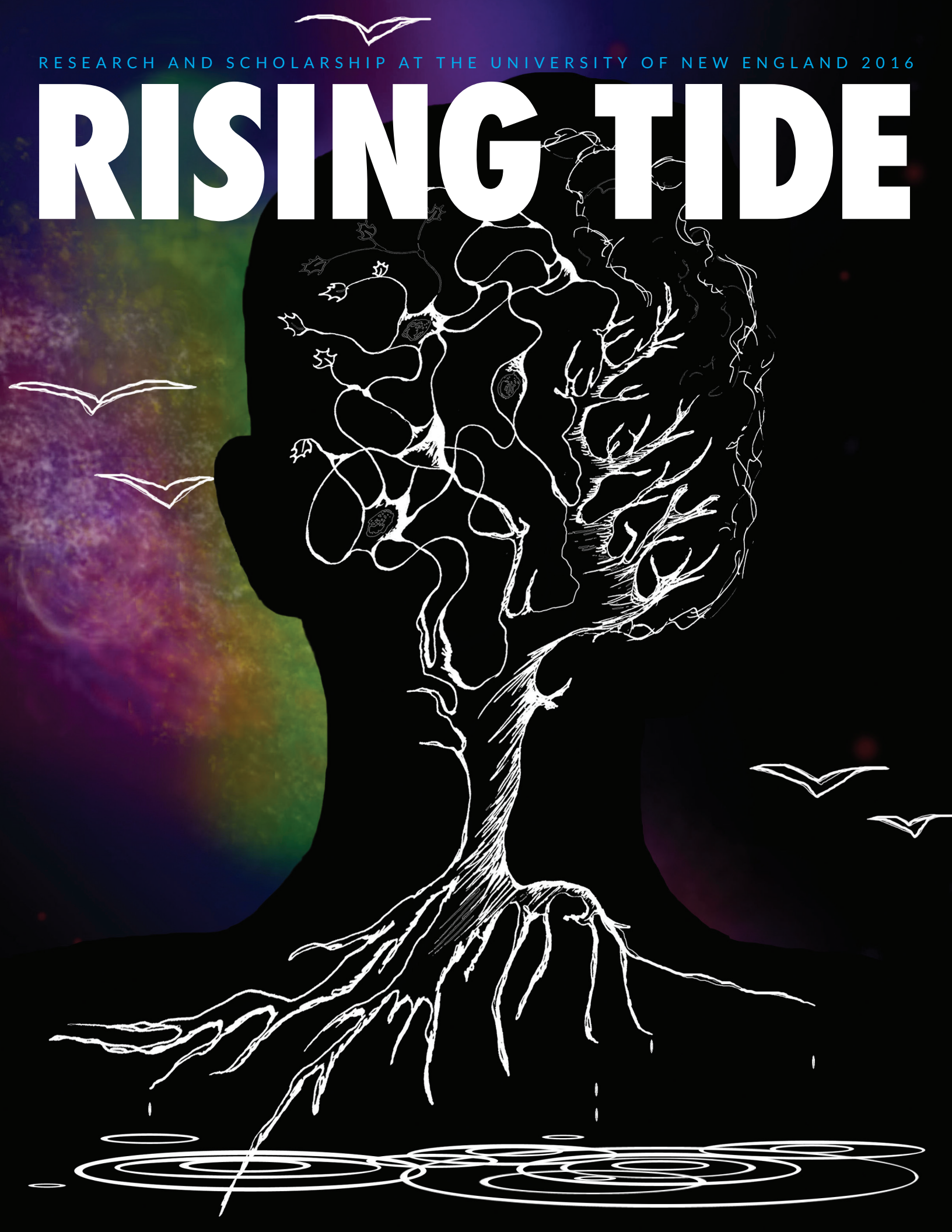


RESEARCH AND SCHOLARSHIP AT THE UNIVERSITY OF NEW ENGLAND 2016

RISING TIDE





Thanksgiving 2015 has provided the break needed to get caught up on writing assignments, including introducing the 2016 edition of *Rising Tide* magazine. It has been a great year personally and professionally, as I have made new and renewed connections with individuals and communities around the globe. On a more personal level, I was able to take members of my family to the 50th reunion tour of the Grateful Dead. This was the band that redefined community on so many levels, transcending the music industry by crossing multiple generations and connecting people decades before the Internet and social media took us by storm. The lyric, “Strangers stopping strangers just to shake their hand” played true at each of the shows as I conversed with many accomplished and creative people including scientists, physicians and artists.

One of my more memorable interactions was with a set of parents experiencing their first weekend of respite in years. Their teenage daughter had been afflicted with severe chronic pain, requiring them to provide care for her almost constantly. A new treatment regimen had recently reduced her pain to the point that she was able to live independently – a clear impetus for continuing some of the research efforts taking place at UNE.

Not coincidentally, this issue of *Rising Tide* explores how UNE’s Research & Scholarship programs connect with communities. We intentionally left the definition of “communities” open to interpretation. They could be small or expansive, internal or external to UNE, and local or global in scale. As the article submissions came in, several things became clear. First, UNE faculty and students have worked together to form scholarly communities that enhance the learning experience and allow teams to take on more ambitious projects than its members would otherwise be able to handle individually. Second, the articles provide example after example of UNE research and scholarship positively impacting our

campuses, communities close to home and communities far away. Finally, the communities we interact with are helping to shape and inform the research and scholarship we conduct. This synergy between UNE and our communities – however they are defined – further energizes and enriches the process.

Sustainability, the environment and economic development are urgent and interrelated issues of particular interest to UNE. UNE faculty and students are investigating creative ways to grow food locally and utilize the produce on our campuses and in Maine. Some of these efforts focus on the technical challenges associated with building closed-loop aquaculture systems, recycling and repurposing waste, and optimizing growth conditions and yield.

Given the vast coastline of Maine, extending some of these projects out into the estuaries, salt marshes and bays requires a careful balance of preserving the natural resources that contribute to our high quality of life and tourism while creating new business opportunities and job growth. Ram Island, a recent gift to UNE from the Girard family of Portland, gives us a unique asset at the confluence of the Saco River and Bay ecosystems that are so important to local communities, business and UNE.

Research and academics are also well integrated through new courses we now offer in marine entrepreneurship, the creation of a maker space for fledgling entrepreneurs, and contests that reward innovation and calculated risk taking. Our environmental sciences group extends our reach even further, working with communities on gully rehabilitation in the Nyando River basin in Kenya. Engagement in these projects not only gives the students invaluable hands-on experience but also promotes the concepts of civic engagement and community entrepreneurship.

UNE’s partnerships with K-12 school systems and community colleges continue to expand in reach and impact. The work being done with the Biddeford schools is one of many examples. UNE’s Department of Education is placing our students into internships that allow them to develop and deliver new approaches to promote literacy, increase math competency and bolster interest in the STEM fields.



Collaborations with Learning Works and the Biddeford Learns After School Together (BLAST) program have resulted in significant performance increases in reading comprehension and math test scores in children who qualify for Title 1 programs that improve the academic achievement of disadvantaged students. The Centers of Excellence in the Neurosciences and in the Marine Sciences are also continuing their outreach efforts while attracting external funding to support community-based programs and evaluate their effectiveness. The Center for the Enrichment of Teaching and Learning complements and extends these efforts into higher education and to the unique needs of adult learners. Some of the center-funded work is expanding into patient education, aiming to improve the management of chronic diseases.

UNE has never shied away from confronting big challenges that can be volatile, polarizing and controversial. Health care reform, the sustainability of health care systems, and community and population health topics frequently appear in headlines, lead stories and trending social media posts. A number of UNE scholars have been asked to offer guidance and expert opinion concerning vaccines, pathogens, potential drug side effects, chronic pain, opioids and substance misuse. Some of their efforts are featured in *Rising Tide* as well as in



Ram Island

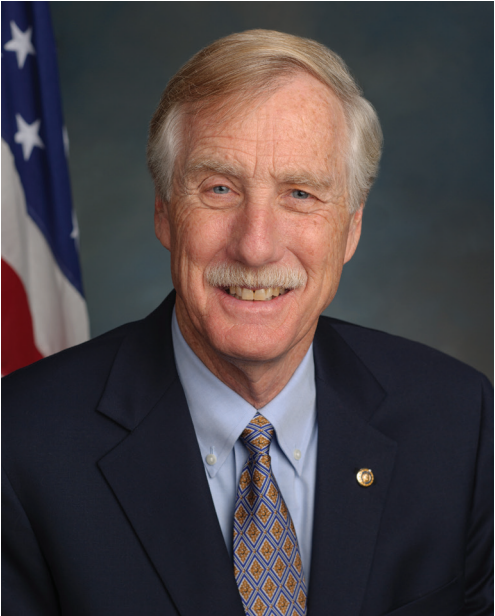
releases by the UNE websites and in the media. Drug take-back programs, public education and advocacy efforts, and research into cost-effectiveness and disease self-management are just some of the proactive initiatives being undertaken at UNE.

In an interesting essay on systems science and the Grateful Dead, author Christopher Chase discusses complex systems that have inherent elements of both autonomy and interdependence. Chase states “Individuals are autonomous and yet must fit into their surroundings, supporting the larger systems in which they play a part.” Similarly, the Osteopathic holistic views of health relating to mind, body and spirit provide an example of how different cells, tissues and organs that have specific and separate functions also work in an interrelated fashion to promote the health of the organism.

Extending this further, we can clearly see how departments, colleges and universities – as their own semi-autonomous communities – deeply connect and contribute to other communities across the globe. The artwork that graces *Rising Tide* captures and illustrates this theme in ways that words cannot fully describe, reminding me of another Grateful Dead lyric from the song “Throwing Stones,” which says, “Picture a bright blue ball, just spinning, spinning free. It’s dizzying, the possibilities.” I am grateful to be part of this innovative UNE community and all that it does for its students and society.



ED BILSKY
VICE PRESIDENT FOR
RESEARCH AND SCHOLARSHIP



Angus S. King, Jr., United States Senator

As one of Maine’s premier academic institutions, the University of New England shapes Maine’s future leaders while contributing to the vitality and vibrancy of our communities. Through scholarship opportunities and an emphasis on pioneering research, UNE is building new paths to higher education for our young people while also providing them with the tools to tackle some of the most pressing issues facing our society today.

Unfortunately, one of the most troubling and difficult issues facing Maine right now is the overuse and abuse of prescription painkillers, which can often become a dangerous gateway to heroin addiction. In Maine, the epidemic has affected thousands of people, taking too many lives, ripping apart too many families and threatening too many communities. In response, government officials, health care professionals and researchers — like those at UNE — have joined together to combat this troubling trend.

Two of these people are Ed Bilsky, Ph.D., vice president for Research and Scholarship, professor of pharmacology, Center for Excellence in the Neurosciences founding director, and Center of Biomedical Research Excellence for the Study of Pain and Sensory Function co-director, who coordinates

UNE’s research and scholarship efforts, and Ian Meng, Ph.D., professor of biomedical sciences and director of the Center of Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function. Through their innovative research on alternative treatments for chronic pain that don’t involve dependency-forming opiates, UNE is rising to meet this challenge confronting Maine and the nation. Through the school’s scholarship programs, more students are able to learn the skills they need to fight addiction on the front lines as future doctors, nurses and treatment providers.

Developing a comprehensive approach to address the opioid epidemic, which affects so many lives, is vital to Maine’s future. The work done at UNE to explore innovative research techniques and educate the next generation of health care professionals is an important part of that effort to build a healthier and safer Maine.

Partnering with many other community groups, UNE faculty, staff and students are models for an engaged citizenry. For example, Associate Professor Michael Burman, Ph.D., leads a nationally recognized K–12 neuroscience outreach program that partners with schools in southern Maine to promote brain health and brain awareness, furthering the University’s efforts to promote healthy communities.

“UNE is building new paths to higher education for our young people while also providing them with the tools to tackle some of the most pressing issues facing our society today.”

— Angus S. King, Jr., United States Senator

With its tireless commitment to transformative research and scholarship programs, UNE provides transformative opportunities for its students and for Maine. UNE not only prepares students for their futures but also invests in our communities and invests in our state. I look forward to the University’s continued contributions for years to come.



Ed Bilsky, Ph.D., meets with Senator Angus King in Washington, D.C., to discuss the opioid crisis.



Senator King discusses the outstanding impact of UNE’s marine science programs with President Danielle Ripich during his tour of the Marine Science Center in 2015.



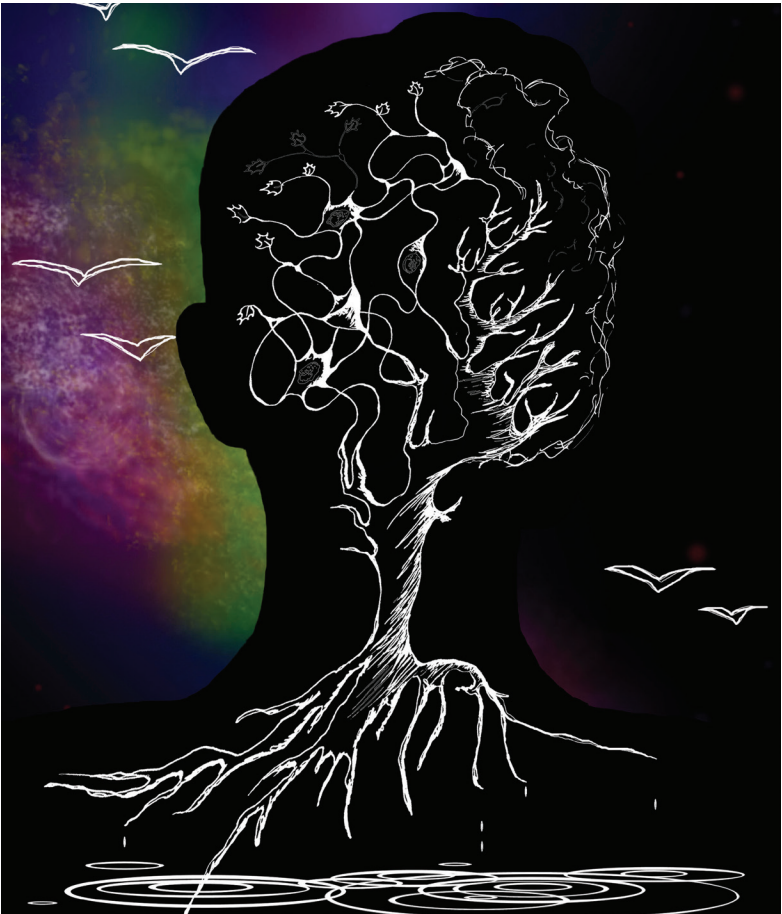
The Office of Research and Scholarship (R&S) encourages and celebrates the convergence of the arts with the sciences. Though they are traditionally thought of as separate disciplines, there have been recent movements by national organizations to facilitate collaborations and cross-disciplinary engagement between the two. The complexity of learning about and existing within the human experience can be more easily understood by using the languages of both disciplines. Infusing the arts with the sciences to strengthen both.

The R&S office facilitated a contest open to students, staff and faculty to design the cover of this year's *Rising Tide*. The call for art asked prospective submitters "to tell the story of how UNE research and scholarship efforts help create and positively impact communities." Community was intentionally defined broadly – it could be small or expansive, internal or external to the University, local or global.

The office received 14 submissions including paintings, drawings, wood carvings and digital creations. The caliber of work submitted far surpassed our expectations, and narrowing down the submissions to only three was harder than we anticipated. We hope our readers find these pieces as powerful and thought-provoking as we do. Congratulations to all who took the time to create works of art for submission. The three chosen artists this year describe their work below:

KATE HRUBY (Environmental Science, '16) provided the third artistic interpretation of research and community, stating, "'Created Nor Destroyed' represents how we are connected to nature down to our neurons and below that, atoms. Processes that began eons ago from stardust have managed to now form human intelligence, and it is our responsibility to remember we are part of a community reaching from the start of the universe to the unknown future, and right now, this is the only earth we have."

JOANNE SMITH, a staff assistant in the Westbrook College of Health Professions, had a different take on research efforts and how they affect local communities. She used watercolor techniques (made with pens and ink) to create "Unrestrained Gains: The Expansive Positives of Research." Smith says, "In creating this piece of art, I wanted to show the interconnectedness and cohesiveness of all aspects of UNE's research and scholarship (R&S) mission. It was my endeavor to have each visual component flow into another component in a seamless manner. I chose to use bold complementary colors that really make a statement and grasp one's attention. In terms of visual concepts, I wanted to show UNE's wide range of disciplines. My thought was that R&S enhances communities. I wanted to point out the effects of R&S on individuals, who are able to live healthy, active lives."



KATE HRUBY (Environmental Science, '16), *Created Nor Destroyed*, digital and ink, October 31, 2015



GINSBERG DUPUY (Health, Wellness and Occupational Studies, '16) created "Knowledge and Nature of the Neural Nor'Easter." He had this to say about his art: "After transferring to UNE my sophomore year, I found that this small school in southern Maine has a lot to offer the community. The hands represent the entire faculty, staff and students here at UNE. The neuron in the center of the piece synapses on some of the areas of research and scholarship done at UNE, pulling from them knowledge that travels through the axon to a pen that is positively impacting communities on a global scale. The amazing faculty, staff and students here have a plethora of knowledge and skills which they use to make this world a better place, and that is what I wanted to encapsulate in the piece that I submitted to *Rising Tide*."

The Office of Research and Scholarship would like to thank everyone who participated. The stunning caliber of submissions served as another reminder that vast talent remains untapped even here in our local UNE community.



JOANNE SMITH, WCHP staff assistant, *Unrestrained Gains: The Expansive Positives of Research*, watercolor with pens and ink, October 19, 2015



GINSBERG DUPUY (Health, Wellness and Occupational Studies, '16), *Knowledge and Nature of the Neural Nor'Easter*, mixed media including pen, colored pencils and charcoal, October 22, 2015



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FOOD FOR THOUGHT

Growth of the Sustainable Food Movement at UNE

ALETHEA CARIDDI, M.S.ED., SUSTAINABILITY COORDINATOR
JERI FOX, PH.D., ASSOCIATE PROFESSOR OF BIOLOGY AND MARINE SCIENCES AND AQUACULTURE AND
AQUARIUM SCIENCES PROGRAM COORDINATOR
ZACHARY MILLER-HOPE, ASSISTANT LECTURER OF BIOLOGY AND MARINE SCIENCES

Jeri Fox harvests green beans from the Marine Science Center's garden, where vegetable seedlings grown in the aquaponics room are transplanted.

Society has lost touch with food — the journey from farm to table is one people depend on but largely take for granted. Over time, there has been a progression away from traditions of backyard gardening and seasonal eating toward a system that is wholly dependent on one-stop grocers boasting everyday options of fresh guacamole and vibrantly plump strawberries. The efficiency of shipping food across countries and between continents results in diminished access to local farmers and the food they produce. Store shelves are lined with so many choices for jams and preserves that people have largely abandoned the practice of canning and preserving a bountiful harvest. The system is broken and unsustainable. A sea change aiming to reconnect the community to their food has been sparked at UNE.

EDIBLE CAMPUS INITIATIVE

The Edible Campus Initiative (ECI), a new project on campus led by Jeri Fox, Ph.D., associate professor of biology and marine sciences and Aquaculture and Aquarium Sciences program coordinator, was formed by a group of passionate students, faculty and staff to

demonstrate the power of local food production, the utility of sustainable landscaping strategies, and the ability to create a sense of community around our food. The ECI is a multifaceted effort across both campuses that currently includes a blueberry garden, two community gardens, a medicinal herb garden, seaweed farming and aquaponics.

CAMPUS GARDENS

UNE’s campus gardens developed as a result of curricular initiatives, student organizations and community service collaborations. The student environmental club Earth’s ECO funded the installation of the blueberry garden in the heart of the Biddeford Campus. Kate Hruby (Environmental Science, ’16) said, “From added foliage in the spring, to fruit in late summer and bright red leaves in the fall, the blueberry bushes are a wonderful touch to such an iconic location on campus. It showed me that college students are more exuberant foragers than deer! The bushes were empty of berries as soon as they ripened!”



Patriot and Northland blueberry cultivars bore fruit in the first year after being planted in the heart of the Biddeford Campus by student environmental group Earth’s ECO.



A College of Pharmacy student plants a cranberry bush, which is traditionally used to treat urinary tract infections, in UNE’s Medicinal Herbal Garden.

“From added foliage in the spring, to fruit in late summer and bright red leaves in the fall, the blueberry bushes are a wonderful touch to such an iconic location on campus. It showed me that college students are more exuberant foragers than deer! The bushes were empty of berries as soon as they ripened!”

— Kate Hruby

The medicinal herbal garden outside the College of Pharmacy building was inspired by a phytotherapy course taught by Cassia Mizuno, Ph.D., assistant professor of pharmaceutical sciences. The class partnered with herbalist and Curator of the Maine Women Writers Collection Cathleen Miller, M.A., M.L.S., to choose locally viable, perennial plants with medicinal properties.

Community gardens on both campuses have brought faculty and staff together since 2009, and, due to a groundswell of student interest last summer, the Biddeford Campus Community Garden was recently expanded.

SEAWEED

Seaweed may be the healthiest food on the planet. It is high in protein, low in fat and absolutely packed with vitamins, minerals, essential amino acids and fiber.

Adam St. Gelais, M.S., research assistant scientist and Sustainable Ecological Aquaculture and Fisheries (SEAFISH) program coordinator has partnered with Seaweed Science Program Advisor Tollef Olson to reproduce kelp in the Marine Science Center’s seaweed lab. This partnership was created with funds from the National Science Foundation EPSCoR grant. The project begins in one of UNE’s Marine Science labs, where kelp spores settle onto spools of line before they are transplanted to a new aquaculture lease site off Ram Island. Kelp is a winter crop, which makes it a perfect seasonal match for shellfish harvesting. Its growth also benefits the environment due to its high uptake of the anthropogenic nitrogen and carbon that accumulate in coastal waters.

AQUAPONICS

The Aquaponics Club had its first successful harvest from a student designed and managed aquaponics system in the fall of 2015. Aquaponics is a symbiotic, recirculating aquatic system in which fish and plants are grown together with high productivity and very little net waste. A healthy and flourishing system is achievable with virtually no input because fish waste is used to fertilize the plants. Two precious resources, space and water, are conserved in aquaponics, so it is a perfect fit for producing fresh foods in marginal spaces.

The crops harvested to date include basil, tomatoes, beans, squash, cucumbers and peppers. The Aquaponics Club has partnered with Maine’s Fluid Farms and Brooklyn’s Edenworks to learn from industry leaders and gain insight in designing a scalable system. Michael Galloway (Marine Science and Aquaculture and Aquarium Science, ’16) comments, “Through my involvement with the Aquaponics Club and community partnerships, I have used and grown a particular set of skills, from balancing biological life to proper time management and even engineering,

“Through my involvement with the Aquaponics Club and community partnerships, I have used and grown a particular set of skills, from balancing biological life to proper time management and even engineering, leading me to a broader range of potential job offers and the satisfaction of a sustainable harvest.”

— Michael Galloway



leading me to a broader range of potential job offers and the satisfaction of a sustainable harvest." The goals of the club are to grow salad greens and rainbow trout to supply the campus community year-round and to have other specialty crops available from time to time.

LOCAL FOOD IN DINING SERVICES

A strong collaboration between UNE's Dining Services and local farms and fisheries is emerging as Dining Services strives to source more food and food products locally. The key to providing local produce in our dining halls on a more regular basis is to connect farmers with distributors. Distributors, such as Native Maine, can aggregate large quantities of produce from small local suppliers, ensure food safety regulations and consolidate transportation to food service operations like UNE. Also, Sodexo, the company that runs Dining Services at UNE, is working with the Gulf of Maine Research Institute and its Responsibly Harvested brand to increase the servings of underutilized fish harvested from the Gulf of Maine. According to Dan Roy, dining services manager, the goal is to have 100 percent of UNE's seafood carry the GMRI Responsibly Harvested brand.

The President's Gala last May highlighted the opportunities available for responsible and sustain-

able eating when a concerted effort is made. Inspired by President Ripich and guest executive chef Barton Seaver, Sodexo served a meal showcasing smoked steelhead trout aquacultured at UNE, locally grown

A strong collaboration between UNE's Dining Services and local farms and fisheries is emerging as Dining Services strives to source more food and food products locally...

produce and Gulf of Maine seafood sourced through Maine Shellfish Company. Roy conservatively estimated that 60 percent of the menu was sourced from Maine.

Partnerships and collaborations, research and innovation, community service, and the desire to be more connected to each other and our food have strengthened UNE's commitment to food sustainability. The ECI strives to create a university-wide participatory food system that promotes efficiency and resiliency. Its goal is to apply the core values of UNE to educational programs, clubs and projects, promoting the production of food, building community connections and inspiring students to live and act sustainably.



Echinacea, used for upper respiratory infections, is planted in the Medicinal Herbal Garden on the Portland Campus near the College of Pharmacy building.

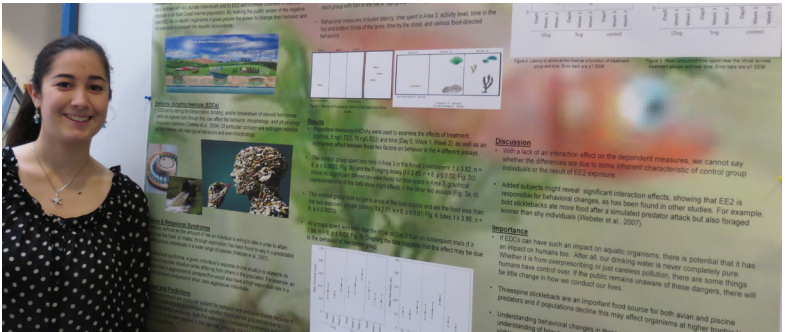


Sweet peas in the Biddeford Campus Community Garden



Undergraduate Research Opportunities: Using the Process of Inquiry to Foster Critical Thinking

TERESA L. DZIEWECZYNSKI, PH.D., ASSOCIATE PROFESSOR OF PSYCHOLOGY, UNDERGRADUATE RESEARCH COORDINATOR AND ANIMAL BEHAVIOR PROGRAM COORDINATOR



Brennah Campbell shows off the work she did this summer with Teresa Dzieweczynski, Ph.D., at the 2015 SURE symposium.

The College of Arts and Sciences (CAS) prides itself on the research opportunities available to its undergraduates. These opportunities take many forms, from smaller group research projects in courses to more extensive scholarship conducted under the guidance of a faculty mentor. The goal of these research opportunities is not only to provide students with hands-on experiences and skills in their discipline of study but also to enable them to become independent, critical thinkers and informed citizens. Engaging in academic inquiry presents an ideal way to achieve this goal.

Students involved in faculty-mentored scholarship commonly present their work at conferences and co-author peer-reviewed articles and other written works, something that is incredibly rare at the undergraduate level. Even those students who do not present their work at national venues have an ideal platform for showcasing their work: the College of Arts and Sciences Student Research Symposium, which is held each May. Last year's symposium featured more than 200 students exhibiting over 60 poster presentations and offering over 40 oral presentations.

The Summer Undergraduate Research Experience (SURE) provides a unique and invaluable opportunity for students in the College of Arts and Sciences to spend the summer working closely with a faculty mentor on scholarship. The benefits these students gain from conducting research with a faculty mentor are immeasurable. Student researchers gain hands-on experience with all stages of the process of inquiry, from formulating a research question, to

designing an appropriate method to test the question, to disseminating the final product of the project in presentation and/or manuscript format. All students in the SURE program are required to present the end product of their summer work at the CAS SURE Symposium; however, many of these students also attend regional, national — and sometimes even international — meetings with their faculty mentors. For example, Molly Wright (Biochemistry, '17), one of this year's Green Family Foundation fellowship recipients, presented at the annual American Chemical Society National Meeting and Exposition in Boston in August. Wright came back feeling validated that she was pursuing the right career path, and the positive reception that her work received left her all the more excited about continuing her line of research inquiry.

The merit of these research opportunities can be spoken to best by the students, themselves. In an anonymous final summer report, one student stated, "Coming out of this experience, I feel as if I have gained a whole new skillset to help me in my future. Field work is not an easy task, but I am glad that I have spent a summer experiencing the ups and downs. More importantly, I was immersed in the research process and witnessed how to handle obstacles and complications in the methods." Another student wrote, "Working on this research project has given me the opportunity to learn more about the research process in general and take an active part in developing a new research project with my mentor." A third explained, "Engaging in a summer of research has provided me with the critical thinking skills necessary in the field of scholarship; it has afforded me the time to familiarize myself with a new body of literature, design a research study, navigate new research software, and collect pilot data."

In sum, students involved in research at the University of New England grow professionally and personally as a result of this experience. Indeed, there are few experiences that lead to such profound growth in such a short time period. Conducting scholarship goes beyond simply providing students with exposure to their field; it provides students with an opportunity to question themselves, learn about the inquiry process, gain confidence and much more.

Healing the Land through Gully Rehabilitation Trusts in Nyakach, Nyando River Basin, Kenya

RICHARD PETERSON, PH.D., ASSOCIATE PROFESSOR OF ENVIRONMENTAL STUDIES AND DEPARTMENT OF ENVIRONMENTAL STUDIES CHAIR

Imagine a farmer in western Kenya, completely dependent on what she grows and what her animals can produce to survive. After the season's rains, she finds that the soil that produced last year's crops — her sustenance — is no longer there and that her farm now borders a massive gully that is eating into her fields, edging closer to her home every day. The soil is gone, washed away and carried down the slopes into Lake Victoria, adding to problems of siltation and nutrient loading, which in turn hurt those who depend on the lake for their livelihoods.

Now imagine that that farmer hears about a group of her neighbors who have come together to try to thwart the erosion that is threatening her and her land. She may want to consider joining a Gully Rehabilitation Trust, a group of farmers, educators and concerned citizens from her community working

to plant aloe vera, sisal, bamboo and other plants with soil-retaining roots to slow the flow of the water, giving it time to drop its soil. This will build deposits on which she can then plant trees. In time, she will witness the return of grasses to provide forage for her animals. Through this partnership, she begins the hard work of restoring the land, healing the wounds soil erosion inflicted on her community.

Building Gully Rehabilitation Trusts to restore the sloping and severely eroded farmlands of the Lake Victoria Basin has been the work of the Nyando District Centre for Environmental Conservation (NYADEC) since 2006. In 2010, students and professors from the UNE Department of Environmental Studies began partnering with NYADEC in this work. Every two years, 12 students spend three weeks in Kenya as part of Environment, Health, and Community



UNE students, NYADEC board members and Richard Peterson, Ph.D., get a taste of the Atlantic at the Wells National Estuarine Research Reserve.



Raphael Kapiyo posing a question to Paul Dest, director of Wells National Estuarine Research Reserve, during a visit to the reserve with UNE students



UNE students planting trees with a NYADEC member in Nyakach, Kenya

Development in East Africa, a course taught by Richard Peterson, Ph.D., associate professor of environmental studies and Department of Environmental Studies chair. In addition to engaging with NYADEC community members in soil conservation activities, students have worked with Peterson and his colleague Raphael Kapiyo, Ph.D., dean and professor in the School of Environment and Earth Sciences at Maseno University, to research the root causes, impact and extent of soil erosion in the region. They are currently producing a manuscript for publication, titled "A Different Kind of Land Trust: Fighting Soil Erosion through Community Participation in Western Kenya."

In September of 2015, six members of NYADEC's board visited UNE to learn more about the University's work in this area with a particular focus on the Department of Environmental Studies' ongoing engagement with local communities through research, outreach and education. The delegation also visited local community organizations involved in environmental education and restoration efforts, including the Kennebunkport Conservation Trust, the Wells Research Reserve, Avena Botanicals,

EcoMaine and Portland Trails. As an experiment in reciprocal exchange, the visit proved to be a resounding success. The members of the group were deeply impressed by the various projects and by the people they met, and they were extremely grateful for the warm hospitality they received and the knowledge they gained. As NYADEC Executive Director Peter Nyabua put it, "There has not been one thing during this entire visit that has not been positive for us."

This past fall, Peterson, Kapiyo and Marcia Moreno-Baez, adjunct professor of environmental studies and GIS (Geographic Information Systems), applied for a grant from the Rufford Foundation to incorporate the use of participatory GIS into their work with NYADEC members. They hope to map historical and current human activities that promote the restoration of land and gully control within the community of Nyakach. The project aims to help build local capacity by training community members, agency technicians, researchers and students in the use of geospatial technology and monitoring techniques. For more information, please contact Dr. Peterson at rpeterson@une.edu.

Partnership between UNE Department of Education and Biddeford School Department

LANE W. CLARKE, ED.D., ASSOCIATE PROFESSOR OF EDUCATION AND DEPARTMENT OF EDUCATION CHAIR

Last summer, Saige Sturvist (Education, '16) was getting ready for her last semester of classes before student teaching in the spring. Jamie Buyak (Education, '16) was working as a medical assistant at a doctor's office, taking classes at UNE, and also planning on student teaching in the spring. Then Sturvist and Buyak received phone calls that changed their plans. They were offered the opportunity to participate in an innovative partnership — they would split a one-year paid position as an Ed Tech in the Biddeford Schools. They would spend half of the day student teaching and the other half employed as an Ed Tech II, part of a team of professionals that supports students. With an extra Ed Tech, students have three adults in their classroom for the entire year, allowing them to enjoy the benefits of a lower student-to-instructor ratio. By June 2016, Sturvist and Buyak would also become certified teachers. Sturvist and Buyak agreed to the plan, strengthening the partnership between UNE's Department of Education and the Biddeford School Department.

For the past two years, UNE's Department of Education and the Biddeford School Department have been working to create intentional and consistent partnership opportunities with the goals of preparing aspiring instructors for 21st century teaching and strengthening K- 12 education for Biddeford students.

The partnership opportunities have varied. For example, in Literacy for Diverse Learners, students spend one day each week in Biddeford primary schools, working with teachers to assist with literacy instruction. In Exploring Teaching, students serve as "Re-sponse-to-Intervention" tutors. America Reads/ America Counts tutors from UNE also work with Biddeford students one-on-one or in small groups to promote confidence and ability in reading and math. Last spring, UNE students hosted a Grammar Fair at Biddeford Intermediate School and a Math Night at Biddeford Primary School. While these partnership opportunities expand, both the UNE Department of Education and the Biddeford School Department are collecting data as to the effectiveness of this connection and exploring other grant and research opportunities.

These collaborative efforts are positively affecting both participants in the partnership. UNE students gain teaching skills and experience day-to-day interaction with students in meaningful and targeted ways. Sturvist comments, "From this internship I am getting the chance to be a part of a class for a full year, learning how to become a flexible teacher [who] can adapt to different student needs." Jeremy Ray, superintendent of the Biddeford School Department says, "Biddeford students are benefiting in a magnitude of ways from being involved in the UNE/Biddeford education partnership. One example includes having over 30 senior interns working with our elementary-age children, allowing for more focus and individualized literacy instruction."

This partnership has also paid off for UNE students after they earn their diplomas; last year the Biddeford School Department hired four recent graduates. Sturvist and Buyak hope to soon join this group of successful alums.



Jamie Buyak ('16) and Saige Sturvist ('16) with their cooperating teacher Amanda Rood and class at Biddeford Primary School



Jamie Buyak ('16) and Saige Sturvist ('16) assisting during a class activity at Biddeford Primary School.

Innovation, Social Entrepreneurship, and Experiential Learning Find a New Home at UNE

MICHAEL DALEY, PH.D., ASSOCIATE PROFESSOR OF ECONOMICS AND DEPARTMENT OF BUSINESS INTERIM CHAIR

BILL SERETTA, M.ED., ADJUNCT PROFESSOR OF BUSINESS AND STUDENT INNOVATION CHALLENGE MANAGER



Zach DeLorenzo and Drew Fortin prepare to launch Version 2 of their remote water quality monitoring buoy.

UNE's Department of Business is giving students the tools that they need to turn innovative ideas into marketable inventions. In 2013, the Department of business embarked on a program reform to strengthen the business degree, designing new concentrations and courses that provide experiential learning opportunities geared toward developing entrepreneurial skills and preparing students to channel talent into marketable ideas.

In one such course, Creating Social Enterprises, taught by Bill Seretta, M.Ed., adjunct professor of business and Student Innovation Challenge manager, students designed and prototyped devices for water quality monitoring and small-scale aquaponics. Two members of the Remote Water Quality Monitoring Project team, Drew Fortin, '15 (Business Administration and Environmental Studies) and Zachary DeLorenzo, '15 (Environmental Studies), continued working during the summer and fall of 2015 to perfect their product and seek financial support to launch their venture. They are currently working on a third version of their device and applying for a Maine Technology Institute (MTI) grant.

During the Spring 2015 semester, UNE held its first student entrepreneurship competition — the "Biz Whiz" Student Innovation Challenge. Students pitched their ideas to a diverse group of UNE and community stakeholders. Cash prizes helped the finalists launch their ventures. Matt Scheuer (Marine Science, '16) won the competition by developing an inexpensive underwater remotely operated vehicle (ROV) with

onboard video camera and sensors, a project called Electrona Robotics. Raymond Keller (College of Osteopathic Medicine, '17) and William Bushey (Medical Biology, '16) won the second place award by developing a process for the treatment of chronic/ end stage renal disease, a project called Third Kidney.

The success of this inaugural competition brought attention to the fact that students needed access to space and services to design and create prototypes for their ideas. Based on student feedback and building on the enthusiasm created by the competition, UNE President Danielle Ripich, Ph.D., recommended the development of a campus-based design center and makerspace. A working group formed during the summer of 2015 and identified space in Decary Hall for this purpose.

The space was renovated and equipped during the fall 2015 semester. The 1,100-square foot facility is equipped with moveable furniture and tools and equipment such as 3D printers, a laser cutter, an imbedded electronics workbench, a sewing machine, and woodworking equipment. Starting in the spring of 2016, two courses, Social Entrepreneurship and Creating Social Enterprises, will be taught in the new Makerspace. The second annual "Biz Whiz" Student Innovation Challenge will take place throughout the spring 2016 semester, leading to a culminating event in early April.

The Department of Business has served as the catalyst for the new courses, the "Biz Whiz" Student Innovation Challenge and the Makerspace, but these opportunities are open to all students at UNE. In fact, the majority of students who have registered for the new classes and participated in the entrepreneurship competition to date have come from other departments. Makerspace will initially support the new courses and the "Biz Whiz" Student Innovation Challenge; however, it is anticipated that other departments will design courses and learning activities that utilize Makerspace's resources.

To further support these university-wide initiatives, the Department of Business is exploring the development of a comprehensive series of workshops to support the "Biz Whiz" Student Innovation Challenge and provide targeted learning opportunities for fledgling entrepreneurs from across UNE.

Exploring the Origins of Anxiety

MICHAEL BURMAN, PH.D., ASSOCIATE PROFESSOR OF PSYCHOLOGY AND CENTER FOR EXCELLENCE IN THE NEUROSCIENCES K-12 OUTREACH COORDINATOR

Michael Burman, Ph.D., associate professor of psychology and Center for Excellence in the Neurosciences K-12 outreach coordinator, and the undergraduate student researchers and staff in his laboratory are hot on the trail of anxiety.

Burman, curious about memory and fascinated by the brain, studied behavioral neuroscience, earning his Ph.D. in a laboratory at the University of Minnesota dedicated to understanding the biological mechanisms underlying traumatic memory formation. During this time, Burman slowly realized that effective treatments for human memory disorders were still decades away. However, prominent neuroscience researcher Joseph LeDoux, Ph.D., had recently predicted that anxiety could be solved in the near future — a tempting opportunity for a young researcher.

The most common psychiatric disorder, anxiety has a lifetime incidence of almost 25 percent. Despite this prevalence, the causes of anxiety remain largely unclear. Treatments remain inadequate due to ineffectiveness and serious side effects.

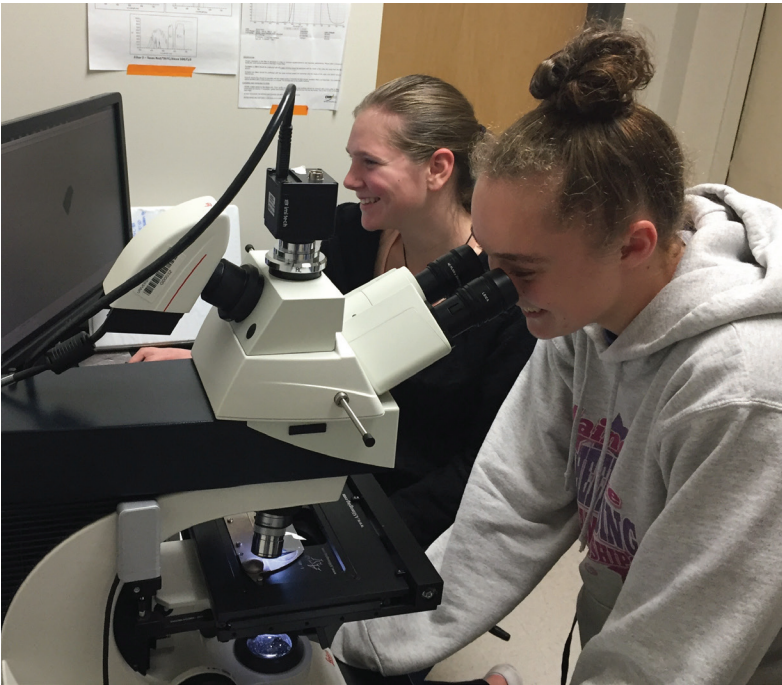
However, anxiety is relatively easy to study because of how readily it is demonstrated across species. Many mammals exhibit the same behaviors (freezing or fleeing) in response to signals of danger. Most are also afraid of similar things, such as potentially painful or harmful stimuli like predators. Research comparing human and animal anxiety traits has very clearly identified key circuitry in the adult brain, centered around a brain structure called the amygdala.

This new focus on solving anxiety attracted a team of like-minded individuals at UNE who were passionate about understanding this disorder. Together, the team realized that the developmental aspect of anxiety disorders had commonly been ignored in current research. The average age of first diagnosis for any anxiety disorder is 12 years old, with some forms of anxiety diagnosed even earlier, around 6 to 8 years old. However, scientists were largely ignorant when it came to understanding the developing brain. Even simple questions — such as the age at which the anxiety circuit starts to function, whether the components of the anxiety circuit change as a function of age, and how early life events may affect this development — were almost completely unknown.

Burman's team decided to start finding answers to these key questions by developing rat models of early life trauma and launching a series of studies to understand the effects of trauma on the developing brain.

So far, the students and staff in the Burman Lab have used cutting-edge behavioral, genetic and proteomic approaches to identify the end of infancy as a critical period in the emergence of anxiety. It is during this time that the amygdala starts to respond to traumatic events in an “adult-like” way and that typical anxiety-like behaviors start to emerge. This led the team to hypothesize that it may be the very earliest events that set the stage for an “anxious brain.”

Currently, the lab is investigating how early-life events, such as the stress of being in the Neonatal Intensive Care Unit (NICU), might affect brain development and later anxiety. Hopefully, by identifying how common events may lead to later anxiety, researchers can change medical practice to better protect children. As more than 15 UNE undergraduates have passed through Burman's lab on their way to graduation, it's just a matter of time until one of them shouts “Eureka!”



Students Crystal Nason and Ashley Steinis conduct research on anxiety in the Burman lab.

Catch them at the Scene: Identifying Whether or Not Migrating Bobolinks Bring Novel Parasites to the Galapagos

NOAH PERLUT, PH.D., ASSOCIATE PROFESSOR OF ENVIRONMENTAL STUDIES



Noah Perlut, Ph.D., watching a bird (bottom right corner) in Galapagos Islands.

In September 1835, Charles Darwin spent five days on San Cristobal, the easternmost island in the Galapagos. There, he shot a bird with a story unlike any other he would later tell. This golden, approximately 30-gram bird, a bobolink (*Dolichonyx oryzivorus*), was a migrant, and a representative of the only landbird species that stops every year on the Galapagos while traveling between its North American breeding grounds and its South American wintering grounds. Darwin's future studies, aiming towards a theory of natural selection, broadly ignored the specimen. He did not know that species on remote islands are generally buffered from parasites and pathogens by geographic remoteness; this buffer, though, potentially makes them more vulnerable when introduced to diseases.

Therefore, Darwin could not forecast that ancient bobolinks migration routes may play a role in a major conservation issue facing the future of all birds in the Galapagos: the recent arrival and transmission of blood parasites (*genus Plasmodium*). These parasites rely on mosquitos as vectors. The Galapagos currently have three mosquito species — one native, brackish-water species; one species that is a known *Plasmodium* vector introduced in the 2000s; and one species introduced in the 1990s but thought to feed less on birds than the other two species. Four species of novel blood parasites have recently been found in diverse Galapagos bird species, including the yellow warbler (*Setophaga petechial aureola*), the medium

ground finch (*Geospiza fortis*), and the Galapagos penguin (*Spheniscus mendiculus*).

Along with his colleagues, Noah Perlut, Ph.D., associate professor of environmental studies, is working to understand the arrival and transmission of these parasites. They began by exploring if bobolinks, sampled on their North American breeding grounds, carried any of the same four parasite species identified in Galapagos. Given the many thousands of catalogued species, they were surprised to find two of the four known parasite species. Of those two species, one was of North American origin, and the other was of South American origin, demonstrating that bobolinks maintain parasites year-round and from disparate regions. This work suggested that bobolinks may carry the parasites to the Galapagos, where they may be bitten by introduced mosquitos that may then infect resident bird species. However, these samples were from birds far from the Galapagos and from populations unlikely to migrate through the Galapagos. Therefore, the only way to truly understand the transmission process was by sampling bobolinks on the Galapagos.

In October 2015, with two colleagues, Perlut traveled to the Galapagos to try to find and capture migrating bobolinks from which to draw blood samples. Starting with Darwin, records of this species indicate that they stop in the highlands of San Cristobal. However, the project's potential for success was low, given that no one at Galapagos National Park knew where or when the birds could be found.

Perlut and his colleagues spent two weeks searching all of the available habitat in the highlands, walking through grasslands, listening, and attempting to draw out quiet birds by broadcasting bobolink song. Luck was with them, as they found two fields, on opposite sides of the high peaks, where bobolinks stopped and refueled. The researchers caught nine birds with mist-nets. In their field efforts, they encountered about 15 birds; therefore, they likely caught the majority of the birds on the island. The samples are currently being tested for parasites.

Through this ongoing research, the story that Darwin began will continue.



Carnivorous Plants: A Compendium of Most Unusual Species

STEPHEN BURT, M.F.A., ASSOCIATE PROFESSOR OF ARTS AND DEPARTMENT OF CREATIVE AND FINE ARTS CHAIR

PAMELA MORGAN, PH.D., ASSOCIATE PROFESSOR OF ENVIRONMENTAL STUDIES



Night Star Etching

In this artist’s book of imaginary carnivorous plants, the images are presented as if the specimens are real, albeit in an anachronistic style of scientific presentation akin to that of the 19th century, utilizing etchings, hand-set type and artists’ papers. However, they are actually the creative inventions of Stephen Burt, M.F.A., associate professor of arts and Department of Creative and Fine Arts chair, and Pamela Morgan, Ph.D., associate professor of environmental studies. A grant from the College of Arts and Sciences supported, in part, the book’s creation.

Morgan and Burt’s respective disciplines informed each other as the project took

form. Morgan’s in-depth knowledge of botanical structures and lifecycles allowed the artist, Burt, to expand the range of graphic invention in his art. Burt began by reading books on carnivorous plants provided by Morgan and, with that background, executed a series of sketches. From those works, Morgan picked ten that she found most compelling. Next, the two discussed how to refine the images and brainstormed possible descriptions for each plant. David Wolfe of Wolfe Editions in Portland set the type and contributed design expertise.

Commented Burt: “Working with Pam was essential to the success of the project and great fun. She was very knowledgeable, insightful and good-humored — and in a project this long and involved, that humor was crucial! The project would not have been realized without her expertise and thoughtful contributions.”

The project is being exhibited at the following venues:

2015 **Bridgewater State University, Maxwell Library, Bridgewater, MA:** *Scientific Illustrations and Beasties*

2016 **University of Southern Maine, Glickman Library, Portland, ME:** *Sustenance in Artists’ Books*

University of New England, Art Gallery, Portland, ME: *Wonder*

Kick! Punch! Vote!

BRIAN DUFF, PH.D., ASSOCIATE PROFESSOR OF POLITICAL SCIENCE AND DEPARTMENT OF POLITICAL SCIENCE CHAIR

When it came time for Megan Lapointe, ’15 (Political Science) to write her senior thesis, she wanted to do research that would help

solve a political problem close to her heart — improving voter turnout among unmarried women.



Megan Lapointe attending her graduation in May 2015

Lapointe knew that unmarried women could be an important political force. They often have the characteristics of people who participate most readily in voting — college educations, good jobs and children — but they vote much less frequently, especially in “midterm” or non-presidential elections. Since unmarried women strongly favor the Democratic Party, their low turnout has a huge impact on congressional races.

One theory for why unmarried women have a lower voter turnout is that they are just too busy to belong to traditional civic or church groups, which tend to encourage voting. However, Lapointe realized there was one sort of group that many did join — fitness classes. Taking advantage of the fact that she was the instructor for three cardio kickboxing classes and that there was a midterm election during her senior year, she devised an experiment.

Lapointe came up with two treatments (based on voter turnout research) to use in her classes as a way to encourage voting. She left the third class untreated as a control group. After the election, she verified the voting records of her classes at the town hall. She found that her treatments had significant results for both groups — each voted at about twice the rate of the control class.



Using the experiments and follow-up interviews with these women about voting and political ideas, Lapointe’s thesis offers new insights into how to get unmarried women to the polls. Indeed, this research shows how unmarried women can develop their fitness as citizens while they work on their physical fitness.

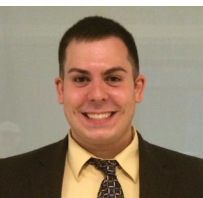
Animal Behavior, Neuroscience and Psychology Students Awarded for Scholarship

GLENN STEVENSON, PH.D., ASSOCIATE PROFESSOR OF PSYCHOLOGY AND NEUROSCIENCE PROGRAM COORDINATOR

Four UNE students won prestigious, national awards or honors this year in recognition of their scholarship.



Jessica Kane
(Animal Behavior, ’16)



Benjamin Katz
(Psychology, ’18)



Kerribeth Szolusha, ’15
(Animal Behavior)



Emily Warner
(Neuroscience, ’16)

Jessica Kane (Animal Behavior, ’17) received honorable mention for the 2015 Barry Goldwater Scholarship, which is awarded to students who demonstrate exemplary work in academics and research related to STEM

(science, technology, engineering or math). Kane was one of only 60 students nationwide to present her research at the Council on Undergraduate Research’s Posters on the Hill event in Washington, D.C. Kane has been working since her freshman year to investigate the effects of environmental contaminants on the behavior of fish in the laboratory of Teresa Dzieveczynski, Ph.D., associate professor of psychology, Undergraduate Research coordinator and Animal Behavior program coordinator.

Benjamin Katz (Psychology, ’17) received an Honorary Undergraduate Scholar (HUS) award from the New England Psychological Association. This award is given to undergraduate students who meet exemplary standards of performance in coursework, research productivity and extracurricular activities. Katz is one of eight college students selected from New England. He has been working in the laboratory of Patricia Long, Ph.D., clinical professor of psychology, Psychology Department chair and Women’s and Gender Studies affiliated faculty, to investigate the development and expression of anxiety in individuals who have sustained traumatic childhood experiences.

Kerribeth Szolusha, ’15 (Neuroscience) received a travel award from the Faculty for Undergraduate Neuroscience (FUN) to attend the Society for Neuroscience meeting in Washington, D.C., in the fall of 2014. Szolusha worked with Michael Burman, Ph.D., associate professor of psychology and Center for Excellence in the Neurosciences K–12 outreach coordinator, to investigate how a molecular inhibitor of cannabinoid metabolism disrupts anxiety-like learning behavior in rats.

Emily Warner (Neuroscience, ’16) received the American Society for Pharmacology and Experimental Therapeutics Summer Undergraduate Research Fellowship (ASPET / SURF) award. Warner was one of only five

college students selected from across the United States to receive this award. Since her freshman year, she has been working in the lab of Glenn Stevenson, Ph.D., associate professor of psychology and Neuroscience program coordinator, to investigate pain/motivation interactions and evaluate the effectiveness and safety of novel delta opioid receptor-binding drugs.

Exploring “Other Lands”

STEVEN BYRD, PH.D., ASSOCIATE PROFESSOR OF SPANISH AND PORTUGUESE AND LATIN AMERICAN STUDIES PROGRAM DIRECTOR

Documenting communities has been at the heart of the research and scholarship that Steven Byrd, Ph.D., associate professor of Spanish and Portuguese and Latin American Studies program director has engaged in since he joined the UNE faculty in 2006. In his first book, *Calunga and the Legacy of an African Language in Brazil* (University of New Mexico Press, 2012), he examined the Afro-Brazilian speech community of Calunga. Byrd’s new book, *Outras Terras: crônicas e ensaios* (Natal, Brazil: Edições Sebo Vermelho, 2015), is a collection of travel essays written in Portuguese, showcasing his encounters with Brazilian and Portuguese culture as well as with other lands and peoples of Latin America.



Castle of Braga

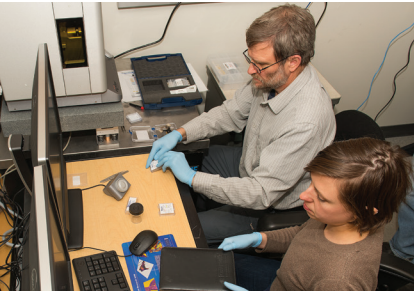


Interestingly, the selections in *Outras Terras* (Portuguese for “Other Lands”) began as a series of writing exercises during his time living and studying in Brazil. As a graduate exchange student at the Federal University of Minas Gerais in Belo Horizonte, Byrd became fascinated with the genre of the *crônica* (“chronicle”), a type of popular, concise literary essay. To practice his Portuguese, he began writing *crônicas* about memorable people and adventures in Brazil. In 2002, he published his first one, “Arroz com Feijão” (“Rice and Beans”), in the Belo Horizonte newspaper Estado de Minas. From then on, he continued documenting his travel experiences in Portuguese until he had compiled a collection, which publishing house Edições Sebo Vermelho accepted.



Farm in Brazil

When asked why he chose to write in Portuguese in an August 14, 2015 interview with the Natal, Brazil newspaper, *Novo Jornal*, Byrd noted that it is a language of historical and literary importance. *Outras Terras*, he hopes, will encourage people in the United States to learn Portuguese or travel to countries like Brazil and Portugal. And, for native speakers of Portuguese, he wishes to illuminate the cultures he experienced from the perspective of someone hailing from another land.



Jamie Vesenka, Ph.D., and Eva Balog, Ph.D., preparing to view two DNA samples with an atomic force microscope.

Powerful Biomaterials Characterization Tool Comes to UNE

EVA ROSE M. BALOG, PH.D., ASSISTANT PROFESSOR OF CHEMISTRY

The “nanoscale” refers to what goes on at the scale of billionths of a meter — about 90,000 times smaller than the width of a human hair. This is the scale of molecules, like DNA strands and individual protein machines. Faculty in the Department of Chemistry and Physics and the Department of Marine Sciences were recently awarded a grant from the National Science Foundation (NSF) for the purchase of a state-of-the-art environmental atomic force microscope (AFM), an extremely versatile, high-speed, high-resolution instrument, for decoding and manipulating materials, processes and forces at the nanoscale.

The Asylum Cypher ES AFM is powerful enough to create an image of the actual double helix of DNA. The device can sense a variety of nanoscopic phenomena through the use of specialized probes and can characterize mechanical properties depending on how materials respond to the AFM probe.

The award was the product of teamwork involving Eva Rose Balog, assistant professor of

chemistry, James Vesenka, Ph.D., professor of physics and Microscope Core Facility director, and Joseph Kunkel, Ph.D., research professor of marine science, as well as investigators from the University of Maine, Orono, and the Bigelow Laboratory for Ocean Sciences in Boothbay, Maine. They will use the AFM to explore a diverse array of research topics, including microbial biofilm and sheath formation, protein and polymer nanomaterials, self-assembling DNA nanostructures, and the architecture and composition of mineralized cuticle from the American lobster (*Homarus americanus*).

The instrument will be housed in the Pickus Center for Biomedical Research on UNE’s Biddeford Campus, where students, faculty and staff will be able to receive training on this cutting edge technology and use the instrument in conducting research. Initial installation and training took place in January 2016, and the new AFM has already begun to inspire new collaborative research projects, both within the University and beyond.

Human Impacts on Salt Marshes

GREG ZOGG, PH.D., ASSOCIATE PROFESSOR OF BIOLOGY

STEVEN TRAVIS, PH.D., PROFESSOR OF BIOLOGY



Rene Legault and Jeremy Lessard amidst the fast-growing invasive plant Phragmites.



Salt marshes play an important role in the ecology of Maine’s coast. For example, salt marshes serve as fish nurseries and bird feeding grounds. Salt marshes also help control erosion, provide protection from storm surges and serve as sinks for rising atmospheric CO₂. However, salt marshes and the ecosystem services that they provide are at risk from a variety of human-caused (anthropogenic) stressors, including grazing by the introduced snail, the common periwinkle (*Littorina littorea*), nutrient additions from upland activities, global warming and competition from the invasive common reed (*Phragmites australis*).

It has long been recognized that plant species diversity can help ecosystems cope with anthropogenic threats, but what about systems like salt marshes that are often dominated by just one plant species? Steven Travis, Ph.D., professor of biology, and Greg Zogg, Ph.D., associate professor of biology, think that the answer lies in genetic diversity. This past summer, Jeremy Lessard (Environmental Science, ’16), Eric Scouten (Environmental Science, ’16), and Rene Legault, B.S., ’10, (M.S. Biological Sciences, ’16) received funding to explore these ideas at UNE’s Marine Science Center.

Preliminary results from Lessard’s study indicate that the more genetically diverse native salt marsh cordgrass (*Spartina alterniflora*) is better able to compete with the invasive plant. Similarly, early data from Scouten’s study suggests that higher genetic diversity enables cordgrass to better respond to herbivory and nutrient additions. Finally, Legault’s study is exploring how both nutrients and global warming alter competitive interactions between native cordgrass and the common reed (*Phragmites australis*).

The early results from these ongoing student projects, combined with prior work by Travis and Zogg, demonstrate the synergistic effects of genetic diversity and anthropogenic

stressors on salt marsh health and can be used to improve conservation efforts. For instance, they show the benefits of utilizing plant stock from a variety of sources to enhance genetic diversity during marsh restoration efforts.

In Defense of Self-Love: The Romantically Rejected Narcissist

JULIE LONGUA PETERSON, PH.D., ASSISTANT PROFESSOR OF PSYCHOLOGY AND WOMEN’S AND GENDER STUDIES PROGRAM DIRECTOR

Given that humans have a fundamental need for social connections, it should be no surprise that individuals use romantic relationships to satisfy their desires for belonging. Unfortunately, negative romantic interactions and failed romantic connections are commonplace, and, as American society grows increasingly narcissistic, it has become important to understand how this type of excessive self-love influences the ways in which people respond to romantic rejection.



Julie Longua Peterson, Ph.D., and her lab team discuss research findings during a lab meeting

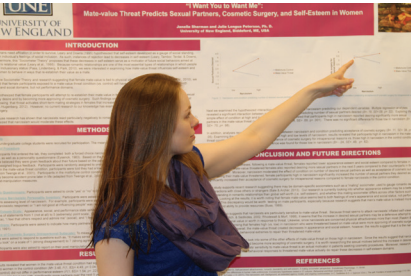
Over the past year, Julie Longua Peterson, Ph.D., assistant professor of psychology and director of the Women’s and Gender Studies program, and her team of undergraduate research assistants have been studying the

romantically rejected narcissist. Peterson’s team includes Janelle Sherman (Psychology and English, ’16), Jill Casazza (Psychology, ’16), Alyssa Mazzariello (Psychology, ’16), Allison Symonds (Psychology, ’18), and Lacey Durkee (Psychology, ’18).

Peterson’s research suggests that when narcissists are hurt by their current romantic partners, they engage in behaviors such as criticizing and name-calling that help the narcissist maintain feelings of superiority over the partner and perpetuate a game-playing style of love (Peterson & DeHart, 2014). In addition, Peterson and research assistants Sherman and Casazza have been conducting a set of studies to explore what happens to narcissists when prospective romantic partners reject them. That is, how do narcissists respond to feedback that threatens their potential for future romantic relationships?

Results from these studies indicate that narcissists, more commonly than non-narcissists, respond to such threats by becoming more approving of cosmetic surgery and non-committal sex, suggesting that the rejected narcissist is willing to go to behavioral extremes to repair his or her feelings of self-worth and relational value.

While previous research has highlighted the value of defending against romantic rejection, Peterson and her lab team have found that, for narcissists, resisting doubts about one’s romantic value is truly a defense of self-love. Over time, narcissists’ love lives will surely suffer the consequences of this dynamic.



Undergraduate Janelle Sherman presenting research on narcissism and romantic rejection.



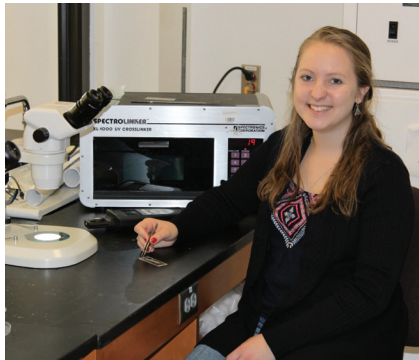
A New Community of Graduate Students

JENNIFER MALON, M.S., M.P.H., PROGRAM COORDINATOR, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

KATHRYN ONO, PH.D., GRADUATE COORDINATOR, DEPARTMENT OF MARINE SCIENCES

GEOFFREY GANTER, PH.D., PROFESSOR OF BIOLOGY

The research conducted by UNE undergraduates is an integral component of their learning experience. To help foster such knowledge, UNE students in the College of Arts and Sciences' Biology and Marine Sciences departments can extend their undergraduate research into master's programs.



Master's student Kayla Gjelsvik at the research bench in the Ganter Lab

These departments offer 4+1 tracks, which enable students to complete a master's degree in one additional year, instead of the traditional two. The program requires students to develop a productive research project as an undergraduate. Then, once they enroll in the program during their senior year, the students can take classes that will count toward the 36 graduate credits required for their master's degree.



Aidan McParland, '15 (Medical Biology) is working on his masters in Biology with a neuroscience concentration, in the Ganter Lab.

This fall, the Department of Biology enrolled the first students in the 4+1 program: Kayla Gjelsvik, B.S., '15 and Aidan McParland, B.S., '15. They are both completing their graduate level year in the laboratory of Geoffrey Ganter, Ph.D., professor of biology and faculty member in the Center for Excellence in the Neurosciences. Gjelsvik and McParland entered Ganter's lab as undergraduates and have been working on research projects investigating pain sensitization using a fruit fly model.



Senior Marine Science student Gwen Pelletier, working in the Frederick Lab

Support for completing their master's degrees is provided by an Institutional Development Award (IDeA) from the National Institutes of Health (NIH) for a

Center of Biomedical Research Excellence to study chronic pain. The IDeA program builds research capacities in states that historically have had low levels of NIH funding by supporting basic, clinical and translational research; faculty development; and infrastructure improvements.



Kayla Gjelsvik, Geoff Ganter, Ph.D., and Aidan McParland

To enter the 4+1 program, a student must have a GPA of 3.5 or higher from UNE's undergraduate program in Biological or Marine Sciences. A student must also receive sponsorship from a faculty member in these departments. As in the traditional master's program, these students are required to write and defend a thesis.

The College of Arts and Sciences' traditional two-year master's programs in Biological Sciences and Marine Sciences not only enroll students who have completed their undergraduate work at UNE but admit those who have earned their undergraduate degrees from other universities across the country as well.



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**CLINICAL APPLICATION
OF S-PRG FILLER CONTAINING
NEW ENDODONTIC MATERIAL:**

In Vitro Study using Human Extracted Teeth

Dental students practicing to prep a tooth for a procedure before treating living patients

TAKASHI KOMABAYASHI, D.D.S., M.DENT.SC, PH.D., CLINICAL PROFESSOR, COLLEGE OF DENTAL MEDICINE



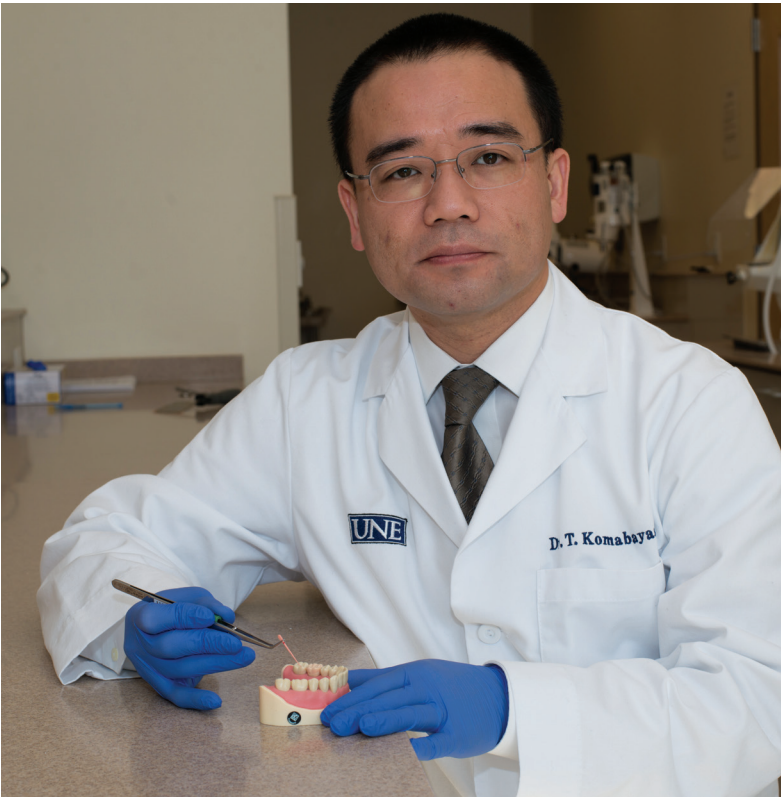
UNE's Oral Health Center

Endodontics is a specialty in dental medicine that addresses structures within the tooth (“endo” = “inside;” “dont” = “tooth”). There are approximately 22 million root canal treatments rendered each year in the United States by endodontists and general dentists. Several million of these cases fail due to the reoccurrence of symptoms (pain or infection as seen on the radiograph). Microbes and microbial products are the main cause of pain and infection in the root of the tooth (pulp). While it is impossible to completely eliminate microbes in all cases, endodontists and dentists use a variety of methods including instrumentation, irrigation and intracanal medication to significantly reduce the population of microorganisms inside the root canal.

In theory, a root canal-filling material with antibacterial properties would reduce or eradicate any remaining microorganisms and greatly reduce the chance of a subsequent infection. Currently there are no commercially available canal-filling products that have excellent antibacterial properties.

The current standard of practice for a root canal procedure is the administration of local anesthesia to numb the area being treated followed by the isolation of the tooth using a thin sheet of rubber or vinyl to keep the area sterile. The dentist drills a hole through the enamel and dentin of the biting surface. Any diseased or dead tissue in the root canal is removed; the area is disinfected; and the hole is filled with a canal-filling material called gutta-percha. The gutta-percha is used in combination with a sealer to help the filling adhere to the tooth.

Research by Takashi Komabayashi, D.D.S., M.Dent.Sc, Ph.D., clinical professor in the College of Dental Medicine, will determine if the use of a sealer with antibacterial properties will reduce microorganisms



Takashi Komabayashi, D.D.S., with a model of lower human teeth.

that cause infection. A filler component of the proposed sealer in question has been successfully used as a filling product for dental cavities. Known as a dental composite resin, the filler is a special glass-ionomer (S-PRG) and was patented in 2003 (U.S. Patent 6,620,861). S-PRG's antibacterial properties are attributed to its ability to release multiple ions, including boron, fluoride, silicate, and strontium in bovine (cow) incisors. To date, no clinical studies in humans have been reported using S-PRG as a sealer in root canal procedures.



Third-year dental medicine students being guided through a simulated procedure

The study proposed by Komabayashi and conducted by UNE dental students will use an innovative procedure involving extracted human teeth. After performing a root canal procedure on the extracted teeth, the students will apply S-PRG as a sealer. They will then evaluate the structure of the teeth using digital radiographs (X-rays) and micro-CT (a three



A sample of the sealer with possible antibacterial properties, S-PRG.

dimensional X-ray). They will use a spectrometer to measure the ion releasing properties of S-PRG, and the potential antibacterial properties will be compared with other commercially available sealers. The project is expected to run for two years and is funded in part by the S-PRG manufacturing company SHOFU Dental Corporation.



Inaugural dental medicine students Brian Cicero and Isha Gandhi with Assistant Clinical Professor Michael Truscott, D.M.D., in the Oral Health Center.

UNE students awarded \$5,000 in cancer research grants

SARAH DELAGE, B.S., COMMUNICATIONS SPECIALIST

CDM

Three groups of students from the University of New England’s Westbrook College of Health Professions and College of Dental Medicine were recently awarded grants totaling \$5,000 from the Northern New England Clinical Oncological Society (NNECOS) to study various aspects of cancer treatment.

Physical Therapy

Eight students from UNE’s Doctor of Physical Therapy Class of 2016 received \$1,500 from the NNECOS for their student-led project, “A review of screening processes for physical distress and appropriate outcome measures for outpatient rehabilitation referral in cancer survivorship.” Through this project, students aim to address the physical and emotional hardships associated with cancer and cancer treatments.

The American College of Surgeons Commission on Cancer recently mandated that accredited community cancer programs across the country screen patients for distress. Aligning with the new goals of the Maine Comprehensive Cancer Control Plan, UNE students will work to find the most appropriate physical distress screening tools that will assist clinicians in determining when a referral is needed for wellness and/or rehabilitation services. They will also identify appropriate outcome measures to help determine when an oncology rehabilitation referral is indicated in outpatient cancer survivors.

Students will complete this project as part of their regular course work under the guidance of Professors Jeff Nevers, M.A., and Mike Sheldon Ph.D., P.T. Professor Amy Litterini, D.P.T., P.T., will advise on the effort, in collaboration with colleagues from Central Maine Medical Center and the Patrick Dempsey Center for Hope and Healing.

Health, Wellness and Occupational Studies/ Medical Biology

Three undergraduate students from the Class of 2017, majoring in Health, Wellness and Occupational Studies and Medical Biology, were awarded a \$2,500 grant for their project, “Improving the treatment of

cancer-related pain through interprofessional education and patient engagement.”

This project focuses on improving treatment for cancer patients and survivors who suffer from pain associated with the disease itself or with disease treatments, such as chemotherapy. Recent studies show that half of all cancer patients experience pain throughout all stages of cancer. According to research, this population has been undertreated, with nearly 50 percent receiving inadequate care for their pain. This student project aims to better prepare and inform future health professionals and current practitioners to work with this population of cancer patients and survivors.

Students will create three interprofessional video narratives and case studies displaying the impact of pain on the patient. These educational materials will be utilized in classroom settings and will be available to the public.

“By better preparing students for the treatment and management of cancer-related pain, we hope for there to be better patient outcomes,” said Morgan Mitchell, (’17). “Pain can greatly impact an individual’s quality of life, and quality care is important for restoring health and returning to normalcy.”

“Pain can greatly impact an individual’s quality of life, and quality care is important for restoring health and returning to normalcy.”

— Morgan Mitchell

CDM



Dental Medicine Class of 2017 students Vidusha Gupta, Riddhi Daftary, Jessfor Baugh, Anh Tran and Dorothy Cataldo.



D.P.T. Class of 2016 students Matt Denning, Alyssa Grigware, Mary Leopold, Erika Lopez, Ashley Tomaswick, Sebastian Stotzfus, Maggie Masiak and Samantha Fisk.



Class of 2017 students Sam Shepard (Medical Biology), Morgan Mitchell (Health, Wellness, and Occupational Studies) and Katherine Roy (Medical Biology) received a \$5,000 award to study the treatment of cancer-related chronic pain under the guidance of Ed Bilsky, Ph.D.

College of Dental Medicine

Students from UNE’s College of Dental Medicine received \$1,000 for their project, “The current dental and interprofessional management of geriatric patients undergoing head and neck cancer treatment in nursing homes in the U.S.: Literature review.” This student work is a response to the high rate of head and neck squamous cell carcinoma, the sixth most common cancer worldwide. Due to the risk factors associated with this disease, it is essential to develop a dental approach toward interprofessional management, treatment planning and rehabilitation for individuals undergoing cancer therapies.

This research literature review focuses on pre-surgery oral hygiene instructions, pre-radiology/chemotherapy dental clearance, dental complications and management during-radiology/chemotherapy, post-radiology/chemotherapy oral health care and adjunctive health care. By reviewing these areas, students seek to affirm the importance of a thorough evaluation process in regards to understanding the overall assessment and safe management practices for patients undergoing oncology treatment. Students also aim to establish guidelines for nursing home health care teams in relation to oral health care and interprofessional collaboration for cancer patients.

Lori Aubrey, executive director for the Northern New England Clinical Oncology Society, was impressed with the grant submissions from UNE students. “NNECOS is delighted to fund these student-led clinical research projects, engaging health care students in meaningful study and exposing them to oncology professionals from across the region,” Aubrey said. “The reviewers were very pleased with the quality of the UNE submissions and were confident in each of the proposals to produce meaningful outcomes from their projects. We look forward to applications in the future to continue to support the great efforts and innovative ideas that come from student-led work.”

EXPLORING THE LINK BETWEEN MOOD AND METABOLISM

Getting to the Heart of the Matter

KAREN L. HOUSEKNECHT, PH.D., PROFESSOR OF PHARMACOLOGY



Karen L. Houseknecht, Ph.D., professor of pharmacology, has long been fascinated by the fact that mood and metabolism appear to be intrinsically linked... but which “drives” the other? Do people’s moods determine their metabolism, or does their metabolic status direct their moods? Trained in the area of diabetes/metabolic disease biology and pharmacology, Houseknecht has spent more than 20 years studying this relationship in both academic and corporate settings.

Houseknecht and her collaborators use genetic, physiological, nutritional and pharmacological approaches to explore the complex interplay between the central regulation of mood and the central and peripheral regulation of energy metabolism. She uses human clinical data to inform basic research in the lab, addressing clinically relevant questions.

“We know that obese and diabetic patients are two-to-three times more likely to suffer from depression,” Houseknecht explained. “We also know that heart disease is highly correlated with depression in patients. Patients with serious mood disorders such as schizophrenia, bipolar disorder, PTSD and depression are two-to-four times more likely to suffer from diabetes and cardiovascular disease. Additionally, data are emerging that highly prescribed medications used to treat mood disorders, including

antipsychotics and antidepressants, have significant endocrine and metabolic disrupting effects that can elevate the incidence of obesity, diabetes and bone loss. We believe that there must be underlying, unifying mechanisms to explain these associated disorders.”

While leading a diabetes drug discovery team at Pfizer, Inc., Houseknecht first reported that a single, clinically relevant dose of several atypical antipsychotic medications caused profound, whole-body insulin resistance, prior to the development of obesity (a

“We believe that there must be underlying, unifying mechanisms to explain these associated disorders.”
— Karen L. Houseknecht

known side effect of these medications). Currently, Houseknecht is the principal investigator on a four-year National Institutes of Health R01 grant focused on understanding the mechanisms underlying bone loss and energy dysregulation associated with risperidone, an antipsychotic drug.

In collaboration with bone experts Clifford Rosen, M.D., and Katherine Motyl, Ph.D., both from Maine Medical Center Research Institute in Scarborough,

Houseknecht has shown that risperidone treatment causes rapid bone loss that can be prevented, at least in part, by co-treatment with the beta-blocker drug, propranolol. Houseknecht believes that these drug effects are both indirect, via dysregulation of the sympathetic nervous system, and direct, via modulation of molecules such as dopamine and serotonin. Little is known about the regulation of the biology of peripheral tissues such as bone by dopamine and serotonin, the functions of which are altered by many psychiatric medications. Thus, Houseknecht and her collaborators are discovering new knowledge about the interplay between the brain, bone and metabolism.

A new focus in the Houseknecht Lab is to explore the link between mood and the heart — specifically the link between medications used to treat mood disorders and incidence of cardiac disease. Houseknecht hypothesizes that antipsychotic drugs, which are known to cause obesity and Type 2 diabetes in many patients, might also be setting the heart on a “fast track” to cardiac disease.

To address this challenge, Megan Beauchemin, Ph.D., has joined the Houseknecht Lab as a postdoctoral research fellow. Beauchemin’s doctoral research focused on the role of microRNAs in cardiac regeneration, using the zebrafish as a model.

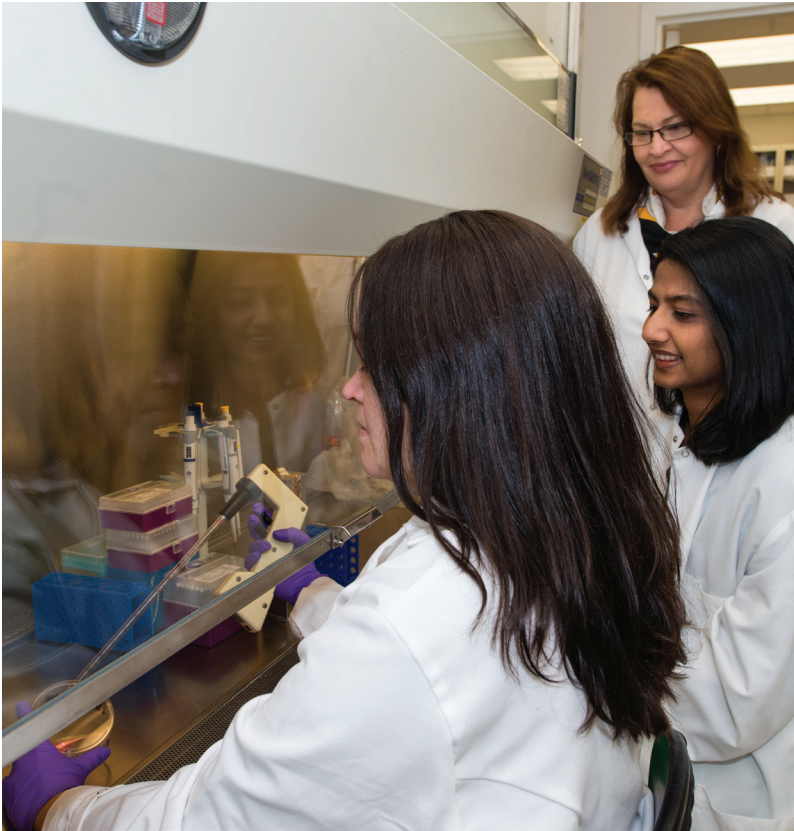
“Complex, patient-centered questions require interdisciplinary approaches. We’re learning a lot from each other.” — Karen L. Houseknecht

MicroRNAs are short, noncoding RNAs that serve as powerful post-transcriptional regulators of gene expression. Several microRNAs are known to be associated with cardiac injury and disease. Houseknecht and Beauchemin are seeking to determine whether microRNAs are regulated by antipsychotic medications to induce arrhythmia, insulin resistance and cardiac disease in patients. Amy Davidoff, Ph.D., professor of biomedical sciences and Histology and Imaging Core facility director, an expert in diabetic cardiomyopathy, has joined this collaborative team to help fine-tune the research strategy focused on addressing drug-induced and mood-induced cardiac disease.

Houseknecht is excited to expand the research team to include medical students interested in translational research, including Anisha Contractor (COM, '18), and experts in cardiac dysfunction and zebrafish models. “Complex, patient-centered questions require interdisciplinary approaches,” Houseknecht reflected, “We’re learning a lot from each other.”



HOUSEKNECHT CARDIAC COLLABORATION TEAM: (left to right) Amy Davidoff, Ph.D., professor in COM; Anisha Contractor (COM, '18); Megan Beauchemin, Ph.D., post-doctoral research associate; Karen L. Houseknecht, Ph.D., professor in COM



Megan Beauchemin, Ph.D., and Anisha Contractor (COM, '18) conducting an experiment to evaluate the effects of psychiatric drugs on osteoblast (bone cells) growth and development



The Houseknecht Lab focuses on the drug Risperdal, the brand name of risperidone.

Posterior Approach to Kidney Dissection: An Old Surgical Approach for Integrated Medical Curricula

FRANK DALY, PH.D., ASSOCIATE PROFESSOR OF BIOMEDICAL SCIENCES



Frank Daly, Ph.D., associate professor of biomedical sciences

There is a shift in medical education, moving away from discipline-based foundational courses to systems-based integrated courses that include both basic sciences and clinical education. One of the problems with this shift is that it places the emphasis on clinical scenarios in which multiple systems interact, often in very different anatomical locations.

The University of New England College of Osteopathic Medicine teaches the respiratory, cardiac and urinary systems in a coordinated timeframe, prior to teaching about the gastrointestinal system. This poses a problem during anatomy dissections because, unfortunately, the kidneys are located in the abdomen, behind the digestive system. Students need access to the posterior abdomen before they have worked through the anterior abdominal wall and peritoneal cavity contents.

Therefore, the students use a nephrologist’s surgical approach to kidney removal to preserve the gastrointestinal abdominal contents while still allowing for the study of the renal system. Luckily, instructors have been given the flexibility to include back musculature as part of the educational block in which students study the urinary system. After dissection of the back, students remove the posterior

muscles to expose the inferior ribs. From there, simple removal of the inferior rib and peri-renal fat exposes the kidney and ureters for study. With this approach, it is possible to maintain the integrity of the peritoneal cavity for future gastrointestinal system work. Unfortunately, the urinary bladder cannot be accessed, so instructors must wait to teach the inferior parts of the urinary system until students open the abdominopelvic cavity.

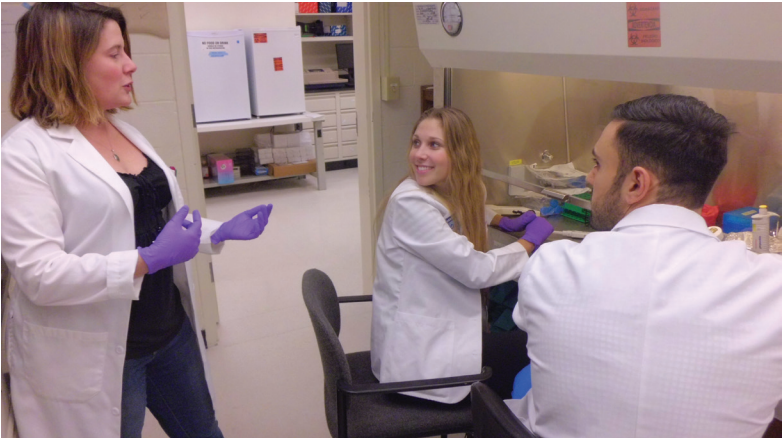
This process exposes medical students to a historical procedure that is no longer used, showing them how this surgery had to be done prior to the laparoscopic surgeries of today. It helps them appreciate the improvements and efficiencies that have been made in medicine. It also emphasizes the integration of the systems so that students can build strong connections between structure, function and dysfunction in a time-efficient manner. These lessons should stay with them throughout their careers.



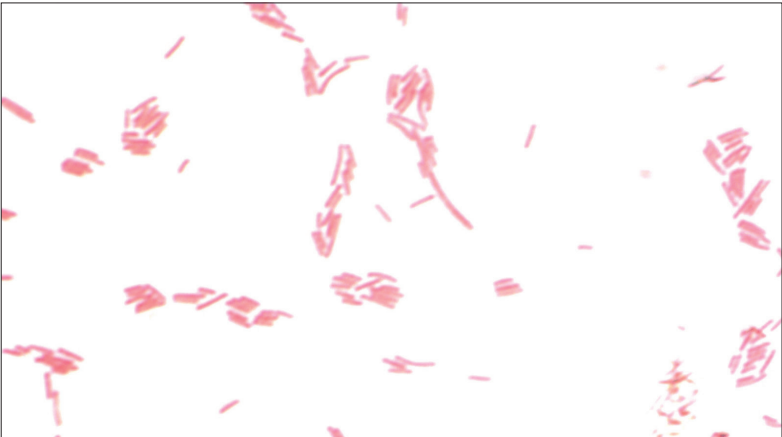
Starting in August 2016, first-year osteopathic medical students will gain experience using ultrasound in their Osteopathic Clinical Skills courses, utilizing the newest imaging techniques to view abdominal structures, including kidneys.

Students Help Discover New Species of *Legionella* Bacteria

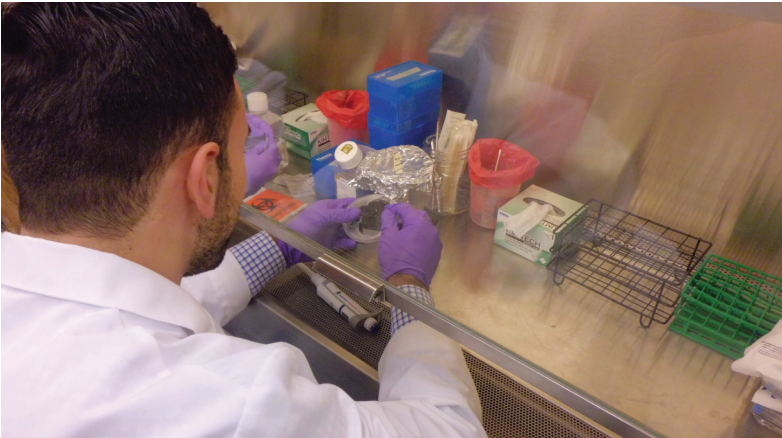
MEGHAN MAY, PH.D., ASSOCIATE PROFESSOR OF BIOMEDICAL SCIENCES



Meghan May, Ph.D., teaching COM Class of 2018 students Linsey Barker and Hugo Raposo how *Legionella* bacteria are collected and utilized in research



The new bacterial species *Legionella indianapolisensis*, found in a lung abscess of a patient with pneumonia, magnified 1,000 times



Hugo Raposo (COM, '18) preparing to look at a sample of the new species *Legionella indianapolisensis* by first removing the Parafilm seal

The latter half of 2015 was rife with news stories concerning a respiratory illness called Legionnaires’ disease after cases began appearing in New York City in late July. The infection is caused by an unusual bacterial species called *Legionella pneumophila*, which hospital laboratories have become quite skilled at diagnosing. This was not always the case because the organism is very difficult to grow in culture. Thankfully, though, cutting-edge molecular biology techniques have made diagnosing Legionnaires’ disease much easier. These developments have also allowed for the detection of new infectious diseases that were previously mistaken for Legionnaires’ disease.

A recent project in the laboratory of Meghan May, Ph.D., associate professor of biomedical sciences, was initiated when the lab received a culture from a lung abscess. The patient of origin was admitted to the hospital with shortness of breath, chest pain on one side and fever, symptoms — very consistent with Legionnaires’ disease and other types of pneumonia. A specimen from the patient’s lung appeared to contain bacterial cells that were similar to *Legionella pneumophila* but were not being recognized by the new diagnostic tests. Hugo Raposo (COM, '18) and Linsey Barker (COM, '18) undertook the task of performing DNA sequencing to identify the mystery organism.

Within a few days, the mystery was solved; the bacterium causing the patient’s lung abscess was a brand-new, previously unrecognized species belonging to the genus *Legionella*. In accordance with convention for these organisms, the new bacterium was given a name stemming from its geographic origin, *Legionella indianapolisensis*.

The patient was treated with antibiotics and made a full recovery. The status of *L. indianapolisensis* as a recognized bacterial species is pending its publication and review within the coming months by the International Committee for the Systematics of Prokaryotes.

CONNECTING WITH COMMUNITY

JIM PEAK, B.S., EDITORIAL ASSISTANT,
AMERICAN JOURNAL OF PHARMACEUTICAL EDUCATION





The University of New England College of Pharmacy building.

Scholarship is at the heart of any university or college, and it is the lifeblood of the University of New England College of Pharmacy's efforts to grow and sustain relationships, not only with its diverse student body but also with the greater Portland community, Maine and beyond.

to businesses, other health care professionals, the government and advocates for changes in pharmacy practice.

“Scholarship is essential to who we are.”

— Gayle Brazeau

“Scholarship is essential to who we are,” commented Gayle Brazeau, Ph.D., dean of the College of Pharmacy.

According to Brazeau, the College's prime directive is to promote a learning environment that fosters intellectual curiosity among students, faculty and staff — in its classrooms, in its research laboratories, in pharmacy practice settings and in the community at large.

This intellectual curiosity is leading to new ideas and new ways of doing things, advancing the practice of pharmacy, enhancing how faculty teach and improving how graduates provide care to patients. It is also cultivating ties

“At the College of Pharmacy, we are always asking ‘why’ and trying to advance our efforts as educators, practitioners, researchers, professionals and citizens of the community.”

— Gayle Brazeau

“At the College of Pharmacy, we are always asking ‘why’ and trying to advance our efforts as educators, practitioners, researchers, professionals and citizens of the community,” Brazeau explained.

The growing body of students at the College, which admitted its first class and opened its beautiful LEED-certified building on UNE's Portland Campus in the fall of 2009, is playing a key role in establishing these connections.

“We are admitting students who are passionate about learning and taking care of their patients and families,” Brazeau said. “But we are also looking for students who are passionate about serving the communities where they work, live and practice. We want to instill in our students the desire and passion to be intellectually curious.”

Whether teaching pharmacy students critical thinking and problem solving skills or engaging with students through innovative research, mentoring, outreach and advocacy, UNE's College of Pharmacy is building a better community at multiple levels.

“UNE offers vast educational opportunities thorough research, academic programs, community-service projects and patient-care

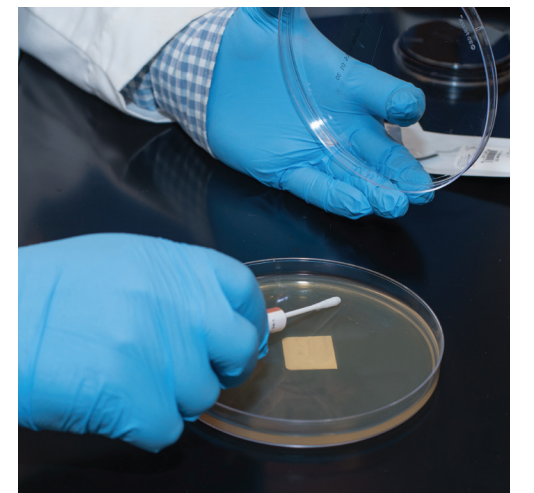
“We are admitting students who are passionate about learning and taking care of their patients and families. But we are also looking for students who are passionate about serving the communities where they work, live and practice. We want to instill in our students the desire and passion to be intellectually curious.”

— Gayle Brazeau

“Through these opportunities, the UNE College of Pharmacy prepares student pharmacists to provide compassionate, patient-centered care as members of their community.”

— Woori Kim

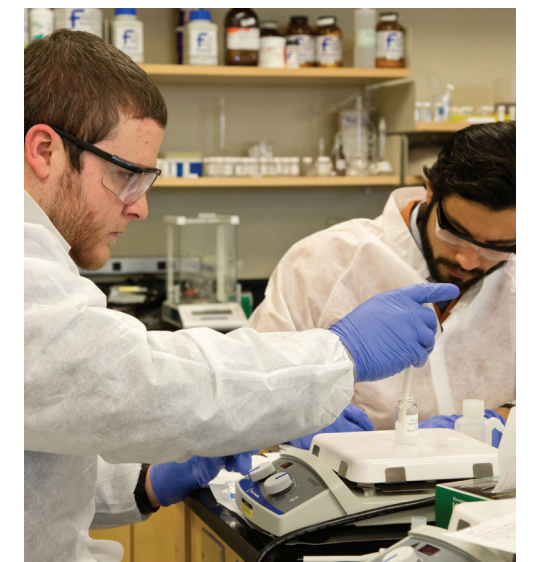
programs to provide each student with the necessary tools to become a competent pharmacist,” said Woori Kim (Pharmacy, '17). “Through these opportunities, the UNE College of Pharmacy prepares student pharmacists to provide compassionate, patient-centered care as members of their community.”



George Allen establishing a bacterial culture in order to assess the viability of a new diagnostic tool, the Puritan Opti-Swab



First-year doctor of pharmacy students, Christopher Stanton and Andres Solinano, perform laboratory experiments in the Pharmaceutics Lab taught by Kimberly Cripps B.S., director of Pharmacy Teaching Laboratories.



Third-year pharmacy students Christ Stanton and Andres Sedano engaged in a Therapeutics class taught by Matt Lacroix, Pharm. D.

Patients in medically underserved communities in Maine, a largely rural state with an uneven distribution of physicians, would gain improved access to health care if legislation pending in the U.S. House and Senate passes. Companion bills in the U.S. House and Senate, HR592 and S314, would amend Title XVIII of the Social Security Act, giving patients access to and payment for Medicare Part B services by state-licensed pharmacists.

Kenneth McCall, Pharm.D., associate professor of pharmacy practice and Professional and Alumni Affairs coordinator, is leading the College of Pharmacy's advocacy initiative for the passage of this legislation. McCall's efforts have included writing letters to and attending meetings with members of the state's delegation. Pharmacy students, including Nicole Chasse, '15 (Pharmacy), are assisting him.

"I was in Washington, D.C., the very day legislation was introduced on the floor of the U.S. House of Representatives in 2014," McCall said. "By participating in the NACDS RxImpact event on Capitol Hill, we were able to hit the ground running and make congressional visits to advocate for this bill on day one."

McCall thinks students and pharmacists have an essential role to play in urging the passage of this legislation. "There's never been a more ideal time for the profession of pharmacy to stand together in a

unified voice," he said. "Now is the time for pharmacists and student pharmacists to advocate for HR592 and S314. You don't have to go to Washington, D.C., to advocate with your congressional representatives. You can send a letter, make a phone call or visit their district office. It's as easy as sending an email or picking up the phone."

The prospective legislation, coupled with the medication expertise and community accessibility of pharmacists throughout Maine, would empower pharmacists to build partnerships with health care teams across the state to optimize patient outcomes. McCall elaborated on the benefits, explaining, "This bill increases access to cost-effective services such as medication therapy management and immunizations provided by pharmacists in medically underserved areas. The lack of pharmacists' recognition as providers limits their ability to provide services they are qualified to perform and presents a barrier to care. Ultimately, we are taking a stand for better health care. By supporting this legislation, we're advocating for improved access to health care services and improved health care quality."

Thanks, in part, to the leadership of McCall and UNE pharmacy students, the pharmacy profession has never been closer to achieving provider status.



Kenneth McCall, Pharm.D., Congresswoman Chellie Penigree and Nicole Chasse, '15 (Pharmacy)



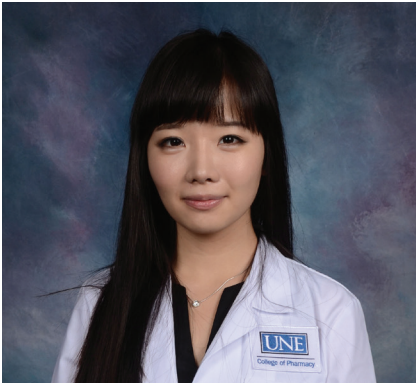
Kenneth McCall, Erin Kany, Stephanie Lewis and Minh Pham of UNE stand with members of the Maine Pharmacy Association. The group met with legislators to advocate for the "Pharmacy and Medically underserved Areas Enhancement Act."

UNE Student Helps Maine Company Expand Product Line

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

JIM PEAK, B.S., EDITORIAL ASSISTANT, AMERICAN JOURNAL OF PHARMACEUTICAL EDUCATION

Protocols that once took days of lab work can now can be completed in a matter of hours, thanks in large part to the evolving field of DNA testing but also because of better products for collecting, storing and transporting clinical samples. One of these tools for collecting, storing and transporting clinical samples was developed in Maine and tested at the University of New England.



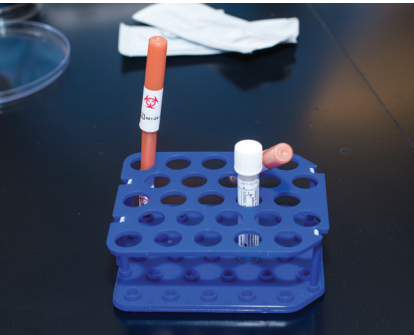
Woori Kim (Pharmacy, '17)

This past year, Woori Kim (Pharmacy, '17), with the assistance of two College of Pharmacy faculty members, completed a study confirming the viability of a diagnostic tool manufactured by Puritan Medical Products of Guilford. The ability to precisely identify and quantify pathogens using DNA testing is prompting companies such as Puritan to develop ever more effective

diagnostic tools. Mehdi Karamchi, Ph.D., senior vice president of Scientific Affairs at Puritan, invited researchers at the College to assess a liquid amines collection and transport system called Opti-Swabtm.

Kim worked with Daniel Brazeau, Ph.D., research associate professor of pharmaceutical sciences and Genomics, Analytics and Proteomics Core director, who supervised her work, and George Allen, Ph.D., associate professor of pharmacy practice and Department of Pharmacy Practice chair, who cultured a bacterium for testing. Kim's objective was to assess how well bacterial DNA could be detected after samples were taken and stored with Opti-Swabtm. She measured concentrations of the bacteria *Bordetella pertussis*, which causes the infection commonly known as whooping cough. The results of her study indicated that Puritan's diagnostic tool was a suitable method for collecting, storing and transporting samples to a laboratory for testing.

In May, Kim attended the American Society of Microbiology Conference in New Orleans, where she presented her findings. "I feel blessed to have been given the opportunity to do research with Dr. Brazeau and to represent UNE at the conference," Kim said. "It was an inspiring experience to present my findings and network with students, pharmacists and doctors from throughout the world."



ATCC cells and Puritan transport system

Pharmacy Students Benefit from Community Partnership

LESLIE OCHS, PHARM.D., PH.D., ASSISTANT PROFESSOR OF PHARMACY PRACTICE

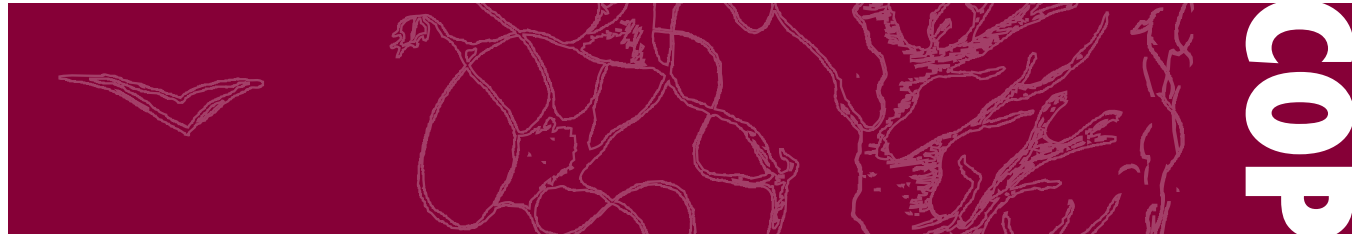
JIM PEAK, B.S., EDITORIAL ASSISTANT, AMERICAN JOURNAL OF PHARMACEUTICAL EDUCATION

College of Pharmacy students learn valuable skills and gain real world experiences through community partnerships. A health outcomes course developed by Leslie Ochs, Pharm.D., Ph.D., assistant professor of pharmacy practice, exemplifies this interactive learning model.

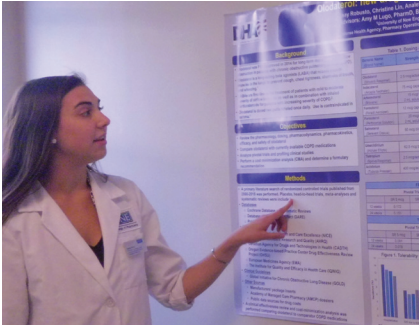
Ochs teamed with Amy Lugo, Pharm.D., BCPS, BC-ADM, FAPhA, clinical pharmacy specialist with the Defense Health Agency Pharmacy Operations Division, Formulary Management Branch, to present lectures on the pharmacoeconomic principles in drug formulary decision-making.

Ochs and Lugo co-presented, delivering lectures via video conferencing. Students could review class lectures ahead of time and were assigned required readings. The course utilized interactive polling software (through cell phone texting technology) to reiterate key points, engage students and create an interactive learning environment.

As a part of the course, student teams were assigned newly FDA-approved drugs awaiting review by the Defense Health Agency's Pharmacy and Therapeutics Committee. The teams reviewed clinical studies and the medical literature, comparing dosing, pharmacokinetics, efficacy, safety and tolerability in order to make formulary recommendations. In addition, teams completed a cost-minimization analysis of medications within the same therapeutic class. Student teams presented their findings



as a mock pharmacy and therapeutics presentation and answered questions posed by faculty and clinical pharmacist judges. Lugo watched presentations via video conferencing, asking students questions after each presentation and then providing valuable feedback to the teams. Faculty and clinical pharmacists also provided feedback to improve students' skills and understanding of pharmaco-economic concepts.



Analesa Muir (Pharmacy, '16) practicing her poster presentation for the American Society of Health-System Pharmacist Midyear Clinical Meeting and Exhibition.

"It is important to help students understand the relevance of pharmacoeconomics to clinical practice and provide them an opportunity to apply skills to a "real world" problem," Ochs explained. "Students need skills in making decisions about drug formularies, not just from a clinical perspective but also from a managed care perspective, especially given the rise of Accountable Care Organizations."

Based on their work in the course, five student team posters were accepted for presentations at the 2015 American Society of Health-System Pharmacists' Midyear Clinical Meeting in New Orleans.

By collaborating and fostering partnerships with health care organizations, pharmacy students directly benefit, developing professional relationships and enhancing their learning.

College of Pharmacy Unites Community Experts to Advance Veterinary Pharmacy Knowledge

CORY THEBERGE, PH.D., ASSISTANT PROFESSOR OF PHARMACEUTICAL SCIENCES AND ENVIRONMENTAL COUNCIL CO-CHAIR

JIM PEAK, B.S., EDITORIAL ASSISTANT, AMERICAN JOURNAL OF PHARMACEUTICAL EDUCATION

It is not uncommon for clients to show up at a pharmacist's counter seeking to fill a prescription for their cat or dog. As the training of pharmacists in veterinary medicine advances, more veterinarians and clients will enjoy the convenience of filling prescriptions for pets at the local pharmacy.

"The field of veterinary pharmacy is evolving because pet owners are increasingly likely to obtain prescriptions for their pets from local pharmacies," said Cory Theberge, Ph.D., assistant professor of pharmaceutical sciences and Environmental Council co-chair.

To help Maine meet this growing need, the College of Pharmacy hosted a veterinary pharmacy skills training day on August 12, 2015. Included among the attendees were 47 UNE students who enrolled in Theberge's veterinary pharmacy elective.

The course is designed to provide students with the skills they need to communicate with veterinarians, review medications and counsel pet owners on how to properly administer medications to their cats or dogs. Additionally, students gain experience using the specialized equipment and materials necessary to formulate medications for small animals.

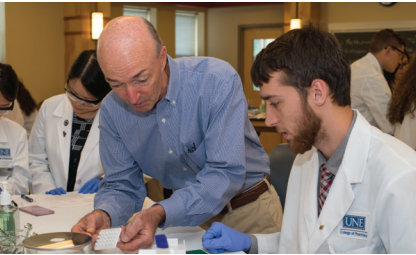
Explained Theberge: "Students also get to practice the custom formulation of veterinary drugs, as about 80 percent of veterinary prescriptions are actually human drugs adjusted in strength and/or flavored for veterinary use."

Veterinarians, pharmacists and student pharmacy technicians collaborated with Theberge and worked with the students. Joe Lorello, RPh, principal pharmacist at Apothecary by Design in Portland, coordinated the efforts of the UNE pharmacy technicians to supervise students during their lab work.

Student technician Shannon Grady (Pharmacy, '16) participated along with fellow technicians Dylan Lim (Pharmacy, '18) and Mike Takach (Pharmacy, '17). "This elective provided me with insight into the small but important area of veterinary pharmacy," Grady explained. "It gave me the knowledge to effectively provide recommendations on medications for animals, the confidence to interact with veterinarians and the resources to look up veterinary pharmacy information."

The improved training of pharmacists in veterinary medicine is vital, Theberge believes, before more veterinarians become comfortable interacting with pharmacists whose primary focus is on humans.

Bringing veterinarians, pharmacists and students together as a community, as Theberge did over the summer, will go a long way toward reaching that goal.



Joe Lorello, RPh, of Apothecary By Design in Portland, instructs pharmacy students Connor Kalin and Brandon Kong during the preparation of custom formulated veterinary medications.

SIGN UP IN MAINE. STUDY IN MOROCCO.



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Known for its stunning and historic campuses in coastal Biddeford and Portland, UNE has set a new study-abroad standard with its campus in Morocco. All of our students are able to spend a semester in Tangier, enjoying state-of-the-art labs, modern accommodations and exciting experiences for about the same cost as a semester in Maine. Because the Tangier curriculum includes lab science courses needed to complete many of the undergrad programs at UNE, students can go global while keeping up with the requirements of their major. Find out more at une.edu

"CHIP" CARDIOVASCULAR HEALTH INTERVENTION PROGRAM BRINGS LOCAL 4TH GRADERS TO UNE CAMPUS

PAUL VISICH, PH.D., M.P.H., PROFESSOR OF APPLIED EXERCISE SCIENCE AND SPORT PERFORMANCE AND APPLIED EXERCISE SCIENCE AND SPORT PERFORMANCE DEPARTMENT CHAIR

Pins given to the undergraduates of the Westbrook College of Health Professions upon graduation.



UNE Student volunteers for data collections

Although cardiovascular disease (CVD) is typically considered an adult disease, a number of studies have shown that precursors of adult CVD have their origins in childhood. Thus, in 2003, the American Heart Association began recommending that primary prevention of CVD begin in early youth.

UNE researchers from the Westbrook College of Health Professions' Department of Applied Exercise Science have teamed up with two nearby elementary schools to study early cardiovascular risk factors and to educate the students about heart health. Combining research and community service like this is truly a "win-win" proposition!

Each year since 2013, up to 300 students aged 10–12 participate in CHIP (Cardiovascular Health Intervention Program), which is funded by the Clark Charitable Foundation via the Children's Research Medical Center in Washington, D.C. Principal Investigator Paul Visich, Ph.D., M.P.H., chair of the Department of Applied Exercise Science and Sport Performance, and Project Coordinator Rebecca Place, M.S., coordinate with principals at Biddeford Intermediate School and Buxton Center Elementary School, which participate in the program.

Every fall, Place conducts a 15-minute introductory presentation for about 15 fourth grade classes and sends information home to the students' parents. Students who enroll are brought by bus to UNE's Biddeford Campus for a half-day of testing, a campus tour and lunch. The battery of tests involves taking

blood pressure, blood lipids and glucose levels, body composition (weight, height, waist and hip circumference and skinfolds), grip strength and a 20-meter shuttle run. Students also complete a survey about their knowledge, attitudes and behavior (eating habits and physical activity).

This data collection presents a hands-on educational opportunity for 30–40 UNE undergraduate students from a variety of majors, who learn how to administer each test safely and accurately. As an added benefit, the UNE students serve as positive role models for their younger counterparts.



Blood pressure station



Lipid Glucose Station

Students leave with a colorful T-shirt and an Actigraph wrist accelerometer to use for the next six days and nights. They also collect nine saliva swabs over three days, storing the samples in their freezers at home. It's no surprise that parents' assistance throughout the week is key! When the students return the accelerometer and samples, they get a \$5 coupon for Subway. Saliva samples are tested for three biomarkers: cortisol and uric acid, which are indicators of stress, and C-reactive protein, an indicator of inflammation.

With these initial data, the investigators look for patterns in CVD risk factors, such as elevations in blood pressure, blood sugar, body fat and cholesterol, and for ways in which behaviors, stress and inflammation may be related to risk. For instance, among last year's 158 students, over half (52 percent) had two or more risk factors. Some UNE students also pursue their own topics of interest. For example, a connection was found among obesity, stress and sleep disturbance. Researchers also share test results with participants' parents, so the latter will have a greater awareness and understanding of

their child's risk factors and can discuss the test results with the child's doctor.

Beginning in January and continuing through the rest of the fourth and fifth grade, students take part in a bi-weekly health education program at school, taught by Place. The class covers healthy food choices, physical activity and why they are important for cardiovascular health. In addition, Place runs an optional one-and-a-half-hour physical activity program after school two days a week at each school. About 50 students attend each session.

At the end of the fifth grade, students return to UNE, where all of the tests are repeated. Comparing the two sets of test results allows investigators to assess how the educational component affects the students' eating habits, physical activity and biomarkers as well as any changes in patterns they may have found at the beginning. The hope is that increasing awareness in combination with learning heart-healthy habits in elementary school will provide the foundation for life-long cardiovascular health.



20 meter shuttle run.



Grip strength test



Dental Camp 2015

The mission of the Maine Area Health Education Center (AHEC) is to work with academic and community partners to address health professions shortages, particularly for Maine’s rural and underserved communities. Centered within UNE’s School of Community and Population Health, AHEC has community-based centers in eastern, western and northern Maine. A key strategy of Maine AHEC is its outreach to Maine youth interested in becoming future health professionals. This is achieved through innovative health-oriented camps offered every summer throughout the state. In 2015, Maine AHEC’s intensive multi-day health careers exploration programs included:

- Scrubs Club in Farmington, Maine (Forty high school students attended in June 2015.)
- Survivor Aroostook (Forty-two ninth-grade students attended in June 2015.)
- UNE Dental Camp (Nineteen high school students attended in August 2015.)

These programs offer a variety of hands-on, health-oriented activities, ranging from participation in a mock trauma response exercise to the conducting a simulated dental examination.

At the same time that the programs offer valuable experiential learning to the students, they also work toward addressing common statewide goals for



A teen gets a chance to observe a blood pressure screening for seniors.

recruiting future health professionals in rural and underserved communities in Maine. These goals include broadening students’ understanding of careers in the fields of health care and public health, increasing their comprehension of the fields’ requirements, and strengthening their commitment to pursuing higher education in these fields.

This year the three community-based Maine AHEC Centers worked with evaluators at the central program office to develop a shared survey to measure these goals across the state. Results from evaluation surveys indicate that excellent progress was made. There was a statistically significant increase among students’ self-rated knowledge of both health career choices and college requirements for pursuing a health career. In addition, 89 percent of participants indicated intention to pursue education at the college or university level when they graduate, and 73 percent said they plan to pursue a career in the health professions. These percentages remained virtually unchanged from the pre-survey responses, which is not surprising given that the students recruited for these tend to be motivated toward health professions careers.



Mock accident! A few of our return campers had makeup wounds applied and played the victims of an ATV accident in the woods. Other campers had to triage the wounded, stabilize the injuries, and get the victims to a safe area with the help of some of our North Star Ambulance crew.



Ever wonder what it was like to have Chronic Pulmonary Obstructive Disease (COPD)? It’s like breathing through a straw! Some Respiratory Therapists were showing the kids what it was like to live with this disease.



Surgical technicians filled a box with cloth towels and the kids used the robotic surgical equipment to retrieve household items from within these towels. They had to watch the monitor while maneuvering the equipment and learned that they needed great hand-eye coordination to be a surgeon or a surgical tech!

The following are some examples of answers to the question, “What did you like best [about the Maine AHEC intensive summer health careers camps]?”

“When we did the drill and had to attend to our patients and act [as] if we... [would] treat them and take care of them.”

“I loved that we were able to get... a glimpse of each career”
— Survivor Aroostook 2015 participants

“I loved the chance for hands-on experience. It was so fun learning to drill and fill.”

“Learning about the experience of the college students going through school, and tips, steps of getting through it. Getting to experience such an incredible opportunity at such a young age.”
— UNE Dental Camp 2015 participant

“I liked suturing!”

“I wouldn’t change anything. I thought it was great.”
— Scrubs Club 2015 participants

Applied Exercise Science Alum Helps Care for Wounded Warriors at the Center for the Intrepid

KATHERINE RUDOLPH, PH.D., ASSOCIATE PROFESSOR OF PHYSICAL THERAPY AND MOTION ANALYSIS LABORATORY DIRECTOR

WCHP



Chad Lyons, '15 (Applied Exercise Science) and Mike Lawrence, M.S., analyzing motion at the Motion Analysis Lab.

Chad Lyons, '15 (Applied Exercise Science) was listening carefully in his Exercise Physiology class when Lara Carlson, Ph.D., associate professor in the Westbrook College of Health Professions, mentioned research opportunities available to undergraduate Exercise and Sport Performance students in UNE's Motion Analysis Laboratory (MAL). Sparked by his experience as a distance runner and the desire to help people in pain, Lyons planned to apply to chiropractic school after graduating from UNE, but that plan began to change. He recalled, "I was always asking goofy questions, so after class we would talk about research and eventually we discussed the research fellowship that UNE offered."

The following year, Lyons was awarded a WCHP Summer Undergraduate Research Fellowship, a 12-week, full-time, mentored-research experience. Lyons' research mentor was Michael Lawrence, M.S., an expert in biomechanics and manager of the MAL, who oversaw the study "Force Production and Muscle Activity during Sprint Starts While Towing a Heavy Sled." Under Lawrence's guidance, Lyons designed the research methods, got approval from the Institutional Review Board, collected and analyzed the data and presented his findings at the end of the summer at the Research Symposium. He found that concepts he had learned in class were being applied in the projects conducted in the Motion Analysis Lab and describes his time in the MAL as, "the most hands on experience I had at UNE." For this

work, Lyons was awarded the 2014 Undergraduate Research Experience Grant from the New England Chapter of the American College of Sports Medicine.

Lyons returned to the MAL to complete an internship — a requirement for the degree in Applied Exercise Science — and later as a volunteer. During those experiences, he was involved in a myriad of activities including ongoing research studies on athletic performance and clinical gait analyses as well as injury prevention programs. He even assisted with developing the Neuromotor Re-Education Exercise Progression Videos for Runners, which was a



Markers on a prosthetic foot and opposite foot to assess push-off force during walking.

WCHP



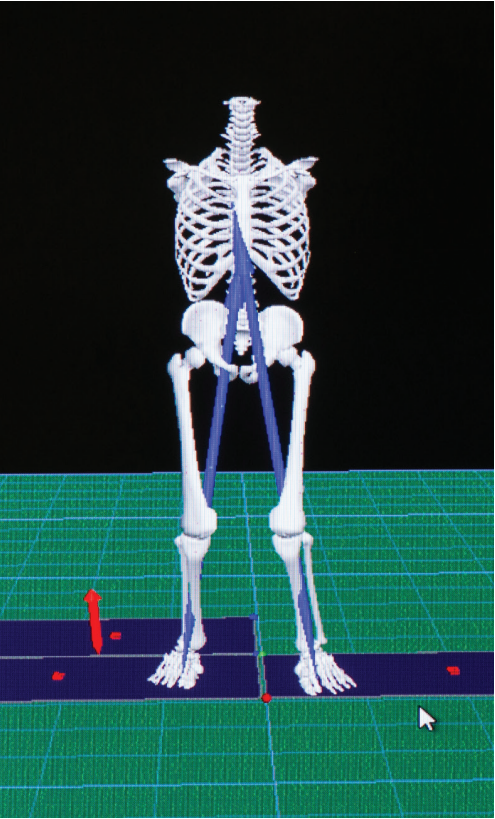
Katy Rudolph, PT., Ph.D., takes advantage of a rest period to check the accuracy of video data collected from Michael Brandon, who underwent a left transfemoral amputation.

collaborative project between the University of New England Motion Analysis Lab and the Spaulding National Running Center in Boston.

As graduation approached, Lyons reflected, "My time in the lab helped me realize that there were other career paths that I could take. Working in the lab gave me a truly unique set of skills. It was the same set of skills... that got me hired at my current job."

Lyons is now working as a contractor for the Henry M. Jackson Foundation in the Military Performance Laboratory at the Center for the Intrepid (CFI), part of Brooks Army Medical Center in Fort Sam Houston, Texas. The CFI utilizes cutting edge technologies for rehabilitation, research, education and training to provide state-of-the-art care for wounded warriors after amputations, burns and limb salvage procedures. Lyons is working on analyzing the gait of wounded veterans with amputations as they walk on various surfaces, including level ground, rocky terrain and stairs and in environments simulated by the Computer Assisted Rehabilitation Environment (CAREN), a virtual reality system. He is now considering the pursuit of a master's degree or Ph.D. in kinesiology, ergonomics or biomedical/biomechanical engineering.

Views expressed in this article are Chad Lyon's own views and do not represent those of the U.S. government.



Analysis of drop jump of a female adolescent soccer player after participating in an injury prevention program.

“My time in the [motion analysis] lab helped me realize that there were other career paths that I could take. Working in the lab gave me a truly unique set of skills. It was the same set of skills... that got me hired at my current job.”

— Chad Lyons

WCHP

ACL Injury Prevention with Yarmouth Girls Soccer Team

KIRSTEN BUCHANAN, PH.D., ASSISTANT CLINICAL PROFESSOR OF PHYSICAL THERAPY



These soccer players can really jump!

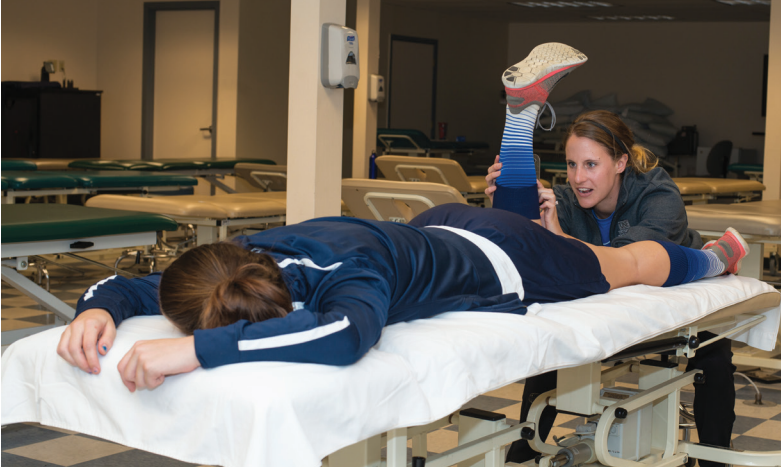
Eavan O’Neil, a member of the Yarmouth, Maine, girls soccer team, tore her ACL during her freshman year with no one around her to hear the pop. Like so many of her peers, O’Neil experienced the rupture in a non-contact situation on the soccer field as she was cutting towards the goal. “I planted, turned toward the goal, and the knee just went out,” she explained.

Unfortunately, O’Neil’s story isn’t uncommon; there is barely a girls’ sports team in Maine that hasn’t been affected by this epidemic. Girls are two to eight times more likely to tear their ACLs than their male peers, with the majority of the ruptures occurring in non-contact situations. The American Academy of Orthopedic Surgeons states on its website that one out of 100 girls will rupture her ACL playing high school sports. In college, that statistic jumps to one in 10.

The long term outlook for O’Neil isn’t encouraging. Once an athlete tears her ACL in one knee, she is at greater risk to re-injure or tear the other ACL within five years. The rate of long-term osteoarthritis is discouraging as well, with over 70 percent of ACL-injured knees showing signs of degeneration 10 to 15 years later. This leads to athletic and functional disability and potentially total knee replacements down the road (in other words, young women with old knees.)

So what is it with girls? Hip width? Hormones? The usual suspects have been researched, and there is no consensus that hormones play a major role or that anthropomorphic measures are wholly to blame. What research does show is that girls tend to land with less knee and hip flexion, increased knee valgus and increased internal rotation of the hip.

However, a number of research studies have also shown that one can prevent these risky movement patterns and subsequent ACL injuries. The Prevent Injury, Enhance Performance (PEP) research



Alyssa Gardner (Physical Therapy, '16) taking flexibility measurements on an athlete.

WCHP

ACL Injury Prevention with Yarmouth Girls Soccer Team



Jen Aucoin (Physical Therapy, '16) assisting one of the U13 athletes in "Russian Hamstring" strengthening

revealed that by teaching good form, activating core muscles and emphasizing proper hip/knee/foot alignment, girls can reduce their risk of an ACL tear — and this can be done with a 20-minute warm-up twice a week.

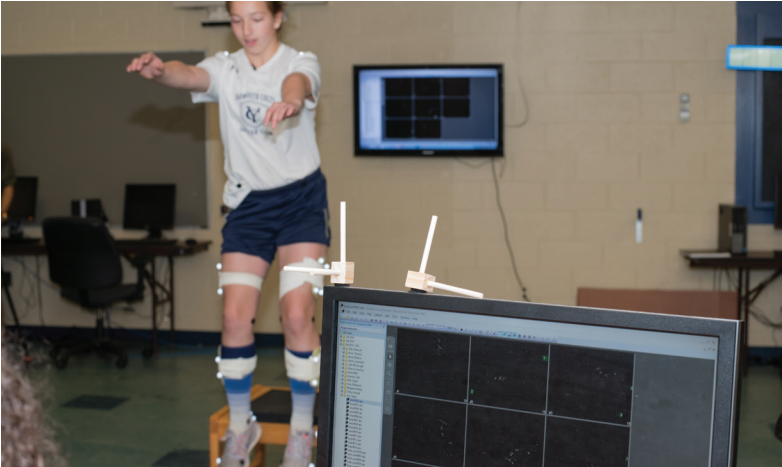
So the research exists, but how do you get this information out to the community? This is where the UNE Doctor of Physical Therapy (D.P.T.) students come in. For the past two years, UNE doctoral students in physical therapy have been heading out to soccer practice twice a week to work with Portland area girls soccer teams to teach them the UNE ACL Injury Prevention Protocol. This program incorporates all the tenets of the PEP research,



Rita Carlson placing markers used in 3-D motion

including strength, core, plyometric and flexibility exercises in a 20-minute warm-up. Additionally, the D.P.T. students have brought the athletes to UNE’s Motion Analysis Lab to assess their movement mechanics before and after the season.

As Paige Blasco (D.P.T., '16), who has had 4 surgeries for ACL tears, says, “I wish this program had existed when I was playing sports. But I am hopeful we can make a difference with these girls.” So far, the preliminary data on the girls look promising. Their mechanics and alignment are better. With the UNE D.P.T. students' help, the hope is that O’Neil and her teammates won't see another ACL injury any time soon.



An U13 soccer athlete participating in the 3-D jump analysis.



Motion analysis markers used to track motion in 3-D

THOMAS CHALMERS MCLAUGHLIN, PH.D., PROFESSOR OF SOCIAL WORK



Tom Chalmers McLaughlin, Ph.D.

For this study, 10 people who were homeless and admitted to Maine Medical Center or seen at the Emergency Department were selected randomly for analysis. After releases were obtained, a physician from Maine Medical Center conducted a chart review of these 10 patients from March 2014 through February 2015. The chart review covered all admissions, treatment and discharge notes. Researchers also collected cost data on these patients over the same 12 months.

Individuals were smokers, four of whom had a diagnosis of COPD. All eight of the male clients had a diagnosis of alcohol abuse, and one was also diagnosed with opioid abuse. Participants had little co-morbidity, and none had diabetes.

The total number of hospitalization episodes among the sample was 35, with three clients never being hospitalized. Based on data from the chart and record review, researchers concluded that a total of 14 extended hospital days may be attributed to the clients' homelessness. The chief causes for these stays being extended were unsafe gait and/or ongoing physical therapy. The reviews found no hospitalization delays for procedures or due to receiving IV antibiotics.

The data clearly point to an overwhelming need for substance abuse rehabilitation. One could infer that housing would decrease the amount of alcohol intake, create a safer environment and allow monitoring to decrease complications such as falls and infections. A number of clients did not have a primary care physician. In light of that finding, stable housing may present an opportunity to develop better relationships with health care providers and to engage with a primary care physician.

Using the charge data from the sample of 10 patients, the average daily cost of a hospital admission was \$4,996. This includes both emergency room charges and in-patient admissions. Applying this daily rate to the 14 extended-days associated with those patients who were homeless and needed the extended stay, the cost came to \$69,928.



Beds in the City of Portland, Oxford Street Shelter for Men

JANE O'BRIEN, PH.D., OTR/L, PROFESSOR
OF OCCUPATIONAL THERAPY

JAN FROELICH, M.S., OTR/L, ASSOCIATE PROFESSOR OF OCCUPATIONAL THERAPY

JOEL HINSHAW, M.S., WELLNESS COORDINATOR, L.L. BEAN, FREEPORT, MAINE

SCOTT O'BRIEN, ATHLETIC TRAINING
'16, NORWICH UNIVERSITY

SAMANTHA CURRAN (M.S., '16)

FAITH SWENSON (M.S., '16)

SASHA SMALL (M.S., '16)

A research team led by Professor Jane O'Brien, Ph.D., OTR/L, and Associate Professor Jan Froehlich, M.S., OTR/L, both from the UNE Occupational Therapy (OT) Department, and including Joel Hinshaw of L.L. Bean; OT graduate students Samantha Curran (M.S., '16), Faith Swenson (M.S., '16) and Sasha Small (M.S., '16) from UNE; and Scott O'Brien, an OT student from Norwich University, examined the program outcomes of an employee wellness program at L.L. Bean in Freeport, Maine. L.L. Bean employs over 4,000 workers and has a strong interest in promoting health and wellness among employees. This collaborative study illustrates the value of OT in a corporate work setting.



L.L. Bean is collaborating with the University of New England Occupational Therapy Department.



JumpStart Program at L.L. Bean to improve conditioning

The authors analyzed four years of program data regarding JumpStart, a work-conditioning program designed to improve health and wellness of employees at L.L. Bean. Occupational therapists consider health and wellness in terms of a person's volition (interest and motivations), habits and routines, performance abilities and environment. The study used the Model of Human Occupation (Kielhofner, 2008) as the framework for reasoning and analyzing the program outcomes.

The goals of the study were as follows:

1. Analyze and synthesize existing data from the JumpStart program at L.L. Bean using Model of Human Occupation concepts to report findings and inform program development.
2. Examine and report "return on investment" for the JumpStart program.
3. Use data and findings to determine best use of employees' time and develop programming suggestions.

In October, the researchers presented their work at the 4th International Institute on the Model of Human Occupation in Indianapolis, Indiana. Their findings suggest that the Model of Human Occupation provides a comprehensive framework to examine program outcomes and design future programming. Participants in the study showed improved performance measures

(e.g., strength, flexibility) and changed their exercise habits (both time spent exercising and number of days). The circuit groups, which were less structured, but overall rated as more enjoyable, produced better results than the groups tailored specifically for job requirements.

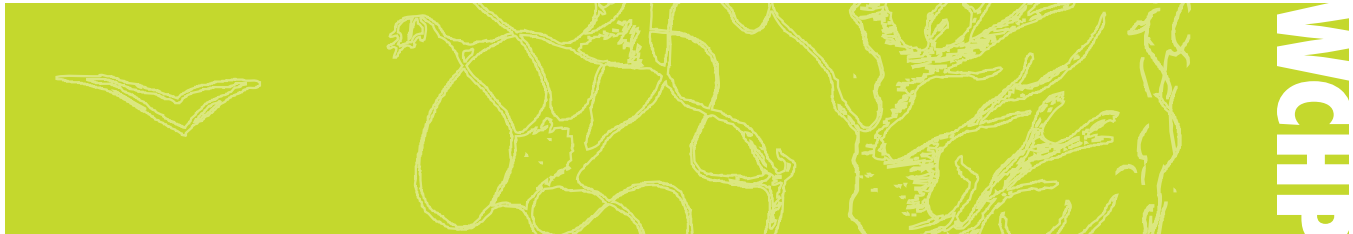
The team will further investigate employees' volition to provide recommendations for future programming to change employee habits and routines and performance within the work environment.



Presentation at the Fourth International Institute on the Model of Human Occupation, October 23–24, 2015, in Indianapolis, Indiana. Scott O'Brien, OT Student; Samantha Curran, UNE OT Student; Faith Swenson, UNE OT Student; Jan Froehlich, M.S., OTR/L; Dr. Jane O'Brien, Ph.D., OTR/L; Joel Hinshaw, Wellness Coordinator, L.L. Bean

REGI ROBBETT, PH.D., OTR/L, PROFESSOR OF OCCUPATIONAL THERAPY

Occupational therapists work with people who, for various reasons, have trouble successfully completing everyday activities, such as managing their health and medications. Medication management is a skill that involves planning, scheduling, fine motor control, memory and reading comprehension



Recent graduate of the OT Master's program, Sara Hanrahan, and Regi Robnett, Ph.D., OTR/L, discuss working on a new research project with the ManageMed Screening.

The ManageMed Screen (MMS) is an assessment tool that has been used interprofessionally over the past decade to determine if a person can manage a moderately difficult medication routine (three vials, three dosages and three schedules). The MMS was developed by Regi Robnett, Ph.D., OTR/L, professor in the Occupational Therapy Department, and several students: Katherine Steward, M.S., '01, Joanna Akladiss, M.S., '01, Kyle Cartmill, M.S., '00, Vadim Kravats, M.S., '01, Chantel Dionne, M.S., '05, Rebecca Jacques, M.S., '05, Allyson LaChance, M.S., '05, and Melissa Mailhot, M.S., '04. The tool is currently being used as a standard assessment for all patients who are in the in-patient stroke rehabilitation program at New England Rehabilitation Hospital in Portland.

In the spring of 2015, Robnett, along with OT graduate students Sara Hanrahan, M.S., '15, Kyle Jerdan, M.S., '15, and Molly Grisham, M.S., '15, conducted an Institutional Review Board approved content validity study on the MMS. The faculty-student research team conducted an on-line survey, in-person focus groups and 28 interviews with clinicians (primarily occupational therapists and speech language pathologists). The aim of the project was to garner expert opinions from clinicians who had used the MMS to determine if the assessment tool was

effective and what changes were needed to keep the system up-to-date and useful for the field of rehabilitation.

The results of the study were used in updating the MMS Manual, which Robnett has co-authored with a UNE alumna, Jessica Bolduc, M.S., '05, Dr.OT., OTR/L.

Building Caring Connections in Maine

ALLISON MORRILL, J.D., PH.D., ASSOCIATE RESEARCH PROFESSOR IN THE SCHOOL OF COMMUNITY AND POPULATION HEALTH AND INTERIM ASSOCIATE DEAN FOR RESEARCH IN THE WESTBROOK COLLEGE OF HEALTH PROFESSIONS

Evaluators from the School of Community and Population Health are evaluating a special project of the Maine Suicide Prevention Program. The program, Building Caring Connections in Maine, is funded by the Substance Abuse and Mental Health Services Administration (SAMHSA).

The program aims to prevent suicide among youth ages 10–24. Trainers from National Alliance on Mental Illness Maine conduct awareness sessions and gatekeeper trainings at school-based health centers and community clinics for school personnel and clinicians to enable them to more easily recognize risk factors for suicide and to learn how to make referrals for care and follow up for at-risk individuals. The project also teams up with community organizations that serve high-risk youth such as LGBTQ (lesbian, gay, bisexual, transgender, and queer (and/or questioning) individuals), unemployed (via job corps programs), justice-involved (via pre-trial services program) and college students living off campus and away from

family. It also provides technical assistance to help schools, clinics and community organizations to develop protocols that address suicide prevention, intervention and postvention.

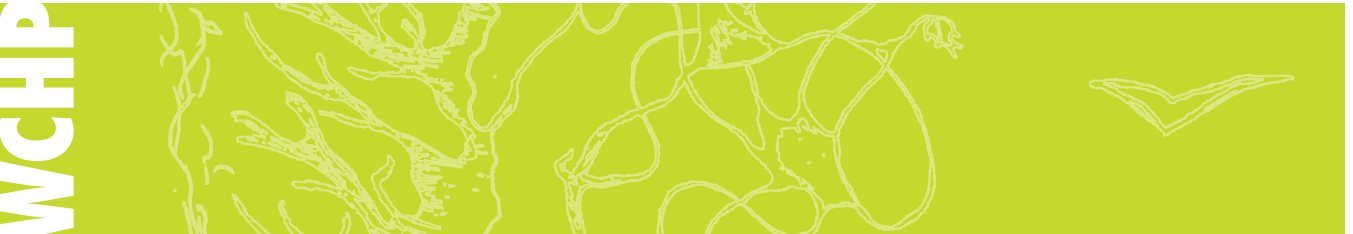
Evaluating such a multi-faceted program can prove challenging, so evaluators are using all of the tools in their kit, for example:

- Reviewing suicide protocols and comparing them to model provisions.
- Interviewing key persons — clinicians, project coordinators and directors — to learn about the practices at their programs.
- On-line surveys of school staff and other participants before and after they attend training sessions.
- Focus groups of individuals who have lost a loved one to suicide — to help formulate a brochure with content that might be helpful to other survivors in the future.

So far, training evaluations point to immediate improvement in knowledge, attitudes and beliefs around suicide. Schools and clinics appear to be busily revising their protocols. A final round of data collection in spring and summer of 2016 is expected to reveal the impact of the project, and the postvention brochure should be ready for use before the project ends in September of 2016.



Survivors appreciated the hope conveyed in this photo.



Project Alliance: A Substance Abuse Action Team

IDA BATISTA, M.P.P.N., RESEARCH ASSOCIATE IN THE SCHOOL OF COMMUNITY AND POPULATION HEALTH

ZOE HULL (M.P.H. '16), RESEARCH ASSISTANT IN THE SCHOOL OF COMMUNITY AND POPULATION HEALTH

SARAH BREUL, M.P.A, DIRECTOR OF COASTAL HEALTHY COMMUNITIES COALITION

WILLIAM PATERSON, M.ED., CPE, DIRECTOR OF DRUG FREE COMMUNITIES



Drug Take Back Day in Old Orchard Beach, Maine.

UNE's College of Osteopathic Medicine and School of Community and Population Health are participating members in the Coastal Healthy Communities Coalition (CHCC) Project Alliance action team. CHCC is a well-established, comprehensive, community-based health coalition formed in 1999 and based at UNE. Its overall goals are social, policy and environmental changes to improve the safety and health of the population in its service area (communities of Arundel, Biddeford, Buxton, Dayton, Hollis, Saco, Old Orchard Beach, Kennebunk and Kennebunkport).

In 2013 CHCC formed Project Alliance, the substance abuse action team of the coalition, to increase the level of community involvement working on behalf of youth. CHCC has partnered with local law enforcement agencies, schools, health care providers and higher education institutions. Project Alliance provides technical assistance, training and educational materials around substance abuse prevention.

In fall 2015 CHCC's Project Alliance was awarded a grant from the Substance Abuse and Mental Health Services Administration (SAMHSA) to run a Drug-Free Communities Support Program, which will focus on youth prevention strategies primarily around alcohol and marijuana. UNE staff will work closely with the Project Alliance action team to implement and evaluate project activities such as

- Working with local school districts to revise substance abuse policies to meet best practice standards.
- Holding educational summits to inform school staff about the impacts of marijuana use.
- Hosting Maine SAMHS parent neighborhood discussion programs.
- Employing the All Stars Program (an evidence-based academic program for youth) in middle and high schools.

Through these types of activities, the Project Alliance aims to both increase community collaboration and reduce youth substance abuse.

Caring for Our Community of Students: "Early Indicator Courses"

EILEEN DUNFEY, R.D.H., M.S., CLINICAL INSTRUCTOR OF DENTAL HYGIENE

The ability to predict success in academic performance is a point of interest across academic disciplines. UNE's Dental Hygiene program is no exception. The traditional four-year program of dental hygiene begins with two years of core curriculum courses and prerequisite math and science courses. Students transition to a majority of courses relating to dental hygiene in the junior year. UNE researchers wondered whether early performance could predict which students will have a smooth transition and graduate with honors, increasing their likely success when they begin to practice in the community.



Mallory Driscoll, '14 (Dental Hygiene) and Zach Bunnell, '15 (Dental Hygiene) reviewing instrumentation techniques with Eileen Dunfey, R.D.H., M.S.

With this goal in mind, researchers looked for associations among SAT scores, final course grades of prerequisite courses (principles of chemistry, statistics, general biology, microbiology, pathophysiology and histology, and embryology) and final grade point averages. They discovered that three freshman courses — statistics, principles of chemistry and general biology — were the best predictors of overall academic success.



Thus, if a student struggling can be identified during one of these first year courses, extra support at that juncture could improve the student's chances of success in the later dental hygiene courses and in their subsequent career prospects.

A Model for Interprofessional Education

KAREN PARDUE, PH.D., RN, ASSOCIATE DEAN FOR ACADEMIC AFFAIRS AND ASSOCIATE PROFESSOR OF NURSING

Research and Quality (AHRQ) and the Interprofessional Education Collaborative (IPEC) Expert Panel report.

Interprofessional education involves individuals from two or more health disciplines coming together “to learn with, from and about each other to improve collaboration and the quality of patient care,” as defined by the Centre for the Advancement of Interprofessional Education. Interprofessional pedagogy focuses on cultivating the skills of teamwork and communication, knowledge of disciplinary roles and responsibilities, and application of ethical principles to promote collaboration across health profession disciplines and high quality patient outcomes.

Pardue’s pedagogical framework guides faculty in the creation, delivery and evaluation of shared learning experiences for diverse health profession disciplines. The framework is grounded in the presage, process and product educational model proposed by adult educator John Biggs and includes immediate application to IPE competency development. This model contributes to the literature, as collaborative learning in the health professions signifies a new pedagogical approach — one which faculty often have little to no experience operationalizing. The model is being referenced by a number of nursing programs across the country for guiding the creation of interprofessional learning for both faculty and students.



Karen Pardue, Ph.D., RN.

Karen T. Pardue, Ph.D., RN, associate dean for Academic Affairs and associate professor in the Department of Nursing, recently published a theoretically grounded model depicting the design, implementation and evaluation of interprofessional education (IPE). Interprofessional education represents a growing trend in health profession study that has been advanced by the Institute of Medicine (IOM), the World Health Association (WHO), Agency for Healthcare



Interprofessional Education Collaborative (IPEC) Shared Learning Experience

ENJOY AFFORDABLE, STATE-OF-THE-ART DENTAL CARE

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MINI-GRANT PROGRAM LAUNCHED TO SUPPORT UNE FACULTY RESEARCH ON TEACHING AND LEARNING

Mock group study: College of Dental Medicine students preparing for Midterm exams. (From left to right) Salome Zangaladze, Nicholas Guy, Priya Katwala, Aleksandra Zak and Swati Krishna Kulkarni (CDM, '18).

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

This past fall, the Center for the Enrichment of Teaching and Learning (CETL), in collaboration with the Office of Research and Scholarship, launched the first round of Scholarship of Teaching and Learning (SoTL) mini-grants. These competitive mini-grant awards are designed to support both junior and senior faculty in research projects that explore ways to enhance the teaching and learning process. Four SoTL mini-grants have been awarded to date.

Yang Kang, D.D.S., Ph.D., assistant clinical professor and chair of the College of Dental Medicine (CDM) curriculum committee, leads one of the funded research projects. A cross-sectional study, Kang’s research will determine whether the course arrangement for the first two years of the CDM curriculum plays a major role in students’ stress and whether socio-demographic factors such as age, marital status and the distance of their permanent residency to dental school influences students’ level of anxiety.

This data could guide curricular changes to balance particularly stressful semesters by switching particular courses, if possible, to different semesters. Additionally, the descriptive data on socio-demographic factors could provide insight into focused interventions to assist students balancing their lives with dental school study.

Gurkishan Singh Chadha, M.Sc., Ph.D., assistant clinical professor, and Srinidi Mohan, Ph.D., assistant professor, both from the College of Pharmacy, are evaluating the impact of repeated and instructor-independent compounding exercises for skill reinforcement. Pharmaceutical compounding is the art and science of creating personalized pharmaceutical products or medications that are tailored to meet the unique requirement of a patient. The technique of compounding has always been kept in high regard, especially during the 20th century when an extensive amount of compounding was required in pharmacy practice. However, many concerns have arisen regarding the diminished compounding skills of graduating pharmacists.

In this study, students’ grades on singly-executed lab exercises and reinforced lab exercises will be compared. Additionally, feedback will be gathered on the students’ levels of confidence, their ability to overcome independent compounding issues and their improvement in skills based on singly-executed exercises versus reinforced exercises.

Kathryn H. Thompson, Ph.D., professor; Douglas Spicer, Ph.D., associate professor; and Rebecca Rowe, Ph.D., assistant professor, all in the Department of Biomedical Sciences, within the College of Osteopathic Medicine, are conducting a study that seeks to



College of Dental Medicine 2015–2016 SoTL researchers: (Back row left to right) Salome Zangaladze (CDM, '18), Priya Katwala (CDM, '18), Aleksandra Zak (CDM, '18), Swati Krishna Kulkarni (CDM, '18). (Front row left to right) Nicholas Guy (CDM, '18), Yang Kang, D.D.S., Ph.D.



Srinidi Mohan, Ph.D.



Gurkishan Singh Chadha, M.Sc., Ph.D.

identify and examine interventions for students “at risk” in Osteopathic Medical Knowledge I, a first-year medical school course that integrates basic medical sciences and clinical sciences.

The multidisciplinary, cumulative nature of the course creates a challenge for student remediation so that students must wait until the next academic year to retake the failed course. Therefore, it is critical to identify students who are at risk of failure as soon as possible and to provide them with appropriate interventions to help improve their performance. Grant funds are being used to establish a process using testing data from the last two years and input from appropriate faculty to set minimum



Future pharmacists in the lab

performance standards on the weekly Readiness Assurance Tests (iRATs) to identify “at risk” students. The researchers will then determine if students identified as “at risk” and referred to the Student Academic Success Center (SASC) use the services and benefit from them.

Finally, Ling Cao, M.D., Ph.D., associate professor of microbiology in the College of Osteopathic Medicine, is exploring the effectiveness of training medical and other health professional students in the management of chronic pain patients. Chronic pain is a serious health problem that continues to grow in prevalence, yet current medical education on pain management is extremely insufficient.

In this study, a team of UNE students from various health care professions will work together with Stephen Hull, M.D., at the Mercy Pain Center to help manage chronic pain patients. Under the supervision of Hull, the students will interview patients, conduct preliminary physical examinations, provide diagnoses and draft initial treatment plans as well as interview patients during follow-up appointments. Students will be encouraged to practice evidence-based medicine by obtaining relevant knowledge through active learning (such as database searching, review of basic science knowledge and clinical reports, etc.).

This case study (since the numbers will be small) will assess the efficacy of the training program. If effective, this component could become standard in the medical training curriculum, as health care providers’ knowledge and experience in pain management directly affect the quality of care that chronic pain patients receive.

These four projects collectively are changing the landscape of the University of New England by supporting evidence-based teaching and learning, which helps to improve our students’ experiences, and, thus, provides yet another way in which UNE is exemplary.



Pharmaceutics lab in session

Expansion, Updates and a New Name for the Center
for Excellence in Interprofessional Education

DORA ANNE MILLS, M.D., M.P.H., VICE PRESIDENT, CLINICAL AFFAIRS, AND DIRECTOR,
CENTER FOR EXCELLENCE IN HEALTH INNOVATION

CENTERS

Our health care and public health systems are undergoing a sea-change of transformation across the country. It is an exciting time for health professions students and faculty to jump into the water to study and be catalysts for these changes, and the Center of Excellence in Health Innovation is helping them make the leap.

Renamed by UNE President Danielle Ripich, Ph.D., in the fall of 2015, the center is building upon the guiding lights created by its precursor, the Center for Excellence in Interprofessional Education.

Clinical Interprofessional Learning Activities

One of the top priorities for the Center is to expand clinical interprofessional learning experiences for UNE health professions students. With our pilot sites, such as MaineGeneral Health’s Family Medicine Institute in Augusta and Eastern Maine Medical Center in Bangor, we have learned that interprofessional teams of students, if given a chartered course with the right curriculum, can add value to clinical sites, especially helping with some of the new work of health care reform.

For instance, health care reform has shined a light on the thorny issue of high readmission rates of hospital patients within a short time after discharge. Those who are 65 and older are especially at risk. However, home visits with recently discharged patients help to quickly identify and address problems early, thereby preventing readmission. To assist clinicians in reducing readmissions, teams of UNE medical and pharmacy students have been visiting such patients, accompanied by nurses or social workers. This work has helped to keep these patients healthy and safe at home, while it has also positioned students to learn from and about each other’s courses of study.

The Center is working with a variety of clinical sites to expand these and other clinical learning experiences so that more UNE students representing a variety of health professions will have opportunities to experience team-based health care. For instance, the expanded curriculum includes teams of students helping clinicians analyze some of the swells of data



Dora Mills, M.D., M.P.H.

available to them using health informatics tools and developing population health strategies, something practices are increasingly required to do but find challenging.

For example, students may analyze the vaccine rates for the patient population of a particular clinical practice site and, through subsequent interviews with the clinicians and some patients, develop ideas for improving the rates.



Dora Mills, M.D., M.P.H., demonstrating vaccine techniques to UNE students at one of several influenza immunization clinics held at Portland area shelters in partnership with the Portland Community Health Center.

CENTERS



UNE medical students administrating influenza vaccine at a Portland area shelter, supervised by Dora Mills, M.D., M.P.H..

Clinical Interprofessional Research

Besides expanding interprofessional learning activities in clinical sites, UNE is also expanding its research in this area. UNE was proud to be named one of eleven interprofessional incubator research sites by the federally-designated National Center for Interprofessional Practice and Education at the University of Minnesota.

UNE’s Center for Excellence in Health Innovation is leading this research in collaboration with UNE’s clinical colleges. To date, the University has two research projects involving a number of UNE faculty and students who hope to contribute to the knowledge of how interprofessional practice is impacting health care costs, quality and outcomes. Tragically, 210,000 to 400,000 people die in U.S. hospitals each year due to medical errors, and a lack of effective teamwork is the root cause in 80 percent

of those cases. UNE’s research and clinical experiences in interprofessional practice and education are addressing this critical public health problem to keep patients safer and healthy.

Short-term Opportunities

The Center is also helping to create a number of short-term opportunities for students to learn team-based skills by sailing in the waters of public health and health care transformation. For instance, UNE students from nursing, medicine and pharmacy help to vaccinate people against influenza and measles in underserved locations, such as Portland’s homeless shelters. And health professions students in their pre-clinical training years have an opportunity to spend a week studying the unique challenges to rural public health and health care transformation.

“A team of experts is not an expert team. By bringing UNE students and faculty into the estuary between interprofessional student education, health care transformations and public health, the Center is helping UNE faculty and students exemplify, teach and research true team expertise.”

— Dora Anne Mills, M.D., M.P.H.



Mills supervises as a first year UNE medical student administers an influenza vaccine to a child at a downtown Portland clinic.

Summary

A team of experts is not an expert team. By bringing UNE students and faculty into the estuary between interprofessional student education, health care transformations and public health, the center is helping UNE faculty and students exemplify, teach and research true team expertise. The center enables students to navigate in the exciting and uncharted waters of a transforming health system while also positioning the University as a leader in charting the course for these changes. By providing students a variety of opportunities to dip their toes or dive right into the deep waters of health transformation, the University of New England is training the captains of tomorrow’s health systems. As one student exclaimed, ‘This is innovative, the UNE way!’



UNE medical student administers influenza vaccine at a downtown Portland clinic.



Stock cars lining up before the next green flag at Beach Ridge Motor Speedway, Scarborough, Maine

The goals of sports science research are to improve the performance and safety of competitive athletes in order to minimize stress on the body during competition. Unfortunately, though, little is known regarding the stress that motorsports drivers face during competitive racing. Until now, the thermoregulatory and cardiovascular stress and strain of actual stock car race competitions have not been carefully quantified. Lara Carlson, Ph.D., associate professor in the Westbrook College of Health Professions and Center for Excellence in the Neurosciences, is the first person to investigate this connection. Carlson recently published her research in the *Journal of Thermal Biology* in an article titled “Physiological Strain of Stock Car Drivers During Competitive Racing.”

Carlson, who shared her passion for racing with her late brother Lawrence, found a way to keep his

memory alive by incorporating her physiology expertise with motorsports. It has been suggested that motorsport competition may increase heat stress and challenge the cardiovascular system. These effects may add to driver fatigue and possibly lead to catastrophic injury. The greatest challenges for these athletes are the extreme heat and gravitational (G) forces. The heat and physiological strain experienced by motorsport athletes competing in National Association for Stock Car Automobile Racing (NASCAR) may be significant enough to impair performance or even result in life-threatening accidents. The constant pedal work required during a stock car race, in addition to the isometric muscular activation of the neck, trunk, abdomen and legs to counter the acute exposure to G forces, may not only contribute to an increase in metabolic heat but to cardiovascular strain as well. All these factors can create a grueling environmental for stock car drivers.

Because of the similarities between the conditions in which stock car drivers and some military personnel perform their jobs, Carlson began her pursuit of her new research passion with the support of the U.S. Army Research Institute of Environmental Medicine (USARIEM). Similar to published research on military personnel (aviation pilots, soldiers in armored vehicles, etc.), Carlson’s study confirmed that completing physical tasks in elevated cabin temperatures, such as a racecar or cockpit, with the addition of protective uniforms that hinder evaporative cooling results in increased heat storage and risk of heat illness as well as in possible impairment of muscle activation and mental alertness.

With the support of Maine asphalt tracks like Oxford Plains Speedway in Oxford and Beech Ridge Motor Speedway in Scarborough, Carlson has succeeded in evaluating the physiological driver stress during competitive racing. Her findings suggest that drivers endure increased thermal stress (elevated skin and core body temperatures), increased cardiovascular strain and potential fluid losses during competitive stock car racing in hot conditions. The results of her work provide support for more research on techniques for mitigating heat stress for drivers and for preparing them for competition in the heat to reduce accidents.



Blair Marelli, Lara Carlson, Ph.D., and Kaylee Pobocik (Athletic Training, '16)

Marine Science Center Makes Leaps in New Education Programming, Research and Partnerships

BARRY A. COSTA-PIERCE, PH.D., DIRECTOR, MARINE SCIENCE CENTER AND DEPARTMENT OF MARINE SCIENCES CHAIR

CENTERS

The Marine Science Center (MSC) at UNE made outstanding progress in research, education and service programming over the past year, expanding into new programs and partnerships and receiving greater regional, national and international recognition.

James Sulikowski, Ph.D., professor of marine sciences, was awarded two competitive National Oceanic and Atmospheric Administration (NOAA) grants, totaling approximately \$500,000, for research on dusky sharks and cod that will add scientific knowledge to both the commercial fishing industry and the marine environment. Dusky sharks are one of the most vulnerable shark species in the western North Atlantic Ocean due to fisheries bycatch. Sulikowski will work in close partnership with the University of Maine, New England Aquarium and NOAA. His second grant will fund a study to determine the post-release mortality rate for Atlantic cod accidentally caught in lobster traps in the Gulf of Maine. Best practice recommendations will be developed to enhance survival of cod captured in lobster gear so that both mortality and interactions can be reduced in this most valuable fishery in Maine.

Markus Frederich, Ph.D., associate professor of marine sciences, initiated The Undergraduate Saco River Biodiversity Observatory Project (Project TURBO), a four-year, \$639,000 undertaking that will provide interdisciplinary research experiences to all science students in the College of Arts and Sciences. Project TURBO is a long-term research project centered on the Saco River ecosystem. Throughout all four years, UNE students will work on the project in multiple courses, entering data into a database on the TURBO website. The data will be used by various courses and will support informed decision-making for policy issues. Students will explore urban, salt marsh, intertidal and open water habitats and apply methods of ecology, physiology, molecular biology, botany, zoology, mathematics, chemistry and physics.

The \$20 million National Science Foundation funded Experimental Program to Stimulate Competitive Research (EPSCoR) program, which established the Sustainable Ecological Aquaculture Network



Barry Costa-Pierce, Ph.D., director of the Center for Excellence in Marine Sciences, briefs Senator Angus King on the new cooperative academic programs, the success of fisheries, and marine research programs.

(SEANET) program, a partnership between the University of Maine and the University of New England, finished its first year. New buoy systems were implemented in the Saco and Damariscotta areas. Twenty-five UNE undergraduate and graduate students and 10 UNE faculty members worked on research projects in SEANET. And, for the first time, UNE is hosting two Ph.D.'s at the Marine Science Center.

The MSC also welcomed back two colleagues from sabbaticals. Charles Tilburg, Ph.D., associate professor of marine sciences, stayed close to home for his sabbatical semester and successfully completed four papers, all of which have been accepted in high-level, peer-reviewed scientific journals. Stephan Zeeman, Ph.D., professor of marine sciences, spent his sabbatical as a Fulbright Senior



Zach Hope-Miller stands next to the large marine algae culture tanks that provide basic live feeds and biomolecules to research and education programs in the MSC's Ocean Clusters.

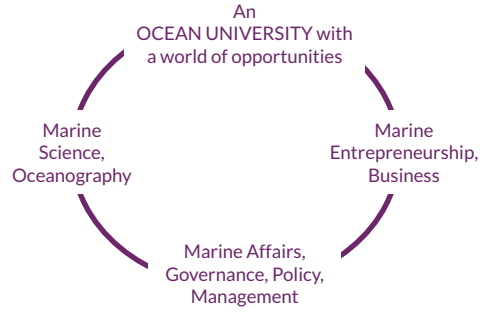
CENTERS



Aquaculture and Aquarium Sciences students from the Class of 2015: Madeleine Cox, Michael Galloway, Dylan Turner and Joe Simonowicz

Scholar at the Universitas Diponegoro in Semarang, Central Java, Indonesia, where he lectured widely on diverse marine topics and was a keynote speaker at a number of national conferences.

The UNE Board of Trustees passed the new Bachelor of Science program in Marine Entrepreneurship, which is a partnership between the Department of Marine Sciences and the Department of Business. Now, UNE can boast that it has the most innovative and diverse marine academic programs of any university in the country.



In addition, the MSC forged new partnerships with the U.S. Naval Academy to broaden UNE's ocean, fisheries, and aquaculture engineering research and education. UNE signed a Cooperative Research and Development Agreement (CRADA) that will expand engineering research in both Saco Bay and at the Academy. The CRADA allows for faculty and student exchanges.

The MSC also welcomed U.S. Senator Angus King and Speaker of the Maine House of Representative Mark Eves for visits. After his tour of the center, Senator King remarked, "When it comes to Maine, our ocean resources are some of our greatest assets. And effectively utilizing federal grants to support collaborative research efforts that will help us harness those resources and drive our future is critically important. The University of New England is on the cutting edge of that work, and I commend the talented faculty and students for all that they have done and thank them for the opportunity to visit the impressive Marine Science Center today."

In October, a UNE delegation traveled to Iceland to explore new ideas for collaboration as part of the Maine International Trade Commission's delegation to the Arctic Circle Assembly, the preeminent international forum for Arctic cooperation and sustainable development. Senator King addressed the assembly's opening session of more than 1,900 delegates, and Speaker Eves also attended. Barry Costa-Pierce, Ph.D., director of the Marine Science Center, hosted a breakout session with Patrick Arnold of the Maine Port Authority on the "Changing Arctic Seafood Ecosystem" in a packed room that included Senator King. Costa-Pierce also gave invited presentations at Holar University and the United Nations University on marine science and education advances in fisheries and aquaculture and discussed potential partnerships between the Icelandic universities and UNE.

Before sending its delegation to Iceland, UNE announced its intent to sponsor the New England Ocean Cluster House, an incubator of marine-related businesses and research that is being developed on Portland's waterfront. Modeled after the Iceland Ocean Cluster House in Reykjavik, Iceland, the Cluster House will be a potential boon to UNE marine science students, allowing them to engage with marine businesses and thought leaders from around the world. Costa-Pierce called the Cluster House a "Google of the ocean," and said, "It's very exciting because you have young people with all of those innovative ideas who are technologically savvy. They know how to communicate and how to put it out to the market."

CENTERS

CENTERS



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The Center of Biomedical Research Excellence for the Study of Pain and Sensory Function (through a grant from the National Institutes of Health) and the College of Osteopathic Medicine both supported Ling Cao, M.D., Ph.D., associate professor of microbiology, during her recent sabbatical. Like many other professors at the University, Cao used her sabbatical to explore new avenues of her research interest — in her case, neuropathic pain.

Hoping to better understand the underlying mechanisms of the development of neuropathic pain, Cao reconnected with clinical populations. She sought to determine if her field of research is adequately trying to solve the problems most relevant to the pain patients. Her time at the clinic has led her to realize that the best solution to treating pain is not through pharmacological treatment alone but, rather, through team-based practice with a multidisciplinary approach tailored to each individual patient.

Cao decided to use some of her sabbatical time to shadow Stephen Hull, M.D., at Mercy Hospital's Pain Center, southern Maine's only comprehensive, full-spectrum pain management clinic. The center's 12-week program works with patients to develop a personalized treatment plan to help them better manage their acute or chronic pain.

While the goal of any sabbatical is to foster the investigator's research interest, Cao has found another more unexpected direction for her research that has led her to additional questions — and the problems posed by these questions are not things that can be solved with a pipette.

Through her time with chronic pain patients, she has begun to notice socioeconomic trends in many of the patients at the center and has decided to investigate if there might be a relationship between economic challenges and people with chronic pain. Cao has since started a database-based study to look at the impact of socioeconomic factors on the prevalence of chronic pain in Maine. This study has furthered collaboration among various colleges and departments at UNE, including the College of Osteopathic Medicine, the College of Pharmacy and the School of Community and Population Health. It is the ultimate

hope of these investigations to develop a better understanding of the causes of transition from acute pain to chronic pain. Furthermore, if management strategies are in place to identify patients with a greater risk of developing chronic pain post-injury/surgery, modifications can be made in care (such as providing education and access to additional services) to improve the long-term outcomes of these patients.

After her sabbatical ends, Cao will continue to attend pain conferences at Mercy and will engage in further collaboration with Hull. The two have discussed plans to analyze data collected from Hull's Living Life Well Pain Rehabilitation Program.

There is also a partnership in the works, thanks in part to a mini-grant from UNE's Center for the Enrichment of Teaching and Learning, to explore the effectiveness of training medical and other health professional students in management of chronic pain patients.

Finally, the Center for Excellence in the Neurosciences has a long-standing relationship with chronic pain patients. Cao's sabbatical has helped strengthen this UNE connection with the pain community. Her sabbatical may also be the beginning of bigger collaborations between the University and Mercy Hospital.



Stephen Hull, M.D., and Ling Cao, M.D., Ph.D., discuss the common problems related to chronic pain at Mercy Hospital



Ling Cao, M.D. Ph.D.

A Student-Led Research Team

LING CAO, M.D., PH.D., ASSOCIATE PROFESSOR OF MICROBIOLOGY

JENNIFER MALON, M.S., M.P.H., PROGRAM COORDINATOR, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

CATHERINE BIXBY, MEDICAL STUDENT, COLLEGE OF OSTEOPATHIC MEDICINE



Catherine Bixby (COM, '18)

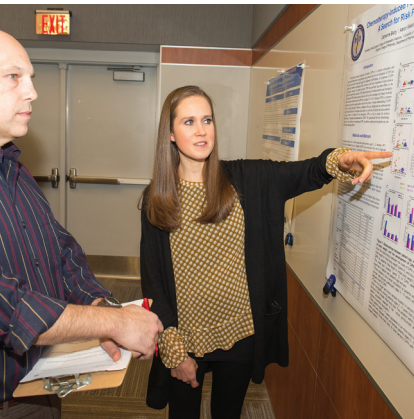
Catherine Bixby (COM, '18) is leading a team of investigators in a retrospective chart review of newly diagnosed cancer patients at Maine Children's Cancer Program (MCCP). The research team is comprised of UNE's Ling Cao, M.D., Ph.D., associate professor of microbiology, and Edward Li, Pharm.D., M.P.H., associate professor of pharmacy, as well as Aaron Weiss, D.O., pediatric oncologist at Maine Medical Center/MCCP and Bryan Beck, D.O., in the Hospital Manipulative Service at Maine Medical Center.

The study aims to help identify factors that place pediatric oncology patients at a higher risk for developing chemotherapy induced

peripheral neuropathy (CIPN) and to assess the potential effectiveness of frequently used treatments.

CIPN is a common neuropathic pain syndrome seen frequently among pediatric cancer patients and survivors. Symptoms of CIPN, which can be motor and sensory based and range from moderate to debilitating, include ailments such as allodynia, neuropathic pain, parenthesis, loss of proprioception, muscle weakness and atrophy resulting in decreased muscle strength, balance deficits and gait abnormalities. Less common symptoms include cranial nerve palsies, oculomotor dysfunction, jaw pain and sensor neural hearing loss. As symptoms of CIPN progress, treatment options become more difficult, which can impact the patients' and their families' quality of life.

Although CIPN is a common problem among pediatric cancer patients and survivors, it is not well understood. Therefore, symptoms often go undiagnosed, are under-assessed and not treated effectively.



Bixby presenting a poster of her research to Derek Molliver at the College of Medicine research symposium

Bixby and her team are now examining the collected data to determine if the frequency of administration or the combination of chemotherapy drugs is influencing the severity of CIPN. The next step in this

project is to conduct a prospective analysis to determine if the addition of osteopathic manipulative treatment (OMT) to a CIPN patient's treatment plan has added benefit for pain management. The researchers hope that the addition of OMT helps decrease pain in these patients to a greater extent than just prescriptions alone.



Stella Maris, home of the College of Osteopathic Medicine

CAS Biology Professor Receives Research Award to Study Pain

GEOFFREY GANTER, PH.D., PROFESSOR OF BIOLOGY

Geoffrey Ganter, Ph.D., professor of biology and faculty member of the Center for Excellence in the Neurosciences, was recently awarded a research grant from the National Institutes of Health (NIH). The \$443K Academic Research Enhancement Award (AREA) from the National Institute of Neurological Disease and Stroke will support a three-year investigation aimed at identifying novel targets for pain relieving drugs.

Also funded by College of Osteopathic Medicine Biomedical Science Professor Ian Meng's NIH Center of Biomedical Research Excellence (COBRE) award, work in the Ganter laboratory has already uncovered

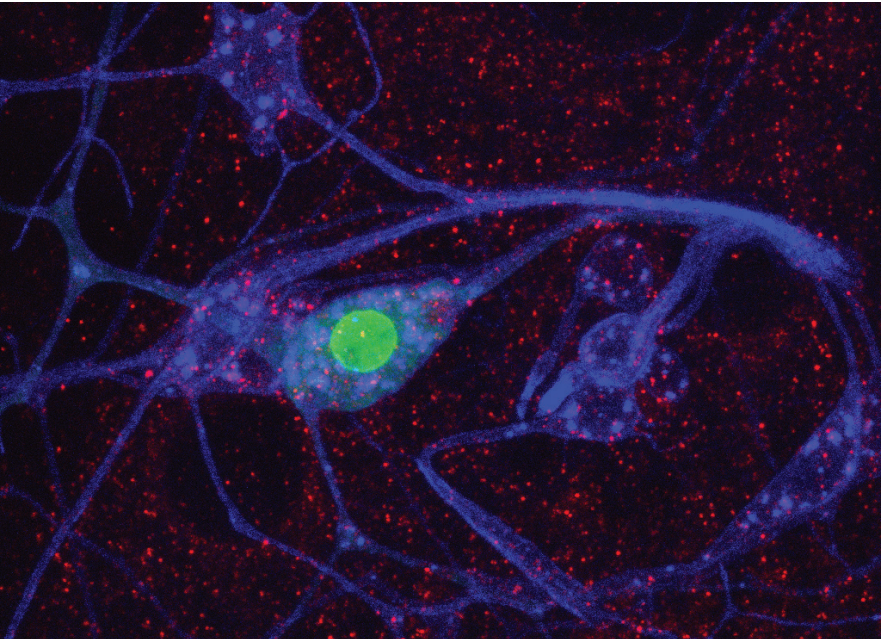


several potential pain drug targets in the Bone Morphogenetic Protein (BMP) signaling pathway.

Ganter and his colleagues use the fruit fly (*Drosophila melanogaster*) because of the ease and speed with which its genome can be manipulated. When BMP components in the fly are manipulated genetically, they have been shown to exert a strong effect on pain sensitivity, and it is hoped that similar mammalian components can be targeted pharmacologically to control pain sensitivity in humans. The BMP pathway is thought to function independently of the opioid system, so the discoveries will offer a much needed alternative to the side effects and addiction liability of opioid pain medications such as morphine.

Research in Ganter's laboratory is largely driven by UNE students. Ganter's AREA grant application was prepared with the help of graduate student Taylor Follansbee, M.S., '15 who spearheaded the BMP work in the laboratory and is now pursuing a Ph.D. at the University of California at Davis. Ganter's current graduate students are working diligently to expand the list of potential drug targets. Kayla Gjelsvik (M.S., '16) discovered an additional BMP that affects pain sensitivity, and Aidan McParland (M.S., '16) has identified components that act in the nuclei of the pain neurons to regulate pain sensitivity.

Ganter's undergraduate students are also making important contributions: Sarah Libby (Medical Biology, '18) is investigating the connection between pain sensitivity and diet, and Courtney Brann (Medical Biology, '16) is studying the mechanisms by which chronic pain results from burn injuries.



Confocal micrograph of a fruit fly sensory neuron cluster (blue), showing the presence of a sensitivity-controlling BMP (red) in a pain sensing neuron (green).



Geoffrey Ganter, Ph.D., with a container of fruit flies and an image of their sensory neurons

The UNE Pledge



On October 5, 2015, University of New England President Danielle Ripich announced a new five-point commitment to students. The UNE Pledge will directly benefit current and future students at Maine's largest private university.

Beginning with undergraduate students in the graduating class of 2016, the UNE Pledge offers:

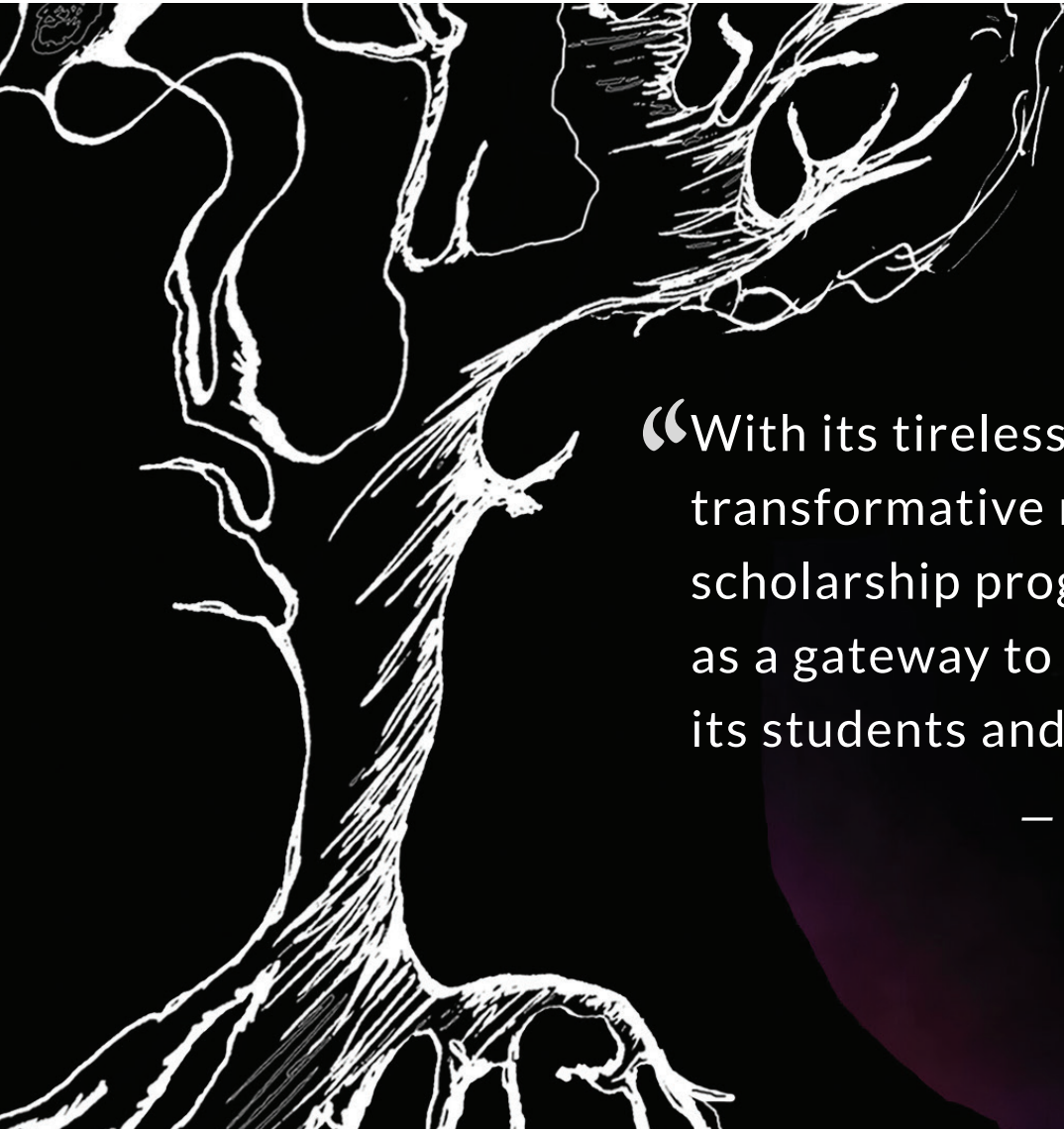
- The opportunity to become a global citizen by spending as many as three semesters in our campus in Morocco and at our partner institutions in Spain, France or elsewhere at no additional cost. Our campus in Tangier, Morocco, has state-of-the-art facilities, while our programs hosted by the University Pablo de Olavide in Seville, Spain, and Sciences Po Saint-Germain-en-Laye, France, offer access to the best European traditions.
- Access to internships and undergraduate research opportunities.
- A guarantee that undergraduate UNE students will face no additional lab or studio fees regardless of their major. This commitment has the potential to save students and their families more than \$1,000 per year.
- An Alumni Investment Award of \$1,000 presented to each UNE undergraduate in a four-year program who is graduating – beginning with the class of 2016.
- A Lifetime Partnership Award of an additional \$1,000, presented to any UNE undergraduate who is graduating and decides to pursue a graduate degree at UNE.





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“With its tireless commitment to transformative research and scholarship programs, UNE serves as a gateway to opportunities for its students and for Maine.”

— *Senator Angus King*