

OSU International!

a Dynamic Community of Faculty and
Students Engaging Internationally



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International Council

The International Council is a key focal point for campus internationalization. The role of the council is to:

- Collectively monitor campus growth and development in international affairs
- Keep a pulse on the range of international activity within each respective College
- Identify and use metrics to assess the internationalization of OSU over time
- Collaborate on campus-wide international priorities

Members represent colleges and work to collectively monitor the strengths, weaknesses, opportunities and threats that face the international agenda. Together they determine how to best tailor the work of the council to complement and support the strategic plan of the university.

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Overview

International Programs in conjunction with the International Council is pleased to share this annual update of important global activities undertaken by Oregon State University's faculty, students and international scholars. As you read these pages, you will be introduced to OSU's robust and compelling commitment to global engagement. Our faculty and students cover the globe doing research, teaching, performing public service and connecting person-to-person.

This publication highlights:

innovative bilateral international research partnerships that tackle air pollution and health (China), HIV and avian flu (India), privacy and data protection (Europe).

global research that helps to protect marine mammals from human impacts, to understand impacts of tropical landscape fragmentation and the effect on species abundance, to explore the sustainability of Mexico's forest sector and the Patagonia Region of Chile, to illuminate pioneering work in area of hydropolitical resilience, and oceanographic research that explores the key role of squid within the marine food chain.

contributions of international faculty and scholars who come to OSU. A notable example is the College of Education's collaboration in the arena of counseling and group leadership with Thai scholars from Chulalongkorn University. Another prime example is the outreach by the College of Liberal Arts through of music in the China-OSU Cultural Exchange Program.

students who are endlessly creative in designing their own global education as part of their experience at OSU. From students hands-on work in El Salvador through the OSU Engineers Without Borders Program, to a Pharmacy student's experience in Niger, exploring the role pharmacists can play on the front lines addressing needs of underserved populations, we can come to appreciate the deep curiosity and an intrinsic caring for others that is evident among OSU's outstanding student body. This publication highlights students traveling to Israel and Palestine to explore water management and conflict resolution within the complex social and political context of the region and several interesting study abroad and internship experiences in Tunisia, Swaziland, Australia, Germany, and Taiwan.

OSU Studying Air Pollutant's Impact on Chinese, U.S. Health

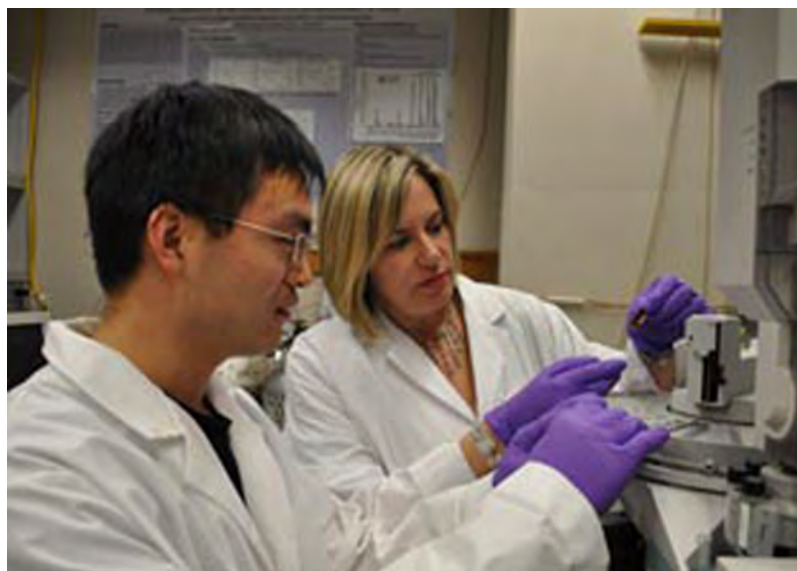
Scientists at Oregon State University and China's Peking University plan to use part of a \$12.4 million grant to study the impact that the burning of fuels like coal and biomass – as well as the smoking of meat – may have on the health of residents of China and the United States.

“Additionally, the research will help determine the cancer-causing potential of certain air masses and where they came from”

—**Staci Simonich**
*OSU chemist and toxicologist,
the lead U.S. researcher on the project*

The research, funded by the National Institute of Environmental Health Sciences, will focus on air pollutants called polycyclic aromatic hydrocarbons (PAHs). They're produced when biomass (like straw and wood) and fossil fuels (like coal and gas) are burned as well as when meat is smoked or grilled. PAH compounds, some of which have been shown to cause cancer in humans, can attach to particles, like soot, and blow thousands of miles through the air and settle in the bottoms of lakes and rivers.

In China, which is a huge consumer of coal and a major emitter of PAHs, researchers will measure how much and what types of PAHs Chinese residents in 12 homes in the Beijing and Tianjin area are inhaling over the course of two years, starting in 2010. They'll analyze the urine of the 30 participants to find out what types of PAHs they're exposed to. They'll also ask them to wear air sampling devices, including ones that are worn as backpacks and have a motor that sucks in air. Air samplers will also be placed inside and outside their homes as well as in six locations throughout the Beijing and Tianjin area.



Chemist Staci Simonich and graduate student Wentao Wang examine a vial containing air pollutants at a lab at Oregon State University. Simonich is training Wang, who is from Peking University, so he can help with research about the impact of polycyclic aromatic hydrocarbons on the health of Chinese and U.S. residents.

(Photo: Tiffany Woods)

“The combined information on which PAH metabolites people are excreting and which PAHs are in air will help us identify the sources of the PAHs,” said Simonich, who is a member of a National Academy of Sciences panel that studies air pollutants entering and leaving the United States.

The Chinese participants will live in three settings: urban apartments that use natural gas for cooking and heating, suburban residences that use coal stoves for these two purposes, and farm houses that use coal and biofuels to do so.

Across the Pacific Ocean in Oregon, air samplers will be set up at the Confederated Tribes of the Umatilla Indian Reservation. Scientists will also ask a handful of tribal members to wear air samplers on several occasions while they're curing fish and game in smokehouses, which produce PAHs. Urine samples will be taken before and after the food smoking events.

Scientists selected these two groups because they wanted to study populations that were exposed to PAHs but from apparently different sources to understand how the different PAH mixtures are metabolized in the body and excreted in urine.

The tribal members, however, might not be inhaling PAHs solely from the smokehouses, said Anna Harding, an OSU public health professor who is one of the leaders of the portion of the project involving the American Indians. Their reservation is downwind of a coal-fired power plant in Boardman, Ore., and it's also home to a truck stop where diesel exhaust is emitted. Additionally, it's in an agricultural area where some fields are burned.

Also as part of the project, scientists will collect air samples from Okinawa, Japan; Portland, Ore.; a rural site in Oregon's Clackamas County; and Mount Bachelor, which is near Bend, Ore. However, people at these sites won't be asked to wear air samplers. Instead, samples will be taken using stationary equipment.

"This combination of sites will help the team understand if PAH emissions from Asia increase the PAH concentrations in populated areas of the western United States," Simonich said.

After collecting air samples, researchers will test the PAHs on bacteria to assess possible damage to DNA. They'll also test them on zebrafish, pregnant mice, and human lung and liver cell lines to find out if the PAHs cause cancer.

Scientists will also see if the PAHs morph, through photochemical reactions, into cancer-causing nitro- and oxy-PAH compounds as they attach to particles and are blown across the ocean to the West Coast of the United States. This will help the researchers understand if the air masses that reach the United States are more or less toxic than when they left Asia.

With additional funding from the National Science Foundation, researchers will simulate this transformation in laboratories at OSU and the University of Bordeaux in France so they can better understand how the changes in chemical composition happen.

The air sampling sites were selected for strategic reasons. Okinawa was chosen because it's downwind of Asia and because Simonich previously conducted research there that traced PAHs back to China. Portland was selected because it's home to a low-elevation urban setting, and researchers want to know if the air masses from Asia, which typically travel at higher elevations, swoop that low, Simonich said. Clackamas County was chosen because it's downwind of Portland.

Mt. Bachelor made the list because its roughly 9,000-foot summit is accessible by chairlift and its high elevation makes it a good place for capturing pollutants from Asia, Simonich said. Additionally, she and her team have been collecting

air samples there since 2004 and have detected chemicals from pesticides, fossil fuels, nonstick cookware coatings and stain-repellants. They traced them back to Asia, California, Oregon and Washington using computer models that followed the path of winds. Their findings have been published in the journal *Environmental Science & Technology*.

In her new research, Simonich will be collaborating with professor Shu Tao at Peking University. She worked with him last summer while monitoring the air quality in Beijing before and during the Olympics.

By: Tiffany Woods

Source: Staci Simonich, Anna Harding

Note:

Dr. Staci Simonich is an associate professor in the Department of Environmental and Molecular Toxicology. More information about her program can be found at <http://emt.oregonstate.edu/people/faculty/staci-simonich>.



Photo: Flip Nicklin, Minden Pictures

Tracking the Great Whales

By Lee Sherman

Bruce Mate's pioneering tagging technologies are helping protect marine mammals from human impacts.

Bruce Mate has scudded most of the world's oceans at the prow of Avon and Zodiac Hurricane inflatables. Using a crossbow or an air gun, the OSU marine biologist has spent several decades attaching radio transmitters to animals that, despite their enormous size, live largely out of sight beneath the opaque surface of the sea. Following a distant spout, a momentary fluke, a

sudden breach, Mate has tagged fin whales in the Mediterranean off the coast of France and sperm whales in the Gulf of Mexico. He's tagged right whales off Nova Scotia and grays off Baja. Bowheads in the Canadian Arctic. Humpbacks off the coast of Africa and in the Hawaiian archipelago. Blues off Chile or traveling the Pacific from California to Costa Rica.

But it's at his office on the Oregon Coast where his research pays off in data. Every morning when he sits down at his desk at the Hatfield Marine Science Center in Newport and logs onto his PC, Mate has a window into the feeding habits and migratory travels of each



OSU's Bruce Mate was a leading scientist in recent efforts to protect the warm waters of Mexico's San Ignacio Lagoon, where gray whales like this mother raise their newborn calves. Below, an elephant seal pup, recently weaned, lolls on the beach at the island of Benito del Oeste off the Pacific Coast of Baja, home to many colonies of seals and sea lions. (Photos: Carol DeLancey)

each tagged animal. That's because the electronic signals emitted by the tiny transmitter lodged in its skin are picked up by instruments on weather satellites, whose relayed data translate into longitude and latitude on the researcher's computer. "Next to the whales and God, I'm the first to know where they are," Mate likes to say.

Aside from its value as basic science — fact-finding about whales' hidden lives — Mate's work holds real, and urgent, import for the fate of endangered and threatened species. The cutting-edge research

that has propelled him into the elite of marine mammal scientists has, for example, helped to preserve critical habitat for grays in the breeding lagoons of Baja and to prevent fatal ship strikes of North Atlantic right whales, which teeter on the edge of extinction. "I don't want whales to become the next spotted owl," says Mate, who holds the Marine Mammal Research Professorship. Using science to prevent problems before they occur is one of his most important aims.



Monitoring Whales with a Mouse

One drizzly day last November Mate, still tanned from a fin whale expedition to the south of France, ignores the hundreds of e-mails that have piled up in his absence, instead clicking on the folder labeled “Grays.” He’s stunned by what he finds. Four of the mother whales he tagged off Baja in March have traveled hundreds of miles north of their expected summer feeding grounds in the Bering Sea. Having weaned their calves by now, three of them are still in the high Arctic, lingering in the Russian waters of the Chukchi Sea even as winter nears. A fourth tagged mother has been killed by Russian whalers who, under International Whaling Commission rules, are allowed to harvest 145 grays annually.

The other surprise is the duration of the data stream: Eight months after tagging, the transmitters are still working. It’s a testament to how far the technology has come. When Mate tagged his first whale back in 1979, the signals from the crude, radio-monitored device reached a mere five miles. He had colleagues listen to receivers from their offices at irregular intervals along the coastline. “I spent a lot of time waiting for phone reports to come in,” he recalls, ruefully.

In 1983, he became the world’s first researcher to track a whale by satellite — a humpback off Newfoundland. Since then, he and the staff at the Marine Mammal Program have pushed the technology relentlessly. With funding from the Office of Naval Research, the Minerals Management Service and the Marine Mammal Commission, he has overseen several generations of tag designs. Today’s model is compact and lightweight, made of surgical-grade stainless steel and infused with long-lasting antibiotics to prevent infection. Super-streamlined, it’s also designed to resist drag and the pressures of deep-water dives.

The goal of the tagging, ultimately, is to protect whales from the myriad

human activities that might harass, harm or kill them — seismic exploration and drilling for oil and gas, sonar, ship collisions, fishing-gear entanglements, pollution and industrial development near sensitive marine habitats.

“Most stocks of large whales are so depleted, they’re under full international protection; everybody’s keen to see them recover,” Mate notes. “But we’re powerless to know what to do unless we know where they go throughout the year and what puts them at risk there. So in my research program, we concentrate on answering the questions, Where? When? and Why? by tracking the animals, month-to-month, season-to-season, across the planet.”

The answers do more than make protection possible. They change our understanding of how the ocean works. For example, Mate and other researchers have shown that whales and other marine migrants are sensitive to small differences in water temperature. These differences are often associated with “fronts” between water masses, boundaries that affect the ocean just as atmospheric cold and warm fronts affect the weather. By tracking where whales go, analyzing what they eat and monitoring such water fronts, scientists have discovered new patterns in

ocean productivity. They have found hot spots, areas where migratory species congregate. They’ve learned how food availability changes from one place to another, knowledge that can be used to predict available habitat and how human activities affect the health of marine mammal populations.

Looking into Inquisitive Eyes

When a calf is born in the warm waters of San Ignacio Lagoon — one of only four gray whale calving areas in the world — it unfolds its one-ton body as it surfaces for its first breath. Here on the Pacific coast of Baja, it



A Royal Polaris crew member steers a skiff through the crystal-clear waters off Baja to pick up eco-tourists after an island ecology hike during the OSU Marine Mammal Program Gray Whale Expedition in March. (Photo: Carol DeLancey)



Anatomy of a Career

Bruce Mate, OSU Professor of Fisheries and Wildlife, Oceanography Hatfield Marine Science Center

He was a Midwest kid, a self-described “technical nerd” who hung out with ham-radio buffs and fell in love with a girl who played flute to his percussion in the school band. Before he headed to Oregon with his bride, Mary Lou, to become a marine biologist, Bruce Mate had never laid eyes on an ocean. He had, however, seen a pickled sea urchin. That’s because a gifted biology teacher named Mr. Barker, hell-bent on hooking his skeptical sophomores, would order exotic marine specimens from Carolina Biological Supply. Another of Mate’s role models was ocean explorer Jacques Cousteau.

Mate’s interest in intertidal invertebrates quickly got eclipsed, however, during his first graduate seminar when UCLA marine mammal expert George Bartholomew revealed that the migratory habits of sea lions were a mystery. Mate headed straight to the library to find out for himself. After scouring the literature, he was astonished to learn it was



true. The indefatigable graduate student took this knowledge gap as a personal challenge. Armed with a pre-doctoral fellowship from the National Science Foundation, he made marine mammal history by figuring out the sea lions’ migration patterns.

After finishing his Ph.D. in biology at the University of Oregon, he secured funds from the newly formed U.S. Marine Mammal Commission to do the first range-wide survey of pinnipeds on the West Coast. Every month for a year, Mate would fly a single-engine Cessna with his left hand, while holding a camera out the window with his right. (The single-lens-reflex Canon F-1, with its telephoto lens, bulk film pack and motor drive, weighed 12 pounds.) Back in Newport, he processed the film and “counted the nose of every

seal and sea lion” from British Columbia to Mazatlan, Mexico. That was 30 years ago. He’s been tracking the movements of pinnipeds and cetaceans (with Mary Lou at his side) ever since joining the OSU faculty in 1973. Today, he holds the directorship and endowed chair of the Marine Mammal Program. Here are a few highlights of a career that has earned him international acclaim:

GENERAL RESEARCH INTERESTS

Marine mammals:

- Critical habitat identification for endangered whales, population assessment, behavior (mating, feeding), seasonal migration
- Marine mammal competition with fisheries and aquaculture
- Development of high-tech research tools including satellite-monitored radio tags

SELECTED SCIENTIFIC COMMITTEES AND PROFESSIONAL SERVICES

- Scientific adviser to U.S. Marine Mammal Commission (10 years, most recently 1995-2000)
- International Whaling Commission, (invited expert five years, most recently 2006)
- Committee member, International Union for the Conservation of Nature, Species Survival Commission

- Member of International Scientific Advisory Committee to Mexican Minister for the Environment on Industrial Development Proposals for Gray Whale winter reproductive habitat (1996-2000)
- Society for Marine Mammalogy, founding Secretary (1982-1988) and founding Treasurer (1982-1992).

RECENT RESEARCH

Identification of migratory routes and habitats of large whales:

- Right whales in the North Atlantic (2000) and South Atlantic (2001)
- Sperm whales in the Gulf of Mexico (2001-present)
- Blue whales off southern California (1998-01, 2004-5), Mexico (2001-2), and Chile (2004)
- Humpback whales off Hawaii (1995-2000), Southeast Alaska (1997), Gabon, Africa (2002), Mexico (2003) and California (2004-5)
- Fin whales in the Sea of Cortez (2001), Mediterranean Sea (2003, 2005) and California (2004)
- Gray whales off Mexico, tracked to Russian high Arctic (2005)

AWARDS

- Marine Mammal Investigator of the Year, Office of Naval Research, 2001
- Marine Conservationist of the Year, Long Beach Aquarium, 2000

will gain as much as 20 pounds a day on its mother’s fat-rich milk, as it grows strong enough to make the 10,000-mile roundtrip migration to its summer feeding grounds in the Arctic.

Each year after the calves are born, Mate leads an ecology tour for 30 adventurous neophytes eager for a close-up look at wild whales. It’s a 30-hour trip from San Diego aboard the chartered, sport-fishing vessel Royal Polaris. After their second night at sea, the eco-tourists awake in the 50-square-mile lagoon, anchored inside a 360-degree panorama alive with rainbowed spouts, glistening black flukes, bobbing heads (grays “spy hop,” thrusting their noses above the water’s surface to look around), thunderous breaches, and even the occasional “Pink Floyd” — a whale-watchers’ euphemism for the five-foot penis that a male sometimes displays when pursuing a female.

Seeing this teeming congregation of whales, visitors can barely imagine that in this tranquil spot, 19th-century whalers slaughtered grays by the hundreds, and that by the early 20th century the species had been nearly wiped out. A worldwide ban on hunting gray whales, established by the League of Nations in 1937 and continued in 1946 by the International Whaling Commission, has allowed the grays to rebound to their pre-whaling population of about 18,000. The species has been so successful, in fact, that the IWC has established a sustained quota of gray whales for the indigenous people of Chukotka, Russia, who use them to feed mink and fox bred for furs.

For Mate’s intrepid band of eco-tourists, the view from the deck of the Royal Polaris is just the teaser. Climbing into small fiberglass motor-boats called *pagas*, the visitors head

out among the grays led by experienced local guides, who, along with the Mexican government, tightly regulate the eco-tourism trade here. Out in the lagoon, the guides slow the motors to a quiet idle. Then, everyone waits.

When a longtime guide named Alvaro points and whispers, “*iballena!*” (“whale,” in Spanish), a sudden sense of vulnerability descends on the group of six afloat in their 20-foot craft. As the 45-foot creature with flippers five feet long approaches — pushing its 35-ton form through the saltwater with a 1,000-pound tail that could snuff a human life like a swatter flattens a fly — they hold their collective breath. The great mottled body passes silently through the dappled sea beneath them. The little boat rocks softly, undisturbed.

One of 30 eco-tourists on Bruce Mate's March whale expedition, Jan Whittlesey, a retired teacher from Hillsboro, Oregon, touches a gray whale mother, while the calf looks on. (Photo: Carol DeLancey)

A few minutes later, another whale emerges from the depths. At her side swims a calf. The humans, having by now exhaled, reach into the water and splash. And something remarkable happens. The mother whale rises to the surface with her month-old calf balanced on her back, its pale gray skin lustrous in the sunlight. After getting a good look at the boaters, the calf slips back into the water and swims toward the splashing hands. Just inches from the boat, it lifts its head. The humans find themselves face-to-face with the spiky hairs that sprout forward of the whale's dual blowholes. The primeval-looking "knuckles" on the last third of its back, hinting of mythical beasts and ancient origins. The black eyes that seem to gaze back at the people with frank curiosity. And when their fingers stroke its rounded nose, its skin feels like a neoprene wetsuit, only smoother.

These whales are among the "inquisitives" — an estimated 10 percent of the stock of San Ignacio — who seek interaction with humans. Mate, in fact, was one of the original researchers to document this "friendly" behavior on an expedition early in his career. So in the mid-1990s, when the U.S. Marine Mammal Commission heard about the \$120 million salt-extraction project that Mitsubishi Corp. and the Mexican government were planning to build in the Vizcaino Desert Biosphere Reserve bordering the lagoon, it sent Mate to meet with concerned Mexican activists and ecologists. For even though grays have rebounded, Mate considers them — and indeed many marine mammal species — still in jeopardy because of the many ways their habitats can be compromised by humans. The saltworks, slated for this pristine birthplace of whales (and countless other species of flora and fauna), might have put this population of grays at risk.

“Next to the whales and God, I’m the first to know where they are.”

— Bruce Mate
Director,
Marine Mammal Program

In his 2001 book *Eye of the Whale: Epic Passage from Baja to Siberia*, author Dick Russell reports that Mate was “the first biologist to take a stand on citing concerns about the saltworks.” In a letter to colleagues in 1995, Mate expressed one of his top concerns — a planned pier for loading salt onto ships for export. The mile-long dock would have been exposed to winter storms and waves from summer hurricanes. If it failed, operations would



have shifted to a tug and barge operation inside the mouth of the lagoon, creating an impediment to the whales.

Mate was appointed to a seven-member advisory panel of international marine experts to guide and review an environmental impact assessment process for the Mexican minister of natural resources. The panel provided “14 pages of concerns — things we felt needed to be addressed,” Mate later told Russell. “This was not limited to whales; we discussed fish and shellfish and larval forms, freshwater utilization for a community that would have to grow, even coyotes in the desert and garbage disposal.”

After years of public and behind-the-scenes efforts among corporate, government, scientific and environmental interests, the “saltworks war” ended happily for the grays when Mexican President Ernesto Zedillo canceled the project in 2000. “It would,” Zedillo said, “irreversibly alter the area’s aesthetics.”

Those aesthetics — the contradictory images of a desert landscape that is both tough and vulnerable — remind Mate’s eco-tourists that the treasures of Baja are not limited to whales. They include the flowers, soft-hued, blooming on barbed cactuses. The pelicans, wheeling above beaches strewn with pink shells and bleached bones. The elephant seal “weaners,” lolling in the sun like overstuffed duffle bags. The gangs of juvenile sea lions, who followed the *pangas* in clamorous undulations. The bottlenose dolphins, who escorted the Royal Polaris out of the lagoon — a swirling, leaping, bow-surfing honor guard.

Saving the Last Survivors

The gray whales are thriving now. But other species that were also decimated by whalers’ harpoons have not

returned to healthy numbers. One of the most critically endangered is the North Atlantic right whale, which got its name from whalers who considered it the “right” one to kill because it swims slowly, floats when dead and is loaded with blubber, prized for lamp oil in the days before electric lights. (Many other products were produced from whale carcasses, including corset stays, buggy whips and brushes.)

From its estimated pre-whaling population of 12,000 to 15,000, the North Atlantic right whale today clings tenuously to existence. Only 300 to 350 individuals now summer in the nutrient-rich waters off Maine, Nova

Scotia and Newfoundland — what author Tora Johnson (*Entanglements: The Intertwined Fates of Whales and Fishermen*)

calls the “ragged remnants of a vast tribe.” Scientists like Mate speculate that the species’ naturally low birthrate (mature females have only one calf every three to five years, in contrast to the grays’ rate of one every two years) makes any death outside normal attrition devastating to the overall population.

Collisions with seafaring vessels are the major anthropogenic (human-related) cause of right whales’ demise. Of the right whales found dead, in fact, fully half have been hit by ships. In part, that’s because their feeding grounds overlap some of the world’s busiest shipping lanes — waters where freighters, tankers, ferries, cruise ships and fishing boats make thousands of trips. Between 1986 and 2005, ship strikes took the lives of at least 19 right whales — and those were only the documented fatalities. The injuries observed by

researchers include severed tails, shattered skulls, internal hemorrhages, deep cuts and gashes. Mate is still haunted by the sight of one whale that had been eviscerated by a propeller.

When Canadian marine biologist Moira Brown of the Center for Coastal Studies in Massachusetts launched a campaign to limit whales’ vulnerability to ship collisions,

Mate’s research played a significant role. The travels of nine right whales he tagged in the late 1990s showed they were in constant danger. “Right whale distribution,” Mate and colleagues concluded in 1997 “coincided with areas extensively used by humans for fishing, shipping and recreation.”

In 2000 Mate and then graduate student Mark Baumgartner (now a scientist at the Woods Hole Oceanographic Institution)

investigated the movements of right whales feeding in the Bay of Fundy. Data from them and other scientists convinced a collaborative group of shippers, fishermen and Canadian officials in 2003 to adopt scientists’ recommendation to move shipping lanes four miles to the east — an unprecedented action that reduced the risk of ship strikes in the bay by at least 80 percent.

Scientists and environmentalists have now turned their attention to U.S. waters. The National Marine Fisheries Service has, for example, recommended lowering speed limits for vessels off the eastern seaboard, where right whales travel annually to their breeding grounds off Georgia and Florida. A 2004 NMFS report cites data (right whale migration patterns and routes, speed and distance traveled, residency periods and dive durations) from studies by Mate

and other scientists in support of the proposal.

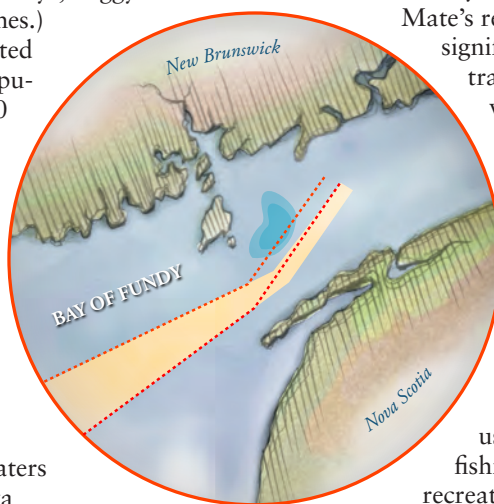
The other big threat facing North Atlantic right whales is fishing gear. New England Aquarium scientists have documented dozens of entanglements with nets and lines in recent decades. They have reported whales with lines through their mouths and wrapped around flippers, head and back. One whale with “three tight wraps from gillnet” over its back was later found dead with line cut into the dorsal body cavity and “wrapped around both flippers and underside.”

The detritus of human enterprise and entertainment — helium balloons, aluminum pull-tabs, plastics by the ton, nylon netting that even a whale can’t break — too often winds up in the world’s oceans, and takes the lives of countless sea creatures. That fact is brought home forcefully for visitors in a graphic photo display at the Hatfield Marine Science Center. The recent travelers to Baja witnessed it firsthand: a sea lion wearing a piece of fishing line cinched around her neck. It had cut its way into her skin, forming an ever-tightening noose. Watching her scratch at it with her flipper, Mate shook his head. “Eventually,” he said, “it’ll kill her.”

For the precarious North Atlantic right whale, these kinds of entanglements are tragic not just for the individuals, they’re ominous for the species as a whole. “Almost 60 percent of North Atlantic right whales are scarred by gear entanglements,” Mate says. “Some years, all of the calves are scarred before they’re a year old. That’s not tolerable!”

Creating a Corps of Advocacy

Mate’s findings are not limited to academic journals and scientific papers. He’s been quoted widely in the popular press, including *National Geographic**, and he makes the evening news whenever whales beach themselves on the Oregon Coast. He’s been featured on the Discovery Channel, the PBS science programs “Nova” and “Nature,”



and several BBC specials with world-renowned director and producer Richard Attenborough, including a recent episode of “Blue Planet.”

Reaching ordinary people about the plight of whales and their cousins gives Mate deep professional satisfaction. For more than 20 years, he reached that broader constituency as a member of the Oregon Sea Grant Extension faculty. Mate believes that when marine mammals are under siege, their strongest shield is public outrage girded by scientific evidence — the kind of evidence that, as Mate likes to say, “will hold up in court.”

That kind of evidence is critical to resolving such issues as the ongoing conflict between salmon fishermen and sea lions in the river systems of the Northwest. The competition for coho and chinook makes headlines across the region year after year. Yet studies by OSU and others suggest that there is more to it than a simple predator-prey relationship between marine mammals and fish. That’s because sea lions have historically had a voracious appetite for a salmon nemesis: the lamprey, a parasitic fish that attaches itself to juvenile and adult salmon. In the 1980s, an Oregon Sea Grant-funded study by Mate and his colleagues found that lamprey topped the sea lions’ diet in the Rogue River. “Lamprey are anadromous (they spawn in fresh water and migrate to sea), like salmon,” Mate says, “and each female that makes it upstream lays 100,000 eggs. Seals and sea lions are thought to be the reason lamprey populations in Oregon rivers have declined.”

Since that study, the picture has changed. Salmon numbers have plummeted while more sea lions, which are protected by federal law, have been making their way upstream. More research is needed to end the bitter debate.

To settle this and other human-animal conflicts, Mate is spearheading the creation of an international Marine Mammal Institute at OSU. In June, Markus Horning, director of the Laboratory for Applied Biotelemetry and Biotechnology at Texas A&M University at Galveston, became the latest scientist to join the multidisciplinary team that will study marine mammal ecology from many different angles — behavior, acoustics, physiology, genetics and seasonal distribution. Horning specializes in pinnipeds and other diving animals. With scientists at the Alaska Sea Life Center in Seward, Alaska, he leads a study of Steller sea lions, using a new implanted tag technology that reveals details about foraging patterns and other aspects of an animal’s life history.

Mate continues to develop his program at the Hatfield Marine Science Center as the foundation of a worldwide effort to understand and manage marine mammals. Because in the end, extending the scope and reach of science, Mate says, is the best hope for the future of the world’s ocean dwellers. **terra**

To learn more about research in OSU’s Marine Mammal Program, see oregonstate.edu/groups/marinemammal 



To Hear Whales Breathe

“There is magic in the air.” Not a sentence one would expect to see in association with research and field science, is it? But the great thing about science is that it so often skates along the edge of understanding; and just past that edge are mysteries that sometimes seem like magic. It’s the pursuit of those mysteries, the demystifying of the magic, that drives so many scientists.

I’ve been fortunate to work with a group of cetacean scientists for five years and have seen quite a few mysteries explained, but each explanation gives instant rise to at least one new question, and usually more. That’s one of the greatest frustrations, and the greatest pleasures, of working in a scientific field.

And there’s another great pleasure as well: sharing knowledge with others. This one, I believe, is the true end goal of science. It’s not just about discovery; it’s about dissemination. Knowledge is nothing if it’s not communicated.

The Marine Mammal Program’s annual Baja Expedition is about all these things: discovery, understanding, sharing. It’s a rare opportunity for people of all backgrounds to learn, answer questions and ask new ones. Our passengers can see elephant seal pups roll over each other and teach themselves to swim, watch juvenile California sea lions make a beeline toward a boat because they’re curious about us and touch a whale because that whale chooses to be touched. As a staff member of these expeditions, I find it just as much fun to watch others make these discoveries as it was to make them myself.

One of the questions I’m often asked on this trip is, do I ever get jaded? Am I tired of it yet, seeing the same things each year? The quick answer is, no way. The longer answer takes the form of a short story.

Our time in San Ignacio Lagoon includes a trip to a particular beach that I adore. It’s located at the north entrance to the lagoon and is literally covered in places with shells and bones. Most of our passengers take great delight in beachcombing this area and quickly spread out as they wander in pursuit of that next interesting or beautiful thing. But I usually sit. Because if we can get to this beach at the right time of day, an amazing thing happens: the wind dies down, the lagoon calms and sound carries. So if I can find a quiet spot to just sit and listen, I can hear whales breathing. I hear them all over the lagoon. Some are close to me; others can be over a mile away — far enough that I see the blow a half second before I hear it.

There’s only one word to describe what it’s like to sit in the sun, on a spectacular beach in a pristine environment, and listen to whales breathe. Magic.

So no, I never get jaded. Because there is, quite literally, magic in the air.

— Story and photo by Carol DeLancey,
OSU Marine Mammal Program

Researcher Profile

Bruce Mate holds the Marine Mammal Research Professorship and directs Oregon State University's Marine Mammal Program at the Hatfield Marine Center in Newport, Oregon, where OSU, state and federal researchers cooperate on a wide range of marine science projects. Mate's funding support has come from the Office of Naval Research, the National Marine Fisheries Service, the Minerals Management Service of the Department of the Interior, the American Museum of Natural History, the Wayne and Gladys Valley Foundation and the British Broadcasting Corporation as well as numerous private donors to the OSU

Foundation's Marine Mammal Program Endowment. In addition to facilities at Hatfield, Mate uses three research vessels for whale tracking purposes. His collaborators include: NASA and the National Marine Fisheries Service; nonprofit organizations including the Wildlife Conservation Institute, the Smithsonian Museum, New England Aquarium, Mystic Aquarium, Sea World, the Woods Hole Oceanographic Institution, the Scripps Institution of Oceanography; and universities including Texas A&M, Centre National d'Etudes Spatiales (France), University Autonoma de Baja California Sur (Mexico), Valdivia University (Chile), Massachusetts Institute of Technology, University of Arizona, University of Oregon, Portland State University, University of Alaska and Harvard.

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* See recent National Geographic article: Blue Whales
<http://ngm.nationalgeographic.com/2009/03/blue-whales/brower-text>

A 96 minute documentary called "Kingdom of the Blue Whale" has also been produced.

Update:

Dr. Bruce Mate now serves as Director of the Marine Mammal Institute which was established in November 2006 within the College of Agricultural Sciences. It remains closely associated with the Coastal Oregon Marine Experiment Station and co-located at the Hatfield Marine Science Center in Newport, Oregon. More information can be found at: <http://mmi.oregonstate.edu/>

Link to the Video on the Blue Whale:

http://channel.nationalgeographic.com/episode/kingdom-of-the-blue-whale-3302?source=banner_nga_99

Dean Thayne Dutson retired in June 2008; Dr. Sonny Ramaswamy became Dean of the College of Agricultural Sciences on August 1, 2009.

Researcher Studies Mobile Commerce, Recommends Privacy Enhancements

A new commercial environment is emerging that focuses on cell phones as a portal for business and for advertisers to reach consumers through their mobile phones. While this new market can provide many benefits, mobile advertising has the potential to plague consumers in similar ways to “spam” on the Internet.

According to a new study by an Oregon State University researcher, creating a business environment in which mobile commerce thrives will require steps to protect consumer privacy.

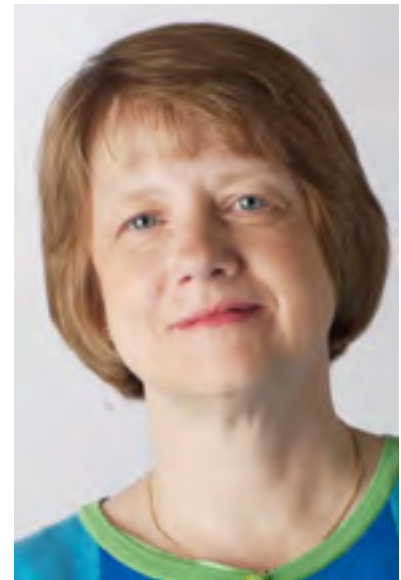
In the forthcoming issue of Federal Communication Law Journal, OSU’s Nancy King lays out the case for privacy practices along with government regulations that are needed to protect consumers in the new business context of mobile advertising. King is an associate professor of business law in the College of Business at OSU and recently was awarded a Fulbright fellowship to conduct European Union/U.S. comparative law research on privacy issues relating to emergent technologies associated with mobile commerce.

According to King, advertisers soon will be able to target messages directly to consumers’ cell phones. In addition, with the use of radio frequency identification technology (RFID) and global positioning systems, companies will be able to know the location of consumers at particular times. So you could be on your way to grab coffee, walk by a major department store and have that store scan your cell phone and send you a pop-up message generated by software on your phone that alerts you to a sale.

If you have “opted-in” to receive these messages, King says, you may be quite happy to receive them. But if not, they could be a real bother.

“The idea that location tracking technologies associated with your cell phone alerts the advertiser where you are, rather than you using your phone as a convenience to find information that you want—that’s a privacy issue,” King said. “Use of location data about mobile phone users by businesses raises important privacy concerns.”

Faculty – Nancy King



King’s research is complex and far-reaching. Privacy concerns from a consumer perspective include the collection, use and disclosure of personal information and the generation of unsolicited mobile advertising, or mobile spam. From a regulatory perspective, mobile commerce involves numerous parties, including advertisers, mobile carriers, cell phone handset manufacturers, commercial databases that collect and sell consumers’ personal data, government regulators and consumers.

“There are private databases out there that are selling personal information—including consumers’ mobile numbers—without their permission, and in most cases there is currently no U.S. law to stop them,” King said. “Although there are currently no official cell phone number directories in the U.S., there are businesses that profit from selling cell phone numbers and other personal information without the cell phone subscribers’ knowledge or permission.”

King says mobile phone users should be concerned about the privacy implications of companies tracking cell phones and advertising directly to them based on personal information about the cell phone user, including location.

“To be able to walk down the street and be anonymous is an aspect of personal privacy,” she said. “But it’s also a personal data issue. Most people view their cell phone numbers as something they control; they give their cell phone number to people or not as they choose. However, if your cell phone number is published in an online directory or sold by a commercial database to an advertiser, and you haven’t given your consent for this, you are not making the choice to disclose your number, yet it is being disclosed for someone else’s profit.”

King has completed the first component of her study—a comprehensive and detailed examination of U.S. law related to mobile advertising and consumer privacy. Because a patchwork of U.S. laws at the federal and state level make compliance a challenging task for those in the mobile advertising industry, the study’s examination of current privacy laws that apply to mobile advertising is useful to businesses in order to help them understand the current regulatory environment. However the study goes further, assessing the strengths and weaknesses of existing federal regulation, identifying regulatory gaps that need to be addressed in order for consumer privacy to be adequately protected, and making a few simple recommendations to ensure basic privacy and data protection for consumers.

Some of the key recommendations include:

- Disclosure of cell phone numbers to third parties, such as mobile advertisers, should be prohibited without explicit consent from consumers on an “opt-in” basis. Consumers should also have the right to be consulted before their cell numbers are published in directories or made available on the Web.
- A multilayered method for distributing companies’ privacy policies should be adopted by companies engaged in mobile advertising, beginning with a short notice suitable for display on cell phones and linking to a complete policy on a Web site.
- Consumers’ privacy and personal data should be protected by companies through adoption of company privacy policies and mobile carrier-consumer contracts that promise not to disclose consumers’ personal information and location, without their express written consent.

Beyond these initial recommendations, which King views as “first steps,” more regulatory work is needed to create an environment that will protect consumer privacy in mobile commerce, yet enable the mobile advertising industry to grow. The regulatory tools chosen could include: industry-self regulation, privacy-enhancing technologies, government regulation, or some combination of the three.

King said the U.S. could learn a lesson from how the federal government dealt with the Internet in its early days. Initially the government hesitated and did not adopt baseline regulations to prevent consumers from being spammed or having their

personal information misused or even their identities stolen, in order to give businesses a chance to regulate themselves. To this day, there are not adequate protections for Internet users, King said, and the result has been that consumers’ experience in e-commerce was not as positive as it could have been with adequate privacy and data protection in place.

In the next part of her study, King will look at how the European Commission (the regulatory body of the European Union) has addressed complex privacy and data protection issues related to mobile commerce and mobile advertising.

“Because there is general data protection legislation in Europe that has been in place since 1995, Europeans have a starting point that we don’t have in the U.S.” King said. “Instead, our legislation has taken a piecemeal approach to protecting privacy and data protection, as problems arise we adopt specific legislation to address them, but we lack general regulatory framework.”

King said U.S. businesses, whether small or large, have something to gain from effective privacy regulation for mobile commerce. Some businesses have been vocal advocates of having the United States adopt at least minimum privacy regulations, analogous to the general privacy laws in place in Europe. Many companies already follow these rules when they do business in other countries, and it would make it easier for them to have the same playing field everywhere. Also, even small businesses in the U.S. have privacy interests that would be protected by new mobile commerce regulations. For example, small as well as large businesses are vulnerable to having their employees’ time wasted receiving mobile spam.

“When we let market forces deal with Internet spam, and did not regulate it, it didn’t work, and we shouldn’t let similar problems discourage the growth of mobile commerce” she said. “Choosing a good balance of the available tools to protect consumer privacy is what it is all about, and I believe that will be good for business and consumers.”

To view a copy of King’s publication by the Federal Communications Law Journal, go to <http://www.law.indiana.edu/fclj/pubs/v60/no2/King.pdf>.

This journal is published by Indiana University’s School of Law and is the official journal of the Federal Communications Bar Association, an association of legal experts on communications law.

Student accomplishments:

Outside the Border:

Jacob Cramer Secures Internship in Germany

By Abby P. Metzger

Jacob Cramer learned that adventure can lead to opportunity when he took a trip to Germany last school year to fulfill his international business option.

The OSU Honors College senior studied abroad at the Berufsakademie in Bad Mergentheim and, because of his strong language and entrepreneurial skills, secured a six-month internship for Würth Group.

A multi-national and family-owned business based in Künzelsau, Germany, Würth Group specializes in the sale and fixing of assembly materials, including screws, screw accessories, dowels and plugs, chemical products, furniture, and construction fittings.

From July to December of 2008, Cramer will work with international key accounts in sales and marketing for Würth, and will be given two projects during the six-month period. The internship complements his program of study at OSU in international business and German.

"I heard there was an opportunity to get an internship at Würth for those who have a foundational understanding of the language. And I figured since I spoke some German, there was a possibility of getting it," he said.

Cramer spoke with Axel Gerloff, the director of the international business program at the Berufsakademie, to set up an interview with Würth. "The interview process was a lot different than your standardized American process. It was more of a personable interview-getting to know who I was and my motivation behind wanting to work in an international firm," Cramer explained.

He asked questions, expressed interest, and displayed a genuine understanding of his skill set and how he could be an asset to the company. Because of this, Cramer got the internship.

The experience was nerve-wracking but ultimately rewarding because internships in Germany are rare for foreigners, who often lack culture and language competency. "It will be a challenging experience, but definitely worth it. Not only for the experience itself, but for the amount of German I'll learn," he said.



Jacob Cramer

Growing up in Canby, Oregon, Cramer worked floor and corporate sales during his summers for Front Room Corporation, a furniture company. He came to OSU and enrolled in mechanical engineering before discovering that he would rather experience the world first hand than from behind a drafting board.

He then realized a degree in international business would give him both a fundamental understanding of the industry and an opportunity to gain valuable cultural insights. "The degree gives you the basis of business, but then it really broadens your perspective and pulls you out of that narrow view of American business into global business," Cramer stated.

The OSU senior says he's looking forward to using his academic discipline in a tangible situation, both during his internship and beyond. When he returns from Würth in December, Cramer will have a term left before he ventures beyond the borders of OSU. "This experience could really alter my perspective, but at this point, I see myself starting work in the U.S after I graduate."

A new perspective and invaluable training are just two of the benefits he will reap during the internship. Cramer is testament that stepping out and going on an adventure can create opportunities and prospects.

"People need to follow what they really love. Don't worry about the job at the end of the road. It's good to experience new situations and get involved in things you wouldn't normally do," he concluded.

For more information, please read an article in the Bad Mergentheim online newspaper on Jacob Cramer and American exchange students at the BA in Bad Mergentheim.

Undergraduate Paul Heim Named Petters International Scholar

By Knox Richardson

OSU College of Business junior Paul Heim has been named one of 20 international scholars for 2009 by the John T. Petters Foundation and will receive \$6,000. The prestigious and competitive memorial scholarships were established to provide undergraduates with financial support for study abroad programs. As an Arthur Stonehill International Business Exchange Program student, Heim will study international finance this fall at the University of Lund in Sweden. He has also been selected to receive an OSU College of Business Dean's International Study Scholarship.

Heim will intern this summer with the private investment bank of Kleinwort Benson of London before continuing his fall studies in Sweden. He plans to graduate in June 2010 with a bachelor's in business administration and options in finance international business.



Paul Heim

Though only a junior, Heim is the paid finance director for the ASOSU, managing a million dollar budget, and a member of the OSU Finance Club that invests hundreds of thousands of real dollars from OSU Foundation funds. He is also a member of the Alpha Lambda chapter of the Lambda Chi Alpha national fraternity, which he credits as the foundation of his academic and extracurricular successes.

Jimmy Yang, OSU associate professor of finance and one of Heim's faculty advisors, said Heim is a capable student who will take full advantage of his time abroad. "Given his capability and willingness to seek opportunities to learn and to serve, I believe he will succeed in this international program," Yang said.

Preparing for a **World** of **Possibilities**

The Long Bridge

“Preparing for a World of Possibilities” is more than just the College of Education’s motto, it is a guide for shaping experiences in education at all levels. In the past year in particular, the college has been working to create connections and opportunities across the Pacific Rim through shared ideas, people, and resources. Anchored in our internationally known faculty, driven by the work and lives of undergraduate and graduate students, and reaching toward the future of education, the long bridge spanning the Pacific soars for the College of Education.

We are continually reminded that education extends beyond the classroom and beyond national boundaries. Dr. Nattasuda Taephant reinforces the expansiveness of possibility through her research and work. Nattasuda was drawn to Dr. Debbie Rubel’s expertise in group counseling and came to OSU specifically to work with her. Nattasuda’s arrival in Corvallis from Thailand was her first trip to the United States and she quickly embraced the community.

Skilled in integrating Thai culture and Buddhism into counseling practice, Nattasuda came to the College of Education to find ways to better train group leaders. In her research, she studied counseling group leaders in Thailand, Japan, and Taiwan, getting up at three or four a.m. for interviews. She opened up a new area of study, which she calls “developing culturally sensitive interventions for Asian clients” and created “a place for Asian group leaders to share what they have done.”

*Chulalongkorn University
(Photo: alumna Nattasuda Taephant)*



International research proved challenging for Nattasuda. She used Skype, a computer-based communications system, as a way to reach her participants. In particular, the voice quality was important to her as she had to transcribe conversations verbatim as they were occurring and be able to hear inflection. She looks forward to better video systems so that she can observe participants' nonverbal communication. Despite the difficulties, working with internationally renowned faculty and in the supportive environment of OSU was "worth the trip."

Nattasuda has since returned to Thailand to teach at Chulalongkorn University in Bangkok. She is teaching in their counseling program, serving as an assistant dean of academic affairs, and doing research on successful aging in a Thai culture. Her experiences at OSU and in Corvallis have opened new doors for her personally and a whole new field professionally.

The college is also building stronger relationships with Thailand through the work of Dr. Darlene Russ-Eft, chair of the Adult Education and Higher Education Leadership department. She had the opportunity to be in Thailand this past year as the President-Elect of the Academy of Human Resources. Darlene's research and professional involvement takes her all over the world and she is among the most respected adult education specialists internationally. She has a forthcoming work on communications styles, including an assessment and profile that was implemented globally by CISCO that she developed with College of Education faculty member Dr. Michael Dalton and graduate Dr. Greg Sampson-Gruener.

Darlene is also part of the college team that is working to create a formal relationship with Kasetsart University, in Thailand. Kasetsart University, which was originally an agricultural college like OSU, is now one of the largest and most diverse higher education institutions in Thailand. Through the Teacher Leadership and Community College Leadership doctoral programs, Thai doctoral students in education administration will have the opportunity to take classes and refine their research proposals. The college has exchanged several visitors from Kasetsart University and OSU this year and is looking forward to the opportunities this cross-cultural movement will create for all students.

(Photo: Hitomi Kuromoto)



(Photo: Hitomi Kuromoto)

Oregon University System has had a formal relationship with Akita International University (AIU) since 2007, when study abroad programs with the school commenced. Akita is a small university with a large international population (around 10%), including students from more than 25 countries and regions. OUS alone has sixteen students studying there in 2009-2010. AIU students also spend at least one year abroad and several have come to Oregon State.

AIU's Naoko Kawamura didn't come through a study abroad program, however. She came to study how to serve those going abroad through the College of Education's College Student Services Administration program (CSSA). While her first area of study had been computer programming, she found student services and international programs offices helped shape both her college career and her aspirations while studying in the US. In 2004, Naoko began working at AIU and became more involved with international education. She returned to the United States to gain direct knowledge in her chosen field. The CSSA masters degree gave Naoko both the programmatic skills to work in the field of international student services and more of the abroad experience she wants to draw from. "Having experiences both being an international student and being the one to support international students in the US will give me a wider perspective to work in the international education field [in Japan]."

The CSSA program, lead by Dr. Jessica White, balances practical experience and theory by placing students in several different graduate teaching/research assistantships and internships throughout their course of study. Naoko credits her university positions with "deep" experiences, which she has put to use in her new position as the Exchange Program Coordinator at AIU. "I learned that student affairs professionals are educators outside the classroom."

The College of Education has a comprehensive approach to education, focusing on learning both in and out of the traditional classroom, that benefits internationally minded students. While Naoko changed her definition of education in the US, alumna Jamie Suter found a way to take education at all levels to Japan. Jamie, who is currently in Japan working with the prestigious and selective Japanese Exchange and Teaching Program (JET), teaches English to a variety of age groups in Japanese schools.

Honored by both the college and the university for her work with international students in 2008, Jamie has an affinity for other cultures. Jamie, who graduated with an Education degree and a Human Development and Family Sciences degree through the Education Double Degree program, worked throughout the latter part of her college experience to make visiting and foreign students feel at home on the OSU campus, through conversation groups, social experiences and friendships. Gene Newburgh, the Senior Advisor for Education, commented that “Jamie has built bridges of cultural connection on multiple levels” and celebrated Jamie’s recognition for her tireless work to bring different experiences to people through one-on-one interaction.

These very qualities won Jamie the coveted Clara Simerville Award, a university-wide recognition of her contributions to “international understanding through personal relationships, scholarship and research, and involvement in campus or community organizations supporting international understanding.” Jamie has continued in her cross-cultural work and is finding her experience in Japan uniquely rewarding. While she gained a great deal of insight through a three-month abroad program in Taiwan, it has been her year in Japan that has given her different view of the relationships between countries and a better understanding of what it means to live and teach in a foreign culture.

A deeper understanding of education in all areas, refined skill sets that will affect future students, and a more nuanced picture of the world are the goods carried across the long bridge of international cooperation being built by the College of Education. Through research, teaching, and education, we are truly “preparing for a world of possibilities.”



Double Degree alumna Jamie Suter, teaching in Japan.

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Harvest of Rain

Engineering water systems for Salvadoran coffee farmers reaps unexpected rewards

By Lee Sherman

Last year's excursions to the remote hill country of southwestern El Salvador promised to be excellent adventures for Scott Crook and Aparna Shrivastava. The OSU students' mission—to build clean-water systems with coffee farmers living high in a hidden rainforest—would test their engineering skills and slake their thirst for new experiences. They never expected the project to change their lives.

"It completely transformed my belief in me," says Shrivastava, a junior in mechanical engineering from Tigard, Oregon. "It changed my perspective about what I can do for the world."

Crook echoes her sentiment. "It made me realize the incredible things you can do in the world," says the civil-engineering sophomore from Salem.

A Salvadoran boy gets his first taste of clean running water after students in OSU's chapter of Engineers Without Borders designed and installed a gravity-fed system in cooperation with an isolated Central American community.

(Photo: Michelle Adlong)

Biodiesel to Solar

The El Salvador Water Project is one of several initiatives of the OSU student chapter of Engineers Without Borders USA (EWB-USA)—a nonprofit humanitarian organization that partners with communities across the globe to solve quality-of-life problems. Coconut-based biodiesel in Fiji, drip irrigation in Niger, solar-powered schools in Mali, pedal power in India, hydro-electric power in Peru—these are a few of the projects underway worldwide, funded by grants and donations.

For the 150 Salvadoran families living among the steep ridges and deep ravines between Las Mercedes and El Naranjito, water is difficult to reach and often contaminated with pathogens. Four or five times a day, women lug five-gallon jugs up and down precarious slopes between their small, brick or stucco homes and the natural springs that bubble out of the

mountainside. When those springs dry up during the summer months, families have to use contaminated surface water, which often causes illness. The children suffer most.

In 2006, OSU students took up the challenge. Portland engineer Aaron Poresky—a recent OSU grad who now heads Portland’s professional chapter of Engineers Without Borders—led the charge by making a reconnaissance trip to get the lay of the land. Since then, 30 students have traveled to Central America in teams of four to 10 to meet with local residents, confer with water councils, obtain permits, survey the landscape, arrange transportation, purchase materials and, working side-by-side with the rainforest communities, construct catchments for “harvesting” rainwater and spring-water collection systems.

“The municipality where the students are working is one of the poorest in all of El Salvador,” says Poresky, an environmental engineer with Geosyntec Consultants. “The Ministry of Health has raised grave concerns about the prevalence of undernourished children there. We know that malnutrition very often is associated with contaminated drinking water and associated illnesses.”

OSU students Malia Kupillas, Janice Keeley, Kelly Kibler, Michelle Adlong, Sonia Galan, and Scott Crook rejoice in their El Salvador accomplishment. (Photo: Don Miguel Escobar)



Capturing Cloudbursts

On the eastern slope of La Cumbre (literally, “the summit”), Salvadoran farmers plant, tend and harvest organic coffee in the shade of tropical vegetation. Rains drench the forest much of the year. Yet without plumbing or public infrastructure, the farmers have no way to capture and store these abundant rains or to bring spring water to their widely scattered homes—they didn’t, that is, until EWB-OSU arrived.

Since Poresky’s initial trip, the OSU teams have brought ceramic and colloidal-silver filtration systems to the community through Potters for Peace. They have built a rainwater “catchment” system for El Naranjito School. And last summer, they constructed a centralized gravity-fed spring-water system in the heart of the forest.

Planning for the gravity-fed system took place some 3,000 miles north of La Cumbre during the winter of 2007 - 2008. Crook and Shrivastava gathered weekly with their EWB peers in a drafty Corvallis classroom while outside, pewter skies spat rain and snow. Together, they studied topographic maps, investigated the suitability of rain catchment versus gravity-fed water systems and discussed the legal requirements of local water boards. Several native Salvadorans talked to the students about cultural norms and traditions. Camaraderie, commitment and lots of coffee sustained them through the sometimes-tedious meetings.

Carl Moen helped steer the thought process. A sophomore from Sandy, Oregon, Moen joined EWB-OSU at his freshman orientation when he heard that the organization was seeking pumping expertise. “It was right up my alley,” says the mechanical engineering major, who was a pumping technician with the U.S. Navy for eight years. “The hands-on problem-solving for an extremely challenging environment is a great way to put your skills to work. You take a design and make it work in the situation.”

Doubts Cast Aside

At age 30, Moen is a force of quiet maturity, a self-described “jack-of-all-trades” who shuns the limelight for a supporting role behind the scenes. “I’m interested in mentoring and training future leaders,” he says.

Between meetings, Shrivastava conferred with the Peace Corps volunteer who was their liaison and translator in the Salvadoran community. She submitted (and resubmitted) design plans to the organization’s technical advisory committee (volunteer professional engineers who review student designs to ensure technical soundness, environmental sensitivity, social relevance and economic sustainability). She worried herself sick about every detail for which, as chapter president, she was responsible. Sometimes she was seized with doubt: Was she really up to the task? “I was very anxious,” she recalls. “It was such a big responsibility to have on your shoulders.”

But with guidance from OSU faculty mentors Harold Yeh, Todd Scholz and Chris Higgins, the students were able to work out the details and logistics for a gravity-fed system of pipes that would snake through the understory to a storage tank encased in concrete and rebar, where families could collect water and wash clothes.

Lost in Translation

The painstaking plans forged in a faraway place soon bumped into realities on the ground. Although the coffee farmers of El Salvador share a hemisphere with the campus in Corvallis, the two communities exist in separate worlds. The daily-life disparities between North and Central America cannot be fully appreciated from afar. Nor can all pitfalls be anticipated. “I went in with a day-in-the-park mentality—you know, just slap on a little mortar,” Crook confesses. “Everything makes sense on paper. But in El Salvador, things don’t usually go the way you think they should go. Building materials aren’t dropped off at the door by Home Depot. You have to make do.”

On one occasion, “making do” meant strapping a 10,000-liter plastic water tank to a semi-truck already bulging with a mountain of bricks. From there it was 30 miles of bad roads and white knuckles. At one point, the truck encountered a power line hanging low across the road. Crook’s reaction (“Oh, shoot!”) lasted only a second. The back-up driver sprung out of the cab brandishing a long pole, which he used to lift the wire while the truck passed underneath. Where the paved road turned to dirt, a second vehicle was waiting to transport the tank to the worksite. A Toyota 4x4, its better days were decades behind it. “The truck looked like something out of a Mel Gibson movie—you know, Mad Max or Road Warrior,” Crook jokes.

In this instance, “making do” meant figuring out how to secure the giant tank onto the tiny pickup and then coax it up slopes that tilted nearly 45 degrees in places. “We used lots and lots of rope, and one guy had to get out and push from behind,” Shrivastava says.



The MacGyver Approach

Another setback—a broken axle—delayed delivery of the gravel needed for the water-tank foundation by three days. When the load finally arrived, the student engineers were dismayed to see “head-sized boulders” passing as gravel. “We ended up using a lot of sand in the foundation,” Crook reports. “It’s very design-as-you-go. You have to MacGyver everything on the spot.”

Other hardships included digging trenches in thick, wilting humidity (or, for teams working in the rainy season, downpours of biblical proportions), and back-breaking, high-elevation hikes with heavy packs. Says Shrivastava, “It feels like you’re climbing stairs forever.”

“Yeah, but without the stairs!” chimes in Crook.

Among the hazards, insects were not insignificant. One day while installing a section of pipe, the students ran into a swarm of hornets. “These were jungle hornets—really evil bugs,” says Crook. “They would zoom at you like kamikaze fighters.” At night, bug-hunting bats swooped in and out of the lightless sleeping quarters. One evening, something huge scurried across the floor and disappeared under a hat. Jerking up the headgear, Crook found an armored beetle the size of a computer mouse. Then there were the “freaky spiders,” which he describes as “crazy fast and as big as dinner plates.” Shrivastava came face-to-face with one of these monsters her very first night. As she flopped wearily onto her sleeping bag, her headlamp beamed upward, casting light across the metal-tiled ceiling. There clung a “huge and hairy spider” with mega-mandibles. At that instant, the oversized arthropod performed a Spiderman-like arabesque across the ceiling. The scream that escaped from Shrivastava’s mouth scared her as much as her roommates.

The Human Element

Seat-of-the-pants feats of engineering and problem-solving were invaluable learning experiences for Crook and Shrivastava. But their inner transformation was sparked by another, rather unexpected, source: the Salvadoran people themselves. The strength and tenacity, warmth and generosity, gratitude and humility of the families they worked alongside moved the students deeply.

“Living with the locals was just as stretching, just as rewarding, as the engineering,” Crook told a group of professors during a recent faculty-club lunch presentation.

Although the OSU students instigated and coordinated the project, its implementation was pure collaboration. Local partners included a mason for concrete work and a lawyer for water-rights expertise. Then there was Caesar, the contract driver who kept the ancient Toyota running against all odds. And Don Pasqual, who offered plates of fried plantains and fresh tortillas and mugs of aromatic coffee, saying: “We bring you food because it’s all we have to give. We can never repay you properly, but God will.”

Crook marveled at the ingenuity, endurance and raw power of the men who helped them lay pipe through the “Jurassic Park-like” terrain. “One guy with a machete cut down a thick tree in about five minutes and then ripped out the stump with a rope,” he says. “They outworked us consistently.”

Cultural awareness flowed both ways. One day, after watching the college men and women work side-by-side for a fortnight—digging, lifting, pounding, sweating—the 20-year-old daughter of Don Pasqual quietly took the handles of a wheelbarrow and joined the crew. In a culture where physical labor is the domain of males, this act was, in Shrivastava’s words, “revolutionary.”

“We got excited,” she says. “It was a cool moment.”

A Child’s Eyes

But it was the children who touched Crook and Shrivastava to the core. One day, a piñata revealed a surprising spirit of sharing. After the kids had whacked the colorful papier-mache dinosaur and gleefully scooped up the scattered candies, they circulated among the college students with bashful smiles, offering them handfuls of sweets.

Every day, 6-year-old Gustavo showed up at the worksite wanting to help. He carried rocks, sifted sand, ran errands. The day the tank was finished, the little boy looked up at Shrivastava and asked—as he had 100 times—“¿Esta listo?” (Is it ready?)

“¡Si, esta listo!” she told him.

“¿Agua?” he asked.

“Si, agua.”

“His eyes were so happy,” she says. “I didn’t think a little kid could be so grateful. The look on his face made it all worth it.”

The El Salvador Project has spun the two students’ career goals 180 degrees. Shrivastava has abandoned plans for a lucrative auto-industry career in favor of public health and social engineering. As for Crook, his one-time aspiration “to make the most money possible” has morphed beyond recognition. These days, he’s thinking about joining the Peace Corps.

Hummingbird Behavior and Pollination Dynamics in Fragmented Tropical Forests

Landscape ecologists have long been concerned about the consequences of human-caused landscape fragmentation due to large-scale forest clearing and conversion to agricultural use. Many studies have been done to document the resulting impacts on animals' presence or absence in fragmented landscapes. However, there are larger implications from fragmentation that are not as well known, especially in tropical regions. A worldwide decline in many plant species is associated with a decline in their pollinators, and is creating what scientists are calling a "global pollination crisis." Bees, wasps, bats and hummingbirds are widely known to play an important ecological role in plant pollination, which is necessary for fruit and seed production. A decline in pollination may have serious impacts on plant biodiversity and on food supply. What impact does landscape fragmentation and habitat loss have on the behavior and movement of these important pollinators? That is the question that Forest Ecosystems and Society PhD student Adam Hadley, assistant professor Matthew Betts, and Fisheries and Wildlife associate professor Doug Robinson are attempting to answer through their research with hummingbirds in the tropical forests of Costa Rica. Over the past 18 months they conducted a pilot study in collaboration with the Organization for Tropical Studies in Las Cruces. Additional collaborators on the second phase of the project will include Drs. Paul Ehrlich and Cagan Sekercioglu at Stanford University.

Green hermit hummingbird (Photo: M. Betts).

Transmitter attached to green hermit hummingbird (Photo: J. Miller).



Bees and wasps are too small to carry electronic tracking devices on their backs, but Hadley and Betts have successfully used eyelash glue to attach 10-centimeter-long transmitters onto the backs of 20 green hermit hummingbirds to track their movement across the landscape. They found that instead of taking the direct route across an open field, the birds took the longer way home through forested areas. They hypothesize that this behavior may be due to either a lack of food sources in the deforested gaps, or to an increased risk of predators. They would also like to discover whether the restricted movement of pollinators is having a negative impact on pollen transfer for plants in isolated patches of the landscape. The next phase of their research will address each of these questions separately. With funding from OSU and Canada's Natural Sciences and Engineering Research Council (NSERC), Hadley and Betts plan to hand-pollinate flowers in both isolated and continuous areas to discover if this results in higher seed production in isolated patches. They will also set up a series of feeding stations (plants and feeders) across open gaps to see if availability of food changes hummingbird travel patterns. If it does not, they think fear of predation may be the factor that restricts the birds' movements across fragmented landscapes.

According to Betts, "The most interesting aspect of this research project is uncovering what these birds are doing to deliver this amazing service to flowers, and the rules governing how and where they move about the landscape."

Photos: Principal investigators Matthew Betts and Adam Hadley (with Acanthos flower)





Enhancing the Economic and Environmental Sustainability of Mexico's Forest Sector

Many poor rural communities in Mexico struggle with creating a viable local economy while managing their natural resources sustainably. To help answer this need, Oregon State University College of Forestry is collaborating with a consortium of Mexican universities and natural resource agencies in a project to strengthen their connections with each other and with rural communities and their forest-related businesses. This United States – Mexico Training, Internships, Exchanges, and Scholarships (TIES) project is part of the Higher Education for Development (HED) Program, sponsored by the United States Agency for International Development (USAID). Wood Science & Engineering professor Eric Hansen is the primary OSU contact for the long-term collaboration. Antonio Silva, an OSU graduate (Ph.D. Wood Science & Engineering, 2004) and professor in the Department of Wood, Cellulose and Paper at University of Guadalajara, is director of the Mexican Consortium.

The overall focus of the TIES project is to increase capacity at Mexican Consortium Institutions to provide M.S. degrees in sustainable forestry, wood products processing, and forest products marketing, and to teach new skills and modern forestry and wood production techniques to local forest-dependent communities. Through this partnership, students and rural community members have opportunities to participate in education and training programs at OSU, at Mexican universities, and with the Mexican forest agency CONAFOR. Two Mexican students, Ana Fonseca and Valeria Villavicencio, are currently attending OSU as part of the project. Since 2007, several OSU faculty members have visited Mexico and collaborated with Mexican professors in the development of eight courses, including extension methods, wood drying, furniture production, business planning and nursery techniques.

Antonio Silva notes, "Projects like this are very important to my institution to increase internationalization, expand our extension activities, and improve our human and technological capacity for innovation. It helps me maintain connections with my alma mater, expands our network of collaborators for teaching and research, and gives us the opportunity to develop personal relationships and greater cultural understanding as we learn from each other. International projects are very important for us to see what is going on in other parts of the world. I love very much what I do."

OSU Forestry Extension folks Rick Fletcher, Dan McGrath, Nicole Strong, and David Zahler led an Extension Methods Workshop in Mérida (31 March – 2 April 2009). (Photos: Antonio Silva)



Already over 250 indigenous people from rural communities have participated in these new extension training courses. CONAFOR is providing financial support to continue offering the continuing education courses in other parts of Mexico. In addition, CONAFOR is funding student, scientist, and forest technician travel to OSU for short courses, and students' subsequent M.S. data collection in Mexico. OSU students also have the opportunity to participate in CONAFOR internships in Mexico. "OSU Extension works closely with local communities and the forest industry, but this has not been common in Mexico. It is exciting to create these connections that expand our ability to work together to improve techniques and meet local community needs," says CONAFOR's Eugenia María Barba, Manager for Education and Training.

The anticipated outcomes of this collaboration are enhanced sustainable forest management practices, more efficient and environmentally-friendly production of wood products, and long-term rural economic vitality. Eric Hansen adds another important outcome: "The project strengthens current ties between OSU and our partners in Mexico, and builds a foundation for long-term collaboration." Although the TIES project is due to end in August 2009, USAID may extend the funding. Connections created between CONAFOR, universities and rural communities through this project make long-term contributions to environmental and economic well-being.



US and Mexican university TIES partners visited small mills around Mérida to meet local community members and learn how they are currently operating their forest products businesses. (Photo: Antonio Silva)

Working to Ensure Sustainability in the Patagonia Region of Chile



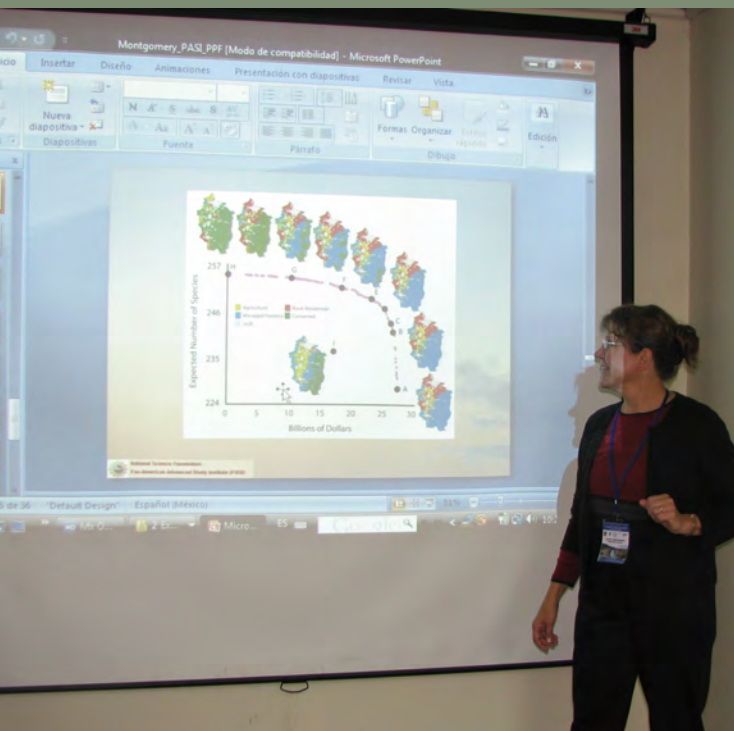
The tower at University of Concepcion, Chile. (Tower photo was downloaded from the PASI website <http://pasi.cssserver1.if.uidaho.edu/>)

The BioBio River Basin in the Patagonia Region of Chile bears some resemblance to the Columbia River Basin of Oregon and Washington, that is, until the hydro dams were constructed on the Columbia. Dams are also proposed for the BioBio River, and a comparative analysis of the two river basins provided an excellent comparison for the Pan-American Advanced Study Institute's 2008 Workshop in Concepcion, Chile. The Workshop, entitled *Human, Physical, and Natural Capital Investment in Patagonia: A Predictive Approach Under the Sustainability Criterion*, was created to link young career professionals with senior researchers in a wide variety of fields related to sustainability. Enter OSU Professor of Forestry **Claire Montgomery**. Claire was invited to attend the workshop as a senior researcher and provide lectures and case studies related to forests of the region in a comparison to Oregon and Washington. Claire relied on her research in forest economics, decision-making under uncertainty and sustainability. Primary concerns in the BioBio River Basin include the effects of hydro dams on local communities, the removal of land from agricultural and forest production, the impacts of a transient labor force during the construction process, loss of biodiversity, loss of ecotourism, and invasive species. In Chile there is a special concern about

a major invasive species from North America ...
SALMON. Salmon are not native, and are voracious feeders, particularly on native fish species.

Over the course of the two week workshop, participants participated in lectures; discussions of relevant case studies, including comparisons to river basins in North America and Europe; and local field trips. There was a special focus on the role of indigenous communities. Claire was particularly enthusiastic about the interaction with young natural resource professionals, and the opportunity to see her research in the Pacific Northwest applied to assist with real world problems in the Southern Hemisphere.

The Workshop was funded by the US National Science Foundation through a grant to the Center for Ecohydraulics Research at the University of Idaho. Co-PI on the grant was **Darek Nalle**, now a professor at the University of Idaho, and a graduate of the OSU College of Forestry.



*Claire Montgomery shares her Pacific Northwest forest research with young forestry professionals at the workshop.
(Photo: Ari M. Michelsen, Ph.D, Texas AgriLife Research Center at El Paso Texas A&M System)*

Establishing a Long-Term Ecological Research Program and Research Collaborations in Northwestern Patagonia



Bariloche sits astride Lago Nahuel Huapi, one of the larger lakes in northern Patagonia. The diversity of Patagonian climate gradients and associated ecosystems includes high elevation snowy peaks to lakes, lush forests and arid regions. (Photo: Rob Kistler)

Forest scientists in Oregon and Argentina, who have a rich history of working together, are embarking on a new venture to establish an International Long Term Ecological Research Program (ILTER) in the Patagonia region of Western Argentina. This multi-faceted collaboration had its beginnings in the 1990s when OSU forestry professor Steve Radosevich served as an advisor for a forestry graduate program at the University of Buenos Aires, along with Argentine scientist Claudio Ghera. Numerous OSU faculty taught courses in Argentina as part of the program, and one of them was Barbara Bond, professor in the Department of Forest Ecosystems & Society. She fell in love with the country, its forests and its people, and subsequently returned on a Fulbright fellowship to teach and do research in Argentina, followed by a four year National Science Foundation-funded project in Patagonia.

This new ILTER endeavor by the OSU-Argentine colleagues is being led by Barbara and Claudio, along with Tomás Schlichter of the Instituto Nacional de Tecnología Agropecuaria (INTA). Funded by the National Science Foundation and Argentina's scientific agencies of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) and the Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT), they conducted a planning workshop in January 2009 in San Carlos de Bariloche, Argentina. OSU colleagues Mark Harmon, Matthew Betts and Carlos Sierra (all of Forest Ecosystems & Society) and Elizabeth Borer (College of Science/Zoology Department) were among the 16 scientists who participated in the meeting.

NSF has provided funding for the LTER program in the United States since its beginning in 1979, and it has grown to include 26 active research sites in a variety of ecosystem types. Mark has been working within the LTER program since its beginning, and his insights were valuable as North and South American scientists explore how to develop, implement, and sustain a long-term integrated research program in Patagonia. Mark recommended that, in order for the program to be successful, research priorities should be centered around overarching questions that link diverse ideas in a long-term context. For example: "How functionally vulnerable and resilient are Patagonian ecosystems in the face of global environmental change and what are the consequences for ecosystem services?" A key outcome of the workshop was identifying initial steps needed to create a multidisciplinary conceptual framework to address critical ecological questions for the region. The next task will be to identify a network of interested researchers and funding sources to establish the ILTER and help it flourish over time.

Why Patagonia? There are at least two excellent reasons: first, northern Patagonia and western Oregon share many similar ecological attributes due to their positions on the western rim of the continent and their "mirror image" latitudes. Because of the steep mountain ranges in both regions, they both experience a dramatic rainfall gradient, and a wide range of ecosystems lie in close proximity. Second, several parallel research projects in the area have already been established with a long-range focus, and this ILTER would provide a mechanism to link them into a more comprehensive scientific endeavor. The potential benefits of creating long-term connections among an international network of researchers include enhanced opportunities for scientific discovery and dialog among diverse disciplines, developing and sharing new research tools, heightened ability to conserve the diversity of natural resources in this region, and an opportunity to inspire similar programs in other parts of South America.

Barbara Bond (front row) convened the January 2009 Patagonia ILTER workshop, bringing together forest scientists from North and South America. (Photo: Tomás Schlichter)



Growth, adventure, inspiration, confidence, challenge...

Kayla Whittington in Taiwan

Let go of stereotypes.

"Many people think of Asian cultures as austere, serious, and strict with their children, but I found the Taiwanese to be warm, friendly, and relaxed," says Kayla Whittington, a senior who is double majoring in human development and family sciences and education. "Although some might be concerned about the language barrier, I would encourage people to experience as many cultures as they can." Kayla learned enough Chinese to be the informal interpreter for her group of 13 OSU students who spent the 2008 fall term attending Fu Jen University in Taipei, Taiwan.

"I look at everything differently now," says Kayla, who plans to teach elementary school. "The people in Taiwan live so differently – they are positive and respectful of each other no matter how rich or poor they might be. They live simply, eat simply, walk everywhere, and seem to have an uncomplicated outlook on life. In comparison to our society, they are happier with less." Kayla says since returning from Taiwan she listens more, is less judgmental, and sees the glass as half full. "I feel that generally I understand people better now. I am more considerate and open to seeing other points of view."

Kayla discovered how positive she can be in challenging situations, such as when they were unable to leave their dorm for a week because of a typhoon. "I could have been homesick, or depressed, or negative, but I pulled it together to help my friends and communicate as best as I could with the Taiwanese students."

*"I listen more
and judge less,"*

says Kayla, pictured at
1:00 in the photo above
with her Fu Jen
classmates.



Creating global citizens

"We have a responsibility to help students find their passion, their path, and their potential," says Tammy Bray, dean of the College of Health and Human Sciences. "And we do this in many ways. We provide opportunities for internships so they may gain practical experience, service learning so they may contribute to their communities, research so they can discover solutions, professional leadership to find their career path, and international study to help them become global citizens." International study is particularly important to Dean Bray, a native of Taiwan, who came to the U.S. to earn graduate degrees in nutrition and biochemistry at the age of 22. She believes that "When we step out of our comfort zone, explore new places, and experience other cultures...only then can we fully understand and appreciate this incredible world we live in."

Tammy Bray, Dean
College of Health and Human Sciences

Collin Kayser in Europe

Explore while you're young.

Although he always knew he wanted an international experience while at OSU, Collin Kayser thought his double major would preclude a semester away if he still wanted to graduate in four years. "I found the perfect solution with the Art and Architecture tour of Europe – a three-week whirlwind summer tour of Rome, Venice, Paris, Prague and London. This fit with my schedule, and the three-week trip gave me a real appreciation for how big and diverse our world really is," says Collin, who graduated in 2009 with degrees in interior design and agricultural business management. The trip included 26 students in the Department of Design and Human Environment and faculty members Carmen Steggell and Carol Caughey.

"We just don't realize how expansive our world is until we see what it has to offer," says Collin. "Standing before the British Parliament or amidst Roman ruins, I could just feel the history, and it gave me more respect for the people I encountered, their culture, and literally everything around me."

Of all the meals he enjoyed, Collin says there's a sweet spot in his heart and stomach for French crepes. "While we were in Paris we made frequent late night runs to the local street carts selling fresh crepes...nothing anywhere quite like it!"

His advice to students considering a travel abroad experience is to do it now. "Live life while you're young, see what's out there before you commit to one thing...a world view will help you see what you need to do to achieve your goals. When you push yourself to step outside your familiar lifestyle and experience a different culture – the food, language, history – you'll simply never look at life the same again."

"I witnessed history,"
says Collin, who found a new respect
for other cultures—and French crepes!

Traveling the world

The College of Health and Human Sciences has developed a successful initiative based on national research that indicates students stay in school and do their best academically when they are engaged in meaningful activities inside and outside the classroom. The initiative, "Learning in Community" or LinC includes small groups that live, learn, or lead together. "One of the most popular program is LinC Global through which students participate in independent and faculty-led study abroad and study tour experiences and internships that prepare them for an increasingly diverse U.S. population and global job market," explains Liz Gray. "Students choose from three-week to 12-week programs in Europe, Asia, Africa, Australia, and South America. Without exception, those who participate in LinC Global say they gain a deeper understanding of our ever-changing world, a new appreciation for other cultures, and insights into their own assumptions and beliefs."

Liz Gray, Assistant Dean
for Academic Programs
Recipient of the 2008

OSU International Service Award
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Travel, friendship, contribution, insight, outreach...and fun!

Courtney Lovemark in Australia

Plan ahead.

“I reaffirmed who I am,”
says Courtney, shown here at
the Taronga Zoo in Sydney.

When she arrived on campus in the fall of 2005, Courtney was determined to get the most out of her OSU experience. As she donned her cap and gown this June, she was satisfied that she had done just that. “Planning ahead made it possible to do everything I did,” says Courtney, who worked with her advisor from the start to schedule a study abroad experience. An Honors College student and exercise and sport science major, Courtney plans to become a physician.

In 2008, she spent a semester at the University of Sydney, which has an international reputation for excellent teaching, research, and state-of-the-art facilities. “I went three weeks early to get settled and experience the country,” says Courtney, who had traveled internationally before. “This trip really reaffirmed who I am and what I can do,” she adds. Courtney was taken with the area surrounding Sydney and enjoyed trips to the Blue Mountains (colored by eucalyptus trees) and the 340 million-year-old Jenolan Caves, the oldest open caves in the world. “Sydney is so diverse culturally, and the Australian people are very welcoming. They always make time to relax and visit.”

Here at OSU, Courtney worked with assistant professor and Extension faculty Kathy Gunter in the college’s Bone Research Laboratory on pioneering research relating to exercise in children that builds bone mass. “This gave me the experience and data that I needed for my honors thesis on how physical activity and diet affect the development of obesity in children.” She also volunteered in the college’s exercise program for community members with multiple sclerosis and worked with children with special needs in the IMPACT program.



Graduating on time

Students are often concerned that including an international study program in their courses will mean taking extra terms to graduate. However, a new program of Curriculum Integration in the College of Health and Human Sciences is being implemented to keep students on track for their graduation timeline. According to advisor Carey Hilbert, “We have detailed the various international opportunities in each department – study abroad, departmental exchanges, international internships, and the international degree program. Specific timeframes are included so that a student’s time abroad can be maximized and degree progress won’t be delayed – hence the integration of the experience into the student’s undergraduate curriculum.” She adds, “If new students know they want to include one of these experiences in their OSU education, it’s good to start planning in their first or second year. That way, we can do our best to assure graduation on time.”

Carey Hilbert, Advisor and HHS
International Studies Coordinator
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Lindsay Boyce in Swaziland

Expect the unexpected.

A self-proclaimed list maker,
Lindsay learned to be spontaneous.
“I learned to plan not to plan.”

Her eyes still tear up as she tells the story of the woman who brought her 15-year-old son to the remote village clinic. “He was very sick with rheumatic fever – he couldn’t walk, he had a high fever and was in a lot of pain, and he needed help immediately or he was going to die,” explains Lindsay, a 2009 graduate in public health. He needed help right away, but the closest hospital was a two-hour drive. Lindsay didn’t think twice when they handed her the keys to the old stick shift truck. And she’ll always remember the drive on dirt roads to the children’s clinic in Mbabane, navigating through the busy city. “I learned quickly to drive on the ‘wrong’ side of the road, and all the time, the boy was moaning in pain and his mother wore a look of fear,” she recalls, adding humbly that the trip probably saved the boy’s life. “It all ended well. He got the medications he needed, and his mother gave me a huge hug, very unusual for their culture.”

She spent three months doing community outreach in the spring of 2009 with the Gamedez, Ngcamphalala and Mamba Chiefdoms through IE3 Global Internships. The experience, she says, changed her life and her heart. Her focus was on HIV/AIDS and TB prevention and she accompanied nurses for home visits and village meetings and helped patients at a health care clinic through their appointments on anti retro viral treatment days. Though she communicated primarily through interpreters, she learned enough SiSwati to bridge cultures

“This was my first time traveling alone, and I found out how independent and assertive I can be,” explains Lindsay. “I am naturally reserved, so I was continually forced out of my comfort zone, but I realized that I have a lot more strength and perseverance than I ever imagined.”



Study Abroad Program in Tunisia

Oregon State has been offering a Study Abroad program in Tunisia since 2004. This program provides a unique introduction to the Arab world. In designing this intensive language program, founding directors Laura Rice, Professor of Comparative Literature, and Karim Hamdy, instructor of Arabic and French, who was recently tapped to be Director of CEMAT—the American Research Center in Tunis—have built upon three decades of OSU international R&D work in the Arab region. They capitalized on their own federally-funded academic exchange projects and their personal research in the areas of gender, literacy, environmental engineering, and literary translation to create a multifaceted study abroad opportunity for students.



Photo with Ambassador Robert Godec, 2008:

Front row:

Melissa Chinn (OSU), Victoria Jensen (UO), Laura Ek (OSU), Anna Rae Goethe (Univ of Chicago), Laura Rice (OSU), Ambassador Godec, Alissa Strunk (UO), Megan Kelly (UO), Sophia Onstad (PSU), Ellen Horn (OSU).

Back row:

Jason Thomas (OSU), Simeon Risom (OSU), Emily Dray (OSU), Karim Hamdy (OSU), Jonathan Graves (UO), Sander Porcelli (Georgetown).



Ibn Shabbat photo: 2008 Environmental studies students with statue of 13th century water scientist, Ibn Shabbat, in Tozeur oasis: Aliss Strunk (UO), Melissa Chinn (OSU), Laura Ek (OSU), Karim Hamdy (OSU), Sophia Onstad (PSU), Sander Porcelli (Georgetown).

OSU's program stands out because it integrates students into a host Tunisian university. It also provides them housing with local host families and offers them intensive study in one of two local languages – Arabic or French. Additional special components of the program are the three academic electives that satisfy bac core requirements. By taking one or more electives, program participants get first-hand experience in academic research in the context of work conducted by Rice and Hamdy that is integrated into those electives : (i) international women's literature, based in part on works translated by Rice and Hamdy, (ii) environmental case studies profiting from Hamdy's long-term involvement with Tunisia's battle to protect natural resources in conditions of scarcity, and (iii) cross-cultural communication course, based on weekly discussions between US program participants and Tunisian English majors. This latter course emphasizes the understanding of current issues in US-Arab relations, Islam and the West, among others. A number of students have learned to do their own original research as part of the international degree program and some have been helped to find internship experience in fields such as medicine, engineering, international education, and social sciences. Because the program has been based on a long-term, mutually beneficial relationship between these OSU professors and Tunisian colleagues, it has succeeded in drawing students from around Oregon and across the nation. Students in the program have come from various Oregon universities and from around the US, including such places as Georgetown, Yale, Fordham, Illinois, William & Mary, and Barnard.



Students in CEMAT courtyard, 2008, left to right: Jason Thomas (OSU), Ellen Horn (OSU), Victoria Jensen (UO), Anna Rae Goethe (Univ of Chicago), Megan Kelly (UO), Simeon Risom (OSU), Alissa Strunk (UO), Jonathan Graves (UO).

International Women's Voices 2006: Laura Rice (OSU), Margaret Sharp (Yale), Christina Pence (OSU), Julie Baird (PSU), Kaitlin Callahan (OSU), Amanda Mabry (UO), Monia Souaiaia (Barnard), Jocelyn Nelson (OSU), Katie Kalk (OSU).



International Comparative Rural Policy Studies Consortium (ICRPS)

Three years ago the Master of Public Policy program (MPP) joined the *International Comparative Rural Policy Studies Consortium* (ICRPS), which is a consortium of twelve universities from Canada, Mexico, the United States, Spain, the United Kingdom, Italy, Norway and Belgium. ICRPS faculty conduct comparative research projects concerning international rural development issues and offer a two week summer field school for interested graduate students. Four core MPP faculty (Denise Lach, Bruce Weber, Brent Steel, Becky Warner) and five MPP students (Yao Yin, Alejandra Juarez, Amy Ewing, Kristin Chatfield, Bridget Kelleher) participated in the most recent field school at the University of the Highlands and Islands in Scotland (Inverness and Isle of Skye campuses). Additional faculty and student participants in the two-week conference hailed from twelve countries on four continents, including Scotland, Norway, Spain, China, Venezuela, Peru, Ecuador, England, Brazil, Chile, the U.S. and Canada. The rich diversity of participants and perspectives in the field school are important for understanding the challenges faced by rural communities in a global context.

Presentations from international experts broached topics such as biofuel production, the effects of consumer trends toward organic and local agriculture, and the importance of differing definitions of “rural” across cultures and policy spheres. Field activities included discussions with local stakeholders, regarding their respective livelihoods and trips to family farms, rural cooperatives, and ecotourism sites. As a final project, teams of ICRPS students conducted consulting projects for one of three rural communities on the Isle of Skye, helping community members to brainstorm solutions to impending challenges such as shrinking economic livelihoods, out-migration, and educational deficit.

With the help of a new USDA Higher Education Challenge Grant (Brent Steel, Co-PI, \$321,955), the MPP Program will host the 2010 ICRPS summer field school at OSU next June. The major theme for the OSU field school will be “Sustainable Rural Communities,” and will cover such topics as renewable rural energy sources, Oregon’s historic land use policy, and migration.



With the help of “Flat Benny,” MPP students and faculty participating in the 2009 ICRPS field school spot Nessie (Loch Ness Monster) during a cruise on Loch Ness, Scotland.



ICRPS students receiving a briefing on Scottish Rural Development Policy from a member of the Scottish Parliament, Edinburgh, Scotland.

Music Department China Report

Prepared by Marlan Carlson

For the last 9 years, the Music Department has conducted its own unique China-OSU Cultural Exchange Program. The beginning of this program was in June of 2000, when State Representative Barbara Ross led a delegation of Oregon State University music professors on an 8-city trip to China. Featured in this delegation was the Arrieu Wind Quintet, at that time the official wind quintet in residence at OSU. During this three week tour, the ensemble taught master classes, performed at student assemblies and played formal concerts. Representative Ross and members of the delegation met with many governmental and industry officials to promote Oregon economic interests. From this first visit, a full-blown cultural exchange program has been developed.

Over the course of the next nine years, eight cultural delegations from the OSU Music Department have performed and taught in Shanghai, Zhengzhou, Tianjin, and Chengdu. Professor Marlan Carlson, chair of the music department, has himself conducted professional orchestras in each of these cities and has offered master classes in orchestral conducting at local conservatories and schools of music as well. In 2004, he was named Permanent Honorable Guest Conductor of the Henan Province Symphony Orchestra.

Three other OSU music professors, Richard Poppino, Bob Brudvig and Brad Townsend have also spent time in China as visiting professors. This October Steve Zielke and Marlan Carlson have been invited to present a paper on global music education at the Sichuan Conservatory of Music in Chengdu. Carlson notes that the Sichuan Conservatory of Music has 15,000 majors and a set of facilities that includes a 700-unit practice room building, a spectacular 3,000 seat concert hall and a 25-story hotel.

As part of this cultural exchange program, the Henan Performing Arts Ensemble featuring Kung Fu, Acrobatics, Peking Opera and Ancient Classical Music, has done three tours of Oregon and California. In addition, economic development groups of governmental officials from Henan Province have visited Oregon twice and had several fruitful visits with Secretary of State Bill Bradbury and Governor Ted Kulongowski, as well as with several business leaders in Eugene, Corvallis and Portland. Other visits to Oregon as part of this program have included the Hong Kong Children's Symphony Orchestra and several music professors from the Sichuan Conservatory of Music. In January of 2008, two spectacular young pianists from Beijing and Chengdu performed concertos with the Corvallis-OSU Symphony Orchestra. This last May, the Corvallis-OSU Symphony Orchestra presented the world premier of *Eulogy for Immortal II* by Sichuan composer, Hu Xiao. This work was dedicated to the memory of the May, 2008, earthquake in Sichuan.

Professor Carlson is extremely optimistic about the future of this exchange program. While he and Dr. Zielke are in China this October, they will be setting the stage for a concert tour by the OSU Chamber Choir in the summer of 2011.



Out of the Depths

Voracious “red devil” squid
are on the move

by Mark Floyd

It was like

a scene from a

grade-B horror film.

On a gently rocking vessel

in the warm waters of the Sea

of Cortez, a young oceanographer

earnestly watches her computer screen

while colleagues lower a cable into the water.

Instruments aboard the ship, the Pacific Storm, ping sound waves toward the cable. The oceanographer's eyes flicker across the screen to make sure the signal is clear. Tethered to the cable is a 5-pound Humboldt squid, and the sound waves, set at 38 kilohertz, bounce off the squid. An image shows up on the screen.

The oceanographer raises her fist in triumph. It marks the first time scientists had clearly picked up a strong sonar signal for squid, which lack the bones and swim bladders that give away other marine creatures.

Suddenly a second image appears, darting up from below. The acoustic signal tracks it from the depths toward the cable — and the tethered squid. It is another squid, larger than the first, and it attacks the tethered animal. The oceanographer screams.

Fade to black.

Seeing with Sound

“Actually, I think I swore instead of screamed,” says Kelly Benoit-Bird cheerfully. “We were watching it in ‘real time,’ and it was like a scene from a scary movie. But in this case, the science is real.”

In April, Benoit-Bird, an assistant professor in Oregon State University's College of Oceanic and Atmospheric Sciences, published a paper in the journal *Acoustical Society of America* on her success, and she received 19 e-mails from colleagues the first day the article appeared. “I've never had such a response before,” she says.

Co-authors included William Gilly of Stanford University's Hopkins Marine Station, Whitlow W. L. Au of the University of Hawaii and Bruce Mate of OSU's Marine Mammal Institute. Support for the work came from the

Marine Mammal Endowment at OSU and from a National Science Foundation grant to Gilly.

The reasons for the excitement are two-fold. On one hand, the ability to track squid with sonar may reveal new details about how ocean ecosystems work. Squid are thought to be a primary food source for sperm whales, but ecologists have never been sure how the whales hunt. A study just five years ago concluded that whales couldn't use echolocation to target squid because signals wouldn't reflect off the squids' soft bodies. Now researchers will need to re-examine the capacity of whales, dolphins, porpoises and other marine creatures to use their own sonar.

Benoit-Bird's research is also important, however, because it gives scientists a new way to look at an important link in the marine food chain. Squid may not have been properly appreciated, but their impact is becoming apparent. The Humboldt squid appears to be expanding its territory, moving from the Pacific Ocean off Mexico and California into the colder waters near Oregon.

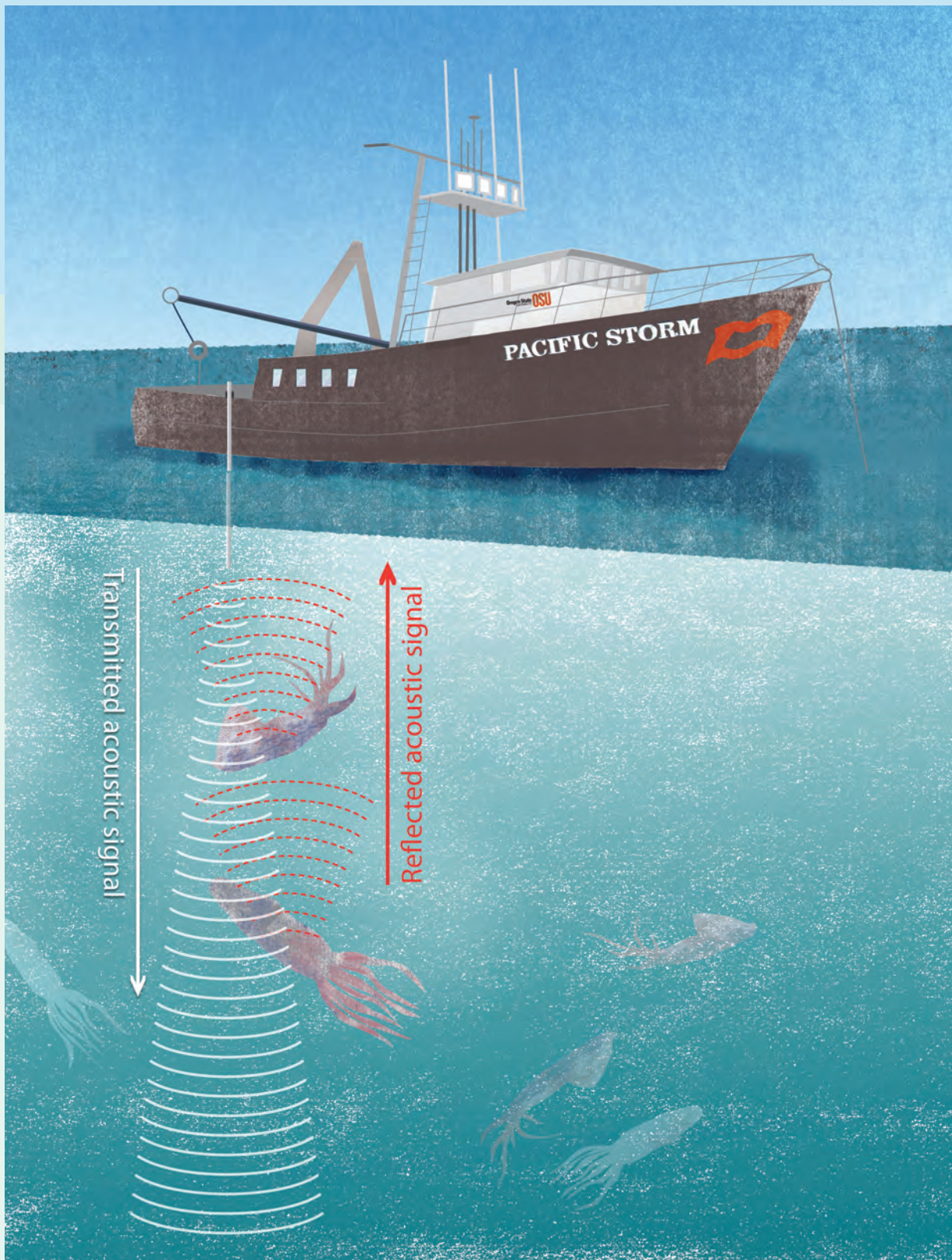
And that is causing some concern.

“The Humboldt squid is a voracious predator that will eat anything it can get its tentacles on,” Benoit-Bird says. “We put a pair of 10-pound squid into a tank and one immediately beheaded the other. These are fierce little beasts.”

Mexican fishermen have a name for the Humboldt squid: *diablos rojos*, or red devils. Known for their strength and razor-sharp beaks, these animals flash red and white at the end of a fishing line. They can get as large as six feet in length and weigh up to 100 pounds, though adults more typically weigh 20 to 40 pounds. They travel in schools of up to 1,000 squid and will eat any fish in sight.

In the Sea of Cortez, the Humboldt squid target lanternfish but are opportunistic feeders. They are highly energetic and require a lot of food to maintain their metabolic rate. Their move into northern California, Oregon and Washington — at a time when salmon stocks are depressed — is a concern to scientists like Benoit-Bird, who studies ecological interactions among marine species.

“Typically, when a species moves into a new area, it adapts,” she said. “If they can't find the lanternfish they ate in



Kelly Benoit-Bird and her team found that the strength of acoustic echoes from Humboldt squid depends on the length of the mantle, an external hood covering the animal's vital organs. The voracious predators prey on lanternfish — and each other. (Illustration: Mary Susan Weldon)

the Sea of Cortez, they may look at juvenile salmon, as well as herring, sardines and other species that salmon may eat.

“Then there is the flip side of the equation,” Benoit-Bird points out. “What will target the Humboldt squid as prey? In Mexico, it is the sperm whale, but they are uncommon off Oregon. Most of our whales are baleen whales, and these squid will be too big for them. Perhaps orcas, perhaps sharks...or they may have free rein.”

Next to sperm whales, the primary predators for the Humboldt squid in Mexico are coastal villagers who row their wooden boats offshore at night, when the red devils are closer to the surface. Fishermen catch squid by the hundreds and sell them for food. It doesn't appear that over-fishing is a problem. *National Geographic* recently reported that some 10 million squid might be living in a 25-square-mile area off the city of Santa Rosalia.

Reliable estimates have been hard to achieve and are historically based on catch rates. With the new acoustic advancement made by Benoit-Bird and colleagues, scientists now have a tool to better monitor the squids' range and habits.

Density Matters

Scientific advancements are rarely easy, and this one was no exception. In 2006, Bruce Mate, director of OSU's Marine Mammal Institute, was taking the Pacific Storm to the Sea of Cortez to study sperm whales and invited Benoit-Bird along to look at its prey, the Humboldt squid. She assembled funding from a variety of sources to pay for the necessary technicians and instruments.


The Pacific Storm is a former fishing vessel, donated to OSU for use by the Marine Mammal Institute and retro-fitted for research. Once they were in the Sea of Cortez, Benoit-Bird and her colleagues had to catch squid and dissect them, carefully measuring each body part and experimenting with different sound frequencies to see what signals might work.

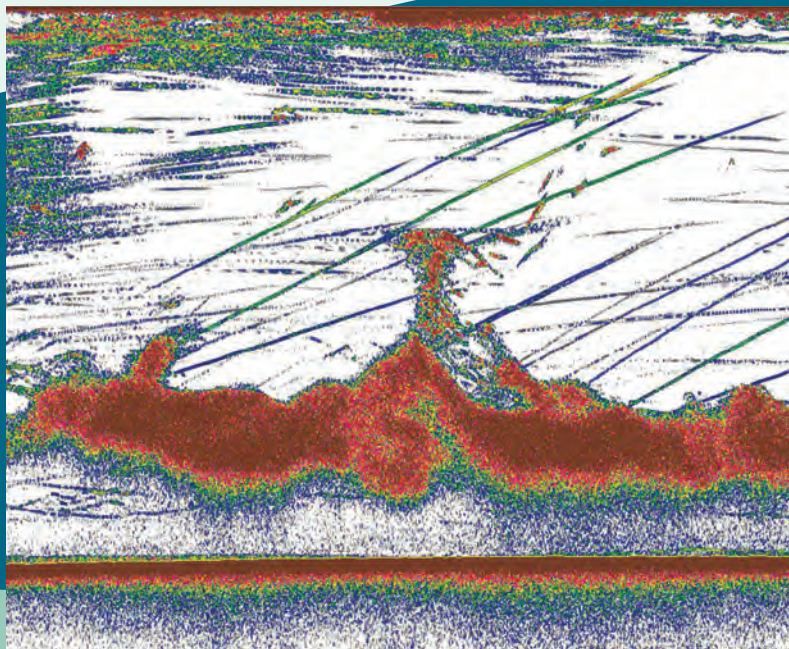
“You need a density difference to get back scatter,” Benoit-Bird says, “and squid are difficult because they have no hard parts. Eventually, we used multiple frequencies and were able to pick up a clear signal, probably from the brain case, but perhaps from the teeth on the suckers along their arms.”

Through days of experiments, the researchers were able to calibrate the signal to pinpoint individual squid and even estimate their size. They were able to observe a squid group, how individuals moved in the water and when they rose from the depths to feed. Using this technology, Benoit-Bird says, scientists should be able to transect a fishing ground and get a better estimate of the squid population.

She also hopes to go back through 20 years of hake surveys from the National Marine Fishery Services and recalibrate their acoustic signal to look for evidence of squid.

“We don't know why Humboldt squid are moving north up the coast,” Benoit-Bird adds, “but now we have a better chance of studying their movements and impact on the environment.” **terra**

Editor's note: This story also appears on LiveScience.com *Behind the Scenes* in collaboration with the National Science Foundation. See more about Kelly Benoit-Bird's research at oregonstate.edu/~benoitbk 



This echogram, or time-depth plot of echo strength, shows how acoustics can reveal the behavior of squid. The panel shows a large school of squid as an intense red mass around 50 meters deep. Individual squid, indicated by the upward streaks, are leaving the school and swimming up to the surface. Researchers could see these squid from the boat, but it took acoustics to reveal the massive school below them. (Echogram courtesy of Kelly Benoit-Bird)

Researcher Profile

An assistant professor in the College of Oceanic and Atmospheric Sciences, **Kelly Benoit-Bird** uses optical and acoustic methods to study interactions between plankton, fish and marine mammals. She collaborates with researchers at OSU, the University of Hawaii, Rutgers and other universities and with federal agencies and businesses to develop new technologies and to understand ecological processes. She has received funding from the National Science Foundation, the Office of Naval Research, the National Oceanographic Partnership Program and the National Oceanic and Atmospheric Administration.



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Pharmacy Student Performs Outreach in Niger



**Vivian
Nguyen ('08)**

West African Medicine Presents Vivid Challenges for Pharmacy Student

2008 College of Pharmacy graduate Vivian Nguyen expected “culture shock” when she went to a remote hospital in Galmi, Niger, as part of a college outreach program. She knew that most people were poor—they had no running water, electricity, or bathrooms, and they lived in mud huts.

But after she dealt with fatal burn cases, struggled against an AIDS epidemic, and held a diseased leg steady while a surgeon amputated it, Nguyen also experienced a little “medical shock.” She soon discovered that Galmi Hospital had few resources to meet the numerous and desperate needs of the people.

“The hospital was what you would have found in the United States 100 years ago, except they have penicillin,” said Nguyen. “Surgeons operate with headlamps in case the electricity goes out. People there die every day of things that you could never imagine seeing today in the U.S., like cholera, malaria, typhoid, and tetanus.”

Nguyen’s experience highlights what OSU and increasing numbers of pharmacy programs all over the country are trying to help more students understand: pharmacists can play a significant role on the front lines to address the immediate and sometimes desperate needs of underserved populations.

In Oregon, that might include working in a rural outreach program, providing vaccinations, or helping break through language or cultural barriers. In other parts of the world, the experience can be more extreme.

During her six weeks in Galmi, Nguyen spent her mornings going on rounds with doctors on the surgical, medical, or obstetrics teams to see new patients and follow up on existing ones. She offered drug prescription and dosing recommendations, but these were not necessarily based on what the doctor wanted or what was optimal for the patient. Instead, they were based on what was available and might help.



“The hospital was what you would have found in the United States 100 years ago...” —Vivian Nguyen

Nguyen tells the story of a man who was admitted to the hospital after kicking over a kerosene lamp in his sleep and awakening in flames. He arrived at the hospital with burns on more than 60 percent of his body. “There was nothing we could do,” she said. Unfortunately, such severe cases were not at all unusual. “Sometimes there were no surgeons, and children with advanced typhoid disease had to be sent home to die because there was no one within 300 miles able to perform an intestinal operation.”

Nguyen also went to local villages and taught malnourished people how to treat lice, scabies, and worms. She vaccinated babies to prevent polio and worked at the HIV clinic.

Now that her eyes are opened in a new way, Nguyen wants others to be aware of the health-care challenges other cultures face.

“It is often easy to focus solely on the health-care issues here at home and forget how millions of people live around the world,” Nguyen said. “I hope more people will donate to organizations working in these areas, or go themselves to help make a difference.” ♦



From this spot in the Bougmez Valley, it took three days for Aaron Wolf and his guide to cross the Atlas Mountains to meet with farmers and other residents of Berber villages. Wolf spent two weeks learning about the rules they have developed to share scarce water supplies. (Photo: Aaron Wolf)

Across THE Divide

Parting the waters

By Nick Houtman



In the summer of 1997, Aaron Wolf and a Berber guide trekked up narrow mountain paths to a village high in the Atlas Mountains of Morocco. Despite the steep terrain, they walked lightly. A donkey carried their gear. As they moved toward snowcapped peaks, they crossed one dry, rocky ridge after another. It took four days for them to reach the M'Goun Valley, elevation 7,000 feet. Their destination was two villages: Ameskar el-Fouqani (upper) and Ameskar al-Tahtani (lower), two communities of mud and stone buildings set among irrigated hillside terraces.

The small spring-fed stream that flows through the villages is vital to the hundred or so families who live here. It serves their homes, powers a grain mill and waters crops and gardens. There is just enough water to meet their needs, but people have arranged to share the stream, doing in a microcosm what nations that divide rivers, lakes and groundwater aquifers do on a grand scale. It was a desire to learn about how a village manages competing demands — through rules that have ancient origins, predating 20th-century European colonization and the rise of an independent Moroccan government — that brought Wolf to this part of the world.

Arid communities with strong links to the past have useful lessons for a thirsty planet, believes Wolf, a water resources specialist and professor in the OSU Department of Geosciences. Traditional arrangements hold practical advice for countries with growing populations and increasing development pressures.



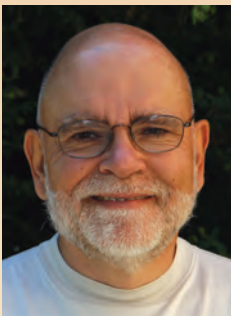
Western Water: from Dispute to Agreement

Water in the West has long been a trigger for disputes. Witness Colorado River diversions in California and Arizona and struggles in Oregon's Klamath Basin. But cooperation is still the

rule, according to research by master's student Kristel Fesler and a team of OSU students in the Department of Geosciences.

In a project funded by the federal Bureau of Reclamation, they have found that water-related events (newspaper reports) in the Colorado and Rio Grande basins more often reflect cooperation than conflict. In earlier research in Oregon, Fesler found that 65 percent of 384 water-related events between 1990 and 2004 were cooperative or neutral.

The strongest common thread among those involving conflict is change in government policy such as new regulations. The lesson: Agencies should foster productive, ongoing relationships with stakeholders and anticipate reactions to new regulations. A native of Minneapolis, Minnesota, Fesler worked with OSU professors Julia Jones and Aaron Wolf.



Water Research for Oregon

Umatilla Basin groundwater, Upper Klamath Lake wetlands, Willamette River flow requirements, water quality in the Deschutes River Basin — these are some of the subjects under

study in OSU's Institute for Water and Watersheds (IWW).

Under the leadership of Director Michael E. Campana, the IWW coordinates water-related teaching and research and applies OSU expertise to the water resources needs of Oregon citizens. More than 80 faculty members in six OSU colleges conduct water-related research, supported by more than \$11 million in annual grant funding.

Campana is past chair of the 10,000-member Association of Ground Water Scientists and Engineers. More online at water.oregonstate.edu.

Funded by a grant from the U.S. Institute of Peace, Wolf's visits to the Berber villages and later to the Bedouin camps of Israel's Negev Desert documented rules that have worked successfully for centuries. For example, arrangements to share water are often based on time instead of amount. (In one case, families set their irrigation schedules according to when a mountain shadow crosses a stream.) This principle equitably distributes the risk of low-flow conditions during drought years. More typical throughout the world, including the United States, is allocation by volume, which allows some water users to have priority, regardless of how much is available from year to year. In case of drought, other users must do with less or go without.

In Berber communities, water irrigation intakes may be built with stones but not with concrete, guaranteeing a flow of water to downstream users. Following Islamic law, people in both societies do not sell water. Access for drinking is a fundamental right, although making use of canals, pipes and other infrastructure may carry a price tag.

When disagreements occur, they are brought before a locally appointed judge. Enforcement can be swift, Wolf recalls being told. Asked about how long one party to a dispute had to agree to a judge's decision, the judge replied by wetting his finger and holding it in the wind. "He said that if there was not agreement by the time his finger was dry, he would see to it that the man's house would be burned to the ground," Wolf says.

Politics and Databases

Wolf has built a career around assembling global water-related information and expertise, watershed by watershed. In his Ph.D. work at the University of Wisconsin-Madison, he focused on the Jordan River Basin in the Middle East, applying the theory of alternative dispute resolution to create a framework for decision-making. Water, he says, may be the single most important focus for continuing dialogue among Israelis, Palestinians, Jordanians and other groups.

"If you just talk about the politics, you end up banging your head against the wall. There is no way to move. Every word has 5,000 years of meaning," says Wolf. "But if you think about the things that are related to this (water), you can find other ways to talk. . . . In my dissertation I set out to capture how water had played a role in the Arab-Israeli conflict over time. And found much to my surprise, because it wasn't in the literature, there is a rich, rich history of cooperation and dialogue."



Despite the breakdown of the peace process, he says, multilateral discussions about water continue to this day. The issue is one of personal interest to Wolf who, as a dual Israeli–U.S. citizen, was drafted and served as a paratrooper in the Israeli Defense Forces from 1986 to 1988. That experience, described in his book, *A Purity of Arms*, instilled in him a deep desire for finding ways to resolve conflict through peaceful means.

In addition to the Jordan, he has worked with organizations to improve management on the Columbia River in the Pacific Northwest, the Salween in Southeast Asia and southern Africa’s Okavango, the “jewel of the Kalahari.” Around the world, the stakes couldn’t be higher. Water development projects are key to social and economic progress, affecting agriculture, energy production, social relations and public health. Inadequate investment already has a staggering cost. The United Nations estimates that more than 1 billion people lack access to clean drinking water and that up to 5 million people, mostly children, die annually of water-related diseases. Some observers have suggested that water wars will haunt the future. “Water supplies are falling while the demand is dramatically growing,” warned Koichiro Matsuura, director general of UNESCO, in 2005.

While Wolf sees access to clean water as a formidable unmet challenge, he disagrees that water disputes will inevitably escalate into wars. It’s not that tension and conflict are absent from water management, he says. Rather, research by him and his students has found that cooperation over water — the kind of traditions exhibited by the Berbers and the Bedouins — is far more common than violence. In scouring historical records and cataloging modern decisions, they have found reference to only one “water war,” which occurred in the Tigris-Euphrates basin about 4,500 years ago. In the last 50 years, nations have signed 400 water-related treaties while 37 disputes involved violence, 27 of those between Israel and its neighbors.

In fact, their research suggests that, far from being an inducement to war, water management can be a pathway to peace. Cooperation over some of the world’s largest rivers — the Nile, the Mekong, the Indus — has succeeded in the face of ongoing hostilities and contributed to productive relationships that make violence less likely.

Building the basis for those relationships, however, is hard work. Wolf and his colleagues have made a start. At OSU, where he is affiliated with the Institute of Water and Watersheds (IWW), Wolf spearheaded creation of the Transboundary Freshwater Dispute Database (www.transboundarywaters.orst.edu), an online library of agreements, case studies and events around the world. It includes maps showing the physi-

cal, social and economic circumstances that guide water-related decisions in Asia, Africa, Europe, and North and South America. OSU faculty members in the Northwest Alliance for Computational Science and Engineering (www.nacse.org) built the digital engine that drives the database.

To people struggling with water-related disputes, the database provides invaluable tools. “No matter where you work, people always think they are the only ones facing these issues. Water pollution, upstream/downstream relations, water rights. They’re so relieved just to hear that other people have tackled them,” Wolf says.

“There’s no blueprint for solving conflicts from one basin to another. There are best practices. We’ve done a pretty good job of assembling them. And there are lessons — trends — where basins evolve over time through stages.”

To help people apply those lessons and develop their own practices, Wolf helps to lead a group known as the Universities Partnership for Transboundary Waters. Currently, it includes experts from 14 universities on five continents. “People are grappling with these issues all over, and I want to see continued interaction between Oregon and the rest of the world. We have a lot to teach, and we’ve got some stuff to learn. I think it’s useful to foster a sense of community around this,” Wolf adds.


A recent example of such community-building endeavors focused on Africa. Together with colleagues at the African Water Issues Research Unit at the University of Pretoria in South Africa, Wolf produced an assessment of hydrologic risks and institutional abilities to address them in the continent’s 63 international river basins. The United Nations Environment Programme published their report in 2005, the first of five such continental-scale analyses.

That report has given a boost to people working on water resources management, says co-author Anthony Turton of the University of Pretoria. He credits Wolf with shifting the world’s attention from water as a source of conflict to one of cooperation, with particular relevance for Africa. “I am grateful that he (Wolf) gave Africa a voice,” says Turton. “His project allowed us to speak on behalf of Africa and present some facts with which to counter the prevailing ‘Afropessimism.’ For that, many Africans are grateful.”

“Hydropolitical Resilience”

Key to the ability of countries to cooperate over water problems is a concept that is central to research by Wolf and his colleagues — “hydropolitical resilience.” The term refers to the expertise and resources that organizations need to adapt to changing environmental and social conditions. Countries need both the technical know-how — engineers, scientists, experts in public health and natural resources policy — and ways to integrate the views of people whose lives are at stake — farmers, fishermen and



 National Boundary

 Disputed Nation Boundary

JORDAN

JORDAN RIVER

DEAD SEA

WEST BANK

OSU
International

College of Science



Stream water serves at least three purposes in the Berber village of Ameskar al-Tahtani. It powers a mill, carries away waste and fertilizes farm fields. "These people have been dealing with water conflicts for thousands of years," says Aaron Wolf. "There may be lessons for the international community." (Photo: Aaron Wolf)

business people. Among these parties, skilled facilitators play a crucial role by guiding negotiations that can be contentious.

To meet these needs, Wolf and his colleagues are building on OSU's legacy of expertise in water science and engineering. The Water Resources graduate program offers students science, engineering and policy tracks. And a new program in Water Conflict Management and Transformation includes a graduate-level professional certificate for people to be trained in the principles and practices of conflict resolution.

"When you ask people in the water field what skills they wish they had more of, (they point to) how you dialogue, how you listen, how you identify common interests. Technical people are very good in many places, but they need people who can run these processes more efficiently," says Wolf. "I see us being a training ground for anyone working in water."

He also sees Oregon's water management experience as a model for others. "Our watershed councils are doing cutting-edge work in terms of local management and local participation. Power really is vested in the local community." With funds from the U.S. Geological Survey and IWW, Wolf and OSU sociologist Denise Lach are documenting the successes of Oregon's local councils in resolving conflicts.

Respecting local knowledge and values can make all the difference, he adds, in the midst of a competition for resources. "You see it a lot in native systems. There's a balance of equity and honor. In a Bedouin land court, I heard a judge tell someone (who won a case), 'You're right, but he (his opponent) still needs a livelihood for his family. Can we think of a way to make sure he still has his minimum needs taken care of?'"

Water management, Wolf and his colleagues stress, is conflict management. **terra**

To learn more about tools for international water management, see www.transboundarywaters.orst.edu/

Researcher Profile

Aaron Wolf, professor in the Department of Geosciences, has worked with academic scientists and government officials in Africa, Asia, Europe and North America to improve water resources decision-making. He has received funding from the National Science Foundation, U.S. Geological Survey, U.S. Bureau of Reclamation, United Nations Environment Program, Carnegie Foundation and Oregon Department of Community Colleges and Workforce Development.

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Spring 2009 Update: Student Engagement in Israel and Palestine

In spring of 2009, Wolf led a student study-abroad group to Israel and Palestine. Below is a summary of the trip written by Sarah Sheldrick, an MAIS English major in Communication.

I am thinking of all the ways I can try to describe the recent trip to Israel and Palestine by OSU's Geosciences Club. Without wild gesturing and maybe a small theatrical play. It feels impossible. Great poets pray for a muse of fire before trying to squeeze the human experience between the margins of a page. You might be asking: what is an article about a trip to Israel doing with a quote from a British playwright? Well even, Shakespeare realized he could not cram within a wooden O the war-torn land of the fields of France. Nor can I presume to capture the torn-up land, the natural phenomena, the unimaginable beauty, the passions of religion that fills every crack of this land we now call Israel.

This trip was no ordinary trip. Yes we learned about water and rocks. Professor Aaron Wolf bellowed "On the bus! ... Off the bus!" repeatedly day after day. As our bus driver, Meir, would pull to a stop we did not know what new place we were visiting. We eagerly jumped off the bus. We dipped our toes in the Mediterranean, stood at the edge of mine fields, hiked through the Golan heights, stood in abandoned Syrian bunkers... And that was just the first two days. We would groan as we were told to get back on the bus. Each sight we stopped at I wanted to take it in. Give my mind time to wrap around the implications of time, the political impact, the future possibilities. But always... "Back on the bus!" Then miraculously we would be at another location to marvel at more than before.

As much as I hated leaving each place, getting back on the bus was no longer a shuffle and a crawl, but rather a skip and a jump. At every stop I would think: Thank goodness we got back on the bus or maybe we wouldn't have had time to get to see the next place! We hiked up to Masada at dawn, sipped tea in a Bedouin tent in the Negev desert, and walked through the Jebusite water-tunnel under the ancient City of David in Jerusalem—an aqueduct over 3,000 years old. Meeting us at every step were geologists, hydrologists, archeologists, and geographers. Each guide shared their passion for their studies pointing out layers and layers of knowledge in each crevice along the way.

What I learned is that scientists are storytellers. Each ruins, each rock has a story to tell. They look through a wadi (canyon formed by seasonal desert floods), dig in the earth, and look at the drops of water that form on a chunk of limestone to discover the story of time. Scientists stop and look at the macro and the micro. Then their job is to report their findings. While the findings of a scientist can have deep impacts for other scientists in a report, those who can take that report and tell a story cause ripples and impacts that reach far beyond their direct experience. We all have stories to share and as I dragged my camera from border to border—to border—to border—to border... I thought about the story. In the end I took 17 hours of footage, which I hope to turn into a 15 min short film. That may be impossible, but I believe it appropriate to the concentration of time and space that makes up this bit of earth. Back on the bus! On to the next adventure!

Inspiring students to learn more about water management/conflict management issues the world is facing, will build on all the work that Wolf and his colleagues have done over the past few years at OSU.



(Photo: Anthony Novak)



(Photo: Anthony Novak)



(Photo: Anthony Novak)

More Water Management and Conflict Outreach...

More recent activities also focused on water management/conflict management. Lynette de Silva, Associate Director of the Program in Water Conflict Management and Transformation at OSU, shares that in July 2007, Mr. Bardyuk, Chief of the Department of Environmental Protection of the Khabarovsk Krai Ministry of Natural Resources, Russia, visited his sister city association in Portland to pursue talks on transboundary water dispute resolution strategies and in-stream assessments. Through the coordination efforts of Thomas Benke, Director of the Portland Khabarovsk Sister City Association Environmental Programs, Mr. Bardyuk visited OSU, where he was hosted by Drs. Michael Campana and Aaron Wolf. Discussions focused on international dispute resolution strategies, OSU's transboundary dispute database, and the Amur River basin.

In November 2007, de Silva says that OSU's International Programs, the Institute of Water and Watersheds and the Program in Water Conflict Management and Transformation hosted an international group of African dignitaries. The group included five individuals with careers in water management from Egypt, Ethiopia, Tanzania, and Kenya. It was an opportunity to exchange ideas related to various aspects of water resource management focused on watersheds, water governance, conflict management and the public involvement/participation in water-related issues.



Photo: Robbie Lamb

UHC Leads Record Fulbright Haul for OSU

Six students from Oregon State University have received 2008-09 U.S. Student Fulbright awards, a record number for OSU that included two awards to undergraduates. Not surprisingly, both undergraduate awards went to UHC students.

Christina Murphy, a senior in biology and fisheries and wildlife, and an international degree and University Honors College student from Eugene, Oregon, received a Fulbright Award to Chile to conduct research at the ECIM Marine Laboratory in Las Cruces. Christina's Honors thesis, entitled Intertidal Ecology along the Western Coastlines of the Pacific: Upwelling and Bottom-up Effects in Chile and Oregon, was written under the direction of Bruce Menge from the OSU Zoology Department and Selina Heppell from OSU Fisheries and Wildlife Department.

Robbie Lamb, a senior in marine biology, and an international degree and University Honors College student from Portland Oregon, received a Fulbright Award to Ecuador to work with the NAZCA Marine Science Institute, a marine resource management and biological research organization based in Quito. Robbie's Honors thesis is on Marine Reserves in the Bahamas and Ecuador: A Scientific and Socio-economic Perspective. Mark Hixon, Bruce Menge, and Darren Johnson from the OSU Zoology Department served as faculty mentors.

The students will use their awards to study and conduct research abroad. These merit-based fellowships are awarded annually to recent bachelor's graduates, master and doctoral students, young professionals and artists. The Fulbright program is sponsored by the United States government to "increase mutual understanding between the people of the United States and the people of other countries." About 1,200 students are selected annually from a nationwide pool of applicants.



Reptile Planet

Dan Preston tracks cold-blooded animals across the globe

As an undergrad at OSU, Dan Preston has studied reptiles not only in the campus snake lab, but also in the wilds of Australia and the outer reaches of Ecuador. (Photo: Jim Folts)

By Lee Sherman

Dan Preston pauses outside an ordinary-looking door in Cordley Hall. “Most people who walk by have no idea what’s inside this room,” the OSU biology major remarks as he turns the knob. Entering the vault-like foyer outside two environmentally controlled chambers, he unlocks one of the gleaming white enamel doors and steps through.

“Here,” he says, “is where we keep the garter snakes.” From dozens of glass tanks, reptilian eyes look out from beneath mounds of fluffy, cellulose-based bedding and upside-down egg-carton shelters. “These guys are from Manitoba, so we keep it cool for them during the winter.”

Under the supervision of OSU zoology professor Robert Mason and veterinary medicine professor Craig Mosley, Preston is studying anesthetics in reptiles for his Honors College senior thesis. These red-sided garter snakes from Manitoba, however, are just one of several cold-blooded species on Preston’s list of undergraduate research subjects. His OSU herpetology resume also includes frogs in Australia and iguanas in the Galapagos.

“OSU really provides undergraduates the opportunity to participate in research from the get-go,” Preston notes.

No Snakes in the House

The Canadian snakes curled up in Cordley Hall are close relatives of the garter snakes Dan first discovered as a kid tramping through the fields of western Pennsylvania. His mother’s no-snakes-in-the-house rule gave way under the little boy’s persistence, and specimens of the harmless serpents were allowed to join the salamanders, frogs, lizards and insects inhabiting his bedroom terrariums. When his parents, an executive recruiter and a social worker, moved the family west, Dan’s collection grew as he explored the wooded ravine behind his Portland home.

“I loved mucking around in creeks and ponds with my net and field guide,” Preston recalls.

His childhood fascination with reptiles and amphibians was rekindled when he got to college. During a semester at James Cook University in Queensland, Australia, with the OSU Study Abroad program, he volunteered to work with researchers studying a disease called chytridiomycosis in frogs. Scouring the northern Queensland landscape for the creatures that had inspired so many boyhood romps, he determined to become a research biologist specializing in reptiles.

Taking further advantage of OSU’s broad undergraduate research options, this one funded by an OSU Undergraduate Research Innovation Scholarship and Creativity grant, he spent his final fall term in the Galapagos Islands studying intertidal ecology involving yet another scaly vertebrate, the marine iguana. This work was done with Luis Vinuela, a Ph.D. student in the lab of marine biologists Bruce Menge and Jane Lubchenco.

Saturday Academy

But Preston's formal scientific research actually began while he was still in high school. Instead of just hanging around with his homies, Preston spent several summers at the side of microbial ecologist Anna-Louise Reysenbach through Saturday Academy's Apprenticeships in Science and Engineering program. The Portland State University researcher, who studies bacteria in terrestrial hot springs and deep-sea hydrothermal vents, took the high school intern into her lab (where he grew bacteria in high-temperature, low-oxygen conditions) and into the field (where he collected microbes in Yellowstone National Park).

"We had special research permits to hike off the trail," says Preston, for whom "off the trail" holds great appeal. "We were collecting Aquificales, these long, filamentous microbes, stringy bacteria, that clump together and use minerals for energy and that give thermal pools their bright colors."

Preston cultured a bacterium called *Hydrogenobacter subterraneus*, originally isolated in Japan. "We found the same organism growing in Yellowstone," Preston says. "The isolate from Japan was a heterotroph, meaning it uses organic compounds, such as sugars, as a source of carbon. The strain I isolated from Yellowstone, while genetically identical, was able to grow as an autotroph, meaning it could use carbon dioxide as a carbon source. This was interesting because previously, *H. subterraneus* was considered one of the only Aquificales to be a strict heterotroph; nearly all other members of the group are autotrophs." The finding became a small part of a larger paper on the phylogeny of the entire group of bacteria studied in the lab under Dr. Reysenbach.

When he got to OSU, Preston continued his studies of microbes in the lab of microbiologist Steve Giovannoni, where he worked with Ph.D. student Olivia Mason, one of Reysenbach's former master's students.

Comparing Anesthetics

For the snake study, funded in part by a Howard Hughes Medical Institute Fellowship, Preston is comparing the effectiveness of an injectable anesthetic against that of several other drugs used in veterinary medicine. Anesthesia is critical in the Mason lab, where experiments to better understand reproductive biology and physiology depend on surgical procedures. "Dr. Mason and Dr. Mosley are great mentors," Preston says. "They let me follow the questions I find interesting and design my own experiments. And they're available whenever I need input."

Garter snakes aren't the only reptilian species inhabiting OSU's Zoology Department. Mason's studies include tropical snakes, which reside in the hotter of the two environmental chambers. "It's going to feel like south Florida in here," Preston warns as he leads the way into the bright, hot space about the size of a one-car garage. Pointing out several brown tree snakes, Preston explains Professor Mason's search for solutions to the invasive reptiles' voracious appetite for birdlife on Guam. Then he opens the tank of a three-foot-long African ball python, so-called because of its defensive coiling strategy. "Want to touch her?" he asks as the muscular reptile curls around his arm, flicking her tongue rhythmically. Her scales feel buttery soft and closely textured, like the skin of an orange. "This is snake No. 11." Lab animals get numbers, not names, Preston explains.

He may not befriend his research subjects, but their wild cousins have his complete commitment.

"When I went to South America, I saw firsthand the devastations of oil drilling, deforestation and rampant population growth in the Ecuadorian Amazon," Preston says, explaining his plans to pursue a Ph.D. in conservation biology with a focus on tropical reptiles and amphibians. "The threats can seem insurmountable, but we can make a difference. We've got to keep that hope."



Disease detective

Manoj Pastey
Veterinary Medicine

Since he was a boy, Manoj Pastey has painted pictures of natural scenes — mountains, animals, water. For subjects, he goes to rural areas where he finds the scenery soothing.

**“For me it is a way to express the richness of life.
It makes me feel good, close to nature,”**

he says. And it seems to run in the family. Pastey’s daughter Nikita, who lives in Bangalore, also paints.

Imagine growing up in India during the 1970s. The country tested its first nuclear bomb. Population swelled past the 500 million mark. Violence in neighboring East Pakistan (now Bangladesh) generated millions of refugees.

Amid that turmoil, what Manoj Pastey remembers are the winners of the Nobel Prizes. He felt inspired by their milestone accomplishments in science, literature, peace and other fields.

“I asked my father about the Nobel Prize winners, and he told me that these people . . . had discovered and created things that were useful world-wide. And he told me that I could do the

same thing,” says Pastey, an assistant professor of biomedical sciences in OSU’s College of Veterinary Medicine.

It didn’t take Dr. Pastey long to discover his own love of science. In college, he explored the world of disease-causing microbes and the clever defenses of the immune system. Today, HIV, avian flu and other respiratory viruses top Dr. Pastey’s research agenda. And he has an ambitious and urgent goal, to improve the detection, prevention and treatment of viral diseases.

Dr. Pastey is a veterinarian, but his discoveries reach directly into the world of human health. One target is an organism

known as the respiratory syncytial virus, or RSV. It is highly contagious, the most common cause of bronchiolitis and pneumonia in infants under 1 year old worldwide. A form of the disease, known as bovine RSV, infects cattle. Severity peaks in calves under 6 months old. There are striking parallels between the human and animal forms of the disease.

Dr. Pastey continues to look for ways to prevent transmission of HIV, and is working on a study of an anti-HIV microbicide in a mouse model that may be eventually effective in humans.

Avian flu has also captured his attention, and Dr. Pastey is working on a new method to detect the virus quickly in birds. In 2006, the U.S. Department of Agriculture approved a \$100,000 grant for his work. In addition, Dr. Pastey is participating in a study of a recombinant vaccine to prevent transmission infectious with the avian influenza virus.

Another study, beginning in 2006 and continuing until 2010, has recently gained new importance as it focuses on the replication of highly pathogenic avian influenza viruses in swine. Understanding how this avian influenza virus changes as it crosses host species is a key to controlling and preventing potential epidemics.

Since Dr. Pastey is intent on stopping deadly diseases, some might characterize him as a battle-tested warrior. Dr. Pastey doesn't disagree, and like many warriors, he appreciates the strengths of his enemies. "When I discovered science, I found myself fascinated by the concept of life in all its forms and breadth. The mechanisms of life fascinated me, how organisms live and how they multiply, and I'm still fascinated," he says.

"Nature is just so powerful and there are so many aspects to it all — things that even today you cannot explain. I just have to learn more."

Dr. Pastey received his bachelor's degree in veterinary science from the University of Agricultural Sciences in Bangalore, India, where he consistently finished in the top of his class. He received his master's and Ph.D. degrees from the University of Maryland and is board-certified in both veterinary virology and veterinary immunology. He is also certified in foreign animal disease pathology, having completed a training program at the USDA foreign animal disease program at Plum Island, New York.

A stint as a research fellow at the National Institutes of Health earned him several awards for research excellence. And in recognition of their work in immunology, Dr. Pastey and a colleague, Barney Graham, received a patent in 2004 relating to a method of halting the infection and spread of viruses such as RSV, para-influenza virus and HIV.

At the College of Veterinary Medicine at Oregon State University, Dr. Pastey heads the Molecular Diagnostic

Laboratory, which is responsible for developing new and improved diagnostic tests for infectious diseases and for performing these assays on samples sent to the laboratory from all over the Pacific Northwest. The laboratory is responsible for surveillance for Avian Influenza, West Nile virus and St. Louis Encephalitis virus, testing numerous samples from mosquitoes, horses, and birds to determine the prevalence of these viruses in the area.

With his wife and daughter temporarily living in India, Dr. Pastey finds his hours filled with research and teaching. He often eats dinner at his desk, continues reading about research shortly after arriving home and finishes up around midnight. He teaches the Veterinary Immunology course to first year veterinary students, providing them with a solid understanding of principles of immunology that they build on throughout the rest of their professional education. The course includes hands-on laboratory exercises designed to provide students with an understanding of the latest diagnostic techniques and tools in veterinary immunology. Dr. Pastey also mentors veterinary students and graduate students, providing them with guidance and opportunities to perform research in areas of virology and immunology.

Dr. Pastey maintains close ties with research associates in India. In 2009, he was an invited speaker at virology meeting in Pune, India. He has also visited and collaborates with colleagues at the National AIDS Research Institute in Pune, India and the National Institute of Immunology and Talwar Research Foundation in New Delhi.

Despite his devotion to his work, Dr. Pastey is quick to set a high priority on family and friends. He often assists family members, giving a boost to nieces and nephews and hoping to advance their education. He contributes to relatives in need of housing, medical treatment and, in India, where weddings are often multi-day affairs with thousands of guests, he has contributed to several relatives' wedding funds.

"Someday, when my wife and daughter return, we'll buy a house," he says. "But I don't need a fancy car, or a lot of other things. The main thing is that I'm a people person. I like to help them, to deal with them and to listen to them. I'll continue with my research and with teaching students. I'll continue to help." •



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