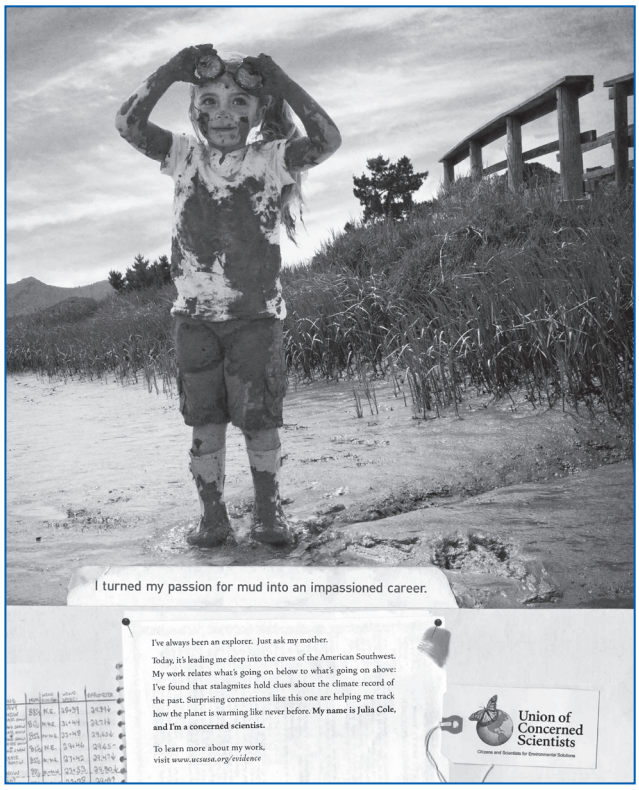
Alumni Profile: Julia Cole, PhD ’92

By Mary Beth Griggs



Julia Cole is, quite literally, a poster child for climate scientists everywhere. Not only does she spend her days solving enigmas in Earth’s history, she does so in incredible places. A typical year will see her diving down to coral reefs in the Galapagos or venturing deep inside Arizona’s limestone caves, living proof that climate science is anything but mundane.

“I have always thought of science as a creative endeavor; one of my biggest challenges is to maintain and nurture that part of my work,” Cole says.

Cole, a professor of geosciences at the University of Arizona, has spent much of her career gleaning information about past climates from fossilized records preserved in the natural environment. Lately, she has also started to communicate her climate research (and that of her colleagues) to individuals outside the field.

Cole’s paleoclimate work began here at Lamont-Doherty in 1986, when her adviser, Richard Fairbanks, encouraged her to make use of his vast coral collection to study the history of El Niño. Known more formally as the El Niño Southern Oscillation (ENSO), this system is one of the most influential climate phenomena on Earth. It occurs irregularly every few years, bringing warm ocean temperatures to the tropical Pacific and disrupting rainfall patterns throughout the tropics and the Americas. Researchers have sought clues about how ENSO might respond to a changing climate by examining coral reefs in the tropical Pacific as a means to decipher ENSO’s past variability.

Cole’s graduate years coincided with an important chapter in the study of El Niño at Lamont-Doherty. In the mid-80s, scientists Mark Cane and Steve Zebiak built the first computer model to simulate and successfully predict El Niño’s occurrence. The two publicized their prediction in 1987 for the first time.

Cole is particularly interested in the history of climate that occurs on human time scales. “We are looking closely at the last century to get a better understanding of 20th-century temperature trends across the tropical Pacific,” she explains. Her research in the tropical oceans has expanded over the years to include reef ecosystems, monsoon variability, and anthropogenic climate change.

When she moved to Arizona, Cole adapted her research to fit her new home. “I became interested in the Southwest when I moved west and realized the fascinating climate history of the region,” Cole says. While the southwestern United States has detailed tree ring records that stretch back millennia, Cole hoped to complement existing tree-ring data with data from the stalagmites that grew in nearby limestone caves.

She developed a paleoclimate project that would include fieldwork and appeal to her students. Using her experience analyzing the geochemical makeup of coral reefs, Cole and her students collected samples from the cave formations and took them back to the lab. Stalagmites form over time, built by the steady dripping of water laden with minerals. Changes in climate indicators, like the amount of water in the area, are recorded in the stalagmites as they grow. With radiometric dating and isotope geochemistry, Cole and her students were able to build an accurate picture of what the climate of the Southwest was like tens of thousands of years ago. They found that previous warm periods were coupled with long spells of drought in the Southwest, and the likely mechanism was the same as that proposed for a future warmer world—the northward shift of the Pacific storm track.

Climate has become a charged political issue in the public realm, and many scientists are unwilling to wade into the morass. Cole is not one of them. “The degree of misinformation and misunderstanding about climate change can be astounding, and I believe we have an obligation to make our science connect with public concerns. The public funds most of our work. More importantly, public awareness of climate change might just help us avoid its most costly and damaging impacts,” Cole says.

In order to meet that obligation, Cole has gone out of her way to engage new audiences. In February 2011 she was selected to be a fellow in the fledgling Google Science Communication Fellows program. As part of the initiative, Google will fund work by the fellows that makes use of technology and new media in communicating the science of climate change.

Cole is no stranger to science communication. Last year, she took part in a PR campaign run by the Union of Concerned Scientists (see inset). And as an Aldo Leopold Fellow in 2008, Cole traveled to Washington, D.C., and met with elected representatives to discuss scientific topics and gain insight into the perspectives held by our elected leaders. The Stanford-based Aldo Leopold Leadership Program works to provide scientists with communication skills that can help them interact with both politicians and the press.

Cole encourages her students to seek similar training, and she is working to start something like the Leopold Program for students and young environmental scientists at the University of Arizona.

While these pursuits do take time, Cole finds that the rewards are plentiful. “One of the best things about the workshops is that they attract fascinating, smart, and energetic scientists. I’ve learned a lot of science through communication activities!”

“I like the process of distilling complex information to something you can explain to your family,” Cole says. “And I can’t help but think that better information will lead to smarter policies, someday.”