

3-2017

Rising Tide 2017

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Preferred Citation

UNE Office of Research and Scholarship; Bilsky, Ed; Deason, Dani; Shelley, Philip; Aranovitch, Jennie E.; Pahigian, Josh; Duffy, Laura M.; and Miller, Marine, "Rising Tide 2017" (2017). *Rising Tide*. 7.
<http://dune.une.edu/risingtide/7>

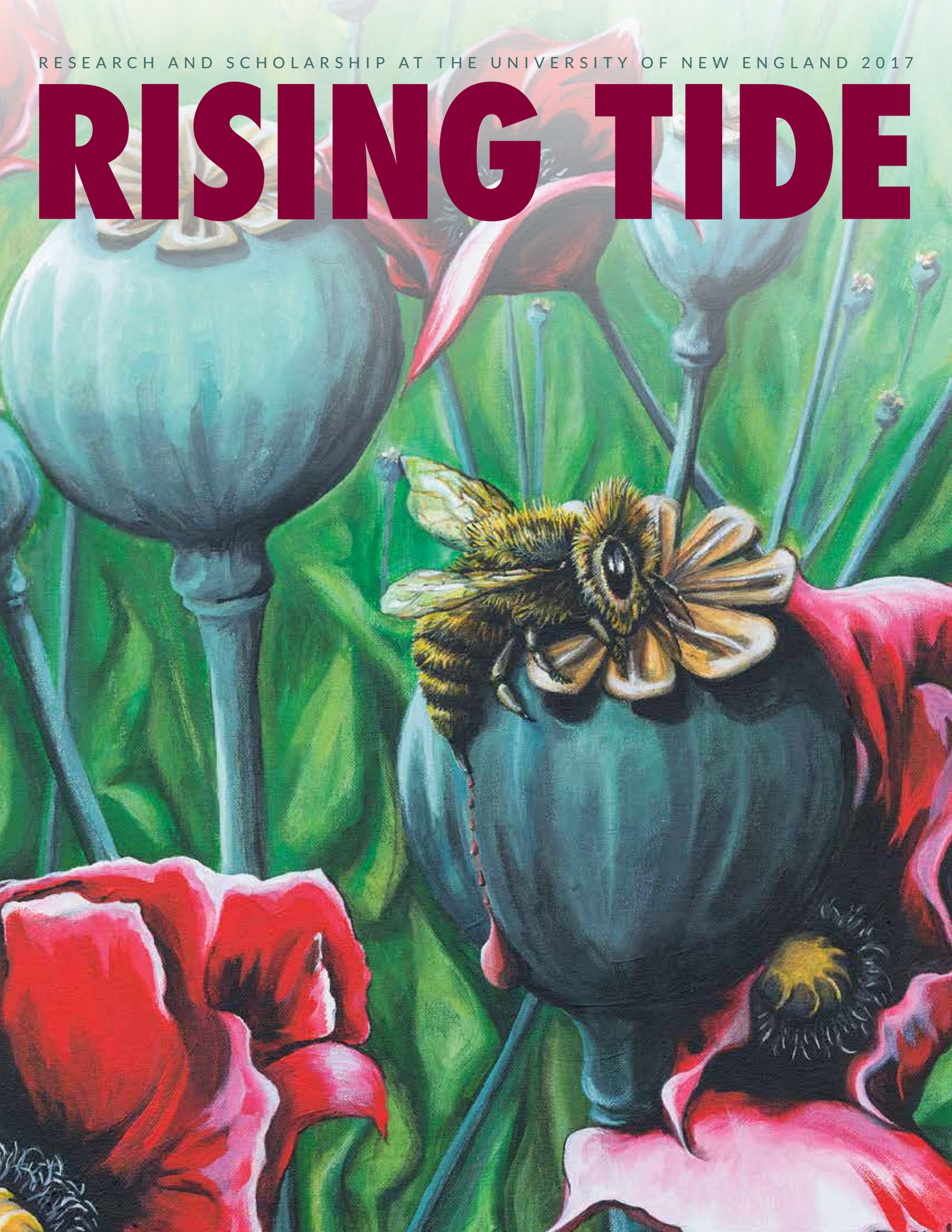
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RESEARCH AND SCHOLARSHIP AT THE UNIVERSITY OF NEW ENGLAND 2017

RISING TIDE





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

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 pored 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.

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 at rates significantly higher than undergraduates at peer institutions and private colleges and universities in the New England region.



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. I 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.

ED BILSKY
VICE PRESIDENT FOR
RESEARCH AND SCHOLARSHIP

RISING TIDE

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

2017

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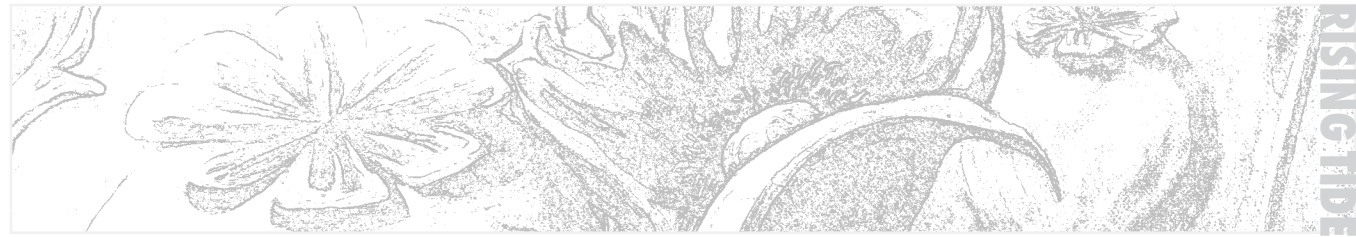
On the cover: *Morphine's Sting*,
Alexis Wells, acrylic on canvas,
2016

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advances in research and scholarship for
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Will Fulford

“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.”
— Taxia 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.”
— Brittney Sorbello (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)

“To give anything less than your best is to sacrifice the gift.”

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.



ED BILSKY



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COLLEGE of ARTS and SCIENCES

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

CAS

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.

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 goals were 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 Scholarship Edward Bilsky, Ph.D., offered their enthusiastic support.

David Mokler, 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."

“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.”

— Deena 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."



Dylan Turner (Aquarium Science and Marine Science, '17) prepares the microinjector by loading the pipette with tissue stain.

CAS

MEGAN BEAUCHEMIN, PH.D., POSTDOCTORAL FELLOW, COLLEGE OF OSTEOPATHIC MEDICINE
 ZACHARY MILLER-HOPE, M.S., LECTURER, MARINE SCIENCE TECHNICIAN, COLLEGE OF ARTS AND SCIENCES



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

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

WHY USE ZEBRAFISH FOR RESEARCH?

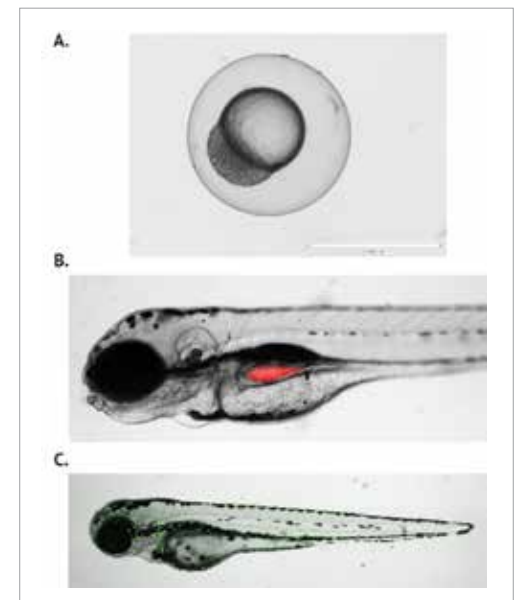
The zebrafish, *Danio rerio*, is a small, striped, tropical minnow originally found in South Asia. The zebrafish has gained acceptance as a vertebrate model system in more than 11,100 laboratories and companies worldwide. Megan Beauchemin, Ph.D., UNE postdoctoral fellow in the College of Osteopathic Medicine, explained, "Zebrafish serve as an important model 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, regeneration, 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.”

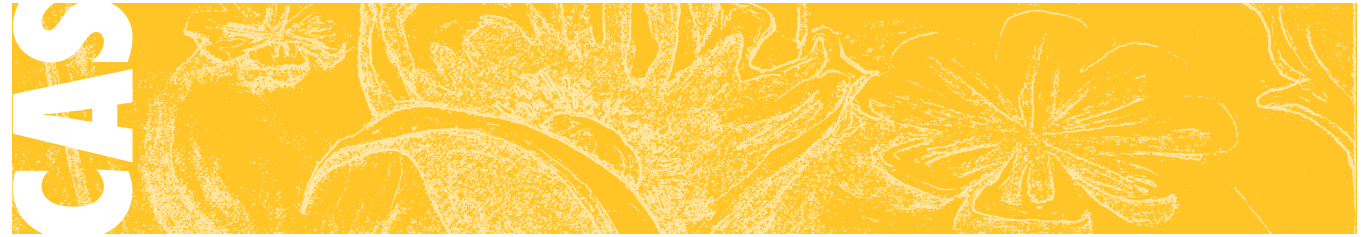
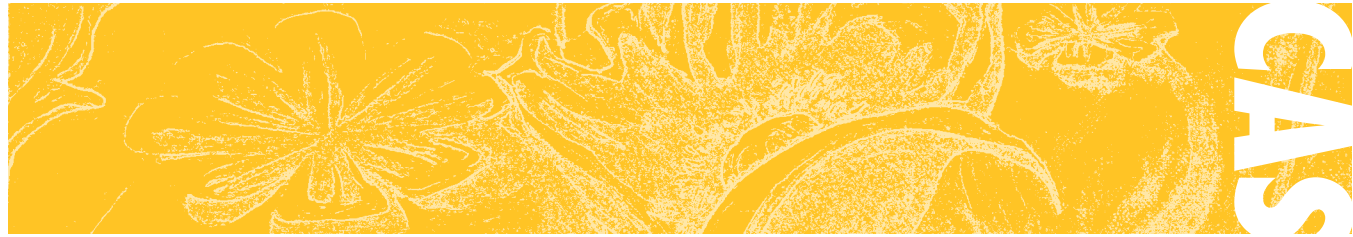
— David Guay

Several UNE faculty members are already engaged in collaborations on a variety of projects. Houseknecht is conducting a study with scientists at the Mount

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



The developmental stages of zebrafish are shown from the time the eggs are fertilized until they reach the juvenile stage: A. Zebrafish blastula at the 64-cell stage; B. Larval form of a genetically engineered zebrafish used to detect the metabolism of environmental chemicals such as dioxin; C. Larval zebrafish expressing a green fluorescent protein in neutrophil cells of the immune system.



Kayla Eustace (Aquarium Science, '17) takes readings on water quality parameters from tanks that contain a strain of zebrafish that fluoresce upon exposure to environmental endocrine disruptors (EEDs).

that are important for cellular motility and response to environmental cues. Joseph Kunkel, Ph.D., research professor of marine sciences, will examine zebrafish scales to study bone metabolism and osteoporosis using his lab's non-invasive ion probes.

All of these projects are expected to include student researchers, allowing students to gain desirable skills that are attractive for employment and graduate programs. Once established, the number of facility users is expected to grow as word spreads about the benefits, including low cost, of this model organism.

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."

“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

“I look forward to this exciting new science education opportunity.” — Deb Landry

Deborah DuDevoir, 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.

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. ■



Zebrafish genetically engineered to fluoresce



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.

Research Experience a Factor in UNE Undergraduate Student Success

GLENN W. STEVENSON, PH.D., ASSOCIATE PROFESSOR, DEPARTMENT OF PSYCHOLOGY
PROGRAM COORDINATOR, NEUROSCIENCE MAJOR

A question we hear frequently from prospective students and their families as they shop for college is, "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 graduate has. One salient factor at UNE is the opportunity undergraduates 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 and is responsible for the daily running of the lab — 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 11 years ago, its graduates have had a 100 percent success rate for graduate school and job placement.

The student lab experience is not limited to the UNE campus, as the Stevenson Lab collaborates with other research facilities, including ones at Harvard Medical School, the University of Arizona, Virginia Commonwealth University and the Maine Medical Center Research Institute. These collaborations provide our students with access to other leaders in the sciences and, in some cases, an introduction to a future graduate school mentor.

Recent examples of students who experienced successful outcomes after working in this laboratory: Philip Atherton, B.S. '15 (Nursing); Katherine



Abby Kinens (Psychology, '17) preparing solution.

Cone, B.S. '15 (Neuroscience); Rebecca Krivitsky, B.S. '16 (Neuroscience); and Emily Warner, B.S. '16 (Neuroscience).

Atherton currently serves as an RN at Newark-Wayne Community Hospital in upstate New York. Cone is a first-year student in the UNE College of Osteopathic Medicine. Krivitsky is a first-year student in the Doctor of Optometry program at Nova Southeastern University, and Warner is a first-year student in the Ph.D. program in neuroscience at the University of Rochester School of Medicine.

A sampling of older alumni includes Amy Luginbuhl, B.S. '11, currently an RN at Brigham and Women's Hospital in Boston; Laura Benoit, B.S. '10, currently a D.V.M. in private practice; and Jim Cormier, B.S. '09, who spent several years in the biotech sector and is currently a second-year student in UNE's College of Dental Medicine.

Stevenson believes that the combination of hands-on experiential research opportunities, active learning in the classroom, world-class faculty and supportive administration, and the unwavering student curiosity and work ethic synergize to result in the successful placement of our students. ■

Digital Initiatives Prepare Students to Embrace the Future

JESSE MILLER, M.F.A., VISITING ASSISTANT LECTURER
MICHAEL CRIPPS, PH.D., ASSOCIATE PROFESSOR OF RHETORIC AND COMPOSITION

Preparing students for the world after college is among the most important components of an education. However, with an unknowable future, how will students be best prepared? The College of Arts and Sciences (CAS) recognizes that a facility with digital tools must be in the mix. Since 2013, with financial assistance from the Davis Educational Foundation, 11 CAS faculty members have participated in a semester-long seminar to develop digital projects in their courses. New this year, CAS has launched a digital makerspace and an expanded electronic portfolio (ePortfolio) initiative to support and extend existing work in new directions to help students embrace the digital.

The ePortfolio initiative, UNE Portfolios, is a web space for students to craft aspects of their digital identities. Launched in 2012 as a set of small, course-based pilots in the English department, UNE Portfolios now has a domain name and server support to help it grow. Since September 2016, nearly 150 first-year 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, M.F.A., visiting assistant lecturer and DigiSpace Lab coordinator, oversees all aspects of the new Mac-based digital makerspace called the DigiSpace. Staffed with peer Digital Literacy Consultants, the



With its 28 MacBook Pros, this mobile learning lab can accommodate a full class of students as they build their digital identities at the DigiSpace.

DigiSpace is more than a computer lab. With financial support from the CAS Dean, the English department and the Davis Educational Foundation, the DigiSpace assists students with ePortfolio work, course-based video projects and more. Hundreds of students are engaged in digital work in CAS, making the DigiSpace an important resource.

Associate Professor of Spanish and Portuguese Steven Byrd, Ph.D., a recent digital literacy seminar participant, explained how his classes embrace the digital, saying, "In my previous Spanish classes, students wrote and performed scripted scenes live in the classroom. These, typically, became just a live reading of their dialogues, and the only effort was put into the written text. Now, with their digital video projects, students are spending more time on their scripts and rehearsing their dialogues much more before they record and present them to the class."

Enthusiasm for the DigiSpace and ePortfolio is not just limited to faculty. Sandy Pham (Elementary Education, '20), working on a project for her Introduction to the Humanities class, raved, "I went to the DigiSpace and it was so beneficial! I'm glad I went — I think my ePortfolio looks awesome now!"

Miranda Hall (Psychology, '19), a digital literacy consultant, assisted Pham with her project. Hall, who loves helping students with digital tools, 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. ■



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

The Role of Food Security in Public Health and Community Sustainability in the Year-Round Islands of Maine

CAS



On islands like Matinicus Island where there are no stores, many foods are not readily available to residents. Photo by S.A. McReynolds

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 (Satsangi, 2009) and jobs (McReynolds, 2104) remain at the core 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.

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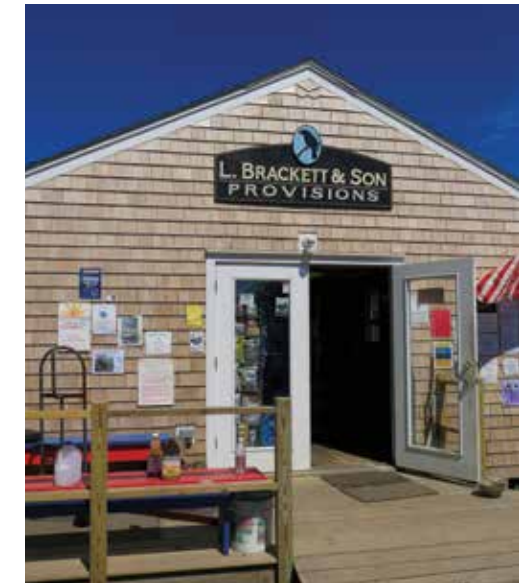
SAMUEL A. MCREYNOLDS, PH.D., PROFESSOR, SOCIOLOGY
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More importantly, however, this research has raised important issues of public health in island sustainability. For example, our survey indicated that fewer than 30 percent of respondents believed there 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. ■



The precarious nature of island stores remains a central issue to island life. Photo by S.A. McReynolds



On most islands, the grocery stores do not have the storage capacity to buy in bulk or the clientele to diversify their food options. Photo by S.A. McReynolds



Health care resources remain a critical sustainability issue for island living. Photo by S.A. McReynolds



Island stores provide a wide range of services and are often a social center of island life. Photo by S.A. McReynolds

Invasion of an Aggressive Crab

MARKUS FREDERICH, PH.D., PROFESSOR, DEPARTMENT OF MARINE SCIENCES



The European Green Crab, *Carcinus maenas*, is one of the most successful invasive species worldwide. Several studies at the UNE Marine Science Center investigate the ecology and physiology of this crab to understand its invasiveness in the context of global climate change.

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 intricate 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.



Amber Jenkins (Marine Sciences, '19) searches for invasive species at the coast of Biddeford Pool. Photo by Jessica Stumper

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: *Botrylloides violaceus*, *Botryllus schlosseri*, *Carcinus maenas*, *Codium fragile*, *Didemnum vexillum*, *Hemigrapsus sanguineus*, *Membranipora sp.*, and *Ostrea edulis*. 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. ■



Lauren Duffin (Marine Sciences, '17) uses a 3D-digitizer to compare the morphology of green crabs from Iceland, Canada and Maine.



Marine Sciences Professor Markus Frederich, Ph.D., and his students perform a monthly survey for invasive species as part of the Marine Invasive Monitoring & Information Collaborative. Photo by Jessica Stumper

UNE's First Artist-In-Residence Moves Students Forward

JESSE MILLER, M.F.A., VISITING ASSISTANT LECTURER

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Bernard's "Wave Phenomena," on display at UNE's Ketchum Library

"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."



UNE's first artist-in-residence, Kim Bernard, visits with Jesse Miller's An Introduction to the Humanities class in the fall of 2016.

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 of more of Bernard's artwork, visit www.kimbernard.com



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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 Indiana University, Bloomington, 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 dissects 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 helps you to discover connections between the disciplines," he remarked. "In my experience, a lot of science majors think that philosophy isn't relevant to their interests. That's just not true! Philosophy is rigorous and transformative. It teaches you how to think clearly and precisely, and it greatly deepens your understanding of science." After a moment's thought, he added, "Maybe most importantly, studying philosophy helps you learn how to learn."

Campbell is now immersed in graduate study in the history and philosophy of science and is enjoying his experience in Bloomington. His main academic interests are in bioethics, the philosophy of medicine and the philosophy of biology. I asked him about his future plans, and he explained that he is looking forward to combining his philosophical and scientific interests. "I plan to attend medical school," he said. "I want to combine philosophy and medicine to advance the role of bioethics in American hospitals."



Alex Campbell, B.A. '14 (Philosophy)

The Digital Promise: Reshaping Teaching and Learning via Student Engagement to Improve Success and Retention

KAUSHIK (KASH) DUTTA M.S., ASSOCIATE LECTURER OF ANATOMY AND PHYSIOLOGY, DEPARTMENT OF BIOLOGY

Several advanced technologies have changed the landscape of teaching and learning in higher education by offering digital tools and resources to educators and learners. Many low cost/no cost solutions offer incremental change and added value to the intrinsic quality of undergraduate teaching and help to develop

a learner-centric educational model.

Students of the millennial and post-millennial generation, raised on mobile devices, digital games, texting, social media and connectivity anywhere, are not novices in using digital courseware for their success. Health professions students at UNE are required to take a two-semester anatomy and physiology course (A&P), which immerses them in an engaging learner-centric environment created with a variety of digital courseware. These tools offer multiple remediation points to ensure student success.

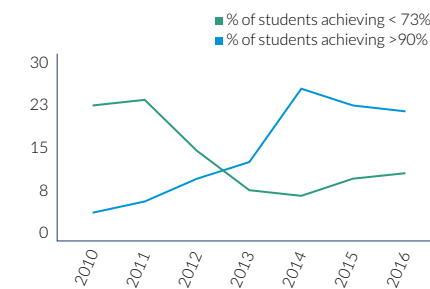
In particular, UNE's Blackboard learning management system, coupled with the textbook publisher's SmartBook Adaptive Learning platform, creates a unique in-class/out-of-class digital learning space. This allows each individual to progress at his or her own speed through the course materials, which are tagged with Bloom's taxonomy levels. Students can engage in remediation until they have achieved their desired level of success. The analytics from the adaptive learning tool help the instructor tailor in-class teaching and discussions to meet areas of student need.



An image from the digital cadaver program

In the A&P laboratory, students use a digital cadaver program with layering technology to explore the anatomy of deep structures. They also use a digital data acquisition system, delivered via a cloud server, to engage in hands-on physiological experiments. Last but not least, a digital social media platform fosters a sense of community among learners where

students can engage in high-level peer-to-peer interactions. Collectively, these technological implementations have incrementally improved student success and retention in A&P over the years.



Trends in student success and retention in A&P: green indicates a decreasing percentage of non-qualifying students over time (students must achieve a grade of >73 percent to progress in their program); blue indicates the increasing percentage of A students over time.

UNE Marine Science Center Acquires Two New Research Vessels

ADDIE COYAC, M.B.A., ASSISTANT DIRECTOR, MARINE SCIENCE CENTER

MARKUS FREDERICH, PH.D., PROFESSOR, DEPARTMENT OF MARINE SCIENCES

UNE marine programs are now moving offshore. The recent gift of Ram Island from Arthur P. Girard allows for teaching courses in marine sciences, environmental sciences/studies or biology on UNE's own island, just one and a half miles from campus. After acquiring the island, UNE commissioned the construction of a 31-foot aluminum Student-Centered Research Capable Landing Craft. In addition to transporting students, faculty and staff to Ram Island, the vessel will allow students to conduct basic oceanographic and marine biological field science on the way to and in the waters

surrounding this Saco Bay island. The research vessel will carry up to 24 UNE students, faculty and staff at a time.

Additionally, Girard gave UNE a 350 Marlin FM that will transport students, faculty and staff offshore to conduct field science. Christened "Sharkology," the vessel is 35 feet long with twin 2005 Yamaha 300-horsepower outboard engines and can carry up to eight UNE students, faculty and staff. Adding these two boats to the UNE fleet opens exciting new possibilities for teaching and student research.



(From left to right) Michael Girard, James Sulikowski, Ph.D., Ed Bilsky, Ph.D., Arthur Girard, Addie Coyac, M.B.A., and Tim Arienti, B.S., embark upon the maiden voyage of Sharkology (not pictured: Kathryn Ono, Ph.D., who was also on board).

Maine Alumnus Continues Science Career in California

GEOFFREY K. GANTER, PH.D., PROFESSOR, DEPARTMENT OF BIOLOGY

While he grew up canoeing the Kenduskeag Stream in Maine, these days Taylor Follansbee, B.S. '13, M.S. '15 can occasionally be found hiking in the mountains of California. But most days, Follansbee is working on his Ph.D. in his laboratory at the University of California, Davis, studying the sensation of itch with professor Earl Carstens.

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 its NIH 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 \$443,490 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."

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.



Taylor Follansbee, B.S. '13, M.S. '15 hikes mountains in Yosemite.



COLLEGE of OSTEOPATHIC MEDICINE

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.

WADEM seeks Collaboration with UNE

COLONEL BILL BOGRAKOS, M.A., D.O., FACOEP, ADJUNCT PROFESSOR, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

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WADEM-UNE, the UNE Addiction Medicine Club, Joseph Wolfberg, adjunct professor in the Physician Assistant program and Carla Johnson, coordinator of Counseling Services at UNE, pose with the Eagala (Equine Assisted Growth and Learning Association) trainers and their horses.

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 enlisting 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 of Military Osteopathic Physicians and Surgeons (AMOPS); Victoria S. Thieme, D.O. '93, advisor for the Addiction Medicine Club; 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.

“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.”

— 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

VICTORIA (STACEY) THIEME, D.O., DIRECTOR OF COMMUNITY MEDICINE, CO-DIRECTOR OF GERIATRICS, ADVISOR OF ADDICTION MEDICINE CLUB AND OF WORLD ASSOCIATION FOR DISASTER AND EMERGENCY MEDICINE-UNE
DANI DEASON, M.B.A., EXECUTIVE ASSISTANT, OFFICE OF RESEARCH AND SCHOLARSHIP

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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! ■



Joseph Wolfberg, adjunct professor in the Physician Assistant program, and Carla Johnson, coordinator of UNE's counseling services, take great risks to care for their patient, demonstrating collaboration and commitment.



Ian Corbett (COM, '19) and Libby Mazzeo (COM, '19) had to use their assets and work as a team to navigate the health care system.

Rapid Evolution of Zika Virus and its Study

MEGHAN A. MAY, M.S., PH.D., ASSOCIATE PROFESSOR OF MICROBIOLOGY AND INFECTIOUS DISEASES

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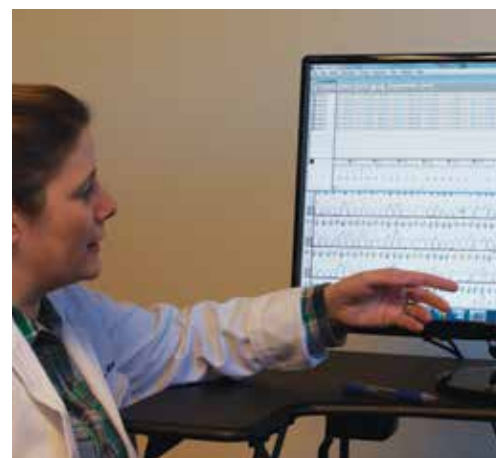
Zika virus is spread by *Aedes aegypti* and *Aedes albopictus*. These mosquitoes are easily recognized by the white banding on their limbs, abdomen and thorax.

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. I had flippantly decided that these cases of fever and rash, none of which were fatal or complicated in any way, were not remotely interesting. I was wrong.

These cases would lead to the alarming clinical discovery that infection with Zika during pregnancy could lead to severe neurological defects in newborns and a higher rate of stillbirth, a looming health infrastructure challenge as these profoundly disabled infants grow into children, a swift and impressive mobilization of the scientific community to create positive outcomes for those at risk, and for me, an unexpected new line of research.

First things first: I am not a virologist. I study emerging diseases and the way infectious agents evolve, but I prefer bacteria. Occasionally, I have been asked to measure the evolutionary patterns of other pathogens (parasitic worms in particular), but I had never felt particularly intrigued by viruses. I was, therefore, quite

surprised to receive an invitation to the Zika Global Health Symposium held in May of 2016, just under a year to the day of the first cases being reported in Brazil. Two things became very clear to me upon my arrival: 1) most others in the room were similarly surprised to have been invited (as it turns out, there were almost no Zika virus experts walking the planet prior to 2015); and 2) each invitee had a separate and transferrable skill that could be applied to Zika research. There was one scientist who designed vaccines, two who studied the way that the immune system initially interacts with similar viruses, one who designed laboratory tests



Meghan May, Ph.D., describes the process of editing and evaluating gene sequencing data used in the systems biology of Zika study.

to detect infectious agents, another who studied neurological pathology in infants during pregnancy, a few who studied interactions between viruses and mosquitoes, and many others.

The reason for my invitation became clear immediately; it was because no one knew much of anything about how Zika evolves and changes. We as a scientific and medical community need tangible outcomes to provide to the public, and, in order to achieve that, we had best understand the factors pressing on Zika that caused it to go from a relatively benign virus to one that targeted the brains of fetuses.

My lab began to study the evolution of Zika virus by looking at its genetics. We took the complete genomes of 33 different isolates, aligned them to find the differences, and then explored the biological impact of those differences. To ensure that we were not biasing the outcome of our study, we were careful to choose Zika isolates from all over the world (11 from Africa, eight from Southeast Asia, 14 from South America or the Caribbean), over the course of decades (1947-January 2016) and from a variety of sources (human plasma, infected wildlife, mosquito pools and post-mortem isolates from lost pregnancies). When we looked at each Zika gene and performed our evolutionary analysis, it was very clear that the virus preferred to keep some traits very stable and yet was at its biological best when others changed extensively.

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.

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 the UNE 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. ■



Meghan May, Ph.D., discussing the infrastructure needed to make sure mosquitoes can't breed

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

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Gioia Guerrieri, D.O., 2008 graduate of the College of Osteopathic Medicine

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, she jumpstarted her research career by applying for and receiving her first COM 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 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.

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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



Marilyn R. Gugliucci, Ph.D., has been Gioia Guerrieri's research mentor since 2003. Gugliucci is the director of Geriatrics Education and Research within the UNE Division of Geriatric Medicine.

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*, *Neuropsychologia* 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. ■

COM Faculty Making Neuroscience Lesson Real and Fun

VICTORIA (STACEY) THIEME, D.O., DIRECTOR OF COMMUNITY MEDICINE, CO-DIRECTOR OF GERIATRICS, ADVISOR OF ADDICTION MEDICINE CLUB AND OF WADEM

COM



Sam Maunsell meticulously dissects the midbrain.

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 out a letter to parents regarding the changing bodies and brains of the students, Thieme knew she needed to talk about the adolescent brain on her next visit to the school.

As Thieme explained, "When the sixth-grade teacher sent an educational article to parents describing the struggles of the parent-child relationship as the young brain and body matures, it made sense to make this year's presentation

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 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.

COM

"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."

— Victoria Stacey Thieme

Armed with sheep brains and dissection kits donated by the UNE Center for Excellence in the Neurosciences K-12 Outreach Program, Thieme created several other activities for the students. Thieme utilized the sheep brains to explore brain anatomy — such as identifying brain regions and functions — and used bike helmets mapped with the cortex regions of the brain to explore how easily the brain can be damaged. The students also created a timeline to evaluate different changes in the body, mind and mobility over time, from infants to adolescents.

"These 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



Cialy Charbonneau and Clare MacDonald examining a brain and considering how theirs might be similar.

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," she reflected. "These students will be some of our future community leaders; therefore, we must prepare them and arm them with knowledge and mentorship."

Thieme is grateful to UNE for providing opportunities and support for her to pursue ongoing educational outreach in the local community. ■

Student Research in the Mokler Lab at UNE

DAVID J. MOKLER, PH.D., PROFESSOR OF PHARMACOLOGY, CHAIR OF THE DEPARTMENT OF BIOMEDICAL SCIENCES, COLLEGE OF OSTEOPATHIC MEDICINE

COM



Amanda Staiti and Donna Bass present their work with David J. Mokler, Ph.D., professor of pharmacology at the 2007 Society for Neuroscience meeting.

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 large 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. And as faculty, we benefit from the hard work and enthusiasm of the students. I have benefited from two fantastic groups of students helping me with my research: the medical students from the College of Osteopathic Medicine (COM) and the undergraduate students from the College of Arts and Sciences (CAS).



Jackie O'Brien (Medical Biology, '17) slices tissue on a cryostat.

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.

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 (Leahy) Correia, D.O. '92; Robert Moore, D.O. '93; Sherry Stadig, D.O. '98; Gudbjorn (Karlsson) Asmundsson, D.O. '99; Heidi Wennemer, 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).

COM

The CAS students have included John Pare, B.S. '88 (Life Sciences), D.O. '92; Allison Gully, B.S. '93 (Life Sciences); Kristy Chioda, B.S. (Marine Biology); Greg Cadman (Continuing Education); Barbra Whitten '93 (Continuing Education); Tracy Sklutas, B.S. '91 (Marine Biology); Sal Abbruzzese, B.S. '95 (Life Sciences), D.O. '99; Sherri Field, B.S. '94 (Life Sciences), D.O. '98; Nancy Theriault, B.S. '96 (Medical Biology); Donna Lavierriere (Occupational Therapy); Nicholas Clayton, B.S. (Medical Biology); Mark Graves, B.S. (Medical Biology), Ph.D.; Eric Housner; Sarah Sinclair, B.S. '97 (Life Sciences), D.O. '03; Heather Mastalong, B.S. (Life Sciences), D.O. '00; Valerie Trumble, B.S. '96 (Life Sciences), D.O. '00; Charles Landry, B.S. '97 (Life Sciences), D.O. '00; Jessica Paddock, B.S. '99 (Biological Sciences); Scott Vaughan, B.S. '99 (Life Sciences), D.O. '08; John Nadeau, D.O. '04; Amanda Buglio, B.S. '01 (Biological Sciences), M.P.H.; Brooke Azie, B.S. (Medical Health Sciences) '01; Jennifer Blair, B.S. '08 (Medical Biology), D.D.S.; Jill Hoffman, B.S. '03 (Biological Sciences), Ph.D.; Jason Dugal, B.S. '03 (Medical Biology); David Bagg, B.S. '04 (Medical Biology); Stephen Nystrom, B.S. '04 (Biological Sciences), D.O.; Amanda Staiti, B.S. '07 (Medical Biology), M.P.H. '10, D.D.S.; Elizabeth Andrews, B.S. '10 (Chemistry), Ph.D.; Donna Bass, B.S. '10 (Psychobiology); Janelle Blair,

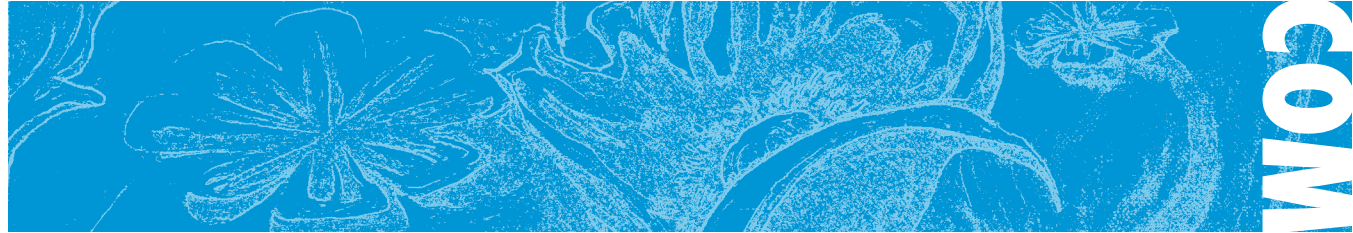


Amanda Staiti presents her research at the EAST Conference. She was awarded a research fellowship from EAST.

B.S. '08 (Medical Biology), D.O.; Shawn Johnson, B.S. '09 (Biological Sciences); Fran Brym, B.S. '10 (Medical Biology), P.A.; Megan McBurnie, B.S. '10 (Psychology), M.D.; Julie Birch, B.S. '12 (Marine Biology); Leah Tustin, B.A. '13 (Psychology); Elyse Johnson, B.S. '12 (Neuroscience), RN; Eben Larrabee, B.S. '10 (Medical Biology), D.D.S.; Andre Trzaskowski, D.O. '18; Marina Barankevitch, B.S. '14 (Biochemistry and Neuroscience); Amanda Quinn, B.S. '14 (Neuroscience); Amber Rigdon, B.S.N. '17; Jacklyn O'Brien '17 (Medical Biology); Harley Neubauer, B.S. '17 (Marine Science); Megan Schanck, B.S. '17 (Medical Biology); and Samantha Schildroth, B.S. '17, (Medical Biology).



The 2011 Mokler Lab celebrates the end of the year.



Bridging Critical Care and Neurology for Survivors of Cardiac Arrest

DAVID J. MOKLER, PH.D., PROFESSOR OF PHARMACOLOGY, CHAIR OF THE DEPARTMENT OF BIOMEDICAL SCIENCES



Teresa May, D.O. '08

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 Seder, 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, while simultaneously completing a master's degree in clinical and translational sciences at the Tufts Sackler Graduate School of Biomedical Sciences.

May's current research focuses on the influence of sedation and cognitive outcomes in patients surviving cardiac arrest. This year, she was awarded a KL2 grant titled "Variation in Sedation and Neuromuscular Blockade

Practices 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.

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

JANE E. CARREIRO, 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 UNE College of Osteopathic Medicine (COM) 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 Beutler Chronic Pain Lab under the supervision of Andreas Beutler, 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)



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



WESTBROOK COLLEGE of HEALTH PROFESSIONS



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

WCHHP

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.



Katherine Rudolph, PT, Ph.D., measures pressure pain thresholds in the arm because knee pain may result in higher pain sensitivity all over the body.

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



D.P.T. students learn about human movement in the Motion Analysis Lab where principles of movement are demonstrated in real time.

WCHHP



Students make connections between their classroom learning, patient care experiences and the research that provides "ah ha!" moments that make research fun and rewarding.

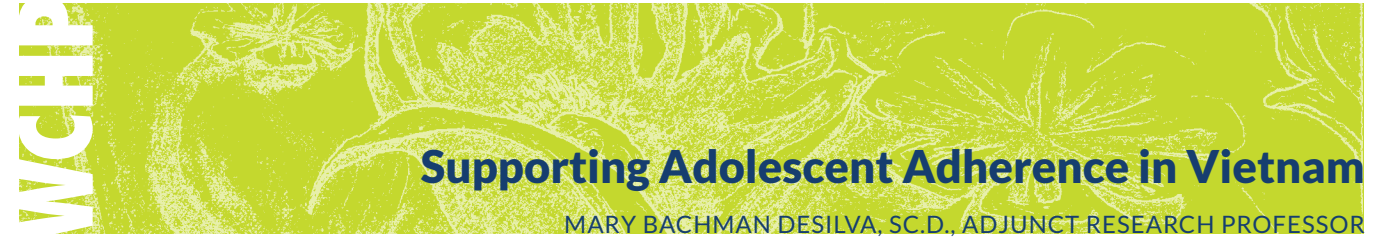
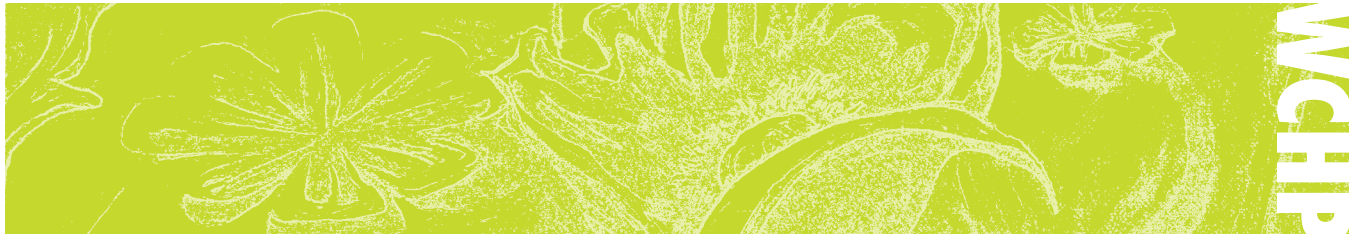
performed. Chronic pain changes the way that sensory information is detected by the nervous system, and Rudolph's research investigates whether sensory changes due to chronic pain from knee osteoarthritis reduce the ability to learn new ways of moving. Motor learning is the cornerstone of physical therapy, 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,



D.P.T. students hone their observational skills and apply principles learned in class to actions performed in the Motion Analysis Lab

Rudolph's NIH-funded research project is in the early stages, so results have yet to be developed; but she is more than satisfied with the educational outcomes that participating students have achieved thus far. As the project progresses, Rudolph is already planning her next grant proposal to test an intervention to reduce pain, improve function and slow progression of knee osteoarthritis, and she is already lining up students to help in that process. "It is extremely rare for physical therapy programs at institutions like UNE to have research facilities like the Motion Analysis Lab," she says. "It is very exciting to work with undergraduates who are just starting to explore physical therapy as a profession as well as with budding physical therapists in the D.P.T. program, because I know that they will 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." ■

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.

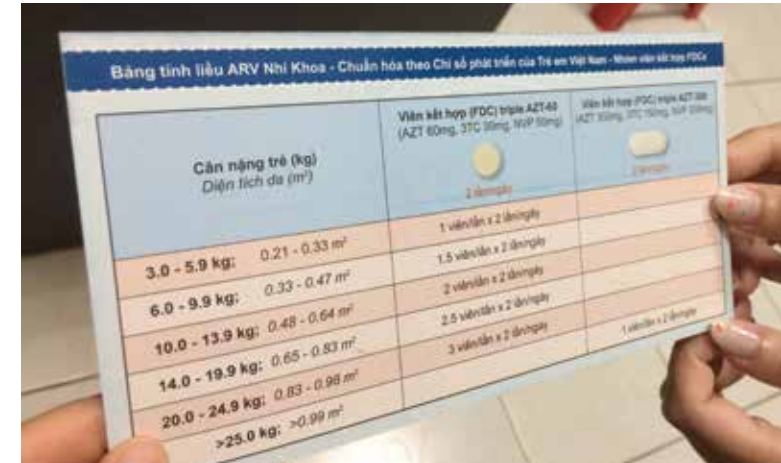
“In 2016, over half of the D.P.T. class, 31 of 59 students, opted to participate in a research project, and 11 of them are working on my NIH funded research.”

— Katherine Rudolph

One student who worked with Rudolph commented in an evaluation that the experience "Really 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 from their research to patients they were treating in the clinic. That was the outcome for which Rudolph had been hoping — translating research into clinical practice.



Research participant Chad Lyons steps onto the stationary belt of a treadmill, one of the conditions used to assess motor learning.



A card describes anti-retroviral therapy (ART) regimens and the proper dosage for children by weight.

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 begun 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. ■



Mary Bachman DeSilva, Sc.D.

Assessing Carotid Artery Changes in Children in the Cardiovascular Health Intervention Program (CHIP)

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

WCHP

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, and, 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 CVD risk factors and CIMT (i.e., whether children with more CVD risk factors have a greater CIMT). A licensed sonographer, using a portable ultrasound unit, assessed CIMT of the right and left carotid arteries in a random sub-sample of 119 5th grade students in two local elementary schools. The average age of the students was 10.5 years.

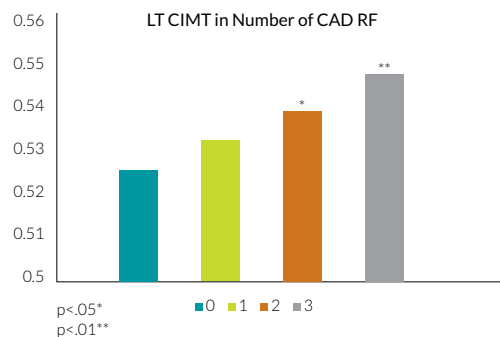
Dan White (Applied Exercise Science, '17) received an Undergraduate Summer Research Fellowship from the Westbrook College of Health Professions to

complete the analyses. Results showed that elevated body mass index (BMI), blood pressure and glucose levels were associated with higher CIMT. Children identified as obese based on BMI had a greater CIMT than children with a healthy BMI. In addition, higher CIMT was observed in children with two or more risk factors for CVD when compared to children with no CVD risk factors.

These results suggest that physical changes in one's carotid artery take place at a fairly early age in children with 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? If the 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 a 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." ■



When comparing CIMT to number of risk factors, a positive linear relationship was observed through 3+ CAD risk factors



Amy Belanger (Applied Exercise Science '16) takes a student's blood pressure.

The ChoRo Test of Visual Perception Related to Driving

REGI ROBNETT, PH.D., OTR/L, FAOTA, PROFESSOR, DEPARTMENT OF OCCUPATIONAL THERAPY

WCHP



The current OT research team learns about using the ChoRo. From left to right: Joshua Demers, Ginsberg Dupuy, Madison Brummond, Peter Chow (sitting), and Kira Shollenberger (all class of 2018), and professor Regi Robnett, their faculty research mentor.



Masters of Science in Occupational Therapy students (class of 2018) Madison Brummond and Peter Chow work on the ChoRo, the on-line visual perceptual test related to driving.

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 number of master's students in UNE's occupational studies program, and alumni developed the ChoRo assessment tool, which uses photos, 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://unehoro.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 Alpha 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

WCHHP



A supermarket lobby display shows special discount marketing for a mix of healthy and less healthy items.

Associate Professor Michele Polacsek, principal investigator (PI), and University of Southern Maine Research Associate Rebecca Boulos (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.

Few U.S. youth and adults achieve the recommended intake of fruits and vegetables (F&V). Increasing intake of F&V and whole grains can help close the “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).

WCHHP

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 healthful 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

“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



Alyssa Moran, a doctoral candidate at Harvard School of Public Health, and Zoe Hull, a research assistant at the UNE School of Community and Population Health, recruit shoppers at a local 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 study 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 retailer 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. ■

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

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

WCHP



Saco Mayor Roland Michaud, UNE President Danielle Ripich, Ph.D., and Biddeford Mayor Alan Casavant give a collective thumbs-up at the second annual UNE Day of Service.

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 is also a 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 for 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 16 undergraduate and graduate faculty members from WCHP, faculty from the College of Pharmacy (COP), representation 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 and 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. ■

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UNE Associate Dean for Academic Affairs Wallace Marsh, Ph.D., and his FYE class pose before heading out on the Day of Service. Participants from the Class of 2020 include (top row): Julia Pruszek (Nursing, '20), Hannah Lynch (Nursing, '20), Emily Marcoux (Nursing, '20), Tammi Compagna (Public Health, '20), Madeline Gendron (Health, Wellness and Occupational Studies, '20) and Caitlin Nye (Nursing, '20); and (front row): Riley McCollett (Nursing, '20). Front right: Wallace Marsh, Ph.D., clinical associate professor and associate dean for Academic Affairs (COP).



Madison Bacon (Pre-Pharmacy, '20) and Kristen Carlisle (Dental Hygiene, '20) check pupillary reaction with Associate Professor of Nursing Dawne-Marie Dunbar in an introductory simulation exercise.

Interprofessional Research Collaborations to Improve Outcomes in Athletes Post-ACL Reconstruction

ERIN HARTIGAN, PT, PH.D., ATC, OCS ASSOCIATE PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY

WCHP

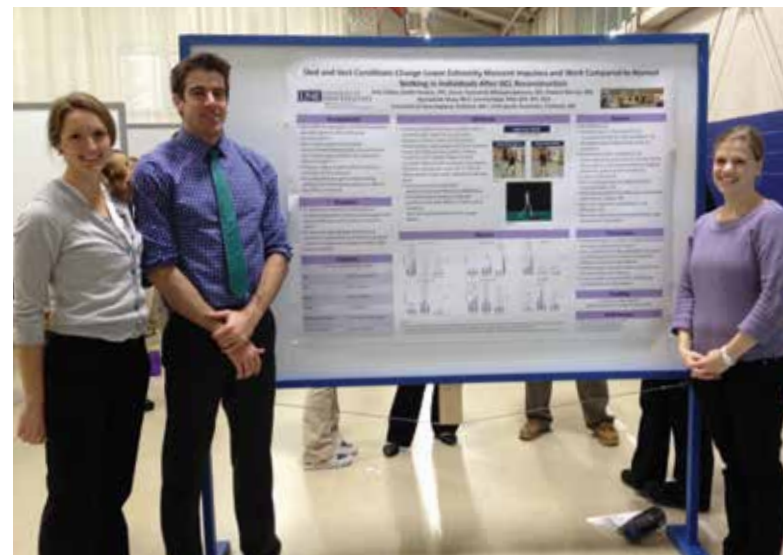
UNE researchers Erin Hartigan, D.P.T., Ph.D., ATC, associate professor of physical therapy, and Michael Lawrence, M.S., Motional Analysis Lab manager, have teamed with orthopedic surgeon Thomas Murray, M.D., and physician assistant Bernadette Shaw, PA-C, both from OrthoAssociates (OA) Centers for Orthopaedics, to improve outcomes for individuals suffering from knee injuries, specifically a rupture of the anterior cruciate ligament (ACL).

Though many individuals who rupture their ACL undergo reconstructive surgery, not all return to sports. Many continue to favor their ACL-reconstructed limb, creating differences when they return to athletic tasks and even when they walk normally. Limb differences, particularly poor force production in the ACL-reconstructed limb, reduce the ability to return to sports and increase the chances of reinjuring the knee.

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,



Erin Collins, D.P.T. '15, James Townsend, D.P.T. '15, and Kaitlin Powers, D.P.T. '15, gather at UNE's Physical Therapy Department's 2014 Research and Scholarship Day.

“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



Class of '17 D.P.T. students Katie Mickelsen, Morgan Wilson (towing the sled) and Stacey Howard are piloting the sled-towing task to feel how the dragging forces created by the sled alter the effort required at the knee compared to normal walking.

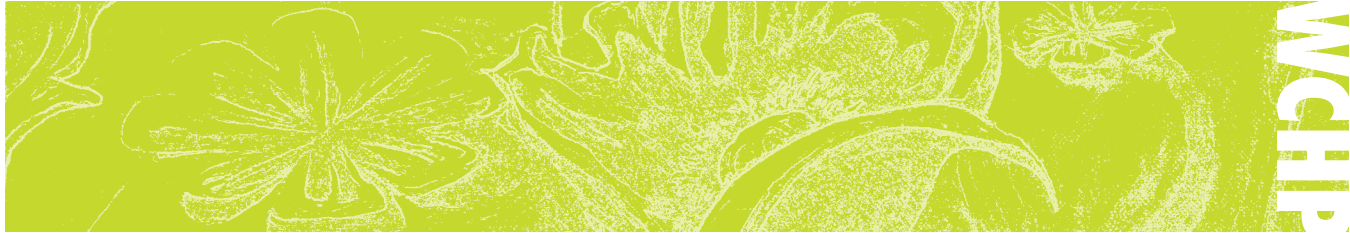
suggesting that men and women should be treated differently after ACL reconstruction. These findings were presented at the 2016 American College of Sports Medicine Conference.

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:

- Jonathan 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.

- Sarah Lamberton, B.S. '15 (Applied Exercise Science) presented her poster, titled "Assessing Muscle Activity during Normal and Challenging Walking Tasks After ACL Reconstruction," at the New England American College of Sports Medicine Conference in 2014. Lamberton also co-authored a publication with Hartigan and Chimera, titled "Clinical Utility of the Functional movement Screen," which appeared in the February 2015 issue of *Lower Extremity Review Magazine*.
- Current undergraduate Anna Michaud (Applied Exercise Sciences, '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 Keafer, 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.(C), RN, CCRN, CNE, ASSISTANT PROFESSOR OF NURSING

JUDITH BELANGER, RN, M.S.N./ED., CNE, ASSOCIATE PROFESSOR OF NURSING

DANA LAW-HAM, PH.D., RN, FNP, CNE, ASSISTANT CLINICAL PROFESSOR OF NURSING

NORA KREVANS, M.A., 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 the 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 programs usually attract. Some studies have reported higher attrition rates for ABSN students than for 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.



Debra Kramlich, Ph.D., assistant professor of nursing, shows senior nursing students a resource for patient teaching.

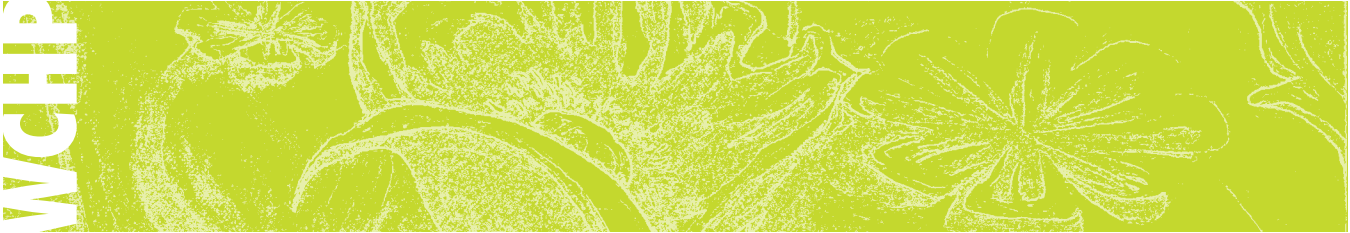
UNE Researchers Investigate Head Impacts in Men's Lacrosse and Men's and Women's Ice Hockey

JOHN M. ROSENE, D.P.E., ATC, CSCS, ACSM EP-C, 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. Visich, Ph.D., M.P.H., of the Department of Exercise and Sport Performance, have been examining sports-related concussions beyond the gridiron. Rosene and Visich 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 Visich, 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.



Brionne Turcotte (Applied Exercise Science, '17) prepares to hit a soccer ball with her head to gather real-time data on the force of the impact.

Self-Organizing Sensory Strategies Promote Occupational Performance

KATHRYN LOUKAS, O.T.D., M.S., OTR/L, FAOTA, DEPARTMENT OF OCCUPATIONAL THERAPY, WCHP

ANNA BROWN, M.S. '12, OTR/L, OCCUPATIONAL THERAPY SERVICES, SPURWINK

At one social service agency, you might see young clients tossing a medicine ball, jumping on a mini trampoline or using mindful coloring activities instead of sitting alone in an empty space. Clinical Professor of Occupational Therapy Kathryn Loukas, O.T.D., M.S., OTR/L,

FAOTA, has partnered with Spurwink's Occupational Therapy Services, which is led by Anna Brown, M.S. '12, OTR/L, to study the use of sensory strategies as an alternative to behavior interventions in the day treatment setting. Spurwink, a nationally accredited non-profit organization, provides behavioral health and educational services throughout Maine.

This collaborative research project includes the entire staff of Spurwink's six special-purpose schools in an effort to change the paradigm of mental health interventions for children and youth with significant behavioral challenges. Spurwink was awarded a grant by the Davis Family Foundation to implement sensory rooms at each school location and to begin the study. The Sensory Strategies Study includes national consultant Tina Champagne, O.T.D., OTR/L, Spurwink administrators, mental health workers, occupational therapists and students and faculty from the UNE Occupational Therapy department. The team has created sensory strategies to support children with autism and mental health challenges in the day treatment setting. These strategies can be utilized when the children are feeling out of control and are, therefore, finding it more difficult than usual to engage in classroom learning.

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 occupational performance, positive behavior and self-regulation. Occupational therapists at Spurwink implemented the sensory strategies to meet the needs of the specific population or individual through the use of a sensory room, cart, sensory activities, "diet," or other safe and self-selected environmental enhancements aimed at helping clients modulate their own nervous system. Westbrook College of Health Professions occupational therapy faculty and students supported the project by developing, implementing and analyzing outcome measures of this two-year project.

In addition to Loukas and Brown, the research team includes Professor Regula Robnett, Ph.D., OTR/L, FAOTA, Tina Champagne, OTD, OTR/L, and Nathaniel Fuller, B.A. The occupational therapy student researchers include Class of 2017 members Kelcey Briggs, Kelly Dolyak, Calley Rock, Arynne Siple and Alexandra St. Clair.



Student Researchers Calley Rock (Occupational Therapy, '17), Arynne Siple (Occupational Therapy, '17), Kelcey Briggs (Occupational Therapy, '17), Kelly Dolyak (Occupational Therapy, '17) and Alexandra St. Clair (Occupational Therapy, '17)

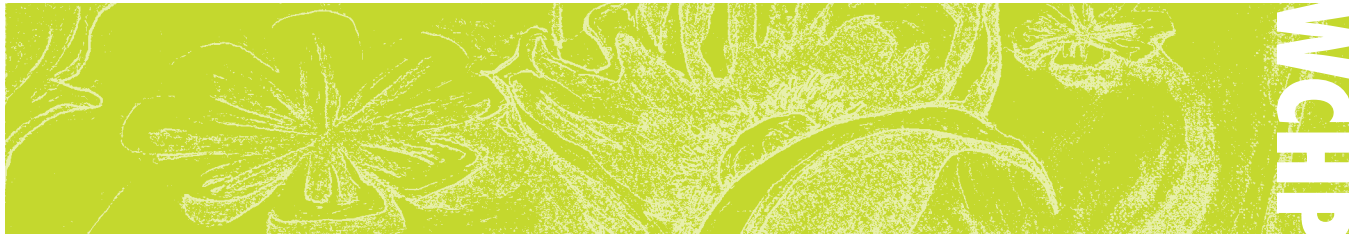
Outcomes a World Away!

JENNIFER LEE MORTON, D.N.P., M.P.H., APHN-BC, ASSOCIATE PROFESSOR, DIRECTOR, DEPARTMENT OF NURSING

R. DENNIS LEIGHTON, P.T., D.P.T., 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 evolved to a new level with measureable outcomes according to the Triple Aim



A nursing student performs a malaria test on a patient in Sekondi Clinic.

Framework. "Triple Aim" refers to the three goals of the program: improved population health, lower costs and positive patient experience.

The following developments demonstrate the progress we have made:

- 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, an optometrist and her staff, and a physiotherapist, all from the UCC; a physician, a physician assistant and a nurse practitioner from the GHS; a medical student from Sekondi studying in the Ukraine; and a pharmacist and two pharmacy technicians from the private sector. Collectively they saw 902 patients.

- UNE students are now a part of the ongoing quality improvement realized in this cross-cultural learning exchange. Initiatives that have been co-generated from student ideas toward clinical improvements include:

1. Refined clinic input card with coding
2. Out-take process that serves as a feedback loop to ensure all care needed was received
3. Tracking malaria rapid point-of-care testing and outcomes
4. Modified community assessments
5. Monitoring exercises prescribed by physiotherapy
6. Tracking return-to-clinic outcomes



Physical therapy students treat a child in Sekondi Clinic.



UNE students, faculty and community health workers celebrate their successful work together.



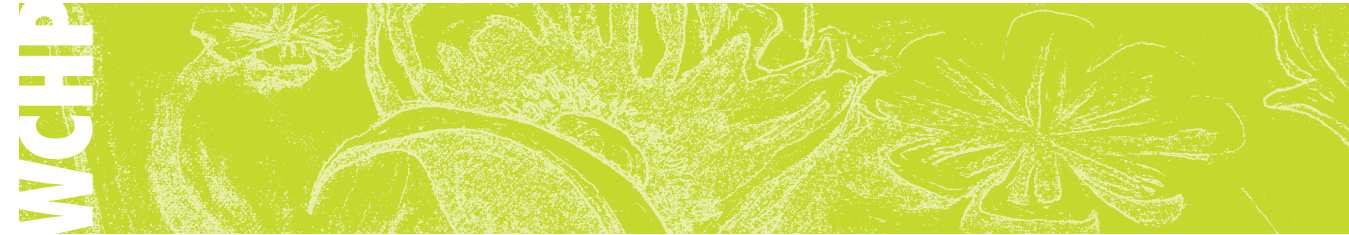
Interprofessional groups of students perform triage in Sekondi Clinic.

The Maine Leadership Education in Neurodevelopmental Disabilities (LEND) Program: Making a Difference for Children and Families in the State of Maine

EILEEN RICCI, PT, D.P.T., M.S., P.C.S., ASSOCIATE CLINICAL PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY, MAINE LEND PROGRAM DIRECTOR

KATHRYN M. LOUKAS, O.T.D., M.S., OTR/L, FAOTA, CLINICAL PROFESSOR, DEPARTMENT OF OCCUPATIONAL THERAPY, MAINE LEND TRAINING COORDINATOR

The University of New England has received funding and currently has nine trainees who are being mentored in Leadership Education in Neurodevelopmental Disabilities (LEND). LEND programs are established to train future interprofessional leaders to improve the health and well-being of children who have, or are at risk of developing neurodevelopmental disabilities such as autism, cerebral palsy and intellectual disabilities. The Maine LEND program is part of a network of programs throughout the country funded by the Health Resources and Services Administration's (HRSA) Division of Maternal and Child Health. This five-year, \$2.2-million grant and the associated curriculum was developed and is being implemented through the leadership of Program Director Eileen Ricci, PT, D.P.T., M.S., P.C.S., associate clinical professor of physical therapy, and Training Coordinator Kathryn M. Loukas, O.T.D., M.S., OTR/L, FAOTA, clinical professor of occupational therapy. Family input, as well as grant



administration support, comes from Peter Herrick, M.S. Ed., assistant director of Sponsored Programs at UNE. Alison Barker serves as the administrative assistant.

The UNE group is working with practitioners from Maine Medical Center and associated clinics to make a difference in many aspects of life for young people with neurodevelopmental disorders and their families statewide. The Maine LEND program received funding on July 1, 2016, and will continue with a new group of trainees, fellows and post-doctoral fellows every year for five years as the program builds. Program goals include increasing interprofessional training in autism spectrum disorder and other neurodevelopmental conditions; increasing access to intervention and support; enhancing clinical expertise and leadership of practicing professionals; research support; strengthening community links and access; and addressing the needs of underserved populations.

Other UNE faculty and mentors involved in the program include: Kira Rodriguez, M.H.S.; Audrey Bartholomew, Ph.D.; Shelley Cohen Konrad, LCSW, Ph.D.; Christine Rogerson, LCSW; Valerie Jones, LCSW; Jennifer Morton, D.N.P., R.N.; and Karen Wadman, D.N.P., RN, NNP-BC.

For more information on the Maine LEND program visit: <http://www.une.edu/LEND>



LEND Leadership group (front row, L-R): Kathryn Loukas, O.T.D., training coordinator; Eileen Ricci, D.P.T., program director; (back row, L-R): Alison Barker, administrative assistant, Alexa Craig, M.D., of Maine Medical Partners - Pediatric Neurology, and Peter Herrick, M.S. Ed., assistant director of Sponsored Programs

Screening Graduate School Applicants for Emotional Intelligence

ALLISON MORRILL, J.D., PH.D., INTERIM ASSOCIATE DEAN FOR RESEARCH, WESTBROOK COLLEGE OF HEALTH PROFESSIONS

KAREN T. PARDUE, PH.D., RN, CNE, ANEF, ASSOCIATE DEAN FOR ACADEMIC AFFAIRS, WESTBROOK COLLEGE OF HEALTH PROFESSIONS, AND ASSOCIATE PROFESSOR OF NURSING

SCOTT D. MCNEIL, O.T.D., M.S., OTR/L, ASSISTANT CLINICAL PROFESSOR AND ACADEMIC FIELDWORK COORDINATOR, DEPARTMENT OF OCCUPATIONAL THERAPY

MARIBETH L. MASSIE, CRNA, M.S., PH.D. (C), ASSOCIATE CLINICAL PROFESSOR AND PROGRAM DIRECTOR, MASTER OF SCIENCE NURSE ANESTHESIA PROGRAM

RHONDA FELDMAN, M.H.S., MSS, PA-C, ASSISTANT CLINICAL PROFESSOR AND PROGRAM DIRECTOR, MASTER OF SCIENCE PHYSICIAN ASSISTANT PROGRAM

In 2016, UNE's graduate programs in nurse anesthesia, occupational therapy and physician assistant in the Westbrook College of Health Professions added a new element to their admission processes. Applicants were screened for Emotional Intelligence (EI) using a combination of interview questions, writing samples and/or role play activities specially tailored for each program by expert consultant Korrel Kanoy, Ph.D., of Developmental Associates. A fourth graduate program, physical therapy, collected EI data from applicants but did not use that information to inform its admission decisions.

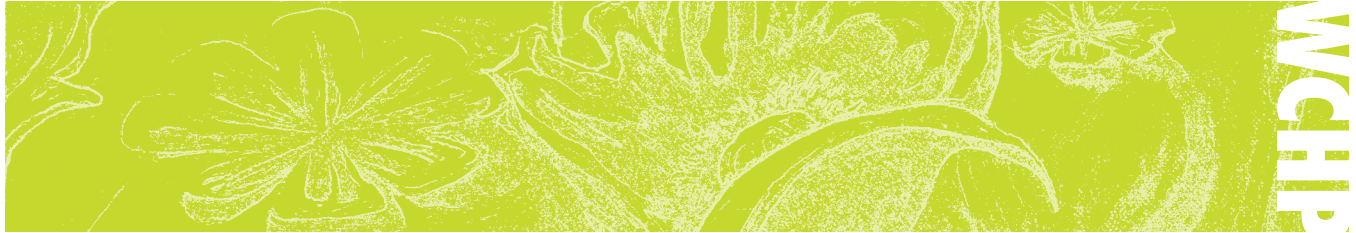
EI is defined as a set of emotional and social skills that influence the way we perceive and express ourselves, develop and maintain social relationships, cope with challenges and use emotional information in an effective and meaningful way.



EI is defined as a set of emotional and social skills that influence the way we perceive and express ourselves, develop and maintain social relationships, cope with challenges and use emotional information in an effective and meaningful way.

Faculty from each program have now begun a collaborative study of the impact of EI screening results on students' long-term academic and professional performance. There are two parts to the study's design: 1) a comparison between the performance of students admitted after EI screening began and the performance of students admitted in previous years; and 2) a comparison among students admitted in 2016 and after, looking for associations between performance and EI score.

Outcomes to be examined include grade point average, probation or marginal status, performance on simulated patient encounters or practical exams during laboratory courses, supervisor assessments in clinical settings, on-time degree completion, and passing board exams on the first attempt or within one year of completing the program. Investigators will also examine qualitatively whether the reasons for less than optimal performance are related to the emotional and social skills that comprise EI. Results will help the Westbrook College of Health Professions determine whether to expand the use of screening for EI into the admission process for its other graduate health profession programs.



Changes in Hydration Status during Pre-Season Training

JOHN M. ROSENE, D.P.E., ATC, CSCS, ACSM 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. PARDUE, 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 Practicums.

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



Liane Vogel B.S. '15 participates in a Flu Clinic.

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Volunteers Erin Edwards, B.S. '15 and Cassandra Simmons, B.S. '15 captivate a crowd with their demonstration of neuroanatomy.

UNE Student Involvement in the Scholarship of K-12 Educational Outreach

CHRISTIAN J. TETER, PHARM.D., ASSOCIATE PROFESSOR, COLLEGE OF PHARMACY, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

COP



Sam Esposito (Lyseth Elementary student) and Erica Paulette (Pharmacy, '16) at the 2015 STEM Expo.

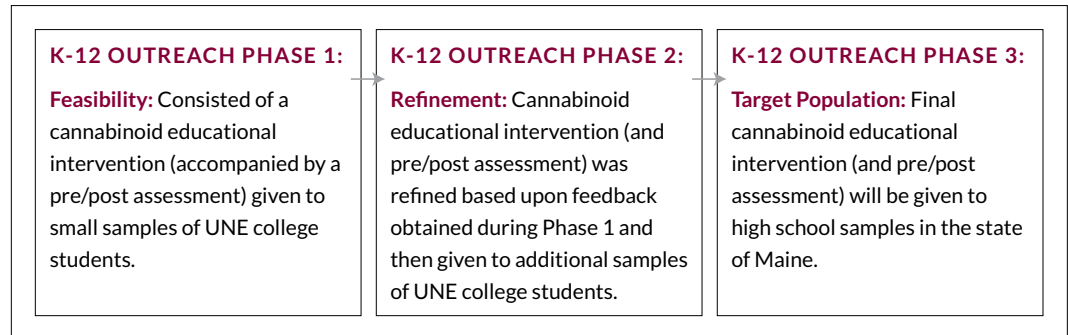
Kindergarten-12th grade (K-12) educational outreach has grown at UNE over the years. Please visit www.une.edu/research/cen/outreach for examples of UNE-driven outreach efforts. As a UNE faculty member, Professor Christian Teter, Pharm.D., has worked with UNE students from a variety of disciplines to offer K-12 educational outreach to Maine schools. There are two outcomes that Teter

and the students have been working towards: (1) K-12 educational outreach efficacy outcomes, and (2) UNE student success outcomes.

This photo of Sam Esposito (Lyseth Elementary student) and Erica Paulette (Pharmacy, '16) was taken during the 2015 STEM Expo. This activity, which centered on brain reward pathways, was presented to many K-12 students over the course of the day. Although this time and effort was well spent, tangible outcomes that might support the "efficacy" of this educational activity were not collected. In fact, there is a paucity of evidence in the literature that has documented K-12 outreach efficacy.

Hence, a recent UNE-driven study administered a cannabinoid educational intervention among college students with the aim to examine the feasibility of this approach and refine the methodology, prior to entering K-12 schools throughout Maine. The UNE research team hoped to gain a better understanding as to complexity of the intervention (e.g., grade-level comprehension), before administering it to K-12 students

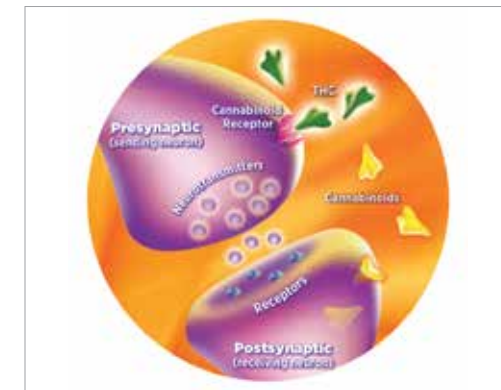
PHASE 1: The UNE research team spent thoughtful time and effort distilling an abundance of publicly available and vetted materials from respected sources, such as the National Institute on Drug Abuse (NIDA; www.teens.drugabuse.gov), into a relatively brief educational intervention. The team focused on cannabinoid effects on the brain, in addition to methods of educating K-12 students. The intent was to include five levels of knowledge regarding the central nervous system (CNS) and substances of use (i.e., cannabinoids). Each level was meant to provide increasingly granular information:



Pharm.D. candidates Marcus Zavala ('17) and Linh Tran ('17) completed Phases 1 and 2 of the overarching project while working under Teter's supervision.

COP

MARCUS ZAVALA (COP, '17)
LINH TRAN (COP, '17)



Pictured is a brain synapse, which contains a pre- and post-synaptic neuron. Cannabinoid activity is communicated across the synapse. In this example, cannabinoids are traveling from post-synaptic to pre-synaptic neuron and acting as "brakes" for this neurotransmitter system.
Source: Adapted from "The Science of Marijuana: How THC Affects the Brain", Scholastic and the National Institute on Drug Abuse, first published 2011 (Available at: <http://headsupscholastic.com/students/the-science-of-marijuana>).

1. Brain: component of CNS (along with spinal cord)
2. Brain structures: cerebral cortex (among others)
3. Neurons: "brain cells"
4. Neurotransmitters: dopamine (among others)
5. Synapses: location in the brain where brain cells communicate

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

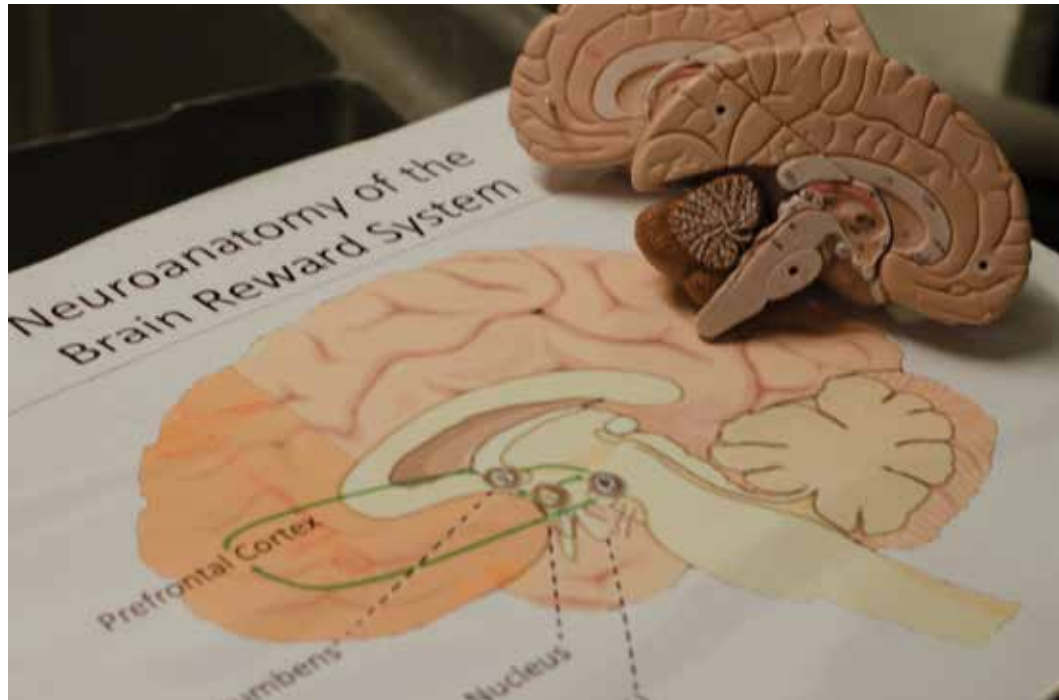
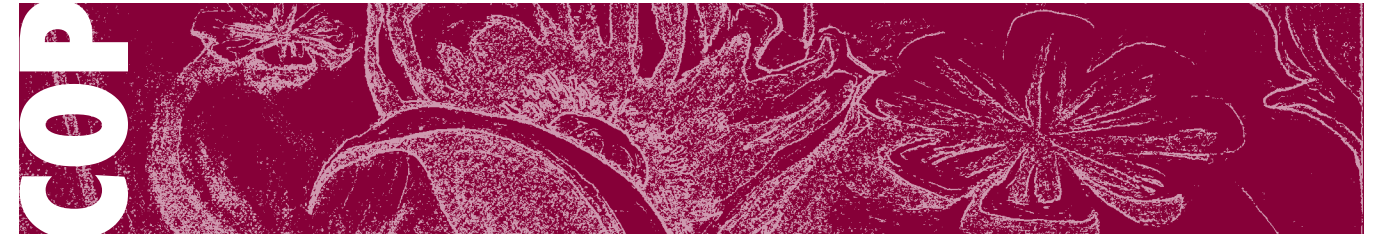
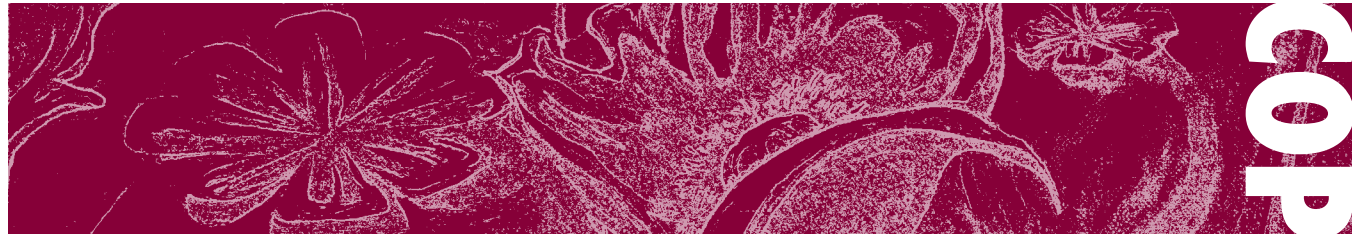
3-D BRAIN MODEL: Two-dimensional posters were paired with three-dimensional brain models to enrich discussions. Potential effects of various substances (most notably cannabinoids) on the brain were discussed. Students were encouraged to handle the brain model and spend time labeling relevant structures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



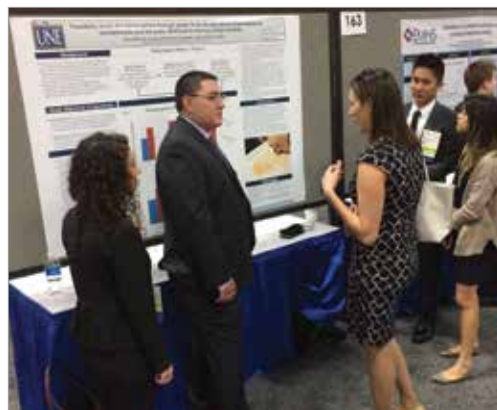
The UNE research team spent thoughtful time and effort distilling an abundance of publicly available and vetted materials into a relatively brief educational intervention.



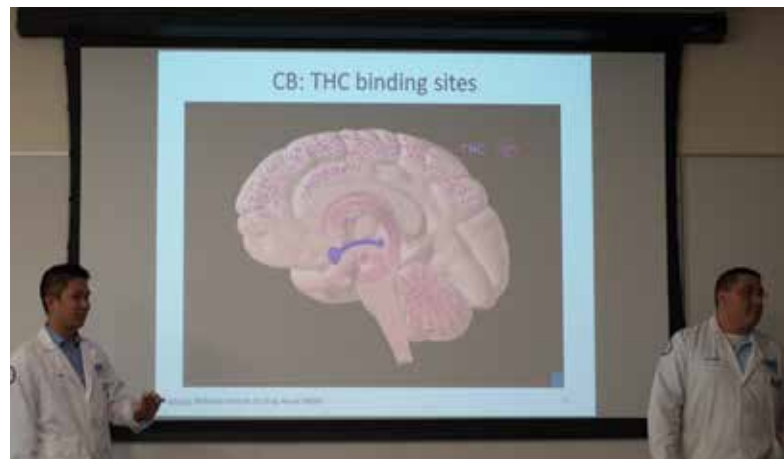
2-dimensional posters were paired with 3-dimensional brain models to enrich discussions

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.

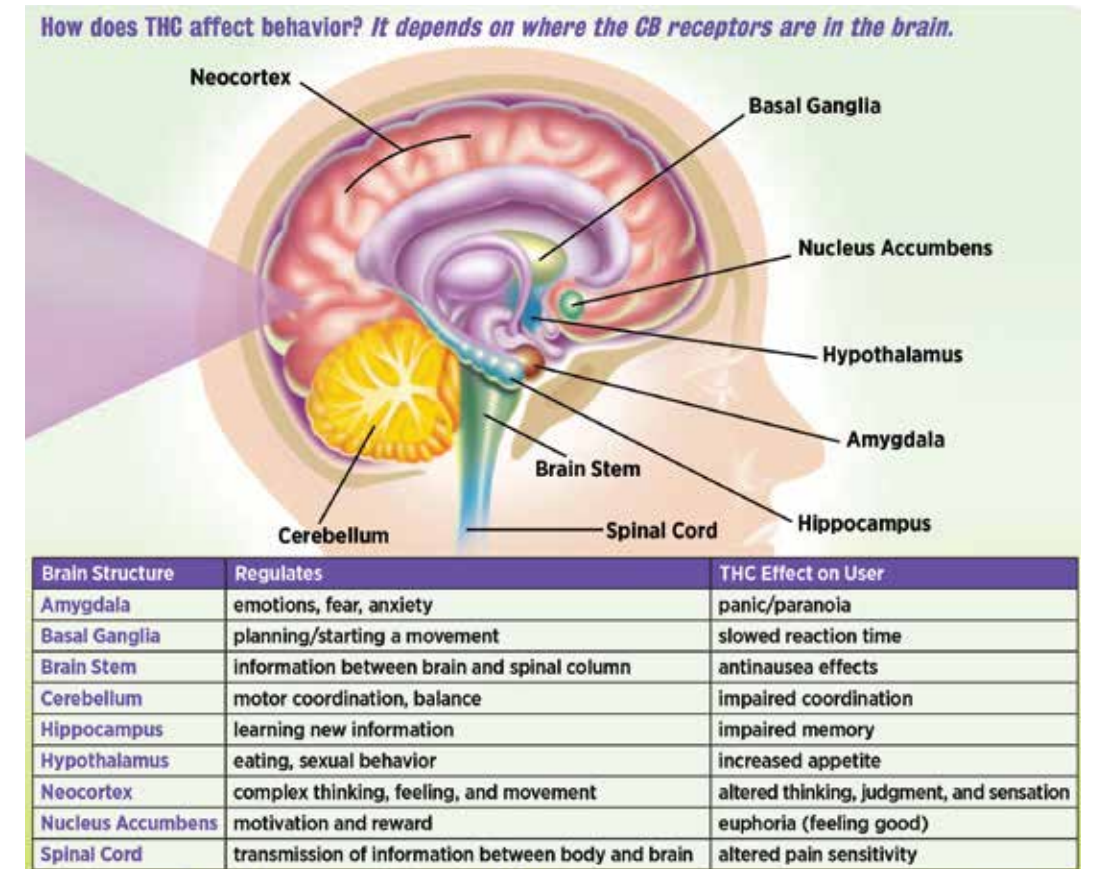
PHASE 3: Building on prior K-12 outreach efforts, Christina (“Chrissy”) Fields (Pharmacy, ’18) has obtained a list of Maine school health educators. The UNE research team plans to reach out to these schools, pending UNE IRB approval, for potential study recruitment.



Pictured are Zavala (Pharmacy, ’17) and Tran (Pharmacy, ’17), along with team member Mehryari (Pharmacy, ’18), presenting K-12 research at a poster session; these sessions are an important step in pursuing post-graduate pharmacy residency and fellowship opportunities.



Marcus Zavala (Pharmacy, ’17) and Linh Tran (Pharmacy, ’17) assisted with creation and delivery of the educational intervention.



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

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 Healthsystem 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. ■



Chinoye Okeke (Nursing, ’18), Christina Fields (Pharmacy, ’18), Kelly Sawyer (Pharmacy, ’18), Whitney Sargent (Pharmacy, ’18), and first NHPC President, Ashley Chace (Pharmacy, ’18)

Tackling the Crisis of Antimicrobial Resistance

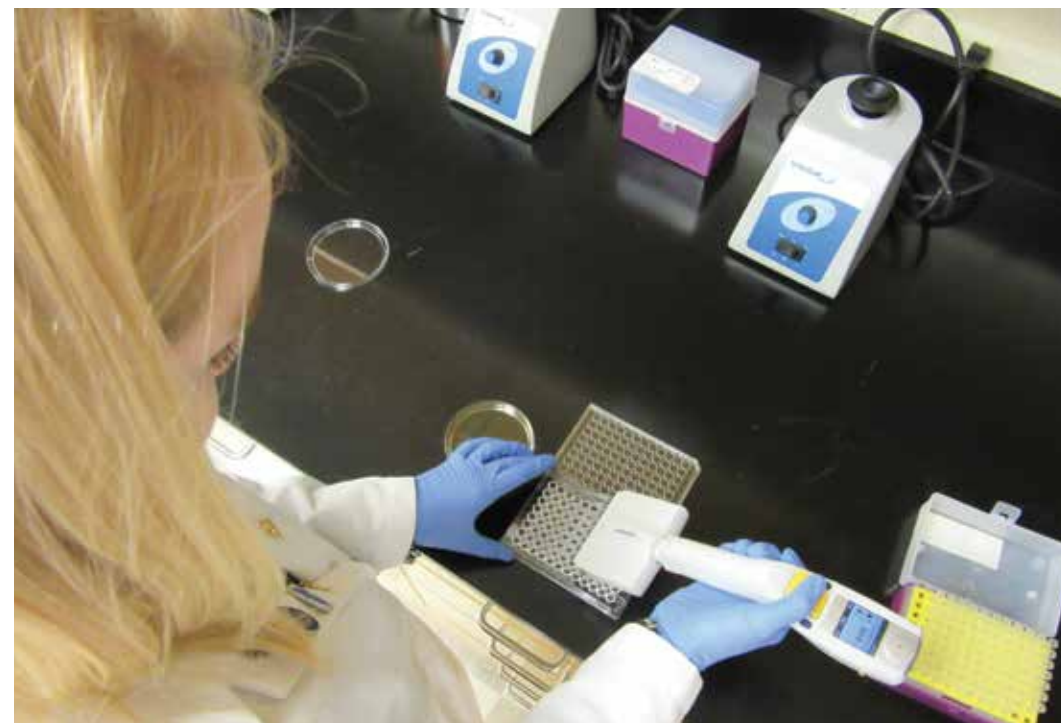
GEORGE P. ALLEN, PHARM.D., ASSOCIATE PROFESSOR OF PHARMACY PRACTICE

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.

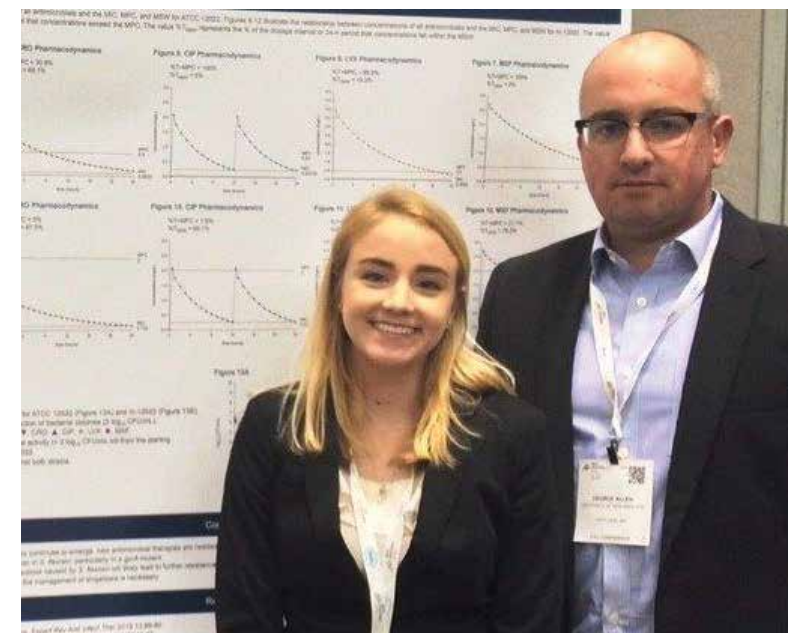
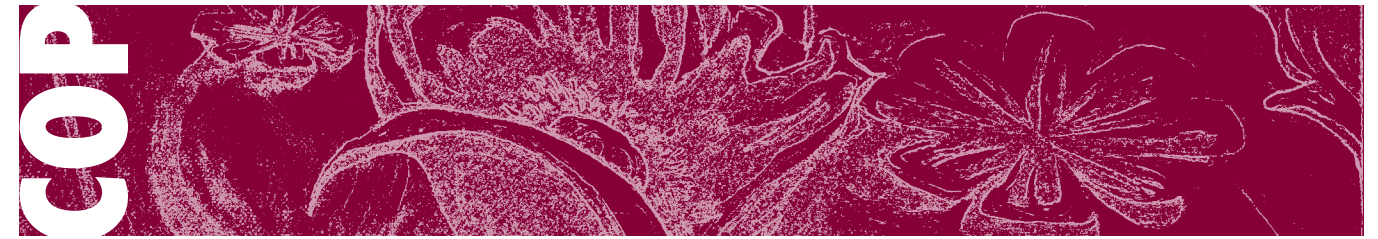
Shigellosis, caused by the bacterium *Shigella flexneri* and related species, is one such infection. In fact, in 2013, the Centers for Disease Control and Prevention designated antimicrobial-resistant *Shigella* as a serious antibiotic resistance threat, one of only 12 microorganisms given that priority 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



Kayla Harris (COP, '18) tests the antimicrobial susceptibility of *Shigella flexneri*.



George P. Allen, Pharm.D., associate professor of pharmacy practice, and Kayla Harris (COP, '18) attend the ASM Microbe conference in Boston, 2016.

(but not ciprofloxacin) may prevent the emergence of further resistance in *Shigella flexneri* isolates with some degree of pre-existing fluoroquinolone resistance. Since such *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.,

“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.”

— Kayla Harris

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. ■



Kayla Harris (COP, '18) performs work that will quantify the activity of various antimicrobials against *Shigella flexneri*.

Student Perceptions about Mental Illness: Looking into Student Attitudes, Disclosure and Inherent Stigma

DEVON A. SHERWOOD, PHARM.D., BCPP, ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACY PRACTICE



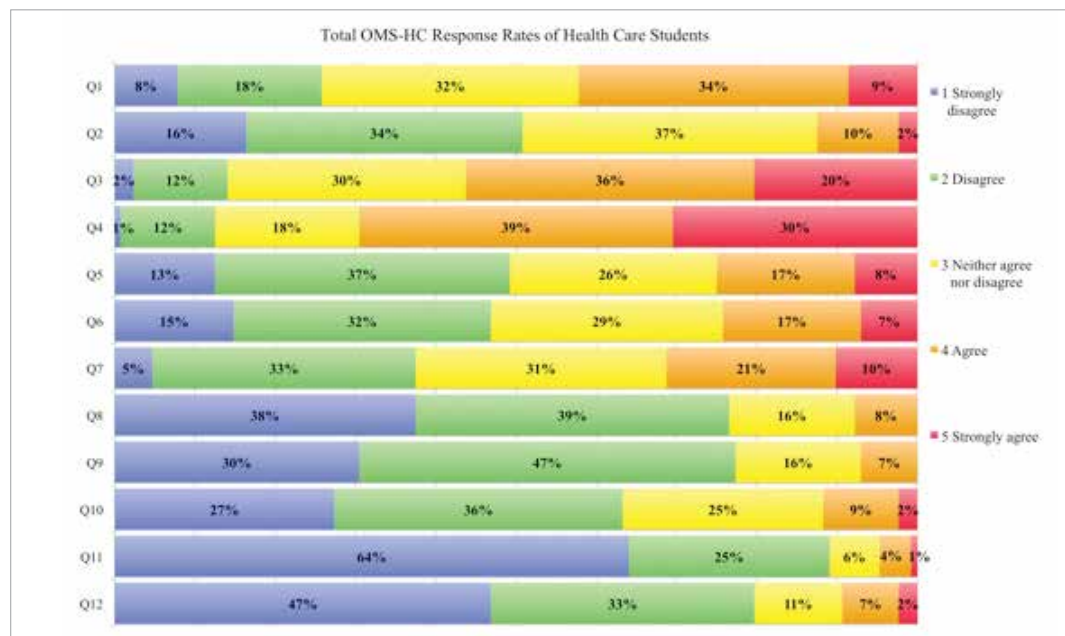
Devon Sherwood, Pharm.D., BCPP

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

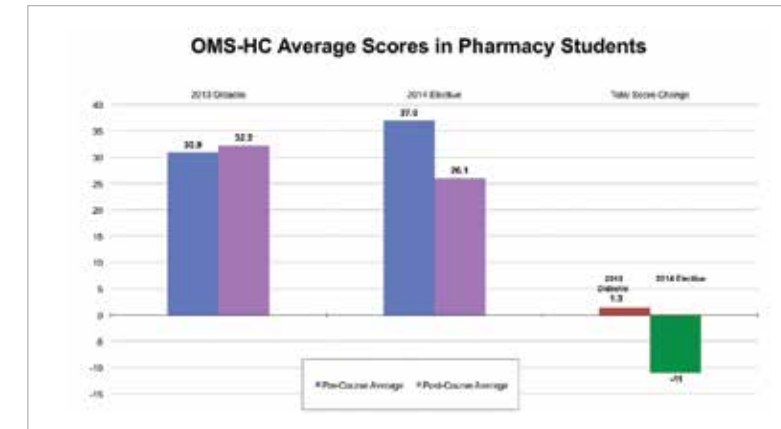
the barriers that stigma creates between patients and providers. As faculty members, we regularly observe students' discomfort toward treating patients with mental illness. We decided to take a closer look to observe whether psychiatric coursework has a mitigating effect on student stigma and whether 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.



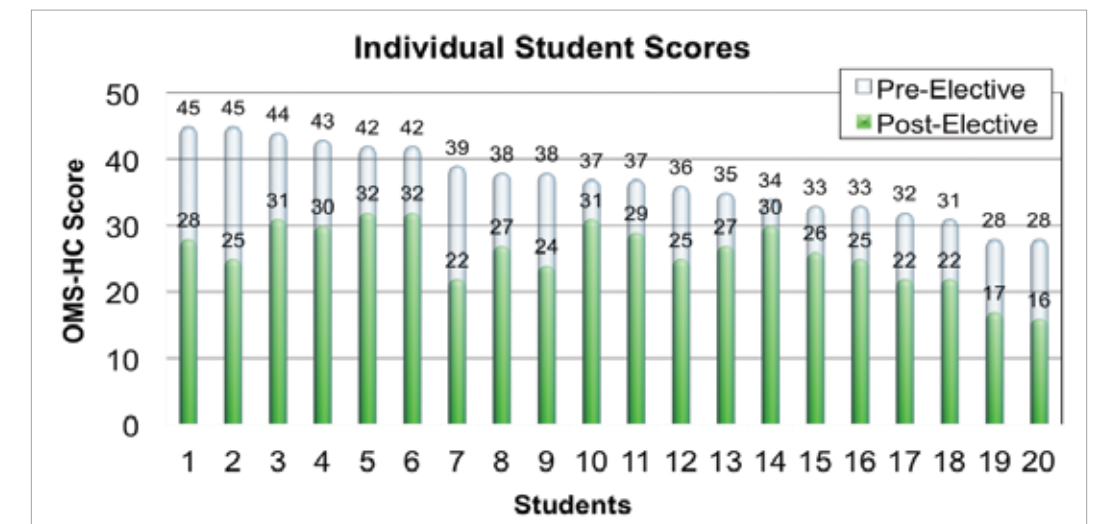
Responses by pharmacy, nursing and social work students demonstrate that 2013 student stigma held after didactic coursework for phase 1 of this study.



Results demonstrate a comparison pre/post classwork from the pharmacy student groups in 2013 and 2014, suggesting elective coursework had a positive impact in reducing stigma toward mental illness.

SURVEY OF STUDENT STIGMA BEFORE AND AFTER A FOCUSED PSYCHIATRY ELECTIVE

After learning that psychiatry coursework does not appear to alter student stigma, the next phase of the UNE study evaluated if interventions in the classroom environment could improve student perceptions. A pharmacy elective course was designed to address stigma and the proper treatment of psychiatric patients. This elective was the first pharmacy course recorded in the United States to include Mental Health First Aid USA certification. This eight-hour program provided training to assist someone experiencing a mental



These results from the psychiatric pharmacy elective course demonstrate improvement in all student scores.

health crisis, educated students about risk factors and warning signs for mental health and addiction concerns, and explained where to turn for help. Various methods to humanize mental illness were used, including bringing in a panel of speakers from the National Alliance on Mental Illness (NAMI) to discuss their journeys living with a mental illness, having an autobiography book review led by a woman diagnosed with schizophrenia, reviewing the neurobiology that causes psychiatric illness, and holding focused topic reviews on primary psychiatric disorders. Results observed were remarkable with all 20 pharmacy students demonstrating significant improvement in stigma toward mental illness. These findings, which were obtained by one UNE faculty member and two pharmacy students completing independent study research, were presented at the 2016 College of Psychiatric and Neurologic Pharmacists (CPNP) annual meeting and are currently being prepared for publication.

Health care students have been previously described as prone to stigma and discomfort when interacting with patients with mental illness. Our findings are similar to previous studies evaluating other health care professionals and students about stigma. Engaging students through focused electives or other activities beyond a didactic curriculum can decrease social distance and stigma and ultimately improve treatment of people with psychiatric disorders. ■

Alumnae Spotlight — Student Researchers Find Success in the Pharmaceutical Industry

GEORGE P. ALLEN, PHARM.D., ASSOCIATE PROFESSOR OF PHARMACY PRACTICE

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 amyotrophic lateral sclerosis. The company is also pursuing treatments for rare genetic disorders and is investigating cutting-edge technologies such as ribonucleic acid (RNA) medicines and gene therapy.

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



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

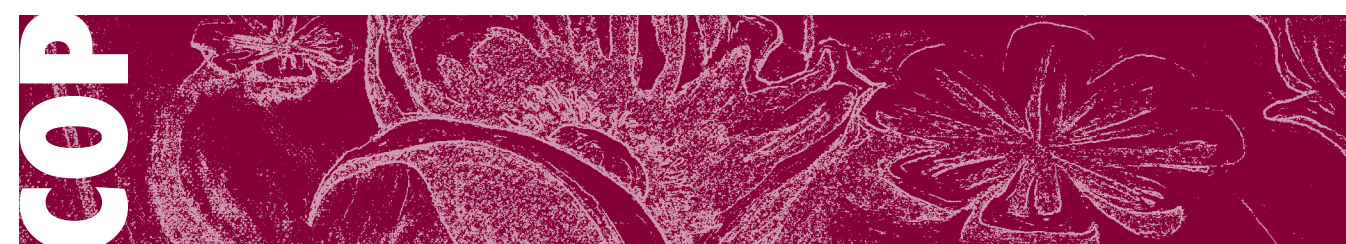
computer-aided fragment-based drug design that may be used to discover novel targets for drugs, particularly targets involved in protein-protein interactions. Some of their work was featured as a cover article in the *Journal of Computational Chemistry* in 2012.

"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 biostatistics 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."



The cover of Volume 33 of the *Journal of Computational Chemistry*



Alexandra Malinowski, Pharm.D. '14 sets up an ELISA assay to assess protein expression in the laboratory of Daniel Brazeau, 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

Biodefense 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." ■



Alexandra Malinowski, Pharm.D. '14 with Lukasz Lakoma, Pharm.D. '13 in George Allen's laboratory at the College of Pharmacy

Novel Prognostic Marker for Aggressive Breast Cancer

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



Srinidi Mohan, Ph.D., in the College of Pharmacy analytical lab

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 cancer tumors. 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 been working with Pharm.D. student researchers to grow



Srinidi Mohan, Ph.D., prepares a cell culture.

and test cells in the laboratory setting. Now, Mohan's work has resulted in his discovering "NOHA" (Nw-hydroxy-L-Arginine) as a sensitive and reliable ethnic-specific indicator for ER- breast cancer early-prognosis, disease progression and treatment outcome. This means that NOHA has potential to be used as a way to detect aggressive ER- breast cancer early, which means patients can start treatment early. Additionally, NOHA can be tracked in these patients to make sure their personalized therapy is helping them as expected. The finding is so promising that the University of New England has filed for U.S. and international patent protection to ensure that this new finding is commercialized so that Mohan's work can help as many breast cancer patients as possible.

Molecular Determinants of Drug Resistance

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



From left to right, Rachel McDevitt (COP, '18) and Cody Black (COP, '18) participated in an NSF research fellowship under the supervision of postdoctoral associate Jacob Fosso-Tande, Ph.D., and Ron Hills, Ph.D., in the College of Pharmacy.

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.



Insights into molecular mechanisms 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 drugs from cells.

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."

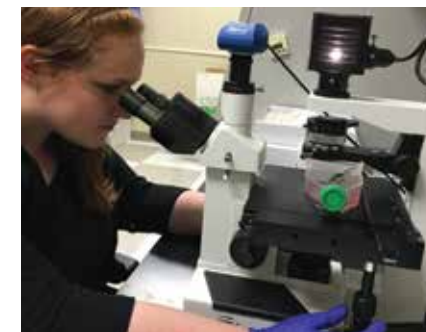
The student-generated research resulted in the working hypothesis of a pathway that allows for substrate transport in the P-glycoprotein transporter responsible for acquired cellular multidrug resistance. The work was supported by National Science Foundation grant MCB-1516826 RUI: "Multiscale Models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

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

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 "Steev" 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.



Sara Stafford (COP, '19) looks through a microscope, checking the quality of cells in culture.

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!"



Amelia Farnham (COP, '18) measures the integrity of the cell monolayer.

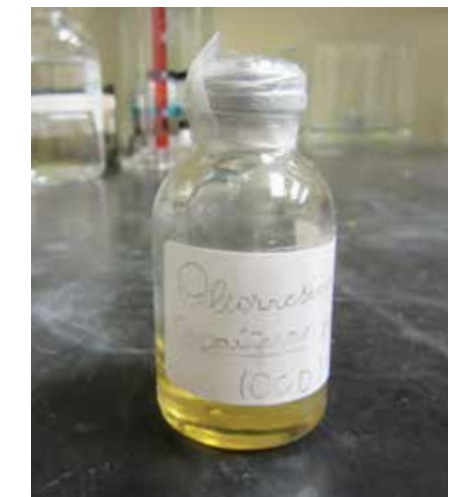
Investigation of Antifungal Activities of Polyalthic Acid Derivatives

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 Cássia Mizuno, Ph.D., in the College of Pharmacy's Department of Pharmaceutical Sciences, has developed ongoing research efforts focused on copaiba oil.

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.



The label on the bottle reads *Oleoresina de Copaifera ducckei*, Portuguese for *Copaifera ducckei* oil resin.

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.

COLLEGE of DENTAL MEDICINE

ORAL HEALTH CENTER

UNE

ORAL HEALTH CENTER

The Oral Health Center houses the College of Dental Medicine on UNE's Portland Campus

UNE CDM Students Rotate Through Dental Clinic at Portland High School

MEGHANN M. DOMBROSKI, D.M.D., M.P.H., ASSISTANT CLINICAL PROFESSOR

CDM



Pellegrini and Creed work together to clean Frank's teeth. Pellegrini uses hand and ultrasonic instruments to scale off the plaque and calculus.

In 2014, Portland High School re-opened and dedicated the Amanda Rowe Heath 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 University of New England 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 directly support the mission of the College of Dental Medicine: to improve the health of northern New England and shape the future of dentistry through excellence in education, discovery and service. Our hope is to instill in our students the call to serve others in need. The Portland High School Dental site is

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



Hillary Creed (CDM, '18) and Peter Pellegrini (CDM, '18) use a hand scaler and gauze to remove calculus from a patient's teeth.

CDM



This model displaying the tooth decay process is used to demonstrate potential dental issues to patients and ways to treat dental decay at the clinic.

require an 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

“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.”

— 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. ■



Hillary Creed (CDM, '18) and Peter Pellegrini (CDM, '18) review a patient's chart before putting on their protective clothing.

CENTERS of EXCELLENCE

- 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.

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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 the Researching the Environment in Active Learning Spaces (REALS) project that is ongoing this year. ■



National expert on higher education pedagogy, Linda Nilson, Ph.D., speaks on critical thinking at a CETL cross-college workshop.



Faculty explore assessment ideas in a CETL sponsored book group.

Identification and Intervention for Students “At Risk” in Osteopathic Medical Knowledge

KATHRYN H. THOMPSON, PH.D., R.D., PROFESSOR, COLLEGE OF OSTEOPATHIC MEDICINE
DOUGLAS SPICER, PH.D., ASSOCIATE PROFESSOR, COLLEGE OF OSTEOPATHIC MEDICINE
REBECCA ROWE, PH.D., ASSISTANT PROFESSOR, COLLEGE OF OSTEOPATHIC MEDICINE

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.

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.

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 students' 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 FTs 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.

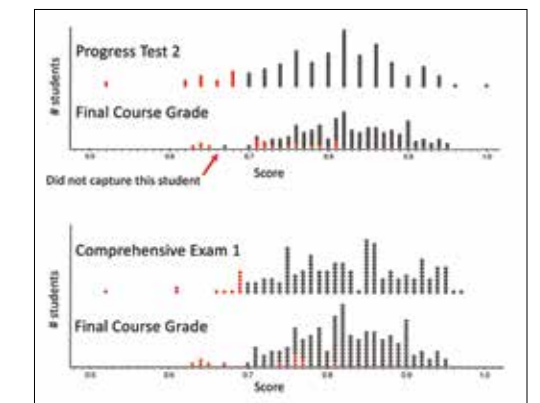


Figure 2. In these frequency plots the red dots represent students who were below a cut score on either Progress Test 2 or the Comprehensive Exam (top) and what their final course grade was (bottom).

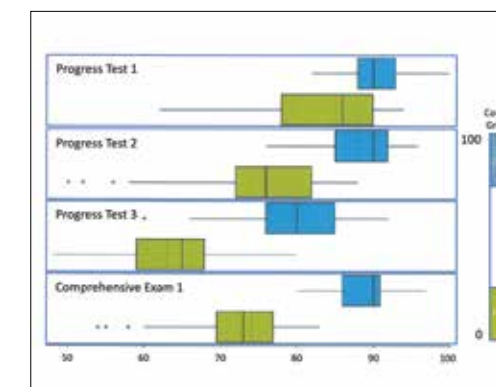


Figure 1. These plots show the performance of the top and bottom students on the Progress Tests and Comprehensive Exam in Block 1. The boxes represent 50 percent of the students in each group while the tails at either side contain 25 percent of the students.

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. ■

Utilizing Engagement-Oriented Teaching Strategies to Create More Dynamic Learning Experiences

JENNIFER STIEGLER-BALFOUR, PH.D., ASSOCIATE PROFESSOR, PSYCHOLOGY DEPARTMENT, COLLEGE OF ARTS AND SCIENCES

CENTERS

CENTERS



A student from the Cognition and Memory class, Lauren Hayden '16, completes one of the experimental learning experiences on her computer.

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



Students discuss one of the interactive web-based experiments in their Memory and Cognition class.

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. ■



A student from the Cognition and Memory class, Jessica Hering '15 completes one of the experimental learning experiences on her computer.

Using Digital Technology to Improve Teaching and Learning Outcomes in Anatomy Courses

KAUSHIK (KASH) DUTTA, M.S., ASSOCIATE LECTURER OF ANATOMY AND PHYSIOLOGY, DEPARTMENT OF BIOLOGY, COLLEGE OF ARTS AND SCIENCES
 MARY SCHWANKE, PH.D., ADJUNCT PROFESSOR OF ONLINE PATHOPHYSIOLOGY, COLLEGE OF GRADUATE AND PROFESSIONAL STUDIES

CENTERS

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



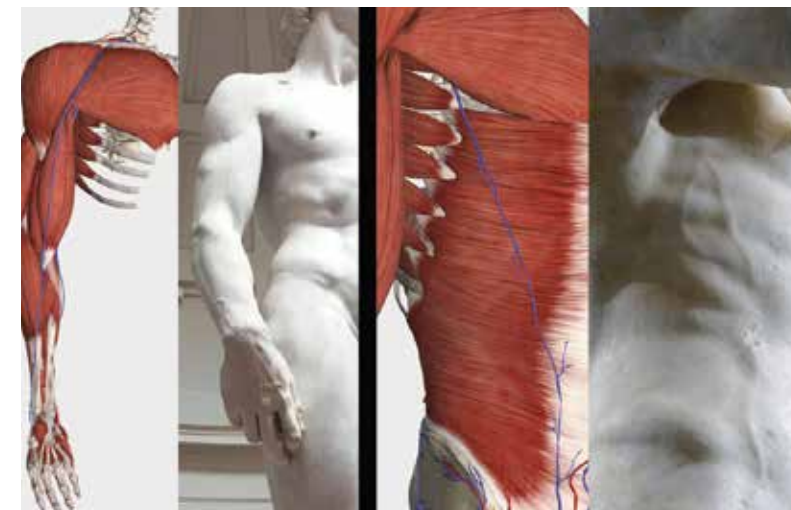
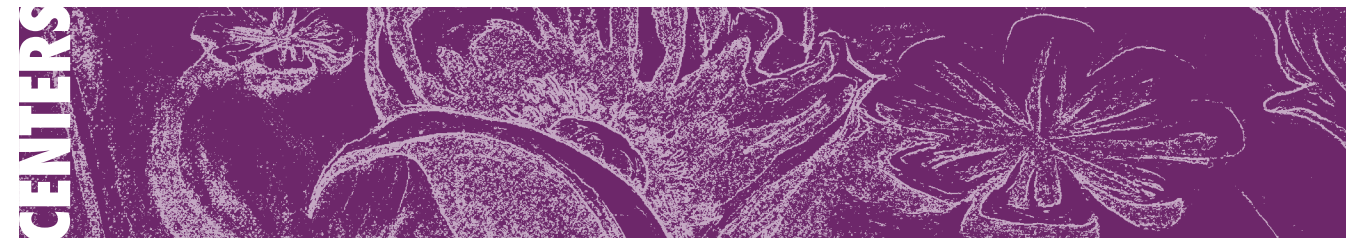
Kaushik Dutta, M.S., demonstrates a dissectible digital cadaver and 3D human model with the iPad Pro.

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



Kaushik Dutta, M.S., uses of the iPad Pro in the A&P laboratory to explain details of respiratory anatomy.



Examples of the app, 3D4Medical, are shown here, highlighting the cephalic vein and musculature underlying the right arm and chest of Michelangelo’s “David” (left), and the thoracoepigastric vein and trunk musculature of the classical sculpture, “Dancing Satyr” (right). “David” was viewed by UNE students in Biological Topics: Anatomy in Italy at the Galleria Dell’accademia in Florence; “Dancing Satyr” was observed by students at the Galleria Borghese in Rome.

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 questions came up.” ■



The iPad Pro was used in the “field” during the travel component of Biological Topics: Anatomy in Italy. Kaushik Dutta, M.S., investigates the accuracy of wax models in the Institute of Anatomy, University of Bologna, with students Becky Zakorchemy (Medical Biology, ‘18), Taylor Wakefield (Medical Biology, ‘16) and Sima Patel (Medical Biology, ‘16).

Assessing Curricular Reinforcement of Pharmacy Compounding Skills

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

GURKISHAN SINGH CHADHA, M.Sc., PH.D., ASSISTANT CLINICAL PROFESSOR, DEPARTMENT OF PHARMACEUTICAL SCIENCES, COLLEGE OF PHARMACY

CENTERS



The compounding process

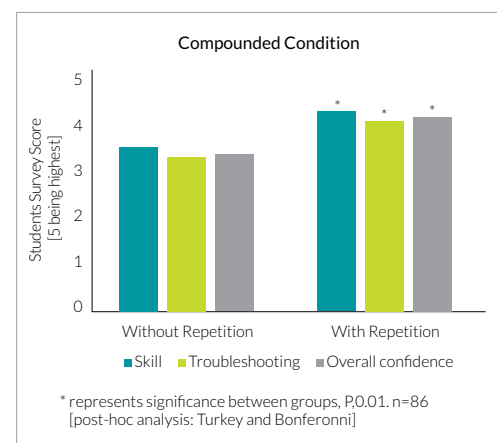
Pharmaceutical compounding is the art and science of creating personalized pharmaceutical products or medications, that are tailored to meet the unique requirements of a patient. The principles of pharmaceutical compounding and its associated skills go beyond dosages and formulations and often provide 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 Gurbkishan 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 trouble-shooting 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 relationship between student survey scores are shown, with and without compounding reinforcement by skill, ability to troubleshoot and overall confidence.

Researching the Environment in Active Learning Spaces (REALS): Are There Impacts on Instruction, Student Engagement and Learning?

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



Blewett 108 prior to renovation



M.S.W. students discuss ethical dilemmas in small groups during an advanced clinical practice class.

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: Blewett 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 Owens, a clinical assistant professor of social work, is among the faculty teaching in Blewett 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. ■

Center Support Yields Collaborations Between Neuroscientists

IAN MENG, PH.D., DIRECTOR OF THE CENTER FOR BIOMEDICAL RESEARCH EXCELLENCE (COBRE) FOR THE STUDY OF PAIN AND SENSORY FUNCTION
 JENNIFER MALON, M.S., M.P.H., COBRE COORDINATOR

CENTERS

CENTERS

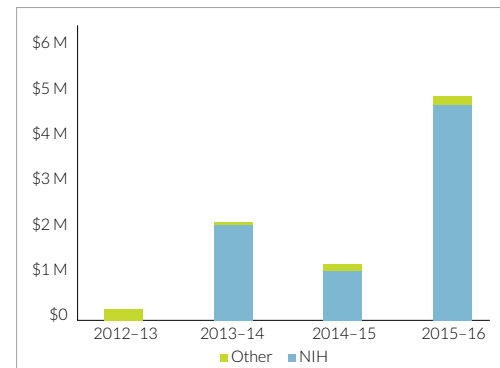


Peter Caradonna, B.S. '13, lab manager of the Histology and Imaging Core, has been instrumental to its success.

have grown in step with the growth of the cores, developing and perfecting new techniques in the field, which, in turn, stimulates the success of the cores.

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 proved successful as two COBRE project leaders received external funding. Geoffrey Ganter, 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. Tamara 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.

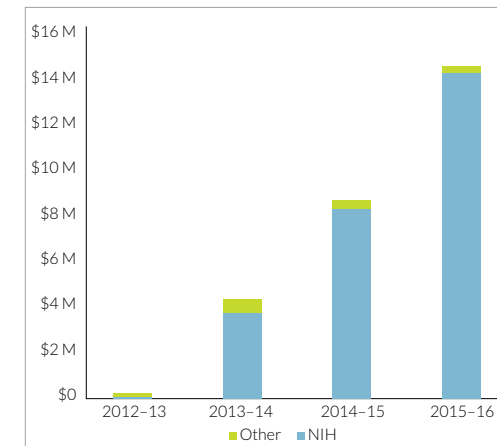


Bars represent new grant dollars received by neuroscience investigators over the past four years. 'Other' is representative of external support that is not NIH-related.

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 Behavior Core and a Histology and Imaging Core. These research cores were designed to provide expert advice, training and services to COBRE project leaders. More recently, the cores have extended their services to investigators both within and outside UNE, including collaborating on projects with external contributors. The cores have provided trainings to faculty, staff and students. In the past two years alone, the cores have performed more than 240 individual trainings in numerous techniques. Core managers and staff



Bars represent the total grant dollars requested by neuroscience investigators over the past four years. 'Other' is representative of external support that is not NIH-related.

Altogether, since receiving the COBRE award, six external grants have been awarded with notices totaling more than \$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 Tamara King. King also worked with Glenn Stevenson, Ph.D., professor of biology, College of Arts and Sciences, on a pilot project investigating osteoarthritis for which Stevenson was awarded a three-year R15 AREA grant. In another pilot project,



Behavior Core Manager Ivy Bergquist, B.S., RLATg, uses the Nanodrop spectrophotometer to quantify ribonucleic acid (RNA) concentrations in a sample.

Katherine Hanlon, Ph.D., assistant professor, College of Osteopathic Medicine, used data from the project for a prestigious Rita Allen Foundation grant submission. Derek Molliver, Ph.D, associate professor of biomedical sciences, College of Osteopathic Medicine, offered guidance on Hanlon'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. ■



COBRE investigators, students and staff attend the Northeast Regional IDeA Conference in September 2015.

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

CENTERS

CENTERS



Molliver Lab Manager Diana Goode, Ph.D., freezes down neuroblastoma cells for future use.

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.

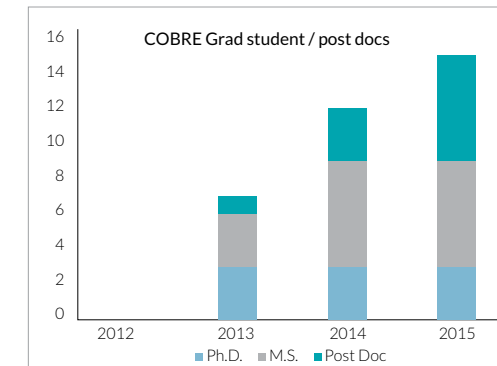
The CEN and Center for Biomedical Research Excellence (COBRE) for the Study of Pain and Sensory Function have provided support for nine students enrolled in the Master of Science in Biomedical Sciences program who have worked in neuroscience labs. Even though it was only a few short years ago when undergraduates 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



Postdoctoral Fellow Kyle Beauchemin, Ph.D., works in the Ganter Lab alongside master's student Courtney Bran, B.S. '16, (M.S. Biomedical Sciences, '18) classifying fly larvae.

undergraduate and master's student at UNE." (See the CAS section for more information on Taylor and his research.)



Bars represent the number of graduate students and postdoctoral fellows in UNE's pain research laboratories since 2012.

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 run 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



Postdoctoral Fellow Seth Davis, Ph.D., shows GSBSE student Cara Sullivan, B.A., M.S., a new technique on the cryostat.



Michael Anderson, B.S. '13, M.S. '15 works on his thesis project, investigating the role of a transcription factor, Sox11, in regulating nerve regeneration and neuropathic pain following injury.

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.

A more recent addition to the CEN community has been the presence of postdoctoral fellows in our neuroscience labs. At the beginning of the COBRE in 2012, there were no fellows working in UNE's neurosciences labs. Today, there are six, three of whom have received COBRE support. These fellows are a fresh addition to the community, bringing with them different skill sets, new perspectives and varied problem-solving skills. It is expected that this community will continue to grow alongside the neuroscience research at UNE. ■

A Career in Neuroscience

DAVID J. MOKLER, PH.D., PROFESSOR, DEPARTMENT OF BIOMEDICAL SCIENCES
JILL M. HOFFMAN, B.S. '03, PH.D., POSTDOCTORAL FELLOW, CENTER FOR
INFLAMMATORY BOWEL DISEASES, UNIVERSITY OF CALIFORNIA AT LOS ANGELES

CENTERS



Jill Hoffman, Ph.D.

Jill Hoffman, B.S. '03, Ph.D. '12, began her research career as an undergraduate student in the laboratory of David Mokler, Ph.D. in the College of Osteopathic Medicine in 2001. Jill was studying medical biology, and several of her friends were doing undergraduate research. Jill looked up the pharmacology professors and reached out to Mokler. She recalled, "When I met Dr. Mokler I knew it would be a great fit. I remember sitting with him in his office in Stella Maris the day that we met, and he opened up a huge file cabinet and pulled out a few glossy reprints of articles and gave them to me to read. I remember being so excited to read through them. I also remember a shelf of textbooks he had, and borrowing many, including one in particular called *The Biochemical Basis of Neuropharmacology*. It included a chapter about serotonin that I read over and over. When I graduated, he gave me my own copy with a note he had written on the inside cover. It said: 'Your future is bright. Wear sunglasses!' That book means so much to me."

Mokler invited Jill to present her work in his lab at the Experimental Biology meeting in San Diego, where she met Robert Darnell, M.D., from Dartmouth Medical School. Based on her experience with Mokler, she was offered a job as a technician in Darnell's lab. Once there, she investigated the role of serotonin in thermogenesis in piglets, which led to additional papers and presentations. Since Darnell was working with serotonin as well, it was natural for Mokler to

become involved with the work in the Darnell Lab. At the time, Darnell was collaborating with a group of researchers centered at Boston Children's Hospital, investigating the causes of sudden infant death syndrome (SIDS). In 2005, Hoffman became a research study coordinator at Boston Children's Hospital working with Hannah Kinney, M.D.

With Hoffman in Boston, Mokler naturally came to meet her new colleagues. After a short time, Mokler began to collaborate with her SIDS group in Boston, which led to a key publication in *The Journal of the American Medical Association (JAMA)* (Duncan et al., 2010). Mokler, Hoffman, and Jhodie Duncan, Ph.D., a postdoctoral fellow in Kinney's lab, analyzed levels of serotonin in post-mortem tissue from children who had died of SIDS. This line of study can be partially credited to the networking and collaboration that occurs in research fields.

Hoffman made a transition in 2007 when she applied and was accepted to the neuroscience program at the University of Vermont. She continued her work with serotonin by joining the lab of Gary Mawe, Ph.D. Mawe is an internationally recognized expert in serotonin's role in the gastrointestinal system, and Hoffman profited greatly from her time with him. She graduated with her Ph.D. in 2012, and her research with Mawe led to another seven publications. Thus, by the time she had earned her doctorate, Hoffman had 12 publications.

Hoffman is now a postdoctoral fellow at the Center for Inflammatory Bowel Diseases at the University of California, Los Angeles in the laboratory of Charalabos Pothoulakis, M.D., where she continued studying serotonin in the gut. From there, she became fascinated with the nervous system of the gut and how it reacts to stress and inflammation. From her research with Mokler, she has a fantastic publishing record (which potential employers will approve of), she has earned her Ph.D. with excellently varied work experiences, and she has cultivated an impressive network of colleagues. Her early experiences in neuroscience research have truly set her up for a successful career! ■

UNE Continues its Effort in Training Ph.D. Students in Biomedical Sciences

LING CAO, M.D., PH.D., ASSOCIATE PROFESSOR, DEPARTMENT OF BIOMEDICAL
SCIENCES, COLLEGE OF OSTEOPATHIC MEDICINE

CENTERS



Virginia McLane receives her Ph.D. hood from GSBSE Director David Neivandt, Ph.D. (left), and UMaine Provost Jeffrey E. Hecker (right) at the University of Maine Commencement Ceremony on May 14, 2016.

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 (GSBSE) program from September 2011 to May 2016. The GSBSE 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 GSBSE program who selected neuroscience as her research focus area. She completed her thesis project, "Effects of



GSBSE graduates line up at the May 2016 University of Maine Commencement Ceremony (left to right): Meghan Beauchemin, Kyle Beauchemin, Beau Rostama, Deepthi Muthukrishnan, Sarah Peterson, Virginia McLane and Benjamin King. Photographed by Lucy Liaw, MMCRI.

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 LP-BM5 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 GSBSE students in working with investigators at UNE has increased significantly. There are currently four GSBSE students completing their thesis research at UNE. ■



In the Cao Lab, Virginia McLane performs an immunoassay to measure inflammatory factors in an HIV/AIDS model system.

Maine Festival-Goers Greeted by Neuroscience Volunteers

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

MICHAEL BURMAN, PH.D., ASSOCIATE PROFESSOR, COLLEGE OF ARTS AND SCIENCES, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

CENTERS



The Center for Excellence in the Neurosciences volunteers for the 2016 Maine Science Festival.

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 19 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. ■



CEN volunteers teach Maine Science Festival visitors about comparative neuroanatomy.

Buzzing with Neuroscience Enthusiasm

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

MICHAEL BURMAN, PH.D., ASSOCIATE PROFESSOR, COLLEGE OF ARTS AND SCIENCES, CENTER FOR EXCELLENCE IN THE NEUROSCIENCES

CENTERS



Winners of the regional brain bee compete in the U.S.A. national competition. Southern Maine's winner (Kyle Ryan - back row center, blue sweater) took 10th place overall.

In December 2015, the Center of 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

K-12 Outreach Program, 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 Bees provide 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). ■



Brain bee contestants prepare for the national competition.

Interprofessional Team Immersion for Health Professions Students: Making It Real

KRIS HALL, M.F.A., PROGRAM COORDINATOR, INTERPROFESSIONAL EDUCATION COLLABORATIVE
SHELLEY COHEN KONRAD, PH.D., LCSW, FNAP, DIRECTOR, SCHOOL OF SOCIAL WORK, WCHP

CENTERS

CENTERS

JIM CAVANAUGH, PT, PH.D., ASSOCIATE PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY
KIRA RODRIGUEZ, M.H.S., RESEARCH ASSOCIATE/IPEC EVALUATOR, CENTER FOR EXCELLENCE IN HEALTH INNOVATION



Faculty facilitators Mary Aube, M.S.Ed., and Shelley Cohen Konrad, Ph.D., observe as students from the interprofessional team "Bright Future" work together to prepare for a client interview.

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



Dental hygiene, occupational therapy, nursing, and physician assistant students hurry to build the tallest tower in an interprofessional activity designed to stimulate teamwork skills under tight time constraints.

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/SOVRLeqeaE>. ■



Team Immersion faculty facilitator Elizabeth Crampsey listens as her interprofessional team, "Clue," works through a complicated case.



Team Immersion faculty facilitators Frank Brooks, Ph.D. (Social Work), and Erin Koepf (Pharmacy) listen as their team members Chelsea Mesloh (Dental Hygiene, '17), Alanna Kaplan (Social Work, '17), Abigail Farniok (Occupational Therapy, '16), Kehinde Aderibigbe (Physical Therapy, '17), and Patrick Kurpaska (COM, '19) (skyping in on the laptop) discuss a complex case.



"The Collaborators," left to right: Brittney Bell (D.M.D., '19); Christina Curry (COP, '17); Clinton Boone (Physical Therapy, '16); Laura Kenney (Occupational Therapy, '17); and Signe Alexander (Social Work, '16) demonstrate how to provide exceptional patient (Jen Pellegore, COP, '17) care using both verbal and non-verbal communication as part of the Interprofessional Team Immersion poster session.

UNE Makerspace Takes Off

ANTHONY P. SANTELLA, ASSISTANT LECTURER AND COORDINATOR FOR THE UNE MAKERSPACE
MICHAEL ESTY, MAKERSPACE TECHNICAL AND PROJECT SPECIALIST

CENTERS

CENTERS



UNE Enactus President Drew Turnball (Business, '20) leads students through creative exercises to design potential Internet of Things solutions to help protect Maine's coast from the neurotoxins that have recently tainted local shellfish.

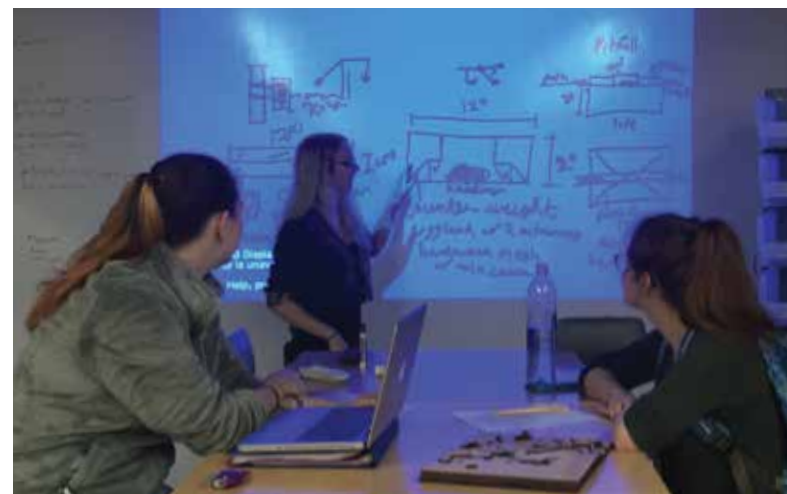
UNE's Makerspace, an innovative campus resource that serves as a laboratory for creation and building, was opened in the spring of 2016, thanks to the inspiration and generosity of many. Things have been taken to a whole new level this fall, as the Makerspace is off to a great start — more than doubling 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



Faith Paglierani (Animal Behavior, '18) works with other students on building a better mousetrap to help track an endangered species.



Students work on rapid prototypes to help fight the neurotoxic algae that hit the coast of Maine this past fall.

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. ■



Michael Esty, Makerspace technician and project specialist, trains students on Arduino, an open-source electronics platform that is used in many Makerspace projects.

Collaborating to Connect Health Care, Public Health and Education

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

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 involve 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



Michelle O'Meara, Pharm.D., '14

Before graduating from UNE, Michelle O'Meara, Pharm.D. '14 participated in a clinical interprofessional training site in 2013 at the Family Medicine Institute, a family practice affiliated with MaineGeneral Health in Augusta. This Advanced Pharmacy Practice Experience (APPE) included learning activities and seeing patients with a medical student from UNE's College of Osteopathic Medicine.

Now a pharmacist at Hannaford Pharmacy in southern Maine, O'Meara found her clinical interprofessional experiences very valuable. She recently reflected, "When discussing treatment options with physicians,

I feel more confident and comfortable having an active role in the discussion of the patient's care."

Since part of the interprofessional training includes medical and pharmacy students jointly visiting patients with complex health issues in their homes, O'Meara notes that "the experience also gave [her] a unique perspective: that of the patients, when they are in a vulnerable position, such as in a clinic office or newly discharged to their homes with new diagnoses and medications."

Overall, O'Meara notes that "the experience gave [her] insight into the challenges facing health care providers in coordination of care and assisting patients while under the care of multiple providers and an appreciation of the team-based approach to health care."

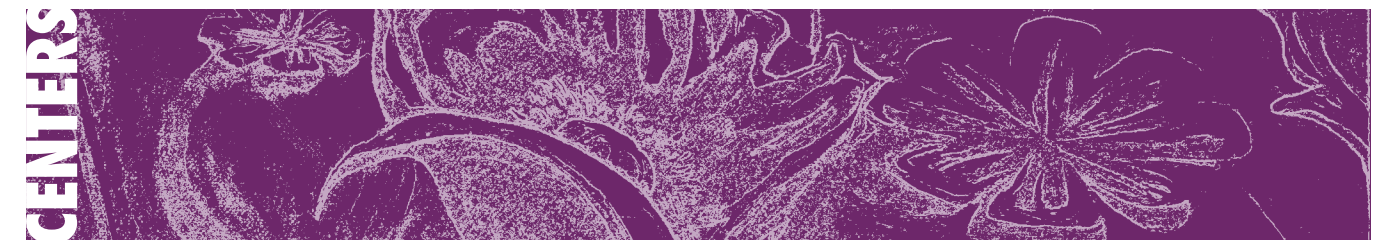
RURAL HEALTH IMMERSION

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 colleges of Osteopathic Medicine, Dental



Maine House Representative John Martin and former Maine State Senator Judy Paradis joined the rural immersion group for breakfast at the beginning (or end) of Route 1 to discuss state and federal policy and its impact on rural health.



Medicine and Pharmacy — spent a week in Aroostook County with Mills, Jennifer Gunderman, M.P.H., assistant lecturer in the School of Community and Population Health, Jenifer Van Deusen, M.Ed., and center staff member Ian Imbert, B.S. '12, M.P.H. '15.

Wesleyan Deibner (CDM, '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."



UNE students and Dora Anne Mills appeared together on the early morning show on the local Aroostook television station, WAGM.

CARE FOR THE UNDERSERVED PATHWAY

UNE's Center for Excellence in Health Innovation and the College of Osteopathic Medicine (COM) launched the Care for the Underserved Pathway (CUP) in the fall of 2016. The inaugural class of 14 second-year medical students from the Class of 2019 participate in interprofessional learning activities focused on caring for the underserved. These



CUP scholars participate in interprofessional learning activities focused on the caring for underserved populations

activities provide the competencies necessary to provide team-based, quality care for vulnerable patients at underserved locations in rural and urban Maine and beyond. Faculty involved in CUP also serve as positive role models and mentors.

Dora Anne Mills, M.D., M.P.H., FAAP, director of the Center for Health Innovation, discussed the variety of service learning activities offered to the students, including influenza vaccine clinics in homeless shelters and veterans clinics, one-week rural immersions, nutrition education among low-income Mainers, and opportunities for clerkships in a variety of underserved urban, rural and international locations. Said Mills, "All of these and other activities are provided interprofessionally, meaning alongside 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. ■

RESEARCH and SCHOLARSHIP



University of New England
NEUROSCIENCE
Research | Education | Outreach

Center of Excellence in the Neurosciences volunteer Erin Edwards, B.S. '15, captivates a crowd with a demonstration of neuroanatomy.

Pain Awareness and National Recovery Month Pulls Communities Together

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

R&S

R&S



UNE faculty and student artwork at Engine explores chronic pain, substance misuse and recovery.



Jenn Malon, UNE Center of Excellence in the Neurosciences, admires "Rib Cage," created by Ally Deflumeri (Health, Wellness and Occupational Studies, '15).



Local community member Polly Noddin stands in front of an India ink drawing and a watercolor she contributed to the exhibit.



The art exhibit and night of storytelling were held at Engine in downtown Biddeford.

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 Addiction." 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 studios 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



"Teardrops" by Hannah McGehee, belongs to a larger project: "Living Fibromyalgia: Communicating Chronic Pain through Art and Narrative."

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.

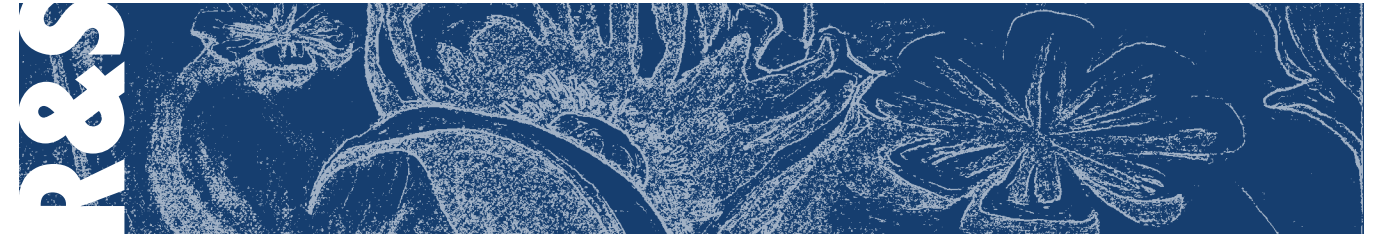
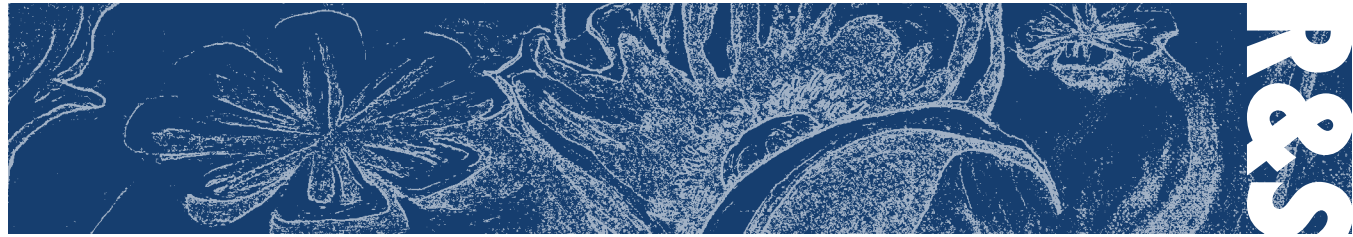
During the exhibition, Biddeford Mayor Alan Casavant and Saco City Manager Kevin Sutherland read a proclamation recognizing September as both Pain Awareness Month and National Recovery Month.



Biddeford Mayor Alan Casavant reads a proclamation recognizing September as Pain Awareness Month and National Recovery Month, while Saco City Manager Kevin Sutherland looks on.

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



Elizabeth Sprague (Health, Wellness and Occupational Studies, '19) shares her story of chronic pain in her presentation, "An Image of Hope."

(Health, Wellness and Occupational Studies, '19), Matthew Braun (Chapter Leader, YPR-Biddeford) and Andrew Kiezulas, (University of Southern Maine student). Using a popular PechaKucha format, each speaker led the audience on a six-minute, 40-second journey that incorporated 20 images that automatically advanced every 20 seconds. These talks were highly emotional and evoked a deep connection between the speakers and the audience members. Intermission included a 15-minute film, "Hooked," which portrayed the story of a high schooler who develops a substance abuse disorder after a serious injury. "Hooked" was created in totality by high school students involved with Project Aware (www.projectaware.net/).

This interprofessional panel was designed to facilitate discussion among student health professionals from different programs regarding two pre-selected chronic pain cases.

For the final event, Lindsey Simmons (COP, '19), working in collaboration with Kris Hall, coordinator of the Interprofessional Education Collaborative, organized a varied panel of health care professionals who discussed topics such as chronic pain, pain treatment, opioid use and misuse, and interprofessional communication. The first expert panelist was Merideth Norris, D.O., an osteopathic physician who is board certified in addiction medicine. Norris directs an intensive outpatient program and a methadone clinic in addition to running an outpatient practice in which she manages many conditions, including pain. The second panelist, Jessica Bates, Pharm.D., is a pharmacist at Penobscot Valley Community Health Care, where she provides controlled substance stewardship. The final panelist was Kelli Fox, LCSW, a clinical social worker, who has been in the field of mental health and addiction since 1985 and has focused her clinical practice on co-occurring disorders of PTSD and substance use, child-parent attachment and bonding and family therapy.

This interprofessional panel was designed to facilitate discussion among student health professionals from

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



Tricia Garrett (Physician Assistant '18) tells the auditorium what her group — including Rob Foley, a veteran with pain — thinks about a complex case.

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. ■



Panelists Jessica Bates, Pharm.D., Kelli Fox, LCSW, and Merideth Norris, D.O.

UNE's 2016 Brain, Body and Wellness Fair a Big Hit with Students and Families

SARAH WISLER, B.A., COMMUNICATIONS SPECIALIST/WEB EDITOR

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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 insect 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.



A Brain Fair visitor gets ready to test her concentration abilities.



Brain Fair attendees learn about the connection between brain and body with a muscle stimulation demonstration.



Geoffrey Ganter, Ph.D., professor of biology, tells students about his pain research. On screen is YouTube video "Charlie Bit My Finger."

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." ■



Continuing education student and Goulet Foundation Scholarship winner Michael Cyr explains the importance of protecting your brain by dropping a melon with and without a helmet.

Pain Summit at UNE

MICHAEL D'APICE, B.A. '12, UNE VIDEOGRAPHER, CHRONIC PAIN NARRATIVE

R&S

R&S

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



Jon Hamilton discusses the importance of talking about science in a way that everyone can understand.

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.

The talks addressed everything from basic patient interaction to the concurrent issue of substance misuse, to neurobiology and mechanisms of pain circuitry. An expert panel, featuring Congresswoman Chellie Pingree, addressed the current status of national policies focusing on chronic pain and fielded questions from pain patients, research scientists and experts in the field.

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



Maine Congresswoman Chellie Pingree discusses the complexities of the opioid addiction epidemic.

continue to facilitate discussion while bringing its resources and innovative approaches to bear in the quest to treat chronic pain and reduce opiate addiction. ■



From left to right, panelists Linda Porter, Daniel Carr and Chellie Pingree



Sean Mackey presents "Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research."

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

“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.”



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

“Dr. Bilsky made a point of teaching his students how to communicate the work we were doing with others, through both the presentation of work at scientific meetings and the constant introduction of students to visiting scientists, technology professionals and senior administrators. Through this, I was taught how to clearly communicate complicated topics and was left with the knowledge of how to conduct myself in a scientific profession. These lessons could not have been taught in a classroom and have proved invaluable in furthering my career.”

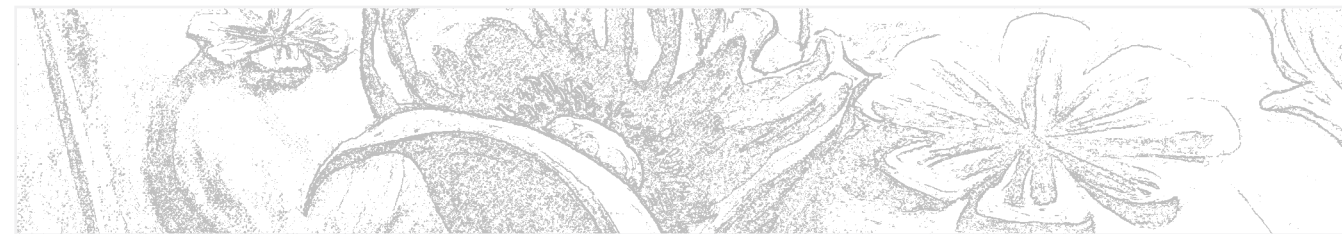


Alexa Lopez, Ph.D. '09
(Psychobiology)

DID RESEARCH WITH: Ed Bilsky on opioid pain pharmacology

CURRENT CAREER: Research psychologist/principle investigator with the U.S. Army Medical Research Directorate-West, part of the Walter Reed Army Institute of Research

“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.”



Richard Feeney, D.O. '09

DID RESEARCH WITH: Ian Meng on medication overuse and headache

CURRENT CAREER: Interventional physiatrist in Exeter, NH

“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.”



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

“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.”



Tom Miller, D.O. '07

DID RESEARCH WITH: Amy Davidoff on cardiomyocyte cell biology

CURRENT CAREER: Assistant professor in the Department of Pediatrics in the Division of Pediatric Cardiology at the University of Utah

“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.”

