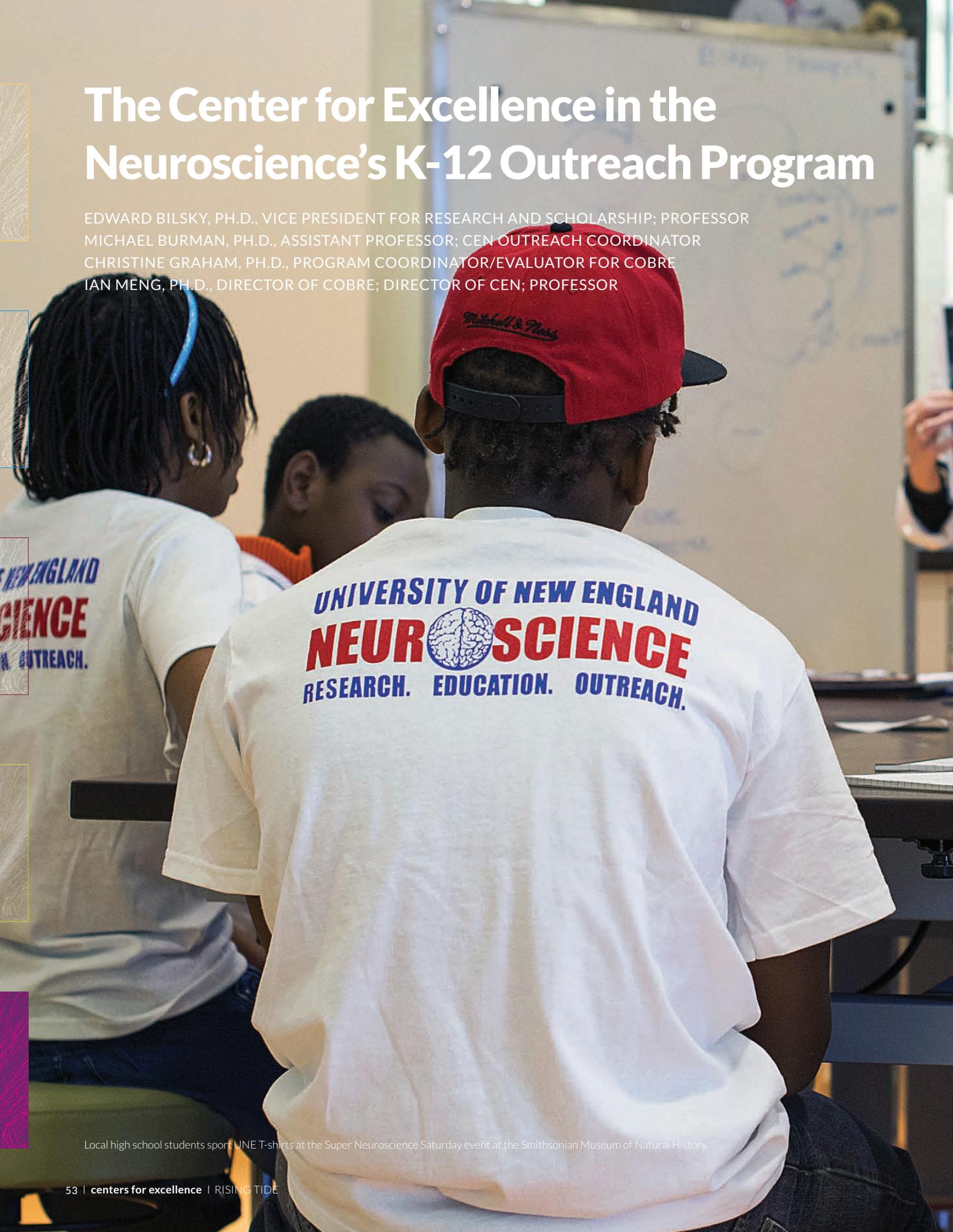
Kelley Strout, Ph.D., R.N., assistant professor in the Department of Nursing, joined a group of 20 other interprofessional geriatric scientists from around the world at the Johns Hopkins School of Nursing's Center for Innovative Care in Aging where they attended the 2014 Developing Behavioral Interventions Summer Research Institute. Strout was one of four attendees who received a John A. Hartford Fellowship to support their participation.

Attending the institute helped Strout develop a testable wellness coaching intervention for older adults. The intervention has the potential for implementation in community-based care settings.

Strout received individualized and group mentoring from nationally recognized research experts through small group consultation, state-of-the-science lectures and hands-on application of knowledge. This research training experience provided her with the foundation and mentoring necessary to begin writing a grant to pilot wellness coaching for older adults in community-based care settings.

The Center for Excellence in the Neuroscience's K-12 Outreach Program

EDWARD BILSKY, PH.D., VICE PRESIDENT FOR RESEARCH AND SCHOLARSHIP; PROFESSOR
MICHAEL BURMAN, PH.D., ASSISTANT PROFESSOR; CEN OUTREACH COORDINATOR
CHRISTINE GRAHAM, PH.D., PROGRAM COORDINATOR/EVALUATOR FOR COBRE
IAN MENG, PH.D., DIRECTOR OF COBRE; DIRECTOR OF CEN; PROFESSOR



Local high school students sport UNE T-shirts at the Super Neuroscience Saturday event at the Smithsonian Museum of Natural History.



UNIVERSITY OF NEW ENGLAND
NEUROSCIENCE
RESEARCH. EDUCATION. OUTREACH.

Great things happen when students, faculty and staff work together toward a common goal. The Center for Excellence in the Neurosciences (CEN) demonstrates this by bringing together undergraduates, professional students, staff and faculty to support the community and partner with local school systems.

Though UNE's faculty members have a long history of visiting schools and engaging with children and young adults, the neuroscience outreach program took off with the establishment of the CEN in 2009. The Center's mission encompasses three major goals: research, education and outreach. Highlighted here is the progress in outreach efforts built upon collaboration, uniting partners across UNE, and working with regional K-12 school districts as well as state- and nation-wide partners. These outreach efforts have not only proven successful but have achieved widespread recognition for their quality and impact.

Purpose

The CEN outreach program serves a threefold mission: support science education in the surrounding community, increase awareness and support for neuroscience research, and make prospective students aware of the outstanding programs at UNE. The CEN believes that any university, public or private, should support the surrounding community where its faculty, staff and students live.

Our outreach volunteers use their skills and knowledge to make these communities as strong as possible. By reaching out to K-12 students, the future leaders, and igniting in them a passion and skill for science, this program contributes to the continued growth of Maine's science-based economy. Raising neuroscience awareness in the surrounding communities not only fuels an interest in science and encourages the next generation to join one of the fastest growing and exciting fields, but it also garners support from parents, teachers and politicians to increase the federal research funding needed to support critical research that improves human quality of life.

Finally, engaging in outreach supports UNE. By seeing thousands of K-12 students each year and revisiting the same students throughout their education, the value of the UNE brand is reinforced time and time again. The program develops collaborations and engages with teachers, principals, superintendents and guidance counselors, all of whom help students navigate the college selection process, and the CEN wants these neighbors to know that UNE is a world-class institution in neuroscience education.

Methods

In visiting area schools for interactions that range from working with a single classroom to leading a comprehensive school-wide activity, the purpose is always to build lasting relationships. This is the cornerstone of the program's unique "Grow-up, Grow-out"™ approach. There are several thematic strands, each comprising curriculum that starts with kindergarten-aged children and continues through their high school years, growing-up with students. For example, the brain safety strand starts in primary school with discussions about helmet use by reading *Franklin's Bicycle Helmet*. Cantaloupes — some with helmets for protection and some without — simulate brains and are dropped from a particular height to demonstrate how the two groups fare. A group discussion covers some of the important things that brains do, the impacts that injuries can have and the importance of protecting our brains.

As students become more sophisticated, so too do the modules. Middle and high school students learn about concussions and how their skulls and cerebrospinal fluid can provide a natural source of protection. They engineer helmets and test their efficacy by putting eggs inside them and dropping them from a desired height to see if the helmet can protect the egg from breaking. They also learn the proper way to fit a bicycle helmet on their heads. By high school, students can tackle advanced topics such as traumatic brain injury, learn about cranial nerve exams, and demonstrate the role of brain plasticity in occupational therapy and physical therapy rehabilitation.

	Neurology	Neuroanatomy	Brain Safety	Function	Drugs of Abuse and Addiction
Primary School (K-3)		"What does your brain do?" drawing activity Color the 4 lobes of the brain	Read <i>Franklin's Bicycle Helmet</i> or watch <i>Bike Safety with Bill Nye the Science Guy</i>	Review the 5 senses Sensory test with textures and illusions	
Intermediate School (4-5)		Build-a-neuron with pipe cleaners	Discuss the importance of helmets "Build-a-helmet" egg drop activity	Discuss learning and memory Stroop test Times maze activity	
Middle School (6-8)	Introduce neurological disorders "What is a migraine?" What is Multiple Sclerosis? (model needle activity)	Sheep brain dissection with a comparative neuroanatomy	Discuss signs and symptoms of concussions Melon-drop helmet demonstration	Discuss short-term and long term memory Short-term memory test activities	Discuss types of drugs and their effects Effects of Drugs on Daphnia activity
High School (9-12)	"What is Alzheimer's Disease?" Telephone activity Short-term memory test	Human Neuroanatomy with preserved specimens	Cranial Nerve examination	Selective attention task (Simon and Chabris, 1999) Multitasking test	Waterwheel demonstration of dopamine depletion

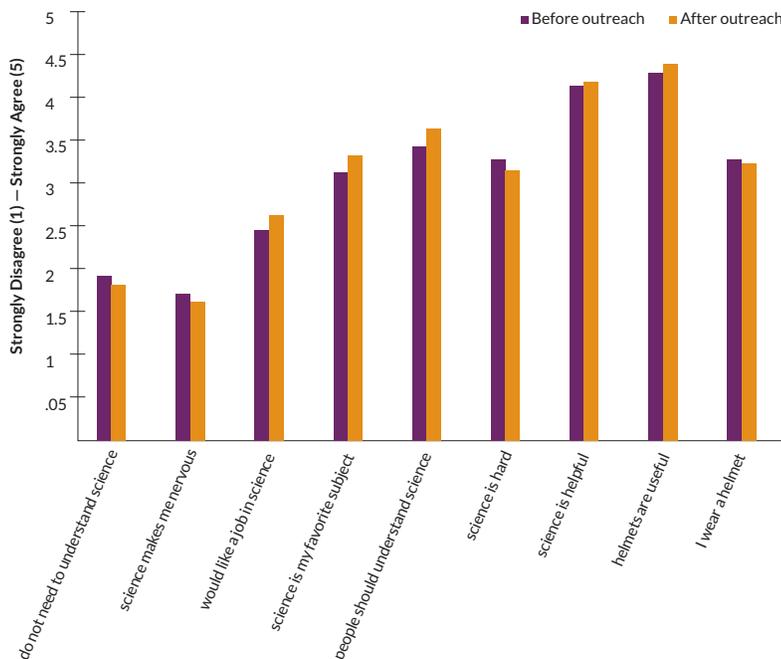
Chart depicts the various modules presented over the course of schooling.

Similar strands exist for neuroanatomy and brain function. As students advance in the school system, the outreach program also “grows-out” into related STEM fields. Materials science and engineering come into play as in the aforementioned helmet-building exercise. Chemistry and pharmacology are woven into lessons about addiction. Psychology is incorporated as students explore brain functions such as memory and cognition. Scientific techniques and methods are taught throughout.

Growth and Outcomes

The program has experienced tremendous growth since its inception in 2009. It has expanded from visits to a handful of classes, reaching perhaps a couple hundred local students, to 30 different annual visits, that reach approximately 100 different classes and thousands of students. The process of assessing the program has begun, leading to a peer-reviewed publication, several funded grant applications, philanthropic support and a growing national reputation.

The initial assessment asked two questions. First, it asked if K-12 students were influenced by the presentations in a manner that made them more interested in science. To answer this question, the CEN partnered with Education Professor Susan Hillman, Ph.D., who now serves as director of the Center for the Enrichment of Teaching and Learning. Hillman had developed a scale to assess interest in and feelings towards science in school children that was modified



Outreach visits significantly enhance students’ reported interest in finding a job in science and increase the likelihood that they will have good feelings about science.



Outreach volunteer Lindsay St. Louis (Neuroscience '13) with Biddeford student Jessica Bilsky at a helmet giveaway event

to produce an 11-question metric. After participating in the outreach program, students showed significant improvement on two of these metrics and a trend toward improvement on the remaining metrics. Second, the impact of the outreach program on its volunteers was assessed. They reported that the experience was very useful, improving their overall communication skills and, more specifically, making them more effective at presenting scientific material to a lay audience. These data have been published in the *Journal for Undergraduate Neuroscience Education* (Deal et al., 2014).

Overall, the Outreach program has brought local and national attention to the UNE neuroscience program. UNE is among a handful of colleges and universities whose outreach programs were robust enough to qualify as Dana Foundation lending library partners. Several pieces of the outreach curriculum are featured on Brainfacts.org. Michael Burman, Ph.D., assistant professor, was invited to participate in a White House/Smithsonian event celebrating neuroscience education, and Vice President for Research and Scholarship Edward Bilsky, Ph.D., was awarded an American Academy of Arts and Sciences (AAAS) grant based on the CEN’s outreach efforts and has been appointed to the education and outreach committee of the Society for Neuroscience.

While these accolades underscore the success of the CEN’s outreach program, it is hoped that the program will continue to show how great things happen when volunteers across UNE and the surrounding communities unite. Only with such collaboration can the program continue to fulfill its mission of getting young students excited about science, raising neuroscience awareness, promoting brain safety, and recruiting talented students to UNE.

The Center of Excellence in Marine Sciences Opens its New Marine Learning Laboratories

BARRY COSTA-PIERCE, PH.D., HENRY L. AND GRACE DOHERTY PROFESSOR AND CHAIR,
MARINE SCIENCES; DIRECTOR, MARINE SCIENCE CENTER

Background: The UNE Marine Animal Rehabilitation Center (MARC) closed in May of 2014 after 13 years of working on the rehabilitation of marine mammals and turtles. UNE's closure followed an internal assessment of the field of rehabilitation, the value of quarantining over a third of the area of the Marine Science Center for MARC, and the loss of federal funding for rehabilitation. The decision was made to discontinue MARC and expand into innovative academic programs in marine biology, marine ecology and conservation, marine policy, fisheries and aquaculture, and marine entrepreneurship.

UNE recognized that although seals were not endangered when it began its rehabilitation efforts in 2001, they were depleted. Consequently, the University invested a great deal of its own resources in seal and turtle rehabilitation. Internal review, however, documented that the seal population had made a significant rebound by 2014. The New England Aquarium and others ceased seal rehabilitation in order to focus on endangered turtles. Seal populations have recovered with the National Oceanic and Atmospheric Administration (NOAA) estimating the current numbers of the western Atlantic stock of gray seals at more than 250,000 animals.

The MALLs: UNE spent the summer of 2014 repurposing the former MARC area into a vibrant, student-centered research and education area that comprises more than 30 percent of the entire building. The area is no longer under quarantine. Called the Marine Learning Laboratories (MALLs) and containing eight "Ocean Clusters," the area allows for student-centered research-education work groups involving various UNE departments and majors as well as external partners.

In just five short months, the MALLs incorporated 13 faculty and staff members, more than 50 students, and many outside partners. In addition, the Department of Marine Sciences now has seven academic programs with more than 200 students and plans to introduce a B.S. in marine entrepreneurship in conjunction with UNE's Business Department which will allow business students to utilize the MALLs.

The New Ocean Clusters

A Saco Bay Mesocosm: UNE students are creating, maintaining and studying a model marine ecosystem, called a "mesocosm." This cluster involves construction of a subtidal mesocosm replicating the Saco Bay that will allow for experimentation on the ecology of Saco Bay in all seasons.



Juvenile Steelheads school in the grow-out tank of the Recirculating Aquaculture Demonstration project; part of the Sustainable Ecological Aquaculture and Fisheries (SEAFISH) Program at the MSC.



Students feed Steelhead fry as part of the Sustainable Ecological Aquaculture and Fisheries (SEAFISH) Program's Recirculating Aquaculture Demonstration Project at the MSC.

Green Crab Biology and Management: The green crab is an invasive species that is impacting one of Maine's most valuable fisheries – the soft shell clam fishery. This cluster investigates the biology of green crabs in Maine and combines field work (transects and larvae settlements) with lab experiments on the design of new and inexpensive methods of green crab trapping. The work supports efforts to establish a commercial market for green crabs, which is the only effective way of controlling this invasive species.

Steelhead Aquaculture: Steelheads are anadromous varieties of rainbow trout that thrive in seawater. They are disease resistant, easy to rear, and have large markets. Projects at the University of New Hampshire have reared them in one season from juveniles to marketable size fish that are worth approximately \$6 per pound. Now UNE students can learn husbandry,



A Marine Science student collects a culture of phytoplankton in the Marine Algae lab.



Different capture methods are tested for green crabs, both to reduce the amount of damage caused by this invasive species and to create a sustainable fishery for these animals.

animal welfare, water quality and management for this species in aquaculture and also study seafood science, applied mathematics, water chemistry, systems engineering and regulations.

The Spiny Dogfish Shark Cluster: In the first phase of this cluster, students and faculty will work with external partners and analyze contaminants, such as polychlorinated biphenyls (PCBs) and mercury (Hg) in this fish. In the second phase, during the Spring 2015 semester, the cluster will establish and maintain a spiny dogfish tank in the MALLs to explore the use of dogfish as a potential source of innovative marine bioproducts (food, fins, fertilizers, oils, gelatins, compost, pharmaceuticals and nutraceuticals). Partners include the Cape Cod Fishermen's Alliance, the Bigelow Laboratory for Ocean Sciences, the Gulf of Maine Research Institute, Mauder Trading, and Highliner Foods.

The Sturgeon Cluster: In phase one, cluster members will capture wild male and female sturgeon from the Saco Bay and estuary and will then transport, hold and acclimatize them to take artificial feeds. In phase two, students will conduct experiments to try to reproduce sturgeon in captivity. This work has the potential to advance sturgeon restoration and aquaculture in Maine and throughout the world.

The Aquaponics Ecosystem Cluster: In this cluster, students and faculty will construct, monitor and harvest an aquaponics ecosystem – an integrated system that uses fish to provide the nutrients to grow leafy greens or seaweeds.

The Microalgae-Seaweed Cluster: This cluster allows for the significant increase in production of marine micro- and macroalgae for all marine academic classes and will allow for the development of new collaborations with Maine's rapidly growing seaweed and shellfish companies.

Pollution Effects Cluster: This cluster involves the use of various local fish to investigate whether they are affected by current pollutants in the environment. The goal is to determine if populations of the same species along different points of the Saco River vary in their behavioral responses to variations in pollution levels and to predict which pollutants may be especially detrimental.

Center for Excellence in Interprofessional Education's Student-led Mini-grants Support Collaboration

SHELLEY COHEN KONRAD, PH.D., L.C.S.W., F.N.A.P., ASSOCIATE PROFESSOR; DIRECTOR OF CEIPE
KRIS HALL, M.F.A., PROGRAM COORDINATOR OF CEIPE

The physical therapy and nursing students who received a Student-led Mini-grant last year did not expect that their project titled "Life is Sweet, Move Your Feet" would become a widely recognized and replicated model for health promotion and disease/injury prevention in Medically Oriented Gyms (MOGs) across the country. Clinical exercise physiologist Jaclyn Morrill-Chadbourne, M.A., co-owner and director of business development at the Medically Oriented Gym in South Portland says, "The other MOGs are jealous because we have a strong research partner in UNE, and projects like 'Life is Sweet, Move Your Feet' that are informing new care strategies could be replicated throughout our national network as we figure out the best business model for providing effective interventions that insurance will pay for."

The student grant recipients also did not expect that their project would result in their post-graduation trip to Pittsburgh, Pa., to present their poster "Life is Sweet, Move Your Feet: A Health Promotion Program for Individuals with Diabetes Mellitus" to an eager professional audience attending All Together Better Health, a bi-annual international interprofessional conference.

So how does a student project become a nationally recognized and replicated model for health promotion and disease/injury prevention? It starts with excellent professional training and a cohort of highly motivated students. Add the opportunity of modest funding, and build upon a thriving interprofessional education infrastructure (including curriculum) that continuously brings students and faculty together from different health professions. These are the ingredients that Center for Excellence in Interprofessional Education (CEIPE) Director Shelley Cohen Konrad, Ph.D., L.C.S.W., F.N.A.P., and Program Coordinator Kris Hall, M.F.A., have relied upon to grow the Student-led Mini-grant initiative.

UNE is nationally recognized for providing students with multifaceted interprofessional campus- and community-based learning opportunities. Aware that health professions students are beset with high expectations for their future practices, the mission of the CEIPE is to build knowledge and inspire confidence in their capacities to collaborate with a range of disciplines without adding unduly to their workload. These collaborative skills will benefit job satisfaction and patient outcomes in clinical and public health



Lily Bottino, M.S.W., and public health student Collyn Baeder worked with a group of women from the Riverton Park housing neighborhood in Portland, Maine, to photograph residents' lives and share the results.



Physical therapy students Ryan Hill and Kristi Stalsbroten in the Medically Oriented Gym with the "Life is Sweet, Move Your Feet" exercise and educational Mini-grant project that included nursing and physical therapy students.

settings, integrated health practices (primary care, behavioral health and oral health) and health research, policy, advocacy and organizational systems.

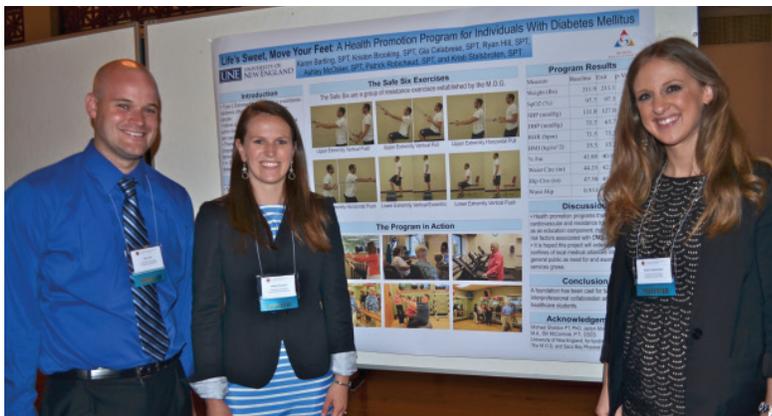
IPE Student-led Mini-grants

In 2012, following the establishment of the CEIPE, Cohen Konrad established the IPE Student-led Mini-grant Program to provide modest funding for

interprofessional student research and scholarship. The mini-grants bring together students from at least two professional disciplines to build new knowledge and/or introduce interprofessional competencies into meaningful community-based activities. The earliest collaborations were achieved with help from the Center in matching students from diverse disciplines to work together on projects. Hall observed, “One of the benefits of the culture change we’ve achieved is the fact that I rarely have to work to bring students from different programs together anymore. They are finding each other, or our faculty is actively helping them make cross-professional connections to build strong teams.”



Nursing student Bryan Zabatta presents his mini-grant work on an interprofessional curriculum for teams of students teaching health and wellness classes to inmates at the Cumberland County Jail.



Physical therapy students Ryan Hill, Kristi Stalsbroten and Ashley McCosker present their mini-grant project that included nursing and physical therapy during a poster session at All Together Better Health, a bi-annual international interprofessional conference.

Applying for mini-grants is a rigorous process meant to simulate real world grant writing. In addition to developing a proposal, detailed timeline and budget, recipients are required to disseminate their findings/projects through professional presentation. Cohen Konrad said, “These students are leaders, and we want them to have all the tools they’ll need to conduct research and create change for their patients, communities and professions in the years ahead.”

Grant topics are varied. For example, one IPE mini-grant project promoted health and wellness with inmates in the Cumberland County Jail. More than 40 students from the Occupational Therapy, Physical Therapy, Nursing and Social Work programs participated in robust collaboration. Occupational therapy student Iris Wilbur-Kameen reflected, “It’s the best interprofessional experience I’ve had here at UNE.”

Another successful IPE mini-grant brought together students from Public Health and Social Work to produce Photovoice, an art intervention that gives cameras to members of a community to document their lives and then brings the community together to discuss the work. Photovoice, which helped immigrant and refugee women in Portland’s Riverton community identify barriers to health, received local media coverage and was the subject of a 20-minute student presentation at the Global Alliance for Arts and Health Annual Conference in Houston, Texas. Pharmacy and medical students have also applied for and received mini-grants.

Conclusions

Students no longer want to merely talk *about* IPE; they want to do meaningful activities that engage their competencies prior to or in conjunction with their formal clinical/community education. The student-led mini-grants achieve this end. Formal and informal student feedback demonstrates that the mini-grants have successfully increased students’ knowledge of each other’s roles in health practice. In addition they raise awareness of the benefits of team-working through “hands on,” interactive opportunities with “real world” impact. These projects have local, national and global reach.

The Center for the Enrichment of Teaching and Learning: Ongoing Support for the Scholarship of Teaching and Learning

SUSAN HILLMAN, PH.D., DIRECTOR OF THE CENTER FOR THE ENRICHMENT OF TEACHING AND LEARNING

The Center for the Enrichment of Teaching and Learning was launched in August of 2014. University of New England President Danielle Ripich's vision of this Center emerged from UNE's Strategic Plan, which described the establishment of a center that would be "... a resource for information and preparation of faculty in advanced and innovative instructional programs... for enhanced teaching and learning results. Undergraduate and graduate education will be improved through the Center's focus on the art of teaching and the process of learning."

“... a resource for information and preparation of faculty in advanced and innovative instructional programs... for enhanced teaching and learning results. Undergraduate and graduate education will be improved through the Center's focus on the art of teaching and the process of learning.”

— UNE's Strategic Plan

Essential to the Center's work is the encouragement of faculty to explore their teaching and to view their teaching as a scholarly endeavor. Ernest Boyer, while directing the Carnegie Foundation for the Advancement of Teaching, first introduced the concept of the "Scholarship of Teaching and Learning" (SoTL). In his article "Scholarship Reconsidered: Priorities of the Professoriate" he reminds us that research "entered the vocabulary of higher education" in England only in the 1870s and that it wasn't until 1906 that one first sees research emerge in American higher education as an openly inclusive concept of "creative work carried on in a variety of places" with "its integrity... measured by the ability to think, communicate and learn."

In this light, SoTL has emerged as a significant category of research in which faculty investigate a component of their teaching with the purpose of advancing not only their own practice of teaching but of making their research findings public in order to advance teaching in general.

In the spring 2014 semester, while a task force was appointed to create a plan for UNE's new center, Barbara Walvoord, a consultant on developing teaching and learning centers, worked with faculty who were interested in pursuing a SoTL project. Since August, Susan Hillman, Ph.D., the founding director of the Center for the Enrichment of Teaching and Learning, has continued to work with these faculty and encouraged others to launch projects. Twenty faculty members from across the University presented their projects in a poster session at the Board of Trustees meeting in November of 2014. Presentations included the following:

Conceptual Understanding of Fundamental Concepts in Introductory Calculus

Michael Arciero, Ph.D., associate professor, Department of Mathematical Studies, CAS

Course Redesign: Increasing Student Learning and Retention in BIO 106

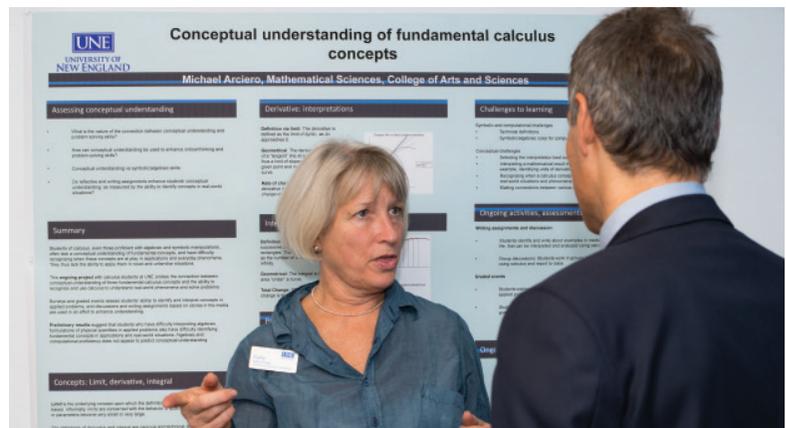
Deborah DuDevoir, Ph.D., associate lecturer, Department of Biology, CAS

Effects of Peer Assessment Instruction on the Quality of Lesson Plans in an Online, Graduate Education Course

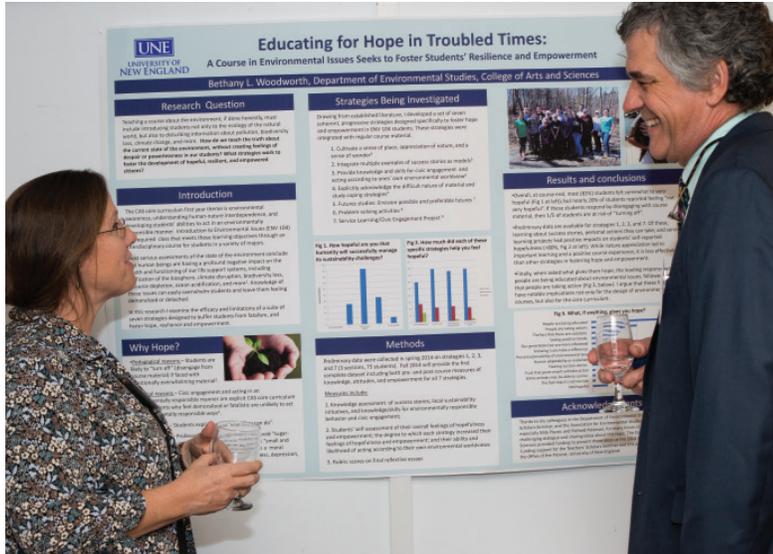
Audrey Bartholomew, Ph.D., assistant professor, Department of Education, CAS

The Experiential Learning Toolkit: Ensuring the Transfer of Knowledge

Jennifer Stiegler-Balfour, Ph.D., assistant professor, Department of Psychology, CAS



Cally Gurley, director of special collections, and Michael Arciero discuss Arciero's research project.



Bethany Woodworth shares her research with Associate Professor Dennis Leighton.

Matching Effective Mentoring Characteristics with Online Mentorship Training

Carol Marcotte, Ph.D., associate lecturer, Department of Education, CAS

Strategies to Improve Student Performance on a Team-based Biology Experiment

Margaret S. Friar, Ph.D., associate lecturer, Department of Biology, CAS

Teaching Hope and Empowerment, Avoiding Despair and Futility and a second project on Using a Current Events Journal to Improve Critical Thinking, Reflective Reasoning, and Inquiry

Bethany L. Woodworth, Ph.D., assistant lecturer, Department of Environmental Studies, CAS

Teaching Undergraduate Students How to Evaluate the Validity of a Source and Recognize Sources of Bias

Ursula Roese, Ph.D., assistant professor, Department of Biology, CAS

Using Collective Working Memory to Support Student Learning

Debra McDonough, Ph.D., associate lecturer, Department of Biology, CAS

Evaluation of Simulation Method for Teaching the Administration of Local Anesthetic

Fields Farrior, D.M.D., assistant clinical professor, CDM

Introduction to Public Health and Pharmacy: A Service Learning Elective to Promote Understanding of Civic, Cultural Issues and Health Disparities in Pharmacy

Leslie Ochs, Pharm.D., Ph.D., M.S.P.H., assistant professor, COP

Reflective Writing as a Tool for Developing Clinical Judgment in a Pharmacokinetics Class

Emily Dornblaser, Pharm.D., assistant clinical professor, COP

Debunking the Myth: Science Courses with Laboratories Can Be Taught Online

Rebecca Rowe, Ph.D., assistant professor, COM

Identification of Facilitation Skills that Promote Student Learning

Douglas Spicer, Ph.D., associate professor, COM

Planting the Seed: Cultivating Medical Students' Reflective Habit of Mind through Prompted Essays

Jenifer Van Deusen, M.Ed., director of curriculum, COM

The Effectiveness of a Clinical Approach to Teaching Undergraduate Gross Anatomy: A Mixed-method Approach to a Better Understanding

Shireen Rahman, M.S., A.T.C., clinical instructor, Exercise and Sport Performance Department, WCHP

Evaluation of a New Dental Hygiene Elective Course

Courtney V. Bain, I.P.D.H., M.S., assistant clinical professor, Dental Hygiene Department, WCHP

Facilitating Student Engagement in an Online Public Policy and Physical Therapy Course

Michael R. Sheldon, P.T., Ph.D., associate professor, Physical Therapy Department, WCHP

Integration of Service Learning in Graduate Occupational Therapy Courses

Jan Froehlich, M.S., OTR/L., associate professor, Occupational Therapy Department, with Regi Robnett, Ph.D., OTR/L., professor, and Kerry Dunn, J.D., Ph.D., assistant professor, WCHP

Teaching and Assessing Students' Clinical Decision-making in UNE's Physical Therapy Program

Erin Hartigan, P.T., D.P.T., Ph.D., O.C.S., A.T.C., assistant professor, Department of Physical Therapy, WCHP

“[research and scholarship collaboration] has built the reputation of the University of New England, and it draws positive attention to the state of Maine, and, most importantly, it helps change lives.”

– U.S. Senator Angus King
During his address to the Senate

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