Outcomes are equally important when evaluating the growth of research and scholarship (R&S) at UNE, as these efforts are featured prominently in UNE’s strategic plan and have received significant investments of both internal and external resources. The conclusion of UNE’s Vision 2017 strategic plan, as well as preparations for upcoming accreditation visits, have provided plenty of quantitative data indicating the progress we have made. Over the past 10 fiscal years, UNE has seen a 325 percent increase in R&S expenditures provided by external sponsors. We rank first in NIH funding for the state of Maine for colleges and universities! UNE currently has 97 faculty and staff who are receiving active funding, representing a 7.7 percent increase from the last fiscal year. There has also been a correspondingly robust increase in peer-reviewed articles (225 percent over the past 10 years) as indexed in the Scopus database.

But these numbers, as impressive as they are, only tell part of the R&S success story taking place at UNE. The number of online stories highlighting the R&S accomplishments of our faculty and students continues to increase and makes up well over 50 percent of new content found on UNE websites. Through the efforts of the UNE Communications department, these stories are appearing with increasing frequency in local, state and national news and print media outlets, expanding the visibility of our quality academic programs and attracting a broader pool of prospective students. These written and visual narratives fill in the who, what, where and why behind our R&S initiatives, giving faces and voices to the important work we are conducting.

There is more work to be done as we assess the impact that our R&S efforts are having on the education of our students, on our respective disciplines, and in addressing some of society’s most pressing issues. One of the challenges is in categorizing a student as a scholar. For athletics, categorization is clear: a student is either on a varsity team or is not or participates in an intramural activity or does not. For research and scholarship, what constitutes the minimum threshold for a meaningful experience? Are there differences in how we classify undergraduates versus how we classify graduate or professional students? We also need to think of creative ways to accurately track students who are engaged in R&S endeavors, internships and community service-based projects that contain a scholarly component.

We have encouraging preliminary data suggesting that providing authentic R&S experiences increases student retention and academic performance—an effect that is similar to what we see with student athletes. From national student surveys we know that UNE undergraduates enter their academic programs with higher expectations of conducting R&S than their non-UNE peers. Exit surveys of UNE seniors indicate that UNE students do, in fact, conduct R&S more than their non-UNE peers. Exit surveys of UNE seniors indicate that UNE students do, in fact, conduct R&S more than their non-UNE peers.

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As I write this introduction in the first week of November, outcomes are front and center. From the World Series (congratulations, Chicago Cubs!) to the Election and everything in between — including this edition of Rising Tide magazine.

Getting some inspiration while attending fall playoff games for UNE’s successful athletic programs, I was reminded that sporting events generate some of the most definitive outcomes that can be tracked and assessed, including win-loss records, conference championships and the multitude of individual and team statistics that are constantly updated and pondered over by athletic directors, fans and parents alike. While these stats are important in tracking progress and performance, they do not tell the entire story. There are also the qualitative elements of education and the maturation that occurs over the student-athlete’s tenure at the university facilitated and guided by the coaching staff and others: the wisdom gained by experiencing wins and losses, the satisfactions of engaging in teamwork and successful goal setting, and the discipline of making a commitment to preparation—and then delivering a performance into which you have put all your effort.

Members of the new UNE women’s varsity rugby team square off against their Harvard counterparts.

The featured stories, snapshots and profiles contained in this issue of Rising Tide help fill in the space between the quantitative and the qualitative, looking at the past six months of research and scholarship at UNE and providing it with the light, color and warmth of narrative. It can’t help but be drawn into these stories. Then, taking a step or two back, I look across the broader scholarly landscape and see how well integrated R&S has become with UNE — with our culture and our mission. It’s a breathtaking achievement, and I am very fortunate to have worked with so many talented faculty, staff and students in helping create something so robust and meaningful. And that, surely, is an outcome of which we can all be proud.

Edward Bilsky, Ph.D.
Excellence in the Neurosciences
Founding Director of the Center for Excellence in the Neurosciences
Vice President for Research and Scholarship at the University of New England

Laura Duffy,
Chief Editor
Magazine Staff
One of Will Fulford’s favorite quotes, from legendary Olympic runner Steve Prefontaine.

This year’s Rising Tide magazine is dedicated to the memory and legacy of Will Fulford, who passed away unexpectedly at the age of 29 while exercising with his wife, Ashley Potvin-Fulford. Will was the assistant coach to the UNE men’s and women’s cross country teams, as well as the head coach for cross country and track at Biddeford High School. He also helped start UNE’s Track and Field Club and was always willing to offer his services when it came to running-related technique and form, offering sessions on running at the UNE All Sports Camp and the Girls Got Game camp.

Will had an enormous positive impact on countless young student athletes in the UNE and Biddeford communities, including my own sons, Jacob and Joshua, who ran for him at Biddeford. He was a quiet and humble man who was particularly effective in building athletes’ confidence in themselves, instilling an admirable work ethic and inspiring a full and heartfelt commitment to the team.

Several UNE runners were also engaged in research and scholarship at UNE, and we asked them to share brief personal remembrances of the man they admired who had so profoundly affected their lives. The tribute that moved me the most was spoken by his grieving mother as she remembered Will and asked us to honor him by being gentle, kind and caring and by giving 100 percent to everything we do.

You will be missed, Will, but never forgotten.

As you know, running and life become deeply intertwined, and this sport can be a great vehicle for inspiring greatness in other areas.?

— Will Fulford

One thing Will told me that has stuck with me is, ‘One of the million ways running is like life is that you have to keep going, and it always gets better.’ This past fall, with Will’s training, my teammate Annelise and I ran a marathon and qualified for Boston, a life goal for both of us. Before the race we dedicated each mile of the race to someone important in our lives that had gotten us to that race... Will got mile 26.?

— Tasia Arabatzis (M.S. in Biological Sciences, ‘17)

Will was the type of coach who believed in you even when you didn’t believe in yourself. He inspired all of his athletes, myself included, to push ourselves more than we realized we could. This helped me find success not only in running but in other aspects of my life as well.?

— Stephanie Ostrowski (Applied Exercise Science, ‘17)

I had the privilege of having Will as a coach for my four years at UNE, and he was one of the best and most dedicated coaches I’ve ever had. I wouldn’t be the runner or the person I am today if it wasn’t for Will.?

— Brittny Sorbelli (COP, ’19)

Will was a quality-over-quantity guy when it came to his words. I had never met a coach who could change my entire mindset in two sentences until he came along. We all agreed we could hear his voice in our heads during races saying what he would always say to us: ‘You’re fine.’ And that was just it, we were fine. Will knew the workouts to make us physically stronger, but, more importantly, he knew what to say to help us become mentally stronger. And for that, he will never be forgotten.?

— Erin Edwards (Neuroscience, ’15)
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Zebrafish expressing Green Fluorescent Protein glow under a black light in their aquarium. These commercially available "GloFish" were genetically engineered to produce green fluorescent protein in all of the cells of their body.
Small Fish Bring Big Opportunities to UNE

DEENA SMALL, PH.D., ASSOCIATE PROFESSOR, COLLEGE OF ARTS AND SCIENCES
JERI FOX, PH.D., ASSOCIATE PROFESSOR, COLLEGE OF ARTS AND SCIENCES
KAREN HOUSEKNECHT, PH.D., PROFESSOR, COLLEGE OF OSTEOPATHIC MEDICINE

I realized how useful zebrafish would be for not only research but also as a hands-on learning tool for students taking courses in a wide range of disciplines,” said Small.

“I was amazed at the ability to visualize effects of chemicals and pharmaceuticals on cell types and tissues in the embryonic and adult fish,” said Small. “I realized how useful zebrafish would be for not only research but also as a hands-on learning tool for students taking courses in a wide range of disciplines.”

Small soon identified faculty and staff from both the College of Arts and Sciences (CAS) and the College of Osteopathic Medicine (COM) who had knowledge about the zebrafish model and were excited to establish a facility at UNE. A committee was formed, including Small; Jeri Fox, Ph.D., professor of biology and marine sciences; Karen Houseknecht, Ph.D., professor of biomedical sciences; Megan Beauchemin, Ph.D., postdoctoral fellow in biomedical sciences; and Zachary Miller-Hope, M.S., lecturer in biology. The committee’s goal was to conduct a feasibility study; find space for the facility; and seek funds to finance the initiative. The group was thrilled when CAS Dean Jeanne Hey, Ph.D., COM Dean Jane Carreiro, D.O., and Vice President for Research and Scholarships Edward Biskis, Ph.D., offered their enthusiastic support.

David Mekler, Ph.D., chair of the Department of Biomedical Sciences (COM), explained, “The COM dean and I supported the zebrafish facility because of the need to continually invest in our research infrastructure with the latest science in order to support the research of our faculty.” CAS Associate Dean David Guay, M.S., echoed this sentiment and remarked, “The establishment of a facility for a new model organism will have a lasting impact on the university for decades.”

Teaching, research, entrepreneurship, outreach

The goal of the UNE Zebrafish Education and Research Facility is to provide UNE faculty, staff and students with opportunities to pursue these essential UNE missions. The effort to establish the facility began after Deena J. Small, Ph.D., associate professor of chemistry and physics, attended a toxicology conference where scientists from all over the world were presenting data that used zebrafish as a model system.

WHY USE ZEBRAFISH FOR RESEARCH?

The zebrafish, Danio rerio, is a small, striped, tropical minnow originally found in South Asia. The zebrafish has gained acceptance as a vertebrate model system for studying human disease, as they share over 70 percent genetic similarity with humans. Zebrafish are utilized in all aspects of biomedical research, including development, regeneraton, infectious disease, cancer and toxicology. Advantages include amenability to genetic manipulation, cost effectiveness and rapid embryonic development. It is no wonder that these amazing creatures have earned their rightful place in the world of biomedical research.

The establishment of a facility for a new model organism will have a lasting impact on the university for decades.

David Guay

Several UNE faculty members are already engaged in collaborations on a variety of projects. Houseknecht is conducting a study with scientists at the Mount Desert Island Biological Laboratory (MDIBL) in Salisbury Cove, Maine, which she says “will elucidate the developmental pharmacology underlying mood disorders, including ADHD, using genetic, behavioral and pharmacology approaches in zebrafish.” Both Small and Fox also are working on environmental toxicology studies with faculty from UMaine, MDIBL, Smith College and UMass.

Zebrafish serve as an important model for studying human disease, as they share over 70 percent genetic similarity with humans.”

~ Megan Beauchemin

Meantime, Kerry Tucker, Ph.D., associate professor of biomedical sciences, plans to use zebrafish to study diseases caused by defects in cilia organelles.

Zebrafish have many advantages as a research model:

1. They are 70% genetically similar to humans.
2. They have a rapid life cycle, with larvae developing in a week.
3. They have a transparent body, allowing researchers to observe internal processes.
4. They are small, making them easy to work with in large numbers.
5. They are amenable to genetic modification.

These features make zebrafish a powerful tool for studying human diseases, including cancer and neurodegenerative disorders.

The UNE Zebrafish Education and Research Facility team (from left to right): Megan Beauchemin, Ph.D., Karen Houseknecht, Ph.D., Deena J. Small, M.D., Jeri Fox, Ph.D., and Zachary Miller-Hope, M.S.

The developmental stages of zebrafish are shown in the figure below. The eggs are fertilized until they reach the juvenile stage. A. Larval stage. B. Larval stage at the 64-cell stage. C. Larval stage at the 64-cell stage. D. Larval stage at the 64-cell stage. E. Larval stage at the 64-cell stage. F. Larval stage at the 64-cell stage. G. Larval stage at the 64-cell stage. H. Larval stage at the 64-cell stage. I. Larval stage at the 64-cell stage. J. Larval stage at the 64-cell stage. K. Larval stage at the 64-cell stage. L. Larval stage at the 64-cell stage. M. Larval stage at the 64-cell stage. N. Larval stage at the 64-cell stage. O. Larval stage at the 64-cell stage. P. Larval stage at the 64-cell stage. Q. Larval stage at the 64-cell stage. R. Larval stage at the 64-cell stage. S. Larval stage at the 64-cell stage. T. Larval stage at the 64-cell stage. U. Larval stage at the 64-cell stage. V. Larval stage at the 64-cell stage. W. Larval stage at the 64-cell stage. X. Larval stage at the 64-cell stage. Y. Larval stage at the 64-cell stage. Z. Larval stage at the 64-cell stage.
Deborah DuDavor, Ph.D., associate lecturer of biology, and Jess Wheeler, M.S., biology laboratory assistant, have already planned genetics courses such as Fish Genetics (BIO 205) in which students breed and examine zebrafish embryos to study Mendelian genetics and chromosomal inheritance. Finally, as part of UNE’s outreach mission, zebrafish will be accessible to local schools and other educational organizations in the community. For example, Deb Landry, Ph.D., founder of iXplore STEM, plans to incorporate UNE zebrafish into her summer science program. “I look forward to this exciting new science education opportunity,” Landry said.

ZEBRAFISH AS AN OPPORTUNITY FOR ENTREPRENEURSHIP

The UNE zebrafish facility will also lend itself to biotechnology and aquaculture initiatives with local business partners. UNE and the Fish Vet Group in Portland, Maine, have already signed an agreement for student internships. Discussions are also underway with this company and others regarding collaborative projects on aquarium design and the development of specialty feeds. Anthony Santella, M.A., assistant lecturer of business and UNE Makerspace coordinator, is excited that the facility can be used as a resource to support entrepreneurship initiated by UNE faculty and students who may be focused on the biotechnology and aquaculture sectors. He thinks this work may potentially open new revenue streams that support UNE programs.

Given the diversity of potential applications, these small fish will indeed bring big opportunities for teaching, research, entrepreneurship and outreach to UNE.

UNE has one of the only aquarium science programs in the northeast [...] the addition of the zebrafish will augment experiences preparing students for employment in the growing number of zebrafish centers associated with research hospitals, universities and businesses.”

— Jeri Fox

“ZEBRAFISH AS AN EXPERIENTIAL LEARNING TOOL

Zebrafish are an easily accessible, inexpensive hands-on tool for education. UNE faculty teaching in diverse disciplines such as biology, chemistry, environmental science, marine science and neuroscience can develop innovative pedagogies with zebrafish that spark student interest. Students enrolled in the Aquaculture and Aquarium Science program in the Department of Marine Sciences will clearly benefit from the facility, as Fox, the program’s director, explained: “UNE has one of the only aquarium science programs in the northeast,” Fox said, “but until now, students’ experiences were primarily limited to food organisms and ornamentals. Although the program has been successful at post-graduation placement, the addition of the zebrafish will augment experiences preparing students for employment in the growing number of zebrafish centers associated with research hospitals, universities and businesses.”

The UNE Zebrafish Education and Research Facility is expected to be the only full-service facility in the southern Maine and coastal New Hampshire area. UNE personnel may use facility services for nominal fees. User fees will also be generated from educators, scientists and businesses interested in using zebrafish in their classrooms, laboratories and businesses. The facility is expected to be open by summer 2017 and will offer workshops on research techniques and pedagogy over the upcoming year. Given the diversity of potential applications, these small fish will indeed bring big opportunities for teaching, research, entrepreneurship and outreach to UNE.

The Aquaneering, Inc. Aquaria system that will house up to 7,000 zebrafish within the UNE Zebrafish Education and Research Facility will be located in Morgane Hall on the Biddeford Campus. The facility will also produce approximately 2,000 zebrafish embryos per day and offer services including the production of transgenic fish.
A question we hear frequently from prospective students and their families is how they can ensure their students will have the best possible experience. “Where do your graduates end up?” There are many variables that impact placement for college graduates, including the amount of hands-on research experience a student has. One salient factor at UNE is the opportunity undergraduate students have to work side-by-side with faculty in their research labs. The growth in STEM disciplines at UNE, including the interdisciplinary neuroscience major, has resulted in recruitment and retention of nationally- and internationally-recognized faculty and, importantly, the attraction and retention of top-tier students to our campus.

The behavioral pharmacology laboratory of Glenn Stevenson, Ph.D., associate professor of psychology, is but one example of dozens of UNE faculty research laboratories that employ undergraduate students with a primary mission of training them to think and perform as scientists. Students in the Stevenson Lab run all experiments, do all data recording, analysis and interpretation, write software code to run equipment, take part in planning future directions, present data at national and international meetings, and serve as co-authors on peer-reviewed published journal articles. Stevenson promotes one junior each year to serve as lab manager, and this student leads all projects — a responsibility typically reserved for graduate or postdoctoral students at most institutions. Students typically join the lab as freshmen or sophomores and stay until graduation. Since the Stevenson Lab was started until graduation. Since the Stevenson Lab was started, nearly 150 students have begun ePortfolio work. By including projects assigned in a variety of classes, as well as their own creative work, students can use ePortfolios to curate a body of digital work over time. Eventually, students will use their ePortfolios to showcase their learning and professionalism as they apply to graduate programs or prepare to enter the workforce.

Jesse Miller works with English Composition students on the development of their ePortfolios in the DigiSpace.

Enthusiasm for the DigiSpace and ePortfolio is not just limited to faculty. Sandy Pham (Elementary Education, ’25), working on a project for her Introduction to the Humanities class, noted, “I have worked with students recording speeches and on their ePortfolios. I am excited for a class that is going to be using [the audio application] Audacity to voiceover a Prezi [the web-based presentation application]!”

Although the future is unknowable, creating opportunities for students to gain facility with an ever-increasing digital toolbox may be the best way to ensure they are prepared to meet whatever tomorrow has to offer.
Maine has been called the place where America really began (Caldwell, 2001). If Maine is where America began, then its first communities were on the islands of Maine. These islands have played and continue to play a critical role in the history, economy, environment and social life of the state.

The nature of this role and of these communities, however, is changing. Previous efforts on my part have focused on the role of community sustainability in the year-round islands of Maine (McReynolds, 2014). During my earlier research (McReynolds, 1997) it was evident that food availability and the cost of food on the islands were growing concerns. Prices of food were, on average, 31 percent higher on the islands. Furthermore, many foods were simply not regularly available, such as fresh vegetables and meats (McReynolds, 2014).

Parallel to my work on the islands was a growing body of literature that examined the importance of food security in economic and social development (Swaminathan, 2001; Pothukuchi, 2004). More recently, literature has been emerging on how to measure food insecurity and its relationship to development (Barrett, 2010). This work, however, has largely been applied to developing nations and island communities in Asia, while little, if any, such work has been done on island communities in the United States. Although housing (Satang, 2009) and jobs (McReynolds, 2014) remain at the center of sustainability, food is a growing and often overlooked element of community development (Brocklesby and Fisher, 2003).

Preliminary results from the research indicate that island food prices relative to the mainland have fallen to 24 percent in difference and that many islands have found new and creative ways to cope with food issues. Still, problems of availability and security remain. Specifically, the precarious nature of island stores remains a central issue to island life.

More importantly, however, this research has raised important issues of public health in island sustainability. For example, our survey indicated that fewer than 30 percent of respondents believed there were sufficient resources for health care on the island, while 44 percent disagreed or strongly disagreed with this conclusion.

Our interviews yield other areas in need of further exploration. For example, the incidence of diseases, such as cancer, that appear to be well above state and national norms was noted. The next step is to obtain the epidemiological data to determine if these anecdotal incidents speak to a greater health concern.
Invasion of an Aggressive Crab
MARKUS FREDERICH, PH.D., PROFESSOR, DEPARTMENT OF MARINE SCIENCES

How do you get rid of an aggressive and destructive invasive marine crab? First, you need to understand the biology of that invader. This is exactly what Markus Frederich, Ph.D., professor of marine sciences, and his team of graduate and undergraduate researchers aim to do.

Frederich and his team are investigating the European green crab, Carcinus maenas, including how the genetically different populations in Maine, Nova Scotia, Newfoundland and Iceland vary in aggressiveness, behavior and stress tolerance. By placing crabs from different populations into an artificial eelgrass bed and monitoring the resulting destruction, by running the crabs on a treadmill, and by exposing the crabs to changing temperatures and salinities and assessing resulting protein and gene expression, a detailed understanding of the intrinsic differences between the populations slowly emerges.

Initial data show the crabs from Maine as the more docile population, while the crabs from Newfoundland are more aggressive. While Maine and Newfoundland crabs are genetically distinct populations, the crabs from Nova Scotia are a hybrid between both and are so aggressive that they even jump out of the water to attack. To make matters worse, the very aggressive hybrid crabs from Nova Scotia seem to be slowly invading Maine waters. Frederich and his team are working on investigating what damage this new invasion will cause.

Frederich's team will continue to monitor this MIMIC site monthly for the next few years to evaluate trends in the abundance of present invaders and to identify potential new invaders. All data will be included in the MIMIC database and will help in the ongoing effort to manage and monitor invasive species in New England.

Establishing a New Invasive Species Monitoring Site as Part of the MIMIC Network

Removing an established invasive species from an ecosystem is nearly impossible. Therefore, several programs and processes were established to track and monitor invasive species, to either remove the very first invaders or to understand the dynamics of the respective invasions.

In New England the Marine Invasive Monitoring and Information Collaborative (MIMIC) monitors more than 60 sentinel sites on a monthly basis for a specific set of 16 invasive species. Frederich and his team of undergraduate and graduate students established a new MIMIC monitoring site at the coast of Biddeford Pool and assessed it for invasive species from May 2016 to September 2016. Eight invasive species were found: Botryllus schlosseri, Botrylloides violaceus, Carcinus maenas, Didemnum vexillum, Hemigrapsus sanguineus, Membranipora sp., Ostrea edulis, and Codium fragile. The abundance of these species varied throughout the summer, with seasonal trends for some species but not for others. So far, no new, presently unknown invasive species was detected in the new MIMIC site.

Frederich's team will continue to monitor this MIMIC site monthly for the next few years to evaluate trends in the abundance of present invaders and to identify potential new invaders. All data will be included in the MIMIC database and will help in the ongoing effort to manage and monitor invasive species in New England.
“Everything that I do is an exploration of movement,” exclaimed Kim Bernard, M.F.A., UNE’s first artist-in-residence, leaping from her chair before a classroom of smiling, wide-eyed students. Bernard’s work, much like the artist herself — kinetic, interactive and community-focused — is often situated at the intersection of art and science.

Growing up, Bernard always knew she wanted to be an artist but had no idea how important science would be to her work. As Bernard explained, “With each and every kinetic sculpture I create, I learned more about Newton’s laws, mechanics, resonance, harmonic oscillation, wave interference — the list goes on. Had I only known in high school what I’d become most curious about later, I might have paid more attention in science class.”

As UNE’s artist-in-residence, Bernard is charged with developing science-inspired works of art and assisting faculty and students. Visiting Assistant Lecturer in English Jesse Miller invited Bernard into his classroom to speak with students in his An Introduction to the Humanities class. During an intimate seminar, Bernard described how the immobility of several family members — including the paralysis of her father — significantly altered her life. From those difficult experiences, however, Bernard has found inspiration, transforming them into art.

Lauren Gerhard (Education, ’20) observes, “Taking the sympathy and pain she felt for her loved ones, Bernard weaved her love of art together with physics, engineering, the study of sound waves and science to build her sculptures. The way she fuses art and science together to create such stunning yet simplistic pieces is truly amazing.”

Bernard’s post on campus signals the vital importance that both science and art have in shaping the lives of students at UNE. At the completion of her residency, Bernard will create one new work of art, which will become part of UNE’s permanent collection.

To see more of Bernard’s artwork, visit www.kimbernard.com.
Interview with Alex Campbell: UNE’s Only Philosophy Major

DAVID LIVINGSTONE SMITH, PH.D., PROFESSOR, DEPARTMENT OF HISTORY AND PHILOSOPHY

Alex Campbell graduated in 2014: the one and only philosophy major in the history of the University of New England. I caught up with him at Indus University, Bloomberg, where he is doing graduate study, and asked him some questions about his academic trajectory.

“When I first came to UNE, it was because of my interest in physical oceanography and environmental science,” Campbell said. “But during my first semester, I happened to pick two philosophy courses with Dr. Smith to meet some of my core requirements and was soon enthralled.”

He went on to tell me that he discovered that philosophy dissected how people think about the relations between concepts in ways that he hadn’t experienced in any other field of study. “After I found this passion,” he said, “I knew that I wanted to major in philosophy. UNE doesn’t offer a philosophy major, so I created my own personal major.”

Next, I asked Campbell what he thinks the study of philosophy has to offer to students at UNE. He was adamant about the importance of philosophy for any field of study. “Philosophy is about combining his philosophical and scientific approachability, centered on training students,” he continued to say. “This environment allowed me to learn about rigorous science and research methodology, and it instilled in me the confidence to give presentations, which has been essential to my rising career.”

Ganter hopes that many more students with talent, curiosity and determination like Follansbee’s will take advantage of transformative research experiences with UNE’s faculty.

After studying medical biology as an undergraduate at UNE, Follansbee enrolled in UNE’s master’s program in biological sciences and researched the mechanisms of pain using the fruit fly system in Geoffrey Ganter’s lab. The project, which was supported by the Center for Excellence in the Neurosciences and NIH’s Center of Biomedical Research Excellence grant, allowed Follansbee to identify several genes required for injury-induced pain sensitization.

These genes, the subjects of a first-author manuscript currently in review, may represent targets for novel drugs for the treatment of chronic pain. Follansbee presented his results at the Genetics Society of America’s Drosophila Research Conference in San Diego, California, and at the Maine chapter of the Society for Neuroscience in Orono, Maine. In addition, he helped Ganter prepare an application to the National Institutes of Health’s Academic Research Enhancement Award program. The application was successful, and the three-year $443,400 grant now supports Ganter and his group’s continuing research on pain.

Follansbee recently credited UNE professors for creating what he called “an environment of approachability, centered on training students.” He continued to say, “This environment allowed me to learn about rigorous science and research methodology, and it instilled in me the confidence to give presentations, which has been essential to my rising career.”

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Kendra Albert (College of Medicine '16) stands next to Lifeflight, a life-saving helicopter service employed by Eastern Maine Medical Center. Collaborations between UNE COM and rotation sites such as Eastern Maine Medical Center strengthen bonds to local communities while providing student doctors critical experiences in the field.
In October 2015, the World Association for Disaster and Emergency Medicine (WADEM) extended an invitation to the UNE College of Osteopathic Medicine (COM), asking its students to form what would be the first student club to be part of this international organization, as a pilot, before they consider establish students from other medical and health-science schools.

WADEM links the military world with the civilian world, and the potential for improving global emergency health care is greater than it would be with the two worlds functioning independently.

WADEM wants to involve and educate future health care professionals from around the world in its ongoing efforts to improve preparation and intervention in disaster and emergency medicine. Guided by COL William Bograkos, M.A., D.O. ’85, president for the American Osteopathic Academy of Addiction Medicine (AOAAM) and advisor for the Association for Disaster Medicine (ADAM); Victoria S. Thieme, D.O. ’93, director of community medicine; and Jennifer Gunderman, M.P.H., assistant lecturer in the School of Community and Population Health, WADEM-UNE endeavors to mentor future health care leaders in the discipline of disaster medicine.

Communication, collaboration and cooperation are the skills that define a high-functioning team and are absolutely critical to disaster responders. As such, students in the WADEM-UNE club seek to immerse themselves in new situations to test their abilities and encounter new opportunities for growth.

As UNE functions from two primary campuses, the students are learning to bridge the geographical barriers while planning and working together to develop presentations, outreach and other learning activities in the discipline of disaster management.

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— Stacey Thieme

One such activity is leadership and team building through Equine Assisted Therapy. After a disaster, victims may need a wide range of services and assistance, and disaster responders are specially trained and equipped to help. But the response team’s theory and skills need to be developed in a safe environment—one that offers the opportunity for discussion and reflection, in order for the students to fully understand the role they play on the disaster-response team.

Working with the equine therapy staff at River Wind Farms allowed the WADEM-UNE club (and also the Addiction Medicine Club) to surpass their comfort levels, learn new skills and continue developing patient compassion.

“Compassion allows wisdom to grow within each of us if we are supported and encouraged to perceive our similarities and our differences as human beings,” explained Stacey Thieme, D.O.

Equine-assisted learning has grown in popularity over the last few years as health care providers recognize the limitations of purely pharmaceutical interventions. As WADEM-UNE is a melding of the civilian and military communities, this four-hour event was the first effort to reach out to the greater UNE community to teach and learn leadership and team-building skills.

Horses were the patients. The patients were rather large and stubborn and enjoyed eating hay and playing with each other. The equine therapists challenged the students to see how the equine behavior was similar to that of a patient with Type 2 diabetes who does not want to attend to behaviors that need modifying. This event included representation from the College of Osteopathic Medicine and the College of Pharmacy, from faculty in the Physician Assistant Program, and staff from the UNE Portland Counseling Services.

“...the experience was mind-blowing and heart-opening,” said participant Carla Johnson.

So, who should join WADEM-UNE? Students with an interest in public health, global health and emergency medicine are the obvious participants. However, you should also join if you are interested in learning strategy and operations as a team member while carrying out a health care intervention. WADEM seeks both civilian and military students. Our goal is to foster leadership and team-building skills while accumulating knowledge around disaster preparedness and intervention. Other areas of conversation within this group include: What is a disaster? Who is affected by a disaster? What special populations need a plan in place in case of a disaster? What are the differences between the intervention needed in an underserved population versus a well-resourced population during a disaster?

Since everybody in the health care field feels responsible in the aftermath of a disaster, why not join WADEM-UNE and learn to be a participant and an active part of a solution?
Meghan A. May, M.S., Ph.D., Associate Professor of Microbiology and Infectious Diseases

Rapid Evolution of Zika Virus and its Study

In May of 2015 I received the first of what turned out to be many outbreak alert notices describing cases of fever in Brazil associated with Zika virus. I raised my eyebrows, mildly interested, and then scrolled on to the next notice. I had heard of Zika in passing, but I couldn’t have told you much about it other than that it was a disease no one thought of as a crisis. As for the cases being reported in Brazil? I shrugged them off too.

It is not spectacularly unusual to see diseases leap from one part of the world to another in the age of air travel. It was just over a year ago that Zika infection was first linked to the severe birth defect microcephaly. Since that time, researchers from all over the world have cooperated and shared their findings in ways that are almost unprecedented. Why? We need tangible, solid tools to apply to this crisis. Perhaps it is because of Zika’s impact on the most vulnerable among us, but this disease has created a fervent demand for rapid outcomes of studies that is rarely seen. On behalf of theUNE College of Osteopathic Medicine, I am pleased to have provided some context to choose Zika virus targets and am similarly pleased to have provided continuing medical education training on Zika for COM alumni in October. The end goal for all of us is positive clinical outcomes for patients, and, on both research and physician-training levels, COM has taken action toward creating positive outcomes for Zika patients.

These findings have great potential to inform the way we design laboratory tests and vaccines because it is far easier to hit a stable target than a moving one. Further, our study found that some of the evolved changes seemed to vary the function of the Zika’s proteins in meaningful ways. Most notably, we found that a small change that all of the Western Hemisphere isolates had in the envelope protein made them able to interact with neurons, potentially explaining why we are suddenly seeing impacts on the brain. We published this study in September, just four months after the symposium.

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Oh! The Places You’ll Go! One Path to Research and Scholarship

Gioia Guerrieri, D.O., a 2008 graduate of the University of New England College of Osteopathic Medicine (COM), has worked diligently since her acceptance at the college in 2004 to advance knowledge and practice through research.

Upon Guerrieri’s acceptance into the college, shejumpstarted her research career by applying for and receiving her first COM’s Dean’s Research Fellowship, titled, “UNECOM First Year Medical Students Perceptions of Older Adults: Pre and Post Curriculum Measures.” She was awarded this fellowship even before her medical school classes started. As Guerrieri’s research mentor from her arrival at COM to now, as her peer mentor, Marilyn R. Gugliucci, Ph.D., professor and director of Geriatrics Education and Research, has witnessed firsthand Guerrieri’s tenacity in advancing her career development and job transitions through research.

The foundation of Guerrieri’s career continued to build as she progressed through medical school. In the spring of her first year, Guerrieri was awarded the highly-competitive American Federation for Aging Research (AFAR) Medical Student Training in Aging Research (MSTAR) Fellowship. She researched the “Impact of At-Risk Drinking on the Development of Disability Among Middle-Aged and Older Persons” at UCLA Medical Center, California (UCLA Mentor: Alison Moore, M.D.). The project led to a peer-reviewed publication.

Guerrieri then presented the results of the AFAR MSTAR research at the Northeast Osteopathic Medicine Education Network (NEOMEN) and was awarded first place for Student Original Research. She also presented this research at the American Geriatrics Society (AGS) 2006 Annual Scientific Meeting and was awarded the AGS President’s Award for Student Original Research. These honors were quite extraordinary to attain as a second-year medical student and spoke to Guerrieri’s talents as a researcher.

During the summer before her third year of medical school, Guerrieri became the second COM student in ten years to attain the highly-competitive Betty Ford Center Summer Institute for Medical Students (SIMS) Fellowship, which enabled her to work with patients and their families at the Betty Ford Center. Guerrieri expressed early on in medical student training her desire to pursue psychiatry as a specialty. She was also one of twenty medical students nationally to be awarded the Boston University Medical School and American Geriatrics Society’s Geriatrics Summer Institute Award. Guerrieri’s student leadership extended beyond her roles within the American Geriatrics Society/UNE COM Student Chapter (co-president) and the UNE New England Research Club (co-president). She was elected by her medical student peers as chair of the American Geriatrics Society National Student Health Professionals Special Interest Group. Despite the AGS’s strong allopathic focus and leadership, Guerrieri worked with medical students across the country to organize symposia sponsored by the AGS student organization at the annual meeting.

Through her clerkships, she continued to apply herself to research as well as leadership, attaining a COM Dean’s Research Fellowship during her fourth year. Her project, titled “Timing and Referral Patterns of Hospitalized Patients on Medical Floors to Psychiatric Consultation-Liaison Services,” contributed to Guerrieri being awarded the Madeleine McCormick Osteopathic Education Scholarship. She was one of 20 medical students and residents selected to participate in leadership training for women in medicine and mentorship. She also authored a Medical Student Beginner Guide to Research, which she dedicated to UNE’s COM students.

At graduation, Guerrieri matched at the Mayo Clinic, Minnesota, psychiatry residency program and continued her passion for healthy aging and clinical research by working with neuropsychiatrists on geriatrics depression, becoming the chair of the department’s resident Neuropsychiatry Case Conference and becoming an Internal Review Board (IRB) member. At the Mayo Clinic, she received an academic appointment and was awarded the Resident Psychiatric Research Grant (an American Psychiatry Institute/Janssen Scholarship for “5-HTTLPR Polymorphisms as Predictors of Response to SSRI and SNRI Treatment among Depressed Persons Aged 50 and Older”). In addition, she received the Mayo Clinic Department of Psychiatry honors for “outstanding team member” and “significant contributor to geriatric psychiatry” in 2010. In 2011, Guerrieri was one of two residents in the nation to be accepted as a fourth-year psychiatry resident to the National Institute of Mental Health (NIMH) Division of Intramural Research Program. During her four years of clinical research experience with Peter Schmidt, M.D., section chief of Behavioral Endocrinology, she became an associate investigator on several protocols in reproductive endocrine-related mood disorders, focusing her work on the hypothalamic-pituitary-adrenal axis in premature and normally timed menopause, premenstrual dysphoric disorder and postpartum depression. She has published in Menopause, JAMA, Neuropsychopharmacology and Archives of Women’s Mental Health. She also started her private medical practice (Well-Minded) during that time, which is an outpatient practice focused on healthy aging, women’s behavioral health and osteopathic principles.

Since 2015, Guerrieri has served as a regulatory medical officer for the Food and Drug Administration (FDA), while continuing her professional development at the NIMH and maintaining her private practice. Currently, she is revising the Medical Student Beginner Guide to Research by adding the pearls she gleaned as a resident “research-track” and clinical research fellow. Publication is planned for 2017.

Guerrieri’s awards, fellowships and publications attest to her multiple strengths: intelligence, training, passion and ability to work compassionately with people of all ages. Guerrieri is recognized for her numerous services to the UNE College of Osteopathic Medicine and its students. She is a wonderful ambassador for research training of osteopathic medical students.
Victoria Stacey Thieme, D.O., director of Community Medicine in the College of Osteopathic Medicine, has been encouraging the students of St. John’s Catholic School to cultivate a deeper appreciation for science and its application to their lives. For the past four years, Thieme has been visiting her daughter’s class and giving presentations on science topics. A background in addiction medicine and health education made Thieme an excellent liaison for these activities. This year, when a teacher sent an educational article to parents about the changing adolescent brain, when the child is young, parents make decisions for the child. As the child grows and the brain grows, the child needs to be allowed to make some choices alone. Hopefully, you’ve learned how to make good choices by the time you are a young adult. This takes practice and lots of communication. But as we all know, not everyone has an opportunity to develop these skills equally well. Thieme’s goal was to really reinforce the fact that the decisions people make have real, tangible consequences. Students needed to examine their own behaviors and actively, consciously change some of them.

“I want to be a doctor when I grow up, so this was a great learning experience. Getting to use a scalpel was especially cool. I hope you can do more fun stuff with us next year!”
— Clare, St. John’s 5th grade student

To get students examining their own behaviors, Thieme began with an activity that refreshed them on the parts of the brain and the functions of the varying brain areas. From there, they moved on to communication — namely, how the different areas of the brain talk to each other (via electricity). The pre-frontal cortex was the leader, the midbrain was the emotional center, and the hind-brain served as the survival center, and the hind-brain served as the survival area. The students needed to force the pre-frontal cortex to listen and understand the needs of the other two areas, without surrendering control. When the emotional and survival areas make the decisions, they are not as well thought-out and can have long-term negative consequences. The pre-frontal cortex is the “voice of reason” and needs to be taught how to lead, especially during times of stress.

“One day, I hope I’ll be able to change some of them.
— Sam, 5th grade student

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“This students will be some of our future community leaders; therefore, we must prepare them and arm them with knowledge and mentorship.”
— Victoria Stacey Thieme

The results of these visits seem to be overwhelmingly positive. Clare, a fifth grader from St. John’s, thanked Thieme with a note that read, “Thank you so much for teaching us about the brain. Dissecting the brain was really fun and interesting. The brain helmet was really funny and the Kit-Kat was delicious. I want to be a doctor when I grow up, so this was a great learning experience. Getting to use a scalpel was especially cool. I hope you can do more fun stuff with us next year!”

Thieme’s teaching goal is to inspire future passionate scientists, osteopathic physicians and amazingly awesome members of society. “If I can touch one young person’s life in such a way that they say ‘no’ to drugs, say ‘yes’ to health, ‘yes’ to compassion, and learn to cope and deal with life’s stressors, then I will be grateful for this time with these students.”

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Thieme is grateful to UNE for providing opportunities and support for her to pursue ongoing educational outreach in the local community.
There is a lot that goes into an education. A good education must include not only classroom learning, but also experiences outside the classroom. Students come to UNE for both the classroom learning and for the uncommonly broad range of opportunities to work with faculty in their research labs. An advantage of doing undergraduate research at UNE is that, unlike larger research universities, UNE does not have many graduate students and post-doctoral fellows. Therefore, undergraduate students have much larger roles in the lab, often conducting their own projects and gaining authorship on publications. Regardless of how far they get in their research, however, they learn that the research itself is exciting and important. Some become involved to the point of being given their own projects, leading to presentations at national meetings and, finally, publication in peer-reviewed journals. Regardless of how far they get in their projects, they always have a sense of accomplishment.

The COM students have so much to do in their two short years here on campus, I am constantly amazed by their ability to get research done too. These COM research fellows have included Tammy Hay, D.O. ’90; Linda Stambaugh, D.O. ’91; Frank Parker, D.O. ’92; Kathleen Quahe Corres, D.O. ’92; Robert Moore, D.O. ’93; Sherry Stolig, D.O. ’94; Guðbjörg (Karlsson) Asmundsson, D.O. ’99; Heidi Wenmmer, D.O. ’00; Janice Grivetti, D.O. ’08; Jacqueline Ciancosi, D.O. ’11; Ethan Beaudette, D.O. ’14; Nicholas Church, D.O. ’15; Sandi Chen (COM ’18); Tim Newell (COM ’18); and Shiva Kolangara (COM ’18). The Federal Work Study program has been a huge benefit to my students and to the research. This program has allowed students to be paid for their work in the lab while they are getting research experience. CAS has attracted students who are interested in doing their undergraduate program at a university with graduate health science programs. Since the undergraduate students know that having research on their applications to advanced degree programs helps them gain admission to those programs, they are motivated to join the research labs. Soon, however, they learn that the research itself is exciting and important. Some become involved to the point of being given their own projects, leading to presentations at national meetings and, finally, publication in peer-reviewed journals. Regardless of how far they get in their projects, they always have a sense of accomplishment.

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Teresa May, D.O., received her medical degree from the University of New England College of Osteopathic Medicine in 2008. She did her internal medicine residency at Maine Medical Center (MMC), receiving the Intern of the Year award in 2009. During her residency, she became interested in critical care medicine and began working with David Seider, M.D., and Richard Riker, M.D. From 2011 to 2014, May did a pulmonary and critical care fellowship at MMC, went on to complete another fellowship in neurocritical care at Columbia Presbyterian, and then received a certificate in Clinical and Translational Sciences from Tufts University. She has co-authored eight peer-reviewed publications in the area of critical care and is part of an active research program at Maine Medical Center (MMC), receiving the Intern of the Year award in 2009. During her residency, she was awarded a KL2 grant titled "Variation in patients surviving cardiac arrest. This year, in Sedation and Neuromuscular Blockade research, May's current research focuses on the influence of sedation and cognitive outcomes in cardiac arrest patients. At MMC, May works with UNE students on various projects. This summer, she and Pasquale Marotta (COM, ’19) initiated a study titled "PROspective Validation of Sedation and Neurological Scales" (PROVEN) and a retrospective review of antibiotic prophylaxis in cardiac arrest patients. They are continuing their collaboration throughout this year.

May speaks readily about the importance of student involvement in research, saying, "There is a big learning curve when it comes to study design, implementation and statistical methods. Obviously, having more experience early in someone's career would be helpful. There is a robust student research program at UNE that complements a variety of interests. I am looking forward to combining the research we are doing at Maine Medical Center with what is being done at UNE."

Up and Coming Researcher: Student Doctor Mark Unger

Mark Unger (COM, ’18) earned his medical degree from the University of New England College of Osteopathic Medicine in 2018. Although the Tanger campus is far from his childhood home in Minnesota, but that is exactly where his current research focus is. Unger's research and clinical work is being done at Maine Medical Center. His research is focused on outcomes after cardiac arrest and has a separate grant through the Maine Medical Center Cardiovascular Research Institute to study outpatient neurocognitive rehabilitation in cardiac arrest patients. As part of his fellowship, Unger works with UNE students on various projects. This summer, he and Pasquale Marotta (COM, ’19) initiated a study titled "PROspective Validation of Sedation and Neurological Scales" (PROVEN) and a retrospective review of antibiotic prophylaxis in cardiac arrest patients. They are continuing their collaboration throughout this year.

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JANE E. CARRIELO, D.O., DEAN, COLLEGE OF OSTEOPATHIC MEDICINE, VICE PRESIDENT FOR HEALTH AFFAIRS

When he applied to medical school in Maine, Mark Unger never expected he would end up in Minnesota, but that is exactly where his journey has taken him. During his second year at UNE, Student Doctor Unger was accepted into the Predoctoral OPP/Anatomy Fellowship program. As part of that program, Unger worked under the direction of Frank Willard, Ph.D., professor of anatomy preparing and presenting anatomical materials at national seminars for interventional anesthesiologists and radiologists. During one of these UNE-led training sessions, Unger had the opportunity to work with physicians and researchers from Mayo Clinic. Subsequently, when the Departments of Anesthesiology and Diagnostic Radiology at Mayo Clinic reached out to Willard with an opportunity for a student research trainee, Unger was identified as a potential candidate. Now, as part of an osteopathic research fellowship affiliation with Mayo Clinic, Unger is a research trainee in the Boulet Chronic Pain Lab under the supervision of Andreas Boulet, M.D., and Timothy Maus, M.D. In addition to gaining exposure to translational research paradigms, Unger works with mentors in the Neuroradiology, Diagnostic Radiology, Oncology and Anesthesiology departments to develop clinical skills around MRI and ultrasound interventions, post-operative recovery, catheterization, sedation, intubation and induction of general anesthesia. He is also responsible for teaching clinical and biomedical material to the laboratory technicians and personnel and for assisting with the design of clinically faithful chronic pain models. When asked about his experience thus far, Unger noted that one of the key skills he hopes to have refined when he is finished with the fellowship is that of "interpreting and applying the clinical evidence base to best help his future patients."

Mark Unger (COM, ’18)

Sign up in Maine. Study in Morocco.

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 www.une.edu
Children in Ghana pose after a soccer match.
Chronic Pain, Motor Output and Motor Learning in Knee Osteoarthritis
KATHERINE RUDOLPH, PT, PH.D., ASSOCIATE PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY

Sitting in a conference room, three students well on their way to becoming doctors of physical therapy are engaged in a lively discussion of what influences human motor control. One student notes, “I think we talked about this in our ‘neuro’ class the other day, is that the same principle?” It is as simple as that, the “ah ha” moment of classroom learning being applied to real life. The meeting is a “journal club” in which students read and present research papers from scientific journals to understand the science behind physical therapy and engage in an ongoing research project.

Titled “Chronic Pain, Motor Output and Motor Learning in Knee Osteoarthritis,” the research project was awarded an Academic Research Enhancement Award (AREA) from the National Institutes of Health. The goals of the AREA Program are to support meritorious research, expose students to research and strengthen the research environment of the institution. Directed by Katherine Rudolph, PT, Ph.D., associate professor in the Department of Physical Therapy, the research investigates whether chronic pain interferes with motor learning, which has important implications for the care of people with chronic pain.

Motor learning involves a complex process in the nervous system that occurs in response to the practice or experience of a skill. When error in a desired movement is detected, the information is used to adjust the output of the muscular system to reduce the error the next time the movement is performed. Chronic pain changes the way that sensory information is detected by the nervous system, and Rudolph’s research investigates whether sensory changes due to chronic pain from knee osteoarthritis reduce the ability to learn new ways of moving. Motor learning is the cornerstone of physical therapy, and a thorough understanding of the scientific principles underlying motor learning is vital to physical therapists’ practice. The results of the study will be used to develop rehabilitation programs to help people with knee pain to move both without pain and in ways that might slow progression of the osteoarthritis.

Rudolph is the director of the Motion Analysis Lab at UNE’s Portland Campus. She came to UNE in 2011 from the University of Delaware where she was an associate professor in physical therapy and director of the interdisciplinary Ph.D. program in biomechanics and movement science. Her mission is to help grow the research capacity in the Westbrook College of Health Professions, and involving students is an integral part of the process. As Rudolph explains, “I love doing research, and my favorite way to teach students is to demonstrate the principles they are learning and provide them with opportunities for discovery. ‘There is no better way to do that than through research, and this AREA award provides the means to accomplish those goals.”

The results of the study will be used to develop rehabilitation programs to help people with knee pain to move both without pain and in ways that might slow progression of the osteoarthritis.

In 2013, Rudolph developed the WCHP Summer Undergraduate Research Fellowship program, which she continues to coordinate. Around the same time, the Motion Analysis Lab moved from a site in Saco to the Portland Campus and, as Rudolph notes, “Since that time research and teaching in the lab has exploded.” More than twenty WCHP undergraduates have been involved in summer research fellowships, working with research mentors in the College of Health Professions as well as the College of Arts and Sciences and College of Osteopathic Medicine. “In 2016, students made connections between their classroom learning, patient care experiences and the research that produces ‘ah ha’ moments that make research fun and rewarding. Students make connections between their classroom learning, patient care experiences and the research that provides ‘ah ha!’ moments that make research fun and rewarding. Students make connections between their classroom learning, patient care experiences and the research that provides ‘ah ha!’ moments that make research fun and rewarding."
In 2016, over half of the D.P.T. class, 31 of 59 students, opted to participate in a research project, and 11 of them are working on my NIH-funded research,” notes Rudolph.

One student who worked with Rudolph commented in an evaluation that the experience “Realistically challenged my critical thinking!” while another wrote, “I can’t wait to come back in the fall and continue the project.” Two of the students contacted her while on their full-time clinical internships to discuss applying the information they had learned in class to actions performed in the Motion Analysis Lab, because they knew that they would have the capacity to think critically about the treatments they provide their patients so that our profession will continually advance and improve the lives of those in our care.”

Mary Bachman DeSilva, who joined the Westbrook College of Health Professions this June as an adjunct research professor, was recently awarded a two-year grant for $345,455 from the National Institute of Mental Health’s Division of AIDS Research. The “Supporting Adolescent Adherence in Vietnam” (SAAV) study just began in August, will assess the feasibility, acceptability and efficacy of an innovative approach to improving adherence to antiretroviral treatment among HIV-positive adolescents (age 12-15) in Vietnam. DeSilva will work with an experienced team of researchers in Hanoi, with strong support from Vietnamese officials and clinicians.

In 2012, there were an estimated 2.1 million global adolescents (10-19 years old) infected with HIV. The benefits of antiretroviral therapy (ART) have been well documented. Thus, achieving and sustaining high adherence to ART remain vital to treatment success. Recent data suggest that mortality is rising in HIV-infected adolescents compared to the general population, making adherence to ART in this population especially critical.

In Vietnam, more than 4,300 HIV-positive children and adolescents are currently on ART, and the first surviving cohorts of pediatric ART recipients are transitioning to adult care. More than 10 percent of these patients are already on second line therapy, raising concerns regarding adherence, drug resistance and the ultimate effectiveness of Vietnam’s HIV treatment program.

Emerging technologies, including electronic drug monitors (EDM), have demonstrated potential as adherence supports in adults. The SAAV study will extend EDM to adolescents. In formative work during the first phase of the study, investigators will examine facilitators of, and challenges to, adherence among adolescent ART patients and their caregivers, discuss strategies for improving adherence and refine options for the intervention. Investigators will also explore with clinicians their experiences caring for youth and managing the transition to adult care. Using this input, they will then tailor an EDM-based real-time adherence support intervention.

In the second phase of the study, a small randomized clinical trial with 80 adolescent patients from an HIV clinic in Hanoi will generate preliminary data on the efficacy of a real-time feedback package (which users may personalize) on adherence and clinical outcomes. The intervention over six months will measure two forms of adherence outcomes: 1) continuous feedback from wireless pill containers via telephone or bottle-based reminders when doses are missed; and 2) clinical data from monthly counseling sessions with a clinician informed by the real-time data. Comparison subjects will also provide adherence data via wireless pill containers and receive usual care along with an offer of counseling at monthly clinic visits. Additional quantitative and qualitative data will be collected using survey instruments and in-depth interviews. Analysis of these data will contribute to the currently limited scientific evidence base on ART adherence support strategies in adolescents.

The research team expects that findings will have a high potential for policy and program impact.
Cardiovascular disease (CVD) continues to be the leading cause of death in our country, and the rise in childhood obesity threatens to promote premature CVD in our youth. The Cardiovascular Health Intervention Program (CHIP) was started four years ago at UNE with Paul S. Visich, Ph.D., as the site primary investigator following grant support. The primary purpose of the study is to provide children with self-awareness and education about CVD, in the hope of encouraging a healthy lifestyle.

This past spring, a new test was added to the study to assess the thickness of the carotid artery, which is referred to as carotid intima thickness (CIMT), in a sub-sample of children. Elevated CIMT has been shown to be associated with an increased risk of CVD, more specifically, coronary artery disease, which can lead to a heart attack. The test, which uses ultrasound, is normally completed in adults who are suspected of having carotid artery disease (a form of CVD) that may require surgery to reduce the risk of a stroke.

The purpose of measuring CIMT in children was to see if there was an association between CIMT and CVD risk factors or CIMT and CVD risk factors for CVD. Previous research has observed favorable changes in CIMT among obese diabetic children after participating in a yearlong lifestyle intervention program. The take-home message is that assessment of CIMT can identify children at a greater risk for developing CVD; this could be a very motivating tool to encourage lifestyle changes in individuals and families. A second cohort of children will be tested this coming spring to validate these results.

White presented this research at the New England American College of Sports Medicine in Providence, Rhode Island, during the fall of 2016. The research was funded by the Clark Charitable Foundation.

“I would highly encourage undergraduates to take part in research opportunity,” White said. “Performing research differs from the classroom because you have to engage real world problem-solving skills such as critical thinking. It may be intimidating to take part in research, but I believe it is essential to step outside your comfort zone, especially as an undergraduate.”

Visual perception, or the ability to interpret visual information so that one can respond to it appropriately, is a vital skill needed for driving. For example, driving requires us to determine how far away another vehicle is, to quickly find landmarks, and to recognize obstacles and driving routes— even in inclement weather. In the field of rehabilitation, clinicians are often required to assess a client’s visual perceptual skills. Based on feedback from occupational therapists (OTs) in the community, who said that an adequate assessment tool was not available, Regi Robnett, Ph.D., professor in the Department of Occupational Therapy, a master of master’s students in UNE’s occupational studies program, and alumni developed the ChoRo assessment tool, which uses visual, figures and concepts related specifically to driving.

Initial psychometric analysis on hard copies of the ChoRo, given to more than 100 adults from the local community, demonstrated that it had promise as a test of visual perception and also that it seemed appropriate for online administration. The ChoRo, which is a UNE-sponsored online tool, is now available for clinicians at https://unechoro.wordpress.com. In return for using it, Robnett and her research team ask test administrators to send in de-identified client data, so that the test can continue to evolve. This is an IRB-approved research project, and, to date, more than 500 clinicians have visited the site. Further analysis and updates are planned on a yearly basis.

Regarding the experience of developing the ChoRo, Kimberly Chonko, O.T. ’01, says, “Having the opportunity to work closely with faculty, whom I studied under and gained respect for during my educational experience at UNE, speaks volumes to the quality of UNE’s occupational therapy program. Collaborating with faculty to help with the research portion and with clinicians who work in the field on a daily basis is essential to developing research that has functional outcomes for our patients.”

“The ChoRo offers clinicians a new way of looking specifically at the visual perceptual skills involved in driving. There are several tests that look at cognitive and visual perceptual skills from children to adults, but none of them directly correlate to driving. Driving rehabilitation is a specialty area for occupational therapists, and was brought to my attention after a conversation I had with a colleague working at Aloha One, which provides independent living services in Maine. After looking at what tests were currently available to address this concern, we found there was nothing on the market. So, that’s when I brought this to the attention of Regi Robnett. I knew she had developed the ‘Safe At Home’ test and was wondering if she had interest in working on this project. That’s how we got the creative idea of calling it the ChoRo, which is short for ‘Chonko/Robnett’.”

Among the other alumni that deserve credit for their involvement in the project from its earliest stages are Jessica Bolduc, B.S. ’04, Amanda Alboth, B.S. ’09, Jacqueline Aldred, B.S. ’10, Cassie Ames, M.S.O.T. ’10, Rebecca Lindquist, B.S. ’09, and Laura Wallace, B.S. ’10.
Supermarket Science: Multipronged Approaches to Increasing Fresh, Frozen and Canned Fruit and Vegetable Purchases

MICHELE POLACSEK, PH.D., ASSOCIATE PROFESSOR, WESTBROOK COLLEGE OF HEALTH PROFESSIONS

Associate Professor Michele Polacsek, principal investigator (PI), and University of Southern Maine Research Associate Rebecca Boulou (co-PI) are collaborating with Harvard University, the University of Southern Maine and the Food Trust of Pennsylvania to conduct outcomes research and change practices to combat chronic disease under a newly funded four-year, $800,000 grant from the National Institute of Food and Agriculture and the U.S. Department of Agriculture.

Barriers to healthy eating include the affordability and availability of fresh produce and other nutrient-dense foods. Research has shown that low-income children who consume a diet rich in F&V , “energy gap” that has led to excess weight gain among children. Children who consume a diet rich in F&V, low-fat dairy products and whole grains, that is also low in energy-dense, nutrient-poor foods, are less likely to be overweight and obese than peers who consume more energy-dense, nutrient-poor foods. Barriers to healthy eating include the affordability and availability of fresh produce and other nutrient-dense foods. Research has shown that low-income populations spend less on F&V per person than higher income populations. Cost, time, convenience, literacy, knowledge and skills are major barriers cited to purchasing and preparing F&V in Maine and elsewhere. Additionally, maternal intake of F&V is positively associated with children’s intake of F&V; this, in turn, is inversely associated with child weight status. These data suggest that efforts to increase F&V purchases and intake by adults in the household will positively impact children’s consumption and weight status.

The large chain supermarket setting is an ideal place to help address the aforementioned barriers. And while nutritional interventions are currently of interest to grocery retailers, public health professionals, policy-makers and federal agencies, there are limited data available using large supermarket chains. There is also much interest in incentivizing the purchase of healthier food items among low-income populations, instead of restricting purchases (such as restricting sugary beverage purchases with dollars from the Supplemental Nutrition Assistance Program, known as SNAP).

This project uses implementation methods from the highly-effective, double-value coupon incentive program used at farmers’ markets, as well as the Cooking Matters at the Store educational program (a part of the national No Kid Hungry/Share Our Strength initiative) to incentivize the purchase and consumption of fresh produce, and healthy frozen and canned F&V (without syrup or salt) as well as nutrient-rich and affordable year-round alternatives to fresh produce. Some 600 shoppers from one supermarket location in a low-income setting will be enrolled and incentivized to use a store loyalty card. Participants’ shopping patterns will be assessed during a two-month baseline period before being randomly assigned to a control arm or to a Fruit and vegetable discount plus a Cooking Matters arm. The intervention will continue for six months and participants’ purchases will continue to be assessed for three months post-intervention.

The primary objectives of the study are to obtain data on: 1) participants’ total and relative percent of F&V purchases per shopping week; 2) participant reported consumption of F&V, and 3) participants’ reporting of children’s F&V consumption at home. The Food Frequency Questionnaire (FFQ) will be used to assess participants’ dietary practices while supermarket checkout data linked to UPC codes will be used to track all purchases. All three aims will be tested among all study participants as well as among SNAP-recipients only.

This project presents a unique opportunity to test the effectiveness of a pricing incentive linked to scalable, point-of-purchase education within a large grocery chain to promote F&V purchases among rural low-income, high SNAP-using families. Research findings will help inform food retailers efforts to encourage healthier purchases for low-income populations and help policymakers identify strategies that include both education and incentives to support regional system drivers designed to reduce the prevalence of obesity. Findings and dissemination efforts will contribute to the overall effort to prevent childhood obesity in the U.S.

“The process made me keenly aware of the many barriers that low income Mainers face in accessing and preparing healthy foods; I’d learned about those barriers while in school for my MPH degree, but talking with individuals about their experience was eye-opening in a very impactful way. This awareness and experience will certainly shape my future work in the field of public health.”

— Zoe Hull
Introducing IHS 130: Health Profession First-Year Experience! Learning Together for Future Practice Together

KAREN T. PARDOE, PH.D., RN, ANEF, PROFESSOR, ASSOCIATE DEAN FOR ACADEMIC AFFAIRS

The Westbrook College of Health Professions (WCHP) is pleased to announce the launch of a new course during the Fall 2016 semester, IHS 130 Health Profession First-Year Experience (FYE) represents a new addition to interprofessional education at UNE and is required for all undergraduate first-year students majoring in applied exercise science, athletic training, dental hygiene, health wellness and occupational studies, nursing, nutrition, public health and social work. The course’s requirement for all students admitted to the pre-pharmacy program.

The goals of this FYE are to ensure a successful student transition to college, provide affirmation of “fit” for a student’s chosen health profession major, begin demonstrating interprofessional collaborative competencies, and facilitate student self-appraisal of optimized personal decision-making and the maintenance of a healthy collegiate lifestyle. The design of the course reflects a unique academic/student affairs partnership, involving 14 undergraduate and graduate faculty members from WCHP, faculty from the College of Pharmacy (COP), representation from graduate faculty members from WCHP, faculty from the Student Academic Success Center (SASC) and a coach from varsity athletics.

Using appreciative inquiry theory as a framework, teams of participants envisioned the course—designing learning objectives, identifying appropriate course content, and creating lesson plans to support consistency across multiple sections. In the Fall 2016 term, 18 FYE sections were offered to 306 students by a talented and committed teaching team. The team approach includes bi-monthly meetings that allow instructors to critique established lesson plans and provide mutual support in working effectively with first-year students. Content for the FYE includes material covering the transition to college and academic study strategies; enhanced self-awareness through the completion of a Myers-Briggs personality assessment, learning styles and emotional intelligence inventories; guidance on healthy collegiate lifestyles; information about the roles and responsibilities of various health professions; and discussion of how to live responsibly in a global society.

The FYE incorporates high-impact, active pedagogical practices, promulgated by the Association of American Colleges & Universities (AAC&U), Learning activities in the course highlight the Interprofessional Collaborative Competencies (IPEC, 2016), providing students with opportunities to learn about and practice effective communication, teamwork, conflict resolution and knowledge of health profession roles and responsibilities. The course is anchored by a common reader. "This I Believe: Personal Philosophies of Remarkable Men and Women" (Allison, 2006). This textbook provides a platform for students to exchange diverse ideas, viewpoints and experiences as well as further clarify their own thoughts and beliefs. The pedagogies described above are intentionally interwoven, addressing a contemporary challenge in higher education to enhance student development of "soft skills" within the formal curricula (AAC&U, 2015; IPEC, 2016; Pew, 2016). The inclusion of effective communication, teamwork, conflict resolution and appraisal of self provides a strong underpinning for sustained academic and career success (AAC&U, 2015).

A comprehensive evaluation plan has been created to assess the outcomes and institutional impact of this FYE course. Approaches include the review of reflective essays by FYE students, student participation in a Day of Service or community service/civic engagement assignment, participation in a human patient simulation activity, student leadership of a This I Believe reading group and authorship of a This I Believe paper. Indirect assessment metrics include cohort analysis of grade point averages (GPA), retention rates and timely graduation rates. At the conclusion of the course, students will complete a First-Year Experience Questionnaire (Krause & Coates, 2008) capturing self-report data addressing the transition to college, study strategies, peer relationships, engagement with faculty/staff and campus-wide engagement. Future plans include the integration of sophomore year “peer teachers” as co-facilitators and course leaders alongside faculty when the FYE is offered again in Fall 2017.

REFERENCES:


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REFERENCES:


This research project really allowed me to explore the depths of what physical therapists can provide beyond treating patients in a clinic and to understand how we can provide knowledge to others through our research.

— Morgan Wilson

This group of researchers has been studying the effectiveness of using weighted gait to increase forces in the ACL-reconstructed limb to ultimately improve knee function after ACL reconstruction. This interprofessional team has engaged UNE students in its research as well. Researchers help students integrate concepts learned in the classroom, create hypotheses of how to improve function, and then test their hypotheses using state-of-the-art motion analysis equipment.

Since joint forces cannot be seen, it is difficult to determine whether individuals are walking normally after an ACL injury and reconstruction. Students who measure force data with UNE’s motion analysis equipment gain a better conceptualization of joint forces. Since towing a sled with 20 percent bodyweight increased knee forces in healthy individuals, students hypothesized that this weighted gait task would help individuals after ACL reconstruction. However, it proved to be ineffective, as individuals with ACL reconstruction used their hip to compensate instead of increasing forces in their ACL-reconstructed knee. As these researchers and students forged on, they discovered that athletes did increase the force in their ACL-reconstructed knees while towing the sled and wearing a weighted vest loaded with 50 percent body weight compared to normal walking.

For more information about this study, please see the full research report published in the September 2016 edition of Sports Health: A Multidisciplinary Approach. Interestingly, other students in the Hartigan lab found that the force increase in the reconstructed knee during these two weighted tasks was still less than those in the individual’s “healthy” limb. This persistent limb difference may increase the athlete’s risk of re-injury, so ways to restore limb symmetry are needed. Recently, three 2016 D.P.T. graduates found that specific muscle performance measures influence knee forces during the weighted sled and vest tasks. They also found that these measures were unique for men and women, suggesting that men and women should be treated differently after ACL reconstruction. These findings were presented at the 2016 American College of Sports Medicine Conference.

Not only are D.P.T. students included in the research which uses state-of-the-art equipment, they are proud to generate novel information to guide best practice to help individuals improve outcomes after such a devastating injury and major surgery. Undergraduate students are also welcome to participate in researching outcomes after ACL injury. Hartigan advises UNE undergraduate students who receive WCHP Summer Fellowship stipends, which advances her research while giving students the opportunity to experience laboratory research firsthand. Since the inception of the fellowship in 2014, each undergraduate student has disseminated his or her findings at professional conferences and via peer-reviewed publications:

- Jonathon Lester, B.S. ’14 (Applied Exercise Science) presented his poster, titled “Precise Marker Placement Produces Good Intra- and Inter-rater Reliability of Lower Extremity Joint Angles During Motion Analysis,” at the 7th Annual World Congress of Biomechanics in 2014.
- Current undergraduate Anna Michael (Applied Exercise Science, ’17) received the 2016 Undergraduate WCHP Summer Fellowship and worked with the research team in the Motion Analysis Lab. Her findings will be presented along with those of two current D.P.T. students from the Class of 2017, Abbey Karns and Carly Kaufer, and those of Adrienne McAuley, D.P.T., M.Ed., OCS, FAAOMPT, at the annual American Physical Therapy Association NEXT conference.
Identification of Academically At-Risk Accelerated Bachelor of Science in Nursing Students to Support Development of Strategies to Promote Academic Success

DEBRA KRAMLICH, PH.D (CI), RN, CCN
CNE, ASSISTANT PROFESSOR OF NURSING
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ASSOCIATE PROFESSOR OF NURSING
DANA LAV-HAM PH.D, RN, NPNP, CNE
ASSISTANT CLINICAL PROFESSOR OF NURSING
NORA KREVANS, MA, LEARNING SPECIALIST, STUDENT ACADEMIC SUCCESS CENTER

Assistant Professor of Nursing Debra Kramlich, Ph.D., and her colleagues were recently awarded a Scholarship of Teaching and Learning mini-grant from the Center for the Enrichment of Teaching and Learning to identify academic factors that may put an accelerated second-degree baccalaureate nursing (ABSN) student at risk of program completion failure. The results will be used to support the development of strategies to promote academic success.

The rapid proliferation of ABSN programs to address the critical nursing shortage has resulted in a more diverse student profile in terms of age, gender, race and ethnicity, and life experience than traditional entry-level nursing students, and this attrition is related to both academic and non-academic factors. The UNE ABSN program is a fast-paced, 16-month, second-degree program for students who already possess a B.A. or B.S. and have met prerequisite requirements. The first cohort of ABSN students was admitted in the spring of 2012; four cohorts have now completed the program, with a fifth currently entering the second semester. Since the first class was admitted in 2012, the program has doubled in size and is exploring further expansion. Although the academic strength of the ABSN students is increasing, attrition rates continue to be a cause for concern.

An admissions test provided by the UNE nursing program’s contracted standardized testing vendor, considered to be a best practice in nursing, is designed to be used as a pre-admission assessment or as a post-entry evaluation for identification of at-risk students. The admissions test was administered as a pilot to the current ABSN cohort during the first week of the program in January 2016. During the first semester, faculty identified possible correlations between admissions test scores and course exam grades, particularly among struggling students. The team anticipates that examination of this data may reveal potentially modifiable factors that put students at risk of non-progression or dismissal and that identification of such factors may then support the development of targeted individualized interventions to promote success.

UNE Researchers Investigate Head Impacts in Men’s Lacrosse and Men’s and Women’s Ice Hockey

JOHN M. ROSENE, D.P.E., ATC, CSCS, ACSM
EPC, ASSOCIATE CLINICAL PROFESSOR, DEPARTMENT OF EXERCISE AND SPORT PERFORMANCE

Sports-related concussions have been a growing concern in recent years. With more people participating in sport at all levels, athlete health and safety has become a more significant focus than ever before. With the discovery of chronic traumatic encephalopathy (CTE) and the settlement between the NFL Players Association and the NFL with regards to concussions, there is increased interest in understanding this injury.

Researchers John M. Rosene, D.P.E., ATC, and Paul S. Vischi, Ph.D. M.P.H, of the Department of Exercise and Sport Performance, have been examining sports-related concussions beyond the gridiron. Rosene and Vischi are examining the incidence of concussions in men’s and women’s collegiate ice hockey at the Division I and Division III levels over the past five seasons. This research has yielded several interesting findings, such as a higher incidence of concussions in Division I versus Division III men’s ice hockey; a higher rate of concussions in forwards versus all other positions; and most interestingly, a higher rate of concussions in women’s Division III goalies versus all other goalies. The results of this study will lead to valuable insight into concussion management and prevention strategies in collegiate ice hockey.

Additionally, Rosene and Vischi, along with applied exercise science students, used head impact monitors to collect information on the number and force of head impacts during lacrosse practices and games. The outcomes of the study found that lacrosse players experience a similar number of hits and force of hits to the head in both practices and games. However, none of the hits measured were significant enough to cause a concussion. These results suggest that lacrosse players are susceptible to repeated head impacts in both games and practices.

Outcomes a World Away!

JENNIFER LEE-MORTON, D.P.N, M.P.H.
APHN-BC, ASSOCIATE PROFESSOR, DIRECTOR, DEPARTMENT OF NURSING
R. DENNIS LEIGHTON, P.T., D.P.T., FAAPA
ASSOCIATE PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY

For several years, UNE students and faculty have engaged in a cross-cultural immersion program with the Ghana Health Service (GHS), the University of Cape Coast (UCC), the private sector and, most importantly, the communities surrounding Sekondi in the Western Region of Ghana.

The trust-based relationship has now doubled in size and is exploring further expansion. Although the academic strength of the ABSN students is increasing, attrition rates continue to be a cause for concern.

In addition to Loukas and Brown, the research team includes Professor Regula Robnett, Ph.D. OTR/L, FAOTA, Tina Champagne, O.T.O.D, OTR/L, and Nathaniel Fuller, B.A. The occupational therapy student researchers include Class of 2017 members Kelcy Briggs, Kell-Dylis Godinuck, Ayreau Siple, and Alexandra St. Clair.

The project utilizes a dynamical systems-based approach grounded in the Recovery Model to create and implement trauma-informed, self-organizing sensory strategies to support children with autism and mental health challenges in the day treatment setting. These strategies can be utilized when children are feeling out of control and are, therefore, finding it more difficult than usual to engage in classroom learning.

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In 2010, we were fortunate to be joined in this framework. "Triple Aim" refers to the three goals of the program: improved health, lower costs and positive patient experience. The following developments demonstrate framework.

- Demographically, in 2014, our reach was in Sekondi and Kansarado. By 2016, our reach extended to two more rural communities: Mpintsin and Diabene.
- In 2011, in philosophical alignment with our Ghanaian partners, we started a longitudinal prospective screening for outcomes, and we started contributing to the cost of an annual insurance premium rather than paying for needs on an individual basis. A total of 122 patients were insured through this framework. In 2016, more than 340 individuals across four communities were insured through this framework.
- In 2010, we were fortunate to be joined in a learning exchange by two doctors and two nurses from the GHS. In 2016, we were joined by three physicians, two nurses from the GHS. In 2016, we were joined by three physicians, two nurses from the GHS. In 2016, we were joined by three physicians, two nurses from the GHS.
Changes in Hydration Status during Pre-Season Training
JOHN M. ROSENE, D.P.E., ATC, CSCS, ACIM
EP-C; ASSOCIATE CLINICAL PROFESSOR,
DEPARTMENT OF EXERCISE AND SPORT PERFORMANCE

Hydration levels may impact performance in numerous ways. Specifically, lack of adequate hydration has been shown to impair athletic abilities in areas such as skill performance, endurance capacity, muscular strength and cognitive function. When in a dehydrated state, athletes have been reported to need longer amounts of time to perform specific tasks compared to when experiencing normal hydration levels. Additionally, dehydration may result in slower decision-making ability.

Preseason camp, which follows off-season training, commonly includes multiple sessions per day of high-intensity activity. In addition to these multiple sessions, activity may be of a higher intensity compared to off-season training due to the type of exercise and duration of practice sessions. An increase in the intensity of activity consequently places a greater physical demand on the athlete. When this increase in intensity of activity is combined with the summer climate, environmental risk factors may be increased. Therefore, hydration levels of preseason athletes become especially significant. In an effort to avoid exertional heat illness, it is important to be adequately hydrated prior to initiating physical activity and subsequently, to appropriately replenish fluid loss after each activity session.

John M. Rosene, D.P.E., ATC, clinical associate professor in the Department of Exercise and Sport Performance, along with 12 applied exercise science and athletic training students recently completed an investigation into how preseason camp affects hydration status of athletes. The athletes were evaluated before and after each practice during the preseason for changes in weight and hydration. The information gained from this investigation will lead to protocols that will aid in improving athlete health and safety relative to heat illness and will, subsequently, improve performance.

Increasing the Public Health Nursing Workforce
JENNIFER LEE MORTON, D.N.P., M.P.H., APHN-BC, ASSOCIATE PROFESSOR AND DIRECTOR OF NURSING
JUDITH A. METCALF, APRN, BC, M.S., CLINICAL ASSISTANT PROFESSOR OF NURSING
KAREN T. PARDOE, PH.D., RN, CNE, ANEF, ASSOCIATE DEAN FOR ACADEMIC AFFAIRS, WESTBROOK COLLEGE OF HEALTH PROFESSIONS, AND ASSOCIATE PROFESSOR OF NURSING

The University of New England Department of Nursing was recently awarded a Nurse Education, Practice, Quality and Retention HRSA award to increase the Public Health Nursing Workforce. UNE concurs that optimal community health is best achieved through health promotion and prevention rather than disease treatment. UNE’s nursing program design is thoughtfully informed by the UK Royal College of Nursing’s “Upstream Nursing” model that recognizes the powerful role of nurses in creating this meaningful paradigm shift within communities.

UNE’s strategy in this academic practice partnership is to provide senior-level nursing students with meaningful experiences in community-based clinical sites at Greater Portland Health’s (GPH) five clinics and involves the following five objectives:

1. UNE’s Department of Nursing develops and integrates a series of didactic and community-based clinical curriculum advances designed to increase the capacity of new nursing graduates to practice in community health primary care settings.
2. UNE’s Department of Nursing establishes a community-based partnership with GPH and its clinical sites that promotes the knowledge, skills and attitudes of community-based learning for students, while improving the health of clients.
3. UNE will recruit a total of 12 senior-level nursing students to participate in the Upstream Practicum.
4. UNE’s Department of Nursing and GPH will provide the Upstream Practicum to a total 12 students.
5. UNE’s Department of Nursing expands its Nurse Leader Institute to a statewide consortium that includes senior-level students enrolled in the Upstream Practims.

Jennifer Morton, D.N.P., M.P.H., APHN-BC, serves as the project director for the program while Judith A. Metcalf, APNH-BC, M.S.N., will coordinate the partnership with Greater Portland Health. Karen Parode, Ph.D., associate dean, WCHP, will coordinate the Population-Oriented Nurse Leader Institute, which continues from the CHANNELS project.

Karen Vogel B.S. ’15 participates in a Flu Clinic.
Volunteers Erin Edwards, B.S. '15 and Cassandra Simmons, B.S. '15 captivate a crowd with their demonstration of neuroanatomy.
K-12 Outreach Phase 1: Feasibility: Consisted of a cannabinoid educational intervention (accompanied by a pre/post assessment) given to small samples of UNE college students.

K-12 Outreach Phase 2: Refinement: Cannabinoid educational intervention (and pre/post assessment) was refined based upon feedback obtained during Phase 1 and then given to additional samples of UNE college students.

K-12 Outreach Phase 3: Target Population: Final cannabinoid educational intervention (and pre/post assessment) will be given to high school samples in the state of Maine.

Active Participation: During the intervention development and refinement phases, the UNE research team experimented with various activities chosen specifically to increase student participation.

3-D Brain Model: Two-dimensional posters were paired with three-dimensional brain models to enrich discussions. Potential effects of various substances (most notably cannabinoids) on the brain were discussed. Students were encouraged to handle the brain model and spend time labeling relevant structures important to substance use.

Vetted Handouts: The UNE research team thoroughly reviewed publicly available materials and used them to create activity worksheets.

K-12 Outreach Outcome Assessment: The efficacy outcome chosen for the educational intervention was derived from multiple “risk of harm” items in the Monitoring the Future Study (Johnston et al, 2016). Students were asked, “How much do you think people risk harming themselves physically and in other ways when they smoke marijuana once or twice a week?” Responses included “no risk,” “slight risk,” “moderate risk,” and “great risk.”

The efficacy activity was chosen as the intervention outcome of choice because of the importance in substance education of understanding the risk and the potential impact of marijuana use. These assessments were derived from the Monitoring the Future Study, a study conducted by the University of Michigan’s Institute for Social Research and supported by the National Institute on Drug Abuse.

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UNE student involvement: Pharm.D. candidates Marcus Zavala ('17) and Linh Tran ('17) were engaged in every step of the research process. They assisted with hypothesis and specific aims development, creation and delivery of the educational intervention, and outcomes assessment.

In addition to acquiring valuable research skills, UNE students presented our findings at the American Society of Health-system Pharmacists (ASHP) Midyear Meeting. This pharmacy-centered conference is a key element in the process of obtaining post-graduate pharmacy advancement opportunities.

Future directions: Teter and UNE students from various programs have formed the Neuroscience in the Healthcare Professions Club (NHPC) on the Portland Campus to serve a complementary role to the Biddeford Campus student neuroscience group. NHPC will help increase outreach efficiency across UNE campuses and help refine a scholarly K-12 educational outreach approach.

PHASE 2: As a result of our intervention, participants demonstrated an increased perception of harm associated with cannabinoid use as well as increased competency of cannabinoid-specific knowledge. Based on student feedback from sessions, we revised our intervention and assessments to ultimately use in the target population of adolescents.

PHASE 3: Building on prior K-12 outreach efforts, Christina (“Chrissy”) Fields (Pharmacy, '18) has obtained a list of Maine school health educators. The UNE research team plans to reach out to these schools, pending UNE IRB approval, for potential study recruitment.

Vetted Handouts: The UNE research team thoroughly reviewed publicly available materials, and used them to create activity worksheets. For example, participants were asked to complete the table in the figure while following the lecture.

Source: Adapted from “The Science of Marijuana How THC Affects the Brain,” Scholastic and the National Institute on Drug Abuse, first published 2011

Marcus Zavala (Pharmacy, '17) and Tran (Pharmacy, '17), along with team members Mehryari (Pharmacy, '18), presented a poster session these sessions are an important step in pursuing post-graduate pharmacy residency and fellowship opportunities.
Kayla Harris (COP ’18) tests the antimicrobial susceptibility of trimethoprim/sulfamethoxazole.

It is no exaggeration to say that the development of antibiotics revolutionized medicine. Unfortunately, antibiotics, once considered miracle drugs, are losing their effectiveness. The continuing emergence of antimicrobial resistance is a global health crisis and some fear that we are approaching a post-antibiotic era in which some infections are untreatable.

Shigellosis, caused by the bacterium Shigella flexneri and related species, is one such infection. In fact, in 2013, the Centers for Disease Control and Prevention designated antimicrobial-resistant Shigella as a serious antibiotic resistance threat, one of only 12 microorganisms given that priority category. Although illnesses caused by Shigella are more common in developing nations across the world, in the United States each year Shigella causes approximately 500,000 diarrheal illnesses, 5,500 hospitalizations and 40 deaths. The treatment of shigellosis is now complicated by the emergence of multidrug resistance to first-line therapies such as the antimicrobials ampicillin, chloramphenicol, tetracyclines and trimethoprim/sulfamethoxazole.

George P. Allen, Pharm.D., associate professor and chair of the Department of Pharmacy Practice, has studied a variety of antimicrobial-resistant bacteria in his laboratory in the College of Pharmacy, and his research has consistently involved Doctor of Pharmacy students. Allen has recently worked with Kayla Harris (COP ’18) to evaluate new antimicrobial therapies that may be options for the treatment of Shigella infections. Fluoroquinolone antimicrobials, such as ciprofloxacin and levofloxacin, have long been used to treat shigellosis, yet resistance to these agents, particularly ciprofloxacin, has recently increased.

Allen and Harris sought to determine whether fluoroquinolones other than ciprofloxacin might represent new potential therapies for shigellosis, and they also studied azithromycin and ceftriaxone, two agents that are currently recommended for shigellosis. They found that the continued use of either azithromycin or ceftriaxone will lead to the development of resistance to these agents in Shigella (flexneri). On the other hand, they found that the fluoroquinolones levofloxacin and moxifloxacin only.

Shigella flexneri organisms with baseline fluoroquinolone resistance are now circulating in many communities, this finding may have important implications for the treatment of this infectious disease.

Antimicrobial resistance has been an interest for Harris since her time at UNE on the Biddeford Campus. She was first exposed to this area of research as a student researcher with Kristin M. Burkholder, Ph.D., assistant professor in the Department of Biology, with whom Harris investigated intracellular mechanisms of survival for the infamous pathogen MRSA (methicillin-resistant Staphylococcus aureus). Upon entering the UNE College of Pharmacy, Harris’ curiosity regarding antimicrobial resistance was again piqued when she learned about Allen’s research.

Explained Harris, “Antimicrobial overuse in the medical community threatens the continued effectiveness of these medications. My concerns about increasing resistance and resulting treatment failures motivate me to continue learning more to understand the problem of antimicrobial resistance and investigate solutions for this threat to public health.”

Allen and Harris’ work was presented at the American Society for Microbiology (ASM) Microbe 2016 conference in Boston, Massachusetts, in June 2016. ASM Microbe is an important international conference in which cutting-edge research concerning all aspects of microbiology and infectious diseases is presented. Allen is continuing his work with Harris and other Doctor of Pharmacy students to explore additional new therapeutic options for shigellosis.
Stigma towards mental illness has existed for centuries. Despite major improvements in psychiatric care over the last several decades, health care providers are less comfortable providing services for patients with psychiatric conditions than those with physical illnesses. This is especially concerning given that about one in five adults in the United States is living with a mental illness, and psychotropic medications make up nearly 20 percent of the most common medications dispensed in pharmacies. The issue raises the question of whether the education health care providers receive addresses student stigma towards mental illness or the barriers that stigma creates between patients and providers. As faculty members, we regularly observe students’ discomfort toward treating patients with mental illness. We decided to take a closer look to observe whether psychiatric coursework has a mitigating effect on student stigma and whether interventions can improve student perceptions of mental illness. These investigations were successful due not only to student participation but also due to student involvement in the planning and execution of the design.

**SURVEY OF STUDENT STIGMA BEFORE AND AFTER CORE DIDACTIC PSYCHIATRY COURSEWORK**

In an effort to better understand pharmacy student stigma toward mental illness and how it compares to students in other health care professions, a study was developed to anonymously survey students in three UNE health professions programs (pharmacy, nursing and social work) using the Opening Minds Stigma Scale for Healthcare Providers both before and after core didactic psychiatry coursework. The impact of coursework was not statistically significant, as all programs yielded similar results with no remarkable score change.
Theresa Foster, Pharm.D. ’13 and Alexandra Malinowski, Pharm.D. ’14 were particularly active researchers while at the University of New England College of Pharmacy, engaging in a variety of research projects with members of the faculty. Since their graduation, Foster and Malinowski have pursued successful careers in the pharmaceutical industry, and both attribute some of their success to their research activities at the College of Pharmacy.

Foster is currently employed as a pharmacovigilance specialist at Biogen, Inc., based in Cambridge, Massachusetts. Biogen specializes in research and development of novel therapeutic agents for neurological conditions such as multiple sclerosis, Alzheimer’s disease, spinal muscular atrophy, Parkinson’s disease, and amniotic lateral sclerosis. The company is also pursuing treatments for rare genetic disorders and is investigating cutting-edge gene therapy.

While a student at the College of Pharmacy, Foster primarily worked with Olgun Guvench, M.D., Ph.D., and Olgun Guvench is investigating cutting-edge gene therapy.

Alexandra Malinowski, Pharm.D. ’14 stands by the Charles River in Cambridge, Massachusetts, with the Boston skyline in the background.

Pharm.D. ’13 and Alexandra Malinowski stand by the Charles River in Cambridge, Massachusetts, with the Boston skyline in the background.

While a student at the College of Pharmacy, Foster primarily worked with Olgun Guvench, M.D., Ph.D., associate professor and chair of the Department of Pharmaceutical Sciences. Their work included the development of novel therapeutic agents for neurological conditions such as multiple sclerosis, Alzheimer’s disease, spinal muscular atrophy, Parkinson’s disease, and amniotic lateral sclerosis. The company is also pursuing treatments for rare genetic disorders and is investigating cutting-edge gene therapy.

Alexandra Malinowski, Pharm.D. ’14 was an USA component protein expression in the laboratory of Daniel Braun, a research associate professor of biomedical sciences.

Malinowski is currently employed by Ultragenyx Pharmaceutical, Inc., as a medical science liaison for the greater Boston, Massachusetts, area. She has also worked for Alexion Pharmaceuticals, Inc. and Synageva BioPharma Corp. Ultragenyx is a clinical-stage biopharmaceutical company that is focused on the development of novel therapies for rare and ultra-rare diseases, particularly serious, debilitating genetic diseases. The company’s work is particularly important because of its focus on diseases for which there are no approved therapies.

At the College of Pharmacy, Malinowski worked extensively in the laboratory of George P. Allen, Pharm.D., associate professor and chair of the Department of Pharmacy Practice. Their research involved evaluations of novel antimicrobial therapies for highly resistant bacteria, including Neisseria gonorrhoeae and Klebsiella pneumoniae. Their findings were presented at a number of influential scientific conferences, including the Interscience Conference on Antimicrobial Agents and Chemotherapy, the first International Conference on Polymyxins, and the New England Regional Center of Excellence in Biosafety and Emerging Infectious Diseases eighth Annual Retreat.

“Recognizing the decline in research and development of novel antimicrobial agents by the pharmaceutical industry, I became keenly interested in research focused on antimicrobial resistance,” said Malinowski. “My work with Dr. Allen largely focused on pharmacokinetic/pharmacodynamic analyses of important antimicrobial-resistant bacteria. Through this work, I fostered the skills to research relevant literature and identify knowledge gaps, as well as ways in which our work could contribute to the broader infectious diseases and medical communities. I developed the ability to critically analyze data and communicate findings to the scientific community.”

Malinowski continued, “In tandem with the required curriculum, independent research demanded the capability to develop, manage and execute both short- and long-term projects with a clear objective in sight. These skills translate well to my current role as a medical science liaison supporting rare metabolic bone diseases in the biopharmaceutical industry. In this role, I serve as a conduit for the broader medical community by developing and maintaining professional relationships with current leaders in the field through the exchange of knowledge concerning the latest scientific information available regarding rare diseases and related interventional therapies.”

Theresa Foster, Pharm.D. ’13 stands by the Charles River in Cambridge, Massachusetts, with the Boston skyline in the background.

Foster is currently employed as a pharmacovigilance scientist. “Working on research articles with Dr. Guvench allowed me to actively create, analyze and convey my results to a scientific community, all of which encompass my routine responsibilities as a pharmacovigilance scientist.”

Theresa Foster, Pharm.D. ’13, and Malinowski, Pharm.D. ’14, were particularly active researchers while at the University of New England College of Pharmacy, engaging in a variety of research projects with members of the faculty. Since their graduation, Foster and Malinowski have pursued successful careers in the pharmaceutical industry, and both attribute some of their success to their research activities at the College of Pharmacy.

Participating in research projects during my time at the College of Pharmacy enabled me to develop skills outside of the classroom that are fundamental to my role as an industry pharmacist,” said Foster. “Independent research projects cultivated my skills in long-term project management, working in a group to reach a common research goal, and learning or exploring new skills such as computer coding, using bioinformatics software and conducting extensive literature reviews.”

She added, “Working on research articles with Dr. Guvench allowed me to actively create, analyze and convey my results to a scientific community, all of which encompass my routine responsibilities as a pharmacovigilance scientist.”
Breast cancer is now known to be a varied disease, with different patients having different subtypes of breast cancer. Advances in treatment have included identifying the subtype and individually tailoring the therapy on a patient-by-patient basis. Looking at the different genes in different subtypes has shown large differences in gene expression signatures between estrogen receptor-negative (ER–) and estrogen receptor-positive (ER+) breast cancers. Among them, ER– is a more aggressive subtype, more difficult to treat, has greater ethnic disparity concerns, worse prognosis and almost twice the risk of mortality.

Assistant professor Srinidi Mohan, Ph.D., in the College of Pharmacy's Department of Pharmaceutical Sciences, has worked to investigate ER– breast cancer patients as possible. Srinidi Mohan, Ph.D., and Ron Hills, Ph.D., in the Hills Lab.

The dynamics of biomolecules at the cell surface, including how molecules move across the cell membrane, are crucial to our basic understanding of life processes. The movement of molecules inside and outside of cells is vital for taking in nutrients and eliminating wastes. It can also lead to the development of drug-resistant bacteria and cancer.

To understand drug resistance, the laboratory of Assistant Professor Ron Hills, Ph.D., in the College of Pharmacy's Department of Pharmaceutical Sciences, develops multiscale models to predict the molecular behavior of protein transporters involved in the absorption of drug molecules. In support of their full-time summer research in the lab, students Rachel McDevitt (COP ’18) and Cody Black (COP ’18) won a UNE-wide fellowship competition and worked alongside postdoctoral associate Jacob Fosso-Tande, Ph.D., in the Hills Lab.

New insights gained through modeling student-generated research discovered a pattern of conserved arginine residues on the surface of the MsbA transporter protein, which are predicted to drive the transport of drug transporters.

Fosso-Tande, who is a scholar from the Republic of Cameroon, stated, “Nothing is as exciting as applying the knowledge of computational science to explore processes necessary for life.”

The student-generated research resulted in the working hypothesis of a pathway that allows for substrate transport in the P-glycoprotein transporter responsible for acquired cellular multidrug resistance. The work was supported by National Science Foundation grant MCB-1516826 RUI: “Multiscale Models for ABC Transporter Molecular Dynamics,” with Hills serving as principal investigator.

With regard to the unpredictable nature and rewards of scientific research, Sutton said, “The students were a big help and created a necessary critical mass in the lab. We search and search, then we search again — but when it works, there is a great feeling of accomplishment!”

Presently, she is investigating the antifungal effect of polyalthic acid, which is a natural compound found in this oil.

Just as patients with serious bacterial infections have to face the possibility of antibiotic-resistant bacteria, others will face the possibility of fungal infections that have developed resistance to existing antifungal medicines. Amazingly, from Mizuno’s studies, it appears that polyalthic acid derivatives have the potential to fight otherwise resistant fungal infections. These compounds, developed by Mizuno’s laboratory, may interfere with the ability of a fungus to expel medicines. By blocking the ability of the fungus to expel medicines, such polyalthic acid-based compounds could make existing anti-fungal therapies effective again.

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### Molecular Determinants of Drug Resistance

**RONALD HILLS, PH.D., ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACEUTICAL SCIENCES**

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### Determining Whether Plastic Nanoparticles Change the Impact and Transport of Benzo[a]pyrene (BaP)

**STEVEN C. SUTTON, PH.D., ASSOCIATE PROFESSOR, DEPARTMENT OF PHARMACEUTICAL SCIENCES**

Benzo[a]pyrene (BaP) is a chemical that can result from the burning of cigarettes, gasoline and wood. BaP is known to attach to DNA, which is the “code of life” within all of our body’s cells. The attachment may affect this code, resulting in diseases such as cancer. During the summer of 2016, two students worked to investigate BaP alongside Associate Professor Steven “Steve” Sutton, Ph.D., fellow of the American Association of Pharmaceutical Scientists.

The work, performed in the College of Pharmacy’s Department of Pharmaceutical Sciences, studied the effect of plastic nanoparticles laden with BaP, as measured by their effect on intestinal barrier cells in culture. In addition to the delicate cell culture techniques, which require special care and feeding of the cells, the research efforts employed specialized analytical instruments in the Department of Pharmaceutical Sciences that can very accurately detect small quantities of specific chemicals.

“Multiscale Models for ABC Transporter Molecular Dynamics,” with Hills serving as principal investigator.

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### Novel Prognostic Marker for Aggressive Breast Cancer

**SRINIDI MOHAN, PH.D., ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACEUTICAL SCIENCES**

Breast cancer is now known to be a varied disease, with different patients having different subtypes of breast cancer. Advances in treatment have included identifying the subtype and individually tailoring the therapy on a patient-by-patient basis. Looking at the different genes in different subtypes has shown large differences in gene expression signatures between estrogen receptor-negative (ER–) and estrogen receptor-positive (ER+) breast cancers. Among them, ER– is a more aggressive subtype, more difficult to treat, has greater ethnic disparity concerns, worse prognosis and almost twice the risk of mortality.

Assistant professor Srinidi Mohan, Ph.D., in the College of Pharmacy’s Department of Pharmaceutical Sciences, has worked to investigate ER– breast cancer patients as possible.

The impact of drug-resistant bacteria and cancer.

To understand drug resistance, the laboratory of Assistant Professor Ron Hills, Ph.D., in the College of Pharmacy’s Department of Pharmaceutical Sciences, develops multiscale models to predict the molecular behavior of protein transporters involved in the absorption of drug molecules. In support of their full-time summer research in the lab, students Rachel McDevitt (COP ’18) and Cody Black (COP ’18) won a UNE-wide fellowship competition and worked alongside postdoctoral associate Jacob Fosso-Tande, Ph.D., in the Hills Lab.

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### Investigation of Antifungal Activities of Polyalthic Acid Derivatives

**CASSIA MIZUNO, PH.D., ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACEUTICAL SCIENCES**

The oil of the Brazilian copaiba tree has long been used in traditional medicine for its healing properties. The tree is found in the Amazon region, and the oil can be tapped from the tree trunk in a manner similar to the way maple syrup is tapped in New England. Assistant Professor Cassia Mizuno, Ph.D., in the College of Pharmacy’s Department of Pharmaceutical Sciences, has developed ongoing research efforts focused on copaiba oil.

Mizuno has engaged UNE Pharm.D. students in her research, as well as visiting scholars on J-1 visas from Brazil, which is a first for the College of Pharmacy. She is currently applying for multi-year funding from the National Institutes of Health to further support and expand this research.
The Oral Health Center houses the College of Dental Medicine on UNE's Portland Campus.
In 2014, Portland High School re-opened and dedicated the Amanda Rowe Health Center, funded by a federal capital improvement grant. The health center includes a dental clinic, allowing the City of Portland to provide dental care to children from ages six months to 21 years in Greater Portland, regardless of income or insurance.

The dental clinic is small, with only three chairs, but it is having a large impact and growing larger. Thanks to a newly formed partnership, third-year students in the College of Dental Medicine (CDM) have the opportunity to rotate through this clinic to treat underserved pediatric patients. UNE dental students spend four days under the supervision of Jenny Fultz Brunacini, M.S.W., D.D.S, providing exams, cleanings, fillings and oral health education. But they also learn about underserved populations, navigating complicated language barriers and the challenges of educating patients on how to best care for their teeth. Students’ experiences at offsite clinics and rotations are particularly rich for students as they get to interact with diverse patients from a variety of backgrounds. Hillary Creed (CDM, ’18) and Peter Pellegrini (CDM, ’18), who have just completed a rotation at the Portland High School dental clinic, recently had a patient named Frank who was from Burundi and had only been in Maine for about five months. Students like Creed and Pellegrini may also have to navigate the challenge of providing service to patients who require a interpreter, who have only been to a dental office once or twice in their lives, or who have extreme emotional reactions to needing dental care. But these experiences — which unfold under the watchful eye of Dr. Jenny — serve them well for their future careers.

“Being able to work with younger patients who are, in some cases, underserved or of foreign descent, where English is not their first language, has really been a challenge of providing service to patients who require a interpreter, who have only been to a dental office once or twice in their lives, or who have extreme emotional reactions to needing dental care. But these experiences — which unfold under the watchful eye of Dr. Jenny — serve them well for their future careers.”

— Hillary Creed

The Portland High School rotation has given me the opportunity to impact the Greater Portland community outside of the UNE Oral Health Center setting,” remarked Creed. “It has allowed me to provide care to a vulnerable population, while applying the clinical skills that I have learned through my education at UNE. The patients at the Portland High School clinic truly value the oral health care they are receiving, and I am thankful to have had such a motivating clinical experience.”

Pellegrini echoed his classmate, saying, “Working at Portland High School is a unique experience for me compared to working at the UNE Oral Health Center. Being able to work with younger patients who are, in some cases, underserved or of foreign descent, where English is not their first language, has really been a privilege. These students are at an age when it is really crucial to sculpt the direction of their oral health for many years to come. This is what we are trying to do at the clinic, and it feels good to be involved in making a difference. The biggest thing I have learned so far working at Portland High School is that even among all the cultural differences and age groups, it’s important to keep a common goal in mind to promote oral health inside and outside of the clinic.”

This rotation is just the beginning of the UNE dental students’ off-site experiences. After two and a half years learning dentistry and public health in their rigorous curriculum and treating patients in the Oral Health Center, our students are ready to head out to positively impact the community. These partnerships are beneficial to all involved; our students are able to learn more about public health service, clinics and dental care, while patients receive high-level, compassionate care.

The College of Dental Medicine is excited to be of service to our local and state communities in support of our mission.
Before you assess summatively, assess formatively to:
- Give students practice with feedback from you, peers, or computer program.
- Get frequent feedback for yourself on their progress.

The Center for the Enrichment of Teaching and Learning’s 2016 cross-college faculty development day focused on infusing critical thinking into the curriculum.
Outcomes Emerging from the Center for the Enrichment of Teaching and Learning (CETL)

The Center for the Enrichment of Teaching and Learning (CETL) serves as a catalyst and support for innovative, vibrant and effective teaching and learning at UNE. To that end, CETL last year supported more than 160 events/contacts involving 386 faculty, with CETL videos receiving more than 1600 views.

Two CETL areas in which direct student outcomes are specifically measured are 1) the Scholarship of Teaching and Learning (SoTL) mini-grant program; and 2) the current active learning spaces research project, in which CETL is partnering with global design manufacturer Herman Miller, Inc., to examine the impact that active learning classrooms can have on instruction, student engagement and learning.

Eight SoTL projects were funded for the 2015-16 year. Four of these projects and their outcomes are described in the following features. The fifth article describes how early in the course and concurrently enrolled in a remedial program. To pursue this approach, we needed a way to identify students who might be at risk for failure as early as possible in the course.

One of the teaching methods we adopted for the course was the use of frequent and multiple assessments to assess student progress. These assessments are primarily composed of multiple-choice questions and include weekly Formative Tests (FT) containing 20 questions each, Progress Tests (PT) given every two to three weeks, which each have 50 questions; and summative, 120-question Comprehensive Exams (CE) given at the end of each six-week block. In this study, we asked which of these assessments could be used to identify the at-risk student and how early in the course this could occur.

Five years ago, the UNE College of Osteopathic Medicine adopted an innovative first-year integrated curriculum. The objective was to improve durable learning and its application to diagnostic reasoning skills by teaching the traditional basic sciences in the context of clinical cases. Because of the integrative and interactive nature of the course, remediation of a student who is not passing the course almost always requires repeating the year. This is a costly prospect both in terms of time and money.

Several reports in the literature showed the risk of failure could be lessened if students at risk of failing could be identified early in the course and concurrently enrolled in a remedial program. To pursue this approach, we needed a way to identify students who might be at risk for failure as early as possible in the course.

To do this we determined at which point during Block 1 we would be able to differentiate the top and bottom quarter of the class (as determined by student’s final course grades) from analyzing student performance on the assessments. Using historical performance data from the class of 2018, we found that the student performance on the PTs was quite variable and would not be a useful discriminator for identifying at-risk students. Results for the three PTs and the CE during Block 1 were more promising and are presented in Figure 1. These plots show a separation between the top and bottom students that increased as the block progressed. In PT2, the boxes no longer overlapped, and they continued to separate in PT3 and CE.

These data suggest that we should be able to identify at-risk students by PT2 and certainly by CE1. Indeed, using these parameters and the performance data for the class of 2019, we found that the cut score on the PT2 captured most of the students who failed the course but also captured a number of students who passed, while the cut score on the CE captured all of the students who failed and fewer students who passed (Figure 2). Therefore, in order to identify at-risk students as early as possible, we will use this cut score on PT2 to initially identify these students and refer them to the Student Academic Success Center. Students who do not make the cut score on the CE will be strongly encouraged to take advantage of this program. We are currently assessing the outcomes of the implementation of this process.
In an effort to explore teaching methods that can help students make more connections among the things they are learning, Jennifer Stiegler-Balfour, Ph.D., associate professor of psychology, recently launched two research projects to test whether employing several new learning activities would be viable methods for strengthening student interest in and retention of key aspects of course material.

In her Memory and Cognition class, Stiegler-Balfour used specially designed interactive web-based experiments and comprehensive lab reports as a supplement to traditional lectures. Assessing the success of this strategy required comparing student performances on essay exam questions in preparation for which some students had received only a traditional lecture while others had participated in the online experiment and/or prepared a scientific lab report.

The results showed that the use of experiential learning generated significantly better recall among students when compared to those who only received a traditional lecture.

With additional funding in the form of an SoTL mini-grant last year, Stiegler-Balfour was able to conduct a follow-up study to further explore teaching methods that create a more dynamic learning experience for students by implementing the flipped classroom method. This method typically has the faculty create video lectures that are then uploaded and shared with the students ahead of time so they can view the lecture outside of class. This allows for time in class to be devoted to active learning in which the students apply the content and become involved in higher level thinking. Thus, to test whether the flipped classroom method would enhance problem-based learning skills, Stiegler-Balfour created multimedia video clips for some of the concepts covered in her Research Methods course to compare the learning outcomes when using the video clips to more traditional teaching methods.

Each exam was analyzed to determine how effective the flipped classroom method was for helping students grasp both relatively easy and more difficult course concepts. Interestingly, it made no difference if the instructor used the traditional or the flipped classroom method for easier concepts; however, there was a significant improvement in learning outcomes for more difficult course concepts.

These results show that the flipped classroom method lends itself particularly well to difficult topics because students can watch the video clips multiple times at home and have the opportunity to ask questions in class while the professor is present as they complete worksheets on putting the concept into practice. These findings were also reflected in the survey results, indicating that students benefited from having the proper support while completing the worksheets in class and would welcome either a flipped classroom or a mix between flipped and traditional classroom approaches for their other classes.

Overall, the results of both studies indicate that encouraging students to become more self-directed learners by seeking out information and processing it at a deeper level yields better learning outcomes compared to more traditional teaching approaches.
The scholarship of teaching and learning (SoTL) involves inquiry into the effectiveness of new pedagogical practices, with the ultimate goal being improved student learning. The project described here was designed to integrate a new technology, the iPad Pro tablet, into the teaching tools of two anatomy courses offered last spring — Introduction to Anatomy and Physiology I, taught by Kaushik Dutta, M.S., associate lecturer of Anatomy and Physiology, Department of Biology, College of Arts and Sciences, and Biological Topics: Anatomy in Italy, a new travel course, taught by Dutta and Mary Schwanke, Ph.D., adjunct professor of Online Pathophysiology, College of Graduate and Professional Studies. The study, funded with a SoTL mini-grant from UNE’s Center for the Enrichment of Teaching and Learning, had two aims: to describe how the iPad Pro could assist in the delivery of anatomical content and to examine its impact on how students view their learning.

The iPad Pro was used to deliver lecture material with split-screen capability via projection to a large screen to enhance lab instruction to small groups; to provide a portable instruction device during travel in Italy; and to carry out “just in time” teaching. Given the critical importance of good visual materials for aiding students in acquiring an understanding of the location and spatial relations of anatomical structures, the iPad Pro was extremely useful for enhancing interactive anatomy learning.

The most useful app for the iPad Pro was a new version of 3D4Medical, which provided access to incredibly detailed and accurate anatomical figures that could be dissected, isolated, rotated or viewed in superimposed layers. While in Italy, the iPad Pro provided a mobile teaching resource for identifying and explaining underlying structures while observing various works of Classical and Renaissance art and historical displays of anatomical specimens, including beautiful wax models from the 18th century.

Surveys were used to assess student attitudes and perceptions about the use of digital technology, including the iPad Pro, and its impact on their learning. The results indicate that while most students did not have prior experience with tablet technology in their courses, they responded very favorably to the use of the iPad Pro. The survey data also showed positive outcomes for students’ perceptions of their learning.

In Introduction to Anatomy & Physiology I, a majority of students found that the iPad Pro, and specifically the 3D4Medical app for this tablet, helped them better understand the course material. In Anatomy in Italy, there were similar findings, especially with regard to the use of the iPad Pro during the travel portion of the course.

In summary, this study supports the incorporation of digital technology such as the iPad Pro into the modern teaching “toolkit” to improve anatomy instruction. Student comments from course evaluations perhaps say it best:

“I really liked how [Dutta] tried to use methods other than just lectures to teach us the material. He used a few apps on his iPad Pro that helped.”

“I really enjoyed having the technology available to help us better our understanding of a subject in the field . . . It was very helpful to have the professor pull up different illustrations and 3D views of modules we were viewing in museums as question came up.”
Pharmaceutical compounding is the art and science of creating personalized pharmaceutical products or medications, that are tailored to meet the unique requirements of a patient. The principles of pharmaceutical compounding and its associated skills go beyond dosages and formulations and often provide immense contributions to many aspects of drug research and development. A strong foundation and thorough knowledge of compounding will always be beneficial for UNE College of Pharmacy students for improving their career opportunities in pharmaceutical and other health care sectors.

Recent studies have reported a growing trend of diminished compounding skills among graduating pharmacists, which is a cause for concern. To address this concern and to improve student pharmacist compounding skills, Srinidi Mohan, Ph.D., and Gurkishan Singh Chadha, M.Sc., Ph.D., with funding support from a Center for the Enrichment of Teaching and Learning mini-grant, evaluated the impact of compounding skill reinforcement through instructor-independent repetition modules, wherein, students in their first didactic year of their Doctor of Pharmacy program were trained in compounding skills.

In this study, for the first three weeks, the students were asked to prepare prescriptions based on instructor-coordinated labs and were provided with additional instructional materials, namely a lab manual and instructor-developed online demonstration videos that are available at www.une.edu/phs104. For the next three weeks, in addition to an instructor-guided compounding lab session, students were instructed to repeat a prescription without any instructor guidance. At the end of each three-week session, students were given an opportunity to repeat or prepare a formulation without repetition. They were tested for the level of concept and skill retention qualitatively through pre-session and post-session surveys and also via analytical assessment of their overall preparation.

Student survey results showed a 91 percent positive response rate favoring repetition beyond instructor guidance to be an effective tool in providing improvement in their understanding of skill and compounding concepts. This result was additionally found to significantly correlate with an at least 33 percent improvement in the overall prescription quality and active ingredient accuracy (as determined by analytical quantitation). Thus, the methodology of instructor-independent repetition has shown initial benefit towards improving overall student skills, confidence, and troubleshooting abilities. The current methodology would need to be refined further, along with additional elective courses on advanced drug compounding, to better suit the curricular delivery for drug compounding in the near future.

The compounded product.

The UNE Center for the Enrichment of Teaching and Learning (CETL), along with UNE Facilities and Information Technology Services (ITS), are collaborating with Herman Miller, Inc., a major American manufacturer of office furniture and equipment, which conducts an ongoing project called the Learning Spaces Research Program. By participating in the program, UNE will test ways to design space that supports the latest pedagogical methods and learning styles.

In January 2016, a visioning workshop was held with faculty from the College of Arts and Sciences and the Westbrook College of Health Professions who are interested in teaching in active learning spaces. They were joined by two student representatives, along with CETL, ITS, and Facilities staff to work with Herman Miller, Inc., to redesign two mid-size classrooms (capacity of 32) that would be renovated over the summer: Bluestone 108 and Marcil 303.

In August, faculty members assigned to teach in the two classrooms participated in a one-day training on active learning techniques, with a focus on the specific set-up of these renovated rooms.

Craig Owen, a clinical assistant professor of social work, is among the faculty teaching in Bluestone 108, and he calls it his “dream classroom.”

Caryn Husman, assistant clinical professor and coordinator for Health, Wellness and Occupational Studies, is one of eight faculty teaching in Marcil 303. She described the classroom as being “equipped with flexible and variable seating arrangements that allow for optimal fluidity and flexibility. Students can select seating to match their learning styles — they can choose a standard table, a high-top table, bench seating or a comfortable chair with a side table. The room design is changeable; therefore, the environment facilitates use of varied learning experiences. Media screens and white boards cover the walls to facilitate group learning activities and use of the newest educational technology. The rooms are also designed with comfort and aesthetics in mind, making the classroom a place where learning is a pleasure.”

Anecdotally thus far, Husman indicates that students report enjoying the different seating options and that they are more likely to participate in discussions. Students also note that they enter the classroom ready to be active participants. Husman also reports that the room affords opportunities to employ active learning strategies with ease. She stated, “More broadly, Health, Wellness and Occupational Studies professors are considering how the environment impacts the occupation of learning. Using an occupational science lens, they postulate that interaction with the objects in the room affords learning that is creative, student-centered and individualized. They further contend that this learning environment impacts the culture of teaching and learning in a manner that promotes the value of deep thought, problem solving and lifelong learning as experienced through active learning.”

Currently, research is being conducted focused on students’ perceived level of student engagement in traditional classrooms versus these new learning spaces. Additionally, observations will occur using a protocol centering on building attributes and activities as well as structured interviews with faculty and students. Results will be disseminated in the spring.
The Center of Excellence in the Neurosciences (CEN) is an umbrella group that brings together neuroscientists from multiple colleges to address neuroscience-related initiatives at UNE and in the greater community. The CEN is heavily involved in undergraduate education and has a very active K-12 Outreach program. Another major arm of the CEN is neuroscience research. Within this arm lies the Center for Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function. The Center is made up of COBRE-funded neuroscience laboratories at UNE that work together to add to a better understanding of the neurobiology of acute and chronic pain. The Center received a COBRE grant from the National Institute of General Medical Sciences in September 2012 and, since then, this grant has provided support for a collaborative group of neuroscience researchers at UNE.

NEW RESEARCH CORES

One of the first tangible outcomes of the COBRE grant was the creation of two research cores: a Neuroscience Core, has been instrumental to its success.

The Center of Excellence in the Neurosciences (CEN) is an umbrella group that brings together neuroscientists from multiple colleges to address neuroscience-related initiatives at UNE and in the greater community. The CEN is heavily involved in undergraduate education and has a very active K-12 Outreach program. Another major arm of the CEN is neuroscience research. Within this arm lies the Center for Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function. The Center is made up of COBRE-funded neuroscience laboratories at UNE that work together to add to a better understanding of the neurobiology of acute and chronic pain. The Center received a COBRE grant from the National Institute of General Medical Sciences in September 2012 and, since then, this grant has provided support for a collaborative group of neuroscience researchers at UNE.

NEW EXTERNAL FUNDING

The Center has worked tirelessly to provide support and guidance to several junior scientists as they establish independent, extramurally funded research programs. Recently, those efforts have proved successful as two COBRE project leaders received external funding. Geoffrey Garth, Ph.D., professor of biology, College of Arts and Sciences, received an R15 AREA grant in early 2016, and project leader Ling Cao, M.D., Ph.D., associate professor of biomedical sciences, College of Osteopathic Medicine, was awarded an R01 in July. These new awards have made it possible to support additional neuroscience researchers, including Michael Burman, Ph.D., associate professor of psychology, College of Arts and Sciences, and a new faculty member, Ben Harrison, Ph.D., assistant professor in the Department of Biomedical Sciences, College of Osteopathic Medicine. Both Burman and Harrison are taking on new roles as COBRE project leaders. Furthermore, a number of other research programs have received awards for projects in which collaborations between neuroscience investigators have led to additional funding for COBRE project leaders. Tamar King, Ph.D., associate professor in the Department of Biomedical Sciences, College of Osteopathic Medicine, and Lei Lei, Ph.D., associate professor of biology, College of Arts and Sciences, are co-investigators on R01 grants received by Cao and Ian Meng, Ph.D., associate professor of biomedical sciences, College of Osteopathic Medicine, and have provided successful outcomes for projects involving neuroscience investigators over the past four years. Other is representative of external support that is NIH-related.

Altogether, since receiving the COBRE award, six external grants have been awarded with totals exceeding $2.7 million.

NEW PILOT PROJECTS, NEW COLLABORATIONS

Collaborations among COBRE researchers have extended into the COBRE pilot projects. A pilot project by Katherine Rudolph, PT, Ph.D., associate professor of physical therapy, Westbrook College of Health Professions, was converted into an R15 AREA grant, awarded in April 2016, in which she is collaborating with Tamar King, King also worked with Glenn Stevenson, Ph.D., professor of biology, College of Arts and Sciences, on a pilot project investigating osteoartthritis for which Stevenson was awarded a three-year R15 AREA grant. In another pilot project, Katherine Harlen, Ph.D., assistant professor, College of Osteopathic Medicine, received funding for a project for a prestigious Rita Allen Foundation grant submission. Derek Moller, Ph.D., associate professor of biomedical sciences, College of Osteopathic Medicine, offered guidance on Harlen’s project. Finally, recent pilot recipients from the College of Osteopathic Medicine, Kerry Tucker, Ph.D., associate professor of biomedical sciences, and Meghan May, Ph.D., associate professor of biomedical sciences, have been working closely with COBRE mentors and project leaders. Both Tucker and May will have their pilot projects extended for this year. Together, these faculty members have helped create a dynamic and diverse center.

The impact of the COBRE grant on our institution has been truly transformative. One final collaboration, and the most critical, has been institutional investment in the center’s program by a number of UNE departments and colleges. The center has been fortunate for such institutional investments in the recruitment of new faculty, increased research infrastructure through laboratory renovations, acquisition of new instrumentation and support for investigators through research cores. Furthermore, the COBRE and the CEN have worked with other colleges and departments to bring more than 75 invited speakers from across the world to UNE over the past four years. With continued investment provided through Phase II funding and institutional support, we will build on our early success and further establish the center as a leader in pain research.
Providing the Groundwork for Future Careers in Neuroscience

IAN MENG, PH.D., DIRECTOR, CENTER OF EXCELLENCE IN THE NEUROSCIENCES
JENNIFER MALON, M.S., M.P.H., COBRE COORDINATOR AND EVALUATOR

Since the opening of the Center of Excellence in the Neurosciences (CEN), the number of master’s degree seeking students, Ph.D. candidates and post-doctoral fellows working in UNE’s neuroscience labs has increased exponentially. UNE neuroscience has come a long way since the days when there were mostly undergraduates or medical students in the labs. The larger numbers of projects and lab employees have allowed for increased collaboration with experts within and outside of one’s own subject area, greater access to shared resources, greater networking opportunities, and better problem-solving opportunities, as a larger and wider range of perspectives are available to assist with technical problems.

The CEN and Center for Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function have provided support for nine students enrolled in the Master of Science in Biomedical Sciences program who have worked in neuroscience labs. Even though it was only a few short years ago when undergraduates such as Jill Hoffman, B.S. ’03, Ph.D., could expect her research interactions to be with faculty or other students, it seems like a lifetime away when compared to the variety of educational attainment levels represented by people working in the labs today. (See the CEN section for more information on Jill and her research path.)

To date, five students have received their master’s degrees. UC Davis professor Earl Carstens testified to the success of the training received by these students when he praised Ph.D. student and center alum Taylor Follansbee in a recent letter to CEN Director Ian Meng, Ph.D., which said, “Taylor has benefited from outstanding training and scientific process, as well as technical skills that were offered to him as an undergraduate and master’s student at UNE.” (See the CAS section for more information on Taylor and his research.)

May 2016 marked the graduation of the first UNE student to be enrolled in the Graduate School of Biomedical Science and Engineering (GSBSE). The GSBSE program is ran by the University of Maine, which grants the Ph.D. degrees but is made up of five other research institutes across the state of Maine, including the University of New England College of Osteopathic Medicine, the Jackson Laboratory, Maine Medical Center Research Institute, the Mount Desert Island Biological Laboratory and the University of Southern Maine’s Department of Applied Medical Sciences. To date, seven GSBSE students have also rotated through neuroscience labs at UNE.

Virginia McLane, Ph.D., completed her thesis dissertation work in a laboratory of Ling Cao, Ph.D., associate professor in the Department of Biomedical Sciences, College of Osteopathic Medicine. (See the CEN section for more information on McLane and her research.)

The COBRE grant has been able to provide support to five GSBSE students over the past four years. In addition, as part of a requirement of the program, a number of other GSBSE students have rotated through neuroscience laboratories at UNE.

Michael Anderson, B.S. ’13, M.S. ’15 continues his thesis project, investigating the role of transcription factor Sox11, in regulating nerve regeneration and managing pain following injury.
In May 2016, Ling Cao, M.D., Ph.D., associate professor in the Department of Biomedical Sciences, College of Osteopathic Medicine (COM) graduated her first Ph.D. student, Virginia McLane. McLane was a Ph.D. student enrolled in the Graduate School of Biomedical Science and Engineering (GBSIE) program from September 2011 to May 2016. The GBSIE program is unique in that it involves six cooperating academic and research institutions within Maine: the University of Maine, the Jackson Laboratory, Maine Medical Center Research Institute (MMCRI), the Mount Desert Island Biological Laboratory (MDIBL), the University of Southern Maine (USM) and University of New England (UNE), with the University of Maine serving as the degree-granting institution. McLane was the first Ph.D. student in the GBSIE program who selected neuroscience as her research focus area. She completed her thesis project, "Effects of Opiates on Central Nervous System Immune Defense in Murine AIDS," under the mentorship of Cao, in Cao’s neuroimmunology research laboratory in the UNE College of Osteopathic Medicine. She published her first manuscript in the Journal of Neuroimmunology in early 2014. She has also presented her work at various national, regional and local conferences. In addition, McLane has presented her work at every annual meeting of the Society for Neuroscience (SFN) since 2013. Recently, she was selected to give an oral presentation at the 2016 SFN meeting in San Diego, California, discussing some of her thesis research in a presentation titled "Type 1 Interferon Signaling in Morphine-potentiated UP-BMS Murine AIDS." In recognition of her outstanding academic performance, McLane was awarded the Michael J. Eckardt Dissertation Fellowship for the 2015-2016 academic year, which provided her with a stipend of $20,000 over 12 months. Following graduation, McLane continued her scientific career by joining the laboratory of Kurt Hauser in the Department of Pharmacology and Toxicology, Virginia Commonwealth University, as a postdoctoral fellow. Hauser is a world-renowned researcher investigating the interactions between drug abuse and central nervous system plasticity. McLane’s accomplishments at UNE are another testament to the rapid growth of UNE’s research capacity, particularly in neuroscience research. Over the past several years, interest among GBSIE students in working with investigators at UNE has increased significantly. There are currently four GBSIE students completing their thesis research at UNE.
The Center for Excellence in the Neurosciences (CEN) at UNE was well represented at the second annual Maine Science Festival in March 2016. Held in Bangor, Maine, the two-day festival was visited by more than 10,000 people. Well over 1,000 people visited the CEN exhibition, and the CEN was grateful for the support of all the volunteers, including undergraduate and graduate students from the College of Pharmacy, the College of Osteopathic Medicine, and the College of Arts and Sciences. Faculty from the CEN in attendance included Michael Burman, Ph.D., associate professor of psychology, College of Arts and Sciences, and CEN Outreach Program coordinator; Kerry Tucker, Ph.D., associate professor in the Department of Biomedical Sciences, College of Osteopathic Medicine; Ian Meng, Ph.D., director of the Center of Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function; Edward Bilsky, Ph.D., vice president of Research and Scholarship; and Cassandra Simmons, B.S. ’15, outreach staff coordinator.

The CEN designed the multi-part exhibit to be enjoyable and educational for all ages. First, medical students and faculty introduced visitors to neuroanatomy. CEN volunteers had created an educational exhibit, featuring more than 20 different human brain specimens in order to highlight the function of different brain regions and common brain disorders. The second part of the exhibit was the family-friendly “Brain Exploration Station,” which used a variety of interactive exhibits to engage the public in hands-on learning about the brain. This included a microscopy table with viewable slices of the brain and a comparative anatomy station with cow, sheep, and rat brains. Volunteers demonstrated to visitors the importance of helmet safety through proper helmet fitting, make-your-own helmet activities, and egg drop and melon drop demonstrations (the eggs and the melons standing in for the human head).

Visitors also found interactive activities that included a MindFlex game and a muscle stimulation game in which people could attach electrodes to their bodies and control the muscle movement of another individual’s arm. Not to be excluded, the youngest neuroscience enthusiasts were greeted with special coloring books and directions for making pipe cleaner neurons.

In December 2015, the Center for Excellence in the Neurosciences (CEN) hosted the second annual Southern Maine Regional Brain Bee. High school students from Thornton Academy, Kennebunk High School and Biddeford High School attended. In addition to the hour-long quiz-style competition, the CEN offered an afternoon of activities to excite students to learn about the brain. These activities included an overview of human neuroanatomy guided by UNE medical students, using donated human brain tissue, sheep brain dissections guided by UNE undergraduate students, and microscopy lessons assisted by CEN volunteers.

Michael Burman, Ph.D., associate professor in the Department of Psychology and faculty coordinator of UNE’s Center for Excellence in the Neurosciences and director of the Center of Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function, Edward Bilsky, Ph.D., vice president of Research and Scholarship, and Cassandra Simmons, B.S. ’15, outreach staff coordinator, coordinated the event along with Emily Warner, B.S. ’15. Dr. Burman said of the event’s success, “Our goal is to help support STEM education in our neighboring school districts. I think you can really see the effectiveness of the program in the enthusiasm these students are showing for the Brain Bee. The amount of time outside the classroom that they’ve put into preparation is incredible.”

The Southern Maine Bee was held simultaneously and in collaboration with the Northern Maine Brain Bee at the University of Maine in Presque Isle, and the Western Maine Brain Bee at the University of Maine in Machias. The Brain Bee provides an opportunity for students to demonstrate their knowledge about the brain and nervous system while motivating them to pursue careers in neuroscience. There are currently about 150 local Brain Bee coordinators in 30 countries worldwide who conduct competitions annually. Winners of regional Brain Bees travel to the National Brain Bee to compete for the U.S. championship title and an invitation to travel to the International Brain Bee competition. The winner of the Southern Maine Brain Bee, Kyle Ryan from Kennebunk High School, went on to place tenth in the nation and has started a successful online neuroscience journal for high school students.

The third annual Southern Maine Brain Bee was hosted on Dec. 6, 2016, and was coordinated by Haley Lawlor (Physical Therapy, ’19).
For three years, the UNE Interprofessional Education Collaborative (IPEC) has offered a highly-interactive extra-curricular program called the Interprofessional Team Immersion (IPTI). IPTI is a developmental, longitudinal and sustainable curricular resource that was designed in response to consistent student survey feedback requesting small, interactive, cross-professional learning experiences. Seats in IPTI are limited to six selected students from each of eight different health professions programs across the university.

Cases are developed by an interprofessional faculty team. Scenarios integrate learning objectives aligned with Core Competencies for Interprofessional Practice (2016) that aim to increase students’ understanding of each other’s roles and responsibilities, hone teamwork skills, refine cross-professional communication, and incorporate factors that providers typically encounter in real-world practice. The majority of students opt to present their cumulative knowledge in a collective project presented at the end of each semester. Instructional formats include team-building exercises, case-based learning and simulations that highlight difficult conversations in areas of disability and sexuality, falls prevention, work with older adults and veteran’s health care. Future sessions will tackle complex elements of addiction and mental illness.

IPTI methodology utilizes a rapid-cycle evaluation scheme whereby students fill out feedback cards that are collected, reviewed and used to make improvements in subsequent sessions. Overall findings indicate that IPTI students advance in their awareness, understanding and appreciation of how combining their expertise can be both extremely useful and, at times, complicated. The majority speculated that they will apply this learning in future clinical learning and employment.

IPTI participants are actively engaged in their learning, being both recipients and producers of knowledge. Simulated interviews with well-prepared “patients” offered a rich pre-clinical platform to experiment with new knowledge and to both test and receive critique on capacities to perform as effective health care team members.

Watch the faculty and student feedback video at https://youtu.be/SOVRL/0qgg.

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Watch the faculty and student feedback video at https://youtu.be/SOVRL0qgg.
UNE's Makerspace, an innovative campus resource that serves as a laboratory for creation and building, was opened in the spring of 2016, thanks to the inspiration and generosity of many. Things have been taken to a whole new level this fall, as the Makerspace is off to a great start—more than doubling both the number of student research projects and the number of students in the Makerspace Club and adding a new social innovation club called Enactus to help develop ideas leading up to the Innovation Challenge.

SOCIAL INNOVATION AND ENTREPRENEURSHIP CLASSES

At the center of the space are interdisciplinary social innovation and entrepreneurship classes that are focused on solving world problems with student ideas. The classes are made up of students from all majors who learn best practices to dissect problems, come up with ideas, and learn ways of prototyping and testing those ideas, including how to make those ideas sustainable through entrepreneurship.

SUPPORT OF RESEARCH PROJECTS MORE THAN DOUBLES

In addition to the classes, much of the focus of the Makerspace is on supporting broad and deep student research projects. Students from many different majors are working on projects ranging from rovers in the ocean that can help with research on ways to keep the oceans healthy, to building a better mousetrap that helps track endangered species, to creating devices that help with neuroscience research.

STUDENT CLUBS DOUBLE

Students learn through making while having fun, especially in the thriving Makerspace Club. The club’s projects this semester have ranged from art to sewing, to making seasonal decorations, to creating plaques to identify trees. Also, a new social innovation club has been started in the Makerspace called Enactus. Its mission is to engage and empower others to make impacts through innovation and entrepreneurial action. The club has already started piloting sparking sessions, think tanks and quick pitch competitions to help students come up with and develop ideas to help with Maine problems, leading up to the Spring Innovation Challenge.

STUDENT INNOVATION CHALLENGE SETS GOAL TO DOUBLE SUBMISSIONS

The UNE Student Innovation Challenge is based in the Makerspace and open to UNE students of any major. UNE’s Student Innovation Challenge is an idea-stage competition that encourages innovative and sustainable solutions to social, environmental, and health issues facing our society. Winners receive cash and support awards with hopes of advancing their ideas to the next level. Students can participate whether they are undergraduates, graduate students or online students. Throughout the fall and spring semesters, the Makerspace will offer workshops, seminars and mentoring to help students spark and develop their ideas and prepare for the Innovation Challenge.

Anyone interested in learning more about the UNE Innovation Challenge or UNE Makerspace can email Tony Santella at asantella@une.edu.
Created in 2016 by combining the former Center for Interprofessional Education with several UNE public health programs, the Center for Excellence in Health Innovation collaborates with UNE faculty, students, and community partners in the transforming nexus between health care, public health and education. As a result, the center provides innovative interprofessional learning opportunities to UNE students, research opportunities for students and faculty and outreach in our communities.

The center’s interprofessional opportunities uniquely focus on those in clinical settings that involves students from UNE’s College of Osteopathic Medicine and other UNE health professions programs. Dora Anne Mills, M.D., the center’s director, explained, “Through these learning activities we are strengthening our relationships with clinical affiliates, building a health workforce pipeline to underserved areas in northern New England, and helping to transform the way health care is practiced.”

CLINICAL INTERPROFESSIONAL EDUCATION

Before graduating from UNE, Michelle O’Meara, Pharm.D.’14 participated in a clinical interprofessional training site in 2013 at the Family Medicine Institute, Augusta. This Advanced Pharmacy Practice Experience (APPE) included learning activities and seeing patients while under the care of multiple providers and an appreciation of the team-based approach to health care.

RURAL HEALTH IMMERSION

Attracting health care professionals to rural and underserved communities has been a priority at UNE for a number of years — and even more so now that Maine is not only the oldest but also the most rural state in the nation. To provide rural health experiences to students early in their education, UNE’s Center for Health Innovation has collaborated with faculty and clinical partners to offer rural health interprofessional immersions for students.

In May 2016, 15 students — an equal number from UNE’s College of Osteopathic Medicine, Dental Medicine and Pharmacy — spent a week in Aroostook County with Mills, Jennifer Gundersen, M.P.H., assistant lecturer in the School of Community and Public Health, Jennifer Van Deusen, M.Ed., and center staff member Ian Imbert, M.S., M.P.H. ’15. Wesleyan Delbom (COM ’18) said, “This experience helped me solidify my interest in practicing rural dental medicine. For instance, we traveled to Van Buren to perform basic dental screenings with medical students on elementary school children and provided them with fluoride varnish and oral health instructions.”

Sam Wood (COM ’19) observed, “We not only learned a great deal from, with and about each other, but we also learned that there is something truly special about the rural component of this place in that it is a true community. The people here all know each other, their kids know each other, they run into each other at the local ice cream shop, and they leave their keys in the car without fear. Most importantly, the health care system acts as an integrated and functional unit... because it has to. Every component and every member of the health care team is essential, and this fact is crystal clear in this environment.”

FALL IMMERSION

In May 2017, a group of second-year medical students from the Class of 2019 (CUP) in the fall of 2016. The inaugural class of 14 second-year medical students from other professions such as dental medicine, pharmacy, social work, nursing and the physician assistant program as well as with the patient as a member of the team, since that is how health care is most effectively delivered — as a team.

My hope is that by providing these opportunities for our students, not only will our communities benefit from their service but even more of our students will choose careers in underserved locations.”

The four-year Care of the Underserved Pathway (CUP) program coordinates current and planned offerings in underserved care and combines them into a comprehensive pathway designed to ensure that rising physicians will provide quality care for underserved patients in Maine and beyond. 

Director, Center for Excellence in Health Innovation

DORA ANNE MILLS, M.D., M.P.H., FAAP, VICE PRESIDENT FOR CLINICAL AFFAIRS

DIRECTOR, CENTER FOR EXCELLENCE IN HEALTH INNOVATION

DORA ANNE MILLS, M.D., M.P.H., FAAP, VICE PRESIDENT FOR CLINICAL AFFAIRS
Center of Excellence in the Neurosciences volunteer Erin Edwards, B.S., B.S., captivates a crowd with a demonstration of neuroanatomy.
Pain Awareness and National Recovery Month Pulls Communities Together

LINDSEY SIMMONS, B.S., (COP , '19)
SAMANTHA SHEPARD, A.A., CPT II, (MEDICAL BIOLOGY, '17)
ERIKA PENROD, B.S. ’16, (PUBLIC HEALTH, ’18)

September is recognized annually as Pain Awareness Month and National Recovery Month. This September, the UNE Pain Education and Advocacy Collaborative (PEAC), in partnership with the Chronic Pain Support Group of Southern Maine, the Biddeford Chapter of Young People in Recovery (YPR) and the US Pain Foundation, hosted a series of events and awareness campaigns with the intention of reducing stigmas associated with pain and substance misuse, while engaging the community in dialogues between the pain and recovery population. Events included an art exhibition, proclamation readings from local city mayors, a community storytelling night and an interprofessional panel at UNE. The collaborative aimed to host a variety of events appealing to students, faculty and community members with varied interests in patient advocacy, chronic pain, recovery and improving medical outcomes.

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September kicked off with the opening night of an art exhibition titled "Pain Unplugged: Honoring the Emotional Journey of Chronic Pain and Addictions." Erika Penrod (Public Health, ’18) facilitated the opening, held at Engine, an art space in Biddeford, Maine, that includes a gallery, a community makerspace and studies where it offers classes and workshops. To curate the collection, PEAC issued a call for art submissions, encouraging students, faculty members and community members to share artwork that they had created representing pain, addiction or recovery. This exhibition provided artists with the opportunity to sell and display their art, which created feelings of self-empowerment and a sense of solidarity within the community. Participants recurrently made comments like, "I always thought, who would want to see my personal art depicting such depressive pain?" Sentiments like these provide examples of the stigma associated with those who experience chronic pain — exactly what PEAC is trying to eliminate. During the exhibition, Biddeford Mayor Alan Casavant and Saco City Manager Kevin Sutherland read a proclamation recognizing September as both Pain Awareness Month and National Recovery Month. Subsequently, community members were encouraged to explore and contemplate the emotions and perspectives of people living with pain, addiction and recovery.

During the exhibition, Biddeford Mayor Alan Casavant and Saco City Manager Kevin Sutherland read a proclamation recognizing September as both Pain Awareness Month and National Recovery Month.

The second event, facilitated by Samantha Shepard, A.A., (Biomedical Sciences, ’17), was a storytelling night, also at Engine, featuring speakers who detailed their experiences with either chronic pain or long-term recovery. The evening was designed to build bridges and encourage the viewing community to consider the multi-faceted aspects of these diseases. Often, the media chooses to highlight the negative stories associated with opioid misuse while stories of successful recovery from drug misuse and successful pain treatment are neglected. The PEAC group and YPR-Biddeford chose to honor stories of resiliency, humanity and healing. Engine was the perfect venue, as its neutral environment allowed for open consideration, and the "Pain Unplugged" art exhibit helped to set the mood and encourage meaningful conversation and contemplation.

The storytelling event featured five speakers, each of whom drew from their personal experiences with either chronic pain or long-term recovery. The group included: Jessfor Baugh, B.S. ’13 (CDM, ’17), Kevin Sutherland (Saco City Manager), Elizabeth Sprague, and Polly Noddin, a local community member. Polly Noddin stands in front of an India ink drawing and a watercolor she contributed to the exhibit. During the exhibition, Biddeford Mayor Alan Casavant and Saco City Manager Kevin Sutherland read a proclamation recognizing September as both Pain Awareness Month and National Recovery Month.
different programs regarding two pre-selected chronic pain cases. As a surprise to the students, members of the Southern Maine Chronic Pain Support Group were placed in many of the student groups, allowing students to gain a firsthand understanding of the needs and ideas of those living with chronic pain. Notably, students reflected on how much they enjoyed working and interacting with the chronic pain patients as opposed to simply reading about their cases in a traditional classroom setting. The event aimed to spark conversation among different health professionals about fully incorporating the patient into the treatment and care plan management dialogue.

Traditionally, pain and recovery advocacy groups have worked separately. However, an interesting partnership formed due to the discovery of the similar challenges and missions of both groups. The intertwining of spiritual, emotional and physical pain between both health conditions, and the concept of resiliency as a driving force to healing and overcoming hurdles, unites the patient experiences of both groups. Working to eradicate the stigmas associated with chronic pain and substance use disorders serves to better educate and empower the community to help fight these diseases, which have reached epidemic proportions. In closing, PEAC, YPR-Biddeford and the Chronic Pain Support Group of Southern Maine would like to emphasize the synergistic effect of bridging the pain and recovery communities and express their hope that these ideas will spread into other communities to make a positive impact for those experiencing these diseases.
Discussing the event, Michael Burman, Ph.D., associate professor of neuroscience and faculty coordinator for the UNE Center for Excellence in the Neurosciences K-12 Outreach Program, explained, “We want to share with the public how amazing the brain is and how important it is to keep it safe. It’s so critical for every aspect of our life and yet also so fragile. And yet, we know so little about the brain, from both the perspective of basic science and treating disorders and injury. We hope this exhibit will inspire more people to study neuroscience, including through our excellent programs at the University of New England.”

Ed Bilsky, Ph.D., UNE vice president for Research and Scholarship, said, “Neuroscience-related topics are in the news every day and have been in the public consciousness and discussion this past year. Topics from concussions to opioid abuse, to diseases that impact the aging brain are so critically important to our society and its health. UNE is a leader in educating physicians and other health care professionals, and our expertise in the neurosciences allows us to bring world-class exhibits and demonstrations to the school systems and public in Maine.”

The University of New England’s Center for Excellence in the Neurosciences hosted its third annual Brain Fair on April 8, 2016, at the Harold Alfond Forum on UNE’s Biddeford Campus. More than 500 students from local school districts attended the event, along with local families and community members. They enjoyed fun and engaging hands-on activities, presentations and exhibits intended to educate the community about the importance of brain health and overall body wellness.

The event took place during Brain Awareness Week, a worldwide campaign launched by the Dana Alliance for Brain Initiatives to promote neuroscience and advocate for science funding. The Brain Fair was part of a series of events hosted by UNE during April to further this mission.

Brain Fair attendees walked through an amazing collection of human brain samples highlighting healthy brains and brains affected by disease and injury. They also found neuroanatomy displays, sheep brain dissections and microscope set-ups where they could observe a variety of microscopic brain pictures.

Families also visited the “Bugs and Drugs” display, which showed how chemicals affect the nervous system and impact behavior. Information sessions on concussion awareness, opioids, how we learn, and the link between music and health were well attended.

Professional athletes joined UNE student athletes to offer demonstrations revealing the link between neuroscience and athletics. The event included presentations by Olympic gold medalist Dick Fosbury, known for revolutionizing the high jump with the creation of his back-first jumping technique, as well as Maine-based professional boxer Brandon “The Cannon” Berry and UNE Motion Analysis Lab Manager Mike Lawrence, M.S., the 18th ranked power lifter in the United States.

The bicycle helmet-fitting presentation and giveaway, sponsored by the Michael T. Goulet Foundation, was once again a highlight of the event. The foundation is a Maine-based non-profit organization that aims to increase awareness, prevention and improved treatment for seizure disorders and brain injuries.

UNe’s 2016 Brain, Body and Wellness Fair a Big Hit with Students and Families

Sarah Wissler, B.A., Communications Specialist/Web Editor

THE END
Chronic pain is a complex, multifaceted and devastating condition that more than a million Americans suffer from each day. As a result, billions of dollars are at risk annually in medical costs, lost wages and care. The University of New England is at the forefront of addressing this growing epidemic through increased pain education in the College of Osteopathic Medicine, top-tier research and community outreach in the New England chronic pain community.

On August 3, 2016, UNE’s Office of Research and Scholarship hosted a pain summit, inviting researchers, osteopathic physicians, clinicians, educators and policy creators to visit campus. The topics addressed that day included issues involving patient care, education, policy and advocacy, and attendees shared new and innovative approaches to treating chronic pain.

Among the speakers were Daniel Carr, M.D., Tufts University; Jon Hamilton of NPR; Sean Mackey, M.D., Ph.D., Stanford University; Jon Levine, M.D., Ph.D., professor of medicine at UCSF; and Linda Porter, Ph.D., National Institutes of Health. Local experts included Brain Kaufman, D.O., FACOI, FACP, Total Health and Spine; Yves De Koninck, Ph.D., FCAHS, FRSC, scientific director of Quebec Mental Health Institute; Ling Cao, M.D., Ph.D., professor in the UNE College of Osteopathic Medicine; Bill Paterson, M.Ed., CPE, PS-C, director of Coastal Healthy Community Coalition; and Jane Carreiro, D.O., dean of the UNE College of Osteopathic Medicine.

Throughout the day, UNE students shared their research through poster presentations that revealed the cutting-edge research being conducted in UNE’s laboratories. The posters detailed research into different types of pain, sociological trends, perceptions in the health care industry, cancer-induced pain and the effects of neo-natal pain.

The event provided a platform for thoughtful discussion of the many challenges associated with treating chronic pain. Along with exploring optimized treatments for chronic pain, participants grappled with the public’s growing opiate misuse and the need for alternative pain treatment approaches. UNE will continue to facilitate discussion while bringing its resources and innovative approaches to bear in the quest to treat chronic pain and reduce opiate addiction.

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STUDENT SNAPSHOTS

Castigliano M. Bhamidipati, D.O. ’06, Ph.D., MS.c.

DID RESEARCH WITH: Ed Bilsky on novel compound development to fight opioid abuse
CURRENT CAREER: Finishing a cardiothoracic fellowship in Seattle at the University of Washington and planning to enter a new chapter of life in academic cardiac surgery

Alex Skorput, Ph.D. ’08 (Biomedical Sciences)

DID RESEARCH WITH: Ed Bilsky on basic pain pathophysiology
CURRENT CAREER: Postdoctoral fellow at the University of Minnesota, researching the pathophysiology of neuropathic pain

Alexa Lopez, Ph.D. ’09 (Psychobiology)

DID RESEARCH WITH: Ed Bilsky on opioid pain pharmacology
CURRENT CAREER: Research psychologist/principal investigator with the U.S. Army Medical Research Directorate-West, part of the Walter Reed Army Institute of Research

Richard Feeney, D.O. ’09

DID RESEARCH WITH: Ian Meng on medication overuse and headache
CURRENT CAREER: Interventional physiatrist in Exeter, NH

Ashlee A. Robbins, B.S. ’08 (Medical Biology and Biochemistry)

DID RESEARCH WITH: Ian Meng on headache and general medication overuse
CURRENT CAREER: Ph.D. candidate, Dartmouth’s program for Experimental and Molecular Medicine

Tom Miller, D.O. ’07

DID RESEARCH WITH: Amy Davidson on cardiomyocyte cell biology
CURRENT CAREER: Assistant professor in the Department of Pediatrics in the Division of Pediatric Cardiology at the University of Utah

The lab experience taught me that research is about basic understanding, logic, communication and impacting the community. At a basal level it was also teaching me how to ask the right questions, test hypotheses and challenge contemporary thought.

I wholeheartedly believe that without my research experiences at UNE, I would have followed a much different path. While I have always been interested in scientific knowledge and validation, having the opportunity to be directly involved with research at such an early stage of my career was critically valuable. I strongly encourage all students who are interested in pursuing graduate education—or any other research-focused career path—to seek out one of the many opportunities that UNE has offer.

There was a pretty tight-knit research group in Stella Maris at the time, so we got exposure to a lot of different kinds of research, from Ian, Ed, Ling and Dave Mokler’s labs. Going to diverse seminars and learning to think critically were aspects of working in the lab and were really important for getting ready for grad school. It gave me a diverse background in a lot of different research techniques.

I left the laboratory with a greater appreciation for the tireless work our basic research scientists pour into the pool of knowledge, which in turn, influences our treatment paradigms. I believe it gave me confidence in critically evaluating the research behind our decisions. This experience definitely guided my path beyond UNE. Choosing physical medicine and rehabilitation, and then subspecializing in pain medicine, was a natural extension of the curiosity stoked by this early research exposure. I believe it made me a more competitive candidate and, more importantly, a more thoughtful physician.

Being associated with a lab kept me engaged with scientific thinking/approach/critique to a level you don’t get with standard coursework. I would enthusiastically encourage others to participate in research at UNE. Being a part of research is the best way to understand how the biomedical sciences advance and what data (or more often lack of data) drive medical guidelines, opinions and decisions.

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