

Mac's World

Chapters
and Verse

The Interaction

Decoding
Diatoms

UMaine Today

CREATIVITY AND ACHIEVEMENT AT THE UNIVERSITY OF MAINE

FALL 2009



Powerless?

**Not if we
plug into
alternative
energy**

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Chapters and Verse

For decades, modern and contemporary poetry and poetics have thrived at the University of Maine. Today, four faculty poets and critics — a new generation of writers — are in the vanguard.



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Decoding Diatoms

By combining ecological field observations and paleolimnology, Jasmine Saros studies diatom fossil records to reconstruct environmental change over time and to better understand the mechanisms driving such change, past and present.



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The Interaction

The nature of interaction in Second Life is rich research material for John Sherblom, whose scholarship focuses on computer-mediated communication.



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+Online umainetoday.umaine.edu

In *UMaine Today* magazine, +Online indicates the availability of additional content — Web-exclusive stories, video and audio clips, photo galleries, full-length

In the Know

Kathy Savoie on food preservation.
Glen McDermott on personal finances,

Photo galleries

Mac's World Selected images by conservation biologist Malcolm Hunter.
The People's Art The encapsulated world of artist Matt LeClair.



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Mac's World

Across the globe and throughout Maine, Malcolm "Mac" Hunter's conservation biology research ranges from the interactions of the smallest fauna to the implications for large-scale phenomena involving ecosystems — a perspective that has helped preserve the world landscape.

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UMaine researchers are discovering ways to create energy and improve existing technologies that are both environmentally safe and consumer friendly.

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versions of articles and a comprehensive editorial archive. More online stories will be added monthly, including answers to questions posed to our In the Know experts.

Video feature

Forestry Camp Every May Term, UMaine students take to the University Forest near campus and to Acadia National Park in Bar Harbor, Maine, for three weeks of intense field training in integrated woodlands management.

Audio feature

Chapters and Verse Poets Jennifer Moxley and Benjamin Friedlander read selected works.

President's Message

SINCE ITS INCEPTION nine years ago, *UMaine Today* has become the true record of the University of Maine's scholarly achievements and its teaching, research and engagement contributions. We are proud of our magazine and its Web site (umainetoday.umaine.edu), both of which have been instrumental in helping us achieve many of our goals related to effectively telling UMaine's story to a wide and varied audience.



Beginning with this issue, we are taking significant steps to broaden *UMaine Today's* reach and impact. Most of you reading this message are UMaine alumni receiving *UMaine Today* for the first time. By expanding our mailing list to include all UMaine alumni, we are hoping to achieve a new level of engagement. Alums are a critically important constituency as we work together to advance the University of Maine and achieve our collective goals related to serving our students and our state.

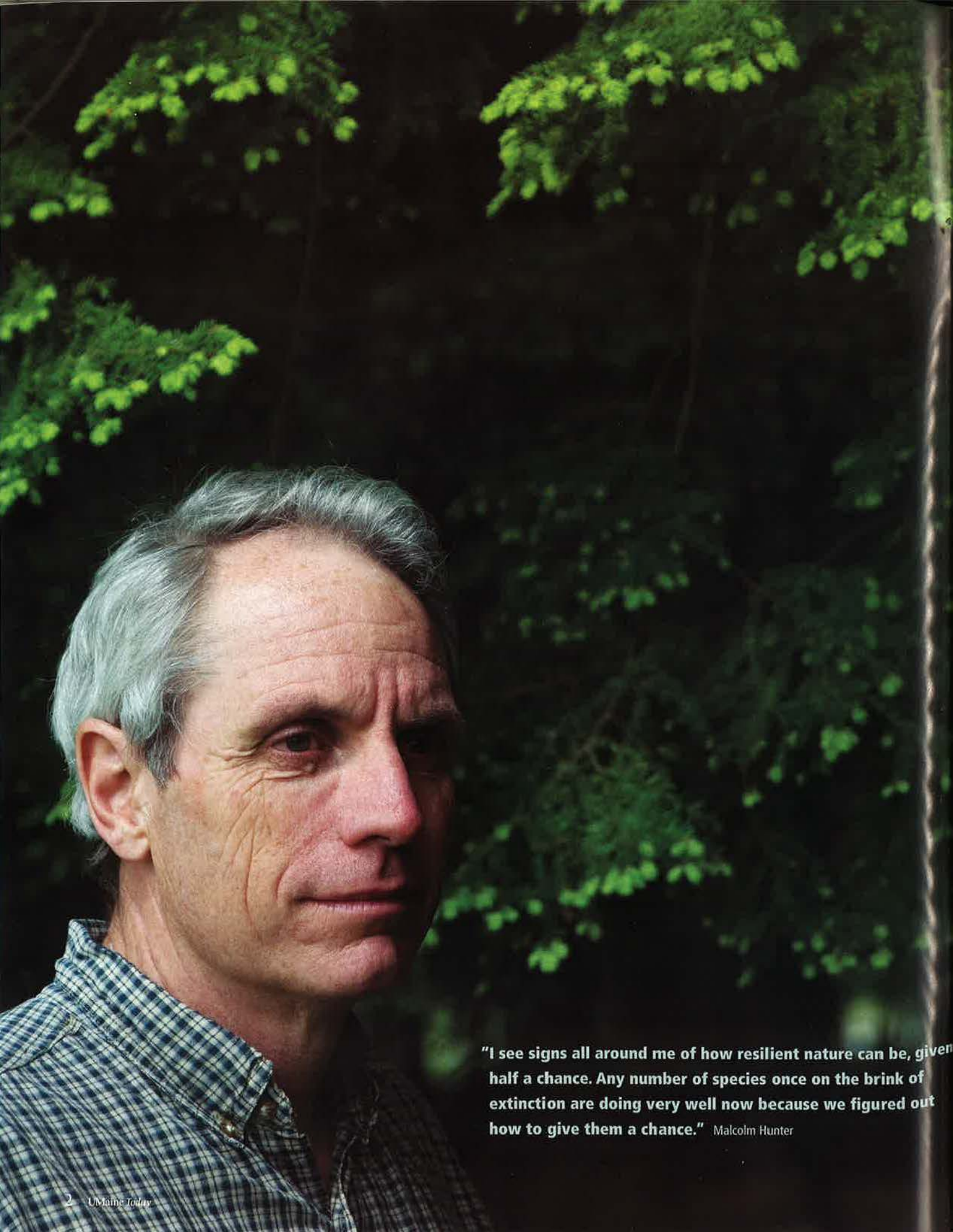
Now, in addition to sharing the achievements of our students, faculty and others in our university community, we are modifying our content to include features about alums whose accomplishments reflect the character and quality of their alma mater. We are particularly pleased to present "Mac's World," a feature story about Malcolm Hunter, one of UMaine's most accomplished faculty members and distinguished alumni.

I hope you enjoy this issue of *UMaine Today* and that you will visit the Web site for regular updates, expanded story coverage, and links to news and information about the University of Maine. We look forward to staying in touch with you through this quarterly publication and we sincerely hope you take advantage of the opportunities to learn more about the exciting initiatives happening at Maine's flagship university.

Robert A. Kennedy
Robert A. Kennedy
President



ON THE COVER: For years, it's been increasingly clear that dependence on foreign oil has us over a barrel. That's why researchers at the University of Maine are actively seeking renewable alternative energy sources. Their focus is on harnessing the forces of nature. See related story on page 8.



"I see signs all around me of how resilient nature can be, given half a chance. Any number of species once on the brink of extinction are doing very well now because we figured out how to give them a chance." Malcolm Hunter

As a leading conservation biologist,
Malcolm Hunter acts globally and locally

MAC'S WORLD

By Kristen Andresen

To fully understand Malcolm “Mac” Hunter’s story, you need to know about the Richmond firehouse.

The year was 1974. That spring, Hunter earned his bachelor’s in wildlife science from the University of Maine, and a few months later, he was getting settled in at the University of Oxford where he would eventually earn a Ph.D. in zoology as a Rhodes Scholar. He had grand plans of becoming an international wildlife biologist, trotting the globe, spending a few years in Brazil, maybe a few years in Africa. He figured he’d come back to Maine eventually, when he was ready to settle down.

But he had some unfinished work to do back in his home state of Maine. Richmond, to be exact. There, he was part of a conservation project involving Merrymeeting Bay, and he flew back to attend a meeting where some critical decisions would be made.

There were 25 people in the firehouse that night.

Hunter knew almost every one of them.

Later that evening, as he drove back to his family home in Damariscotta, he had an epiphany.

“I realized I had a connectedness to Maine I would never achieve if I spent two years in Brazil, two years in East Africa, et cetera,” Hunter recalled. “That night, I changed my plan. I decided I would come back to Maine as soon as I finished at Oxford.”

He returned in 1978 and spent five years working as an assistant research professor at UMaine, scraping together just enough money to keep peanut butter on the table, biding his time until he could become a tenure-track professor.

Three decades later, Hunter is UMaine’s Libra Professor of Conservation Biology. In 1996, he was named the University of Maine Distinguished Professor. He has written the definitive textbooks on both conservation biology, and wildlife and forestry management, among others. In short, he is a giant in his field.

“The current global movement of conservation biology remains incomplete without Mac,” says Pralad Yonzon, the chair of the Resources Himalaya conservation group who earned his Ph.D. from UMaine. “He is a household name in conservation, even in India and Nepal. He believes that the global community requires regional conservation leaders and country-specific pathfinders to address biodiversity conservation.”



As it turns out, Hunter's plans to become an international wildlife biologist and to stay in Maine weren't mutually exclusive. His research and conservation work in 25 countries focus on biological diversity and forests, ranging from the interactions among the smallest fauna, including reptiles and amphibians in vernal pools, to the implications for large-scale phenomena, such as regional fragmentation of ecosystems. He has helped UMaine students in 11 travel-study courses to three continents discover the wonders of the natural world, and conducted groundbreaking efforts to maintain the state's forestry industry while conserving wildlife and delicate ecosystems.

For the last 30 years, Hunter hasn't just thought globally, he's acted globally — and locally. Such a perspective, he says, provides a more holistic view of how to tackle larger problems.

"Ultimately," says Hunter, "it's all about human institutions and how one changes the world."

Earlier this decade, he served as president of the Society for Conservation Biology and earned the international organization's Distinguished Service Award for his leadership. But when Hunter started out, there was no such thing as the Society for Conservation Biology because the field didn't exist.

The discipline emerged in the late 1980s, and at first, Hunter was skeptical because it seemed like an expansion of wildlife management. However, the need for an international, interdisciplinary approach to conservation soon became apparent. Today, marine scientists, social scientists, biologists, wildlife managers and others have joined the effort.

Professionally, Hunter has served on two White House task forces — one on biodiversity, the other on spotted owls. He chaired the environmental committee of the Doris Duke Charitable Foundation, and he serves on the board of The Nature Conservancy, among his many accomplishments that are too numerous to list. But while all

of this is very impressive, his classroom work is equally important.

"My overriding goal is to convince my students that the natural world is really interesting and we should take steps to conserve it," Hunter says.

His message is powerful and his teaching style is inimitable. As one former student says, "Mac doesn't tolerate sloppy thinking." He believes in the power of mentorship and considers his wife, UMaine professor of wetlands ecology Aram Calhoun, and former department chair Ray "Bucky" Owen to be great role models. Just as Hunter has been a role model to so many.

"Mac believes more in a large patch of growing trees rather than a few old giant trees because the future is all about growth," Yonzon says. "He is not only my mentor but my global comrade-in-arms in conservation biology. Actually, I have become a devout believer in mentorship — what you sow is what you get."

With this approach, it is hardly surpris-



"Ultimately, it's all about human institutions and how one changes the world." Malcolm Hunter

ing that many of Hunter's former students have gone on to become leaders in the field, both nationally and internationally. One of those students, James Gibbs, coauthored the most recent edition of Hunter's *Fundamentals of Conservation Biology*.

Gibbs, now a professor of conservation biology and herpetology at the State University of New York College of Environmental Science and Forestry, says Hunter was a positive force during his undergraduate days, and he continues to have an influence.

"Mac invested an immense amount of time in teaching me how to write, how to be a professional and how to think," Gibbs says. "He is so dedicated to the welfare of biological diversity you can't help (but) get infected by his devotion.

"He also confirmed for me that it was fine to aspire to do first-rate science, get papers out in all the best journals, and learn how to do fancy stuff with computers, but also important to know your shrews, what they eat and where to find them — that is,

to remain connected to field realities."

Hunter practices what he preaches. At home, Hunter and Calhoun have turned their landscape into a sanctuary for amphibians and reptiles. He is an avid nature and wildlife photographer. He initiated efforts that will ultimately conserve more than 60,000 acres in Maine's Penobscot Valley.

When asked about his favorite place on Earth, he speaks reverently about the Okavango Delta in northern Botswana. It is a place filled with wetlands and forested islands — a "spectacularly beautiful landscape" where he has walked among elephants and slept with lions prowling around his campsite.

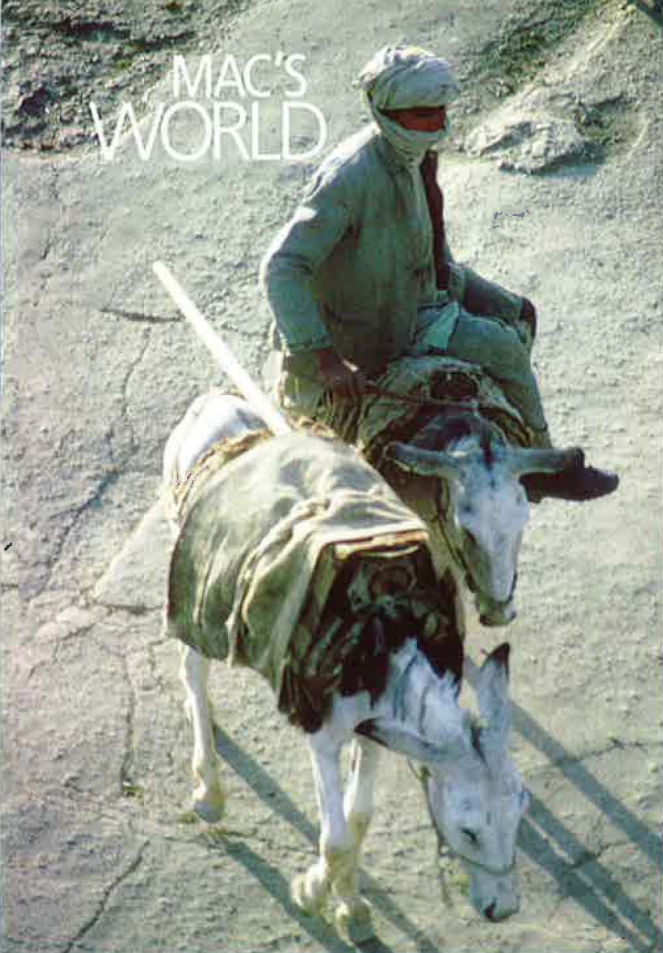
"Being in a place with big, dangerous animals makes you come alive," he says.

Hunter has seen incredible changes in the world and acknowledges that these are challenging times. Species have disappeared. Climate change looms like a storm on the horizon. Population growth and mass

Malcolm Hunter is an avid and accomplished nature photographer. We asked him to share images from his collection that have personal meaning for him. These are his picks.

Hunter photographed polar bears on Spitsbergen, an island north of Norway, in 2002. As the polar ice cap melts, many, including Hunter, fear these bears will face extinction.

During his travels, Hunter has had many opportunities to get close to creatures great and small. While Hunter was taking its photograph, this gorilla had its hand on his knee. The photograph was taken in 1988 during a trip to Zaire, now the Democratic Republic of Congo.



consumption have both put tremendous stress on our natural resources.

His travels — particularly to developing nations and places of intense poverty — have underscored how difficult it can be to think about conservation when you can't even put a meal on the table. Desperate situations often lead to shortsighted solutions that threaten the environment.

One of his more poignant photographs depicts the golden toad, a few years before it went extinct. But for every horror story, he has a success story, as well — like the wood duck. The species was on the verge of extinction, but once people stopped overhunting it and started providing nest boxes, things turned around. Now, it's doing great.

In Maine, Hunter has worked with a team at the Holt Research Forest near Bath to study forest management practices to maintain biodiversity. His findings are encouraging; their implementation is not.

"The good news is that it's clear you can

cut the forest in ways that produce timber and still sustain ecological integrity," Hunter says. "(Unfortunately,) it isn't always done that way, especially with the movement away from long-term forest owners. With that I've seen a lot of less-than-ideal forest management practices, in particular cutting the forest in very short rotations."

Still, Hunter remains optimistic, in part because of the work he and his colleagues have done to protect the environment and convince others to do the same. For inspiration, all he has to do is look out his window at home, at the thriving forest that has risen from a former industrial site.

"I see signs all around me of how resilient nature can be, given half a chance," Hunter says. "Any number of species once on the brink of extinction are doing very well now because we figured out how to give them a chance. It does take people making the right decisions. And often not acting in our own short-term, selfish interest is required." ■ [Online](#)

In 1975 and 1976, Hunter spent a lot of time in Afghanistan (he snapped this photograph in Kabul) and Iran, places he wouldn't dream of traveling now. However, at the time, because of apartheid, he didn't feel comfortable traveling to South Africa — a place he has visited several times since. "It shows how dynamic the world is," Hunter says.

Hunter photographed this golden toad in Monteverde, Costa Rica, in the early 1980s. Several years later, the species went extinct.

100 questions

IN JUNE, the journal *Conservation Biology* published an essay, "One Hundred Questions of Importance to the Conservation of Global Biological Diversity," compiled by W.J. Sutherland at the University of Cambridge and 42 other senior representatives from the world's major conservation organizations, scientific societies and universities. The prominent researchers included Malcolm Hunter. The scientific questions in 12 categories — from ecosystem functions and services to climate change and impacts of conservation interventions — were selected for their relevance to the conservation of biological diversity worldwide, and are designed to help identify new directions for researchers and funding agencies.



Photo by Jay L. Clendenin/Los Angeles Times

Bettina Boxall

on fire

Journalism alumna receives Pulitzer for explanatory reporting

The 2009 Pulitzer Prize winners in explanatory reporting are UMaine alumna Bettina Boxall and Julie Cart of the *Los Angeles Times* for their five-part series, "Big Burn," exploring the growth and cost of wildfires. Boxall, a *Times* reporter since 1987, covers natural resources and environmental issues in California and the West. She graduated from UMaine in 1974 with a bachelor's degree in journalism.

Who were your mentors at UMaine and what advice did they give you that still resonates?

He was not a mentor in the classic sense. But my most influential teacher was geology professor Stephen Norton. I took introductory geology from him in a big lecture class. On both the exams and field trips, he demanded that his students think rather than regurgitate information. The facts were just the foundation for critical thinking. That was a valuable lesson to learn as a journalist.

Best scoop as a student reporter?

In college I was more interested in photojournalism than reporting. I worked for the yearbook rather than the student newspaper and earned enough money to buy my first car chronicling campus life with a Nikon.

In addition to "Big Burn," what are the three most memorable stories you've written?

It is not so much individual stories as beats that stand out in my career. I covered criminal courts in Passaic County New Jersey for two years. The cases and court testimony offered a fascinating, at times disturbing study in human behavior. I often felt as though I was writing soap opera scripts. In the early 1990s, I covered gay rights in California, just as gay marriage and other issues were bubbling to the surface, signaling profound social shifts. More recently as a state and environmental reporter, I've traveled all over the West.

What did you learn about wildfires that you didn't know before your 15-month investigation?

Fighting wildfires has become such big business that one Nevada rancher described it as the new cash cow for the rural West. A fire-industrial complex has developed, funneling taxpayer money to private businesses that provide federal firefighters with an astounding array of often very expensive services.

How important is investigative journalism and do you worry about its future?

The best investigative journalism is a check — on government, on business, on power. In an age of sound bites and endless spin, it is more vital than ever for journalists to probe beneath the surface and go beyond transcription. But the demands of the Internet and the crumbling economic model for newspapers are pushing reporters in the opposite direction. I think there will always be an appetite for investigative stories, but I do worry that journalists will not be given the time and resources to pursue them.

HARNESSING NA



UMaine researchers tap the environment's innate potential

By Aimee Dolloff

We stand now where two roads diverge. But unlike the roads in Robert Frost's familiar poem, they are not equally fair. The road we have long been traveling is deceptively easy, a smooth superhighway on which we progress with great speed, but at its end lies disaster. The other fork of the road — the one less traveled by — offers our last, our only chance to reach a destination that assures the preservation of the earth.

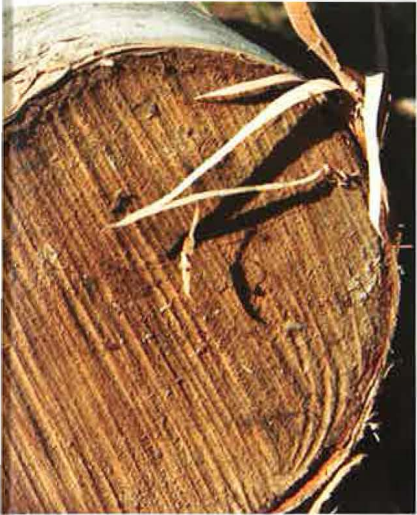
Rachel Carson

AMERICANS HAVE BEEN CALLED to chart a new energy future, invest in clean, renewable energy and combat climate change. While science must lead the way in developing new technologies, the culture of an entire country dependent on fossil fuels must revolutionize the way it operates. This sustainability initiative not only is about preserving what resources we have left and minimizing the damage that already has been done. It's about living in a new way that's respectful of the resources around us.

At the University of Maine, researchers are discovering ways to create energy and improve existing technologies that are both environmentally safe and consumer-friendly by harnessing the energy produced all around us by the sun, wind, water and earth.

"People ask me why UMaine is taking on this challenge. I tell them, 'because this is the future of Maine,'" says Jake Ward, UMaine's assistant vice president of research, economic development and governmental relations. "Maine's greatest challenge in the next half-century is going to be how we support our citizens, our businesses and our environment, and energy is the biggest part of that. Our goal is not just in good research and energy creation, it's in economic development for Maine. All of these areas have the potential to be excellent economic development drivers for the state to keep Maine a great place."

TURE



to provide energy alternatives



OFFSHORE WIND

A great wind is blowing, and that gives you either imagination or a headache.

Catherine the Great

THE GULF OF MAINE has been characterized as the Saudi Arabia of wind. To Habib Dagher, it is a wellspring of one of the Northeast's greatest renewable energy resources.

Dagher, director of UMaine's AEWCA Advanced Structures & Composites Center, is collaborating with companies on the design, manufacture and testing of floating

wind turbine technology off the Maine coast in waters 60–900 meters deep. The turbines would feature 300-foot towers with 200-foot blades prototyped, manufactured and tested by AEWCA researchers.

In early 2010, AEWCA is expected to open an advanced wind blade prototyping facility, where full-scale trial blades can be designed, fabricated and tested under one roof. Funding for the facility came from the Maine Technology Institute, which last fall awarded nearly \$5 million to two AEWCA initiatives focused on the renewable energy and transportation industries. The allocations were made possible by a \$50 million Maine Technology Asset Fund (MTAF) R&D bond Maine voters approved in 2007.

In the past year, Dagher's deepwater wind research has made national headlines. In June, he met with U.S. Energy Secretary

Steven Chu to discuss a proposal to establish a national offshore wind research center at UMaine. In summer 2008, Dagher was on Capitol Hill advocating for increased funding for wind energy research and development before the U.S. Senate Homeland Security and Governmental Affairs Committee.

Most recently, AEWCA was awarded a 2009 Academic Pioneer Award by the Ocean Energy Council.

Research has shown that ocean winds are steadier and stronger, and can produce more energy than onshore wind turbines. There also is less visual impact to the landscape, since those Dagher proposes for the Gulf of Maine will be located 3–20 miles from shore.

Dagher says concerns about disrupting the natural habitats of whales, fish and birds can be overcome in an environmentally responsible manner.

HARNESSING NATURE

It's important that alternative energy research progress rapidly, especially in Maine, in light of an estimated 80 percent of the state's residents who use heating oil, Dagher says. If other viable fuel options aren't discovered and implemented, the region's heating crisis likely will intensify.

As defined by Dagher, the current sustainable energy plan for the state is to generate 5 gigawatts of offshore wind in the next 10–20 years by installing 1,000, 5-megawatt wind turbines in the gulf.

Within 50 nautical miles of Maine's coast is the potential to produce 149,000 megawatts of power using offshore wind — the

equivalent of 40 nuclear power plants, Dagher says.

"If we do it right, we can take care of ourselves and export not only lobsters from the Gulf of Maine, but clean energy," he says.

Despite the potential for offshore wind as a sustainable energy source, Dagher cautions that it isn't the whole story. Becoming more energy responsible also includes increasing smart grid technologies to efficiently transport electricity to consumers, converting traditional heating systems to modern heat pumps, and expanding use of electric hybrid vehicles.



TIDAL

Roll on, thou deep and dark blue ocean, roll!

Lord Byron

THE POWER of waves crashing on Maine's jagged coast has been captured in paintings and photographs for years. Now, it's time to capture that energy to help alleviate the state's dependence on fossil fuels.

Pumping heat

WHILE UNIVERSITY OF MAINE engineering students are involved in many areas of alternative energy research and efficiency technologies on campus, one mechanical engineering course in particular provides one-of-a-kind, hands-on experience as part of senior design projects.

Michael "Mick" Peterson, who teaches the course, urges students to take on projects that have real-world application potential. James LaBrecque, a local inventor who has been a consultant and adviser to the Mechanical Engineering Department since the mid-'80s, supervises the technological innovation.

One of the ongoing initiatives is to create and improve residential and commercial heat pump technology that can lower the energy cost in Maine homes and businesses, and some of UMaine's buildings.

Energy-efficient heat pumps move rather than generate heat, producing many units of heat for each unit of electricity used.

A heat pump installed in March at the Engineering Science Building on campus is expected to save the university \$125,000 annually in oil costs, while only adding \$25,000 a year to UMaine's electricity bill. Money for the \$200,000 project came from the University of Maine Foundation's Green Loan Fund, which lends money to the university for projects designed to reduce energy consumption and improve campus sustainability.

A second generation unit built by students is scheduled for installation and testing this fall at a supermarket in Farmington, Maine. The unit, the first of its type, will recover heat from the store's new refrigeration technology, built earlier this year at UMaine's Advanced Manufacturing Center.

Tidal power is tapped by submerged turbines with foils that are turned by ocean currents, similar to the way that wind moves turbines on land. But before full commercialization occurs, researchers and developers need to fully understand all aspects of the project.

"We know how much power potentially could be produced, but we don't know how much you can extract commercially and have it be economically feasible and environmentally responsible," says Michael "Mick" Peterson, UMaine Libra Professor of Engineering.

UMaine researchers are using a \$951,500 federal appropriation to lead a collaborative effort to advance development of Maine's tidal power resource.

They are assessing current prototypes and models of turbines that can be submerged in the ocean to produce power using tidal currents. The researchers also will evaluate the potential environmental impact of harnessing tidal energy off the coast of Eastport in the Western Passage of Passamaquoddy Bay.

UMaine oceanography professor Huijie Xue is an expert in oceanographic computer modeling, which is key to understanding how much energy is produced by ocean currents. She points out that Maine's jagged coastline contains many channels and passages perfectly suited for capturing tidal power, including Cobscook Bay in Maine and the Bay of Fundy in Nova Scotia that have some of the highest tides in the world.

"(Eastport) is the most viable site with the highest tides in the continental United States," says Peterson, one of the driving

forces behind the project. "If tidal energy is going to be commercialized in the U.S., it's going to be in Maine."

The impact on the ocean environment and how to lessen that effect is another issue researchers are working to understand.

"Since we've been talking about tidal energy, and it's been around for a long time, there's been obvious concern that when you put a turbine in the water, there could be potential (environmental) impact," says

Gayle Zydlewski, a fish biologist with UMaine's School of Marine Sciences. "(But) if we do it right, it can be done in a safe and sustainable way."

Once the environmental and commercial viability questions are answered, it is likely that the technology can be implemented fairly quickly.

Maine Maritime Academy (MMA) and Portland-based Ocean Renewable Power Company LLC (ORPC), partners in the ongoing research, bring specialized skills and knowledge that will allow the research and turbine development to advance efficiently and safely, serving the state's economy and the environment.

"It's a technology that is something that we can implement in a fairly short term — a matter of years," says MMA engineering professor Rich Kimball. "For example, offshore wind has a much larger potential, but that's going to be a longer time frame to get that developed."

In addition to involving students from both UMaine and MMA in creating a new industry, there is abundant opportunity for Maine's small coastal communities to benefit from the prospect of jobs and positive economic spin-off.

"This funding will allow us to kick off an important project that is going to have significant economic impact in Washington County and throughout the state," says Chris Sauer, ORPC president and CEO.

The company estimates that in the next seven years, tidal energy has the potential to be a billion-dollar industry in Maine.

Throughout the summer, the company conducted in-water testing of the commer-

**Other
UMaine Energy
Initiatives**

- Fuel cell research
- UMaine Cooperative Extension energy conservation outreach
- Innovative wood pellet manufacturing
- Biofuel from canola oil
- Industrial energy audits

HARNESSING NATURE

cial design of its generator unit, which has turbines made of a composite material developed by U.S. Windblade LLC of Bath, Maine, and a composite structural frame made by Harbor Technologies LLC of Brunswick, Maine — two companies with ties to UMaine's AEW.

Last year, ORPC proved that its turbine generator unit is technically viable; now it's time to continue with the process to demonstrate that it's ready for commercial use.

"It's critical that we are able to prove through this testing that this turbine generator unit is commercially viable," Sauer says. "It has the potential of catapulting us to the front of the tidal energy industry, while at the same time putting Maine on the world map as far as tidal energy."



SOLAR

There are painters who transform the sun to a yellow spot, but there are others who with the help of their art and their intelligence, transform a yellow spot into the sun.

Pablo Picasso

RESEARCHERS AT UMaine's Laboratory for Surface Science and Technology (LASST) are investigating the potential of nanoparti-

cles to better harness the energy of the sun. Currently, solar panels typically capture only a fraction of the energy that potentially could be used because only certain wavelengths of the sun are utilized.

LASST Director Robert Lad is working with electrical and computer engineering professor Rosemary Smith and UMaine materials physicist Robert Meulenberg to study ways of making solar panels capture that wasted energy.

The research focuses on the creation of thin film coatings that fluoresce at different wavelengths. In solar panels, these thin films could increase the number of wavelengths captured from the sun, resulting in more energy production.

The research will lead to better understanding of how a nanoscale particle's size, shape and surface affect the overall properties of a semiconductor. Solar panels are essentially large semiconductors because they directly convert light energy into electricity.

The UMaine researchers are collaborating with Ascendant Energy Co., in Rockland, Maine, which is designing a solar panel system for the newly remodeled Wells Dining Center on campus. By the end of this year, the technology is expected to provide electricity and hot water for a portion of the facility.

This past spring, Ascendant Energy received more than \$575,000 from MTA to help establish a Solar Center for Excellence: Advanced Photovoltaic Production Facility in Rockland. The university is a partner in the project, with a focus on technology transfer.



BIOFUEL

The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value.

Theodore Roosevelt

ONE DAY SOON, seaweed and trees could be fueling the cars we drive, based on research being done at the University of Maine to create a variety of biofuels.

"Forest biomass represents a significant renewable resource in Maine," says Hemant Pendse, director of UMaine's Forest Bioproducts Research Initiative. "Efficient use of this resource using our existing forest products industry manufacturing assets will help us save Maine jobs and build new businesses."

The U.S. Department of Energy recently awarded more than \$712,000 to chemical and biological engineering professors Peter van Walsum and Clay Wheeler for a three-year project to create a high-quality transportation fuel from renewable biomass resources. Hardwood extract from the kraft pulping process and seaweed by-products from extracting carrageenan — primarily used as a natural food additive — will be fermented into organic acids, such as acetic and butyric. The acids will be chemically upgraded into high-quality liquid fuels, such as ethanol and butanol.

"The technology uses a robust biological

conversion process, which requires no sterile operating conditions, no genetically modified organisms or any breakthrough in enzyme technology," van Walsum says. "This means it can be implemented more quickly and, we expect, with less expense. It also means that the system should be able to handle a wide variety of biomass feedstocks and process different feedstocks at different times of the year, if necessary."

The bioconversion technology also has been demonstrated to work with problem wastes, such as sewage sludge and animal manures.

The result will be superior, more energy-dense fuels with more miles per gallon; less volatility, which equals less air pollution; and easy blending with gasoline, requiring fewer changes to current infrastructure.

The researchers also hope to use the technology to produce jet fuel.

Industrial collaborators in Maine include Old Town Fuel and Fiber, a nearby kraft pulp mill in Old Town, and FMC BioPolymer of Rockland, a division of FMC Corp., and the only seaweed carrageenan processing facility in North America.

"We've been quite active in pursuing alternative uses of this by-product," says Dennis Healy, an environmental compliance specialist who, like several other FMC BioPolymer employees, is a UMaine graduate. "It's a good fit for our company."

Chemical engineering Professor Mark Holtzaple of Texas A&M University will consult on the technology. Two students and a postdoctoral researcher from UMaine will undertake most of the laboratory and modeling work. ■ [Online](#)



Smart solutions

THE QUEST to reduce America's dependence on fossil fuels is eminent, but how will the electricity produced by these alternative measures be delivered to consumers, particularly those who live far from energy generation points?

In addition to research and development projects involving wind, tidal and solar power, and the creation of biofuels, the University of Maine also is trying to address the need for a smart electrical grid for the state — a modern electricity transmission system that's a more efficient and dependable delivery network to meet the needs of future growth and emerging energy sources.

"Maine's (in) a unique geographical position to benefit from the electric Internet revolution known as the smart grid," says Mohamad Musavi, chair of UMaine's Department of Electrical and Computer Engineering. "Maine is the corridor between the vast Canadian renewable energy and the center of energy consumption in southern New England and New York."

To develop the Maine Smart Grid, UMaine is working with the state's electric utilities. If funding and support from the university and state and federal governments are made available, Musavi estimates it will take three to five years to complete the plan.

"The integration of the Maine Smart Grid with existing renewable energy sources, such as wind power, not only will satisfy the state's energy needs, but also the needs of other states, resulting in significant economic development for Maine," he says. "The Maine Smart Grid will be a secure digital, connected and controllable electrical energy network that will provide reliability, efficiency, security and access to the state's vast energy resources."

In addition to improving communication between consumers and providers, the grid would provide increased access to renewable energy sources; be able to detect, analyze, respond to and restore system outages; and improve security with resilience against physical and cyber attacks.

The people's art

Matt LeClair's creativity comes in a capsule

WHAT CAN A QUARTER buy these days?

One-eleventh of a gallon of gas. Fifteen minutes on a parking meter. And, if you're lucky, a few extra pickle slices on a hamburger.

Thanks to Matt LeClair, 25 cents — or 50 cents, in some cases — will also buy an original piece of art. But you won't find the masterpieces hanging in a museum or perched on a pedestal at some hip, downtown gallery.

LeClair sells the works in gumball machines.

"I hate art galleries," says LeClair, a University of Maine alumnus who teaches online UMaine courses in new media. "I love art, but going to a gallery is like eating bran. It's good for you, and you think you're supposed to enjoy it, but there's a wall there. You're not supposed to interact with it. I kind of wanted to break down that wall and create art people could put in their pocket and take home."

So he decided to place art in plastic capsules, the kind you find in a toy vending machine at the entrance to a grocery store. It adds an element of surprise and anticipation, because you never know what you're going to get.

"I love that," says LeClair, who works as

a tech artist for L.L. Bean. "I want artwork to be more fun, more social, a more direct experience."

In many ways, LeClair echoes the sentiments of his forebears — avant-gardes who often "violently opposed" the linking of art and elitism. LeClair's methods and message also reflect his graduate work with UMaine professor Owen Smith, an artist and Fluxus historian.

Of the many manifestations of Fluxus, a movement that champions democratization, simplicity and the idea of life as art, *Fluxlist Box I* most appealed to LeClair. For the 1999 project, 37 artists each contributed

37 objects that were then assembled in 37 plastic boxes. Each participant received a box, which one described as "a collage of art novelties."

LeClair decided to riff on the concept by combining his love for alternative publishing formats with his populist attitude toward art. Several years ago, in one of Smith's graduate-level art courses,

Callithump! was born. LeClair calls it an "encapsulated magazine," though it doesn't look anything like *Martha Stewart Living*. Each "issue" features a piece of art or poetry small enough to fit in a vending-machine capsule.

"He's very interested in the idea that creativity and innovation can happen anywhere and everywhere," Smith says of LeClair. "He's interested in saying, 'I want to be involved in the process of creativity; I want to move out of the restrictive confines of traditional art and into the popular culture using something like a gumball machine.'"

"A lot of people just say print publishing is dead, and for them, if it's not on the Internet, it doesn't exist. I disagree. Anything that can't evolve is going to die out, but I think from here on is where physical publishing gets interesting." Matt LeClair

These tiny treasures also underscore the importance of physical publishing in an increasingly Internet-driven world.

"A lot of people just say print publishing is dead, and for them, if it's not on the Internet, it doesn't exist," LeClair says. "I disagree. Anything that can't evolve is going to die out, but I think from here on is where physical publishing gets interesting."



CALLITHUMP!

an encapsulated magazine

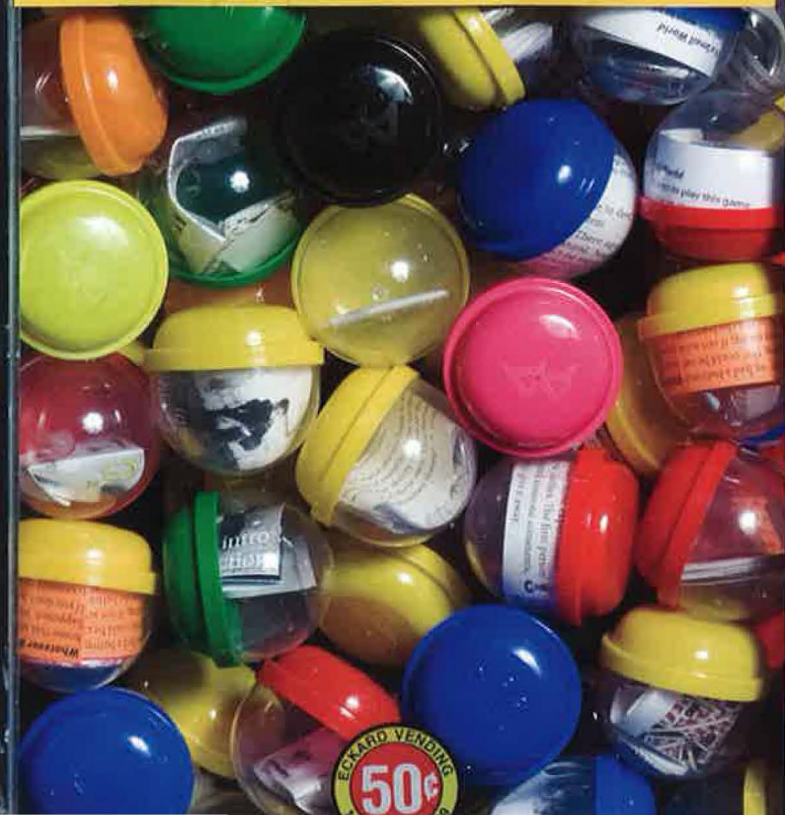


Photo by Linger Light Photography

“People are just going to have to ask: Why does this exist as an object? Do we gain anything by making this ‘real’ instead of electronic?”

The most recent edition of *Callithump!* is in a pinback button format, for which LeClair and his wife, Jessica, created 1,000 designs. Some are a nod to history, like the earliest buttons that featured stars of Edwardian theater and were collectibles in their day. Others focus on modern phrases and imagery, such as a cartoon rendering of Stephen King’s face.

In the spirit of *FluxList Box 1*, LeClair has recruited other visual artists to contribute to the magazine. And he hopes *Callithump!* — which gets its name from a boisterous parade that anyone can join — will inspire people to bring art into their lives in other ways.

“It’s a cheap way to buy art, but it’s also about making the leap into realizing that art is something worth spending money on,” LeClair says. “If you spend 25 or 50 cents on art when you have a little extra change and you enjoy the experience, maybe this will lead you to realize that you can enjoy buying art at a larger scale. If that can happen, maybe those art galleries aren’t so unapproachable after all.” [+Online](#)

CHAPTERS and **VERS**

By Kristen Andresen

UMaine's internationally recognized poetry tradition

Carroll Terrell had some nerve.

In 1971, the English professor known for his renegade ways founded an organization dedicated solely to Ezra Pound scholarship. Terrell, like Pound's poetry, was notoriously difficult. He had the audacity to call his upstart the National Poetry Foundation.

It didn't matter that nobody cared about Pound at the time. It didn't matter that Terrell scheduled world-renowned poets and scholars to speak at his conferences without asking them

first. They came anyway. In droves. And Terrell's elaborate bluff became a reality. NPF grew into its name. It was inevitable.

Concurrently in the English Department, professor and poet Burton Hatlen was leading writers' workshops with faculty and students. Poet Constance Hunting started Puckerbrush Press in Orono and later joined the English faculty. By the late 1980s, the UMaine English Department introduced a concentration in creative writing — one of

the few such programs in the country to incorporate poetics.

For decades, the University of Maine's dedication to nonmainstream poetry has attracted the minds of the ages — faculty poets and authors, generations of students, and such literary giants as Allen Ginsberg, Robert Creeley, Margaret Avison and May Sarton.

Through the years, NPF published volumes of poetry and organized "decades" conferences that attracted poets of international stature. The foundation also grew to embrace other American Modernist poets, including William Carlos Williams, Hilda Doolittle (H.D.) and Louis Zukofsky, as well as the Objectivists, Language poets and others.

"This was a generation of U.S. poets arguably equivalent to the English Renaissance, and NPF had a lot to do both with creating that canon and compensating, when necessary, for what was one-sided or unduly restricted about it as the years unfolded," says UMaine Associate Professor of English Steve Evans.

Though NPF's original stewards have all passed away in the past six years, their legacy lives on in the critical and creative work of Evans, Carla Billitteri, Benjamin Friedlander and Jennifer Moxley, who represent the foundation's next generation. The four have continued its tradition of championing the experimental and the avant-garde, and they're poised to make their own mark.

"The study of poetry offers us, I believe, our most direct access to the human mind as it engages the world; and when we read poetry within an historical context, we can gain an equally direct access to the 'mind of the age.'"

Burton Hatlen, July 2007

"I'm not part of the death-of-poetry camp by any means. There are more readers of poetry in this country right now than ever before. It's not a mass market, but it's a substantial market."

THERE'S A PLACE for easy, popular, safe, mainstream — just not on Steve Evans' bookshelf. Not in his classroom. And not at the National Poetry Foundation.

Poetry that appeals to the broadest possible audience is great, Evans says, but no single style has a monopoly on poetic truth, and an exclusive emphasis on "accessibility" can be a recipe for superficiality and triviality.

"It has to open up something for people, to show them something new, so that it's

worth having a mind," says Evans, who writes and edits the poetry Web site Third Factory and is known for his critical work. "That's where our commitment to the unexpected, the experimental, the avant-garde comes in."

Yes, Evans and his colleagues continue to redefine the canon, much as their predecessors did. Of course, they've embraced NPF's editorial and publishing duties. And since NPF in some ways is better known internationally than in its own backyard, they've tried to put it in the spotlight.

But Evans has taken things a step further. Through the New Writing Series he established a decade ago that has brought nearly 150 of today's most adventurous writers to Orono, he has made sure that poetry and contemporary literature have a living, breathing, dynamic presence on campus.

UMaine students not only attend poetry readings, they get to hang out with writers over coffee and spend time asking them questions about their lives and their work. Via the Internet and a variety of social media tools, Evans has ensured that this vital dialogue about poetry continues long after the poets have left campus and extends far beyond Maine's borders. And this is just the beginning.

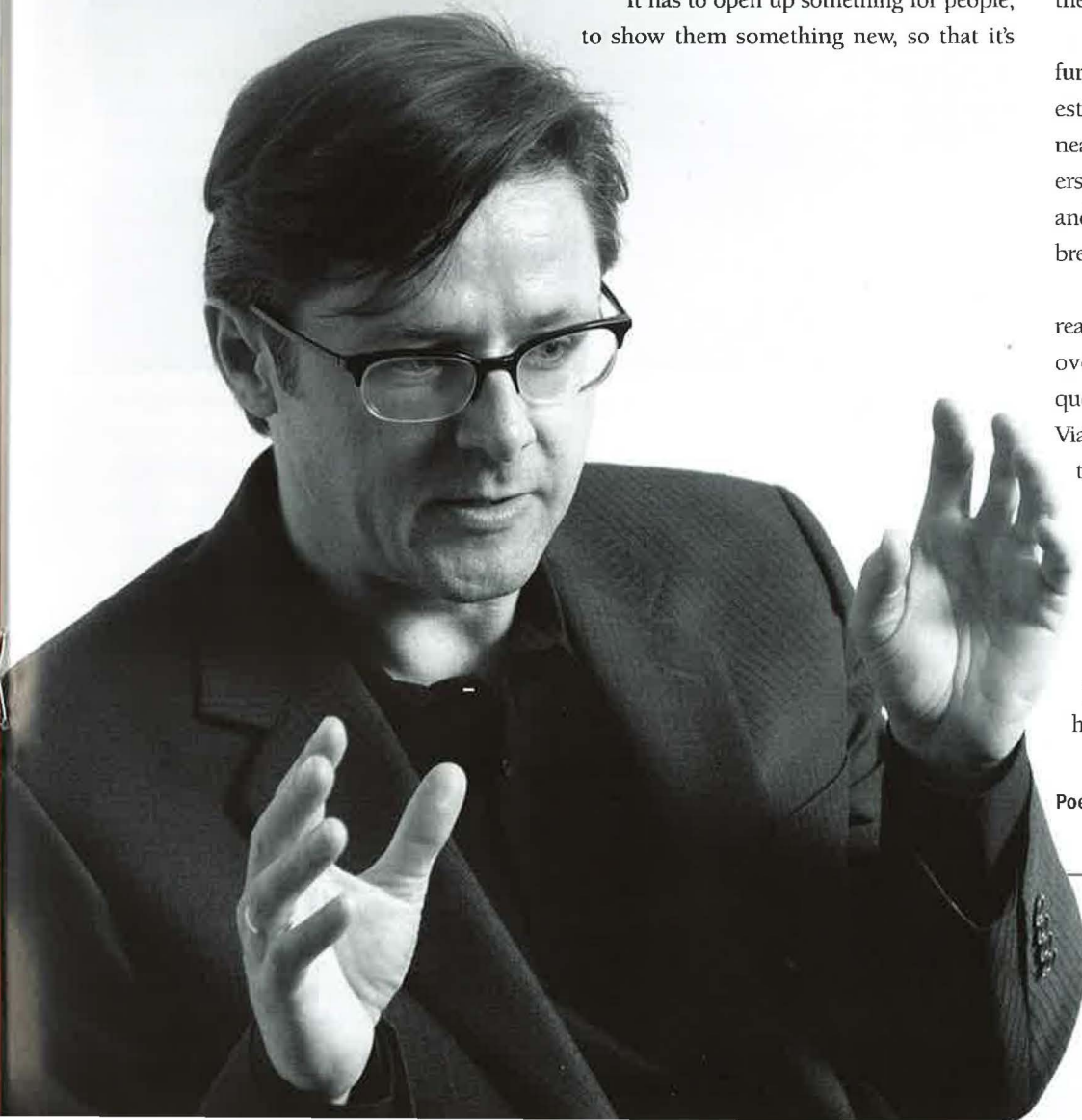
"We are set up to be a discomfiting presence, but that's part of innovation," he says.

Poetry at the University of Maine: A timeline

1948

Carroll Terrell joins English Department

E
turns another page



“Where else in the United States is there still a hub for the avant-garde, politically infused, radical poetic traditions of the '70s, where they're part of that alternative counterculture tradition, as opposed to academic or mainstream?”

POET AND EDITOR Jennifer Moxley studied the avant-garde tradition of the 1960s and has since redefined it in her own work. NPF brought her to UMaine, where she has become a fierce advocate for keeping the foundation alive, relevant and thriving.

“When we got here, we already had a sense of this as a poetry place,” says Moxley, whom *The Nation* dubbed “a girl genius” in

its review of her 2009 book *Clampdown*. Moxley serves as poetry editor for *The Baffler* magazine, and is well-respected in the field for her translations, most recently of the French poet Jacqueline Risset.

Her drive to sustain UMaine's commitment to innovative poetry isn't just about celebrating the legacy of her friends and mentors Burton Hatlen, Constance Hunting and Sylvester Pollet. It's about staking a claim for poetry at a time when its presence has been diminished or cut entirely on many college campuses.

It's unusual for a land-grant institution to specialize in something like avant-garde poetry, but in doing so, the UMaine English Department has earned an international reputation on par with schools that have much larger budgets.

Moxley says it's imperative that UMaine continues to be a place where emerging poets and young scholars can publish their first work. A place that keeps redefining the canon. A place that continues to be at the center of contemporary literary conversation.

“When I think about other institutions (where poetry is central), I can count them on one hand,” Moxley says. “It's not like ‘poetry’ travels in a package from college to college. Poetry is often marginalized. Just to be in a place that centralizes poetry is really kind of rare. It becomes a point of pride.”

1958

Fugues for Nerves + *Thighbones*, a student poetry and art literary magazine, debuts; others follow, including *Stolen Island Review*, *Moth* and *Onan*.

1967

Burton Hatlen joins English Department. He and Jim Bishop go on to form a writing workshop with faculty and students, including Stephen and Tabitha (Spruce) King.

B e n j a m i n FRIEDLANDER

"We're not a discipline unto ourselves. We're in a discipline within an entire world of outcasts."



stream, innovative poetry. He published papers in NPF journals that he never could've published anywhere else.

It was NPF's pioneering publishing that laid the foundation for a new field.

"I don't know if that could be created again," Friedlander says. "NPF had a big role. It created an entire discipline. People who published in journals then are now teaching this work to a new generation of students. They're now editing their own journals and training their own students. Now, NPF is no longer the only place you can publish that kind of work."

That's both a testament to NPF and a challenge to Friedlander and his colleagues — one that is worth taking on for the next generation of students.

"I think of it in skill terms," says Friedlander. "I feel the experimental poetry we're committed to gives you these skills for dealing with everything."

ROBERT CREELEY once said that Benjamin Friedlander "speaks with ungainsayable clarity of what we had thought to forget."

Friedlander made his name editing a 2008 collection of Creeley's poems, which was reviewed favorably in the *New York*

Times, as well as a seminal collection of Charles Olson's work. He's also well-regarded as a small-press poet. And he wouldn't be here if it weren't for NPF.

When Friedlander was a student in the late 1970s and early 1980s, there were very few places in the United States to do serious scholarly work on nonmain-

1971

Carroll Terrell establishes the National Poetry Foundation. Constance Hunting founds Puckerbrush Press, then joins UMaine faculty in 1978. NPF publishes *Paideuma: A Journal Devoted to Ezra Pound Scholarship*.

1975

NPF holds its first conference on Pound. Later NPF conferences, focusing on Modernist and contemporary poetry, attract nationally and internationally known poets and scholars.

1980

Great Living Poets Institute features Robert Creeley, Stephen Spender, May Sarton, Archibald MacLeish, Basil Bunting and Constance Hunting.

1982

NPF publishes *Sagetrieb: A Journal Devoted to Poets in the Imagist/Objectivist Tradition*.

1990

Burton Hatlen becomes director of the National Poetry Foundation.

"Poetry has an immediate impact — on the psyche, on the ears, on the eyes."

A **S AN UNDERGRADUATE** in Italy, Carla Billitteri knew all about the National Poetry Foundation. She was studying 20th-century American and European poetics, and many of her critical sources were books published by NPF

"If you do poetry or poetics, this is a place you want to be," says Billitteri, a scholar, critic and translator of contemporary Italian poetry. Her most recent book, *Language and the Renewal of Society in Walt Whitman, Laura (Riding) Jackson, and Charles Olson*, was chosen as the inaugural

text for a new series on modern and contemporary poetry and poetics.

Billitteri first came to UMaine for NPF conferences, then in 2001 as a professor. She not only found a community of like-minded academics, she found students who were eager to find their place in this avant-garde poetry tradition, much as she had years ago.

"The cultural legacy I'm carrying on is more of an attention to the place of poetry in cultural production, attention to the critical and historical discourse of poetry, attention to the work of rethinking the literary canon," says Billitteri.

Billitteri and her colleagues have their eyes on the early 21st century, much as their predecessors looked to the early 20th century. They strive to find — and celebrate — the next H.D., Ezra Pound or William Carlos Williams.

"There is an incredible wealth of ideas, figures and poetic practices in the history of American poetry, but most of it is still not very well known," she says. "Part of the legacy of the NPF is constantly revisiting our sense of the canon as it pertains to 20th-century American poetry. Constantly asking why is this poet not there — or not 'visible' — yet. We feel at this point it is our duty to be proactive." ■ **Online**



1999

New Writing Series established by Steve Evans.

2008

Steve Evans, Carla Billitteri, Benjamin Friedlander and Jennifer Moxley form an editorial collective to direct the National Poetry Foundation.

AS THE MAINE PUBLIC POLICY SCHOLAR from the University of Maine, Jessica Long spent the last academic year researching nutrition guidelines in public schools. The yearlong program provides an intensive research and networking experience for students from Maine's public universities. Long, a South Portland, Maine, native who graduated in May with a bachelor's degree in political science, recently sat down to talk about her academic career, which included study abroad in South Africa.

Tell us about the Maine Public Policy Scholars Program.

I wanted to evaluate the current nutrition environment in public schools in the state. I worked with my academic adviser, along with superintendents and food service directors in three school districts. I also met with Karen O'Rourke, acting executive director of the Maine Center for Public Health, two women from the Maine Nutrition Network and other health professionals in the field.

How is this type of research different from the classroom experience?

This is my project, this is my baby and I've worked really hard with the research abilities that I gained from the regular classroom setting to transition into more of a real-world environment.

How was your year studying in Cape Town?

It was amazing. I met so many wonderful people. I gained a lot of experience and knowledge that you can't really gain in a classroom. It's a different type of learning that is so worthwhile.

Where are you headed?

I would like to get my master's in public health. My major in political science really gave me a better understanding of my moral obligations in the world.



Going public

Research, study abroad
shape student's worldview



Decoding

Sediment records of past algal communities inform today's investigations of the effect of climate change on lakes nationwide

diatoms

By Margaret Nagle



In alpine lakes in the Pacific Northwest and the Rockies, in salt lakes in the northern Great Plains and in the "Great Ponds" of Maine, paleoecologist Jasmine Saros, pictured above and far left, combines field observations and bioassays with sediment core analysis of diatom fossil records to reconstruct the history of environmental change. Her goal is to better understand the mechanisms — from rising water temperatures to decreasing numbers of zooplankton grazers — driving past and present changes in algal communities. Reaching the high-elevation lakes during the short ice-free season often requires traversing snowfields or horsebacking up bouldered mountain passes.

Mt. Rainier, left, and Beartooth Mountains photos courtesy of Jasmine Saros

EVERY SUMMER for the past decade, paleoecologist Jasmine Saros has trekked across snowfields and horsebacked up bouldered mountain passes to reach remote, high-altitude lakes in the shadow of the Beartooth Mountains of the central Rockies. In the pristine wilderness of Montana and Wyoming, at altitudes above 9,400 feet, she arrives at the alpine lakes just after ice off to study changes in the algal community, looking for evidence of climate change and airborne pollution.

Saros, an associate professor in the University of Maine Climate Change Institute and School of Biology and Ecology, is focusing on diatoms living in the water column and preserved in the lake sediment, the remains of their silica cell walls testifying to their centuries of existence. By combining ecological field observations and bioassays with paleolimnology, Saros studies

Decoding diatoms

the diatom fossil records to reconstruct environmental change and to better understand the mechanisms driving the change, past and present.

Diatoms, one of the most common groups of phytoplankton, are part of the base of the food web, where changes in such fundamental species can cause ripple effects. In Saros' research, diatoms are tools for understanding what's happening chemically and physically in lake ecosystems.

Sediment cores reveal that in the past 10,000 years, the abundance of various *Cyclotella*, one of the most common diatom groups, has fluctuated in lakes in the central and northern Rockies. However, in the 20th century, the diatoms' numbers have increased not only in the Rockies, but also worldwide in alpine and temperate lakes, as well as in the Arctic.

"Many people believe that's a sign of global warming," says Saros. "What we don't know is the mechanism driving the

increases, and whether it is the same catalyst across all lakes."

ALPINE LAKES are ideal for studying climate change because of their short ice-free season, typically July to October.

"Any change in the length of that ice-free season has big impacts," Saros says. "As we see climate changing and the ice-free season becomes longer or shorter, it has a big effect on the species in those ecosystems."

In 2007, the fourth assessment report of the Intergovernmental Panel on Climate Change noted that there is substantial new evidence that changes in marine and freshwater biological systems are associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation. These shifts include increases in algae and zooplankton in high-latitude and high-altitude lakes.

Saros is investigating whether changes seen in alpine lakes are purely climate-

driven. If they are, shifts in the diatom record should be evident in the sediment cores taken from lakes in the central and northern Rockies that date back 2,000 years.

To interpret the data preserved in such fossil records, researchers need to better understand the relationships between environmental variables, and the growth and distribution of diatoms. In Saros' research, two of the critical environmental variables are nitrogen and phosphorus — essential nutrients for algae in the right quantities; in excess, the cause of algae blooms and other harmful water quality.

Alpine lakes are removed from the typical sources of human-induced nitrogen and phosphorus pollution — fertilizers, storm water and agricultural runoff, and faulty waste treatment systems. Yet in the highest elevations, humans still have the capacity to affect water quality via atmospheric nitrogen deposition, a form of air pollution resulting largely from the burning of fossil fuels.



One of the diatoms studied in the fossil record is *Cyclotella bodanica*. In a laboratory at UMaine's Climate Change Institute, wildlife ecology major Marcus Collado of Brunswick, Maine, who graduated in May, samples a sediment core for diatom fossils.

Diatom photo by Courtney Salm



According to Saros, human activity has led to a doubling of the amount of atmospheric nitrogen deposited in alpine lakes in the past century. Since 1980, species changes in the diatom communities have indicated nitrogen enrichment.

“We’re seeing rapid changes in the diatoms,” she says. “What’s hard to say with nitrogen is whether, in a low-deposition area like this, we’re seeing a level of saturation due to accumulation over time, or whether there’s a new atmospheric source, such as air pollution from Asia.”

FOR THE PAST decade, much of Saros’ research has focused on six lakes — three above and three below the tree line — in the central Rockies in Wyoming and Montana, outside Yellowstone National Park. Lakes in this area have had few disturbances, such as development on the watersheds. Nevertheless, across the lakes, there has been a synchronized increase in some species of diatoms, suggesting “a larger-scale driver.”

Using field surveys and on-site experiments, including annual sampling for water chemistry and biodiversity, she has looked at how changes in nitrogen and phosphorus alter the structure of aquatic communities.

Sediment cores from the area lakes revealing a 300- to 400-year-old record show that two diatoms, *Asterionella formosa* and *Fragilaria crotonensis*, are indicators of nitrogen enrichment.

“What’s most disturbing is that this is a wilderness area and yet it’s undergone such rapid change because of atmospheric deposition.”

Jasmine Saros

But unlike their incidence hundreds of years ago when they made up less than 1 percent of the phytoplankton population, lake sampling done since 1999 shows that the two species are now dominant in the water column.

It appears that increases in nitrogen deposition are not only stimulating diatom species changes, but also driving phosphorus limitation in at least three lakes. One of the concerns is that lakes that are limited by phosphorus are more prone to the acidification effects of air pollution.

Acidification in lakes changes the transparency of the water column, altering the depth that ultraviolet (UV) radiation reaches. Alpine lakes are particularly vulnerable to UV radiation, yet another environmental variable with the potential to change diatom communities.

Saros now plans to study the alpine lakes transitioning to phosphorus limitation, looking at what such chemistry means to the transparency of the water column and biodiversity of the ecosystem.

“What’s kept me going back over the decade are the pretty dramatic changes now occurring,” Saros says. “Since 2001, the lakes we’re studying have progressively gone from nitrogen limited to phosphorus limited, and it’s unclear how this major change across these lake ecosystems will alter the ecology of these systems.” ■



Graduate students Courtney Salm, left, and Kristin Ditzler in UMaine’s Diatom Ecology Laboratory.

Thresholds of change

IN LAKES in Maine, the Rockies and the Northern Plains, three University of Maine graduate students are using the historical records found in lake sediment cores to help reconstruct the past and tease apart the environmental catalysts of change in today’s aquatic systems.

The research by master’s students Kristin Ditzler and Heather Arnett, and Ph.D. student Courtney Salm is contributing to our understanding of the thresholds of change through time, including the triggers and how they can be managed or even precluded.

Ditzler, from Hershey, Pa., is assessing the effects of white perch removal on the frequency of algal blooms in Maine lakes. In the high-elevation lakes of the Rockies, Arnett, from Rochester, Minn., is studying how much nitrogen pollution is introduced from the atmosphere, and what effect such deposition has on algae in the aquatic ecosystems of all alpine lakes. Salm, from Sheboygan, Wis., is looking for patterns of food web interactions in the paleolimnology record of saline lakes, assessing the influence of lake-specific ecological processes on diatom-based climate reconstructions. The focus is on how ecological factors intrinsic to each lake affect the diatom record.



The Interaction

Learning communication realities in a virtual world

By Kristen Andresen

LAST FALL, University of Maine senior Lyra Hall led three lives. Most of her classmates recognized Hall as a fairly outgoing mass communication major with a wry sense of humor. But a handful of others also knew that in the virtual world that is Second Life, Hall had two avatars — digital representations of a person, for the uninitiated — she

named Jermaine Waffle and Rachael Fromund.

Jermaine liked jet skiing and hot air balloon rides. He was a muscular, jeans and T-shirt kind of guy. Rachael, who hung out at clubs, was very sociable, but didn't have many true friends. She was slender with a schoolgirl style (think early Britney Spears).

Negotiating the two other personas as part of professor John Sherblom's course in

“While students are in the midst of it, it’s engaging and fun. Upon reflection, they learn serious lessons about the ways in which we communicate.” John Sherblom

communication and technology was challenging — and revealing — for Hall.

“You can see how people interact with you differently,” says Hall, who is from Machias, Maine. “Sometimes, it’s a little weird (having an avatar) of the opposite sex. It’s a little difficult to get used to.”

In Sherblom’s class, such lessons occur in what amounts to a laboratory for interpersonal communication processes. In real life, the way students interact is often based on factors over which they have little control: race, gender, social class, upbringing and geography, to name a few. In Second Life, they can choose their avatars’ physical and cultural identities. Afterward, they have time to consider why they made those choices and how those choices affected the way they communicated with other avatars.

As they navigate Second Life, they also become acutely aware that identity is social — a co-constructed reality. For example, there was only one person — the same person — behind Lyra Hall’s avatars Jermaine Waffle and Rachael Fromund. But other Second Life residents treated them differently, in part because of their appearance and gender, and because of the way Hall communicated through them.

“When I talk in class about issues of identity, about the symbolic interaction of the ‘I,’ the ‘me’ and the ‘generalized other’ — about how we construct our social reality through our communication, and how we coordinate and manage meaning structures with others — those are abstract concepts that are not easily understood. But here, in Second Life, students get to experience what those concepts mean,” Sherblom says.

“When they reflect on what they’ve experienced, they’re able to better understand.”

INTERACTION IN Second Life, where avatars “talk” to one another in real time through text and sound, is rich research material for Sherblom, whose scholarship centers on computer-mediated communication.

“The fact that Second Life is a three-dimensional virtual world, yet it’s text-based, opens up communication avenues, both nonverbal and verbal,” Sherblom says. “There are paralinguistic cues not available to older styles of text-based computer-mediated communication media, such as e-mail, text messaging, instant messaging, or through Web pages.”

Because Second Life is entirely user-created, the world is a playground for the imagination. Avatars often take human form, but they don’t always. It’s not uncommon to strike up a perfectly civilized conversation with a vampire, a furry creature or an angry squirrel. (Yes, an angry squirrel.) The faces behind the avatars hail from all over the world and all walks of life, but in Second Life, none of that matters.

Though there is a body of research that focuses on the recreational side of Second Life, Sherblom has little interest in that. He and his collaborators in research and teaching — UMaine alumna Lesley Withers of Central Michigan University and Lynnette Leonard of the University of Nebraska–Omaha — are drawn to Second Life’s more practical applications.

“I don’t care about furies or angry squirrels in Second Life,” Sherblom says. “I’m

interested in its educational use and the way it can facilitate group work in general, and for businesses and nonprofits.”

In the last academic year, Sherblom and Withers shared a virtual classroom and campus that Leonard created for her university. Here, their undergraduate students — or their avatars, anyway — worked among themselves and with other peers. This fall, with a grant from UMaine’s Center for Teaching Excellence, Sherblom will have his own campus in Second Life.

Through this active learning experience, students gain a more global perspective, master new technology and enhance their communication skills, Sherblom says. And because no lecture or textbook can prepare students for the unknown terrain of Second Life, they learn to take charge.

“I’m there to help resolve a problem, but it’s their responsibility to share what they’ve learned with their classmates,” Sherblom says. “Over the semester, we became a networked group of expert learners. We learned as a group, and I think that’s what worked for us.”

THAT LEARNING network extends far beyond the classroom. UMaine students chat with people from France, England or Japan (Second Life provides a universal translator). They also collaborate virtually with people nationwide, including their counterparts in Nebraska and central Michigan, sharing first-hand experiences about the challenges and opportunities of computer-mediated communication.



Communication researchers John Sherblom, Lynnette Leonard and Lesley Withers, and the avatars Sherblom and Withers use in Second Life to interact with their students — and each other. Leonard's avatar appears on page 26.

"I don't care about furries or angry squirrels in Second Life. I'm interested in its educational use and the way it can facilitate group work in general, and for businesses and nonprofits." John Sherblom

"While students are in the midst of it, it's engaging and fun," Sherblom says. "Upon reflection, they learn serious lessons about the ways in which we communicate."

Second Life also provides a research environment where Sherblom, Withers and Leonard are better able to understand the ways in which the medium influences individual and group communication. Their team is one of the first to study these concepts specific to Second Life.

"Originally, people said (computer-mediated communication) is so new, it's going to completely change the way we do things," says Leonard, whose classes deal with issues of communication, computer-mediated communication and leadership. "What we're finding is that we actually are bringing many of our expectations and behaviors online with us. Issues of credibility and trustworthiness are still very important."

STUDYING THE way others interact in Second Life has provided the researchers insight into the way people communicate face to face. For instance, online, conversation flow can present a challenge in knowing who is saying what, when. Sherblom, Withers and Leonard have adopted techniques — reiterating specific points someone raised or stating the person's name being addressed — that have not only enhanced their online interactions, but their real-life discussions.

It has to do with social presence, Withers says, or how "there" or connected you feel to others.

Withers and Sherblom have engaged in computer-mediated communication research since the early days. As an undergraduate at UMaine in the early 1990s, Withers took Sherblom's first course in computer-mediated communication. She went on to earn a master's degree at UMaine and a Ph.D. at the University of Connecticut.

Withers will return to UMaine in October to present on teaching in Second Life at the Center for Teaching Excellence. The three researchers also will lead a panel on Second Life this fall at the National Communication Association conference. Next spring, they plan to resume their classes in the virtual world.

"When you're face to face, there's lots of social presence," Sherblom says. "Second Life has a sense of social presence, too, and that's what makes it so involving. It's engaging in the way real life is." ■



Can-do

IN A PICKLE? Ready for a jam session? Fear rotten tomatoes?

University of Maine Cooperative Extension can help with every food preservation need. That's why Whole Foods Market called on Extension educators this spring for advice. The chain featured UMaine Extension's canning and preserving Web site in *This Is What Summer Tastes Like*, a seasonal entertaining guide available at Whole Foods Market stores throughout the country.

"Preserving delicious summer fruits and vegetables is an amazing way to enjoy the flavors of summer's seasonal harvest year-round," says Barbara Gulino, marketing team leader at the Whole Foods Market store in Portland, Maine. "With UMaine Cooperative Extension's extensive knowledge of food preservation, we hope the partnership will help educate our shoppers and other people in the community about how simple and cost-effective it can be to preserve locally grown summer favorites."

Whole Foods Market also sponsored food preservation outreach throughout southern Maine this summer, including a series of free classes taught by Cooperative Extension at

Whole Foods Market partners with UMaine Cooperative Extension to promote food preservation

the Portland store. In addition, Whole Foods Market funded resources to support the educational efforts of an Extension food preservation program aide.

The partnership continues in November with a "5 Percent Day" fundraiser, in which 5 percent of the Portland store's daily sales will benefit UMaine Extension's ongoing food safety and preservation efforts in Cumberland County.

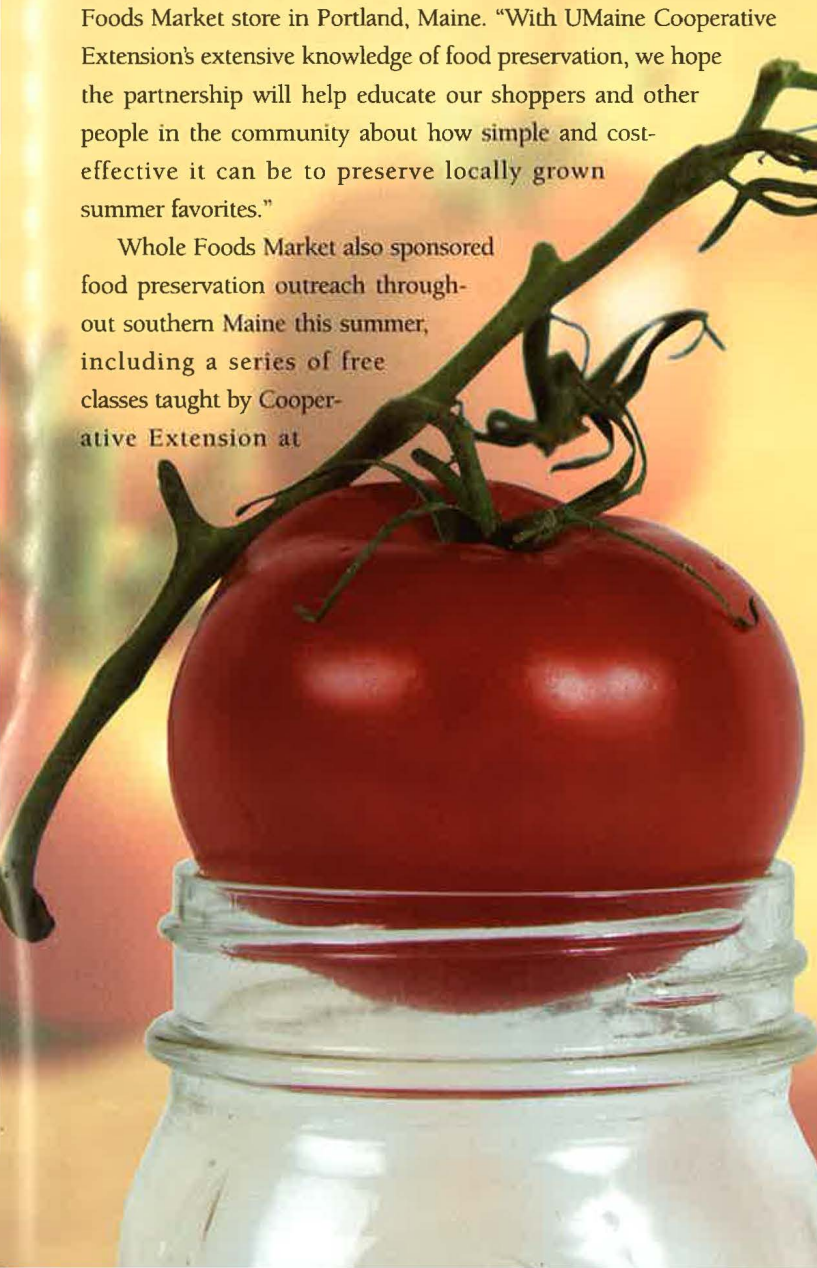
"It's a partnership," says Kathy Savoie, an associate Extension professor based in Cumberland County. "This reinforces that we are the go-to place for food preservation information."

This is a banner year for canning, pickling and freezing. Savoie and her colleagues saw a sixfold increase in requests for food preservation information by May, before many Maine gardeners even had their seedlings in the ground. She attributes the spike in popularity to a number of factors: increased interest in locally grown foods; a desire to save money; concern over the safety of the nation's food supply; and a means to extend access year-round to Maine-grown foods in our northern climate.

However, improper preserving techniques, such as using outdated recipes or the wrong method for the type of food, can be hazardous. Food poisoning is always a concern, and with so many novices joining the fray, it is a priority for UMaine Extension to spread the word about proper, safe canning methods.

Throughout the growing season, UMaine Extension leads food preservation workshops statewide and offers information online (extension.umaine.edu/food/) through a variety of publications. The Cumberland County office also offers the Master Food Preserver program, a more intensive course that gives participants the expertise to teach others. This summer, Extension educators also gave informal preservation demonstrations at Maine farmers markets.

"We want to make sure we're reaching people at as many points along the way as possible and providing them with current information," Savoie says. "It's the people who don't contact us that worry me the most."





Arsenic and asthma

WITH FUNDING from the PhRMA Foundation, University of Maine biochemist Julie Gosse is conducting research to determine if there is a link between arsenic in drinking water and asthma. Recent studies on the prevalence of the disease suggest that arsenic exposure elevates asthma incidence, but the underlying molecular and cellular mechanisms that potentially trigger the symptoms are unknown. The focus is on mast cells, which are key in the inflammatory process and are important immune defense cells in the body, charged with fighting parasitic infections. Using biochemical, molecular and cellular techniques, Gosse hopes to determine whether arsenic affects how mast cells function.

Intertidal invaders

THE ALIENS STOWED AWAY in the ballast rock of the great 19th-century sailing ships that brought trade and emigrants from Europe to Nova Scotia. Once in North America, the rockweed species *Fucus serratus* and the herbivorous snail *Littorina littorea* colonized the shores, launching a biological invasion affecting the intertidal community structure in the northwestern Atlantic. Today, the rockweed species is dispersed throughout the Canadian Maritimes, and the snail is found as far south as Delaware. University of Maine marine scientist Susan Brawley and a team of

CREATING A SUSTAINABLE SOCIETY — one that addresses current economic, social and environmental issues without compromising the ability of future generations to meet their needs — is one of the most fundamental and difficult challenges today. Now with a \$20 million grant, Maine is positioned to become a leader in addressing sustainability challenges. Led by the University of Maine's Mitchell Center and involving the University of Southern Maine and other higher education institutions statewide, the initiative will create a collaborative Center for Sustainability Solutions and implement related K–20 educational activities for more than 15,000 participants. The five-year grant from the National Science Foundation's Experimental Program to



Stimulate Competitive Research (EPSCoR) will be coupled with a \$1 million match each year from the Maine Economic Improvement Fund. Participating institutions will provide in-kind contributions for faculty salaries, student research internships and other expenses.

Sustainability solutions

researchers from the Netherlands, Canada, Georgia and the Smithsonian Environmental Research Center in Maryland used shipping records from 1773–1861 to guide molecular fingerprinting of the species from the Canadian Maritimes and Europe. Their findings contribute to a broader understanding of marine communities. The researchers note that the two species studied are likely just the tip of an "invasion iceberg" to the northern Atlantic shores from Great Britain and Ireland in the 19th century. Their findings were published in May in the *Proceedings of the National Academy of Sciences*.



Old ice

USING ICE SAMPLES from the Allan Hills blue ice region in East Antarctica, scientists at the University of Maine, in cooperation with Princeton University, hope to extend climate records back 2.5 million years. Andrei Kurbatov and Paul Mayewski of UMaine's Climate Change Institute have been awarded more than \$430,000 from the National Science Foundation for UMaine's part of the project. The goal is to reconstruct details of past climate changes and greenhouse gas concentrations for certain time periods by applying emerging methods for absolute dating of air bubbles trapped in the ice. During two field expeditions, researchers will collect ice core samples and conduct surface trenching activities at Allan Hills.

THE MAINE TECHNOLOGY INSTITUTE (MTI) selected four University of Maine projects to receive \$6.8 million from the Maine Technology Asset Fund (MTAF) for projects that will lead to significant economic benefits for Maine. In addition to the direct awards, UMaine is a partner in seven other projects granted more than \$9 million from MTAF. This was the second round of funding from the \$50 million MTAF R&D bond Maine voters approved in 2007. Last year, MTI identified the first 14 projects to receive nearly \$30 million. UMaine researchers developed five of those funded projects, which were awarded more than \$13 million.

The new UMaine proposals receiving awards are:

- The University of Maine Innovative Industries Initiative, \$3.69 million, for construction a New Media Innovation, Research and Development Center at UMaine. A least eight independent Maine-based new media companies will be involved in the project.
- Maine Center for Autonomous Marine Survey (MCAMS), \$1.2 million, to establish a coordinated technical center for autonomous survey vehicles that will make new technologies for measuring crucial ocean properties in the Gulf of Maine easily accessible.
- University of Maine Pulp and Paper Process Development Center, \$1 million, to update UMaine's pulp and paper pilot plant.
- Strengthening Biotechnology & Supporting the STEM Education Initiative in Maine, \$883,000, to renovate and expand Bennett Hall to include an image processing laboratory and commercialization space to enhance the types and number of samples imaged by FPALM, a new fluorescence photo-activation localization microscopy system developed at UMaine to study cellular molecular organization.



experts on topic



Carol Kim

THE SWINE FLU outbreak that started in Mexico and quickly spread throughout the world has spurred renewed interest in vaccinations and the biological mechanisms that facilitate the spread of such illnesses from animals to humans. University of Maine microbiologist Carol Kim, director of the Graduate School of Biomedical Sciences, conducts research on innate immunity using zebrafish as a model organism. Her work focuses on the numerous biological factors that augment, extend and prolong the innate and acquired immune response to infection. The goal is to develop more effective vaccines and to understand host response to pathogens.



Highmoor's 100th

THIS YEAR MARKS the centennial anniversary of Highmoor Farm, the University of Maine's fruit and vegetable research and grower outreach facility in Monmouth, Maine. Highmoor is the oldest of UMaine's five farms located throughout the state. It features:

300
acres, with 30 in crop production

50
varieties of apples, including heritage varieties and the staff favorite — SnowSweet

37
pumpkin varieties trialed for yield

24
varieties of strawberries growing in the last of a three-year trial for taste, yield, quality

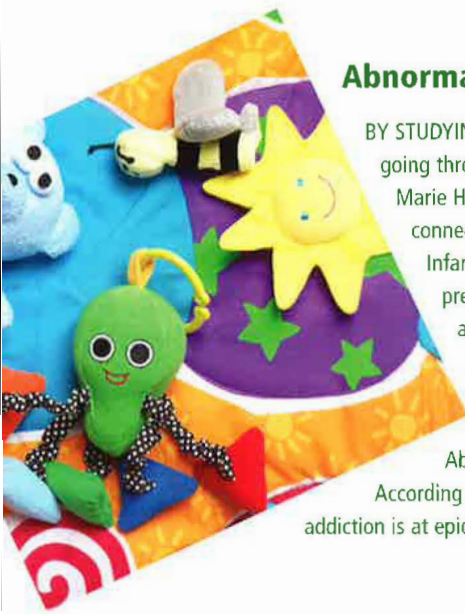
3
integrated pest management (IPM) programs for three crops — apples, strawberries, sweet corn

1
internationally recognized Maine Compost School



Bear Brook revisited

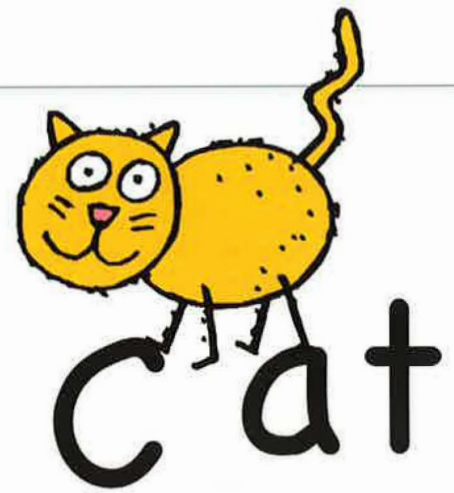
THE ENVIRONMENTAL IMPACT of excess nitrogen in a changing climate is the focus of a new \$800,000 National Science Foundation study led by three University of Maine researchers — Kevin Simon, Ivan Fernandez and Stephen Norton — in collaboration with colleagues at Virginia Tech. The project builds on a long history of research at Bear Brook Watershed, an experimental forested area in eastern Maine where studies began in the mid-1980s as part of national research to determine the effects of acid deposition on surface waters and their related watersheds. In addition, the project will incorporate research being conducted by scientists at Virginia Tech and the U.S. Forest Service at the Fernow Experimental Forest in West Virginia. Researchers will examine the interactions among multiple elements, such as nitrogen, phosphorus, carbon and metals, and ecosystem processes of acidification and nitrogen enrichment.



Abnormal sleep and SIDS

BY STUDYING the sleep patterns of opiate-addicted newborns going through withdrawal, University of Maine psychologist Marie Hayes said she hopes to more clearly establish the connection between abnormal sleep and the risk of Sudden Infant Death Syndrome (SIDS) in babies exposed during pregnancy to narcotics, medications, tobacco and alcohol. Hayes, an allied senior scientist with the Maine Institute for Human Genetics and Health, has a two-year, \$337,000 grant from the National Institutes of Health for the research on SIDS risk and Neonatal Abstinence Syndrome, the opiate withdrawal process.

According to the Maine Center for Disease Control, opiate addiction is at epidemic levels in northern and eastern Maine.



Sounds of language

THE FINDINGS of a new study led by University of Maine Assistant Professor Susan Lambrecht Smith that further refines the speech and language skills of preschoolers as predictors of reading disability are gaining widespread citation. Last October, the paper detailing the research was published in the journal *Learning Disabilities Research & Practice*. Since then, it has been cited on more than a dozen Web sites, including ScienceDaily, Medical News Today and FirstScience News. The longitudinal study by Smith and three colleagues — Kathleen Scott and Jenny Roberts of Hofstra University, and John Locke of City University of New York — found that some components of phonological awareness appear to remain strong predictors of reading disability in at-risk youngsters over the course of preschool and kindergarten. Phonological awareness is defined as the conscious sensitivity to the sound structure of language. Performance on tasks such as phoneme deletion (e.g. pronouncing the word “cat” with and without the first letter) and rhyme production were highly predictive of later reading status. Distinct differences in other skills such as alphabet knowledge and rapid naming that were evident in pre-K youngsters with learning disabilities when compared to their peers were diminished by the time the children entered the first grade.



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This is a niche for Maine in making a plastic from nongenetically modified potatoes and wood by-products. The bioplastics market is growing in double-digit percentages each year, so it's a growth market with potential for worldwide trade."

Michael Bilodeau

Director, Pulp and Paper Process Development Center

The University of Maine's Sustainable Bioplastics Initiative has received a second Maine Technology Institute Cluster Enhancement Award for \$500,000. The project started with a seed grant to research the feasibility of making polylactic acid (PLA) plastics — found in yogurt containers and disposable utensils — using the starch from cull potatoes. UMaine researchers also have discovered that wood by-products from Maine's forest product facilities, such as pulp mills, are viable sources of fermentable sugars. The only U.S. plant currently making PLA plastic is in Nebraska, using corn to produce the necessary starch. Companies wanting nonGMO materials don't have any options, but Maine is poised to fill that void while creating jobs and developing a new industry for the state.

Student view

IN HIS NEARLY 38 YEARS at the University of Maine, Wayne Hamilton learned two important lessons from young people, many of whom were first-generation college students. He learned that they — and their parents — looked to UMaine for a better life, and that scholarship dollars can make such aspirations reality.

“I always grew up believing that one should give a helping hand to the next generation,” says Hamilton, associate dean emeritus of the College of Engineering and professor emeritus of civil engineering.

“I was supported in college by the GI Bill at the undergraduate level and the National Science Foundation in graduate school, and feel fortunate for that support. It’s my hope that by establishing a scholarship, perhaps I can assist some students in obtaining their college education and maybe they, too, will assist other students in future generations.”

When Hamilton retired in 1997, he established the **Wayne A. Hamilton, P.E. Civil Engineering Scholarship** in the **University of Maine Foundation**. The goal, he says, is to provide help and incentive.

Wayne Hamilton joined the Department of Civil Engineering in 1960. He served as department chair from 1969–77 and associate dean of the College of Engineering from 1977–97. With the exception of 15 months spent getting his Ph.D. at Oklahoma State, Hamilton taught at least one course every semester.

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