SPRING 2014

UMaine Today

CREATIVITY AND ACHIEVEMENT AT THE UNIVERSITY OF MAINE

Blue is green

A legacy of sustainability

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1865 THE UNIVERSITY OF MAINE

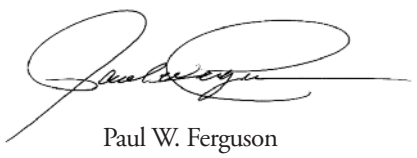
Darling Marine Center, Walpole, Maine

Photo by Edwin Remsberg

IN A RECENT ARTICLE published in the *Presidential Perspectives Series on Elevating Sustainability Through Academic Leadership*, I referred to Marten and Samels' book, *The Sustainable University: A Need to Move Forward* and the vision of Anthony Cortese, founding president of Second Nature, in calling for the placement of sustainability within higher education's priorities. This integration of sustainability into the fabric of the core mission of the university — developing a campus "sustainability state of mind," if you will — is precisely the commitment of the University of Maine. UMaine's strategic plan, the Blue Sky Project, embraces the guiding principles and areas of distinction for Maine's land grant university — innovation, interdisciplinarity, inclusivity, sustainability, stewardship and renewability.

As proposed in the University of Maine Climate Action Plan, such transformation toward a sustainability state of mind can be accomplished by an "overarching institutional focus on climate protection and sustainability in our own research, public policy development, public outreach and student training, and, in so doing, mount a significant challenge to the widespread but nonetheless specious notion that sustainability is 'soft' and generally at odds with 'hard' economic development and technological progress."

Higher education leaders are best positioned to foster a vital cultural and societal change, and move intentionally in shaping a comprehensive sustainability state of mind. Such a state of mind will clearly benefit our bottom line, saving dollars and cents in an environment of fiscal challenge while also preserving our sense of mission and place promoting communities of enlightened citizens. This approach, which at UMaine we now refer to as Blue Sky Thinking, requires creative conversations and a focused return on investment, coupled to a positive outlook for the future — a future dependent upon strategic sustainability.



Paul W. Ferguson
President

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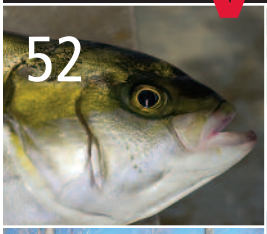


Photo by Edwin Remsberg

ON THE COVER: UMaine's sustainability story is comprehensive, multifaceted and complex. The cover illustration by Robin Moline captures some of the many landmarks across the UMaine landscape that represent the pillars of sustainability at the state's flagship university — from lessons in the classroom and green living on campus to national leadership and global research.

When birds that are not directly hunted begin to decline, it speaks symptomatically to larger declines underway, says UMaine evolutionary and behavioral ecologist Brian Olsen.

For the Birds

CANARIES ARE no longer used to detect unsafe levels of carbon dioxide in mines, but birds are still sentinels of a region's health, says Brian Olsen, University of Maine evolutionary and behavioral ecologist.

Few animals and even fewer vertebrates offer a window into their private worlds like birds. So, when bird watchers in Maine spot wrens, screech owls, turkey vultures, mockingbirds, cardinals and titmice, they're observing species that have adapted to changing climate and landscape.

Climate change and habitat loss are the two biggest threats to birds in North America, Olsen says. How birds respond to change — and which species do it well and which don't — are central questions for Olsen.

One species facing a survival threat is the saltmarsh sparrow, which breeds exclusively from Maine to North Carolina. Olsen says population viability models indicate the species could face extinction in the next 30 or so years because the birds build their nests within centimeters of high-tide marks, and sea levels are expected to continue to rise.

"We have a responsibility for being the caretakers of life's diversity on this planet," Olsen says. "From a more utilitarian perspective, we simply do not understand completely yet the role that every species plays in its ecosystem, and the loss of any species could have far-reaching consequences." ■

WHEN LOOKING for a mate outside of their pair bond, female coastal plain swamp sparrows *(Melospiza georgiana nigrescens)* choose males with large bills, according to a University of Maine-led study conducted along Delaware Bay. Small-billed males are more at risk of being cheated on by their mates. Males with larger bills than their avian neighbors, on the other hand, sire a greater percentage of young birds in their territory, says Brian Olsen, assistant professor in UMaine's School of Biology and Ecology, and the Climate Change Institute. Thus, Olsen says, sexual selection may explain why males have larger bills than females along the Delaware coast. Conventionally, bird bills have been considered one of the premier examples of how diet shapes morphology: the right tool for the right job, he says. For the past 40 years, researchers have explained differences between the shapes of male and female bills by differences in diet. But Olsen and his colleagues say their research suggests that female mating preferences alone could do it.

The health of moose in Baxter State Park and elsewhere in Maine is the focus of UMaine's Animal Health Laboratory. Photo courtesy of George Dooley

Healthy icons

UMAINE OPERATES the Animal Health Lab with support from Cooperative Extension as a service to the state's veterinarians, livestock producers and animal owners. The lab is used to perform diagnostic services in necropsy, microbiology, virology and pathology. The lab is part of the Northeast Wildlife Disease Cooperative (NWDC), a diagnostic and research collaborative composed of a regional group of wildlife health laboratories. Through the cooperative, multiple institutions contribute skills and knowledge, and pool resources to fund a cost-effective and efficient means of detecting, diagnosing and addressing wildlife disease events, according to the group's website. "We're using each other as colleagues and resources more than we used to. I think it will have important impacts," UMaine's Dr. Anne Lichtenwalner says of NWDC and the database it's creating for sharing information.

THE HEALTH of Maine's moose is a top priority for researchers and students at the University of Maine's Animal Health Laboratory. Lab director Dr. Anne Lichtenwalner was approached five years ago by a Maine Department of Inland Fisheries and Wildlife moose biologist who wanted to know the cause of occasional calf deaths.

In the past two years, Lichtenwalner, a veterinarian and assistant professor of animal science, and her students have examined over 150 sets of lungs from Maine moose. Many were infected with lungworms, winter ticks and lung cysts. Lungworms, which can cause pathology and pneumonia, and may contribute to death, were found in over 25 percent of moose evaluated in 2012–13.

Echinococcus granulosus (EG), the intermediate stage of a tapeworm, was found in the form of lung cysts. The lab published information about EG online and informed state veterinarians to remind clients that tapeworm medication is advised for dogs that may eat infected moose meat or viscera.

The lab is also part of a two-year tracking study assessing the health of moose in Maine and New Hampshire. The lab conducts blood work and processes tissues from the 90 radio-collared Maine moose to test for diseases and parasites. ■

Lifesaving R&D

THE UNIVERSITY of Maine's Modular Ballistic Protection System saved lives inside the United States consulate during a September 2013 attack in Afghanistan's Herat province, according to a U.S. State Department official, who notified Tex Tech Industries (TTI), the commercial manufacturer of the ballistic panels, of the news.

"There's a great deal of satisfaction knowing that something we developed and designed is being used and is helping to save lives," says Paul Melrose, engineering manager in the university's Advanced Structures and Composite Center.

The Modular Ballistic Protection System project began in 2005 at UMaine when the U.S. Natick Army Soldier Research, Development & Engineering Center contracted with the university for five years to develop a product to safeguard soldiers from enemy fire and projectiles as they worked, slept and ate in military vinyl tents. Two years later, UMaine unveiled its creation.

At that time, the panels had wood cores surrounded by advanced resins and fibers. In 30 minutes and with no tools, four soldiers could up-armor a 20-foot-by-32-foot tent with the lightweight portable composite ballistic panels. The ballistic panel system won the 2007 American Composites Manufacturers Association's Best of Show Award and the People's Choice Award for the highest degree of design and innovation, and best use of composite materials.

University researchers have continued to develop and improve the ballistic panels for use in military tents with various functions, shapes and sizes. UMaine students, including veterans who served in Afghanistan and Iraq,

Research technician Chris Urquhart works on the Modular Ballistic Protection System project.

IN 2009, UMaine approached Tex Tech Industries (TTI), a major manufacturer of ballistic body armor with a facility in North Monmouth, Maine, to produce ballistic panels on a commercial scale. Moe Maheux, TTI's executive director of operations, says the collaboration is a perfect fit. Now TTI is developing partnerships with other Maine-based companies and is working to sell the ballistic panels to agencies and corporations that have employees in high-risk locations worldwide. In 2010, UMaine signed another contract with the U.S. Army.

Quality data

UNIVERSITY OF Maine researchers have designed a handheld device that can quickly detect disease-causing and toxin-producing pathogens, including algal species that can cause paralytic shellfish poisoning. The device — a colorimeter — could be instrumental in monitoring coastal water in real-time, thereby preventing human deaths and beach closures, says lead researcher Janice Duy, a recent graduate of UMaine's Graduate School of Biomedical Science and Engineering. Duy is now conducting postdoctoral research at Fort Detrick in Maryland.

The research team, which includes UMaine professors Rosemary Smith, Scott Collins and Laurie Connell, built a prototype two-wavelength colorimeter using primarily off-the-shelf commercial parts. The water-resistant apparatus produces results comparable to those obtained with an expensive benchtop spectrophotometer that requires technical expertise to operate, says the research team.

The instrument's ease of use, low cost and portability are significant. The prototype cost researchers about $200 to build; a top-shelf spectrophotometer can cost about $10,000.

A touch screen prompts users at each step of the protocol. Researchers note that an Android app is available to enable smartphone integration of the measurement system. ■

The colorimeter is being used in fresh and marine water testing in the **Republic of Korea,** and several devices will be field tested by state officials **in Maine** this summer.

A NEW app developed by a University of Maine graduate student allows iPhone users to take water quality measurements. The goal is to crowdsource water quality data, says Thomas Leeuw, an oceanography student from Lincoln, Vt. As part of his master's thesis, Leeuw developed HydroColor, an app that uses three photos to measure the reflectance of natural water bodies. Based on the reflectance values, the turbidity or level of suspended sediment in a given water body can be measured. "What we're measuring is the reflectance of the water and the particles inside it," Leeuw says. "To make reflectance measurements, oceanographers use precision instruments called radiometers. HydroColor is taking what a lot of ocean scientists do with radiometers and satellites, and applying it to an iPhone camera." The process requires three photographs — a photographer's gray card, and photos of the sky and water. By aggregating data from many people over large spatial and temporal scales, HydroColor can determine the typical turbidity or chlorophyll values for different environments. The interactive online database can then be used by laypeople or lake association officials to help monitor changes, such as increased algal bloom occurrences or erosion leading to higher suspended sediment.

Writer's toolbox

TAKING APART a broken laptop, learning how to repair it and putting it back together is a typical exercise in one University of Maine English class. For students in ENG416: Technical Editing and Document Design, learning how to diagnose and repair electronics is essential to writing about the process in the form of easy-to-use consumer guides.

Since 2011, students in Charlsye Diaz's class have been required to create an e-manual for iFixit, a website that offers free step-by-step guides to help consumers repair devices to keep more electronics in use and out of landfills.

"This experience is important because it is messy," says Diaz, an associate professor of English and coordinator of UMaine's professional and technical writing program. "When things 'fall apart' or the projects don't go as well as I would like, I love it, because they'll face those obstacles on the job every day."

Students work with iFixit's technical writers to adhere to the company's guidelines. As a result, they receive feedback from someone besides the professor while working in a supportive classroom setting.

In 2003, iFixit was started by two California Polytechnic State University students who struggled to fix an iBook without instructions. In 2009, the company started the iFixit Technical Writing Program as a way to engage students with a hands-on, repair-focused technical writing project. Students from 20 universities — including UMaine — have created 5,000 repair guides for electronics, which have helped more than 9 million people fix their devices, according to the company's website.

Diaz says the project also benefits potential employers by sending students into the workforce with real-world experience.

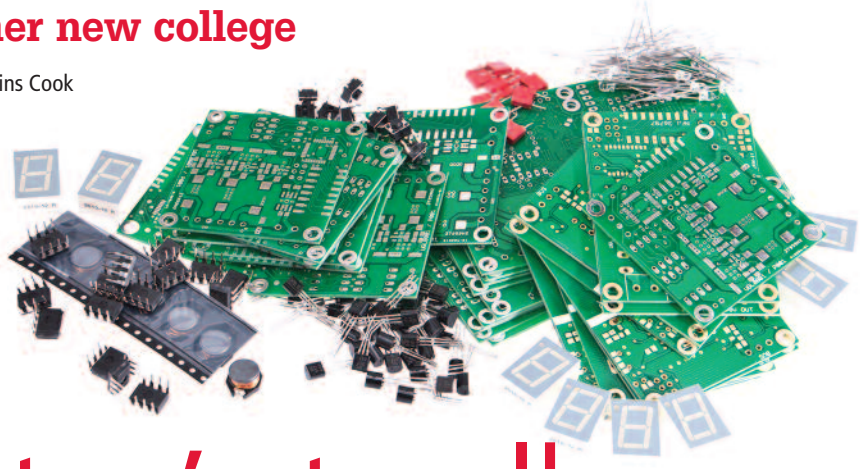
"It's one thing to go to an interview and claim to be able to write instructions because you practiced during a class assignment. It's another thing to say you took apart a scanner and wrote instructions for replacing the scanner lamp, and then provide a link to a published guide that people use," Diaz says.

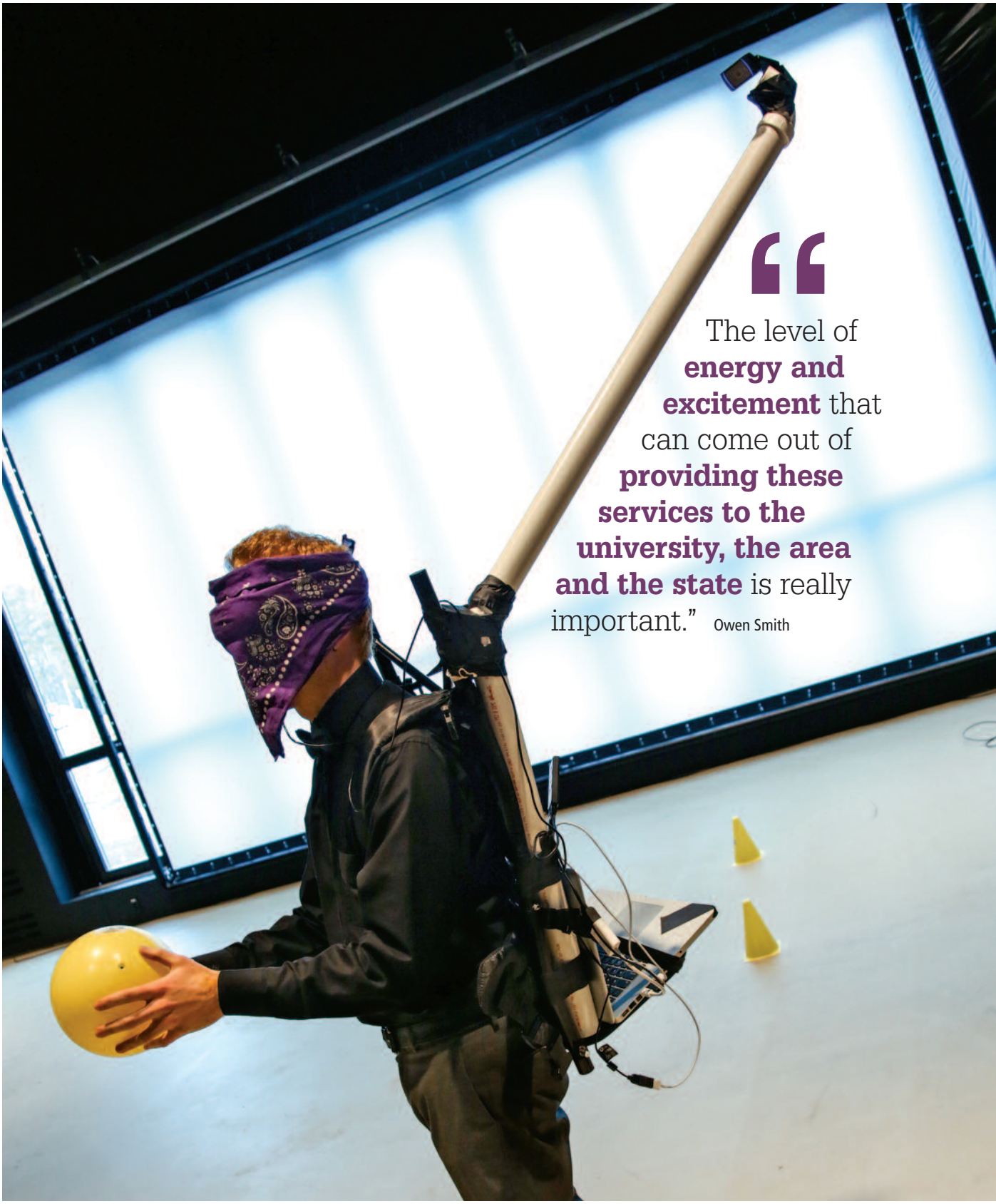
KC Collins Cook, a 2013 UMaine graduate who earned an undergraduate degree in English with a concentration in professional and technical writing, is an information developer for IBM in North Carolina. She says every day she applies the knowledge she learned from Diaz's classes. ■

"We leave campus with a competitive skill set that **sets us apart from other new college graduates** in our field." KC Collins Cook

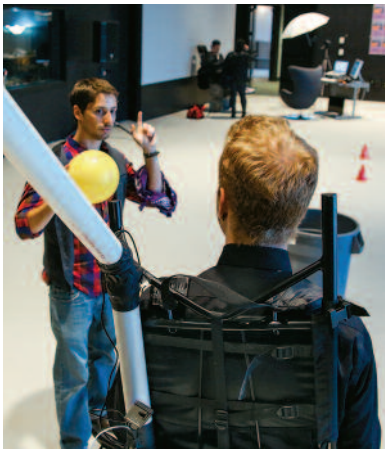
UMaine English students have written step-by-step, fix-it-yourself manuals for:

Sony Ericsson QuickShare T630 (cell phone)
Visioneer OneTouch 7400 USB (scanner)
Motorola Adventure V750 (cell phone)
IBM ThinkPad R40 (laptop)
Olympus Camedia D-560 (camera)





“The level of **energy and excitement** that can come out of **providing these services to the university, the area and the state** is really important.” Owen Smith



IMRC CENTER resources support cutting-edge research and technological experimentation, advancement and production. The center includes an electronics lab, where students design and print circuit boards and build other electronics; audio and video production labs that include video editing studios, an electronic music studio and recording post-production studios; a fabrication studio that includes traditional tools, such as a table saw and drill press, as well as more innovative tools like a plastics forming machine and computer numerical control (CNC) equipment; a prototyping studio with 3-D and large-format printers, and a laser-cutter engraver; and a large multipurpose production space that includes a projection screen for movies inside or outside, a stage to host concerts and a 360-immersive video room for virtual reality experimentation.

Concept to reality

THE NEW Innovative Media Research and Commercialization (IMRC) Center was dedicated with a ribbon-cutting ceremony and afternoon conference celebrating innovation and the state's creative economy Jan. 9.

The 15,000-square-foot IMRC Center in the recently renovated Stewart Commons is home to UMaine's Department of New Media and the MFA in Intermedia Program. Students and other Maine entrepreneurs benefit from its resources, including state-of-the-art equipment, professional expertise and mentoring, and technical support in creative production and prototyping.

The goal of the IMRC Center is to re-envision creative teaching, learning and research, linking new media and innovative problem solving with science and technology.

The more than $10 million renovation of Stewart Commons, also home to the Wyeth Family Studio Art Center, was funded in part by a Maine Technology Asset Fund award from the Maine Technology Institute.

Owen Smith, director of the IMRC Center, says the building upgrades for the New Media Department combine the research and educational functions of the university with commercialization, workforce training and business start-ups that focus on creative development and media production.

"It's neither just a pure research facility nor is it an auxiliary facility that might just be connected to outside sources," says Smith, the Alston D. and Ada Lee Correll Chair in New Media, and director of the Intermedia MFA Program. "The basic idea is that by bringing together professionals — whether it be individuals or businesses — with students, faculty and staff, we can create a real hub of activity in new media."

The center includes two high-end computer classrooms, a PC- and Apple-capable classroom, and a nontraditional wireless classroom to support students with laptops, cell phones or tablets.

"We have a full range of production facilities and digital media production tools that connect to physical production," Smith says. "We're providing access to tools and equipment to the range of innovative, creative people who have ideas and need help putting the ideas into form." ■

“We live in a country of great wealth. My story is just one. There are **1,000 different stories and faces.** The common denominator is **we’re all hungry.”** Dennis Willette

Photos by Edwin Remsberg and Michael Mardosa

SEVERAL YEARS ago, Dennis Willette thought he was king of the world when, for $1, he scored three cans of dog food to eat. He was homeless, hungry and drinking alcohol to dampen his bipolar disorder. Then a farm manager at a local organic homestead enrolled Willette in the University of Maine Cooperative Extension's Master Gardener Volunteers Program.

"I liked being outside, but the only thing I had ever grown were tomatoes in a white bucket," says Willette. During the 40-hour Master Gardener Program, he fell in love with horticulture, was inspired by people he met and was motivated by the ability to help feed himself and others. He learned to can fresh vegetables and he built a root cellar.

"It was life-changing for me," says Willette, who once owned a catering company.

Now 55 and a Master Gardener Volunteer, Willette has a place to call home and is enrolled at York County Community College. He plans to transfer to UMaine or Unity College to study sustainable agriculture and/or renewable energy.

This October, Willette will share his experiences at the Maine Hunger Dialogue at UMaine. Students and staff from colleges statewide will gather at the conference

A call to action

Reenvisioning food to address Maine's need

By Beth Staples

University of Maine Cooperative Extension is a significant part of the food system in Maine, which has the largest and most diverse agricultural economy in New England.

Oct. 16–17 to brainstorm and take action to eradicate hunger, a scourge that affects 200,000 Mainers, 49 million Americans and 892 million people on the planet who do not have enough to eat, according to Good Shepherd Food Bank, Feed America and stopthehunger.com.

COLLEGE STUDENTS are among the hungry. Hunger plagues those attending class in ivy-covered brick buildings just as it afflicts veterans, babies and the elderly who make choices about whether to buy medication, heating fuel or food.

Hunger is the world's No. 1 health risk, killing more people each year than HIV/AIDS, malaria and tuberculosis combined; 60 percent of all hungry people are women; and every 10 seconds, a child dies from hunger-related diseases, according to World Food Programme.

Lisa Morin, coordinator of the University of Maine Bodwell Center for Service and Volunteerism, says some graduate and upperclass students living off campus struggle trying to balance tuition, rent and food costs.

In 2009, UMaine opened a campus food pantry to help. In the fall 2013 semester, Morin said 27 new clients were among those who made the 300 visits to the Black Bear Exchange in York Complex. Because food is donated and supply is limited, each client is restricted to 15 food items once a week. Morin said faculty have told her they buy food for students in need.

That generosity is important because an estimated 35 percent of Mainers who are food insecure do not qualify for government assistance, says Barbara Murphy, a UMaine Extension educator.

In 2000, UMaine Extension initiated Maine Harvest for Hunger as a way to address food

UMaine Extension contributes to a well-functioning food system in which policy, research, production, processing, commerce, nutrition, and food security and safety are integral and integrated.

In the last 13 Harvest for Hunger growing seasons, UMaine Extension and participating gardeners, farmers, civic organizations, schools, businesses and volunteers have **donated more than 600 tons** of fresh produce. **Maine Hunger Dialogue** grew out of **a desire to do more.**

insecurity by encouraging farmers and gardeners to donate fresh fruits and vegetables to soup kitchens, food pantries and people in need. Murphy said UMaine Extension's enthusiastic Master Gardener Volunteers, including Willette, are vital to the program's success.

IN THE last 13 Harvest for Hunger growing seasons, UMaine Extension and participating gardeners, farmers, civic organizations, schools, businesses and volunteers have donated more than 600 tons of fresh produce.

The Maine Hunger Dialogue, says Murphy, grew out of a desire to do more. Murphy and her colleagues were inspired at conferences, including the Universities Fighting World Hunger Summit and the Kansas Hunger Dialogue.

The Universities Fighting World Hunger Summit seeks to harness the drive and intelligence of college students worldwide. It assigns higher education the tasks of eradicating hunger and generating academic models that can be used to accomplish it.

The Kansas Hunger Dialogue began in 2011 when, according to its website, people were moved to take action in light of the knowledge that enough food is produced for every single person on the planet to have 4.3 pounds of it per day, but that nearly 1 billion people go hungry.

In Maine and other states, Murphy said students and campuses tackle hunger in many ways — from an academic minor in hunger studies, to alternative spring breaks and food drives.

To coordinate and increase the cumulative positive effects of these approaches, the Hunger Dialogue will partner with Maine Campus

The U.S. Department of Agriculture estimates that 200,000 Mainers don't have enough to eat. That's why UMaine Extension is committed to initiatives such as Maine Harvest for Hunger.

Compact — a coalition of 17 member campuses whose purpose is "to catalyze and lead a movement to reinvigorate the public purposes and civic mission of higher education."

Colleges, according to the Campus Compact, are "vital agents and architects of a flourishing democracy." Murphy says students and staff at these colleges will plan this October what they can do collectively to eradicate hunger.

"Our dialogue will be all about action," Murphy says. Part of the action includes packaging 10,000 meals (each of which will feed six people) that will be donated to campus-based food pantries in Maine.

MAINE HUNGER Dialogue participants have plenty of inspiration and ideas from which to draw: There's L.A. Kitchen in Los Angeles, which collects fresh restaurant food that would otherwise go to waste and uses it in a 15-week culinary arts job training program for youth emerging from foster care and adults released from incarceration.

There's an Arizona State University student team that developed a FlashFood app so restaurant managers with extra unserved food can enter their location, and the type and amount of leftovers. FlashFood drivers then send a mass text to app subscribers (churches/food pantries) alerting them to where they will be transporting food for pickup. Their motto: "Fighting Hunger. Reducing Food Waste. Faster."

And there's the Food Recovery Network, initiated by students at the University of Maryland in College Park. They collect leftover food from dining halls and donate it to shelters in the Washington, D.C. area. In 2011–12, students provided 30,000 meals for the hungry. The

UMaine Extension's role in fighting hunger in Maine ranges from school and children's gardening programs to helping the state's potato industry save more than $20 million annually by managing late blight disease.

network, which has chapters at 46 colleges in 21 states, strives to be on 1,000 campuses and donate 10 million pounds of food by 2018.

RICHARD ROBBINS, author, anthropologist and professor at State University of New York at Plattsburgh, says to understand hunger, it's necessary to know that food is viewed as a commodity produced for people to purchase, rather than a provision for life. Just as people wouldn't expect "The Gap to manufacture clothes, Adidas to manufacture sneakers, or IBM to provide computers for those people earning $1 a day or less; likewise, you would not expect ADM (Supermarket to the World) to produce food for them," he writes on his website.

Eradicating poverty, he says, is necessary to eliminating hunger.

Murphy agrees that, in order to solve hunger in the long-term, people need to earn livable wages.

Willette said it's empowering to do things for himself and others. That includes growing food, weeding a community garden, shopping for bargains and preparing healthy meals on a budget.

"Little steps are the same as a big step," he says. "It's about moving forward and giving back."

In the summer, Willette donates produce to a shelter in South Berwick. In the winter, he stands in line outside a food pantry in Alfred, talking with others waiting for sustenance, including retirees and single working mothers.

Anger, he says, is also a motivator. "We live in a country of great wealth. My story is just one. There are 1,000 different stories and faces. The common denominator is we're all hungry."

Food for thought

AT THE 2013 Maine Food Summit, University of Maine President Paul Ferguson said sustainability is a core value of the land grant institution.

"It's our role to produce graduates who understand and who are committed to sustainability and shaping a vibrant society," he said. "If we don't, we've missed our mark."

Members of Food Solutions New England followed with a presentation on a sustainable New England food system based on food as a human right.

Mark Lapping, Distinguished University Professor at the Muskie School of Public Service at the University of Southern Maine; Molly Anderson, Partridge Chair in Food and Sustainable Agriculture Systems at the College of the Atlantic; and Amanda Beal, sustainable food systems research and policy consultant, said the vision calls for New England to develop the capacity to produce at least 50 percent of "clean, fair, just and accessible food" for New Englanders by 2060.

Sweden, the researchers noted, is 80 percent self-sufficient in food products.

The researchers presented three possible scenarios, intended to inspire discussion and further study:

- Business-as-Usual model: If farmland expands from 2 million to 6 million acres and people's diets remain much like they are now — a lot of beef and other animals products, fat and sugar, and few vegetables, fruits and whole grains, as much as 40 percent of people's food could be produced in New England by 2060.
- Omnivore's Delight model: If farmland expands to 6 million acres and recovery of the Gulf of Maine fishery is assumed, and if people eat more fruits and vegetables and consume less meat, sugar, saturated fat and processed foods, 50 percent of the diet could be produced in New England.
- Regional Reliance model: If farmland expanded to 7 million acres and people ate even less meat and more legumes and nuts, as much as 70 percent could be produced regionally.

Innovating Maine

Blackstone invests in businesses, students to accelerate growth

By Elyse Kahl

WHEN UNIVERSITY of Maine student Sam Albert signed up for the Blackstone Accelerates Growth Innovate for Maine Fellows Program offered through UMaine's Foster Center for Student Innovation, he was majoring in computer science and had doubts about his creative abilities.

Two years into the internship program, Albert has changed his major to marketing and is confident that anyone is capable of innovating when given proper training.

"The first time I interned was absolutely amazing, so I decided to come back," says the Eagle Lake, Maine, native. "A lot of other places treat interns like they're still learning and with us, they gave us high-responsibility jobs. We had major encouragement and motivation."

Innovate for Maine internships are one facet of Blackstone Accelerates Growth (BxG), an outreach effort to create and sustain jobs and economic development in Maine by supporting entrepreneurship and innovation.

> "The internship program has to be **the most successful new program** that was started since Blackstone came to Maine. **It brings needed expertise into companies** that could not afford it." Susan MacKay

The $3 million effort launched in October 2011 was part of the New York-based Blackstone Charitable Foundation's five-year, $50 million Entrepreneurship Initiative. The goal: to support innovative programs and spur job creation nationwide.

"Blackstone Charitable Foundation created this fund to spur innovation and entrepreneurship throughout the country. They heard they should come to Maine, that there are interesting things going on here — specifically at UMaine and Maine Technology Institute," says Renee Kelly, co-director of the Foster Center, and a member of BxG's strategy and leadership team.

UMaine and its Innovation Engineering Program, founded in the Foster Center, partnered with BxG, Maine Technology Institute (MTI) and Maine Center for Entrepreneurial Development. The partners strive to improve existing resources and create a statewide network to help businesses and entrepreneurs succeed. The network consists of regional Innovation Hubs in Bangor, Portland and the midcoast, uniquely working to encourage and support aspirations for growth and for building world-class companies statewide with events that engineer the serendipitous "collision" of people, ideas and resources.

"The idea of Blackstone is to work with start-ups and current companies to help them be more innovative," says Foster Center Coordinator Jesse

Statewide reach

AS OF APRIL 2014, 178 Maine companies have participated in a major BxG program, such as Accelerated Ventures, Top Gun or the Innovate for Maine internship program. Seventy-four of those companies participated in multiple offerings, according to BxG partner Maine Technology Institute (MTI). BxG has hosted, sponsored or presented 89 events, including innovation roundtables, Maine Mentor Network matching events and Top Gun showcases, with more than 2,000 attendees. BxG has also conducted more than 400 one-on-one meetings, connecting entrepreneurs with resources. "In various programs, we have reached every corner of the state," says Scott Burnett, director of marketing and analytics at MTI. Burnett says he has already seen the positive influence of BxG programs on Maine students and companies, and anticipates the success will continue. "Each of the companies affected by BxG is moving forward," he says. "I think 2014 is going to be a stellar year for Blackstone. It will really reach even more companies, students and communities."

Moriarity. "We're really looking to help these companies — to make them more competitive."

FOUNDED IN 1985, Blackstone is a global investment and advisory firm. The Blackstone Charitable Foundation was established in 2007 to use the company's resources to foster entrepreneurship globally, according to the company's website. To reach this goal, the foundation created the Blackstone Entrepreneurship Initiative, which includes four models to promote economic gains: Blackstone Accelerates Growth, Blackstone LaunchPad, Blackstone Entrepreneurs Network and Blackstone Organizational Grants.

"Maine's Blackstone Accelerates Growth was the third project they funded in the country, and they looked to us as a potential model for rural states to support entrepreneurship and innovation," Kelly says.

Blackstone Charitable Foundation is also sponsoring programs in North Carolina, Michigan, Ohio, Pennsylvania and Montana.

"Maine and other mostly rural states were chosen for the program with the intent to excite growth in rural economies," says Scott Burnett, director of marketing and analytics at Maine Technology Institute. "The Blackstone Charitable Foundation is trying to make an impact in places that are lagging in business formation and development."

Kelly, who is also the director of economic development initiatives at UMaine, says the Foster Center and the university play a role in all of BxG's objectives — accelerating companies, connections, and the next generation of innovators and entrepreneurs.

UMaine's partnership with BxG is also helping reach the goals of the university's five-year strategic plan, the Blue Sky Project, including serving the state by catalyzing Maine's future. The goal is to ensure that the university's teaching, research, outreach, workforce and economic development program excellence are in close alignment with Maine's priority needs, says Jake Ward, UMaine vice president for innovation and economic development.

UMAINE'S FOSTER Center for Student Innovation is responsible for plugging its Innovation Engineering Program into BxG, as well as managing the Blackstone Fellows Innovate for Maine internship program.

Kelly says the university is leading the next generation aspect of the initiative by offering the internship program and awarding scholarships for Innovation Engineering courses at any of the University of Maine System's seven campuses. Innovation Engineering courses provide a systematic approach to innovation with fundamental concepts, including tools and methods for creating, communicating and commercializing unique ideas.

Emma Wilson

> My professional goal is to **find a career that I genuinely love and am excited about going to every morning.** The Innovate for Maine program has taught me that whenever I decide to move back to Maine, I will always be able to find a well-paying job." Emma Wilson

Crowd-funding champion

PRODUCTS FOR A CLEANER ENVIRONMENT: University of Maine student Emma Wilson has spent most of her senior year working as an intern for Zeomatrix, a small Orono business focused on bringing its patented zeolite technology in odor-absorbing paper products to market. Zeolites are naturally occurring members of a family of volcanic minerals with unique chemical and physical qualities, according to Zeomatrix. The company was founded in 2006 by Susan MacKay to "engineer products for a cleaner environment" while commercializing technologies developed by the company and UMaine faculty, according to Wilson.

BACKING BIODEGRADABLE BAGS: Wilson, of Greenville, Maine, is a double major in management and marketing, with a concentration in international business. She's also a member of the Honors College. She applied for the Innovate for Maine Fellows Program because she knew it helped local start-up businesses and taught students about innovation. As an intern, Wilson's major responsibility has been handling the marketing launch of the Zeo Litter Bag — a bag lined with the company's zeolite technology that absorbs the odor of used cat litter. The bag is also biodegradable and better for landfills. For the marketing campaign, Wilson has done SWOT analyses (a technique used to understand the strengths, weaknesses, opportunities and threats of a company), sales forecasts, usability tests and market research; designed and launched the product's website; shot a crowd-funding video; and started a crowd-funding campaign. The crowd-funding campaign aims to raise money for the first production run of the bags and to spread the word about the product.

CREATE SESSIONS: Wilson says the internship has taught her the importance of teamwork and colleague support. It was fun to come together for "create sessions," where everyone collaborated and came up with ideas — no matter how crazy — for projects, she says.

ALWAYS WELCOME: Wilson says in the program she learned about marketing and job opportunities in Maine. After graduation, she would like to work first for a marketing firm in Boston or a study abroad company that helps students discover the world, then move back to Maine.

Igniting innovation

WITH FUNDING FROM Blackstone Accelerates Growth, the University of Maine has awarded more than 150 scholarships — 119 for Innovation Engineering courses, 43 for professional training in Innovation Engineering for businesses and nine to Top Gun Prep entrepreneurs. Since it began in 2012, the Innovate for Maine internship program has offered work to 52 students. Students come from at least 17 colleges or universities with at least 36 majors, including business, marketing, English, new media, engineering, studio art, anthropology, psychology, political science, math, marine science, economics and physics. About 40 companies are participating in the program, providing work to interns and learning from the students' Innovation Engineering expertise. This coming year, about 50 students and 60 companies are expected to be accepted into the Innovate for Maine internship program.

"Blackstone enabled us to create programs we thought would be important to the state," Kelly says. "The scholarships have attracted more students, which help build the program, but also build a bigger cohort of students who will be able to create their own company or innovate within an established organization when they get into the workforce."

She estimates with funding from BxG, the university has awarded more than 150 scholarships to students and entrepreneurs for Innovation Engineering courses and workshops.

The Innovate for Maine internship program is offered as a fellowship to college students who are either from Maine or attending a Maine institution. The students come to the center to get trained in Innovation Engineering before being placed in an internship with a Maine business.

"The Innovate for Maine program is important to provide students with practical opportunities to apply their innovation expertise," Kelly says.

In 2012, the program's first year, 20 students were selected. In the second year, 30 students were chosen. Today, about 40 Maine companies are participating.

LIKE SAM Albert, Jordan Nickerson, a psychology major from Brewer, is a 2013 Innovate for Maine Fellow. Nickerson says the intern projects, such as market research, logo design and promotional materials, vary depending on the company, but all jobs involve helping businesses grow and create. Some of the interns work with well-established companies, while others get paired with start-ups.

During the summer, Nickerson worked with Eastern Maine Healthcare Systems, an established, larger company interested in becoming more innovative. Albert spent his second year in the program working for a Portland-area healthcare consulting business that was preparing to launch.

The internships last one summer. However, companies often continue to employ interns and some offer permanent, full-time jobs. Networking is also an important aspect of the program, not only for the interns but the companies, Albert and Nickerson say.

"These companies know other companies and you end up getting to know so many people," Albert says. "Not only does the program help develop these businesses and industries, but it also prepares us for creating our own business in the future."

Besides gaining practical work skills, Kelly says the program shows college students they don't have to leave the state to have a successful career. It also allows the university to show local companies what services and skills UMaine and its students have to offer.

"The internship program is making such a great connection between Blackstone, the University of Maine and Innovation Engineering

John and Christine Carney

> The Foster Center is **giving us the opportunity** to go from a small, home, Internet-only business **to something that could really turn a profit for us and potentially change our lives,** which is pretty awesome." John Carney

Cut out for business

BIG BREAK WITH BIG GIG: University of Maine students and married couple John and Christine Carney won the Big Gig's second pitch-off event for the promotion of their business, Thick & Thin Designs LLC, which offers quirky acrylic cupcake toppers, jewelry and ornaments. The Carneys were one of three competitors pre-selected to pitch their products or business to a panel of judges at the event in Old Town, Maine, and advanced to the Big Gig Finale by winning the second of three preliminary contests. The Big Gig, which brings together Bangor-Orono area innovators and entrepreneurs, is offered through a partnership between UMaine, Old Town, Orono and Husson University, and is supported by Blackstone Accelerates Growth.

THROUGH THICK AND THIN: In November, the newlyweds from Seekonk, Mass., launched their business and were surprised at how quickly it took off. They credit much of its success to counseling and mentoring from the university's Foster Center for Student Innovation and the Innovative Media Research and Commercialization (IMRC) Center. John, a graduate student in the Intermedia MFA Program, was on the IMRC Center team responsible for assembling the facility's prototyping lab, including researching the 3-D and vinyl printers and laser cutters. He and Christine, who is pursuing a second bachelor's degree in zoology, were looking for a collaborative, innovative project.

ZOMBIES, NINJAS AND CUPCAKES: One night, the pair was looking at zombie cutouts John had made using the IMRC Center's laser cutter. He envisioned putting bases on the figures and selling them as board game pieces. But then they asked: "What if we put a spike on this and stick it in a cake?" Christine says they then joked about having a lone survivor among a bunch of zombie-topped cupcakes. "And that was sort of like our aha moment," Christine says.

LIFE-CHANGING POTENTIAL: The Intermedia MFA Program offered them a $500 scholarship fund grant under a few conditions: They had to write a statement about their business and their intentions, show receipts and talk to Foster Center coordinator Jesse Moriarity. Foster Center supplied office space, and helped with the necessary paperwork, business contacts and publicity. During the 2012 holiday season, the business took off, with 100 Etsy orders in the first month for ornaments and zombie, ninja and octopus tentacle toppers.

because it's allowing students to get a feel for what these companies are doing while making early connections," Nickerson says. "It has also allowed companies to see there are students being trained in real skills that are going to help the growth of businesses in Maine."

Nickerson says she's still amazed when she walks into Eastern Maine Healthcare Systems and longtime employees look to her — a college student — for guidance.

"Innovation is such a new field and it's something a lot of people are afraid of, so if you have the answers to it, people are impressed," she says. "The nice thing about what I've learned is that it can be applied anywhere. Everybody in every company can be innovative."

THE FOSTER Center for Student Innovation also coordinates activities in BxG's Bangor Innovation Hub. The hub aims to connect entrepreneurs, businesses, organizations and UMaine students in the Greater Bangor-Orono area to form a community dedicated to improving the local economy.

"Right now, there are great innovators around the state, but they're kind of dispersed and not really connecting with one another. So part of what we're doing is trying to make that activity more robust — get more people doing it, facilitate more connections and then celebrate what people are doing so there's more awareness of what's going on throughout the state," Kelly says.

> "Maine's Blackstone Accelerates Growth was **the third program** they funded in the country, and they looked to us as a **potential model for rural states** to support entrepreneurship and innovation."
>
> Renee Kelly

Bangor and Portland were named the program's first Innovation Hubs. The Midcoast Innovation Hub was established in February. Burnett of MTI says BxG organizers expect to launch two or three more hubs this year, with a long-term goal of bringing the regional hubs together to share resources and collaborate.

Other BxG programs offered in the hub include Big Gig networking and pitch-off events, Top Gun entrepreneurial accelerator training, the Accelerated Ventures program and the Maine Mentor Network. Big Gig, a partnership between UMaine, Orono, Old Town and Husson University, offers a series of networking and business-pitch competitions.

"The Big Gig builds on the fact that there are faculty, students and people in the community who are entrepreneurial and innovative. It gives them an opportunity to get together and learn about what each other is doing," Kelly says.

Sarah Newcomb, a UMaine doctoral student in behavioral economics and a research assistant in Maine's Sustainability Solutions Initiative, won the Big Gig's first pitch-off event in October with "Who's Your Daddy?" The app she wants to develop allows shoppers to scan products to learn more about parent companies. UMaine students John and Christine Carney won the second pitch-off with their business, Thick & Thin LLC, which sells quirky acrylic cupcake toppers, jewelry and ornaments.

THE MAINE Center for Entrepreneurial Development (MCED) offers programs such as the Maine Mentor Network and Top Gun, a program that features courses, training and mentoring to accelerate entrepreneurial development. Many Top Gun graduates are invited to participate in the BxG Accelerated Ventures program. Companies in the program receive customized resources to create growth and increase visibility, including Innovation Engineering and the Entrepreneur in Residence Program, providing business professionals for ongoing strategic consultations.

"Accelerating companies is about trying to pull the critical resources

UMaine alumnus Doug Hall is a business innovation consultant, and founder/CEO of Eureka! Ranch, an invention and research think tank in Ohio. In 2010, he made a 10-year commitment to his alma mater to work with students, faculty and businesses to grow the Innovation Engineering Program. Hall, who studied chemical engineering, says Innovation Engineering brings an engineering discipline to innovation, while giving students knowledge, tools and confidence.

Innovation central

FOSTER CENTER for Student Innovation at the University of Maine is the home of the Innovate for Maine internship program and the campus hub of Blackstone Accelerates Growth (BxG). Innovation Engineering courses taught at the center are key in helping the growth of Maine companies and the future workforce — two major goals of the BxG initiative.

Innovation Engineering provides a systematic approach to innovation with fundamental concepts, including tools and methods for creating, communicating and commercializing unique ideas. The courses, open to all students in any major, are designed to explore methods of communication, validating ideas, business planning, collaborating and creative thinking — concepts that can be applied in any career. The program aims to spark students' ability and desire to use their education in a professional setting. For businesses, Innovation Engineering can help address problems and opportunities — from sales and profits to transforming company culture.

Innovation Engineering courses began at the University of Maine in 2005, and four years later, were approved for a minor. Since 2010, the Foster Center has also provided training to more than 1,000 Maine business, government and nonprofit leaders. The center's programs cover topics taught in the classroom in a compressed format, with a focus on how to innovate new product and service ideas.

5 Doug Hall's top tips for innovating

1. FILL YOUR BRAIN
Think of your brain as an immense database of wisdom, experience, emotion, facts and solutions. When faced with a challenge, your brain searches the library in your head to make a connection and find a solution. Complex problems require putting together multiple pieces of a solution into a new idea. The more experiences and knowledge you have to connect, the more creative you will be.

2. DIVERSITY
While group brainstorming isn't always effective, leveraging diverse opinions and perspectives has an exponential effect on your ability to create ideas. Try calling experts or requesting advice from colleagues or customers via email for additional thoughtful responses.

3. DRIVE OUT FEAR
Research finds that as fear increases, the number of big ideas generated decreases. Fear of the unknown, fear of rejection and fear of exposure are all real threats to innovation. The best way to combat fear is to take action. Take the unknowns and break them down into small pieces that can be tackled to build momentum. We call it "fail fast, fail cheap." Instead of trying to build something perfect from the start, learn what works and what doesn't in manageable doses.

4. PROBLEM, PROMISE, PROOF
Almost all innovations solve problems. Know who your audience is and solve their problem with a better solution than currently exists. That's what we call meaningful uniqueness. Be sure to understand and communicate the promise that your innovation has to solve the problem, and proof of how it works.

5. CLARITY AT THE START
Many organizations try to innovate without real forethought of what they want to accomplish and how. That is like trying to drive across the country without a GPS or road signs. Before you start to create ideas, think about the mission of the organization and its important opportunities. What are the constraints of the organization? What kinds of ideas are you not interested in? With this kind of thinking at the beginning of the process, you stay focused on the right course when the inevitable roadblocks turn up.

> "The nice thing about what I've learned is that **it can be applied anywhere. Everybody** in every company **can be innovative.**"
>
> Jordan Nickerson

together that will make those companies successful and help them overcome their biggest obstacles to growth," Kelly says.

Accelerated Ventures companies usually use the program for three to nine months, and receive subsidies of up to $10,000 each. Some companies remain BxG community leaders, helping build a community of professionals by serving as role models at Innovation Hub events and providing work for Innovate for Maine Fellows.

Burnett describes the Accelerated Ventures as "having the right stuff." He says they were chosen for being entrepreneurial and innovative, with opportunities for growth and a strong management team.

BxG expects to add another dozen Accelerated Ventures by the end of 2014 through a competitive nomination process. One of the eight companies in the Accelerated Ventures program is Cerahelix, based at the university's Target Technology Incubator in Orono, which has developed a nanoceramic coating to make efficient filters. CEO Susan MacKay says opportunities provided by BxG are essential to growing a successful entrepreneurial community in the state.

Cerahelix was selected as an Accelerating Venture in the program's first year. BxG has provided an Entrepreneur in Residence, assistance with commercialization and interns. In return, Cerahelix has participated in BxG events.

"The internship program has to be the most successful new program that was started since Blackstone came to Maine," MacKay says. "It brings needed expertise into companies that could not afford it."

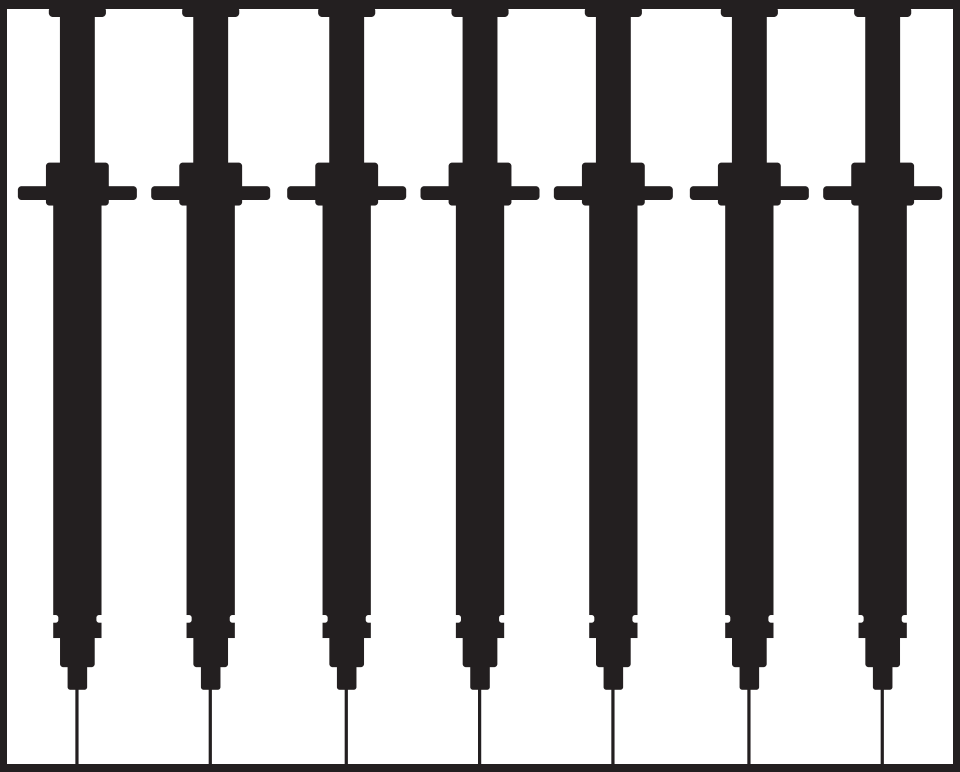
The Innovate for Maine internship program recruits and interviews students, pays a share of the intern stipend, and provides additional supervision and instruction for the interns, MacKay says.

"I could not afford the time, nor attract the caliber of intern that I received with my own resources," says MacKay. "I hope the programs that have initiated and expanded with the Blackstone resources continue after this initial phase. I believe this is the best way to create a diverse and vibrant economy for the state."

Burnett believes BxG is gaining momentum, and he has high hopes for the program in 2014.

"Last year was a very strong year in helping build the foundation, and 2014 is really the year for acceleration," says Burnett, who credits BxG Operations Director Martha Bentley, and BxG strategy and leadership team members — Kelly of UMaine, Don Gooding of MCED and Joe Migliaccio of MTI — with bringing the partner organizations together.

The long-term goal of BxG is to create a sustainable entrepreneurial community, Burnett says. He sees BxG continuing beyond the four pilot years in some form, evolving to best address the needs of Maine's entrepreneurs. ■



HIV behind bars

Alumnus studies healthcare communication as an intervention in the growing global prison population with recidivism and untreated substance abuse

By Margaret Nagle

HIV behind bars

JEFFREY WICKERSHAM is a research scientist who studies issues involving gender, health and HIV. At Yale University School of Medicine, he works in infectious diseases. He received a master's degree in communication from the University of Maine in 2005 and a Ph.D. in communication sciences from the University of Connecticut five years later, with a postdoctoral fellowship at Yale University School of Medicine in 2012. His research focuses on the relationship between gender, HIV and substance dependence.

How did your research in communication come to dovetail into the public health field?

There's a strong link between communication of health-related information (e.g., sex-risk behaviors or drug-risk behaviors) and health outcomes (e.g., reduction of risk-taking behaviors) in a variety of contexts. During graduate school (both M.A. and Ph.D.), my research and training focused on how communication about one's gender and sexual identities influences how others perceive and evaluate one another. During that time, I regularly came across evidence of drug use as a coping strategy among LGBT youth, which is obviously a risk factor for adverse health outcomes, including HIV. I also discovered that research on novel approaches to treating drug abuse among this population, including research specific to women, was virtually nonexistent. As such, I felt additional training in addiction medicine and public health were essential to expanding my research into this understudied area.

Tell us about your research in substance abuse, infectious diseases and health outcomes.

My current research addresses the syndemic of incarceration, substance use and HIV. Many nations, including the U.S., have taken a punitive approach to the problem of drug abuse, favoring incarceration over treatment. This approach has led to explosive growth in the global prison population, untreated substance use disorders and high rates of recidivism.

In Malaysia, our research team is studying the efficacy of initiating individuals into medication-assisted treatment for opioid (e.g., heroin) dependence in order to stabilize them before they re-enter the community, thereby reducing the likelihood of relapse to drugs. We also aim to link them to healthcare and support serv-

ices in the community. Likewise, in Ukraine, my colleagues and I are studying new communication-based interventions among people who inject drugs. The goal is to increase their motivation to enter treatment and counseling for their addiction. In addition to these projects, I am also planning a large-scale study of sex workers in Malaysia to determine the prevalence of sexually transmitted infections, including HIV, and evaluate the accessibility of healthcare services to this population. The goal of this study is to identify potential interventions to increase access to — and use of — healthcare services among persons engaged in sex work, and also to understand what factors influence health-seeking behavior (e.g., violence, poverty, police harassment).

Why was communication your field of study?

Communication is a dynamic, challenging and adaptive area of study. It's at the core of nearly all our interactions and has enormous power on our attitudes, beliefs and behaviors, including those related to our health. I chose communication for these very reasons — it defines who we are.

Why UMaine for a master's?

In addition to having outstanding and prolific faculty, I chose UMaine's master's program in communication because it provided training across research methodologies, including quantitative, qualitative, as well as critical, which, looking back on it, has proven to be an invaluable skill. Whereas most social science programs train students in one particular mode of academic inquiry (e.g., experimental design, ethnography), UMaine provided training across these methods. This invaluable approach has given me the strength to work across disciplines and has framed how I approach all of my research today.

What research were you involved in for your master's?

Consistent with my current interest in gender, my master's thesis examined the relationship between gay men's childhood interactions with family members and their present-day perceptions about themselves and the gay community.

Who was your favorite UMaine professor — and why?

UMaine's communication faculty are what make the program so exceptional. John Sherblom provided me outstanding training and mentorship in research methods and statistics. He also gave me the opportunity to serve as an editorial assistant to the journal *Communication Research Reports.*

How does UMaine continue to influence your life?

UMaine is at the heart of my work — the training I received there is at the center of all my work today. ■

How sweet it is

By Beth Staples and Elyse Kahl

Show me the **money**

Syrup production pours revenues into Maine

THE MAINE maple syrup that enhances the flavor of pancakes and ice cream also sweetens the statewide economy. University of Maine economist Todd Gabe says that, including multiplier effects, Maine's maple industry annually contributes about $49 million in revenue, 805 full- and part-time jobs, and $25 million in wages to the state's economy.

Multiplier effects occur when an increase in one economic activity initiates a chain reaction of additional spending. In this case, the additional spending is by maple farms, businesses that are part of the maple industry and their employees.

$49 million

That's the annual revenue, including multiplier effects, contributed by the Maine maple syrup industry. Maine has the third-largest maple industry in the U.S.

Maple producers provided information about their operations, which allowed for a detailed economic impact analysis, says Gabe, whose study was released in February. Each year, the industry directly contributes about $27.7 million in revenue, 567 full- and part-time jobs, and $17.3 million in wages to Maine's economy, he says.

Maple producers earn about 75 percent of the revenue through sales of syrup and other maple products, including maple candy, maple taffy, maple whoopie pies and maple-coated nuts, he says.

Retail sales at food stores and the estimated spending of Maine Maple Sunday visitors on items such as gasoline and meals accounts for the remainder of revenue. This year, Maine Maple Sunday was celebrated March 23 at 88 sugar shacks and farms statewide.

Maine has the third-largest maple industry in the United States. According to the United States Department of Agriculture, maple syrup is produced in 10 states — Connecticut, Maine, Massachusetts, Michigan, New Hampshire, New York, Ohio, Pennsylvania, Vermont and Wisconsin.

In 2013, Maine accounted for 450,000 gallons, or 14 percent, of the more than 3.25 million gallons produced in the U.S. Vermont (1.32 million gallons) and New York (574,000) were the top two producers.

Among the three top-producing states, Maine had the highest growth rate — 25 percent — of production between 2011 and 2013, Gabe reports.

In Maine, the maple production industry appears to be dominated by a few large operations; the 10 percent of maple farms with 10,000 or more taps account for 86 percent of the total number of taps in the state, he says.

While the maple producers who participated in Gabe's study had an average of 4,109 taps, almost 40 percent of Maine's maple producers had fewer than 250 taps. The study participants have been tapping trees and boiling sap for an average of 24 years.

Depending on temperature and water availability, the length of the sap flow season varies. In Maine in 2013, it ran from March 4 to April 12.

Close to 40 percent of the maple producers licensed in Maine returned surveys for the study, which received financial support from the Maine Agricultural Development Grant Fund and Maine Maple Producers Association. ■

Making the grade

Maple school ensures a top-quality product

Grading is used to determine the purity and flavor of syrup, which affects pricing. Syrup is graded by density, color, clarity and flavor, says University of Maine Extension Professor Kathryn Hopkins. The lighter grades have a more delicate flavor that are generally preferred for drizzling on ice cream; medium grades are often used on pancakes and waffles. The flavor of the syrup becomes more robust and full-bodied the darker the color gets, making the darker syrups more commonly preferred for cooking. Hopkins says although flavor is important, the most crucial lessons in grading focus on food safety to ensure syrup is free of contaminants and impurities.

A DECADE AGO, New England maple syrup industry experts offered a presentation for producers, bulk syrup buyers, state inspectors and others who need to accurately grade maple syrup or maple products for contest judging, commercial distribution or personal use. Continued requests from interested participants convinced the organizers to offer the presentation annually as a class, and the International Maple Syrup Institute adopted the program as a signature event — the Maple Grading School.

In 2004, Kathryn Hopkins, a University of Maine Cooperative Extension educator and professor; Henry Marckres, of the Vermont Agency of Agriculture, Food and Markets; and Sumner Dole, a University of New Hampshire Cooperative Extension forest resources educator, offered their first presentation on maple grading in Lancaster, N.H.

"We held the first school and thought we'd be done," Hopkins says. "We enrolled 35 people — which was too many — and had a waiting list, so we decided to offer two years of the school. After that, we still had a waiting list and people started asking for the school to come to them."

The two-day school, also known as a maple quality assurance program, aims to help U.S. and Canadian maple producers achieve consistent understanding of grading and quality standards to benefit consumers. It is offered by UMaine Cooperative Extension; the Vermont Agency of Agriculture, Food and Markets; and the International Maple Syrup Institute — a nonprofit organization founded in 1975 to promote and protect maple syrup and other maple products, according to the institute's website.

The grading school's location changes annually, with classes held in Maine, Vermont, New Hampshire, Ohio, Connecticut, Minnesota and Canada. Participants receive the latest information on grading, equipment calibration, food safety, quality control and best management practices from Canada and the U.S. A strong scientific base with hands-on exercises provide the foundation for increasing

> People are really concerned about the **quality of the product** and are protective of its image. **Producers are proactive** on behalf of the industry and aren't just waiting for something to go wrong. It has been great **working for an industry that cares."** Kathryn Hopkins

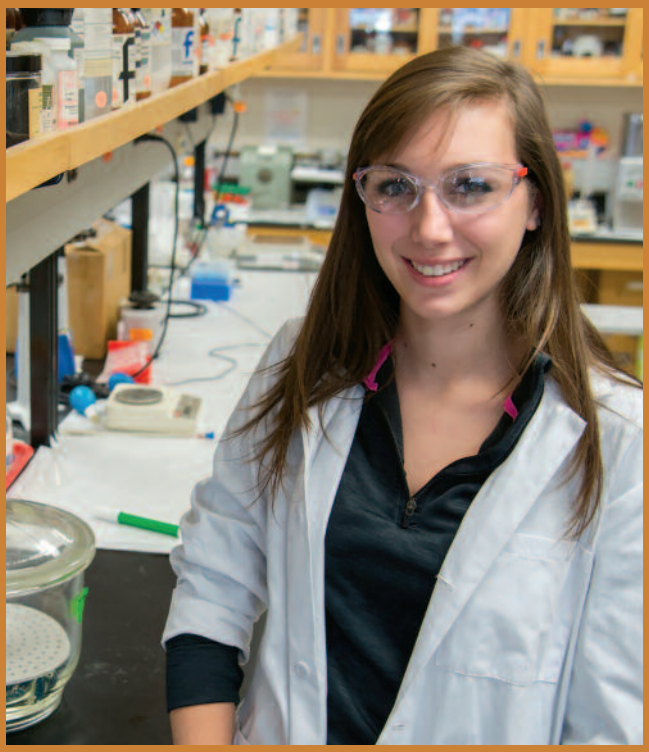
grading knowledge, with the long-term goal of helping save money by increasing profits and sales, or reducing costs and waste.

Although the USDA has established maple syrup grades, many states and Canadian provinces have their own regulations for production, licensing and grading. The USDA and the Canadian Food Inspection Agency are changing their regulations to conform to new international grade standards.

"We're not telling them anything they don't know or can't find in a book, but the hands-on element is key to the school's success," says Hopkins of the more than 200 participants who have attended the school since it began in 2004. Participants range from hobbyists and agricultural high school instructors to commercial producers and inspectors.

Hopkins, an agriculture and natural resources expert, works with maple syrup producers statewide, and with farmers, Master Gardener Volunteers and home gardeners in Somerset County, which produces more maple syrup than any other county in the United States.

Hopkins' research focuses on issues related to the maple industry, such as food safety and consumer acceptance of



Kaitlyn Feeney

Syrup safety

HELPING ENSURE that the beloved syrup of New England is safe from mycotoxins, including those created in the storage process, is the focus of an independent research project by third-year food science student Kaitlyn Feeney, of Hermon, Maine. Last year, Feeney began looking at the toxin mycophenolic acid (MPA). MPA has its benefits. It is used with surgery patients who undergo a transplant to help suppress the immune system enough to ease the body into accepting the organ. The same mold can grow on syrup after consumers fail to refrigerate opened containers. Feeney is studying MPA found in syrup to further verify storage safety. Her work in the Food Chemical Safety Laboratory, directed by Assistant Research Professor Brian Perkins, is part of UMaine's ongoing efforts to develop testing methods for syrup safety.

Have you worked closely with a mentor?
Dr. Brian Perkins offered me a job in his lab when I was a first-year student. At first I thought I would just be washing dishes and cleaning up the lab. I had no idea I would actually be learning so much about food science. Dr. Perkins has taught me how to use almost every piece of equipment in the lab and I have learned how to run tests and analyze data myself.

Have you had a UMaine experience that's shaped how you see the world?
Absolutely. I never knew about food science until I came to UMaine. There are so many opportunities in the food industry that I never really thought about. I always took for granted that there would be a safe and abundant food supply here in the U.S. I never thought about who is helping to make sure our food supply is safe or what research has been done to conclude that blueberries are good for you. Now I am going to be one of those people.

How sweet it is

Tapping resilience

Researching effects of weather and climate change on sap flow

UNDERSTANDING MORE about the relationship between weather and maple sap flow, and how Maine syrup producers will adapt to climate change is the focus of research being conducted by University of Maine graduate student Jenny Shrum. The master's student in ecology and environmental sciences is attempting to unravel the biophysical relationships between weather and sap flow. She wants to better understand what drives flow and how trends in climate may affect processes and harvesters.

This spring, Shrum collected on-site weather station data and sap flow rates at three test sites, and is interviewing small- and large-scale producers. The goal is to determine if longtime sugar maple stand managers will be more or less resilient to climate change, and if large-scale producers will be better equipped to adapt. Her research is supported by the National Science Foundation and EPSCoR through Maine's Sustainability Solutions Initiative and its Effects of Climate Change on Organisms research project.

The physiological process for sap flow is not completely understood, Shrum says. It involves a complex interaction between freezing and thawing of the xylem tissue and the molecule sucrose, which maple trees produce during photosynthesis in the summer and convert to carbohydrates to store energy between seasons.

Sugar maple trees grow as far north as New Brunswick and as far south as Georgia, yet maple syrup is only produced commercially in the most northern states because of the colder weather, Shrum says. In Maine, the season usually starts sometime between the middle of February and the middle of March, and continues for about six weeks.

"Studies are starting to show that the preferred block of time for tapping is starting earlier if you base it on ideal temperatures," Shrum says, citing a 2010 Cornell University study by Chris Skinner that found that by 2100, the sap season could start a month earlier than it does now. For big-time operations, Shrum says an earlier season probably won't be a problem, but she's not sure how smaller Maine operations will adapt. ■

To record weather and sap flow data, UMaine graduate student Jenny Shrum deploys weather stations at maple tree stands in Albion, Dixmont and Orono. She's also using iButtons to record soil temperatures and time-lapse photography of the buckets to record hourly sap flow rates. She can then relate flow rates to variables the weather stations record, such as temperature, precipitation and sunlight.

Throughout 2014, the University of Maine Museum of Art is celebrating the permanent collection through a series of exhibitions, which this spring included, *From Piranesi to Picasso: Master Prints from the Permanent Collection.*

Photo by Kathy Rice

Collected works

By Elyse Kahl

Celebrating the art that belongs to Maine citizens

IN 2014, the University of Maine Museum of Art launched a yearlong celebration of its permanent collection with *From Piranesi to Picasso: Master Prints from the Permanent Collection.* The exhibition was one of the collection's largest installations featuring 70 of the museum's finest works that highlight printmaking.

Two additional exhibitions in the coming year will showcase some of the newest acquisitions in photography, paintings, works on paper and sculpture.

UMaine's growing permanent collection contains more than 3,600 pieces.

"We're celebrating the permanent collection — both its early development and its future growth," says George Kinghorn, the museum's director and curator.

The master prints exhibition contained original prints from the 18th century to the late 1980s by internationally renowned artists such as Winslow Homer, Andy Warhol, John Marin, Käthe Kollwitz, Susan Rothenberg and Edward Hopper. Exhibit highlights included Giovanni Battista Piranesi's 1748–72 etchings that document Rome's architectural landmarks; Francisco Goya's aquatint and etchings from *Los Caprichos;* and Pablo Picasso's *Faun*

Unveiling a Woman, considered to be one of his most significant graphic works.

Kinghorn says UMMA is the region's art museum, with a collection belonging to Maine residents. He says during the master prints exhibition, many visitors said they had no idea the stature of the museum's collection, and were delighted to see work by artists such as Homer and Picasso in their own backyard.

"You don't have to travel to New York City to see these works. That's what makes it special," Kinghorn says. For instance, the museum is home to the same impression of Picasso's *Jacqueline in a Straw Hat* that is owned by the Metropolitan Museum of Art in New York City.

The beauty of the collection is its variety and range of work that includes realism, pop art, abstract expressionism and cubism, says Kinghorn. The museum's collection features artwork created since 1900, with an emphasis on contemporary art (1945–present).

Original prints are created by the artist, sometimes working with the assistance of a master printer to make a limited set of prints without using mechanical processes. In an exhibition like the one earlier this year, students and the public learn about prints that demonstrate etching, silk-screen, woodcut, lithograph, drypoint and engraving. The museum, which serves the university, general public and Maine school systems, often hosts speakers or events related to exhibitions.

"You don't have to travel to New York City to see these works. **That's what makes it special."** George Kinghorn

The university's art collection was established in 1946 by founding museum director and UMaine art professor Vincent Hartgen. The collection became a museum in the 1980s and has been sited in downtown Bangor for more than a decade, extending UMaine's reach and service to the community in keeping with the land grant mission of the university, Kinghorn says.

UMMA's focus on modern and contemporary art distinguishes it from other Maine museums, Kinghorn says. It offers new exhibitions of contemporary art from across the country every three months. And since 2007, the museum has seen an annual attendance increase of more than 250 percent.

The majority of the works in the master prints collection were donated to the museum. Most of the prints were given by Robert Venn Carr Jr., a UMaine alumnus who donated 303 pieces starting in 1986.

"These donors have entrusted their works to us so we can conserve, interpret and exhibit them for the enjoyment and education of Maine residents and visitors to the state," Kinghorn says. "Through their donation, they acknowledge the important role the museum plays in Maine's cultural life." ■

Pablo Picasso

Jacqueline au Chapeau de Paille (Jacqueline in a Straw Hat), 1962
Color linocut
Gift of Robert Venn Carr Jr., Class of 1938

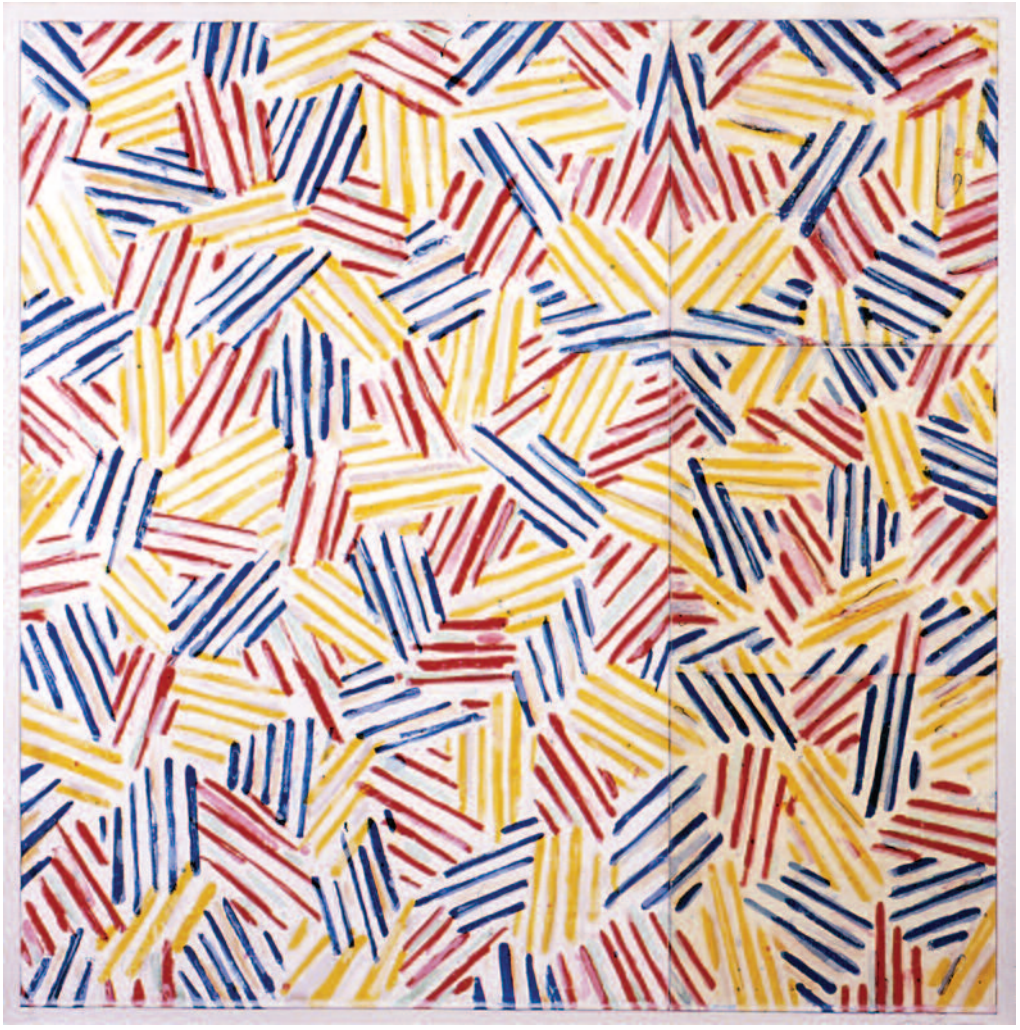
Collected works

Giovanni Battista Piranesi

Veduta della Basilica de S. Giovanni Laterano, 1750
Etching
Gift of Dr. and Mrs. Howard J. Means

Richard Estes

D Train, 1988
Screenprint
Gift of an anonymous donor



Jasper Johns

#6 (After "Untitled, 1975"), 1976
Lithograph
Gift of Robert Venn Carr Jr., Class of 1938

Francisco Goya

Nadie Se Conoce (Nobody Knows Himself) from Los Capricos, 1799
Aquatint, etching
Museum Purchase

Käthe Kollwitz

Brustbildeiner Arbeiterfrau mit blauem Tuch (Portrait of a Working Woman with Blue Shawl), 1903
Lithograph
Gift of Robert Venn Carr Jr., Class of 1938

Pablo Picasso

Faune dévoilant une Femme (Faun Unveiling a Woman), 1936
Aquatint and etching
Gift of Robert Venn Carr Jr., Class of 1938

Roy Lichtenstein

Reclining Nude, 1980
Woodcut with embossing
Gift of Robert Venn Carr Jr., Class of 1938

David Hockney

Afternoon Swimming, 1979
Lithograph
Gift of Robert Venn Carr Jr., Class of 1938

Edward Hopper

Lonely House, 1922
Etching
Gift of Adeline F. and Caroline R. Wing

Winslow Homer

Eight Bells, 1887
Etching
Gift of Adeline F. and Caroline R. Wing

John Marin

Chartres Cathedral, 1910
Etching
Museum of Art Alliance, Gift of Lisa Marie Marin

Working with Picasso

CHRISTOPHER BURNS is a senior English major from Winterport, Maine, who has explored many roles during his years at the University of Maine. He says his current position as student administrative assistant at the UMaine Museum of Art is easily the most rewarding. "If you had asked me a couple years ago if I would have a chance to carry a Picasso in my arms, I would've said no," says the student literary magazine editor and aspiring writer.

Tell us about your role at the Museum of Art.
It's great to be able to take part in almost every stage of the museum process. One of my primary roles is in guest relations, so as people come in, I greet them, make them feel welcome and let them know whose work is on display. That means telling them what makes it significant or unique, or telling the story behind it. It's about helping people understand and make the most of their art experience.

Do you have the opportunity to work directly with the art?
I've helped install two shows so far, and there'll be probably at least two more that I'll be able to help work on. A couple years ago, I would've said there's probably not a Picasso within a couple hundred miles of here, and it turns out there are several, not even 20 miles away.

Has your museum experience influenced your career plans?
I'd like to write about art and culture — to highlight and share these places and events with other people, and make it accessible to people. Being able to write about art and culture for a newspaper, magazine or journal could help contextualize things for people in a way they can understand.

Christopher Burns

Future scapes

2014 President's Research Impact Award recognizes mapping tool to aid community planning

A SOPHISTICATED online mapping tool that allows Maine communities to visualize future landscape scenarios earned the 2014 President's Research Impact Award for Spencer Meyer, a Maine's Sustainability Solutions Initiative (SSI) doctoral candidate in the University of Maine's School of Forest Resources, along with faculty advisers Rob Lilieholm and Chris Cronan.

A member of SSI's Alternative Futures Team, Meyer led the development of the Maine Futures Community Mapper (MFCM) over four years with team leader Lilieholm, associate professor of forest policy; Cronan, professor of plant biology and ecology, and Michelle Johnson, an SSI doctoral candidate in UMaine's Ecology and Environmental Sciences Program. The groundbreaking tool will allow town planners, conservationists, developers and the public to better understand and manage community assets — both in terms of conservation and economic development — now and in the future.

MFCM is a web-based tool that helps Mainers identify locations that are most suitable for development, conservation, agriculture or forestry, as well as potential conflicts and compatibilities between land uses. It also helps envision future landscapes under different possible scenarios.

The tool was developed with the belief that Maine's most important asset is its exceptional quality of place and that communities are at the heart of that asset. The goal is to help ensure a future in which Mainers can count on vibrant communities with vital economic development and a sustainable natural resource base.

Since 2010, the team creating MFCM has involved more than 75 community stakeholders, including policy-makers, conservationists, farmers, foresters, business leaders and scientists. ■

Spencer Meyer has been accepted into The Nature Conservancy's NatureNet Fellows Program and will begin a two-year fellowship at Yale University's School of Forestry and Environmental Studies this fall.

Blue is green

By Danielle Walczak and Margaret Nagle

UMaine's sustainability legacy, leadership rooted in values and vision

FOR THE fifth consecutive year, the University of Maine has been named a "green college" by Princeton Review for its exemplary commitment to sustainability in academics, campus infrastructure and programming.

The Princeton Review's Guide to 332 Green Colleges: 2014 Edition profiles 330 schools in the United States and two in Canada that are the most environmentally responsible. Other featured universities in the past five years include Georgia Tech, the University of Oregon and the University of Illinois Urbana-Champaign.

The annual guide, produced by Princeton Review in collaboration with the Center for Green Schools at the U.S. Green Building Council, surveys four-year colleges to measure their commitment to the environment and sustainability.

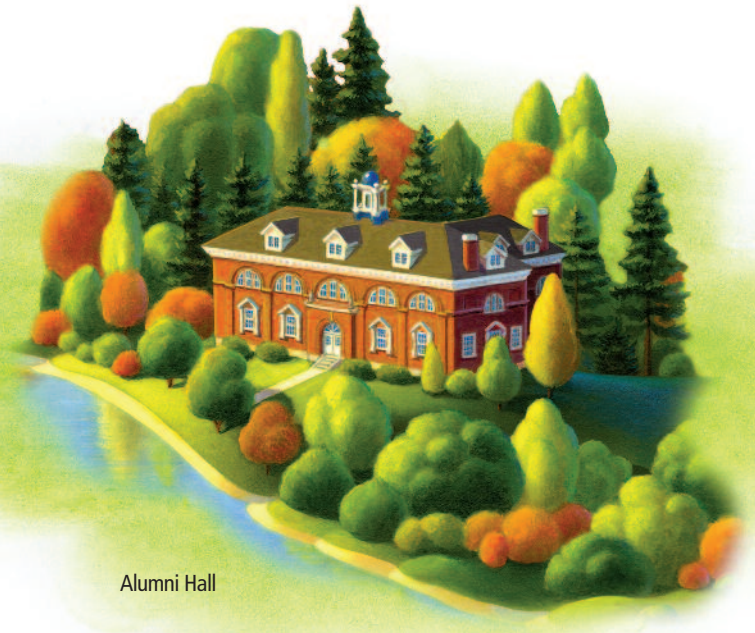
"The University of Maine's sustainability focus is comprehensive and impactful," says UMaine President Paul Ferguson, who, in April, was elected vice chair of the Steering Committee of the American College & University Presidents' Climate Commitment (ACUPCC). "Maine's flagship campus has a statewide and national leadership role in sustainability and stewardship in keeping with the university's five-year Blue Sky strategic plan. At UMaine, sustainability helps define the institution."

UMaine's sustainability initiatives range from the Black Bear Orono Express shuttle and the campuswide single-stream recycling program to UMaine's overarching goal of achieving carbon neutrality by 2040.

Today, the university is in a "smart-growth" period, says UMaine Sustainability Coordinator Daniel Dixon. Even with essential new construction and necessary upgrades to older infrastructure, multiple building renovations and energy-efficiency

> "The University of Maine's **sustainability** focus is **comprehensive and impactful.** At UMaine, sustainability **helps define the institution."**
>
> UMaine President Paul Ferguson

Illustration by Robin Moline



Alumni Hall

Sustainable leadership

NATIONALLY, UMAINE has a leadership role in sustainability. In 2007, the university became a charter signatory of the American College & University President's Climate Commitment (ACUPCC), which focuses on presidential leadership in promoting sustainability on college and university campuses, and in communities and society. For the past two years, UMaine President Paul Ferguson has served on the ACUPCC Steering Committee. This spring, he was elected vice chair. UMaine participates in the Sustainability Tracking, Assessment & Rating System (STARS), a voluntary, self-reporting framework for helping colleges and universities track and measure their own sustainability progress. Since 2009, UMaine's award-winning comprehensive campus master plan has provided a road map for sustainability-focused campus development. In addition, UMaine is consistently rated by Princeton Review as one of the most environmentally responsible colleges in the U.S. and Canada. In 2011, UMaine received a Second Nature Climate Leadership Award recognizing outstanding climate leadership among doctorate-granting institutions.

projects have contributed to an overall reduction in energy use and greenhouse gas emissions since 2005.

Continued sustainability at UMaine is important because it can save money for the university, promote institutional leadership by modeling best practices and facilitate community engagement.

UMaine Today asked Dixon, who also is a research assistant professor in the university's internationally recognized Climate Change Institute, about UMaine's sustainability legacy and leadership.

How do you define sustainability and why is it important?

Our most basic requirements —unpolluted air, clean water and fresh food — all come from our environment, as do the energy and raw materials needed for construction and transportation. We currently harvest the Earth's resources at an unsustainable rate. Despite ongoing warnings from environmentalists and scientists, the business-as-usual approach remains. Continuing to operate this way will likely have serious consequences for our fragile ecosystem.

There are a multitude of definitions for sustainability. One of the most basic is "the ability to meet our requirements for existence indefinitely." In 1987, the definition by the World Commission on Environment and Development (WCED – The Brundtland Report) was that sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs." WCED's definition arose from concerns that unhindered population growth and environmental degradation would compromise the health, justice and prosperity of future generations.

In 2013, the Environmental Protection Agency echoed a similar environmental concern: "Everything that we need for our survival and well-being depends either directly or indirectly on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, (conditions) that permit fulfilling the social, economic and other requirements of present and future generations."

Regardless of the definition one chooses, several key concepts apply,

Sustainable Benchmarks

1865
Maine College of Agriculture and the Mechanic Arts opened as a land grant institution; in 1897, renamed the University of Maine

1903
Edith Marion Patch, UMaine's first female scientist, arrived in Orono to start the Entomology Department

1912
University of Maine Cooperative Extension established

1934
Fay Hyland Arboretum created

including: The Earth has environmental limits; modern humans have the responsibility of preventing environmental degradation; and environment, society and economy are interconnected and interdependent. Realizing true sustainability is essential for the future of society and all other life on the planet.

What forms does sustainability take at UMaine?

In leadership, UMaine President Paul Ferguson is a dedicated champion of sustainability. In the classroom, more than 25 UMaine departments offer environmental and sustainability-related education opportunities. Our world-class sustainability-related research centers include the Climate Change Institute, Maine's Sustainability Solutions Initiative, the Advanced Structures and Composites Center, and the Forest Bioproducts Research Institute. Our dedication to public service is exemplified by University of Maine Cooperative Extension, a public doorway to the expertise of Maine's land grant institution for over 100 years.

Sustainability initiatives across campus have been ongoing for

Living green

GOING GREEN in the UMaine community means day-to-day campus life is as efficient and as sustainably mindful as possible, including transportation options. For example, the student-run Blue Bikes Program rehabilitates abandoned bicycles and makes them available for use, free of charge. (Blue Bikes evolved from UMaine's Green Bikes initiative started in 2001.) In addition, the Black Bear Orono Express is a free shuttle service on campus and in the local community. UMaine Dining and Housing programs promote sustainable living for students, which includes occupancy sensors and high-efficiency lighting in resident rooms and throughout residence halls. "Trayless dining" with unlimited access to the dining commons has reduced food waste, and behind the scenes, a dishroom pulper has decreased water use by 400 gallons daily. Then there's UMaine Dining's commitment to buying local. An estimated 17 percent of all food served in campus dining halls is harvested at Maine farms — from meats to beets. In the last academic year, UMaine Dining served more than 28,700 pounds of Maine potatoes, over 16,300 pounds of state-grown apples and 2,580 pounds of Maine blueberries. On the Memorial Union Bear's Den salad bar, fresh greens are provided by the student-run hoophouse on campus. The hoophouse, home to the UMaine Greens Project, is adjacent to UMaine's new advanced composting facility, established by UMaine Dining and University of Maine Cooperative Extension. The composting facility has the potential to convert more than 1 ton of organic waste per day from campus dining facilities into a rich soil amendment for use by the UMaine Greens Project and in campus landscaping. UMaine Greens and the advanced composting facility build on UMaine's Sustainable Agriculture Program, which includes the student-operated Black Bear Food Guild, a community-supported agriculture initiative based at UMaine's Rogers Farm. Across campus, the undergraduate UMaine Green Team supports and promotes sustainable and environmentally friendly campus initiatives.

UMaine Greens hoophouse and the adjacent advanced composting facility; Maine Bound, home of the Blue Bikes Program; and Hilltop Dining Commons.

1971
UMaine received first Sea Grant of $100,300

1972
UMaine professor Frank Eggert conducted research into organic growing methods

1973
UMaine Institute for Quaternary Studies founded; now called the Climate Change Institute

1980
UMaine-New Hampshire Sea Grant Program established

1986
Sustainable Agriculture Program created

Building sustainably

SINCE 2005, the university has required all new campus construction to be built to LEED silver standards or better. Currently, UMaine has five LEED-certified buildings. Leadership in Energy and Environmental Design (LEED) certification is an internationally recognized whole-building approach to sustainability, including water and energy, materials and resources, indoor environmental quality and awareness through education. Among the sustainability hallmarks:

Offshore Wind Laboratory (Gold)
: The building project diverted 1,120 tons (95 percent) of on-site generated construction waste from landfills.

Foster Center for Student Innovation (Silver)
: An estimated 46 percent of construction materials were manufactured within 500 miles.

New Balance Student Recreation Center (Silver)
: The building facade, entry and stairway bases use 90 percent recycled copper and locally harvested stone.

Wells Conference Center (Silver)
: Water use was reduced by 52 percent.

Advanced Structures and Composites Center (Certified)
: UMaine's first LEED-certified building, the facility has a 35 percent optimized energy performance.

decades thanks to dedicated collaboration between the offices of Administration and Finance, Facilities Management, Auxiliary Services and many others. Successes include: construction of LEED-certified buildings, the Blue Bikes Program, the Green Loan Fund, the campus master plan, the commuter car pooling program, hybrid-electric vehicles in the UMaine motor pool, the Green Campus Initiative, the Green Team, LED emergency lights, a campus anti-idling policy, a dishroom pulper, low-flow shower heads, green cleaning products, occupancy sensors in rooms and offices, high-efficiency lighting, "trayless dining" and locally sourced food for UMaine dining commons.

This list only touches on the plethora of UMaine's sustainability efforts. It's also important to note that several of the initiatives are strictly student-led endeavors. In addition, significant progress has been made in campus infrastructure and operations, resulting in an overall reduction in energy use and greenhouse gas emissions since 2005.

Where do we find UMaine sustainability initiatives statewide?

UMaine Extension puts university research to work in homes, businesses, farms and communities in every county in the state. Many of UMaine's more than 1,000 faculty and staff dedicate significant time and energy to sustainability-related projects in Maine.

There are too many statewide projects to list, but perhaps the most visible is anchored about 2.5 miles off Monhegan Island. VolturnUS is a 1:8 scale 20 kW grid-connected offshore floating wind turbine, and is the first to be deployed off the coast of the Americas.

New Balance Student Recreation Center

1988
UMaine offered bachelor's degree in sustainable agriculture

1994
Black Bear Food Guild established

2000
Maine Harvest for Hunger launched

2001
UMaine Green Bikes initiated, became the Blue Bikes Program in 2009

2003
UMaine campus designated an arboretum; UMaine's student-led Sustainability Alliance formed

Why is sustainability leadership important for universities, especially for state flagship research institutions like UMaine?

Universities act as role models for society, and in all countries they have an explicit obligation to educate the leaders of tomorrow. As the hub for advanced learning, research and public service in the state, the University of Maine exerts a defining influence over a significant number of people. The moral values expressed by UMaine representatives throughout the world reflect directly on the principles of our campus community and, more importantly, the state of Maine.

UMaine's primary vehicle for advancing sustainability is education. UMaine offers over 70 classes that fulfill the Population and the Environment portion of students' General Education Requirements. Those classes are offered in more than 25 academic departments.

In any given year, there are over 10,000 UMaine students enrolled. The hope is that the majority of them will carry on our culture of sustainability, returning home with an understanding of the importance of environmental stewardship and equipped with the tools to take action.

How do we continue to heighten awareness and make sustainability a way of life in the UMaine community?

Our goal is to inspire the core principles of sustainability in all our graduates, fostering a "sustainability state of mind" in successive generations of educators, leaders, innovators and informed citizens. If our community members make informed decisions using the knowledge gained through academic advances in the understanding of sustainability, we stand a good chance of limiting the environmental disruption that will inevitably result from a business-as-usual approach.

The UMaine Terrell House Permaculture Living and Learning Center is a good example of a small community working together to achieve sustainability. Student residents at Terrell House, located just off campus on College Avenue, share responsibilities through regular meetings, planning sessions, design and garden work, and experimentation with a variety of systems and approaches to

Central Steam Plant

Energy-saving efforts

TOTAL CAMPUS energy use and greenhouse gas emissions peaked in 2005. Since then, energy use has decreased and greenhouse gas emissions have fallen as a result of energy-efficiency improvements and fuel-switching. At the Central Steam Plant, a 600kW backpressure turbine was installed in 2010, reducing UMaine's electric bill. Two years later, a 60,000 lb/hr boiler completed the Steam Plant's conversion to natural gas. The university's sustainability plans call for reducing the campus carbon footprint to zero by 2040.

2004

UMaine designated as National Sea Grant College

2005

LEED principles applied to all new campus construction projects; six hybrid-electric vehicles added to motor pool

2006

The State of Maine Governor's Carbon Challenge signed; first LEED-certified building completed

2007

UMaine Green Team founded; the American College and University Presidents' Climate Commitment signed; comprehensive GHG emissions inventory completed; campus recycling efforts reduced waste stream by 45%

Stevens Hall

Committed in the classroom

UMAINE'S LAND grant mission and leadership as the state's research university are inextricably linked to students' academic experience. For instance, in 1995, UMaine's Art Department was among the first to go green with nontoxic printmaking materials and processes. The History Department is home to one of the leading scholars in U.S. environmental history. The School of Economics has long studied the residential waste stream and value of recycling. And a National Science Foundation-funded doctoral program focuses on adaptation to abrupt climate change. In addition, UMaine offers a comprehensive list of sustainability-related courses in more than 25 academic departments. The courses include:

- Society and the Environment
- Conservation Anthropology: The Socio-Cultural Dimension of Environmental Issues
- Sustainable Solutions in the Developing World
- Environmental Philosophy and Policy
- Oceans and Climate Change
- Sustainable Population and Environmental Design and Construction
- Horticulture and Green Design
- Sustainable Energy Economics and Policy
- Rachel Carson, Maine and the Environment
- Women, Health and the Environment

communication, education and economics. The Terrell House provides an opportunity for interdisciplinary learning and research, and a chance to see sustainability in action.

How do we know when we have achieved a culture of sustainability?

To achieve a culture of sustainability, all members of a society must be in agreement with — and actively working toward achieving — the core principles of sustainability. We must become acutely aware of the consequences of our actions. A sustainability state of mind means we should be asking ourselves: Which of my options does not damage the environment? Which option will benefit me and those around me? Am I doing things as efficiently as possible? Are my efforts improving the world in which I live?

On a daily basis, these questions of sustainability are difficult to pose and more difficult to answer. For many people today, the reality is that the less sustainable alternatives are more viable because they are cheaper. Also, many of the impacts of an unsustainable lifestyle are not readily apparent, so "out of sight, out of mind" often unconsciously rules the day. A culture of sustainability has been achieved if members of society consider questions of sustainability automatically — if concern for the environment and all life becomes second nature.

In recent years, UMaine's sustainability legacy has been punctuated with LEED buildings, local food and free alternative transportation. What's next?

Perhaps the biggest challenge for the university will be discontinuing or at least significantly reducing fossil fuel use. There are several approaches we

2008

UMaine hired full-time sustainability coordinator; Governor's Carbon Challenge goals achieved

two years ahead of schedule (CO^2 10% below 2005 levels); UMaine Green Loan Fund created

2009

UMaine developed award-winning campus master plan focused on sustainability; SSI received $20M in EPSCoR funding

2010

Installation of 600kW back-pressure turbine in Central Steam Plant completed; UMaine released Climate Action Plan

2011

UMaine received Second Nature Climate Leadership Award; single-stream recycling implemented campuswide

can take to achieve this goal, the most likely of which is converting our Central Plant to burn renewable fuels, such as biogas, biofuel and landfill gas. We also need to acquire our electricity from renewable sources. This can realistically be achieved using a large-scale solar photovoltaic installation, hydropower or a combined heat and power installation at the Central Plant (powered by renewable fuel).

How does your science background inform your work as UMaine's sustainability coordinator?

I have spent more than a decade studying the effects of climate change around the world, and I feel privileged to have had the opportunity to train at one of the world's foremost climate research facilities. I have peered into the Earth's past over timescales of hundreds, thousands and tens of thousands of years, and I can say with certainty that climate change is real. It is something that we should all be taking very seriously. My knowledge of — and firm belief in — human-induced climate change provides me with a strong sense of purpose.

I feel a real sense of urgency to communicate the importance of sustainability and the ways to approach it. If we do not act soon to stop the environmental degradation we are causing, the consequences for the future of society are likely to be dire.

A decade from now, what will we point to as further evidence of UMaine's sustainability leadership?

My hope is that a decade from now — if not sooner — efficiency, recycling and composting will be second nature to each and every member of the University of Maine community. More than ever, students will be drawn to UMaine for its national reputation as a hub of environmental consciousness and sustainability innovation.

All our graduates will go out into the world with a sustainability state of mind. Their decisions will be based not only on what is good for them, but what is right for the community at large and the world population in general. They will work to spread the knowledge they have learned and help to bring about a new era of health, justice and prosperity. ■

Leading research

UMAINE HAS a statewide commitment and an international reputation for research and outreach that address needs, contribute to understanding and provide leadership in achieving greater sustainability. Among the highlights:

Advanced Structures and Composites Center
: Using cutting-edge technology to develop deepwater offshore wind as an alternative energy source.

Climate Change Institute
: Integrating transformational field, laboratory and modeling activities to understand the physical, chemical, biological and social components of the climate system.

Forest Bioproducts Research Institute
: Advancing ecologically sustainable forest-based bioproduct production.

Maine's Sustainability Solutions Initiative (SSI)
: Connecting knowledge with action to promote strong economies, vibrant communities and healthy ecosystems.

University of Maine Cooperative Extension
: For over 100 years, conducting community-driven, research-based programs in every Maine county.

Advanced Structures and Composites Center and Bryand Global Sciences Center

2012

New 60,000 lb/hr boiler completed 100% natural gas conversion at Central Steam Plant; UMaine made Princeton Review Green Honor Roll; Offshore Wind Laboratory awarded LEED Gold; advanced composting facility installed

2013

UMaine joined EPA Food Recovery Challenge; campuswide sustainability and energy awareness program launched

2014

UMaine President Paul Ferguson elected vice chair of ACUPCC Steering Committee; Presidents Council on Sustainability held inaugural meeting; Princeton Review cited UMaine as green university for fifth consecutive year

A fish tale

A Maine story of aquaculture research, entrepreneurship and education

By Beth Staples

ON A SUNNY, frigid February afternoon, self-described foodie John McConochie buys a California amberjack at Herring Gut Learning Center's (HGLC) School of Roots in Port Clyde, Maine. McConochie, owner of Green Bean Catering, is eager to roast the fish in his wood-fired oven that evening.

While California amberjacks are generally found in the Pacific and Indian oceans, it would be difficult for McConochie to find a fresher fish unless he caught one himself. It is one of 36 California amberjacks harvested that morning at the University of Maine's Center for Cooperative Aquaculture Research (CCAR) in Franklin, Maine, 127 miles northeast of the fishing village of Port Clyde. The 36 fish, which tip the scale at about 4.5 pounds each — 160 pounds collectively — had been packed in fresh snow and trucked to Port Clyde Fresh Catch, a cooperative perched adjacent to a dock on the bay, next to HGLC.

Since Glen Libby helped form the cooperative about four years ago, he's filleted more than a few fish. But this is the first time the fisherman has taken a knife to a California amberjack.

Libby isn't fazed. Earlier that afternoon, he watched a YouTube video demonstrating how to fillet the fish that can be found on restaurant menus in a roll with jalapeño, cilantro and sautéed cashews.

Libby peers over the top of his glasses, sharpens a knife and gets to work on the first fish.

More than a few **dreamers, old salts, young fry, marine scientists** and **investors** had monitored its 18-month journey **from a hatchery** in New Hampshire to a **processing facility** in Port Clyde.

"All fish are pretty similar," he says. But this one was special to a number of people.

More than a few dreamers, planners, old salts, young fry, marine scientists and investors had monitored its 18-month journey from a hatchery in New Hampshire in 2012 to a processing facility in Port Clyde. For most of the previous 18 months, this fish and 999 other California amberjacks had lived in recirculating 72-degree Fahrenheit ocean water in 300-gallon tanks in CCAR's indoor facility on Taunton Bay.

During that time, the robust swimmers grew from a weight of about 3 grams by eating certified commercial feed selected for optimum nutrition and health, with no antibiotics required. In the wild, California amberjacks can weigh as much as 110 pounds and measure 5 feet in length. Chefs around the country have applauded the taste of California amberjacks from the same group purchased by Chris Heinig, Tap Pryor and Ed Robinson.

Heinig, Pryor and Robinson — principals of Acadia Harvest Inc. (AHI) — anticipate that in two years, many others will also be eating California amberjacks grown in Maine. Their plan is to farm them.

By 2016, it's expected that AHI initially will produce as much as 450 metric tons of fish annually in Maine's first commercial-scale indoor production facility that will use direct ocean water and produce little to no waste. The indoor ocean of sorts may be in Corea, Maine, where AHI has a purchase option on the site of a former naval facility.

While AHI is striving to break new ground in Maine with a recirculating aquaculture system, closed-loop production structures have been in operation for a decade or more in Saudi Arabia, Norway, Massachusetts, Wyoming, Canada and Japan.

In the next two years, AHI (formerly called RAS Corp. — Recirculating Aquaculture Systems) will be doing more planning, research and preparation. And like AHI's efforts the previous two years, much of it will be done in collaboration with CCAR. UMaine's aquaculture research center has been instrumental in helping AHI prepare by providing sophisticated marine recirculation facilities, expertise in recirculation technology and business incubation.

> **I don't believe we could learn any more** from one batch of fish. We've been **growing along with the fish.** We hope this puts us **ahead of the business growth curve."** Chris Heinig

CCAR DIRECTOR Nick Brown, who earned his doctorate in aquaculture at the University of Stirling, Institute of Aquaculture in Scotland, is an authority on commercial aquaculture. Head of CCAR since 2001, Brown has designed a number of large-scale recirculation systems, including the center's 24,000-square-foot marine hatchery.

Brown and UMaine staff acquire juvenile fish and other marine necessities, and assist with applications for research funding. They help AHI manage projects and plan for its full-scale commercial farm, and lend expertise in developing business plans and securing investment capital.

It's one-stop shopping for those serious about entering the fish-farming business.

"Nick and his staff are absolutely phenomenal," says Heinig, CEO of AHI. "Their expertise and knowledge are extremely useful. He knows what to do and then gets it done. He gives us confidence to move forward to where we've never gone before."

Heinig — whose resume includes oyster farming, managing a shellfish hatchery, and designing and constructing a fish hatchery in France — says he's learned a lot about black sea bass and California amberjack, from growth rates to proper feeding and from temperature control to pH tolerance.

"I don't believe we could learn any more from one batch of fish," says Heinig of the California amberjacks AHI purchased in 2012. "We've been growing along with the fish. We hope this puts us ahead of the business growth curve."

About 60 of the original 1,000 New Hampshire hatchery fish have been added to CCAR's brood stock, which are in an adjacent building at CCAR. Some California amberjacks there weigh as much as 30 pounds each.

"We have to have access to a convenient, reliable source of juveniles and we want to keep improving the gene pool group," Heinig says, adding that like buying fresh vegetables from a local farmer, consumers can be similarly confident when buying high-quality fish raised close to home.

AHI, Heinig says, is considering using gill tags with bar codes so consumers can access a host of information about the fish they purchase, including the date the fish egg was fertilized, where the fish was farmed and the date it was harvested.

AT CCAR, AHI also is working on approaches to dealing with waste and aquafeed made from ocean forage fish.

"It's a moral and ethical obligation," says Pryor, whom President Lyndon Johnson named to a commission that created the National Oceanic and Atmospheric Administration.

Organic farmers have demonstrated the value of biodiversity and Pryor says aquaculture can do the same. AHI is running fish growth trials incorporating oysters, sandworms,

A dozen middle-school youths in the School of Roots at Herring Gut Learning Center in Port Clyde, Maine, helped Acadia Harvest Inc., sell the California amberjacks raised at UMaine's Center for Cooperative Aquaculture Research.

seaweed and algae. The fish waste serves as a nutrient for the other species, and is consumed within an ecologically balanced system.

AHI is striving to develop a nutritional plant-based feed to raise the farmed fish. Currently, fish meal and oil are major components of commercial aquafeeds, made using wild-caught forage fish. Anchovies, herring and menhaden are overharvested in some oceans and it's a priority for aquafarmers to find new feed formulations using other components.

Finding solutions and prepping to become a commercial-scale aquafarm take capital. Funding, to date, has come from a variety of sources, including Maine Technology Institute (MTI), Coastal Enterprises Inc. (CEI) and the National Science Foundation.

Both private nonprofits — MTI in Brunswick and CEI in Wiscasset — invest in innovation to help create high-quality jobs, and economically and environmentally healthy communities. Representatives from MTI and CEI joined Pryor, Heinig and Robinson to watch Libby fillet the fish. Students from the School of Roots at HGLC also crowded around Libby in the processing room. The middle-schoolers

had presold the 36 harvested fish to families and area stores.

School of Roots students first met the AHI crew a couple of years ago. Tony Barrett, AHI's commercial adviser, talked with Brown about AHI being the first in Maine to grow black sea bass and amberjack in recirculating systems. CCAR was already growing sandworms, sea urchins and cold-water marine fish, including Atlantic halibut and Atlantic cod in these types of systems. And HGLC was already growing tilapia in an aquaponics system that includes plants and freshwater fish.

So AHI officials toured the aquaponics fish hatchery and greenhouse at HGLC, a nonprofit organization that strives to sustain and strengthen the economic and social vitality of Port Clyde and other coastal communities.

Two days a week, 12 middle-school youth in RSU 13's alternative education program attend the School of Roots at HGLC, where, as part of their studies, they grow, harvest and market tilapia and lettuce. AHI officials initially asked the youth to help them market black sea bass. After that venture's success, AHI asked the youths to sell California amberjacks.

Eighth grader Will Saunders says he enjoys the hands-on learning, one-on-one instruction and motivation he receives at HGLC. Lead teacher Ann Boover says the active-learning approach and individualized attention have helped many students academically thrive, as well as develop confidence and social interaction skills.

While Port Clyde is a picturesque coastal village, all is not idyllic. Slashed education budgets, worrisome school dropout rates, and depleted fishing and employment opportunities are challenges there, as they are in other communities.

To help people succeed in the face of these challenges, HGLC provides academic courses that mesh with real-world experience, and encourages preservation and economic development in coastal communities.

With UMaine, AHI, HGLC and funding agencies pooling their strengths — vision, business acumen, innovative technology, research knowledge, funding and traditional customs — a number of Mainers may benefit when a new-look, indoor fishing village is open for business in Down East, Maine. ■

Kevin Neves of Acadia Harvest retrieves California amberjack from CCAR's 300-gallon recirculating tanks.

Seafood source

ABOUT 90 percent of the 4.5 billion pounds of seafood Americans consume annually is imported, according to the National Oceanic and Atmospheric Administration. The United States needs to produce more of what it eats, says Nick Brown, who directs the University of Maine Center for Cooperative Aquaculture Research Center (CCAR). CCAR is a state-of-the-art business incubation facility and center for aquaculture research, development and demonstration on a 25-acre campus on the shore of Taunton Bay in Franklin, Maine.

"Sourcing safe, sustainable, traceable seafood is the mantra of most seafood companies now," he says. "What better way to achieve these goals than to produce in our own country where we can control these factors while providing good jobs and growing the economy?"

There's plenty of room to grow. According to the Food and Agriculture Organization of the United Nations, America's aquaculture industry meets about 5 percent of the U.S. demand for seafood, including oysters, clams, mussels and salmon.

CCAR researchers have developed and tested recirculation system technology for numerous species of finfish and invertebrates. The facility also produces juveniles, or seed, for the aquaculture industry. With its top-notch marine hatchery and vast in-house technical expertise, Brown says CCAR has the capacity to produce hundreds of thousands or even millions of juveniles annually, depending on the species.

CCAR crops:

- Atlantic halibut
- Atlantic cod
- California amberjack
- sandworms
- green sea urchins
- sea vegetables

Active citizen

Two degrees, two study abroad trips, two internships — and more

THIS SPRING, Ariel Bothen of Mount Desert, Maine, graduated from the University of Maine with two bachelor's degrees — one in international affairs, another in anthropology. The honors student had a concentration in political science, and minors in Spanish and history. Next stop: Capitol Hill. **ON CAMPUS:** Bothen was involved in the Community Governing Board, International Affairs Association, Alternative Breaks and the Provost Council. She served as president of the UMaine chapter of Amnesty International and as a Student Government senator. Bothen also was a resident assistant, a certified lifeguard with Campus Recreation, and a peer adviser in the Office of International Programs. **GOING PLACES:** In 2012, she participated in the University of Virginia's Semester at Sea, which took her to 12 countries across three continents, and last summer she studied abroad at the Universidad del Pais Vasco in Spain. Subsequently, Bothen wrote her honors thesis on the politics of the Basque region. **D.C.-BOUND:** In summer 2012, Bothen interned with the Elizabeth Warren for Senate Campaign in Boston. This summer, she will intern in the Washington, D.C., office of Sen. Angus King. She plans to pursue graduate work in international affairs. **COMMUNITY ENGAGED:** UMaine fosters community involvement and Bothen has become, as is said in Alternative Breaks, an "active citizen." Now, community engagement is an invaluable part of her life that will continue throughout her career. ■

Ariel Bothen says joining campus organizations is the best way to make friends, feel engaged and find your passion.

$15M renovation

NEW BALANCE Field House reopened in late January for use by the University of Maine track and field team, as well as more than 500 students from 17 high schools in the Penobscot Valley Conference – Eastern Maine Indoor Track League. Completion of the Field House interior is a milestone in the $15 million renovation project that includes Memorial Gym. The project is one of UMaine's major initiatives under Pathway 5, Stewardship of Place: Restoring the Dream, of the Blue Sky Plan. The Gym and Field House renovations are expected to be completed in fall 2014. Renovations to the Field House include numerous upgrades. Among the highlights:

- Newly surfaced track (shortened from 218 meters to 191 meters to meet NCAA requirements) with a fourth running lane and a second long jump/triple jump pit added
- Updated mechanical, lighting, life safety and ADA accessibility
- New spectator area with bleachers
- New press/operations area for event management
- Permanent throwing circle, with a retractable throwing cage
- New sports netting system to enclose the entire infield
- UMaine-branded color scheme on walls, trusses and floor

"I look forward to leading our department in support of the university's **Blue Sky Plan.** Our goals will be **centered on the student-athlete experience** and **engaging the many constituents** that make up our university community." Karlton Creech

KARLTON CREECH, who joined the University of Maine community as director of athletics Feb. 10, has 20 years of senior athletics administration experience. Since 2012, Creech had been senior associate director of athletics at the University of North Carolina, Chapel Hill (UNC), serving as chief of staff and overseeing the department's capital projects, human resources and facilities. From 2004–12, he was associate executive director for UNC's Educational Foundation Inc., where he managed capital projects — including coordination of the $88 million football stadium expansion, the Annual Fund, marketing, fundraising and ticket sales programs, as well as donor stewardship and development. He also worked for the Student-Aid Association at North Carolina State.

TWO UNIVERSITY of Maine researchers are teaming up with a University of California-Berkeley professor to study the sinking and rising rates and trajectories of phytoplankton in relation to particle shape and water turbulence.

Phytoplankton form the base of the marine food web and help maintain atmospheric health by absorbing and sequestering carbon dioxide and producing oxygen. The microscopic plant-like organisms account for about half of the oxygen we breathe. Their trajectories determine their access to nutrients and light, and encounter with grazers.

Lee Karp-Boss, a marine scientist and associate professor in the UMaine School of Marine Sciences, is a principal investigator of the project, along with Evan Variano, a researcher in the Civil and Environmental Engineering Department at UC Berkeley. Pete Jumars, a UMaine professor of marine sciences and oceanography, is a co-principal investigator of the study.

The National Science Foundation recently awarded more than $409,000 to the UMaine researchers and over $315,000 to Variano for the three-year project. The study will advance understanding of how turbulence and particle shape affect the sinking velocity and paths of phytoplankton — specifically diatoms.

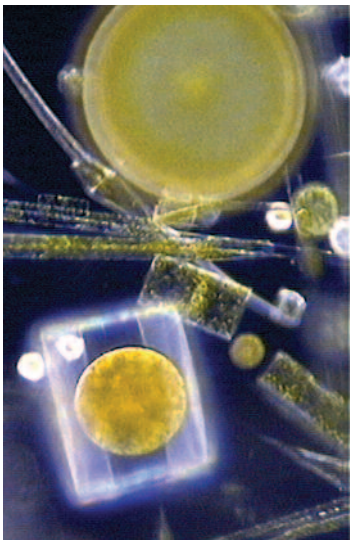


Photo by David Townsend

COMPANIES CONSIDERED to be good social performers are more likely to limit pay levels for their executives than similar firms in their industries, according to University of Maine researchers.

But the top executives at large firms examined in the study are not being penalized. The average compensation package in the sample was about $8 million, and additional pay above this level is not likely to generate additional motivation, say Maine Business School researchers Patti Miles and Grant Miles.

In their findings, published in *Social Responsibility Journal,* the researchers suggest that executives for the good social performers may be willing to "sacrifice at least a piece of financial compensation for the intangible rewards of being seen as good corporate citizens."

A review by the journal publisher congratulated the researchers for findings that relate to "wider debates that have gone on around corporate ethics."

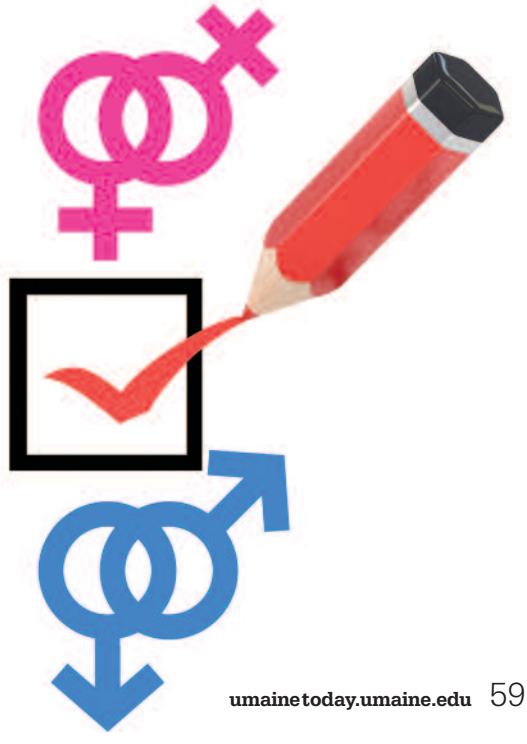
Their findings were based on an examination of data from 57 firms identified as demonstrating good corporate social responsibility, which were compared to 57 firms of similar size and in the same industries. All of the firms in the study were drawn from the Fortune 1000 list, and most rank within the Fortune 500.

Executive compensation data were drawn from public reports from 2005–07. The researchers examined both CEO pay and average compensation for the company's top management team. In both cases, there was a significant correlation between corporate social responsibility and lower levels of executive pay.

OPPOSITION TO same-sex marriage is greater on Election Day than indicated in pre-election polls, according to research by a University of Maine political scientist. That's because people being surveyed tend to say they'll vote the way they think is socially desirable, regardless of their real position on the issue.

Social desirability bias has largely disappeared on issues of race and gender, but not same-sex marriage.

Richard Powell, UMaine associate professor of political science, says polling systematically minimizes resistance to same-sex marriage. Opposition to it at the ballot box on Election Day is about 5 percent to 7 percent greater than in pre-election polls. Powell examined the accuracy of polling on same-sex marriage ballot measures relative to polling on other statewide ballot issues in 33 states from 1998–2012. He says social desirability bias on ballot measures such as same-sex marriage is more prevalent in states with larger populations of Republican and highly religious voters.



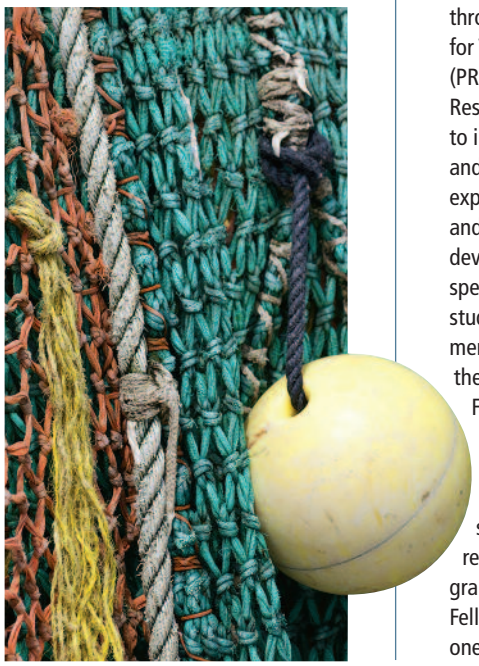
UNIVERSITY OF Maine head football coach Jack Cosgrove was named the 2013 American Football Coaches Association (FCS) Region 1 Co-Coach of the Year. Cosgrove received the AFCA Regional recognition for the first time in his 21-year career. Earlier in the season, Cosgrove was named the Colonial Athletic Association (CAA) Coach of the Year and the New England Football Writers' Association Jack Grinold New England Coach of the Year. After being selected eighth in the CAA Football preseason poll, Cosgrove led the Black Bears to a 10–2 regular season and a 7–1 mark in the CAA. The CAA title was a first in UMaine history. UMaine earned a No. 5 seed in the NCAA FCS playoffs and hosted its first postseason contest.

The Black Bear football team captured 10 wins for the first time since 2002 and made its seventh overall NCAA postseason appearance.

$1.8M

National Science Foundation grant

A $1.8 MILLION National Science Foundation grant will allow a multidisciplinary team of researchers to examine the impact of rising ocean temperatures on Gulf of Maine ecology and economics. Led by Andrew Pershing from the University of Maine and Gulf of Maine Research Institute, the team will conduct a four-year project as part of the NSF's Coastal SEES (Science, Engineering and Education for Sustainability) Initiative to support collaborative studies. Climate change is impacting the distribution of fish and lobsters in the Gulf of Maine and these ecological changes can have significant economic consequences, Pershing says. For instance, record warm ocean temperatures during 2012 prompted lobsters in the Gulf of Maine to migrate shoreward about a month early, making them easier to catch. Lobstermen proceeded to haul in record numbers of the crustaceans, but the overabundance of product on the market tanked the price paid to lobstermen.



THE CENTER for Undergraduate Research (CUGR) has launched the Research Fellows Program, a new Blue Sky initiative to support University of Maine faculty efforts promoting undergraduate research opportunities. Emerging from 2011 stimulus funding of CUGR as one of six initiatives through the 2011 Presidential Request for Visions of University Excellence (PRE-VUE) Program, this CUGR Research Fellows Program is intended to improve undergraduate research and scholarship mentoring skills, expand curricula to include research and scholarship experiences, and develop proposals for further funding, specifically involving undergraduate students. Twenty-three faculty members who were nominated by their deans to be CUGR Research Fellows will participate in the two-year development program. Workshops will focus on topics such as mentoring undergraduate students, funding sources, responsible research conduct and grant writing. Each CUGR Research Fellow receives a modest stipend and one undergraduate assistant.

A UNIVERSITY of Maine alumnus and faculty associate in the Department of Anthropology recently won an international prize for his ice age research related to the first human settlement in the high Peruvian Andes.

Kurt Rademaker, who is also an associate graduate faculty member at UMaine's Climate Change Institute, won the Tübingen Research Prize in Early Prehistory and Quaternary Ecology. His work also was highlighted in the News & Analysis section of the May 9 journal *Science*.

The goal of Rademaker's research is to better understand the timing, environmental setting and adaptations of early settlement. His new evidence suggests that Paleoindians "spread throughout North and South America earlier than long believed — and even camped high in the Andes Mountains," according to *Science*.

"Human colonization of the Americas was the most rapid and extensive geographic expansion in our species' history, in which hunter-gatherers successfully settled some of the most challenging environments on Earth," Rademaker says.

Rademaker and his team discovered humans lived at 14,700 feet elevation in southern Peru about 12,000–12,500 years ago, making the Andes settlements the highest known ice age archaeological sites in the world.

"The fact that hunter-gatherers were physiologically capable of living in high-altitude mountains at the end of an ice age is an example of how amazingly adaptable our species is. My team and I are trying to learn more about how people managed this initial settlement and how Andean environments, ecology and culture have changed since then," says Rademaker, who collaborates with researchers from throughout the United States, Canada, Peru, Chile and Germany.

PARENTS IN the Orono and Old Town areas can feed their young children's love of reading with Literacy to Go — two informational texts, a storybook and a storyboard, all delivered in a themed pizza box kit.

The University of Maine Raymond H. Fogler Library is utilizing a $43,000 grant from the Institute of Museum and Library Services to partner with UMaine's College of Education and Human Development, Old Town Elementary School and Old Town Public Library to train librarians to promote early literacy with informational text. Informational text is nonfiction that focuses on the arts, sciences and social studies. The vocabulary is technical, and photographs and illustrations are realistic.

> "The kits are really just the **vehicle for this change in thinking** about libraries as a **source of support for family literacy.**"
>
> Susan Bennett-Armistead,
> Correll Professor of Early Literacy,
> UMaine College of Education and Human Development

Fogler Library purchased books for its kits and the Correll Fund purchased books for kits at Old Town Elementary School and Old Town Public Library.

A variety of themes are highlighted in each of the 22 kits. The books in each kit are written for youngsters ages 3–5. One of the informational texts is designed to be read by the child. The second informational text and the storybook are for the parent to read to the youngster. The books are intended to promote conversation between parents and children, and the felt storyboard can be used to reinforce concepts.

“Working closely with the Maine Potato Board allows us to **commercialize** the best varieties to **support the Maine potato industry** and further research.”

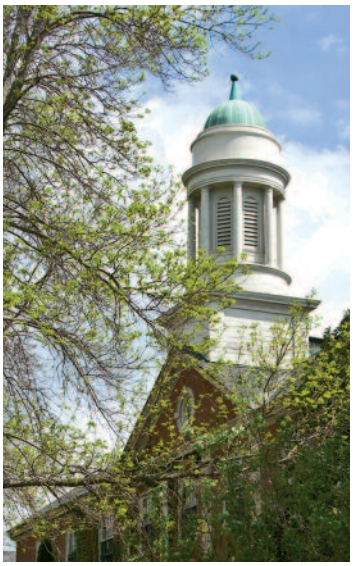
Kris Burton,
Director of Technology Commercialization,
UMaine Department of Industrial Cooperation

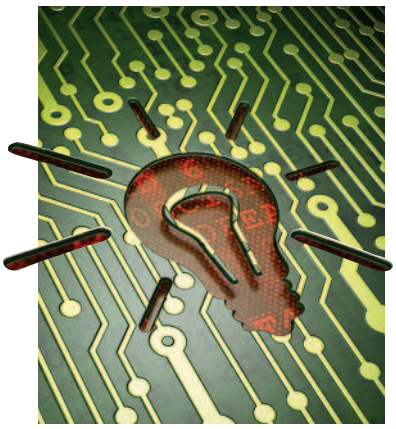
TWO NEW potato varieties — Easton and Sebec — have been developed by the University of Maine in partnership with the Maine Potato Board. While appropriate for fresh market consumption, Easton was developed as a new french fry processing potato variety. Sebec is expected to primarily be used for potato chip production in growing areas that currently rely on the standard chipping variety, Atlantic. Easton and Sebec are the first varieties to be released by the University of Maine in a decade. Tim Hobbs, director of development and grower relations for the Maine Potato Board, says potatoes are bred for certain characteristics, including disease resistance and improved fry color. Getting the right combination of characteristics in one variety takes a large investment of time and resources. The initial results of the investment in Maine is the release of these two varieties, from the UMaine breeding program led by Greg Porter, professor of plant, soil and environmental sciences, and agronomy. Easton is named after a northern Maine town in Aroostook County that is in the heart of Maine’s most intensively cropped potato production area; Sebec for a lake in Piscataquis County. Several other potato varieties are being evaluated for commercialization.

UVAC

THE UNIVERSITY Volunteer Ambulance Corps (UVAC) at the University of Maine was named the 2013 Region 4 EMS Service of the Year by the Atlantic Partners EMS. UVAC is one of 79 state-licensed EMS providers in Region 4, which includes emergency service providers in Hancock, Penobscot, Piscataquis and Washington counties. This is the first time the UMaine group has won the award. UVAC was recognized for its members’ dedication to serve others, for the more than 30,000 volunteer hours it provides annually, and for establishing a comprehensive CPR program on campus, which has included the placement of more than 20 automated external defibrillators (AED), and relevant training for staff and students. UVAC, which operates as part of the university’s Auxiliary Services, is composed of 62 UMaine students, in addition to a dozen staff and neighboring EMS providers. More than 60 percent of the members are EMTs, while others are drivers and assistants.

THE UNIVERSITY of Maine has launched an innovative leadership program that will prepare a group of faculty from across campus to serve as ambassadors to Maine communities and constituents. The Blue Sky Faculty Fellows Program is helping to strengthen UMaine’s contributions to the state by building a network of 20 faculty leaders who can communicate UMaine’s importance, and build stronger bridges to people and organizations statewide. The program, funded by the Office of the President, is providing training in media relationships, interpersonal communication, audience analysis and partnership building, creating better pathways for making UMaine’s work matter more to the state.

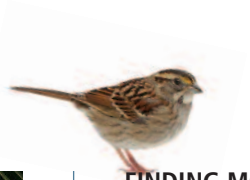




RESEARCHERS AT the University of Maine hope to improve the teaching and learning of two central topics, taught in both physics and engineering, that are critical to undergraduate programs. John Thompson and MacKenzie Stetzer, faculty in the Department of Physics and Astronomy, have received nearly $600,000 from the National Science Foundation to investigate student learning of thermodynamics and electronics in the two disciplines. The project emphasis on interdisciplinary research, especially in courses beyond the introductory level, is well aligned with a recent National Research Council report on the status and future of discipline-based education research.

The researchers, along with their colleagues in engineering, are examining student conceptual understanding in parallel courses before and after instruction in order to identify important differences in student learning that may be linked to the treatment of similar ideas in each discipline. They plan to apply their findings to develop and refine instructional materials across disciplines.

Most of the project's research staff are members of UMaine's Physics Education Research Laboratory and the Maine Center for Research in STEM Education. The project is expected to positively affect all disciplines engaged in teaching thermodynamics and electronics, and could lead to the development of a more coherent educational experience.



FINDING MORE efficient ways to serve Maine landowners by incorporating social work strategies — including effective communication and resource-linking skills — into forest management is the goal of a collaborative project between researchers at two schools in the University of Maine College of Natural Sciences, Forestry, and Agriculture.

Jessica Leahy, an associate professor of human dimensions of natural resources in the UMaine School of Forest Resources, is leading the study that tests social work approaches to conservation in the Cumberland County town of Baldwin and surrounding communities. Researchers seek to determine if these strategies could lead to more effective outcomes to landowners' challenges as opposed to using traditional forestry solutions, such as management plans and outreach materials.

"Social workers are good at listening to people — understanding their needs and connecting people to appropriate resources," Leahy says. "That's why we need social workers to help landowners — to listen to what they'd like to do with their land, and then connect and coordinate services from natural resource professionals."

"It's an innovative, highly experimental, **never-been-done-before project** that's bridging forestry and social work in an effort **to better engage** and **serve rural families** who own forestland in southern Maine."

Jessica Leahy

Many conservation problems are related to social and economic factors. While foresters and other natural resource professionals help landowners make decisions about land management, they may not be equipped to handle the challenges landowners face that involve family dynamics. A social work approach could be the answer to solving these conservation problems, Leahy says.

Leahy, the project's forestry expert, hired Doug Robertson and Chris Young, students in the UMaine School of Social Work who grew up around Maine woodland owners. They are interested in connecting with landowners through the project, learning more about the land that many families rely on and how community organizations can help.

More than
85,000 families
in Maine
own at least
10 acres

A TEAM of University of Maine scientists studying a nearly 100,000-year-long ice core record from Greenland found history repeating. Paul Mayewski, director of UMaine's Climate Change Institute, says today's climate situation in the Arctic is equivalent to, but more localized, than the warming during the Younger Dryas/Holocene shift about 11,700 years ago.

Mayewski led the research team that examined Arctic ice formed during a rapid climate transition from the Younger Dryas (near-glacial) period to the Holocene era (period of relative warm since then). The abrupt shift then included a northward shift in the jet stream, an abrupt decrease in North Atlantic sea ice and more moisture in Greenland. These changes resulted in milder weather, fewer storms and, initially, more than a doubling of the length of the summer season around Greenland, the team says.

Ice formed during that one-year onset of the Holocene climate sheds light on the structure of past abrupt climate changes and provides unparalleled perspective with which to assess the potential for near-term rapid shifts in atmospheric circulation and seasonality, Mayewski says. Additional exploration of the ice cores, with respect to the length of seasons, is expected to yield information about precursors for abrupt climate shifts. Ice cores, in essence, are timelines of past climates.

THE UNIVERSITY of Maine's Clinical Psychology Doctoral Training Program was recently ranked as one of the best clinical psychology programs nationwide in a journal article based on a University of North Texas study.

The program was identified as performing exceptionally well in the article "Hidden gems among clinical psychology training programs," in the American Psychological Association journal *Training and Education in Professional Psychology.*

The purpose of the study was to use public data sources to identify programs that excel at graduate training in professional psychology as evidenced by two emerging professional benchmarks — internship matching rate and Examination for Professional Practice in Psychology pass rate. UMaine's program was ranked ninth out of 233 accredited clinical psychology doctoral programs in the category that combined both benchmarks.

UMaine's Clinical Psychology Doctoral Training Program prepares students for a doctorate in psychology and for careers that combine research and practice. Since 1990, it has graduated 85 Ph.D. students. Twenty-one of them now have careers in Maine and have had clear impacts on the state's mental health policies and direct care provision, says Douglas Nangle, a professor and director of the Clinical Training Program at UMaine.

There are currently 22 students in the program.

Building a Framework and Platform for Climate Adaptation and Sustainability (CLAS) Planning for Maine Communities

A Climate Change Institute conference
Oct. 23, University of Maine

Expertise and tools will be introduced, shared and expanded through a conference focused on building a Web-based framework and a Google Earth-based platform for Maine community CLAS planning.

CLAS
CLIMATE ADAPTATION AND SUSTAINABILITY

80th Anniversary Matching Gift Program

Emeritus vice president and professor John Alexander is taking this opportunity to increase his ongoing support of the Margaret Chase Morrill '43 Civil Engineering Scholarship Fund.

IN CELEBRATION of the 80th anniversary of the University of Maine Foundation, the Foundation Board has announced a 25 percent matching program to encourage gifts to existing Foundation endowments and the creation of new funds. The Foundation will match a minimum gift of $8,000 with $2,000 for an endowed fund. The program extends to a maximum match of $20,000 for an $80,000 gift. Commitments may be pledged over four years (2014–17); all gifts must be received by Dec. 31, 2017 to qualify for the match. The matching gift offer will be in effect until Dec. 31, 2014, or until the limited matching funds are allocated — whichever comes first. Consider taking advantage of this offer and contact the University of Maine Foundation today.

"Since 1992, I have supported this fund, and watched it grow and become endowed. **I encourage others who want to leverage their support** for the University of Maine to take advantage of this matching gift program."

John Alexander, vice president for academic affairs and provost emeritus and professor emeritus of civil engineering

In 1992, the Margaret Chase Morrill '43 Civil Engineering Scholarship Fund was established at the University of Maine Foundation in honor of Margaret Chase Morrill, the first female civil engineering graduate at the University of Maine.

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207.581.5100 or 800.982.8503

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Falmouth, Maine 04105-1445
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umainefoundation.org

1865 THE UNIVERSITY OF MAINE
Division of Marketing and Communications
5703 Alumni Hall
Orono, Maine 04469-5703

BEHIND THE 33-foot planetarium dome: Construction is nearing completion on the Emera Astronomy Center at the University of Maine. This fall, the Emera Center will open the universe to youngsters, astronomers, researchers and students at UMaine and beyond. The facility will serve as a critical mass of astronomy STEM education resources for Maine. As the home of the Maynard F. Jordan Planetarium and Observatory, the center will expand opportunities for students and educators to access leading-edge equipment, including the largest telescope in the state. Undergraduate and graduate students will undertake projects never before possible at UMaine's astronomy facilities. Emera Astronomy Center is a LEED-certified building and the first geothermal facility on campus.

What's ahead

at Maine's Flagship University

Emera Astronomy Center