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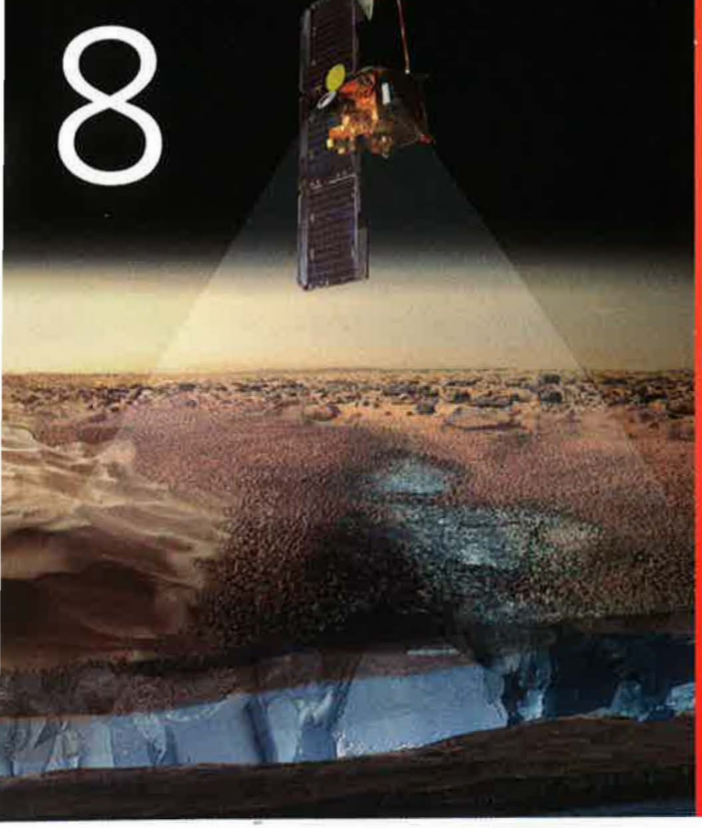
UMaine Today

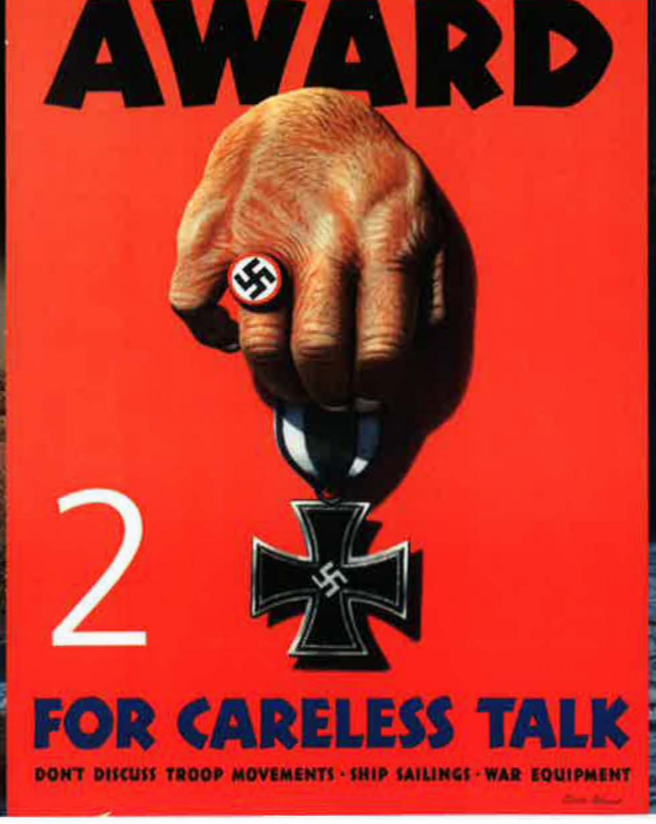
CREATIVITY AND ACHIEVEMENT AT THE UNIVERSITY OF MAINE

FALL 2011

Fit to be tide?

Researchers weigh trade-offs, impact of harnessing ocean energy





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ON THE COVER: UMaine researchers are working to guide responsible tidal energy development in Maine by studying potential impacts in terms of engineering, marine life, human life and energy production. See related story on page 16.

UMaine, Bangor libraries collaborate to bring poster collection into the spotlight

The art of war

By Jessica Bloch

THERE WERE FEW places Americans went in this country during World Wars I and II where they didn't see a war poster or two.

The posters were no mere decoration. With their striking images and stirring words, they were key pieces of propaganda and communication used to promote the war effort on the home front. They implored people to buy war bonds and maintain their gardens. They reminded citizens of their freedom to use a public library. They urged Americans to be vigilant against the threat of spies.

Today, the posters provide valuable insight into life during those wars, and how the U.S. government wanted citizens to perceive what was going on overseas.

At Bangor Public Library, a collection of nearly 800 posters from the world wars — believed to be among the largest in the country — has sat for decades on its basement shelves. Many are too fragile to be displayed, and the collection had never been cataloged.

But beginning in November, the public will have a virtual view of the collection, as well as the opportunity to purchase full-size reprints, thanks to a digitization project made possible by a partnership with the University of Maine's Fogler Library, which will host the online collection on its server. The project is underwritten by Fogler Library employee Eugene Daigle and his wife, Barbara, both veterans.

"I hope that in some ways, seeing these posters will allow people to be a little closer to what went on during World War II and maybe think about what goes on now," says Eugene Daigle, Fogler Library's manager of network services, whose father served in overseas combat. "There are issues on the home front that people never think of. A lot of people gave up quite a bit and still do. If the poster project can share that, it will be quite worthwhile."

Bangor Public Library amassed its poster collection through the efforts of then-librarian L. Felix Ranlett, a World War I veteran who collected them as they were released, says Barbara McDade, the current library director. UMaine Dean of Libraries Joyce Rumery first saw the posters in 2010 when they were on display for U.S. Sen. Susan Collins.

The poster project collaboration between Fogler Library and Bangor Public Library is not unusual for Maine, but it is for the nation. According to librarians at both facilities, there are library collaborations around the country, but often only by type — for example, public municipal libraries in a state might collaborate on a project, but they likely wouldn't include the state's private academic libraries. In a similar collaboration, Fogler is working with the Maine State Library to digitize town reports going back to the early 1800s.


O'ER THE RAMPARTS WE WATCH
SCHLAIKJER
UNITED STATES
ARMY AIR FORCES

The art of war

Soon after, Rumery mentioned the poster collection at a Fogler Library staff meeting. Daigle knew of other war poster collections, most of which were much smaller than the one in Bangor.

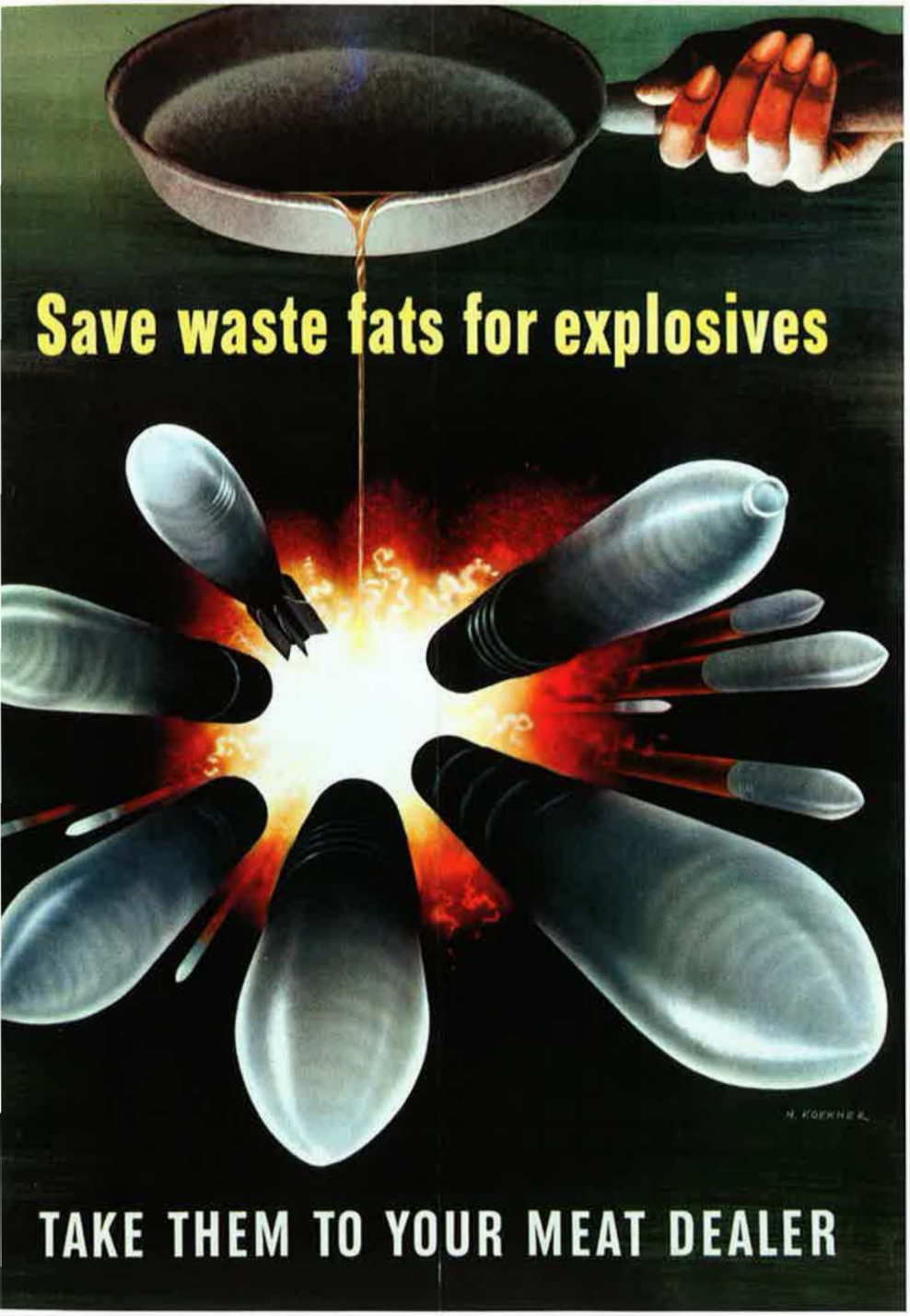
"I was intrigued by the fact that there would be this large collection of them locally, but they were very hard for people to view because they were stacked up on shelves, and you have to handle them carefully," he says.

Each poster image will be stored on the Fogler Library server in three sizes: as thumbnails in a viewing directory; 8-by-10-inch images suitable for printing; and 5 megabyte files for full-size displays. Fogler Library will sell prints, with proceeds benefitting the Bangor Public Library's plan to conserve the original war posters.

Although the Daigles are eager to share the posters with the public, their motivation is personal. Eugene Daigle served six years in the Air Force, including one year of active duty during the end of the Vietnam era, followed by 22 years in the Coast Guard Reserve. Barbara Daigle served eight years in the Coast Guard Reserve. Both attended college on the GI Bill and went on to earn advanced degrees at UMaine (business for Eugene, nursing for Barbara).

Their military connections also go back a generation. Barbara Daigle's father served in the Navy during World War II, while Eugene Daigle's father was in the Marines and then the Air Force during the Korean War. For the Daigles and many others who were without a parent during the wars, the posters are reminders of what life was like at home. ■ Online

No matter the subject or theme, most World War II-era posters went through the Office of War Information. War bond posters, for example, might have come from the U.S. Treasury. A poster encouraging women to sign up to become nurses is credited to the U.S. Public Health Service. A poster about preventing forest fires was issued by the U.S. Department of Agriculture. In addition, some private companies printed posters. In order to keep their names in the public eye, many companies engaged in institutional advertising or conveyed a public service message such as,



"Join the Women's Army Corps." The posters, with their rich colors, dramatic images and liberal use of capitalization and exclamation points, were designed to attract attention. Though some featured the work of artists — Norman Rockwell designed the "Ours ... to fight for" poster (at right) — many were designed by advertising specialists, screen and radio writers, and journalists who ended up working in government press and information offices — especially the Office of War Information — or in the military.

Posters and the public

THE USE OF government-sponsored posters exploded during World War I, the first major war for the U.S. that required massive mobilization. It was also a divisive war, according to University of Maine historian Nathan Godfried, which made posters important tools for generating public support.

As the country began an even more massive buildup for World War II, several key propaganda themes began to emerge.

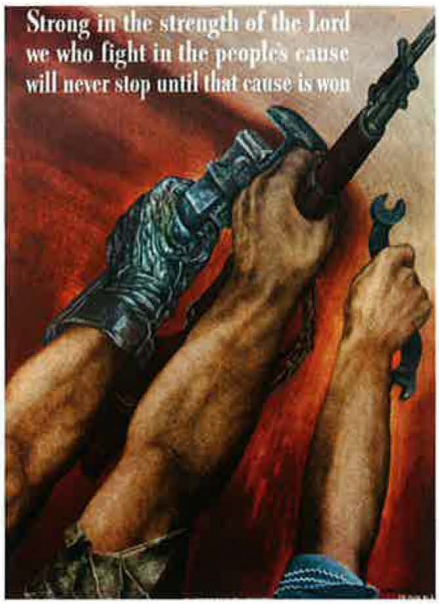
"It was the idea that victory begins at home, that (the individual plays) an important role in linking the fighting front to the home front," says Godfried, whose research interests include the history of mass media, labor history and American pop culture. "Some of the posters addressed broad principles such as, 'What are we fighting for?'"

The use of war posters petered out after World War II, due, in part, to the widespread use of television and other electronic media. Equally important is that none of America's foreign conflicts since 1945 has involved a declaration of war by Congress or necessitated an extensive national buildup and global involvement; they've been fought in a specific country or region.

"World War II required massive coordination and mobilization, and you don't have the same historic conditions, mentality and commitment in subsequent wars," Godfried says. "Therefore you simply don't get the same kind of messages asking for sacrifice at home. With the war on terror, for example, government officials urged patriotic Americans to go to the mall and buy something. It's just a different mentality."

The art of war

The poster project is of special interest to educators and students at the high school and college levels. The posters may serve as primary source documents for teachers, professors and their students — particularly those in history, art history and marketing, according to UMaine Dean of Libraries Joyce Rumery. "Those posters served every purpose, guiding the local communities how to think about what was happening, how to act and react, how to support the military, and how to build community," she says. "There was a sense of, 'We're all in it together.'"



Conditioning champions

UMaine experience helped John Whitesides get the Boston Bruins into Stanley Cup shape

FOR THE LAST TEAM standing, the Stanley Cup represents the successful end of a National Hockey League season featuring more than 100 games, extensive travel and countless injuries — both significant and minor. University of Maine graduate John Whitesides, the team's strength and conditioning coach, played a key role for the 2011 champion Boston Bruins, working behind the scenes to optimize player performance and minimize downtime related to injury. Whitesides, a New Hampshire native who now calls Bedford, Mass., home, continues to draw on his UMaine experience. He earned a bachelor's degree in kinesiology and physical education in 1995 and a master's in exercise physiology in 1997.

How did UMaine help prepare you for your career?

In strength and conditioning, there are colleges that have bigger names than UMaine, and I know people from those programs. I feel that I was better prepared than they were. The hands-on approach and the personal involvement of professors like Dr. (Glenn) Reif, Dr. (Steve) Butterfield and Doc (Robert) Lehnhard kept me interested and put me on track to be successful. I still lean on Doc today, asking his advice on things like specialized testing procedures and other aspects of my work.

Why did you study exercise science?

I started out with an interest in teaching and coaching, and I was on track to finishing my degree in four years. Education is important to my family and my first goal was to earn a degree. I was recruited to play football at UMaine. Because I was redshirted, I had a year of eligibility remaining, so I planned to stay at UMaine. Doc encouraged me to pursue the department's teaching fellowship, to cover the cost of my master's degree while giving me a chance to teach some labs and courses. I got that fellowship and all of a sudden I found myself switching gears. I made the commitment to teaching and learning about exercise physiology, and I walked away from football. I was thrust into high-level exercise courses, and Doc Lehnhard was right there to help me. That was when I made the transition onto my career path.

What was the impact of Black Bear football on your career path?

I had a number of injuries, which led to experiences that would help me in my work because a lot of my responsibilities involve dealing with injured players. They feel separated from their teammates and they often have nowhere to turn, and I know that feeling. The strength coach plays in important role; you become an ally. There are no politics in the weight room. What you lift is what you lift. It's a raw, bottom-level experience because what you put into it is what you get out. ■

Seeing red

For a UMaine computer scientist, ice sheets on Mars shed light on Earth's changing climate

By Kristen Andresen

WHEN VIKING I sent back the first images from Mars in 1976, the world was abuzz about the possibility of life on the red planet — and that mysterious mesa shaped like a human face. But James Fastook was fascinated with something else entirely: ice.

Fastook was a year away from earning a Ph.D. in physics at the University of Maine, working in the lab of glaciologist Terence Hughes. Fastook's specialty was — and continues to be — ice

sheet modeling, and he hoped to apply his equations to Mars. But at the time, his model wasn't sufficient.

In time, Fastook perfected what is now known as the University of Maine Ice Sheet Model, a multifaceted mathematical approach to ice sheet physics. Today, his work helps climate scientists gain a better understanding of the glaciological processes that have shaped both Earth and Mars.

The obvious question is, Why Mars? Well, Mars is the only other planet in our solar system that has glaciers. It also has moraines and eskers — the types of landscape features that result from glacier movement — so it serves as a means of comparison.

"One of the things you need to do to understand planetary physics is to look at more than one planet," says Fastook, a UMaine professor in computer science with a cooperating appointment in the university's Climate Change Institute. "If you only look at one planet, you only get part of the picture."

Mars is significantly colder than Earth. And in many ways, the climate of Mars is much simpler than that of our planet. There's no biology there to complicate things, no oceans, no plate tectonics. But the driving forces that affect the planets are similar: orbital changes that cause seasons. Sunlight. An atmosphere. Wind. Weather. Clouds. Snowfall. Maybe — a long, long time ago — rain.

"At the same time, the planets are different enough that it tests our understanding of the physical processes," Fastook says.

Chasma Boreale is a long, flat-floored valley that cuts deep into Mars' north polar ice cap. Its walls rise about 1,400 meters (4,600 feet) above the floor. Where the edge of the ice cap has retreated, sheets of sand are emerging that accumulated during earlier ice-free climatic cycles.

Photo by NASA/JPL

Seeing red

THOUGH FASTOOK has long had a scientific interest in Mars, his work modeling ice sheets there didn't begin in earnest until about five years ago, at the request of James Head, a planetary geologist at Brown University. Head studies the processes that form and modify the surfaces, crusts and lithospheres of planets over time. He also focuses on the climate history of Mars, mapping the distribution of ice and water deposits as clues to the changing climate.

The theory is that Mars was once much warmer and wetter than it is now, and Head and his team are trying to figure out if there's evidence to support that. After mapping images of the surface of Mars and simulating a variety of climate models, Head wondered whether it was possible to get tropical mountain glaciers on Mars. Photos show that there is ice at the poles, but Head wanted to know what past conditions could've driven that ice into the atmosphere and redeposited it at the planet's equator.

Early in his career, Head was inspired by the work of UMaine glacial geologist George Denton. He continues to collaborate with Denton's colleagues and students, particularly David Marchant, a Climate Change Institute alumnus now on the faculty at Boston University. When he told Marchant about his interest in ice sheet modeling on Mars, he recommended Fastook.

"Jim was able to help us figure out what would happen to ice that was deposited on the side of the huge equatorial volcanoes," Head says. "He showed that extremely large, 160,000-square-kilometer ice sheets would form and flow downhill, producing the types of features that we saw in the images."

Head was impressed with Fastook's enthusiasm and his ability to explain the complexities of basic physics to other scientists in a way that was easy to understand. Fastook has since received an adjunct appointment at Brown and is actively involved in Head's research group.

"His ability to communicate in simple, straightforward terms is really important in bridging fields and making very significant research connections," Head says. "He has inspired and influenced many of my undergraduate and graduate students through his visits to Brown and he has made a huge impact in the field of Mars climate change through this work."

"Glaciers respond slowly to climate change. They filter out the noise of weather systems and respond to long-term changes. The kinds of changes we're seeing in Greenland and Antarctica are true indicators that something is happening." James Fastook

THOUGH HIS SPECIALTY is glaciology and much of his research falls squarely into the category of climate change, Fastook is first and foremost a classical physicist whose specialty is solving numerical equations through a computer.

"Ice is a nonlinear material, so all of the solutions need to be mathematical solutions," Fastook says. "You can solve problems you can't solve analytically."

Whether on Earth or Mars, the challenges that ice presents are many. For starters, even though ice is solid, its movements are fluid. Ice sheets wax and wane for a variety of reasons — including internal physics, which Fastook's model accounts for. To further complicate matters, ice sheets themselves affect the climate by reflecting light and redirecting prevailing wind patterns.

"When I started out, this was a very obscure branch of Earth science, trying to understand the ice ages, why ice sheets disappeared and came back," Fastook says. "At that time, we weren't talking about climate change. Our question was, when will the next ice age start."

But when the scientific community

started raising questions about humans' contribution to climate change, glaciologists such as Fastook rose from obscurity and became central to the conversation.

Some glaciers expand and retreat because of factors independent of climate. For example, the glaciers that covered Maine 14,000 years ago took some 2,000 years to collapse. But at the rate things are going today, the ice sheets in Greenland and Iceland could retreat within several hundred years. By simulating what happened in the past, scientists can predict and prepare for the future.

Fastook's models add to the understanding of glaciers' internal physics, whether the glacier is on Earth or on Mars. Most recently, he helped a Brown student who was trying to figure out the timing of a series of moraines near the equator of Mars. Were they the result of a 100,000-year climate oscillation or was something else at play?

"They can look at the record and assign some chronology to the events they're seeing," Fastook explains. "Here, we have lots of methods to assign dates to things, like carbon-14 dating. With Mars and other planets, all you can look at are pictures and dating is a lot harder."

The pictures raise interesting scenarios, though. Looking at images from the Mars Global Surveyor and the Mars Orbiter Laser Altimeter, Head saw eskers. Eskers mean that the bottom of an ice sheet is producing a lot of water as it moves. This suggests that at some point, Mars was warm enough for water, so Fastook built an ice sheet model of a warmer, wetter period on Mars.

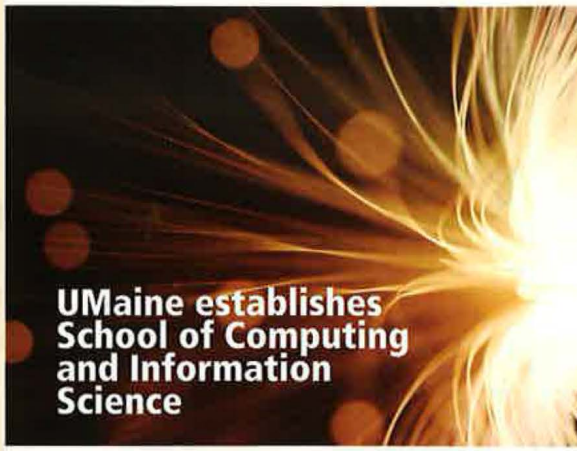
TODAY, IT'S SO COLD on Mars that at its south pole, in winter, a meter-thick layer of carbon dioxide ice forms. It's so cold that the atmospheric pressure dips because so much of the atmosphere freezes. It's so cold that Fastook looks at the polar ice caps, with their beguiling spiral cracks, shakes his head and moves on. Though Fastook has been able to model other glaciers on Mars, the ice caps are too thick, too complex for his equations to handle.

That could change soon. For the last two years, a radar instrument has been in orbit around Mars, measuring the thickness of the polar ice caps, among other things.

"I still look at the polar ice caps and think they're too hard," Fastook says, "But in the next few years, I might do a model."

In the meantime, there's one question that continues to drive him. It's the question that captivated him in 1976, when those first images came back from Mars. It's the question that he asks about the glaciers he models on Earth. It's so basic, so fundamental, and yet the answer could hold the key to life on the red planet.

"In terms of climate change on Mars, there are river valleys. There are lakes with shorelines. There are spillways. There's all this evidence of a lot of liquid water flowing around the surface of Mars," Fastook says. "But where's the water now? If we want to go there, we need to know where the water is. We need water to make fuel to come home again. Was there ever life there? Is there life there now?" ■



UMaine establishes School of Computing and Information Science

THE UNIVERSITY OF MAINE has merged its Department of Computer Science with its Department of Spatial Information Science and Engineering to create a School of Computing and Information Science.

"Computing and information science has emerged as a key discipline for the 21st century," says Susan Hunter, UMaine's senior vice president for academic affairs and provost. "It is now a broad discipline that is at the technical core of our social interactions and relationship with the environment. This new structure will provide real value to our students while enabling new opportunities in research and public engagement."

In a recent address to the Maine Legislature, University of Maine System Chancellor Richard Pattenaude stressed the importance of providing computing and information degree programs that respond to Maine's workforce needs. Hunter says the new UMaine school is well-positioned to help achieve Pattenaude's stated goals of doubling the number of graduates in these areas within four years.

Professor Michael Worboys has been appointed the school's first director. He says he will focus his efforts on initiatives that will unify, strengthen and engage the university's many academic and other units that have a computational focus.

"Highly skilled information technology workers are in short supply and will continue to be in high demand in Maine and across the nation," Worboys says. "Industry is looking for people who understand IT and systems as a whole. These are the systems on which small and large enterprises alike depend for their operation in today's digital age. The new school provides the critical mass to meet these needs."

Sculpting a

Ceramicist Constant Albertson uses her art to fill

IN CERAMICS, the void is a powerful thing. Whether visible or hidden from view, the hollow space inside a vessel is as important as the surface. It defines structure, shape, character.

As a ceramic sculptor, Constant Albertson is acutely aware of that inner space. Sometimes in her work, it holds or cradles an object — a slice of apple, a skeleton, an egg — that the viewer can access through a hinged door or an opening in her piece of art. Other times it holds an idea or a message, shrouded by a wall of clay, a secret known only to the artist.

In life, the void is an equally powerful thing. Albertson discovered this viscerally, intensely in the wake of her mother's death in 2007. Johnnie Albertson was larger than life. Extraordinary. Her death left a hollow space not easily filled with figures or ideas.

"When death comes and when it's personal, it seems like such a mystery," Albertson says. "They're here and then they're gone. What do you do with that hole in your life?"

For Albertson, an art education professor at the University of Maine, the answer was obvious: Make art. And for three years, she focused on this memorial, building and refining sculptures that examine the complex — and at times contradictory — life of a self-made woman.

The resulting installation, *Storyteller*, is a riveting narrative about motherhood, myth and memory. Arranged like a clock face, *Storyteller* consists of 13 sculptures,

Constant Albertson developed *Memorial* from several drawings that she did sitting at her mother's bedside. It represents the moment that her mother, Johnnie Albertson, died.

life

By Kristen Andresen
Photos by Alan Stubbs

one at each time station — each representing seven years of Johnnie's life — and one in the middle. Instead of hands, crayon lines and handwritten dates on the gallery floor radiate from the center. The crayon is intended to blur and fade, like memory, over time.

NARRATIVE IS CRITICAL for Albertson, whose work has been exhibited internationally. A previous series, *Unhinged*, explored the parallels between personal and worldwide crises — pairing the domestic with the global, the unraveling of an individual life with the unraveling of an entire system.

In *Storyteller*, Albertson explores her mother's personal history, a tale that is rife

Symbolism plays heavily into the sculptures Constant Albertson created for her installation *Storyteller*. In this piece, the triangle symbol of Alcoholics Anonymous represents her mother's sobriety and the active role she played in AA. During Constant's childhood, Johnnie Albertson served as a sponsor for many recovering alcoholics and she was on call at all hours.

the void left by her mother's death

Sculpting a life

A rocking horse of sorts — a hybrid of a rabbit, bird and fish — is Albertson's way of coming to tērms with the grandmother her mother, Johnnie, wanted to be and the grandmother Johnnie was.

with struggle and success. Johnnie was an orphan who climbed trees, read voraciously and dreamed of a better life. She married for love. She had a pioneering career in advertising. She was a loving mother to her son and adopted daughter. She also had her demons — alcohol, drugs and, when her marriage failed, poverty.

But it would take more than hardship to squelch Johnnie's spirit. In time, she joined Alcoholics Anonymous. She rose through the ranks of the Small Business Administration, achieving the highest possible position in American civil service without a congressional appointment. She even jumped out of a cake — when she was in her late 70s — at a convention.

Albertson's sculptures capture the landmark moments, using recurring symbols to represent themes in Johnnie's life: birds serve as witnesses; apples and apple trees symbolize learning and ambition; a rabbit embodies androgyny and fear.

The idea of bearing witness plays heavily into Albertson's work. In the show's centerpiece, *Memorial*, a swallow perches on the shoulder of an elderly woman, eyes closed, at peace. A hinged door at the woman's abdomen opens to reveal a slice of apple and a painting of an orchard. The sculpture represents the moment of Johnnie's death.

The bird and apple trees reappear on a sculpture of a child's wagon, a rumination on motherhood, on giving children roots and wings. Another bird perches atop a sculpture of a well-worn Louis Vuitton bag — the clay as supple and slouchy as the real thing.

In many ways, the sculptures are a celebration, but Albertson unflinchingly tackles the difficult times, as well. A tall, narrow house, side open to reveal a skeleton cradling a baby, represents the dissolution of Johnnie's marriage and the dark

"When death comes and it's personal, it seems like such a mystery. What do you do with that hole in your life?" Constant Albertson

A beautiful designer handbag was a special luxury for Johnnie Albertson — a symbol of just how far she had come. Constant Albertson modeled this sculpture after her mother's favorite travel bag.

The eagle plane represents Johnnie Albertson's service in the Women's Airforce Service Pilots — a story told many times, and one that may not have been true.

days that followed — days of alcoholism, suicide attempts and overdoses. And then there is the eagle plane — a B-17 with talons instead of wheels, representing Johnnie's stint as a Women's Airforce Service Pilot — a story Albertson heard many times. Yet she couldn't find any record of her mother's service.

"You question whether you heard the story right," Albertson says. "What does it mean that it's unlikely to be true? I went through a period when I thought she had lied to me, but I started thinking about the context of her life, thinking about the psychology of the person, thinking as an adult rather than a child. As a woman who has faced difficulties, sometimes you come to believe the metaphor. Sometimes, the distinction between metaphor and verifiable fact becomes untethered."

After much soul searching, Albertson decided that the facts were less important than the overarching truth about her mother — she did soar.

Johnnie wasn't perfect. But she was amazing. And when she passed away, her absence left a void that was difficult to fill. Through her art, Albertson was able to build something beautiful around that void. Something that would make sense of it. Something that would contain it.

"For most people, their mothers are a pretty big presence, but my mother was a big presence for others as well," Albertson says. "Most of us hope to achieve more or to build on what their parents did, but when you get someone who is so extraordinary as a parent, you have to rethink that." ■ +Online

Learning through story

STORIES AREN'T JUST central to Constant Albertson's art. They're central to her research in education. Albertson focuses on dyslexia and the factors that influence a student's compensation for dyslexia.

When she started this work in the early 1990s, she found that education texts either overgeneralized about students with dyslexia or made them out to be "some sort of uniform creature without much impulse control — not terribly intelligent." Her response? Broaden the conversation — by truly turning it into a conversation. She conducts open-ended interviews with participants, allowing them to become storytellers. Her scholarship provides a more nuanced perspective of the issue.

"My goal is for people to try to view people with learning disabilities as individuals, and try to have empathy for what they've achieved and what they've dealt with," Albertson says.

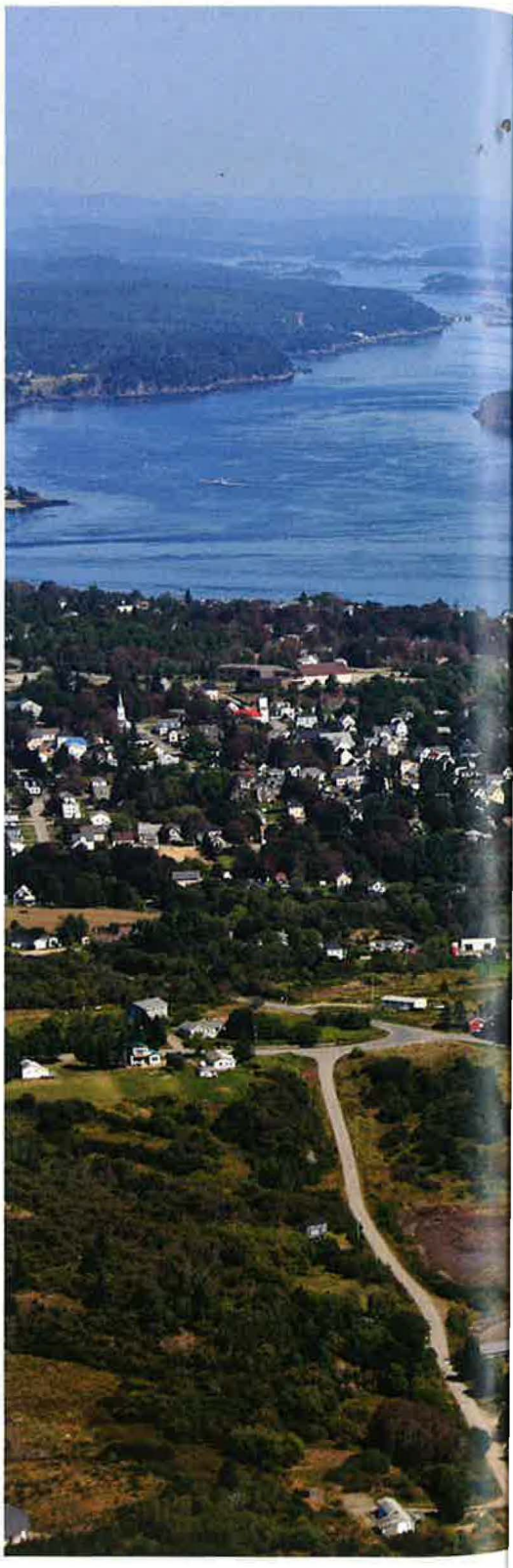
Albertson is dyslexic, and as a teacher of teachers, she urges her students to remember their own classroom experiences, to consider their own childhood struggles, and to more deeply explore how people think and how they learn.

"There's a tendency when you're working in a stressful environment — and schools are stressful — to forget you were a child and that you once had problems and that those problems get brought to school," Albertson says.

WORKING TIDAL

UMaine engineers, marine scientists weigh trade-offs of harnessing the ocean's power

By Margaret Nagle



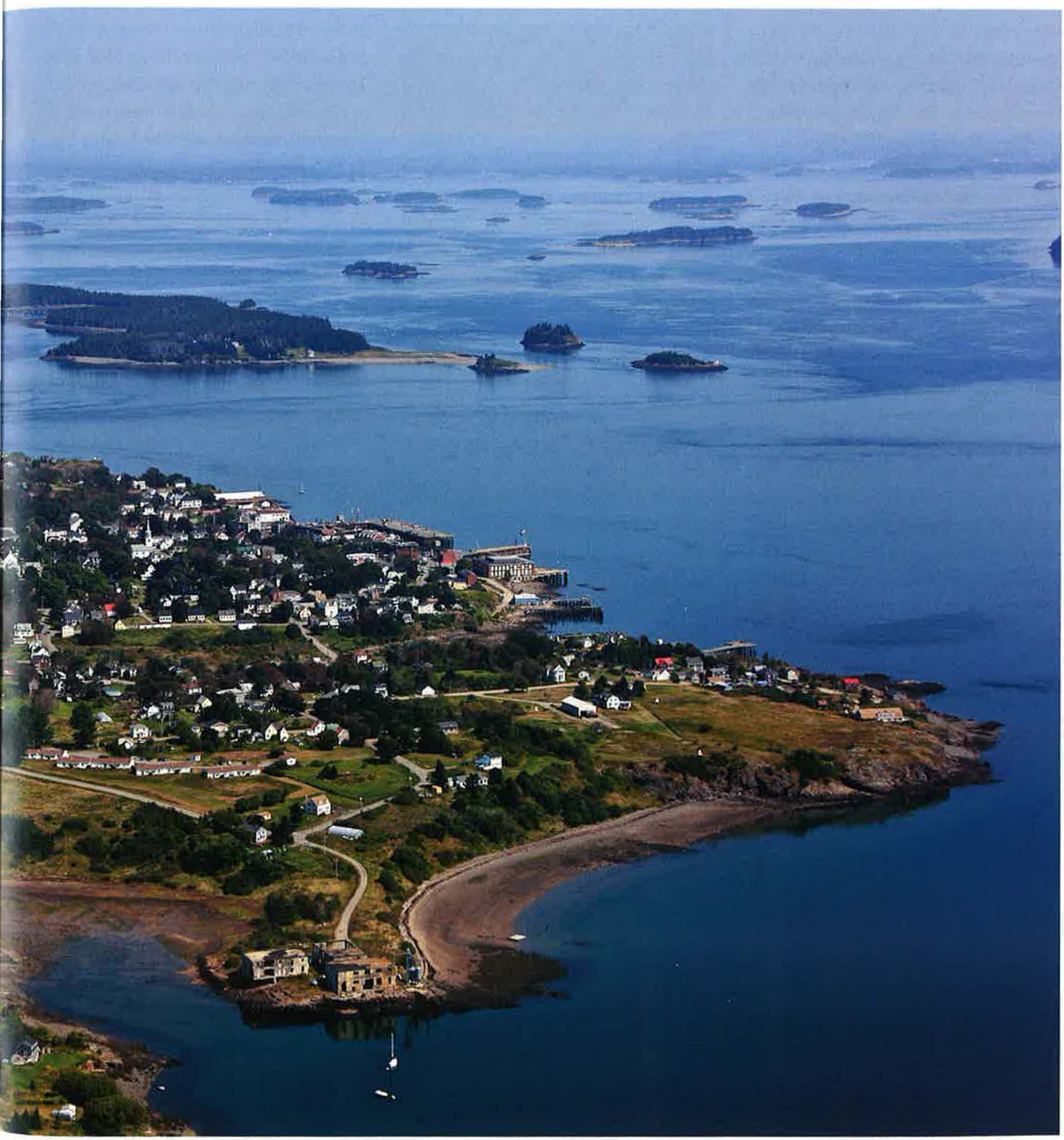
FOR MOST OF THE WORLD, ocean waters rise and fall roughly every 12 hours under the gravitational influence of the moon and sun — regularity that's particularly attractive when humans attempt to harvest tidal energy.

But that predictability stands in sharp contrast to the unknowns involved in tapping the tides. The decades-long quest to harness marine kinetic energy has focused largely on the engineering needed to efficiently and cost-effectively generate electricity. In Maine, that has taken the form of mill dams along the coast and the ill-fated Depression-era Quoddy tidal project in Cobscook Bay.

Today, the quest continues with new technology in the form of in-stream turbines, and engineering is still the focus in this effort to turn the tide into an alternative energy source.

But at the University of Maine, the questions go deeper than that.

A team of engineers and marine scientists from UMaine and Maine Maritime Academy has formed the Maine Tidal Power Initiative to conduct research that will inform responsible tidal energy development in the state. In their four-pronged approach, researchers are pursuing questions in engineering — turbine design, modeling and testing. They're assessing the energy resource — from determining the amount of in-stream



In Cobscook Bay, Ocean Renewable Power Co. is testing the largest ocean energy device installed in U.S. waters.
Photo by Dave Cleaveland/maineimaging.com

Working tidal

tidal energy to quantifying the impact of energy extraction on tidal flow. And they're also measuring the impact of tidal energy projects on two key populations: marine life and residents of coastal communities.

"We consider those four to be equals," says Michael "Mick" Peterson, University of Maine Libra Professor of Engineering and the coordinator of the Maine Tidal Power Initiative, based at UMaine and part of the Sustainability Solutions Initiative. "There's nothing subordinate, because any one of them will stop the entire progress of the industry."

The researchers work with developers, communities and device manufacturers to create an informed framework for tidal energy projects, tailored to the social and ecological conditions of each site, with a focus on sustainability and broad benefits to residents. The goal is to understand the value of the energy resource related to a tidal project and to determine if a site is commercially viable, locally accepted and environmentally suitable before making further investment.

"With tidal energy, it's important for stakeholders to know what it means to their community, their fishing grounds and their industrial development," Peterson says. "(Maine) stands out in tidal energy; nobody else has this kind of resource in the continental United States. And so we should be leading the industry."

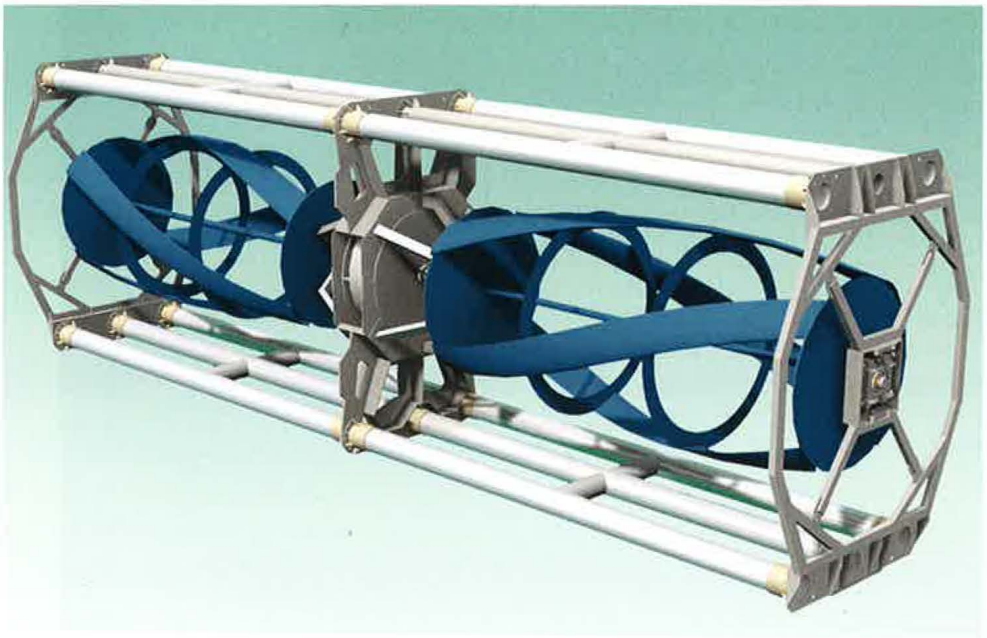
IN MAINE HISTORY, two large projects stand out for their sweeping scopes and promise. The latest is being carried out by Portland, Maine-based Ocean Renewable Power Co. (ORPC) in Cobscook Bay at the mouth of the Bay of Fundy off Eastport and Lubec — the same waters that harbored a national dream championed by Franklin D. Roosevelt called the Passamaquoddy Tidal Power Project.

Quoddy, as it came to be known, was a proposed series of dams and gates for Cobscook and Passamaquoddy bays to capture tidal energy from the Bay of Fundy. What the project failed to do was secure ongoing support from Congress, which cut funding in 1936 after the first small dams were constructed. Despite efforts in the 1950s by Sen. Margaret Chase Smith and others, the federal government failed to reinvest to make it a reality.

In 2010, ORPC successfully deployed, tested and sustained operation of its Beta TidGen™ Power System, described as the largest ocean energy device ever installed in U.S. waters. The beta run incorporated the company's commercial-scale turbine generator unit (TGU), as well as the *Energy Tide 2*, ORPC's research vessel from which TGU was deployed. Also on site were performance and environmental monitoring systems.

With the help of a $10 million matching grant from the U.S. Department of Energy, ORPC will connect a TidGen™ Power System, consisting of an array of five TidGen™ devices, to the Bangor Hydro Electric grid by mid-2013 — a $21 million project. By 2015, ORPC expects to generate more than 3 megawatts of power using multiple devices in the Eastport-Lubec area.

UMAINE'S ROLE in tidal energy research started more than three years ago as a subcontractor to ORPC, doing turbine foil analysis and modeling. With DOE



ORPC's Beta Pre-Commercial Turbine Generator Unit (Beta TGU) successfully completed deployment testing in Maine in 2010. Image courtesy of ORPC

funding to UMaine, researchers launched the first of the initiative's independent environmental and energy resource assessments, making the university the go-to source of data and analysis for state and federal organizations, including regulators.

"Because they were in the process of developing a device, that was very much focused on the engineering," Peterson says. "But from Day One, our interest has been in developing tidal energy as an industry and a resource in the state — assessing the size of the resource and the environmental impact, as well as developing tools that could be used for the different locations in Maine to determine how much energy is available."

To date, the Maine Tidal Power Initiative at UMaine has received nearly $4 million in funding, including $1.9 million from the Department of Energy in 2009 and 2010, and $846,000 from ORPC's $10 million DOE grant last year. Maine Tidal Power Initiative, through its partner, Tidal Energy Device Evaluation Center at Maine Maritime Academy, also has subcontracted with two other Maine companies.

"In Maine, tidal energy will never be something that is a standard item that goes everywhere, because the complexity of the flow in any coastal area means that the design and the output are going to need to be understood in terms of local effects," Peterson says. "On the environmental side, we can't even necessarily transfer some of our understanding from one site to the next, because it depends specifically on what species exist in that location and how they use that water."

"Philosophically, what we want to do today in tidal energy is understand the impacts and decide whether this is an appropriate place to develop it. Then, if we decide it's appropriate, minimize the impacts."

Michael Peterson

ONE OF THE primary issues for the Maine Tidal Power Initiative is to determine where and when fish and other marine life are in the water column throughout the year, to assess the potential risks of turbine operations on fish and fish communities. Leading the investigations on the marine species is UMaine fish ecologist Gayle Zydlewski.

In 2009 and 2010, Zydlewski and her research team started collecting data on fish distribution in Western Passage (between Maine and Deer Island, Canada) and Cobscook Bay. The researchers used acoustic technology to study the distribution of fish communities in the water column, and they also collected information on such factors as water temperature, velocity and salinity.

"With input from stakeholders, particularly regulators, the questions are becoming more specific: Which species are where in the column?" she says.

Last summer, Zydlewski's team expanded its work to include netting fish in the mid-water column. Fish biologists know that anadromous species such as salmon and alewife take advantage of tidal energy to move, while some species, such as Atlantic herring, disperse to other habitats during peak tidal flows.

Schools of fish that move through the area in June are not the same species moving through in September. Fish communities also change yearly.

"Over the last year, we've been focusing on the potential impact of tidal turbines to the entire suite of fish in the Cobscook ecosystem," Zydlewski says.

Fish netting this summer targeted mud flats and coves. And as the purview widens, questions turn to the dynamics throughout the marine food chain, including how tidal energy projects affect phytoplankton, zooplankton and marine mammals.

Zydlewski's next questions focus on the commercial growth of tidal energy technology — the difference between a single turbine versus an array in the water, and how best to monitor and quantify environmental impact.

IN MAINE, tidal energy sites fall in three general categories: large commercial sites like the ones off Eastport and Lubec; very small sites, using technology comparable

Working tidal

Studying the ocean's energy

GRADUATE STUDENTS and research associates in tidal energy include:

Joshua Boynton: master's, civil and environmental engineering, physical modeling of soil-structure interaction (using a geotechnical centrifuge)

Matthew Cameron: master's, mechanical engineering, measurements of the wake field of hydrokinetic devices

Geoffrey-deBree: master's, mechanical engineering, testing of high solidity cross-flow tidal turbine

Jessica Jansujwicz: postdoctoral associate, human dimensions of tidal power development

Thomas Lokocz: master's, mechanical engineering, design and testing of ducted axial flow tidal turbine

Molly Ramsey: Ph.D., ecology and environmental sciences, human dimensions of tidal power development

Garrett Staines: research associate, hydroacoustic assessments of the environmental impacts of tidal power

Colleen Swanger: master's, mechanical engineering, blade design, testing and scaling of cross-flow tidal turbine

Raul Urbina: Ph.D., mechanical engineering, analytical models for cross-flow turbines

Haley Viehman: master's, marine sciences, impact of tidal energy development on marine life

Jeffrey Vieser: master's, marine biology and marine policy, fish and fishing communities of Cobscook Bay

in size to a small wind turbine; and middle-size sites such as Wiscasset, where the town and a local conservation organization are pursuing a municipal partnership. Peterson expects the latter to become a model for the Maine Tidal Power Initiative.

"This gives us the opportunity to now look at the site and discuss with the community what its values are, and to look at the environmental impact and how much energy will be generated so that the community can make the decision," he says.

Research on community concerns and the potential social impacts related to tidal energy development is the focus of social scientist Teresa Johnson, whose work examines the human dimensions of marine fisheries.

In summer 2010, in collaboration with the Maine Sea Grant Program and the Cobscook Bay Resource Center, Johnson surveyed stakeholders — including fishermen, scientists, regulators and Passamaquoddy tribal members — in the Quoddy Bay region in an effort to better understand their questions and concerns about tidal energy.

In the initial survey, concerns about the potential environmental impacts of a tidal energy project on marine mammals, fish and birds topped the list.

"There's a lot of uncertainty related to tidal energy because it's so new," she says. "Our big task is staying engaged with the community. Moving forward in tidal power, it's important to know that the research makes sense and is useful to the community. We need research that answers their questions."

ONE OF THE BIGGEST questions residents and developers have is just how much in-stream tidal energy is in the Gulf of Maine. For investors, the answer can justify the costly up-front capital associated with a tidal energy project. For coastal residents, it comes down to a trade-off between a potential source of alternative energy and changes to the natural environment in which they live and work.

"Right now, the estimate of the size of tidal energy is that it's going to be bigger than terrestrial wind and it's going to be smaller than offshore wind in Maine," says Peterson. "We don't know for sure how big it's going to be because it depends on details of how we design arrays of turbines. And that's why (UMaine Professor of Oceanography) Huijie Xue's work is so critical to the overall effort. She's got the potential to build the skill set for the state of Maine, to tell us how we install these arrays."

To understand just how much energy is available, tidal flow variability at proposed sites must be examined using large-scale numerical models.

Understanding wake decay — basically, how far behind the turbine is there an effect — is a major focus for the tidal energy industry.

Researchers must quantify what effect energy extraction will have on tidal flow and, subsequently, the marine environment, which depends on the strong tide to flush nutrients, pollutants and waste in intertidal areas, affecting water quality and ecosystem diversity. Changes in circulation could also affect the number of fish surviving the larval and juvenile phases to

"We've been focusing on the potential impact of tidal turbines to the entire suite of fish in the Cobscook ecosystem. The question is, when turbines are in there — particularly multiple turbines — how will the physical dynamics change to ultimately influence fish there?" Gayle Zydlewski

enter the adult population each year.

As a physical oceanographer, Xue studies the tidal currents to provide baseline data on the energy resource and suitable sites for development. In Maine coastal waters, nearly a dozen sites could be considered for tidal energy projects based on the strength of their currents. They include Castine Harbor, Taunton Bay, the Kennebec River, Cowseagan Narrows, Outer Cobscook Bay and Western Passage. All are part of the Gulf of Maine and connected to the Bay of Fundy, where nearly 10 percent of the energy dissipation in the North Atlantic occurs, says Xue.

FOR THE ENGINEERS on the Maine Tidal Power Initiative, site-specific questions focus on turbine form and function of energy conversion. Peterson and Richard Kimball, a Maine Maritime Academy associate professor and a UMaine external graduate faculty member in the Department of Mechanical Engineering, have collaborated to study in-stream cross-flow and axial turbine designs at test facilities on campus and at a demonstration and evaluation site near Castine.

The engineering research also includes the little-considered interaction between the seabed and foundation structures that support the energy conversion technology. Sites for offshore energy technologies are in complex geological areas with variable bedrock depths and soil properties. And no matter how the technology is secured to the seabed for fixed or floating devices, the foundation must withstand any number of loading scenarios — from large lateral forces from tidal currents over multiple tidal cycles to extreme ocean storms.

However, designs that incorporate mooring and foundation system responses with metocean conditions — meteorological and oceanographic — could increase efficiency of power production and cost, say civil and environmental engineers Melissa Maynard at UMaine and James Schneider at the University of Wisconsin.

"Developers have a misconception that you can put technology on the seabed and not a lot of engineering is required," says Maynard. "But soil is an engineering material. We have to understand how the material will interact with new loading scenarios."

WITH THE LARGEST tidal energy resource in the continental United States and its land-grant and sea-grant university pursuing research to help ensure responsible, cost-effective and sustainable development, Maine is poised to be a leader in tidal energy, Peterson says. In Maine, the biggest tidal energy-related benefits are in the form of tax revenue, jobs and renewable energy — in that order.

"This is an immature industry, and that actually puts us at the forefront of ocean renewable energy: wave, tidal and offshore wind. But we need to build the cluster of skills before we can move forward."

Peterson points to the early success of the auto industry in Michigan. One company started it all, then another moved there to take advantage of existing support sectors. Similarly in Maine, small companies supporting paper and other industries, for example, could diversify to meet the needs of emergent tidal energy and offshore wind industries, he says.

"We already see where there's a group of people on the mechanical side — independent engineers, machining and assembly companies. So the next company that comes in is already going to have an engineer who knows how to do marine design for this particular application. Our goal here is to build the independent companies that already exist in Maine."

In 10 years, Peterson says, the tidal energy industry will be ready to explore the next frontier, such as wave or freshwater in-stream turbine technology. With the multidisciplinary approach of the Maine Tidal Power Initiative, Maine's tidal energy infrastructure will be in place — and keeping pace. ■ Online

Want to raise pigs, cows or veggies on the back 40? Extension course gives would-be farmers a reality check.

AT ROCK Island Farm in Orono, Maine, the hayfields seem to go on forever, acre upon acre of lush green rippling in the breeze. In a small, unassuming plot next to the barn, something exciting is brewing. The two garden beds don't look like much now, but by next summer, they could be the foundation of a new business for Hetty Richardson: a roadside farm stand.

In February, Richardson left her job at the Maine Department of Environmental Protection to pursue farming full-time. She and her husband had been haying their fields for several years, and she also has raised sheep. Vegetables would be a new endeavor, so she enrolled in the University of Maine Cooperative Extension's "So You Want to Farm in Maine" course.

"The course was very timely for me," Richardson says. "I had found some information on my own, but I needed a plan."

Richardson isn't alone. In recent years, Extension educators have seen an uptick statewide in calls from first-timers and seasoned farmers who want to change their focus. In response, they created the course, which has attracted 140 students statewide in the last two years. It was designed to help students navigate aspects of farming that are only peripherally related to crops or herds. Things that may seem obvious but often aren't. Things like business plans and access to capital, agricultural rules and regulations, market research, accounting and interpersonal relationships.

"There's a lot of number crunching and soul searching that needs to go on," says Donna Coffin, an Extension educator based in Dover-Foxcroft, who co-taught the northern course with three colleagues in three counties — technology bridged the geographic distance. "I always get calls from people who ask, 'How can I make money on my land?' I ask them, 'What do you want to do? What do you enjoy? Do you like animals? Crops?'"

"You need to make sure your family understands what the impact is going to be. If your spouse hates the smell of pigs, that's good to know so you don't put the barn next to the house." Donna Coffin

From there, the questions get more complex: Do you just want to break even? If so, have you considered the cost of your labor? If you're selling at break-even prices, do you realize that you might be undercutting local farmers who are trying to make a living? Do you or someone on your farm like people? If the answer is no, the farmers market circuit probably isn't the best fit. How do your spouse and kids feel about farm animals? If they hate chickens or pigs, you know you can't rely on them to muck out the barn if you're sick or need to go away.

"These are good things to know so you don't have a family conflict," Coffin says. "We encourage people to talk to everyone in their family unit."

The course addressed more than relationships, though. Participants were asked to start a business plan over the course of the four-week session. Guest speakers addressed taxes, financing, insurance and legal issues. Many in the course were interested in keeping up with the most current regulations and guest speakers from Maine agricultural agencies addressed those concerns.

"If you're not involved in farming, there are all these specific things that you wouldn't even know," Coffin says.

"So You Want to Farm in Maine" serves as an introduction to those specifics, but Extension educator Tori Jackson stressed that Extension's involvement doesn't end when the course does.

"We all do a lot with production, so down the line, farmers can call us with production issues or for other advice, as well. We're also able to connect farmers with professionals within the University of Maine System," says Jackson, who is based in Androscoggin and Sagadahoc counties. "Cooperative Extension can be a resource for every area of how to run a farm business." ■


Our yard is such a pigsty!









UMaine diving program immerses future marine scientists in underwater research

By Jessica Bloch

AS AN EMPLOYEE of the University of Maine Department of Safety and Environmental Management based at UMaine's Darling Marine Center in Walpole, Maine, Christopher Rigaud spends a lot of time on land dealing with hazardous waste and laboratory safety issues. However, when he's not at his desk, Rigaud is likely to be in the water.

Rigaud leads the UMaine Scientific Diving Program, working with up to eight students at a time who want to learn how to do research underwater, collecting marine specimens, gathering data and taking measurements — key skills for future marine scientists.

In October, Rigaud and the Darling Center will host for the first time the annual meeting of the American Academy of Underwater Sciences (AAUS), which will draw science divers and researchers from all over the world. Rigaud is on the AAUS board of directors and hopes to promote Maine as a viable community to do science and diving projects.

What makes UMaine's diving program unique in the state and nation?

To my knowledge, no other university program in the state has this kind of organized scientific training program. The diving we do here is regulated under AAUS guidelines. We've been members since 1995, so our training program, safety standards and equipment standards all meet that national standard. If the students finish all the requirements, they can go on to any other AAUS institution and start as a science diver with minimal additional training. Being an AAUS-qualified diver will put them on the top of the list for jobs.

Also, students have the opportunity to learn to dive in fairly challenging environmental conditions. In Maine, we never have ideal conditions, such as 100-foot visibility in 80-degree F water. The visibility is poor by any means, even on good days. The water is cold, and even when it's warm in the summertime, it never really gets above 60 degrees F. Due to these demanding environmental conditions, the equipment requirements are also pretty intense. Divers must wear thick wet suits or dry suits,

Christopher Rigaud (top left) runs UMaine's Scientific Diving Program at the Darling Marine Center in Walpole, Maine.

WHAT A DIVE

gloves, hoods and a fair amount of weight. Essentially, if they learn to dive here, they can pretty much dive anywhere. You can't really take someone who's been trained in the Bahamas, for example, and put them up here and expect them to hit the ground running. When our students go to places with ideal conditions, they can really focus on their science mission because they're prepared for and used to much harsher conditions.

How did UMaine's science diving training program come about?

Scientists have been diving at UMaine for more than 40 years. It used to be that these divers were trained only as necessary for specific research objectives. To use UMaine oceanographer Bob Steneck as an example, he would have an underwater project and would hire student divers and interns to help accomplish his work. When these divers arrived at UMaine, we would train them to our standards and integrate them into the program. I wanted to create an academic diving program where, instead of waiting for student divers to sign on to a research project and then have to retroactively do the training, we could actively promote underwater research by giving them an opportunity to get into the water and get all the necessary training requirements done, so that when they became seniors or graduate students, they were ready to go.

How does classroom work integrate with fieldwork?

We have an academic component we talk about in class, and build in guest lecturers and other experts in the field whenever possible. When we go out to dive, it is always with a certain objective in mind, either science- or skills-related. After the first few dives, we integrate students into the process and require them to create their own dive plan for executing the scientific protocol or skills objective for the day.

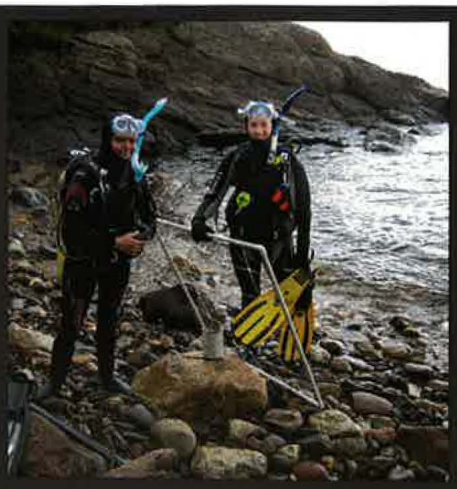
What would a student familiar with recreational diving get out of the class?

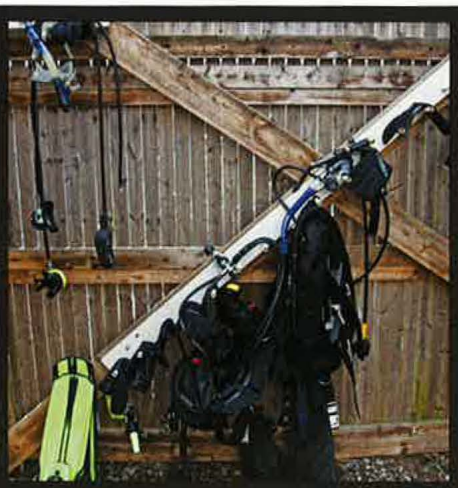
The goal of recreational diving is to have fun and enjoy yourself. Science divers use diving as a tool to meet a larger scientific objective. We're using actual scientific protocols to collect specimens, gather data, map and measure habitat, and perform other tasks not associated with recreational diving. When possible, we encourage students to integrate the dive class into their other coursework, so, for instance, they can go out and collect organisms for their invertebrate biology or marine ecology class. Diving allows them to observe these organisms in their natural habitat before bringing them back to the lab.

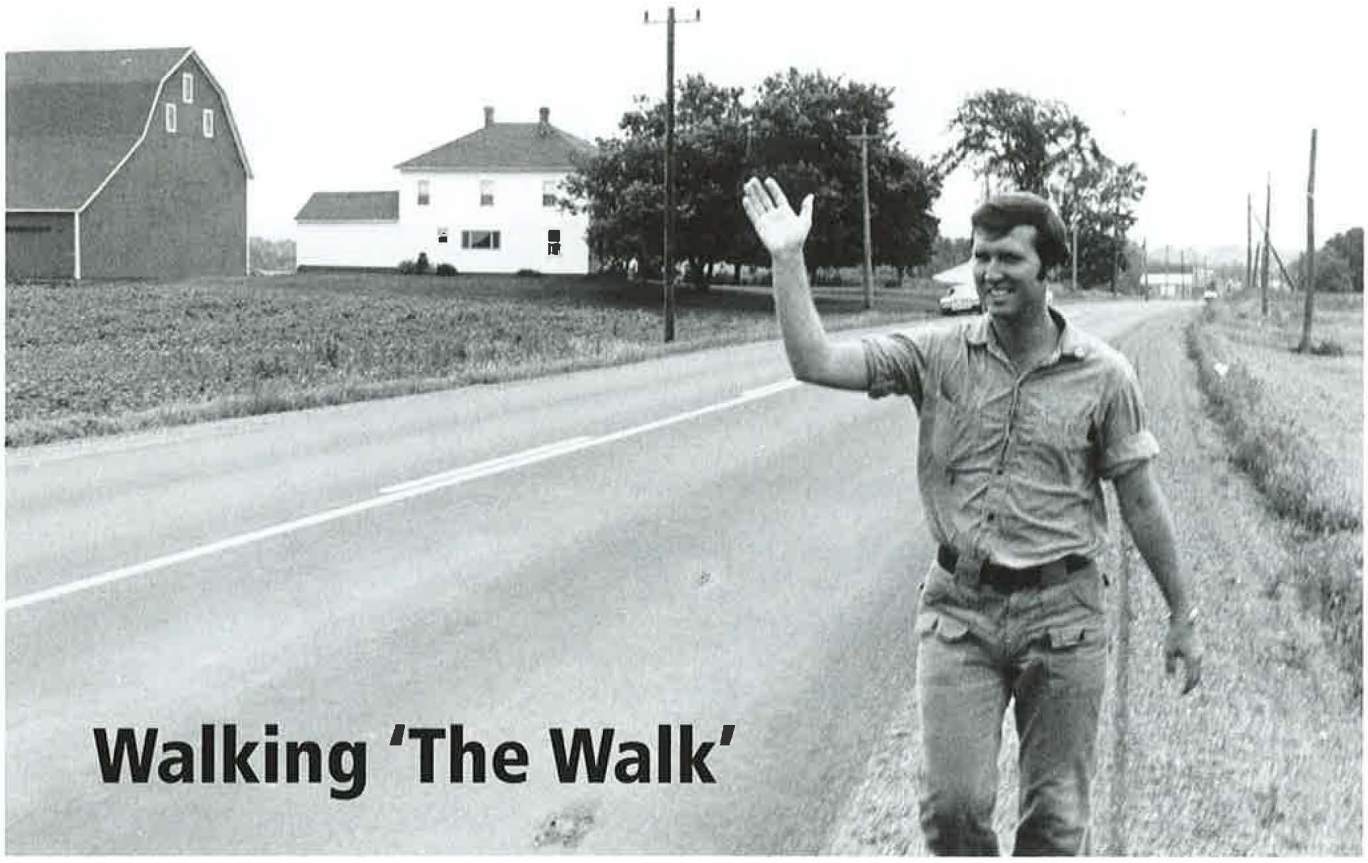
In addition to earning their scientific diving authorization, students also can earn two recreational diving certifications, which are built into the scientific diver course. Students end up being more knowledgeable, proficient and well-rounded divers.

What kinds of science diving projects have you worked on?

I started my scientific diving career here at UMaine as a diving intern in 1996, and since then have worked on scientific diving projects as a working diver or diving supervisor for a variety of scientific and academic institutions. ■







Walking 'The Walk'

IN THE 1972 CONGRESSIONAL CAMPAIGN, William Cohen walked 600 miles across Maine's Second District to meet and talk informally with constituents. The Walk, as it came to be known, took him through 47 Maine communities — from Gilead to Fort Kent. In subsequent campaigns for office, and even in nonelection years, walking through communities he represented as a "man of the people" became his signature. Cohen served in the U.S. House of Representatives, 1972–79, and the U.S. Senate, 1979–97, and as secretary of defense, 1997–2001. The William S. Cohen Papers in Special Collections in Fogler Library extensively document his nearly quarter-century of congressional service as well as his term in the Defense Department. His tenure included such landmark events as Watergate and the Iran-Contra Affair. The collection also covers a broad range of topics in Maine history marked by dramatic changes in the textile, energy and defense industries; healthcare reform; environmental issues; and concerns about government corruption and bureaucracy. One of the most recent donations to the collection occurred two years ago when Thomas Bright, Cohen's former press secretary, added his papers, providing intriguing insight into the campaign that launched a Washington career. The Bright papers in the Cohen Collection reflect the inner workings of the campaign and interaction with members of the press in the 1970s. ■

The William S. Cohen Papers in Special Collections in Fogler Library not only include documents and ephemera, such as this photograph from Cohen's 600-mile walking tour through Maine's Second District in 1972, but also artifacts, such as the shoes Cohen wore during the walk and a "honk-wave" campaign sign (below).

At their 'culinary incidents,' intermedia M.F.A. students serve up a performance in four courses

In culinary incidents such as *An Evening with Professor Enki* at UMaine's Lord Hall Gallery, participants who are willing to "dig a bit and follow up on small intrigues that are sprinkled through the main plot" find a deeper story, says intermedia graduate student John Bell.

Photo by Alexander Morrow

A surreal meal

LOOKING FOR a relaxing night of dinner theater? You won't find it in the events produced by University of Maine intermedia graduate students.

Their two-hour "culinary incidents" focus more on art than theater. Here, food, actors and audience members all have equal roles.

The artists behind the events describe their productions as planned chaos. A human experiment on the human experience.

This is no passive evening of entertainment. And it's attracting the attention of the professional art community from here to New York City.

"The idea is to force the audience to become a community and find a certain comfort in their neighbors," says installation artist Richard Corey, one of the five graduate students producing UMaine's culinary incidents. "We're not interested in people coming for just entertainment; we're interested in immersing the audience in our art."

The first culinary incident in 2010, *An Evening with Professor Enki*, was a class project focused on the eccentric scientist and his offbeat colleagues who travel the world in search of greater understanding of morality and memory.

Audience members entered Lord Hall Gallery on campus to take a seat in Professor Enki's laboratory and become one with the experience — and his experiments. Students in the class and local professional actors took on scripted, disquieting roles in an environment with rich structural, sculptural, video, audio and "set" items.

The first course was served in a pill cup. Salads arrived, then were whisked away within minutes at the ring of a bell, with the leftovers scraped into a plastic bag. When the main course arrived, diners gulped their beef stew for fear it, too, would be cleared prematurely. Little did they know it was timed for an exorbitant 30 minutes. All the while, Professor Enki ranted and his researchers hovered, taking notes and videotaping.

"More than anything else, I think it's an invitation," says intermedia graduate student John Bell. "Sure, come for some food or for some entertainment, but while you're here, why not closely examine the cutlery or ask one of the actors why there are gas masks on the wall? Everything that ends up in the space is there for a reason, and curiosity is usually rewarded with something fun and interesting."

Bell, Corey, Bethany Engstrom, Justin Taylor and Matthew Leavitt — the Core 5, as they are known — scripted the first event, then went on to do a second production in December called *The Gorsedd*. Based on the events' success and intrigue, the Core 5 is now fielding inquiries from as far away as New York City to stage productions. The group plans to continue making culinary incidents. They're among the 11 students in UMaine's first master of fine arts in intermedia class, which graduated in August. The Intermedia M.F.A. Program is directed by professor Owen Smith. ■

In flux

USING THE LATEST in optical sensor technology, marine scientists from the University of Maine and the University of Washington have achieved unprecedented documentation of a critical phenomenon that occurs during the spring phytoplankton bloom in the North Atlantic that feeds the deep ocean and contributes to carbon dioxide sequestering.

During what's called an aggregate flux event, phytoplankton growing on the ocean surface form layers of aggregates and sink, providing food for deep sea ecosystems and a carbon cycling function vital to the global atmosphere. Despite its importance, scientists have struggled to estimate it.

The ability to detect aggregates for months to years at a time has the potential to inform estimates of carbon flux in the ocean and modeling efforts.

On a research cruise in 2008 to study the bloom in the waters south of Iceland, the researchers used optical sensors on four autonomous underwater sea gliders and aboard ship to collect data on the flux event.

The research, led by UMaine oceanographer Mary Jane Perry, was the focus of a master's thesis by UMaine graduate student Nathan Briggs and will be published in the journal *Deep-Sea Research*.

A closer look at fungal infections

A LARVAL ZEBRAFISH MODEL developed by University of Maine biomedical scientists is providing unprecedented, real-time views of the little-understood interactions between immune cells and fungal pathogens in blood vessels.

Their in vivo model that enables imaging of the immune system in action has the potential to be used for screening new drug therapies. It already has led the UMaine researchers to discover evidence of an enzyme that regulates the growth of one of the most common yet lethal fungal pathogens to humans.

The researchers studied *Candida albicans*, a yeast that makes its home in the human body, where a healthy innate immune system keeps it in check. But in people with compromised immune systems, the fungal pathogen causes life-threatening infections. It is the fourth leading cause of infection in patients hospitalized in the United States.

The UMaine researchers — graduate students Kimberly Brothers and Zachary Newman, and microbiology professor Robert Wheeler — published their findings in the journal *Eukaryotic Cell*, where their discovery also made the journal's Highlights section. It also was spotlighted in *Microbe* magazine.

To better understand the molecular nature of the interactions between *Candida* and innate immune cells, researchers developed a novel candidemia infection model in zebrafish larvae. The larvae are transparent, facilitating noninvasive visualization of the way pathogens interact with the innate immune system. With the zebrafish model, the scientists showed that immune NADPH oxidase limits the proliferation and filamentous growth of *C. albicans*.

A tool for Maine schools

FOR ALMOST EVERY YEAR since the mid-1990s, the University of Maine Office of Institutional Studies has surveyed incoming students to understand their demographics and expectations on the eve of their college careers. The results are broken down by Maine high schools, providing administrators, guidance counselors and school board members further insight into their graduates who are enrolled at UMaine. Among the findings: There's often a disconnect between what students expect to happen academically and what occurs in their first year at UMaine. Institutional Studies Director Ted Coladarci and Associate Director Phil Pratt say the hope is that the data and analysis can foster and inform dialogue in Maine high schools related to college preparation, including the often unrealistic expectations of college-bound students and the demands of college.

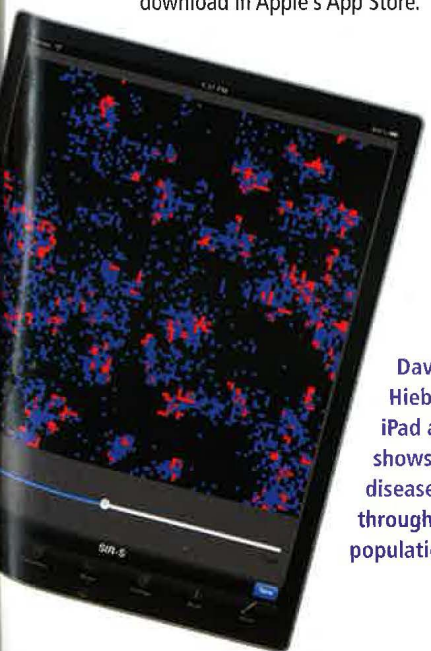
Super models

MODELING THE SPREAD of infectious disease? There's an app for that.

University of Maine mathematics professor David Hiebeler, in conjunction with computer science and mathematics major Peter Bilodeau of Greenville, Maine, has developed an iPhone and iPad app intended to help with the outreach Hiebeler does in Maine schools.

Using computational and mathematical models, Hiebeler's research describes how certain populations behave over time and under a variety of simulated environmental conditions. To introduce undergraduates and graduate students to his research, he created the Spatial Population Ecological and Epidemiological Dynamics (SPEED) Lab on campus. His K–12 outreach is an extension of this work.

The app includes three simulations; two model the spread of infectious diseases, and one is a population model. Users can control the parameters — for example, changing vaccination levels in a model community to see how that might affect the spread of a disease. Hiebeler and Bilodeau plan to add more simulation models — demonstrating such scenarios as strategies for controlling invasive species — and develop a similar app for android devices. The app is available for free download in Apple's App Store.



David Hiebeler's iPad app shows how a disease spreads through a population.

Home sweet home?

FOR PEOPLE WITH AGORAPHOBIA — abnormal fears of open, crowded or public places — their homes seemingly become their refuges and traditional treatment focuses on acclimating them to the external places they avoid.

But University of Maine philosopher Kirsten Jacobson argues the problem for agoraphobics is not external but in a flawed relationship with home itself. Often the agoraphobic has a poor sense of what it means to be "at home," stemming from overprotected, dependency-encouraging experiences in their childhood. As a result, agoraphobics feel vulnerable and incapacitated in public — frightened of a world in which they feel unwelcome.

That's especially true for women, who have historically been subordinated within the household.

In the first half of the 20th century, women's anxiety about leaving home and taking on new responsibilities "out" in society was evident in the increasing incidence of agoraphobia diagnoses. One study found women to be 89 percent more likely than men to have the disorder.

According to Jacobson, writing in the journal *Human Studies*, agoraphobia is emblematic of the continuing challenges women face in being recognized and supported as equal members of contemporary society.

Correction

DUE TO AN editing error, the cover story in the summer 2011 issue of *UMaine Today* magazine, 9.11+10, incorrectly cited the number of hijacked airplanes involved in the Sept. 11, 2001 attacks. Four planes, not three, were hijacked that day.

Reef relief

IT IS WIDELY HELD that coral bleaching occurs when temperatures and solar radiation are high, overwhelming antioxidant defenses in the algal endosymbionts and their coral hosts. Little understood are the biological mechanisms underlying such destabilization under stressful conditions.

An international research team led by marine biologist Malcolm Shick and chemical oceanographer Mark Wells of the University of Maine School of Marine Sciences studied the symbiotic coral *Stylophora pistillata* from the Great Barrier Reef to fathom the role of iron limitation on coral bleaching. Iron and other trace metals are essential for photosynthesis, antioxidant defenses and other metabolic processes.

Their study is the first to demonstrate that limited iron availability exacerbated the high-temperature stress in *S. pistillata* by decreasing its photosynthetic efficiency and antioxidant defenses.

The implication is that the degree of coral stress in natural environments under high light and temperature may be modulated by trace-metal nutrition.

The findings of the team, including scientists from the University of Western Ontario and the Australian Institute of Marine Science, were published in the journal *Limnology and Oceanography*.

Stylophora pistillata at Myrmidon Reef, Great Barrier Reef

Wide-open spaces

ACROSS THE AMERICAN landscape, many housing subdivisions have been built using cluster zoning, requiring a portion of the land to be preserved as open space. But open space that fails to connect key natural habitats can be detrimental to wildlife that migrates across the landscape.

An alternative planning method, conservation zoning, requires communities to identify and incorporate the most ecologically important features of their landscapes into protected areas. In a conservation subdivision, emphasis is given to the quality of open space rather than the quantity of open space, and connected or networked open spaces are encouraged.

University of Maine ecologist Robert Freeman and resource economist Kathleen Bell studied the two zoning approaches by producing build-out scenarios for Falmouth, Maine, which in 2007 enacted conservation zoning.

Conservation zoning produces a more permeable landscape than cluster zoning under most scenarios, according to the researchers, suggesting that the design of open space may be at least as important as the quantity. Such a trade-off between the amount and design of open space suggests the possibility for policies that benefit both wildlife and developers, say Freeman and Bell, writing in the journal *Landscape and Urban Planning*.

Virtual support networks

Members of Alcoholics Anonymous and Cancer Caregivers said Second Life provided greater anonymity than in-person meetings.

TO GET THE MOST out of a social support group meeting, you may want to send an avatar, according to communication researchers at the University of Maine and State University of New York at Oswego.

The team interviewed 23 participants in Alcoholics Anonymous and Cancer Caregivers support groups that meet in Second Life, a three-dimensional virtual world navigated using avatars. The support groups' members described Second Life as a communication medium in which they can build interpersonal relationships that differ from those developed online, in text-based discussion forums and in face-to-face social support groups.

The use of avatars facilitated real-time, nearly synchronous communication, openness and "intimate, hyperpersonal relationships with people who care about them and who help them cope with their stressful life circumstances."

The convenience of such virtual communication capabilities, coupled with the social cues of avatars interacting in a visual space, and anonymous connectivity to a large network of people with similar issues is conducive to social support communication and relationship development, according to the research conducted by UMaine graduate student Sara Green-Hamann, who is advised by Professor of Communication and Journalism John Sherblom, writing in the *Journal of Computer-Mediated Communication.*

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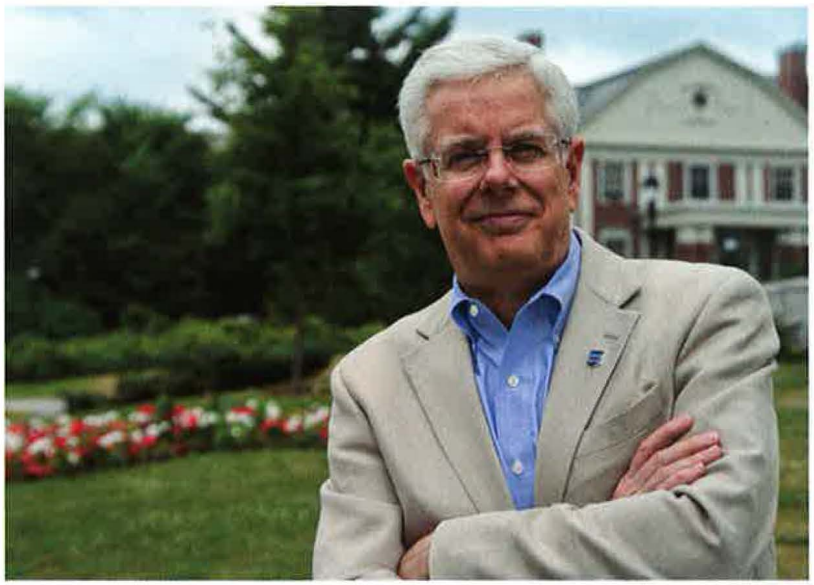

MY FIRST FEW WEEKS at the University of Maine have been as encouraging as they have been busy. I have traveled a good deal of this magnificent state — a warm and welcoming new home to my wife, Grace, our daughter Jenny, who is a new UMaine sophomore, and me. We have been struck by the friendly, genuine nature of Maine's people and, moreover, the deep, pervasive appreciation for UMaine as the state's land-grant university.

That really hit home when Cooperative Extension Executive Director John Rebar and I visited UMaine's blueberry research facility in Jonesboro. A grower walked up to John, shook his hand, and said, "I don't know where our industry would be without your team." Those words capture beautifully the abiding connection between UMaine and virtually every segment of our state's economy. It was a brief exchange, but it spoke volumes about the invaluable nature of our mission, which should be a source of pride for all of us.

As the academic year begins, Grace, Jenny and I are looking forward to all that is to come. We have a lot of work to do as we engage our stakeholders in bold yet pragmatic strategic approaches to planning for UMaine's future. I also look forward to continued opportunities to meet more of the alumni and other advocates who care so deeply about this wonderful university.

Paul W. Ferguson
President

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"UMaine provides a solid academic foundation in almost any discipline and the resources you need to succeed in the classroom. Beyond academics, I have built long-lasting relationships with friends and faculty who have been important in all aspects of my life."

Valedictorian Kristopher Cooper stands with keynote speaker U.S. Sen. Susan Collins at UMaine's spring 2011 commencement ceremony.

UNIVERSITY OF MAINE 2011 valedictorian Kristopher Cooper of Winthrop, Maine, majored in biology and minored in business. He was the 2007 salutatorian at Winthrop High School and at UMaine received a Top Scholar Award and the Edward and Grace Cutting Scholarship. Since his sophomore year, he was involved in potato disease management with professor Stellos Tavantzis. His research experience included fieldwork in Aroostook County and laboratory analysis on campus. As a member of MEDLIFE at UMaine, Cooper participated in a week-long medical mission to Ecuador. He also coordinated the Dental Outreach Program of the Health Professions Club, taking presentations on oral health to local elementary schools. This fall, Cooper begins his graduate studies at the University of Connecticut School of Dental Medicine. Scholarships, research opportunities and academic offerings for UMaine students are enhanced by donations to THE FUND. Please consider making your Annual Fund gift today.

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