

"Bringing these fields together allows us to offer a curriculum that emphasizes the interdependence of human health, society, and the environment, and illustrates the crucial role of science in understanding these interactions," said Dean **Richard Malkin**.

With this background, College of Natural Resource graduates are prepared for a nearly limitless choice of careers. "Our interdisciplinary approach and small classes help students go in their chosen direction with an understanding of how the world works. They can discover not only the wide range of careers open to them, but how their actions influence society and the global environment."

Profiles of just a few alumni in this issue demonstrate the diverse application of a College of Natural Resources education.

ARIK OLSON

Plant Biology, B.S., 1993

Physician, Director of Home Visit Program
NYU Downtown Hospital
New York, NY



"When I was in college, I felt pressure to have the right major and to know what I was going to do with my life...but you never know where life is going to take you," said Arik Olson.

Although Olson considered becoming a doctor while in high school, he was sure he didn't want to be in the pre-med program at Berkeley.

"I came from a high school with a senior class of twenty. At Cal, I felt lost in a sea of undergrads," he said. "I liked biology and chose plant biology because I liked gardening, the classes were small, and the professors were nice."

He did an undergraduate research project in Adjunct Professor **Sarah Hake's** lab, in the Division of Plant Biology. "She's brilliant and funny," he said. But for him, the project confirmed that he preferred people to the lab bench.

He decided to become a medical doctor after all, but not before another stint among plants during the

summer. Olson worked in the lettuce fields of Salinas, looking for insects and taking soil samples as part of a project to design a computer-based water management system.

Olson graduated from the Medical College of Virginia and completed a residency in internal medicine at Mt. Sinai Hospital in New York City.

"Medicine is a way to use science but work with people," he said. Although some of the medical school interviewers asked him why he studied plant biology, Olson said he told them "he thought it was interesting and they seemed to respect that."

Today, he directs the newly formed Home Visit Program for New York University's Downtown Hospital.

And just like at Cal, you're unlikely to find him in a lab coat.

"In New York, there are lots of rent-controlled apartments without elevators. If you're elderly, you may be too weak to get out for primary care medical visits, so we go to them. Our goal is to keep people out of the hospital." Working in Chinatown, he also gets to speak Mandarin, which he studied at Berkeley.

"I'm interested in being a person with my patients," he said. "Maybe it makes me a better doctor."

Backing Up Coursework With Experience

Courses and research combine in the College to cover both basic and applied science.

“Understanding how nature works is key to developing viable strategies for conserving biological diversity and managing our natural resources in a sustainable manner,” said Professor **Steven Beissinger**, Chair of the Department of Environmental Science, Policy and Management. “Most faculty conduct studies that are driven both to understand the mechanisms of natural processes, and to determine how this knowledge can be used in wise management.” Similar application of basic science or theoretical tools takes place in all College departments.

JOHN SWIFT

**Conservation of Natural Resources,
B.S., 1976**

**Sustainable Specialty Farmer
Swift Subtropicals
Los Osos, CA**



“When I came to Berkeley, I had no idea what I wanted to do,” said John Swift. “I could have gone into psychology, criminology, or forestry.”

But his interest in eco-farming led him to the College of Natural Resources.

Now, he owns and manages Swift Subtropicals near San Luis Obispo, California. Swift raises organic specialty fruits and vegetables such as feijoas from Brazil, pepino melons from Chile, and horned melons from Africa. Swift sells the produce to farmers’ markets to promote the food locally, and to specialty brokers in Los Angeles.

“The College was a stepping stone,” said Swift. From there, he traveled by truck from London, England, to Kathmandu, Nepal, “pretty much for fun,” but also looking at agricultural systems across Iran, India, and Afghanistan. Then he returned to California Polytechnic Institute and graduated in 1979 with an M.S. in international agriculture.

He remembers Insect Biology Professor **Donald Dahlsten’s** holistic approach to viewing systems and Berkeley’s approach to looking at broader issues as motivating influences.

“I remember a discussion paper on the Green Revolution and the problems with introducing some of those technologies to Third World countries,” he said. “Those ideas were validated later on in my career when I was overseas.”

After Cal Poly, Swift volunteered for two years as a project manager in Papua, New Guinea, with the International Voluntary Service. At the Wau Ecology Institute, he worked to improve traditional cultivation techniques during the shift from slash-and-burn agriculture to using composting and agroforestry.

Swift returned to the states in 1982 and began identifying, importing, and propagating specialty produce varieties on the 600-acre Bear Creek Ranch that he purchased with his brother, Jim. Swift Subtropicals takes up 25 acres on the ranch. On the rest of the land, the Swifts raise purebred Texas longhorn cattle and thoroughbred horses.

“My background gives me flexibility to try new things” he said.

Undergraduates can delve deeper into an issue by conducting their own research. A hands-on project can lead to a love for research, or in some cases, a way to identify preferences.

That was the case for **Michelle Michalek**, a senior in Environmental Economics and Policy (EEP).

"When I was a freshman, I was interested in why plants grow a certain way. I wanted to study plant biology, but didn't realize the questions I was asking were really questions about genetics," said Michalek. So she spent a semester in CNR Professor **Michael Freeling's** genetics laboratory, looking at the expression of a genetic mutant in maize that causes stunted growth.

DANIEL STOTTER

Conservation and Resource Studies (CRS), B.S., 1985

Environmental Attorney
Bahr & Stotter Law Offices
Eugene, OR

For Daniel Stotter, the beautiful redwood trees around Giannini Hall were spiritually motivating. The professors were stimulating. And the always politically active CRS student organization was inspirational.

"I had no idea what law school would be like, but the classes I took at the College of Natural Resources led me to believe that legal strategies were needed to protect environmental resources," says Stotter.

Now he's partner in a distinguished environmental law firm, representing clients trying to protect natural resource areas.

With his CNR degree, Stotter says he was accepted into several environmental law programs. "I was able to select the law school that I wanted to go to," he said.

He graduated from the University of Oregon School of Law, which was "like undergraduate finals every day of the week for three years." Then Stotter worked in legal arenas ranging from the halls of Congress as an environmental legislative aide, to the National Wildlife Federation in Washington, D.C., to several forest conservation groups in Oregon.

In 1994, he established a law office in Eugene, Oregon, with law school classmate David Bahr.

Typical of his work is a current case representing Thistle Down Farms. "They're opposing the conversion of prime farmland to aggregate for a proposed gravel pit in Lane County, Oregon." To make his case, Stotter has to synthesize technical information

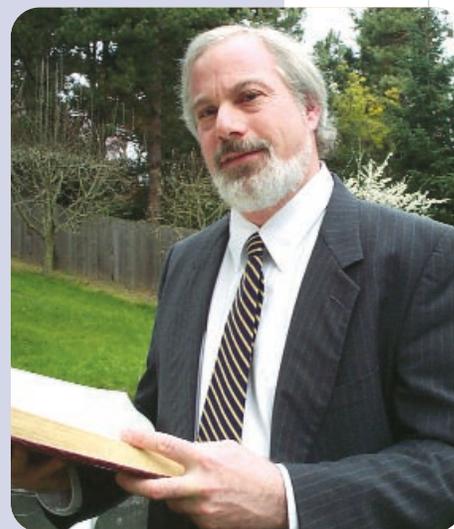
from a wide range of technical disciplines, such as hydrology, pollution monitoring, geology, and traffic analysis to demonstrate the impact of such a conversion.

"The scientific side of my education helps me deal with the full range of interdisciplinary natural resource issues that may have bearing upon a particular controversy," Stotter said.

His firm has been recognized by the environmental law community with the prestigious Kerry Rydberg Award for Environmental Activism in 1999, for "public interest environmental activists from around the world who have demonstrated outstanding lifetime achievements and leadership in environmental litigation and advocacy."

Stotter also helped develop FOIAdvocates.com, a website dedicated to helping citizens obtain public records from hesitant agencies. Last year, the site received the Sunshine Award from the Society of Professional Journalists.

"That's been a real exciting area, because we've gotten records from public agencies that have been very helpful to our clients, many of whom are public interest groups," said Stotter.



K. BUCHANAN

"The lab work was interesting, but I discovered that I don't want to work in the lab all the time. I was more interested in working outdoors," Michalek said.

Next, she chose to do field research as part of a beginning biology course. At the campus' Richmond Field Station, she and other researchers studied how mice and voles shared space in a field. Although she liked working outside, she still wasn't satisfied. She wanted to look at larger environmental issues and realized that she needed to bring in the human element.

"I was really excited when I found environmental economics," Michalek said. "I think it's important that economists and environmentalists speak the same language," she said. "Environmental policy often uses economics to motivate change. The EEP major teaches us that kind of communication," she said.

And research is still part of the picture.

Gina King had already arranged to work for the Yakama Nation when she came to the College of Natural Resources.

After King studied zoology at the University of Washington, she worked seasonally on the Yakama reservation. But she knew an advanced degree would benefit both her and her work in the 600,000-acre Yakama Reservation Forest.

The forest, part of the Yakama tribe's homeland, historically supported endangered species such as lynx, wolves, and spotted owls. The tribe uses the forest for non-economic resource values as well as the financial support of its timber sales.

As part of a cooperative agreement between the tribe and the U.S. Forest Service, King wrote her master's thesis on spotted-owl habitat characterization. The owl is the one threatened species that biologists know still breeds on the reservation.

"A lot of the work on spotted owls was done on the west side of the Cascade crest, which has different forest compositions and used different forestry techniques," King said. On the east side, fire suppression has replaced the Ponderosa pine forests with grand fir and Douglas fir.

Instead of clear-cutting even-aged stands, they typically remove about a third of uneven-aged stands.

"The change in trees has actually provided more continuous expanses of spotted owl habitat than would have been there historically," she said. "Unfortunately, that continuous tree cover also provides the perfect conditions for the spruce budworm. It's a real balancing act to deal with forest health problems while maintaining enough habitat for the owls."

As she expected, the College's courses and faculty prepared her to meet the challenges of protecting threatened and endangered species in the forest. What surprises her, though, is how important silviculture and forest economics — classes she was reluctant to take — are to her effectiveness.

"The foresters don't expect a wildlife biologist to understand them, and it really gets their attention when you can talk to them in their terms," King said. "When you're out in the field with the timber sale officers, you can really see the challenges and try to come to compromises."

GINA KING

**Wildland Resource Studies,
M.S., 1993**

**Wildlife Biologist
Spotted Owl Project Leader
Yakama Nation
Toppenish, WA**



YAKAMA NATION WILDLIFE

Michalek combined her education in environmental economics with an internship at Transfair USA in Oakland. Transfair works with small-farmer cooperatives in the developing world to promote social justice and agricultural sustainability in coffee-producing communities. Participants in the program receive a “Fair Trade” label for their product.

As part of her senior honor’s thesis research, Michalek interviewed coffee producers in Nicaragua over two weeks beginning in December 2001. A grant through her department from the Hung Wo Ching Student Assistance Fund paid her travel costs to Nicaragua.

“According to the International Fair Trade Labeling Organization (FLO), coffee growers with Fair Trade certification are supposed to practice a degree of environmental stewardship in their production. I wanted to investigate the relationship between economic and environmental sustainability that potentially coexists in this model of trade,” she said.

Michalek found that the relationship was indirect. “The farmers grow organically not because FLO tells them to, but because it gives them a higher price. In this context, the Fair Trade model makes a difference in requiring that the farmers be a part of an exporting cooperative. Producers learn about the demand for organic coffee because they have a direct connection to the international marketplace through the cooperative.”

STEVEN HILL

Forest Management, B.S., 1969

Senior Vice President
Human Resources
Weyerhaeuser Company
Federal Way, WA



Steven Hill was one of many students that then Blodgett Forest Manager **Herb Sampert** took on tours of companies in the forest industry. “He had an extremely high regard for Weyerhaeuser Company, and that had a lot to do with my choosing to have a career there,” said Hill.

While in school, Hill spent two summers as a field forester with Weyerhaeuser. But Hill’s career is in business, not forestry.

“I decided I didn’t want to be a forester, per se,” he said. So Hill obtained an M.B.A. from UCLA and joined Weyerhaeuser’s raw materials division as an analyst.

“Even though I didn’t pursue a science career, I learned important critical thinking skills from Forestry Professor **Bill Libby** (emeritus) and other CNR faculty. A forestry education provided exposure to biology, economics, and policy—all those areas have helped me as I’ve moved forward in my career.”

He also learned leadership skills, acting as student manager of CNR’s forestry summer camp. “That is another aspect of forestry education — the expectation of teamwork.”

In 1978, Hill served as a White House Fellow in Washington, D.C. He worked as a staff assistant in the management of large-scale research and development projects in the Department of Energy.

When he returned to Weyerhaeuser, he moved into human resources and now leads the company’s HR area. And even though it is quite different than he anticipated when he first went to Cal, he still finds connections to his forestry degree.

“When I first went into human resources, I was given a briefing on actuarial tables. It reminded me of forest science laboratory—one has to do with people’s lives and the other with trees’ lives,” he said.

Even though she changed direction several times, Michalek is happy with the path she took.

“Understanding the details of plant growth and animal behavior brings us a step closer to understanding how the world works,” she said. “In Nicaragua, my knowledge of both the scientific process and biology helped me talk with the coffee growers — I understand not only their economic decisions but also something about the ecosystem in which they work everyday. For the agricultural producer, this connection is essential — the land is their well-being.”

Turning Students On With Research

Other students, like **Anita Lee**, discovered that they love laboratory research and go on for more.

Lee, a CNR graduate student, started her laboratory experience as a work-study student in CNR Professor **Norman Terry**’s plant physiology lab.

“I was analyzing samples for a selenium phytoremediation project, and I was interested in learning more,” she said. Postgraduate researcher **Zhiqing Lin** explained to her that selenium is one of the major pollutants in California’s Central Valley. Researchers in Terry’s laboratory are developing biological methods to clean up contaminated soil and water.

“I thought it was really cool to generate new knowledge from a simple experiment in the lab,” Lee said. She developed a research proposal and won a place in the highly competitive Haas Scholar’s Program. She developed the summer-long research project into her senior thesis.



NOAH BERGER

**MICHELLE
MICHALEK**

*Graduating senior in Environmental
Economics and Policy*



NOAH BERGER

ANITA LEE

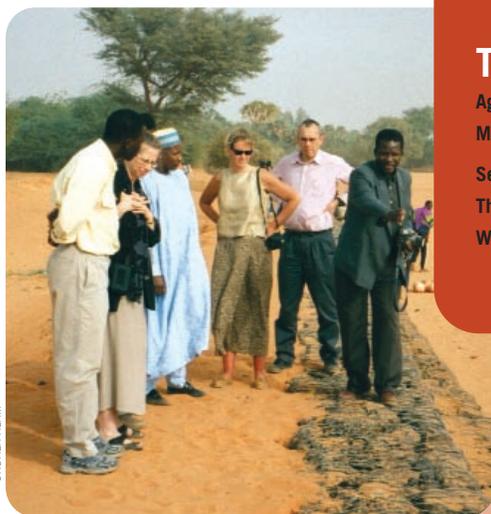
*Graduate student in
Atmospheric Chemistry*

Under Lin's guidance, Lee designed a greenhouse experiment to look at how pickleweed volatilized selenium from the soil into the atmosphere. This work followed up on a 1999 discovery by Terry and Lin that pickleweed converted inorganic selenium to volatile organic selenium at rates 10-fold higher than other tested plant species.

Lee's research showed that unlike other plant species, pickleweed did not need soil microbes to convert the selenium. The work was so well received that she published a paper in a respected scientific journal, *Planta*.

"Research can turn students on," said Terry. "Students like Lee who come to our lab become really motivated and interested. They get real-life research experience in a modern, cutting-edge laboratory. Many get to collaborate on scientific papers. All of that is a pretty strong recommendation when they apply to graduate school," he said.

And for Lee, the undergraduate research experience led indirectly to her graduate interests.



TRACY HART

Agricultural and Resource Economics,
M.S., 1993; Ph.D., 1997

Senior Economist
The World Bank
Washington, D.C.

"There wasn't much question where I'd go to graduate school," Tracy Hart said once she was accepted into the College's Agricultural and Resource

Economics (ARE) graduate program.

Hart (center in photo) obtained a B.S. in foreign service from Georgetown University in Washington, D.C. She spent her junior year abroad in Senegal, and served in the Peace Corps in Mauritania after graduation.

To back up her international experience, she wanted a technical focus in international development.

"Economics would give me that backbone," she said. "CNR is the top school for ag and resource economics."

At CNR, Hart said she benefited from being with the same people over many years in small classes. "I was taught to think very critically," she said. In addition to the academic side, she also gained work experience.

ARE Professor **Alain de Janvry** helped her apply for a 6-month research assistantship at the World Bank. After graduation, she returned to the World Bank through its Young Professionals Program.

"Most of my colleagues from my graduate class went on into academia," said Hart. "I decided that academic research and publishing wasn't for me, but the same skills and rigorous thought serve me well at the World Bank. We're lending large amounts of money that needs to be used wisely."

Many of her current responsibilities involve water resources in Africa. "We look at the costs and benefits of investments such as rural water supply projects," she said. "It's easy to see that cleaner water will benefit people, but that doesn't immediately translate into making money to pay back the loan." She works with governments and local communities to help them select appropriate locations for such development projects and feasible repayment plans.

Although there are other types of training that prepare international development professionals, Hart said that employers highly value the ARE graduate program. In fact, she said the World Bank hires ARE students as often as they can, because they know the program has such a strong environmental focus.

"Environmental economics is difficult to do well. If I need the theoretical tools, I can pull them out of my pocket," she said.



MONICA MOORE

Political Economy of Natural Resources, B.S., 1980; Wildland Resource Studies, M.S., 1997

Co-founder and Co-director, Pesticide Action Network North America Berkeley, CA

Monica Moore came to Berkeley because she knew she could learn about the thread that ties human rights, women's issues, and ecological issues together.

"What I got out of my education was a new set of questions, an understanding that I needed to learn more, and some really excellent advice on how to get more experience."

As a student, Moore found that she disagreed with many of the assumptions that formed the basis of resource policy and economics. But she didn't have enough experience to resolve her concerns.

With the help of her advisor, Professor **Richard Norgaard** in the Department of Agricultural and Resource Economics, Moore spent a year after graduation in Brazil. There, she volunteered with environmental groups, women's organizations, and other non-governmental organizations in exchange for room and board.

"That's where I first became active around pesticide issues," she said. "I was surprised to find that all those groups were working together with religious and community groups to critique and demand alternatives for pesticides."

When she returned, Moore joined with groups in San Francisco to protest U.S. military intervention in Central America and to work for social justice in countries with refugee camps.

Then, with colleagues she developed through these efforts, Moore helped organize the Pesticide Action Network in 1982. In 1984, she co-founded the organization's North American regional center (PANNA). PANNA's goal is to replace pesticide use with ecologically sound and socially just alternatives. The group works by identifying dangerous pesticide uses, coordinating interested groups at local through international levels, and advocating ecologically sound approaches to pest management in agriculture and public places.

To deepen her theoretical background, Moore returned to the College of Natural Resources for a graduate degree. "It was very valuable to have time to study in depth and take classes in biological control and agroecology," she said. "There's no way I could have done that while I was working."

PANNA's greatest accomplishment, said Moore, has been to "establish and nurture an international capacity for change that didn't exist before."

"Twenty years ago, people said we were crazy," said Moore. "Now a lot of our ideas about pest management are considered conventional wisdom."

"The project sparked my interest in how we are affecting the environment — are our efforts to fix pollution causing other problems?" Selenium, she said, is even more interesting, because it is an essential nutrient as well as a pollutant. "If you could transport the selenium from a place of high concentration to a place of low concentration, it would not cause a problem," she said.

She followed up her research in Terry's lab by studying dimethyl selenide in the San Joaquin Valley for an atmospheric chemistry class with CNR Associate Professor **Allen Goldstein**. That class sparked a greater interest; she's now a graduate student with Goldstein, studying how monoterpene emissions from pine trees influence regional air chemistry.



John Tonkyn came to CNR to study with experts in plant genetic engineering. He graduated in 1991 with the "educational foundation and laboratory skills that could take me to any position in molecular biology," he said.

Now he's using his experience to help solve crimes and missing persons cases.

With an interest in plants and a B.S. in botany from the University of Washington in Seattle, Tonkyn expected to pursue a career in plant biotechnology. He joined (former) Professor **Wilhelm Gruissem**'s laboratory to study the molecular genetics of spinach chloroplast DNA. Then he completed a

post-doctoral position at Rutgers University looking at the expression of disease-related proteins in tobacco.

But when it was time to find work, "the field was suffering from some hesitation about genetically modified organisms and the job prospects were slim," Tonkyn recalled.

At the advice of a friend, he joined the California Department of Justice's DNA laboratory.

Tonkyn's task was to help develop DNA tests that were more sensitive for human identification. "We had to develop these tests and then convince others in the field that they worked," he said.

Last July, Tonkyn's team finished converting the information in their criminal offender database. "We have more than 200,000 profiles from convicted felons." The profiles are compared to crime scene evidence when there is no specific suspect.

"To date, we've made 74 matches and aided more than 100 investigations," Tonkyn said. "We know this is just the tip of the iceberg."

Now Tonkyn's applying his molecular biology skills to help identify missing persons. "We have approximately 2,100 sets of human remains that can't be identified by other methods, and about 3,100 missing persons that were never located." Similar to the criminal database, this database will allow investigators to compare the remains to DNA from missing persons and their family members. "We've just begun analyses and we've already had one match."

"Although it was extremely difficult to leave the field of plant biology, I really enjoy my job," he said.

JOHN TONKYN

Plant Molecular Biology, Ph.D., 1991

Assistant Laboratory Director
Missing Persons DNA Program
California Department of Justice
Richmond, CA

But perhaps the biggest benefit of undergraduate research for Lee was increasing her contact with faculty. "It's really easy to feel lost at Cal, and a lot of people feel anxiety talking with professors because they seem so advanced. Working in the laboratory, you learn that professors are people, too."



JENNIFER MAXWELL

Nutrition and Food Science, B.S., 1988

Co-Founder, PowerBar, Inc.
Marin County, CA

Most undergraduates stop for food or a library book between classes. Jennifer Maxwell (then Biddulph) went to her mailbox.

Likely to be there were mail orders for PowerBars, a revolutionary new energy bar.

She and her future husband, former Cal track and cross country coach Brian Maxwell, launched PowerBar in 1987 while she was an undergraduate in nutrition at the College of Natural Resources. Brian supplied the idea and the business plan. Jennifer used her nutrition education and love of cooking to refine the bar's formulation.

"I remember a food chemistry lab with Professor **Len Bjeldanes**," she said. "I brought in the bar to analyze it for vitamin and mineral content."

The idea for PowerBar was unique. As competitive runners, the Maxwells wanted to create a fuel source to help athletes maximize their performance. "At the time, athletes did not eat before they ran."

The Maxwells were also pioneers in educating athletes about low fat, soluble fiber. "We were using oat bran, which was sold to us as horse feed, as a fat substitute so we didn't have to coat the bar with hydrogenated oil," she said.

"Everyone said the oil was necessary in the manufacturing process, and that what we wanted to do

wouldn't work," Maxwell said. "But my professors and the atmosphere at Cal encouraged free thinking and the courage to try something new," she said.

So along with their product, they developed a new manufacturing process. Starting by word of mouth, they gave away PowerBars at track meets. They made the dry mix, oversaw the manufacturing, and started selling them through the mail.

After she graduated in 1988, Jennifer and Brian married. In 2000, they sold PowerBar to Nestle USA for about \$375 million dollars. Today, they're still running and working to meet their greatest challenge: raising five children.

"Set a goal, think openly, and bring your own personal passion," cited Maxwell as keys to her success. "Because we're athletes, we were incredibly passionate about our goal. There was never a doubt in my mind that it would work."

Undergrads in the Lab: Both Students and Faculty Benefit

Faculty also benefit from the interaction. "It's a mutual process," says CNR Assistant Professor **Jean-Marc Schwarz**. "For me, it's very exciting if I can trigger some interest for research in undergraduate students," he said. It's also practical. "They get to learn how a research question can be tackled and we get a hard-working person in the lab."

That's true for **Joo-Young Han**, a graduating senior in nutritional sciences who works in Schwarz's lab. She transferred from Santa Monica College in 2000 and plans to apply to medical school next year.

She's helping Schwarz in a collaborative study with UC San Francisco on the effects of treating HIV-infected patients with growth hormone. Schwarz and colleagues have found that growth hormone helps stabilize an imbalance in fat deposition in patients treated with antiprotease inhibitors. But growth-hormone therapy could have a negative effect on carbohydrate metabolism.

Han is analyzing urine samples to identify the differences in how the liver processes glucose in those patients treated with growth hormone.

"I wasn't sure I would do research when I came to Berkeley, but I wanted to learn more outside of class," Han said. In the beginning, it was hard, at times boring, and seemed to go nowhere.

"Now that I'm almost done with my research and I'm seeing some good results, I think 'wow, it works!' and that is really rewarding for me."

Schwarz knows how it is to be a student researcher as well. "I did some similar things when I was a student in Switzerland," Schwarz said. "It was a determining factor for me to become a graduate student. I hope it will do the same for my students." 🍌

JOO-YOUNG HAN

Graduating senior in Nutritional Sciences



NOAH BERGER

The Undergraduate Research Opportunities Program

"Students who want to pursue research careers need to understand that both laboratory and field work can be tedious and frustrating as well as rewarding. By getting some direct experience, they will learn whether a research career suits them," said Dean Richard Malkin.

"Undergraduate research also helps break down the bigness of Berkeley. Instead of classes with hundreds of people, students enjoy very close interaction with a team of six or seven," he said.

One way to get that experience is through the College of Natural Resources' Undergraduate Research Opportunities Program. Each year, faculty submit proposals identifying projects that could be completed by an undergraduate student researcher. "We typically fund 40 to 50 of those proposals at an average of about \$2,000 each," Malkin said. Funding pays for supplies, travel, and student stipends. Students can also get course credit. Funds for the UROP grants come from gifts to the College's annual fund, the Berkeley Fund for Natural Resources.