

UMaine Today

CREATIVITY AND ACHIEVEMENT AT THE UNIVERSITY OF MAINE

MAY/JUNE 2006

Altered States

Thinking Outside
the Bait Box

Paper
and Plastic

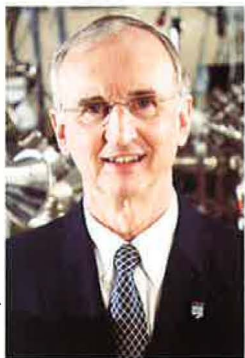


a muddy Start

Could this mean there are little green men?

President's Message

Photo by Bill Drake



AS A MODERN LAND GRANT, the University of Maine is committed to growing and strengthening its capacity to adapt to changing needs and conditions. We are constantly exploring initiatives to strengthen our academic and research foundations. We're seeking creative solutions to emerging problems through the development of partnerships and collaborations that build on our strengths.

Such a progressive approach requires new ways of realizing solutions, incorporating innovation and visualizing the world around us. Examples of that kind of thinking are just what you'll find in each of the stories in this issue of *UMaine Today* magazine.

Oceanographer Larry Mayer's perspective on our coastal mudflats has sparked new questions about how animal life on a planet could start. Sculptor Sam van Aken's art has prompted us to reevaluate our media-saturated culture. Instructor Ginger Yang Hwalek's inspirational pedagogy has earned her the title of best music teacher in the nation. The Center for Cooperative Aquaculture Research is fulfilling its role as an incubator for aquaculture innovation; in this case, a business helping to fill the gap left by a diminishing natural resource.

And YoBons. New ways of thinking about our world don't get any sweeter than that.

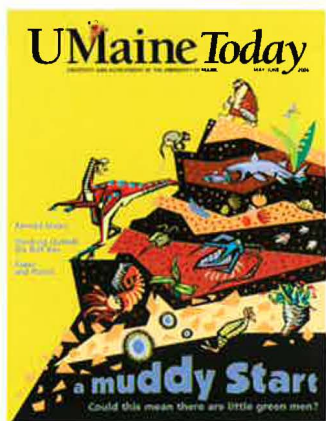
The research and creative achievement of these people and their programs are just a sample of what makes UMaine great. This spring, we also added a new, innovative project to further support Maine's economic development — and the state's future.

UMaine is launching a \$10.35 million research program to develop the infrastructure for forest biorefining in Maine. The research will provide the private sector with the science and engineering needed to build and support a forest bioproducts industry that will add jobs in the state. Forest bioproducts research is a priority for the university, giving Maine an advantage in building this industry into an economic success.

An integrated forest biorefinery, like so many other UMaine economic development initiatives, is part of our R&D momentum. It is key to our emergence as a new model land-grant university and to our role as a leader in Maine.



Robert A. Kennedy
President



ON THE COVER: It was an idea inspired by the mudflats of Maine more than a decade ago. In a paper published in *Chemical Geology* in 1994 dealing with the composition of marine sediments, University of Maine Oceanographer Larry Mayer made an important connection between the burial of organic matter and the presence of clays. Through a recent collaboration with geologists from the University of California - Riverside, his discovery has been put into a worldwide context, providing a perspective on how multicellular life could have begun on this planet — or any other.

Illustration by Carol Nichols

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University of Maine profile

Located in Orono, Maine, the University of Maine is the state's land-grant and sea-grant institution. UMaine serves its home state through its explicit statewide teaching, research, and public service outreach mission. Offering 88 bachelor's, 64 master's and 25 doctoral degree programs, UMaine provides the most varied and advanced selection of programs available in Maine. The Carnegie Foundation for the Advancement of Teaching classifies UMaine as a Doctoral Research Extensive University, the highest classification.

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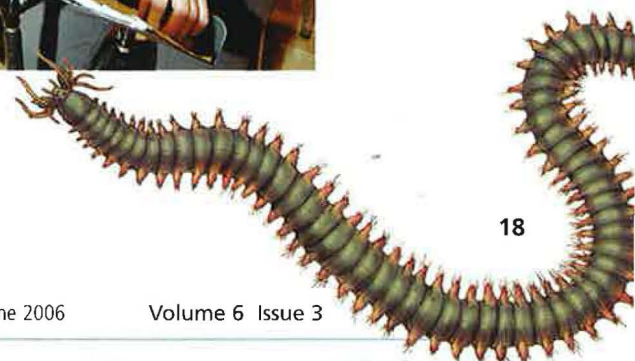
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Seabait Maine, one of the only aquaculture facilities in the world that grows sandworms, has the potential to produce 70 million tons of worms at \$30 per pound, supplying shrimp aquaculture farms and bait businesses.

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Refining the forest

By Clinton Colmenares

Imagine — or maybe you can remember — the looks on Americans' faces in 1961 when President John F. Kennedy promised to put a man on the moon and return him safely to Earth. You might see a lot of raised and wrinkled brows in front of a black-and-white glow. But at what was then 3-year-old NASA, scientists with slide rules in hand and Buick-size computers chugging away weren't asking if the lunar landing would happen, but *when*.

Re-enter present-day Maine. A similarly perplexing quandary prevails, and although this one is rooted in terra firma, the "space race" provides a reliable metaphor.

At the University of Maine, amid the intense murmuring of laptops and combo-drive Macs, scientists and engineers armed with a new, multimillion-dollar federal grant address the pressing issue of our time: fuel, energy, green chemicals — and trees.

They're talking about forest biorefineries, using trees instead of oil to make fuel. But not just fuel. UMaine wants to augment the pulp and paper and building products industries with new revenue streams of high-profit-margin chemicals to make coatings, plastics for tubs for butter or fenders for cars, and maybe even nanotechnology products. Best of all, these bioproducts would leave a smaller, lighter ecological footprint.

People in pockets of America might scrunch their faces. But Mainers, like people in the Pacific Northwest and South who depend on forest industries for their livelihoods, are ready. That's especially true when faced with increasingly harsh economic realities, like the announcement this past March that Georgia-Pacific was closing its mill in Old Town, Maine, a stone's throw from the UMaine campus.

"I think it is almost inevitable that a transformation of the pulp and paper industries will come," says Adriaan Van Heiningen, a UMaine professor and the Ober Chair of Chemical Engineering, who is recognized worldwide as a leader in chemical engineering related to pulp and paper processing. "I even think if the pulp and paper industry will not do (biorefining), energy companies will."

Trees, after all, are made of carbon, hydrogen and oxygen, just like corn — and oil.

Other states and universities, and public companies and private investors, are ramping up biorefinery research. Even singer Willie Nelson has joined the biodiesel bandwagon, branding his own Bio-Willie and pumping up support coast to coast.

"WE KNOW HOW to extract hemicellulose from wood and still make pulp. Professor Van Heiningen can do this," says Hemant Pendse, chair of UMaine's Department of Chemical and Biological Engineering. "Hemicellulose then can be turned into sugars for fermentation to ethanol. But nobody has been able to do it effectively or efficiently enough for commercialization."

Until now.

With a \$6.9 million NSF grant, UMaine is investing in research and infrastructure to develop sustainable forest bioproducts

Advances in science, coupled with better understanding of the ecosystem, the biology of tree growth and the chemistry of breaking wood down, allow us to approach forest biorefining more efficiently than we have in the past, says Stephen Shaler, a UMaine professor of wood sciences and technology, and associate director of the Advanced Engineered Wood Composites Center on campus.

Maine researchers realize that no resources are infinite, and they are growing the field of sustainable forestry to raise awareness of the need to take better care of what we have.

But tree plantations in Brazil, Chile, New Zealand and other countries produce as much as five to seven times more wood per acre than in unmanaged forests. One estimation puts tree plantations at 5 percent of total forestland, but production is 20 percent of the world's total, satisfying 34 percent of the world's demand for wood; they are projected to provide 60 percent of the world's softwood by 2050.

Scientists ominously refer to exports from these operations as the "wall of wood." This wall's encroaching presence has decreased the price of paper, but the price of wood in the northeastern U.S. has risen because of increased energy costs. Profits are squeezed by this dual behavior, Van Heiningen says.

Fuel and transportation costs also figure into the timber industry. The cost to ship product from Old Town to the rest of the country was one factor in GP's closing of its Old Town mill, a company vice president told the local media.

UMaine researchers are spurred to action by a confluence of local and global events: the war in Iraq and the escalating price of West Texas Intermediate; an anemic and limping forest products industry in Maine; and the nagging knowledge that other scientists and engineers in other laboratories in other states and countries also are closing in on forest biorefining.

And here we are again. Prompted by foreign pressures seemingly out of our control, economic doldrums and

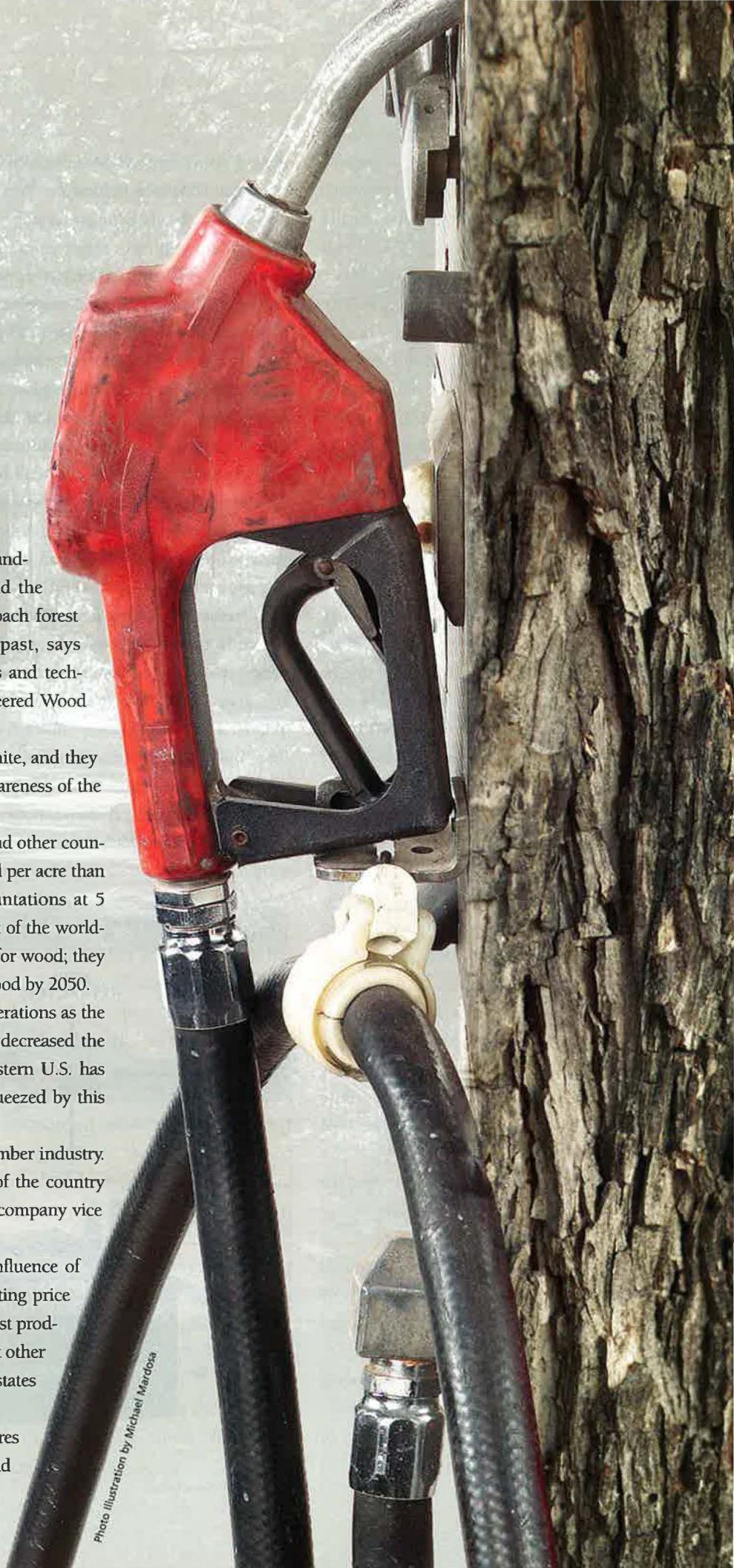


Photo illustration by Michael Mardosi

Refining the forest

global competition, we are about to begin a scientific quest. We even have a presidential call to action, although the famous remark, “we shall see space filled with instruments of knowledge and understanding,” from President John Kennedy’s speech at Rice University in 1962 is slightly more eloquent than, “We’ll also fund additional research in cutting-edge methods of producing ethanol . . . from wood chips and stalks, or switch grass,” from President George Bush’s State of the Union in 2006.

IN MARCH, UMAINE received a \$6.9 million award from the National Science Foundation’s Experimental Program to Stimulate Competitive Research (EPSCoR), which required a 50 percent (\$3.45 million) match by the university through the Maine Economic Improvement Fund. The grant, called “Investing in Maine Research Infrastructure: Sustainable Forest Bioproducts,” is making all of this new research possible. With it, the university will build the research infrastructure to create a biorefinery in Maine.

Discussions also are under way to determine the feasibility of establishing a Forest Bioproducts Research Institute, involving basic and applied research, and industry interests.

“Wood-based products like plastics, fuels and other new materials are the new wave,” Pendse says. “We are essentially positioning the state so that (it) can be a big player in this arena.”

The fact is, the state is used to using the forest for products, which means “we’re ready to roll,” Shaler says. Private industry would build a forest biorefinery — one of the first in the country. UMaine will supply the science and engineering, and the educated workforce to carry it forward.

“The university’s role is really to catalyze the private sector’s advances,” Pendse says.

Wisconsin, New York and Mississippi all have programs in forest biorefining. But

Pendse points to the NSF EPSCoR grant as proof that UMaine is out front.

UMaine also is taking advantage of the vast amount of human resources in the Pine Tree state, creating a holistic approach, breaking through traditional academic barriers to cross-pollinate expertise in engineering, chemistry, biology, forestry, ecology and economics. Partnerships are in place among leaders in the forest-products industry and forest landowners. Business leaders, scientists, engineers and foresters will collaborate.

UMaine’s science is on a unique course. Other research uses all the components of wood to produce ethanol, eliminating the coproduction of traditional products, Pendse says. UMaine’s research keeps the current forest-based products — pulp and paper and wood composites — intact.

WOOD HAS THREE components — cellulose, lignin and hemicellulose. Cellulose, which comprises almost half, contains the valuable fibers that give wood its structural value. Lignin has a high-energy value when

it’s burned to fuel a mill. But lignin and hemicellulose are combined in the spent pulping liquor, and since hemicellulose has half the heating value of lignin, burning hemicellulose does the mill little good. Practically half of the wood becomes valuable pulp; the other half is burned for fuel, of which about half doesn’t generate much heat.

But ethanol may be derived from hemicellulose; hence, its value. The problem is that hemicellulose degrades during pulping, and it is difficult to separate hemicellulose from lignin, which is where research comes in. It’s also more difficult to obtain hemicellulose from softwood while maintaining the fibers’ structural integrity during pulping.

Van Heiningen, with students and post-docs in his lab, as well as with collaborators, is trying to perfect that separation. The first step will be extraction of hemicelluloses.

“This is what sets us apart from the others,” says Van Heiningen. “I take the hemicellulose out before we do the actual pulping,” while maintaining the wood fiber quality for pulping or other processing.

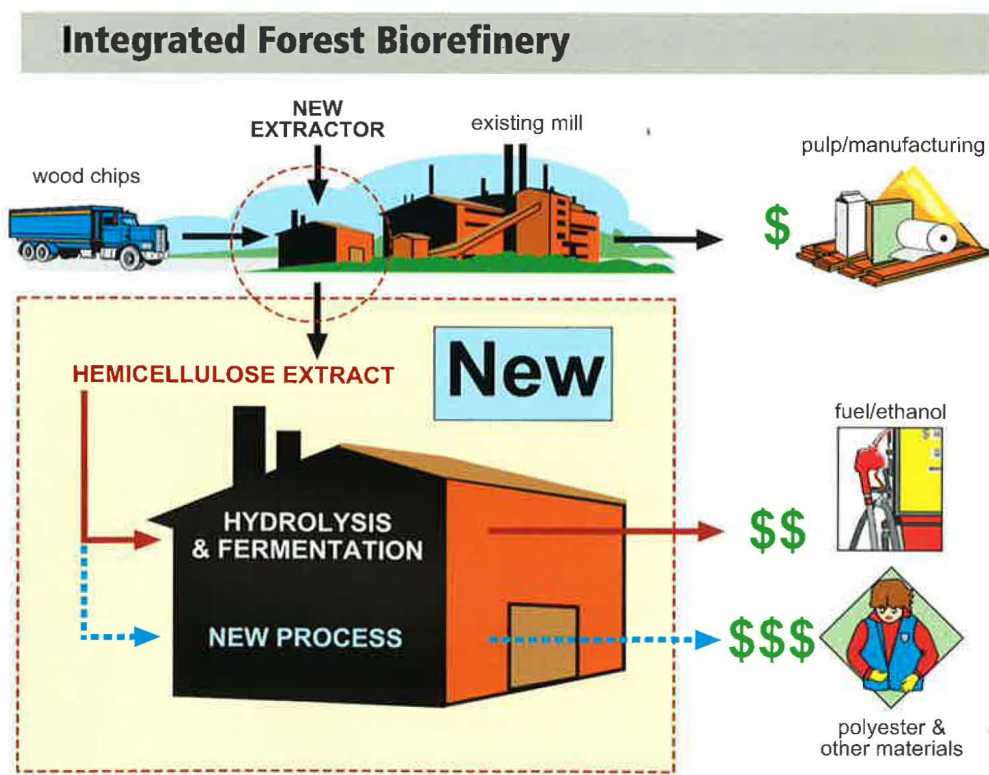


Illustration by Carol Nichols

The set-up would be relatively simple for mills, and would not require much of a technical challenge. Some mills could extract the hemicellulose and make ethanol to sell; others, Pendse suggests, could send it to a satellite mill where it could become finished products.

Like oil, chemicals from trees could be used to make a variety of products: plastics for containers or manufactured parts, coatings, adhesives and resins. One project in the Advanced Engineered Wood Composites Center is a car fender made using a wood-derived resin.

These niche chemicals could bring twice or triple the price of pulp, Van Heiningen says. Deriving ethanol alone could add 20 percent to 30 percent in revenue.

In Maine, trees have many advantages over other crops used in biorefineries: they don't have to be shipped in, they're abundant and can be harvested year-round, and they have a unique polymeric architecture. Seventy percent of wood cellulose is nanocrystals, Shaler says. If these nanocrystals can efficiently be removed from cellulose, they have the potential to compete with carbon nanotubes for a variety of structural, consumer and electrical applications, such as textiles and circuitry.

"We're looking at a new field of products that traditionally have not been made in the forest products industry," Shaler says.

VALUABLE, HIGH-MARGIN, wood-based products depend on the quality — and availability — of the tree from which the products are derived. As the value of bioforest products rises, so would the value of American trees.

"For landowners, a forest biorefinery means increased demand for their product," says Robert Wagner, UMaine's Henry W. Saunders Distinguished Professor and director of the Cooperative Forestry Research Unit, where he serves as a liaison between UMaine research and forest landowners.

"The big boon for (foresters) is likely to be the increased market for low- and poor-quality trees," because they'll be used for hemicellulose.

Valuable trees, the logic goes, receive better care, which will improve the environment. The "energy input" — the amount of energy expended to make ethanol compared to the energy value of ethanol itself — from wood is low, less than 50 percent; ethanol from corn is close to 100 percent.

Trees also remove carbon dioxide from the air, making any CO₂ production negligible. In the long run, Shaler says, using trees for fuel could help reduce greenhouse gases.

Creating a biorefinery and reaping its benefits will be a long row to hoe. Van Heiningen estimates that the volume of transportation fuel produced from Maine forests will be significant in the state. But nationally, at less than 1 percent, it's a drop in the 55-gallon barrel. Yet, if Maine creates the model, and other states that share the North Woods — Vermont, New Hampshire and New York — duplicate the efforts, the impact could be substantial in the Northeast, Pendse says.

There are as many factors as there are varieties of pines that will determine the success of forest biorefining — including the price of oil. Americans seemed to quickly forget the "energy crisis" of the 1970s. If oil prices come down, as some economists are forecasting, there is a history of investors being shortsighted and abandoning a bet on a sure thing like forest biorefining.

However, if biorefining processes reach their full potential, and measures to sustain the forests and the industries are successful, the creation of these new revenue streams will go a long way to reclaiming — and creating — a lot of jobs in Maine.

"I believe this could save the (forest) industry," Van Heiningen says.

While it's premature to say the *Eagle* has landed, the project has lifted off and the horizon is clear. ■

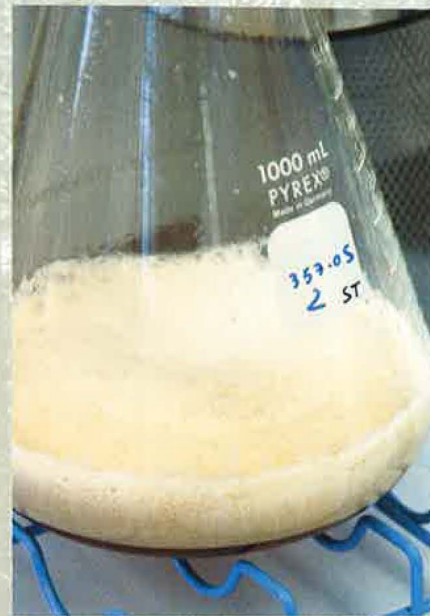


Photo by Bill Drake

Efficiently extracting hemicellulose is key in forest biorefining.

A holistic approach to sustaining a forest and its bioproducts market

- UMaine's new \$10.35 million forest biorefinery research program will build infrastructure to enable Maine's private sector to build an integrated forest biorefinery.
- The forest bioproducts research will immediately create more than 40 jobs. The research will lead to new technology that will be commercially licensed or will be spun-off into companies, providing jobs in science and engineering.
- The research will augment the state's forest products industry. Paper mills can add new, higher-valued product lines while maintaining current operations. Landowners will see increased demand for their product and a new market for low- and poor-quality trees.
- In its holistic approach, the project will be performed by researchers in such disciplines as science, engineering, economics and forestry. UMaine also will partner with those involved in the forest products industry, including landowners, mill operators and other commercial ventures created by new technology. UMaine will collaborate with other colleges and universities in the state, creating new research and educational opportunities for these schools' faculty and students.



“Ffsssssfffs”

It is, admittedly, a sound that doesn't translate well into the written word. Expressed in slow succession on low tide mornings all along the Maine coast, it's the sound a rubber boot makes when it is drawn from the clinging, clay-laden muds of coastal Maine by the straining hamstrings of its owner.

For University of Maine oceanographer Larry Mayer, it also is the sound of inspiration.

Mayer has been hip-deep, both literally and figuratively, in the Gulf of Maine's marine muck for nearly 30 years, unraveling the mysteries of marine sediments with microscope, boot and shovel since he began his tenure at UMaine's Darling Marine Center in the 1970s. His research forays have led him to vast flats of waterlogged goo across Maine and around the world, trudging through slop and sludge while gaining a deeper understanding of the Earth as it exists below the seas.

It was the viscous grip of his own local, coastal muds that ultimately led to his appreciation for

a muddy

UMaine scientist helps show how clays may

st-pock!”

the holding power — and growing potential — of clay.

While working on problems facing the clamming industry in mudflats, Mayer began to more fully appreciate the important connection between the preservation of organic matter and the presence of clays. He pursued this connection into the larger Gulf of Maine, and then into sediments around the world. Through a recent collaboration with geologists from the University of California - Riverside, his discoveries have been put into the context of geological time, and may help to explain how multicellular life on Earth began. Their research was published in *Science* earlier this year.

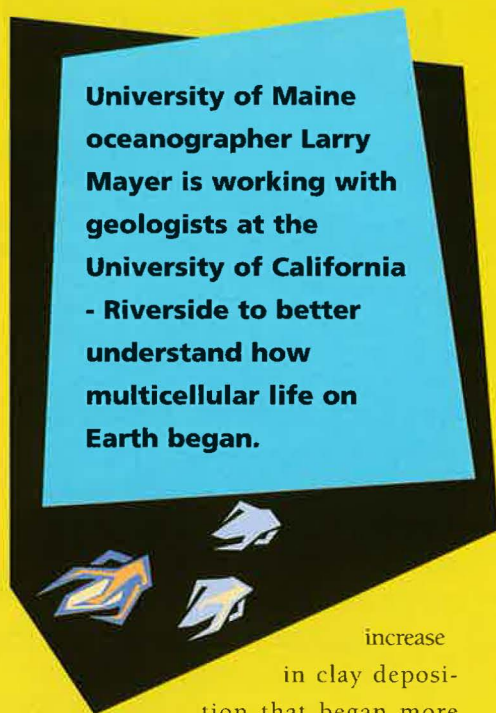
“Ask your average economist what came first — kitty litter or kitties? Likely (he or she will) reply, kitties. In the environment, clays act as a kind of kitty litter. They cover over and seal in organic matter,” says Mayer, pointing out the interaction between clays and organic particles on an electron micrograph. “In the mudflats just beyond the woods here, our studies showed that the accumulation of clays enabled the accumulation of organic matter in marine sediments. By burying organic matter, clays made it possible to increase the levels of oxygen in the atmosphere.”

In other words, if you are breathing, you may have clays to thank. From his woodsy office laboratory tucked away in a corner of UMaine’s Darling Marine Center in Walpole, Maine, Mayer explained that the

forming the Earth from a relatively harsh and uninviting place for animals to a fully oxygenated Eden where multicellular life could flourish.

Mayer is the first to admit that he is not much of a geologist. With nearly 30 years of oceanographic science under his belt as a UMaine researcher and professor, he is much more at home solving the puzzles of the present day ocean than pursuing the mysteries of the Earth’s distant past. However, in his own college days, Mayer was formally trained as a clay mineralogist. He took the opportunity to return to his geological roots when he agreed to collaborate with University of California - Riverside geologists Martin Kennedy, who led the research.

“Larry made some of the original observations on the mechanisms in modern sediments that this research is based on,” says Kennedy, who was joined on the study by UCR’s Mary Droser and David Mrofka; and David Pevear. “I’m interested in the longer-term implications — how things changed in geological time. We met at some sort of meeting in Washington, and he was very enthusiastic about the geology involved.”



increase in clay deposition that began more than 500 million years ago may have tipped the balance between the production of oxygen by plants through photosynthesis and the consumption of oxygen by single-celled microbes, trans-



Start



By David Munson
Illustrations by Carol Nichols

have made animal life on Earth possible

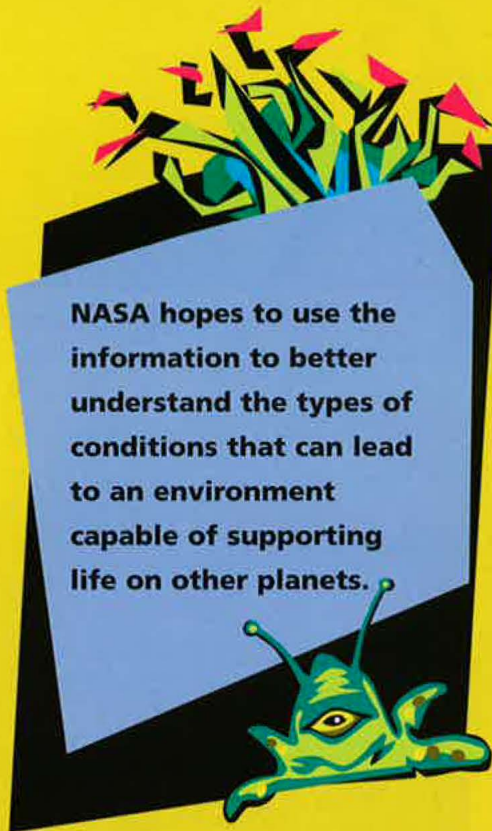
Kennedy and Mayer's casual discussions soon evolved into a globetrotting tour of the world's hot spots for very old sedimentary rocks. As the research team collected samples from critical sites in locales as diverse as Australia, China and Norway, their goal was to test their idea that the Earth started making clays in abundance prior to the evolution of animals.

The layers of sediment act as a tape recorder of Earth's history, says Mayer. The trick was to find the most complete version of that tape. The University of California - Riverside geologists were able to locate thick successions of rock that could integrate the discards of whole continents, across big space and time scales. By studying the composition of those rocks, the researchers found that clays came into the geological record on a worldwide scale between 1 billion and 1.5 billion years ago, during the Late Proterozoic.

Thus, clays arose just before the earliest proliferation of multicellular animal life — a strange assemblage of Precambrian creatures known as the Ediacaran fauna. As with any scientific enigma, the hows and whys of the Ediacaran explosion depend heavily on the wheres and whens. Mayer and Kennedy believe that the amazing proliferation of multicellular marine life during the Ediacaran was made possible by the holding power of clays.

But what made the clays? As it turns out, timing of the global increase in clay deposition fits into a time when new forms of life were believed to spread across the early Earth's terrestrial landscape.

It is thought that fungi, and maybe mosses and liverworts, first started to



become common on the Earth around 600 million–800 million years ago. Fungi would be very interesting additions to the landscape, because they add new chemicals that are very good at breaking down minerals and accelerating the weathering process that creates clays. The evolution of these organisms probably brought about rich, biotic soils that are essentially clay factories.

Much of the output of these clay factories made its way to the oceans in the roiling waters of ancient rivers and streams, along with other types of sediments and increasing amounts of organic matter. As plants contributed to the atmosphere's oxygen, some of the organic matter that they also created was sealed off by clay particles from the bacteria and other organisms that would otherwise break it down using their oxygen-fueled metabolic processes.

“Oxygen is just a waste product of making organic matter, and it's the job of respiring organisms to use that oxygen to break organic matter down again. It's a very efficient recycling system,” says Mayer. “So, in order to get more oxygen to stay in the atmosphere, you have to sneak organic matter out of the equation, and clay is very good at doing that. The increase in clays may have been the critical step in increasing oxygen in the atmosphere. There would be no opportunity for multicellular animals to evolve without that oxygen.”

In other words, you couldn't get to kitties without first making the kitty litter.

“This research speaks to one of the big questions, if not the biggest question, in geobiology: Why did animal life arise on Earth and what geological conditions make life possible?” says Kennedy. “The natural extension of that question is to ask what needs to happen on other planets for life to exist. It really shows how amazing our planet is and how dependent we are on the incredibly complex series of linkages between geological and biological processes.”

Indeed, much of the research was funded by NASA. By providing insights into the

complex processes that allowed multicellular animals to develop and thrive on Earth, the research done by Kennedy and Mayer will help NASA scientists as they examine the geology of other planets.

NASA hopes to use the information to better understand the types of conditions that can lead to an environment capable of supporting life on other planets. The information may help NASA researchers as they look at new directions for the nation's space program.

Mayer's interests are a little more down to Earth. He plans to continue his investigation into the nature of clays' interactions with organic matter and other particles. By developing a better understanding of why clays are so effective at protecting organic particles from bacteria and other organisms, Mayer hopes to gain new insights into the basic geochemical processes that make the Earth such a dynamic — and hospitable — planet. ■



Photo by David Munson

a clay base

WHILE LARRY MAYER has earned a reputation as one of the country's leading experts in marine sediments, his academic training was in clay mineralogy, a discipline that he largely set aside when he began his career at the University of Maine in 1976. His interest in clays was rekindled when a group of students approached him four years ago to request that he teach a course dealing with the nature of clays. He agreed.

"This is an example of the synergy between teaching and research," says Mayer. "Teaching the class made me get back up to speed in the clay business and sparked my interest again, helping to steer me toward this project."

The infusion of geology into his ongoing oceanographic research has opened new doors for Mayer, who believes the combination of teaching and research is of key importance when it comes to keeping a research program dynamic and exciting.

"I like getting back into this subject; it's really interesting. And it's great to get into the field with a rock hammer again."



In *The Multiple Deaths of Willem Dafoe*, sculptor Sam van Aken compiled the death scenes from 13 of Dafoe's classic movies and took the deathwatch to its "absurd but logical conclusion" — a funeral. On six black and white television sets surrounded by white floral arrangements, Dafoe's death scenes ran simultaneously. Mozart's *Requiem* melded with sights and sounds of the violence; electrical cords ascended to the ceiling.



By Margaret Nagle

Installation photos by Sam van Aken

Altered st

Just how many times can a man die? Thirteen, according to Sam van Aken. One man died in Los Angeles in 1985 and in Vietnam in '86. The same man was crucified near Jerusalem in 1988, was decapitated when he fell on his sawed-off shotgun in Big Tuna, Texas, two years later, and succumbed to hunger, cold and madness after 11 days subsisting on cheese crackers while ice fishing on Maine's Moosehead Lake in '92.

He also died in St. Martin, Prague, Beijing and New York City.

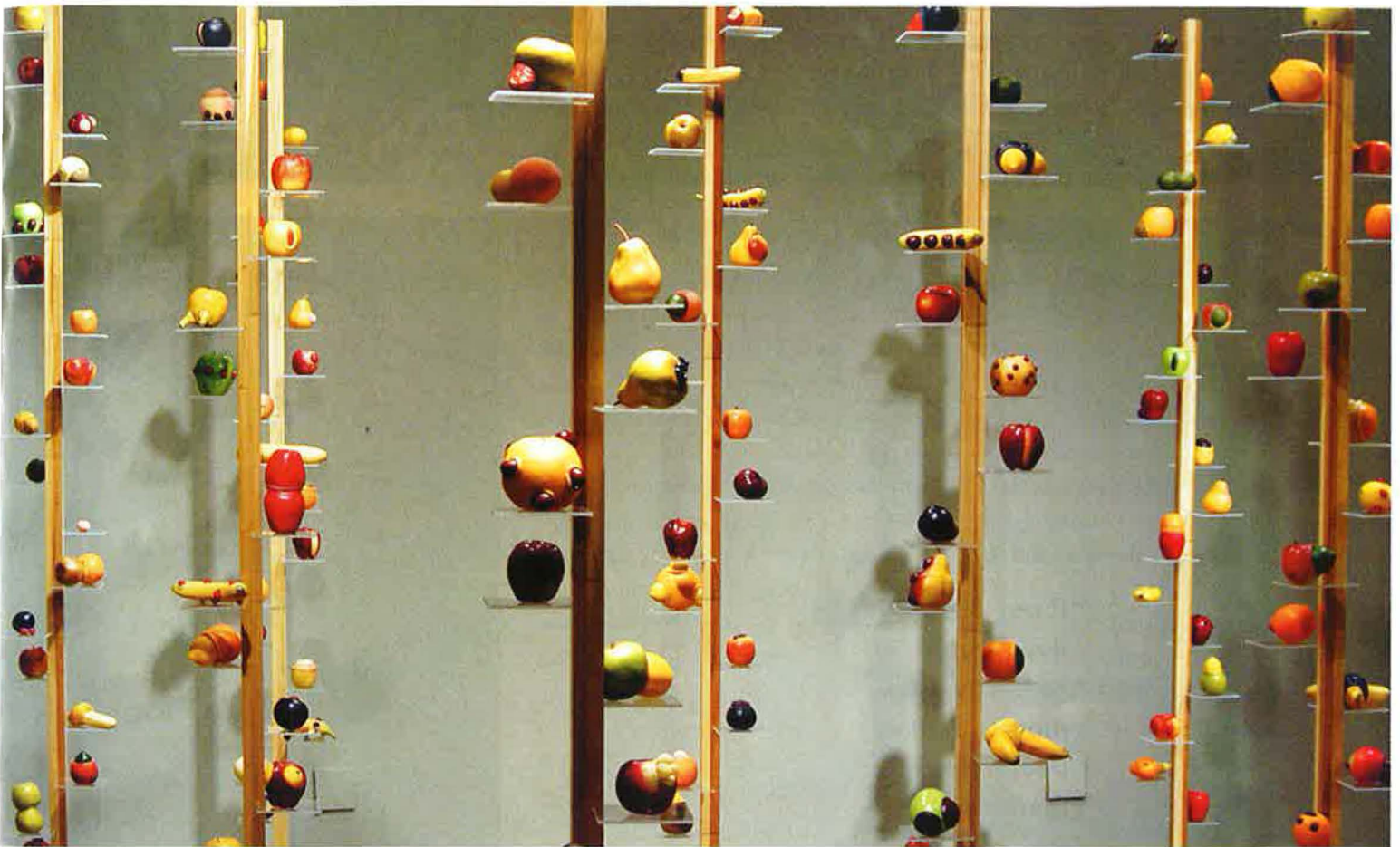
So how many times can we watch a man die before becoming jaded to the macabre, trapped in the twilight between fiction and fact?

That's the real question, says van Aken, an artist whose multimedia sculptural installations like *The Multiple Deaths of Willem Dafoe* are increasingly capturing the attention of art critics and audiences.

"I don't like to be didactic; I'm not trying to teach anybody," says van Aken, an assistant professor of art at the University of Maine. "But I do want to engage them in questioning. My works deal with historical themes — art, life, death, love. I'm trying to look at how technology and mass media change our perceptions about those themes. By involving viewers in questioning, I'm involving them in how popular culture and mass media are impacting them."

Van Aken has a heightened awareness of the subtle, subversive

Sculptor Sam van Aken explores the twilight zone between fact and fiction in our media-saturated culture



Hybrids, a 2005 sculptural installation at the University of Massachusetts and then at UMaine, featured a forest of 20 vertical structures affixed with small Plexiglas shelves arranged in the spiral pattern of a helix. On each shelf perched a piece of mutated plastic fruit — hybrids like peach-banana and apple-strawberry. *Hybrids* took up the contradiction between genetic modification and natural reproduction. As an adult, Sam van Aken was surprised to learn that genetic modification is increasingly part of the production and processing of the foods we consume. As a child growing up on a Pennsylvania farm, the annual grafting of cherry trees in his grandfather's orchard mystified him.



ates

and sublime media-saturated cultural influences and life experiences that shape us. He is driven by inspiration and intuition. His work explores that increasingly indistinguishable gap between fiction and reality, and leaves us questioning not only what we know, but how we know it.

Take *The Multiple Deaths of Willem Dafoe*. In 13 movies, including *Platoon*, *The Last Temptation of Christ* and *Spider-Man*, the actor dies one horrific cinematic death after another. Yet viewers unconsciously suspend reality to watch the actor rise from the dead to take on another role.

In his multimedia installation, Van Aken took this deathwatch to

its “absurd but logical conclusion” — a funeral. On six black and white television sets surrounded by white floral arrangements, the death scenes from the Dafoe classics ran simultaneously. Mozart's *Requiem* melded with sights and sounds of the violence; electrical cords ascended to the ceiling.

The Multiple Deaths of Willem Dafoe, which debuted in Boston in 2003, prompted an e-mail from the actor to van Aken in which he quipped that he hoped the streak of death scenes was not a career trend.

For van Aken, the career trend is Marshall McLuhan-ist — the medium is the message.

“Art is not necessarily an object or something contained; it’s something between the viewer and artwork itself,” says van Aken, who has been invited to spend this fall in residency at Tacheles, the largest art center in Berlin, Germany. “I approach art as a situation, rather than creating an image and having people perceive it. Through this, the viewer becomes more involved in the act of questioning.”

Theoretical aspects of '60s and '70s Minimalism, as well as his working-class background, sculpted van Aken's psyche and now echo in his work.

As a double major in communication and fine art at Slippery Rock University, van Aken learned about semiotics — the study of symbols — and the aesthetic model of communication. He dabbled in video production and learned graphic design, which ultimately landed him an opportunity to study and work in London in 1994.

In those early days, van Aken admits, the works of American Minimalist sculptors like Donald Judd appeared to him to be “just geometric forms.” Yet he knew there had to be something more to the movement. Like Alice determined to get through the tiny door to Wonderland, van Aken spent afternoons in London's Tate Modern galleries. Ironically, the paintings of the Abstract Expressionist Mark Rothko were van Aken's bottles labeled “DRINK ME,” giving him access to a world where he now speaks the language fluently through his art.

“The Mark Rothko paintings were big colored fields with nothing representational. All these large blocks. I sat there an hour before I finally realized I was lost in them. I was providing the imagery and the works, the meditative state. After that, it was easy to see how Minimalist art works. It's based on the visual, but also on the physical perception.”

Van Aken's Minimalist approach expanded in the mid-'90s when he traveled to Poland as part of an international artist exchange. There, he met Poland's radical, Modernist artists who had just emerged from under the thumb of communism. They had spent years subverting the government and flirting with imprisonment, making art without traditional materials and holding one-night exhibitions in friends' living rooms.

“From them, I realized how important art is,” says van Aken, who worked and later studied at the Academy of Fine Arts in Poznan, Poland. “For years, they provided an alternative perspective of what the government was feeding everyone. I borrow a lot of that philosophy in what I do.”

By 1996, van Aken had moved to New York City to take up his career in graphic design. But he was restless, increasingly questioning his life, until one day he stashed \$500 in his pocket, threw two suitcases and his fly-fishing gear into his car, and drove west. He headed for adventure and open spaces in the tradition of the Zane Grey novels he read as a kid.

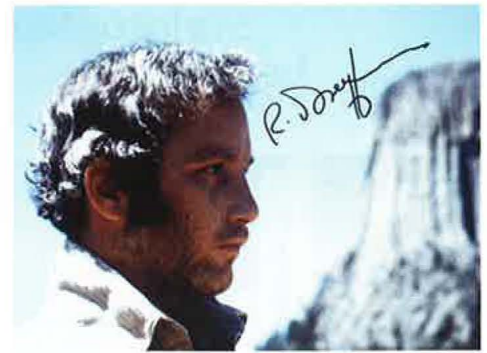
“If our day-to-day lives aren't equivalent to movie dramas, people feel inadequate.”

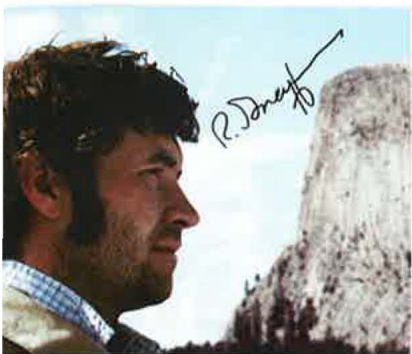
Sam van Aken

He spent three years in Oregon, where his education, travel and life experiences coalesced, and his art took shape.

For van Aken, the many facets of Minimalism that some critics initially deprecated are the very characteristics he champions. “Minimalism was initially criticized as being too theatrical because it required a viewer to perform with the work in order to get anything out of it,” he says. “Yet that's the magic — the strongest element — of it. I get caught in the performative aspect, the interactivity that's close to what we have going on in a technologically driven culture.”

Van Aken is a young artist with the sense to tap life experiences that leave indelible impressions and the sensibility to articulate the unspoken.





The importance of images in mass culture prompted Sam van Aken to look back at the first movie he saw in a theater, Steven Spielberg's 1977 classic *Close Encounters of the Third Kind*. Van Aken saw it when he was 5. For his most recent installation project, *Becoming*, van Aken spent more than two years taking on the persona of Roy Neary, the character Richard Dreyfuss played in *Close Encounters*. Van Aken gained 30 pounds, grew out his sideburns, and retraced the protagonist's pilgrimage from Muncie, Ind., to Devils Tower National Monument in Wyoming. For the reenactment, van Aken bought an '86 Buick station wagon. *Becoming* featured a living room movie set, complete with the sculpted mountain, stills in which

van Aken took on Dreyfuss' poses, video of the artist's journey and film footage — even the \$300 Buick. In this process of *Becoming*, van Aken noticed that he wasn't so much recreating the movie as he was creating something new — constructing an identity, a life, a world with its own props, sets and supports. But in these recreations, he could never quite get it right, and from the humor and absurdity in his failure, he began to draw a comparison with Don Quixote, whom van Aken sees as not so much delusional as much as “purposely taking up a fiction to make up for the inadequacies he perceived in the world around him.” From that point on, the project focused on those gaps between fiction and reality.



Mostly, he knows that art has the power to “change the way people see.”

“How does the media determine our different psychological states — shock, terror, grief — or our intellectual footing?” says van Aken. “To what extent is media shaping our reality?”

After 9-11, Van Aken heard eyewitness accounts describing the World Trade Center disasters as being “just like the movies.” That’s when he started looking even closer at derealization, the altered state in which reality feels unfamiliar.

“Movies become yardsticks by which we measure our lived experience,” van Aken says. “Trends in our culture, all disseminated through the media, often are adopted and not even considered. If our day-to-day lives aren’t equivalent to movie dramas, people feel inadequate. That gets to celebrity worshiping. That also places an importance on images — including images of ourselves as reflected in those throughout mass culture.”

For van Aken, those images started with the 1977 Steven Spielberg film *Close Encounters of the Third Kind*, on which the sculptor based his most recent and monumental work, *Becoming*. The piece, which debuted at UMaine and was installed at Colby College, allowed people to “question their own identities as constructs,” says van Aken.

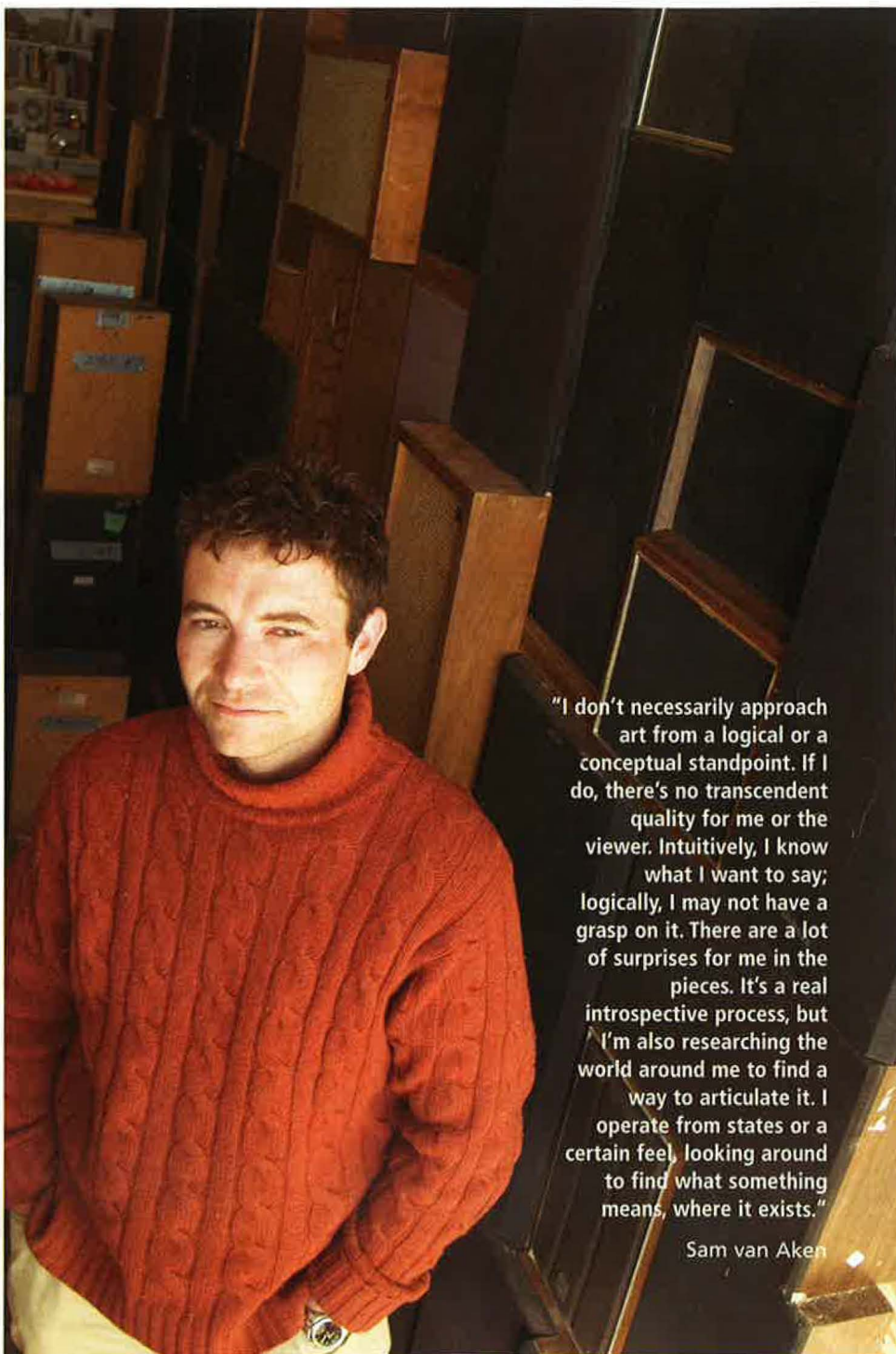
His next exhibition is June 7–July 30 at the Institute of Contemporary Art in Portland, Maine. *From Baja to Bar Harbor: Transnational Contemporary Art* will feature large-scale video and installation works by three emerging artists: Michele O’Marah of Los Angeles, Julio Morales of San Francisco and van Aken.

“I’m trying to convey a perception of the world,” van Aken says. “It’s a form of communication on a level that transcends logic and rational thought, that touches people through sight, sound and three-dimensional form.

“Fluxus artist Robert Filliou once said art is what makes life more interesting than art. Art does that for me,” says van Aken, “and a lot more.” ■



Oh My God was Sam van Aken’s response to Sept. 11. “Seeing the second plane fly into the tower over and over on television was numbing,” says van Aken. “What also stood out was a woman’s voice in the background, screaming ‘oh my God.’” Van Aken began collecting “oh my God” sound clips from the news, action movies, sitcoms and porno films. He also started buying used stereo speakers of all shapes and sizes. The first installation featured 180 speakers stacked like bricks, each eerily whispering those three little words. After nine minutes, the sound built to a cacophony — a dissonant wailing wall of life’s emotion.



“I don’t necessarily approach art from a logical or a conceptual standpoint. If I do, there’s no transcendent quality for me or the viewer. Intuitively, I know what I want to say; logically, I may not have a grasp on it. There are a lot of surprises for me in the pieces. It’s a real introspective process, but I’m also researching the world around me to find a way to articulate it. I operate from states or a certain feel, looking around to find what something means, where it exists.”

Sam van Aken

Yo Bons!

If you thought luscious fruit bonbons couldn't be part of a health-friendly diet, think again.

Five University of Maine students have developed a tasty treat called YoBon Berry Bites that are loaded with antioxidants and bone-building calcium. The one-two punch they pack proved powerful enough for YoBons to be named one of five finalists in the Institute of Food Technologists (IFT) Student Association's 2006 Product Development Competition.

The student team — undergraduates Jennifer Jordan, and Jason Bolton, and Ph.D. students Shari Baxter and Kristi Crowe, all in the University of Maine Department of Food Science and Human Nutrition; and microbiology major James Perry — worked with faculty adviser Denise Skonberg to

develop the frozen confection. The concept for YoBons originated in a 500-level product development class Skonberg teaches.

This is the first UMaine team to reach the final round of the IFT's prestigious contest. The students went toe-to-toe with peers in some of the largest university food science programs in the country. The dark chocolate-covered, frozen blueberry yogurt-filled bonbons were chosen from more than 20 new food products to go on to the final round of competition at IFT's annual conference in June.

The new product's niche market is 30- to 50-year-old women, offering them both healthful anthocyanins from blueberries and antioxidants from dark chocolate. The treat is also fortified with calcium and vitamin D.

In preparation for the next round of competition, the students are preparing for a large-scale taste test that they hope will bolster their proposal for full-scale product production.

From processing to shelf-life stability, the team must be versed in all aspects of the product's development, marketing and testing. Industry experts will judge YoBons on a range of criteria. Competition is stiff, but the team is excited to move its product forward.

"We knew we had a really good, solid product, but we were shocked to be chosen as a finalist," says team member Kristi Crowe. "This is a big accomplishment for the UMaine Food Science Program."



Kristi Crowe is one of five students on the team that developed YoBons, a finalist in the IFT Student Association's 2006 Product Development Competition. Photo by Bill Drake

Photo by Nicolas Blouin

GINGER YANG HWALEK was 4 when she started playing the piano. She was in the second grade when she knew, without a doubt, that her life's calling was to be a pianist, and she was a college student when it became clear that teaching — not a solo career — was the passion she would pursue.

This spring, her lifetime of devotion to piano performance and pedagogy reached a pinnacle when she was named the 2006 Teacher of the Year by the Music Teachers National Association.

Like the other milestones in her professional career, Hwalek says the national recognition has been “life changing.”

“To me, this is like the Oscar for piano teaching,” Hwalek says of the honor from the 24,000-member professional organization. “It reinforces all the grassroots work that I do as a teacher.”

Hwalek, an instructor in the University of Maine School of Performing Arts since 1982, has an exemplary, versatile teaching style that is rigorous and widely respected, physically and psychologically challenging, requiring students to think both abstractly and concretely — multitasking at the highest artistic performance levels.

Practicing Piano



UMaine music teacher named best in the nation

By Margaret Nagle

took her to Wichita State University, where she again was Hamilton's pupil, as well as a student of piano pedagogy pioneer Marguerite Miller.

The intimacy and emotion of chamber music that she discovered at both universities became the focus of her doctoral work at Northwestern, where she studied with Robert Weirich.

In preparing to teach the instrument she loved, Hwalek learned important lessons about communicating the phrasing in a piece of music, the value of tone quality and

The training she offers reflects her own instruction in the Midwest in the '70s.

Soon after placing first in a competition in her home state of Indiana, which earned her a solo spotlight with the South Bend Symphony Orchestra, Hwalek began studying under renowned pianist Robert Hamilton. She was in ninth grade.

As an undergraduate at Indiana University, she was a pupil of Hamilton's mentor, Sidney Foster, and Hans Boepple. Her graduate work

the use of imagery to help students visualize the connection between the brain and fingers, heightening sensory perception of the keys. Above all, she came to recognize the individuality each student pianist brings to the instrument.

"Every student has his or her own concepts of how to play piano," says Hwalek, who directs UMaine's Chamber Music Program and Maine Summer Youth Music. "At Wichita, I learned the importance of customizing the piano learning process to each person. Without seeing that difference in each student, you won't teach piano successfully."

Knowing the whole student involves understanding "where they see themselves going, where their parents want them to go, the speed at which they learn, the music that's right for them," she says. "That's why a piano class with up to 12 students in one room, each with his or her own keyboard, is a real challenge."

That heightened awareness of the young pianist's personality and aspirations is key to building trust between teacher and student. With such an alliance, Hwalek says, the student responds to the lessons knowing the teacher understands the performer's potential and aspirations.

Such understanding is particularly important with the precollege- and

college-age students with whom Hwalek now works most. Those in private lessons transfer to her studio after outgrowing their previous programs or because they are ready for "a new view of the piano." They usually spend a year in transition with Hwalek, understanding her performance standards and allowing her to get a grasp on "what makes them tick." At this performance level, they are taking on very involved works that require an understanding of the musical message and the composer's style.

"My job is to teach students to play in different styles without sacrificing their own personalities," says Hwalek. "Part of the challenge is to not only teach them this music, but also how to express themselves."

Hwalek's hope is that, no matter where their careers take them, the students will be lifelong, active music participants and patrons. She wants them to know that, in their formative years, they studied with someone for whom music was very important and who knew how important music was to them.

For nearly a quarter-century, Maine audiences have come to know Hwalek and her students. Like their mentor, Hwalek's students make a clear statement about how the music has infused their lives.

As a professional accompanist and chamber musician, Hwalek's hope is that her audiences hear a new interpretation and leave entertained.

"That's important," she says, "because I'm teaching while I'm playing. Through the music, I'm conveying beauty, energy, thought; maybe for the first time pulling (emotions and memories) out from deep inside them." ■

Ginger Yang Hwalek, named the 2006 Teacher of the Year by the Music Teachers National Association, is a University of Maine instructor, professional accompanist and chamber musician who, with soprano Nancy Ogle, has recorded three CDs of contemporary American art songs on the Capstone Records label.

Photo by Bill Drake



Research yields new growth in Maine marine worm aquaculture

Thinking outside

Ah, THE NEREIS VIRENS. The common sandworm. Take a look at that mug. Think it's not adorable? Oh, but it is. Irresistible, even, to striped bass and marlin, flounder and grouper, and most other saltwater fish.

The sandworm's value to fishermen all but makes up for the less-than-charming characteristics of this burrowing, biting species of marine worm that is traditionally retrieved from mudflats during hours of backbreaking digging.

That's why, for the past three years, research has been under way in Franklin, Maine, 10 miles inland, in an effort to capitalize on the intrinsic value of sandworms and to develop the first commercial sea worm aquaculture operation in the United States. The aquaculture pilot project at the University of Maine's Center for Cooperative Aquaculture Research (CCAR) mitigates the

physically demanding labor required for harvests because the sandworms are grown indoors, maintaining a constantly available, consistently quality product for an economically viable business.

Today, Seabait Maine LLC, the company that owns the worms and is developing its technological know-how with UMaine, sells out of its sandworm stocks in advance. The wholesale price: about \$30 per pound.

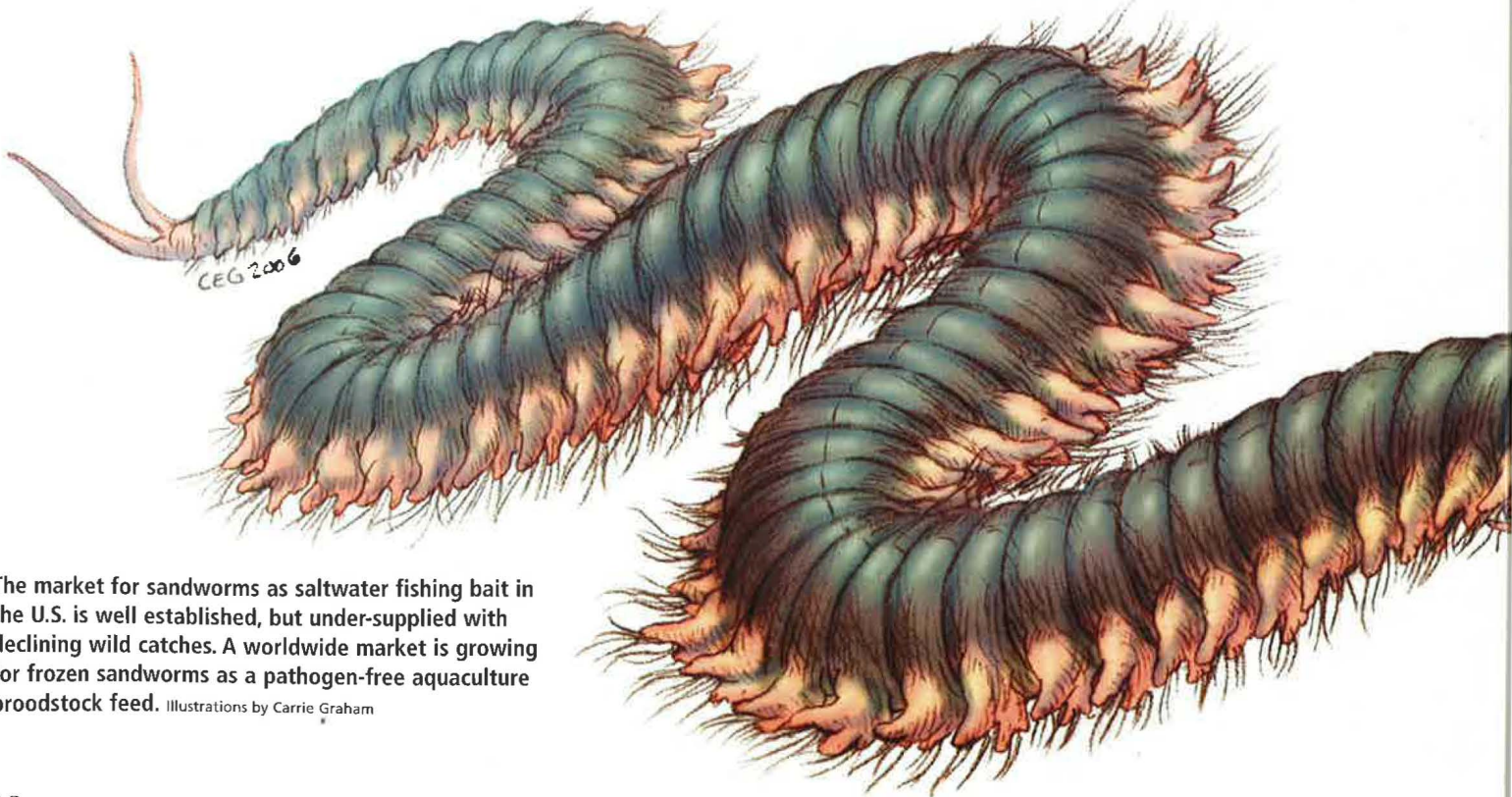
This fall, the Maine branch of Seabait Ltd., in the United Kingdom plans to break ground on a new facility that will eventually increase production 20-fold and raise awareness of UMaine's marine worm aquaculture research around the world.

The result of collaboration and a synthesis of state-of-the-art technologies is a system that will be "technically and economically viable, and will provide a real opportunity for Maine to add new jobs and

productivity," according to Nick Brown, manager of operations at CCAR.

IN ACADEME, scientists nobly pursue the wonders of the world. They're also driven by supply-and-demand economics. Take Viagra. Research that made possible the first drug for erectile dysfunction developed out of high blood pressure research in academic medical centers. In another economic sector, the timber industry's slump helped make UMaine's wood composites and forestry stewardship research crucial. Now the university is researching ways to use the forest to ease the energy crunch, another market-driven necessity.

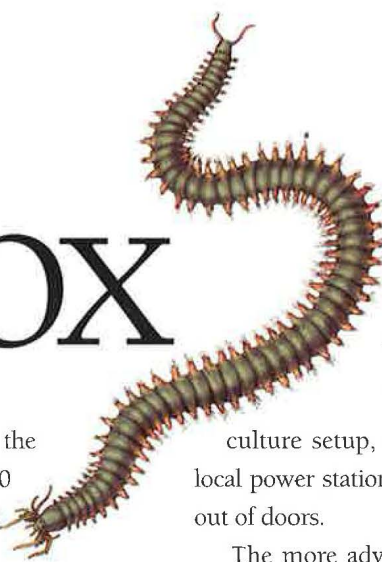
CCAR takes a similar approach. One company in residence there is growing the first generation of halibut on land, in part because there's a growing demand for the fish and because there are increasingly fewer



The market for sandworms as saltwater fishing bait in the U.S. is well established, but under-supplied with declining wild catches. A worldwide market is growing for frozen sandworms as a pathogen-free aquaculture broodstock feed. Illustrations by Carrie Graham

the bait box

By Clinton Colmenares



stocks in the sea. Seabait is filling a similar niche, providing high-demand fishing bait and food for shrimp farms.

The Maine Aquaculture Innovation Center, Maine Technology Institute and UMaine invested in Cowin's innovation to create a fully commercial worm farm.

"Everyone we've encountered in Maine has been willing to lend us a helping hand to bring in new investment, create new jobs and develop new technologies that don't exist anywhere else," says Managing Director Peter Cowin.

Cowin spent most of his boyhood in New England. In 1981, he went to UMaine's Darling Marine Center in Walpole, Maine, with an idea to farm marine worms. He went off to school in England, and four years later, as an undergraduate at Newcastle University, started his company with his father, Kenneth Cowin, and a faculty mentor, Peter Olive.

"For the first decade it was a matter of survival," Cowin says. "A lot of businesses went out of business trying to do the same thing. We had the technological backup of the university (Newcastle)."



Last year, Seabait Ltd., in the UK produced more than 50 tons of worms and sold them in more than 30 countries. It has five patents in Europe and the U.S., with several more pending.

REMOVING WORMS from their natural habitat and expecting them to thrive in a world where it never rains, the sun never shines and no other creatures exist is always a challenge.

"When you farm an essentially wild organism, they need to be happy. In fact, more than happy, because ideally you want them to grow faster than in the wild to reduce the time to harvest," Brown says.

Cowin and his team scientifically scrutinize the worms at every stage of life — from eggs through adulthood. They study reproduction, nutrition and other factors essential to growing worms and other aquaculture species.

Among their findings: the worms self-clean their tanks, leading the researchers to hypothesize that perhaps they could clean tanks of other species, lowering both the cost of worm food and tank cleaning; the worms are high in omega 3 fatty acids, making them a healthy food source; and sea worms might one day join their distant cousins, leeches, in medical applications, because elements in their blood compare favorably with the blood of humans.

Seabait's UK operation is a unique aqua-

culture setup, using waste heat from a local power station to help the worms grow out of doors.

The more advanced climate-controlled Seabait Maine facility in Franklin looks like a large, open dormitory with stacks of bunk-like tanks running almost the full length of the 150-foot building. The lights are dim. It's quiet. And the familiar smell of saltwater suggests what lies in the tanks is aquatic.

Swimming and crawling through a thick slurry of sand are the worms. (Seabait won't disclose the ingredients of the gritty habitat; the recipe is intellectual property.) With a

controlled environment, no other competition for food, and lack of predators and pathogens, Seabait Maine's sandworms grow faster than those at the UK facility, and five to six times faster than those in the wild.

CCAR's indoor recirculation technology, along with Seabait's technology, helps create and control the growing conditions. Cowin grows his worms to meet market demand, 6–8 inches long. That takes about five to six months, he says, compared to two to three years in the wild.



Photo by Bill Drake

"Everyone we've encountered in Maine has been willing to lend us a helping hand to bring in new investment, create new jobs and develop new technologies that don't exist anywhere else."

Peter Cowin

THAT'S A MUCH different picture than what's happening in the wild, where the sandworm and bloodworm industry in Maine is feeling the effects of overharvesting. One Maine company in the sandworm and bloodworm business notes on its Web site that when it started in 1950, an average

Thinking outside the bait box

tide would yield 4,000 worms; now the average is 550, forcing diggers to take the small worms before they reproduce.

Such a decrease in the natural resource quickly affects other businesses, like the one owned by Pete Santini. The well-known fishing supply retailer and fishing guide in Everett, Mass., who has another operation in the Galapagos Islands, buys sandworms because they are one of the most popular baits available.

About seven years ago, Santini says, he started receiving shipments of wild worms that were inconsistent in size — around 3 inches long, less than half the length the market demands. Santini's sales depend on receiving consistent size and quality. For him, the controlled environment at CCAR provides the consistency needed in the thousands of sandworms he sells.

TODAY, SEABAIT'S market includes seasonal fisheries customers and aquaculture seafood businesses around the world. Eric Pinon works for Service Aqua LLC in Miami, Fla., which distributes feed for shrimp and fish farms throughout the continental U.S. and Canada, in Hawaii, and in Central and South America.

When he started selling Seabait worms, his aquaculture customers saw vast improvements in the broodstock, compared to those fed pelletized food.

"You don't have to be a brain surgeon to find the difference between one tank fed with quality Seabait worms and one not," Pinon says. Compared to other worms, he estimates up to 15 percent more productivity from Seabait's *Nereis virens*.

But not everyone, of course, is sold on Seabait. Maine wild worm diggers whose families have been harvesting for years have voiced concerns that companies like Seabait could put them out of business.

It's true that while wild harvests dwindle, Seabait's production is expanding. The current facility incubating at the CCAR

Motor mouth

MARINE WORM DIGGERS are very familiar with the nasty bite sandworms can inflict. University of Maine researchers also know that the power of that mouth filled with tiny teeth is important for the species' mobility in mud.

Biomechanically, it was thought that worms burrow by pushing or excavating sediments. But UMaine marine researchers have demonstrated that the polychaete *Nereis virens* uses its mouth like a wedge to open cracks in muddy sediment. The sandworm burrows by turning its mouth inside out and applying pressure perpendicular to the direction of its motion, propagating the crack in the mud.

Muddy sediment acts like an elastic solid that fractures under force. By visualizing a worm's movement through seawater gelatin, which mimics the properties of mud, the researchers were able to characterize the stress field around a crack.

The process the sandworm employs could affect the movement of pollutants and other substances through mudflats. It also affects organic carbon fate (burial, resuspension or assimilation into animal biomass), which is important to the carbon cycle.

Among the researchers involved in the discovery are Ph.D. student Kelly Dorgan and Professor of Marine Sciences and Oceanography Peter Jumars, both at UMaine's Darling Marine Center; UMaine Professor of Civil Engineering Eric Landis; and Bruce Johnson and B.P. Boudreau of Dalhousie University, Halifax, Nova Scotia.

They reported their results in the February 2005 issue of the journal *Nature*. The story of their research also was featured in *New Scientist* magazine and the *New York Times*.



Kelly Dorgan is a University of Maine Ph.D. student in oceanography. She studies the mechanical behavior of marine sediments and how it affects sea worm burrowing. In her research, Dorgan found that marine worms burrow through muddy sediments by "cracking" rather than deforming them.

Photo by Eric Weissberger

produces 5 tons of worms a year. The new facility initially will produce about 65 tons, then, ultimately, 100 tons or more.

But, Cowin says, there's room for more suppliers. Wild Maine marine worm landings are around 500 tons a year; demand on the East Coast is about 700 tons, not counting exports to Europe or for the aquaculture feeds markets, Cowin says.

Globally, with the meteoric rise in aquaculture — with shrimp farming as its fastest-growing segment — the demand for

marine worms is in the thousands of tons.

With wild stocks depleting, operations like Seabait might be necessary to sustain the marine worm industry. If supply can't keep pace with demand, shrimp farmers will likely find other feed sources, which could lock out all marine worm suppliers — wild and cultured — for a long time.

Santini likens it to the fishing industry, in which some species have been overfished. "This," he says of Seabait, "will take the pressure off of wild stocks." ■

Talking Animals

LUKE MANLEY HAS LONG KNOWN

that his future would involve working directly and indirectly to improve the lives of animals.

His passion was put to the test in his first job at a neighborhood pet store.

“My mother is one of the biggest animal lovers I’ve ever known,” says the University of Maine senior. “That’s why she hates pet stores and was angry that I got the job, but I justified it, telling her that even if (pet store chains are) not always the best environments for animals, my working with them would make their lives better.”

That philosophy also imbued Manley’s volunteer efforts at a greyhound boarding and adoption kennel, and his work for more than three years at Buttonwood Park Zoo near his Cape Cod home.

At UMaine, he got involved in large animal care at the Witter Teaching and Research Farm, first as a student employee, then as a member of the student-operated dairy cooperative and the equine co-op. Manley got experience on campus in the Department of Animal and Veterinary Sciences’ Diagnostic Lab and now works off campus at Eastern Maine Emergency Veterinary Clinic.

He learned to shear sheep from Scott Bowdridge, then joined the UMaine graduate student on his summer jobs throughout the state, which included clipping three ovine owned by actress Kirstie Alley.

After he graduates in May with a degree in animal science with a preveterinary option, Manley wants to volunteer in Cameroon to save orphaned chimpanzees. He has his sights set on attending veterinary school in Oregon.

Manley has benefited from hands-on experience with a variety of animals and from the extensive knowledge of the many people who work with them. “I had the fortune to work in a pet store with a manager who really cared for the animals,” he says. “At the zoo is an entire workforce of people who (couldn’t) care more about their

animals. At the farm, we can assist the vets with everything from calving to treatments on cows and horses.”

Manley also appreciates the contributions of wildlife biologist Jeff Corwin, the host of a popular Animal Planet show. Coupled with his own interests in journalism and travel, Manley hopes

one day to offer similar educational programming for young people.

It’s all in keeping with his commitment to indirectly or directly affect animals’ quality of life.

“When I get out of school, I’d like to travel and be a vet for international and domestic zoos,” says Manley, who also is exploring the USDA’s Food Safety and Inspection Service, and Animal and Plant Health Inspection Service, which would involve travel and varied professional service. “When I settle down, I’d like to teach at the university level or run an emergency clinic. Not knowing what will come through the door will keep me challenged and interested.”

“When I settle down, I’d like to teach at the university level or run an emergency clinic. Not knowing what will come through the door will keep me challenged and interested.”

Luke Manley



Photo by Bill Drake



Managing a Campuswide Arboretum

FOR THEIR SENIOR capstone project, University of Maine landscape horticulture students have written a how-to guide of best management practices for use in one of the state's largest arboreturns — the campus of their alma mater.

The capstone project mirrors similar management plans drawn up by previous landscape horticulture seniors for such high-profile sites as the grounds of the Maine governor's mansion and the Yew Dell Gardens in Kentucky.

In 2004, UMaine President Robert Kennedy announced the desire to establish the campus as an arboretum.

Students conducted research and heard from nationally recognized experts on how to manage large landscapes from an environmentally friendly perspective. Their strategies included guides for proper plant care and "putting the right plant in the right place" as part of an integrated pest management approach.

Last semester, three student teams each developed how-to manuals that were presented to the university's Campus Arboretum and Beautification Committee. This spring, the students' best recommendations have been compiled into a Web-based UMaine landscape management plan with a public education component.

The students call it a plan for the campus' future, with a concentration on large, diverse plantings to enhance the outdoor experience.

"The hope is to take care of the campus more as a botanical garden, not just landscape to maintain," says senior Merideth Torrey.

ACROSS THIS COUNTRY, more than 90,000 people are on waiting lists for organ donations, according to the U.S. Department of Health and

The values of organ donation

Human Services. While an estimated 74 people each day receive an organ transplant, another 18 die because of the shortage of donated organs.

In the face of this social dilemma, researchers are attempting to identify people's values that influence their behavior when it comes to signing up to donate their organs posthumously. With these values identified, it would then be possible to tailor health communication messages to more effectively encourage donation, according to University of Maine psychologists Richard Ryckman and Joel Gold, working with Bart van den

Borne of the University of Maastricht in the Netherlands and Bill Thornton of the University of Southern Maine.

In their study, the researchers surveyed 180 Maine college students using a factual test of their knowledge of organ donation, an examination of their

drivers' licenses as a measure of their intent to donate, and a personality inventory indicating their values.

The researchers found that young adults whose values reflect benevolence, universalism, achievement and risk taking are more likely to have registered to donate their organs posthumously. In a college-age population, students in certain majors most often hold those values.

For decades, psychologists have known that people in particular occupations, including students in various majors, tend to strongly endorse certain values and be less concerned with others. For example, business and economics students particularly value achievement, and social science students strongly endorse benevolence and universalism.

The scientists now are conducting a parallel study with Dutch adolescents.



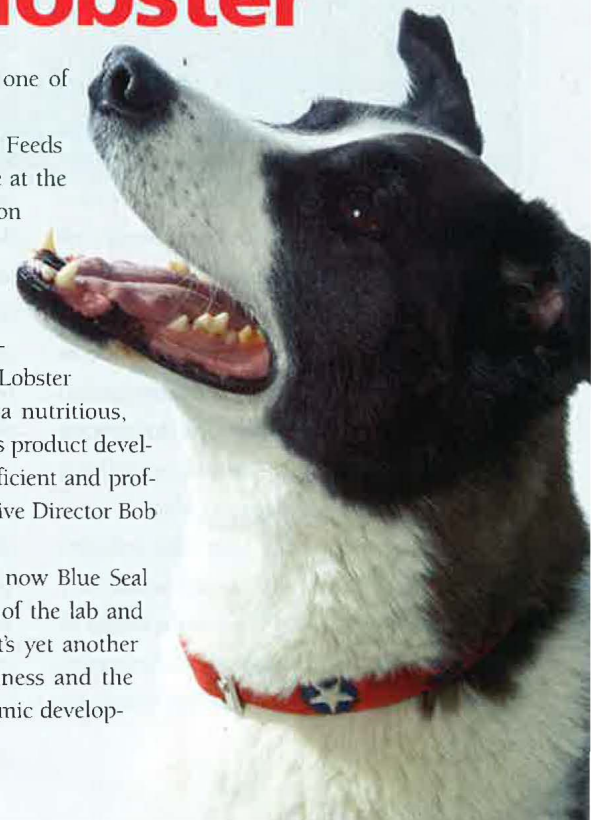
Pamper your pooch with lobster

LOBSTER-FLAVORED DOG BISCUITS are one of the newest ways to pamper your pooch.

The Lobster Bisque-its, sold by Blue Seal Feeds Inc., were developed by the Lobster Institute at the University of Maine and its commercialization partner Saltwater Marketing LLC. The all-natural dog treats are baked with lobster meal, a source of natural flavor and protein.

Saltwater Marketing, a Portland, Maine-based company, has been working with the Lobster Institute for the past two years to develop a nutritious, flavorful lobster-based pet treat. The institute's product development work is geared to creating a more efficient and profitable use of the lobster resource, says Executive Director Bob Bayer.

"Working with Saltwater Marketing and now Blue Seal Feeds, we were able to get this product out of the lab and into the commercial market," Bayer says. "It's yet another example of the collaboration between business and the university that is such a critical part of economic development for Maine and New England."





NEW Thinking

A NEW HAND-HELD sensing device designed to detect hazardous materials has the potential to be a real boon to firefighters and other first responders on the scene of an emergency. University of Maine Professor of Chemistry Carl Tripp from the Laboratory for Surface Science and Technology, and engineers from Orono Spectral Solutions, have nearly completed a prototype, with business assistance from Bret Golann of the Maine Business School. A product survey

“You’ve got to communicate with the customers, understand their needs. The hard part is figuring out what customers will want even two or three years down the road. You can’t respond to what you don’t understand.” Bret Golann

of fire chiefs showed enthusiasm for the new invention. Then one of the fire chiefs asked: What happens if it’s accidentally dropped from a building?

“You have to reengineer to respond to that,” says Golann, assistant professor of entrepreneurship and technology commercialization. “That’s why you can’t just function in a lab (when doing new product development).”

Golann and other UMaine professors teach entrepreneurship courses as part of the undergraduate business curriculum at UMaine. He also offers a new course in technology commercialization that builds on the entrepreneurship courses by helping seniors and graduate students in any field learn how to launch and grow technology-based businesses.

“Whether they join an entrepreneurial company or go out on their own, I want them to be able to take even the most poorly defined ideas and figure out if they can be viable and grown into sustainable businesses, not flashes in the pan,” says Golann.

Adding **student innovation** to the team

SPORTS DONE RIGHT, the University of Maine program designed to guide the improvement of interscholastic and youth sports in Maine and across the country, has teamed with the campus-based Student Innovation Center to develop a national marketing campaign.

Last summer, two students conducted market research to determine the most effective informational product for customers — schools, coaches, parents, community groups and student-athletes. Now four students with graphic design, multimedia and marketing skills are working with Karen Brown, director of the Maine Center for Sport and Coaching in UMaine’s College of Education and Human Development, which initiated Sports Done Right.

Together, they are developing a kit, complete with informational and survey material and a DVD, to assist schools and communities with the implementation of Sports Done Right. The implementation tool kit also will include a self-assessment instrument, which is required when applying for Sports Done Right accreditation.

Sports Done Right’s five-year accreditation, through the Maine Center for Sport and Coaching, means that a school or community “signs on” to the core principles and practices as outlined in the report, *Sports Done Right: A Call to Action*

on Behalf of Maine’s Student-Athletes. As such, they pledge at all levels — from the student-athlete to the coach, from the school and the school district to the entire community — to provide opportunities for young people to experience the very best of interscholastic athletics in a setting where sports are “done right.”

The tool kits are expected to be ready for distribution to a nationwide waiting list by early summer.



Ocean Bowl

In February, 17 teams of high school students from Maine, Vermont and New Hampshire were at the University of Maine competing in the annual Nor’Easter Ocean Sciences Bowl, designed to introduce high school students to marine sciences. This year’s northern New England championship team from Contoocook Valley Regional High School in Peterborough, N.H., is headed in May to the National Ocean Sciences Bowl in California. Among the possible questions teams faced in the regional competition:

On North America’s Atlantic coast, identify the four major intertidal zones and organisms found in each.
Answer: Upper intertidal — lichens, encrusting algae; middle intertidal — barnacles, mussels, rockweed; lower intertidal — Irish moss; extreme lower intertidal — seaweeds.

Why does coral bleaching occur?
Answer: Zooxanthellae, a type of algae, gives coral color. Changes in salinity or increases in temperature, UV exposure or pollution result in the expulsion of zooxanthellae.

Globally, which regions tend to have the greatest and the least species diversity?

Answer: Regions of high species diversity tend to be located near the equator. Regions of low species diversity tend to be in the North Atlantic. Within geologically recent times, these areas were glaciated, with only a relatively short period of evolutionary time for species to recolonize.



Forests for Maine's Future

REPRESENTATIVES from four key forestry groups in the state — the Maine Forest Service, the University of Maine's Forestry Programs, the Small Woodland Owners Association of Maine and the Maine Tree Foundation — have joined forces to help promote greater public awareness of Maine's forests and their importance to the state's economic, social and environmental health.

The group will work to draw attention to all aspects of Maine's forests — from jobs, clean water, vibrant rural economies and unique habitats to industry, recreational opportunities and sustainable energy products.

"Our forest products, outdoor recreation and tourism industries depend on a healthy, vibrant forest in order to thrive," said Gov. John Baldacci. "The work of Forests for Maine's Future will give all Maine citizens a new perspective on Maine's forests in the 21st century."

Editor's Note

IN THE MARCH/APRIL issue, the story titled "Double Lives" reported on the collaborative migratory bird research of scientists Rebecca Holberton of the University of Maine and Peter Marra of the Smithsonian Migratory Bird Center. The researchers have requested a point of clarification on the story: Holberton's research focuses on hormones in the blood of migratory birds, while Marra's work centers on stable carbon isotopes in birds' tissues. Together, they study the connectivity and seasonal interaction among the different habitats in which migratory birds live during the year.

Evergreen Aquaculture

WORLDWIDE, GOVERNMENTS use site leasing as a means of regulating the aquaculture industry. But with the end of the lease comes the uncertainty of whether it will be renewed or cancelled.

Evergreen operating contracts, like those used for forestry leases in New Zealand and Canada, and for grazing rights in Australia, provide a more efficient and effective alternative. Under an evergreen contract, the lessee and the government renegotiate terms midway through the agreement. The advantages, say a University of Maine economist and an Australian scientist, are greater continuity and predictability, which help avoid undesirable incentives to pursue shortsighted gains as the lease expires.

"Evergreen contracts can often find common ground on issues that would be more difficult in either a regulatory context or a fixed-period lease," according to Ralph Townsend, chair of UMaine's Department of Economics, and Michael Young of the Australian Commonwealth Science and Industry Research Organisation, in the journal *Marine Resource Economics*.

The option to renew a lease half way through the current agreement dramatically affects the ability of the lessee and the government to plan, say the researchers. An evergreen contract encourages longer-term vision, and recognizes that the relationship must evolve as new information emerges.



The Silica Solution

UNIVERSITY OF MAINE Associate Professor of Chemical Engineering William DeSisto is conducting research

refining petrochemicals and building better batteries for everyday consumer use.

on a new class of modified mesoporous silica membranes with the help of a prestigious award to young scientists, the National Science Foundation Faculty Early Career Development Award.

DeSisto is the sixth UMaine faculty member to receive the award since 2001.

With \$400,000 in the next five years, DeSisto will study silica membranes as an alternative to traditional energy-intensive separation processes, like distillation. The membranes could have applications in

In order for silica membranes to be used on

a large scale, fundamental research is needed on how to control their performance. DeSisto plans to control the size of the silica membrane's tiny pores and, ultimately, their surface chemistry through new chemical reaction approaches.

Hybrid composite membranes of inorganic, nanoscale — millionth of a millimeter — pores filled with organic material could be molecularly tailored to specific separations, like light gases and vapors, and larger molecules, like proteins.



A potential application for William DeSisto's membranes is in the petrochemical industry, where molecules of the same size yet different physical properties must be separated. DeSisto also is working with the makers of lithium ion batteries, which commonly overheat. With a hybrid porous silica layer, DeSisto hopes to fill the pores with a plastic to allow the lithium ions to move through, while increasing the thermal stability.

lasting impression



Among the dignitaries at UMaine's commencement June 20, 1948: left to right, J. Seelye Bixler, president of Colby College; A.E. Mercker, USDA, Washington, D.C.; Judge John Peters, Ellsworth, Maine; Edward Chase, Cape Elizabeth, Maine; Gen. George Carter, Augusta, Maine; Edwin Supermeister, Westbrook, Maine; writer E.B. White, North Brooklin, Maine; UMaine President Arthur Hauck; Rev. John Gowdey, Boston, Mass.; Edward Roderick, Augusta, Maine; Dr. Lennie Copeland, St. Petersburg, Fla.

Archival photo courtesy of Bowdoin Library Special Collections



A contemporary commencement ceremony.

THIS YEAR AS PART of commencement, the University of Maine will award honorary degrees to three distinguished community leaders: nutritionist and longtime professor Katherine Musgrave, wire lobster trap inventor James Knott Sr., and construction engineer Herbert Sargent. The three are the latest in a long list of eminent educators, writers, researchers, politicians, artists and humanitarians to be recognized by UMaine for their contributions. Through the years, those dignitaries have included President John F. Kennedy, authors Stephen and Tabitha King, and photographer Berenice Abbott. In 1948, UMaine became one of seven universities to award an honorary degree to *The New Yorker* magazine writer Elwyn Brooks White. By this time, E.B. White had published *One Man's Meat* and *Stuart Little*; those books were followed in the 1950s by *Charlotte's Web* and the Strunk and White edition of *The Elements of Style*.

White disliked ceremonies and public appearances. His stepson, Roger Angell, writing last year in *The New Yorker* in observance of the 20th anniversary of White's death, described the day E.B.W., known as "Andy," received an honorary degree from Dartmouth, also in 1948: "And when the time came for the encomiums and the enrobing, there in the sunshine at Hanover, he went on, his hood — 'white, quite big, and shaped like a loose-fitting horse collar' — became entangled with the honoree in the next seat, Ben Ames Williams: Andy's worst dreams come true. 'When I got seated the thing was up over my face, as in falconry,' he continues. 'A fully masked Doctor of Letters, a headless poet.' After that, he stayed home, even passing up an invitation in 1963 to go to Washington and receive the Presidential Medal of Freedom from Lyndon Johnson." Luckily for UMaine, which held its commencement ceremony a week after Dartmouth's, White had committed in April to come to Orono.

ebw:mf

THE
NEW YORKER
No. 25 WEST 43RD STREET



EDITORIAL OFFICES
BRYANT 9-8200

April 26, 1948

President Arthur A. Hauck
University of Maine
Orono, Maine

Dear President Hauck:

Many thanks for your letter, renewing the proffer of a degree. I am glad that I can accept it this year, and shall plan to be in Orono for the Commencement exercises on June 20.

I'm enclosing the card, filled out, and in stating the hat size have allowed for the normal expansion that takes place in a man's head on discovering that he is about to become a Doctor of Letters.

Sincerely,

EBWhite
E. B. White



Eleven members of the 2006 All Maine Women. Member Keri Lyle is pictured at right.

Photos by Bill Drake

In 1925, University of Maine President Clarence Little and Dean of Women Carolyn Colvin established a senior honor society for UMaine women students — All Maine Women. (Its counterpart, the all-male Senior Skulls Honor Society, was formed nearly two decades earlier.)

Since its inception, All Maine Women has inducted more than 900 members.

All Maine Women represents the broad diversity of student accomplishments on campus. Members are considered consummate role models for undergraduate women. Each has a record of demonstrated scholarship and distinguished leadership. They are recognizable not only by the tiny pine tree they wear on their right cheeks one day a week, but also by their commitment to community service, their display of UMaine spirit, and their dedication to upholding and promoting the ideals, standards and traditions of their alma mater.

The dozen members in the Class of 2006 major in art history, journalism, parks and recreation, communication, marine sciences, psychology, social work, marketing, education, chemical engineering, and child development and family relations.

An **All Maine Women Honor Society Endowment Fund** recently established in the **University of Maine Foundation** helps support members' community service projects and activities that encourage positive relationships between students, faculty, staff and alumni.

All Maine Women

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