

## A Second Chance

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## A Second CHANCE

SAMANTHA J. KATZ

**H**ow do you change the way science is taught? You might start by giving teachers a second chance—or CHANCE, in this instance. Jacqueline McLaughlin, assistant professor of biology at Penn State University, is doing just that through an innovative professional development program called CHANCE, or Connecting Humans and Nature through Conservation Experiences. CHANCE exposes participants—in-service and preservice high school teachers—to the way scientists think and work by involving them in research projects in the field. The program's two weeks of fieldwork, carried out in Costa Rica, coupled with the creation of interactive, online learning modules, provide teachers with a better understanding of how research is conducted and supply them with the tools to teach students what science is, how scientists work, and what scientists do.

The program is conducted in three stages. Before traveling to Costa Rica to begin the fieldwork, participants learn about the country—its ecosystems, history, culture, and government—and about the impacts that humans have had on Costa Rican biodiversity. Then, for two weeks, the CHANCE teachers explore selected Costa Rican habitats, taking part in conservation and hands-on research efforts conducted by biologists with the Caribbean Conservation Corporation. After the fieldwork, participants submit their research reports, journal entries, and species assignments; they also have the opportunity to create online modules.

It was the sea turtle research that appealed to Paula Wang. Wang, a biology and environmental science teacher at a Washington, DC, high school, had been teaching for 25 years when she first heard about CHANCE through the National Association of Biology Teachers. The program intrigued her: sea turtle biology, behavior, and conservation were topics she could teach in her advanced-placement environmen-

tal science class, and she had always wanted to visit Costa Rica. She attended the summer program, earning continuing education credits through Penn State; the high school where she taught paid for the course.

“I expected to expand my knowledge of conservation biology. What I didn't expect was how the course made me reevaluate my teaching and rethink the way high school biology is taught,” Wang said. Every aspect of the CHANCE program can be applied directly to classroom teaching, whether through teachers' accounts of hands-on experiences or through the Web-based modules that can be used to integrate research into classroom discussions. The course is well organized, and it is taught at an appropriate level—many professional development courses fail to be challenging.

Developed from the research of scientists from around the world, the online interactive modules translate fieldwork in a way that allows students to explore, observe, question, hypothesize, and manipulate and analyze data. The modules feature a “progressive notebook” in which students record their experimental research findings as they progress through the module, much as a researcher would progress to the next step of an experiment. The modules can be used even without the course, Wang said. “I use the modules in place of the textbook for the topic areas I can,” she stated. The modules prompt students to use the scientific method to figure out how something works—they challenge the students to think. Six modules have been developed so far, covering species extinction, global warming, amphibian decline, loss of deciduous forest biodiversity, raptor migration, and invasive species.

Professional development courses that blend teaching, basic research, and technology, as CHANCE does, are better than traditional classes at promoting knowledge retention and transfer. “CHANCE is

an exemplar program that combines computer-based, problem-based learning exercises with actual field research,” said Emory University's Robert DeHaan, founding director of the Elementary Science Education Partners program, a science education outreach effort supported by the National Science Foundation. “There are not too many professional development courses for high school teachers that do this,” he added. CHANCE, DeHaan said, is an imaginative program that exemplifies what he has been working toward for many years: it helps teachers move away from textbooks, using problem-based learning strategies and teaching by incorporating real scientific data into the classroom, all the while keeping the central focus on the student. “Textbooks teach the history of science [and] science is an intellectual activity that students need to engage in; they don't get this the current way we teach science as a series of facts,” DeHaan said.

Many scientists have come to recognize how important it is to improve the teaching of science at all levels. “More scientists are realizing that you need to apply the same experimental thinking in both the classroom and laboratory,” DeHaan said. Preservice and in-service programs like CHANCE that espouse “scientific teaching” are not only timely—they are necessary. Since 2004, more than 50 Pennsylvania high school teachers have undertaken field training in Costa Rica, and hundreds of other teachers have been trained in the development and use of the modules. To learn more about CHANCE, visit its Web site at <https://teamworks.campuses.psu.edu/psu/lv/CHANCE>.

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*Samantha J. Katz was AIBS director of education and outreach when this article was written.*

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