

Karen Kalumuck



Karen Kalumuck dons a miner's helmet for a 2004 lava tube descent at Volcano National Park in Hawaii.

After five years as a graduate student in genetics and three more as a postdoctoral fellow researching the gene for human argininosuccinate lyase, a critical enzyme in the urea cycle, Karen Kalumuck dropped the bomb. She told her mentors that she wanted to teach. Their initial reaction was “disapproving,” to put it mildly, but Kalumuck says that she didn’t take it personally. The response was typical of the time. It was 1987, and benchwork had the prestige. “Now I see a lot more support from faculty for students to teach,” says Kalumuck. “They’re even dipping their toes into outreach themselves. But back in the day, it wasn’t well regarded.”

But Kalumuck’s PI at the Baylor College of Medicine in Houston eventually came around and recommended her in the warmest possible terms to St. Olaf College, a liberal arts school in Northfield, MN. Kalumuck spent five happy years at St. Olaf, teaching everything from cell to developmental to marine biology, along with genetics and bioethics. Then Kalumuck left the college tenure track behind, moving to the Bay Area, where she spent two years—happy ones, she says—as an itinerant adjunct in biology at various community colleges. Kalumuck finally found her niche at San Francisco’s innovative science outreach museum, the Exploratorium. She was hired to teach teachers to teach biology.

“It’s hard to explain just how radical the Exploratorium was in its early mission to engage the public on science,” says Stanford’s David Epel, “and how rare it was for an academic scientist like Karen to make a career there. Scientists today should not feel that they are locked into a career in the lab but should be able to look at alternatives.”

Those Who Can Teach

Watching Kalumuck teach science teachers is a sight to behold, says Lisa Sardinia, a friend and former colleague from St. Olaf. Sardinia now

teaches biology at Pacific University in Forest Grove, OR. “Teachers are the worst students in the world,” Sardinia declares. “I say this as a teacher myself. At professional development workshops...teachers jump in there with, ‘What if we do this? What if we do that?’” But Kalumuck never gets flustered, according to Sardinia. “Karen has a way of bringing in their experience and their ideas so that in the end it’s a richer experience for everybody.”

The science teachers in the summer program at the Exploratorium’s Teacher Institute are

not dewy-eyed beginners. Kalumuck’s students are often middle and high school teaching veterans who must go home to underfunded programs and undermotivated students. “Karen’s frequently doing workshops for science teachers who don’t have anything like the resources of a university or a college,” Sardinia points out. “How do you teach these modern technologies when you don’t have the budget for electrophoresis equipment? I’ve seen Karen make an electrophoresis gel with Tupperware, stainless-steel boxes, and a six-volt battery.”

Kimberly Tanner has also seen Kalumuck leading workshops with science teachers. “One of her major goals—and I’ve never seen her fail—is that every teacher there will leave the room at the end of the session thinking, ‘This is the most fun, interesting, and cool stuff, and I can’t wait to take it to my kids.’” That science is cool is an important message for science teachers, says Tanner. She is a science education researcher at San Francisco State University. “Most of what passes for ‘professional development’ these days convinces teachers that science is really complicated and boring,” she adds.

The Iron Science Teacher

“Not boring” could be in Kalumuck’s job description. Besides her Teacher Institute work, Kalumuck advises on and vets anything biological in the Exploratorium’s renowned interactive

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floor exhibits. She writes about science for the lay public and writes hands-on science manuals for science teachers. She has become a webcast personality through the Exploratorium (including appearances on its *Iron Science Teacher* faux game show) and through the National Science Teachers Association–National Science Digital Library partnership.

All these activities make Kalumuck a role model, says Tanner, for a new generation of research-trained scientists who reject the notion that biology education is a lesser calling. Tanner explains, “Karen was out there doing biology education at a time when a lot of biologists thought that was a second-class thing to do. There are a lot of young people who are coming up now for whom biology education is a clear option.”

Education was a limited option for her parents, Kalumuck recalls. They were products of the Great Depression. Her father left school after the ninth grade and worked 44 years in the Briar Hill Works at Youngstown Sheet and Tube. But he was an engineer manqué. Her father taught himself calculus and built—and remodeled—their house to close tolerances. “Within microns,” Kalumuck says with a laugh. Her mother worked as a bookkeeper at the Nabisco factory until she married.

More Questions than Answers

Kalumuck grew up in Campbell, Ohio, but went to the coed Catholic Ursuline High School, in Youngstown. Her science education was hit and miss. She “missed” with a biology teacher who was also the football coach. She “hit” with an inspired chemistry teacher and again in her senior year with a one-semester advanced class in genetics in which students did fruit fly crosses. Her college counseling was a complete miss. No one mentioned scholarships or suggested a “reach” school. Kalumuck chose the state university in Bowling Green, Ohio, because it looked less expensive and less intimidating than Ohio State. But in those days Bowling Green State University was also the home of the Mid-American *Drosophila* Stock Center. Ron Woodruff, a new fruit fly geneticist at the center, invited her to join his lab. Woodruff included her in lab meetings and steered her toward graduate-level classes. Kalumuck decided that she had a special talent for the research life. “I certainly had more questions than anyone could answer,” she recalls.

Still, Kalumuck had to be cautious about finances, so she enrolled in a Master of Public Health program at the University of Texas

Health Science Center in Houston. Lonely and lost in the heavily occupational program, she was rescued by *Drosophila* and James Procnunier’s new fly lab across town at Rice University. Kalumuck transferred into the graduate program, did her thesis work with Procnunier on ribosomal RNA genes, and was awarded a doctorate in genetics in 1983. But she had had enough of *Drosophila* by then. In search of opportunities to study human biology, she took a postdoc at the Baylor College of Medicine in a lab jointly run by an M.D. and a Ph.D. Kalumuck liked the lab, liked her PIs, and liked her work on the human argininosuccinate lyase gene. But she’d slowly discovered that she liked the human contact of teaching more than the solitary struggle at the bench. After she revealed her shocking decision to go to a liberal arts college, it was Bill O’Brien, the Ph.D. side of the lab, who finally helped Kalumuck get her wish.

St. Olaf College was all she could have wished for. Teaching undergraduates stretched her in new directions. “I was coming from being this expert on one narrow field, and suddenly I had to back up and become broader.” She was a natural for St. Olaf, which valued teachers who involved their students over researchers who avoided them. But there was the small matter of her having been hired as a developmental biologist. Come summer, she set out for Epel’s lab at Hopkins Marine Station to take her first developmental biology course. “I felt [like] a bit of an impostor,” Kalumuck recalls. “I was the only faculty member taking the course. Everyone else was a student.” But Kalumuck was soon swept off her feet by Monterey, by tide pooling, and by the possibilities of using sea urchins as an instructional system. She also noticed a research associate in Epel’s lab, a biochemist named Rob Swezey.

Escaping the Tenure Trap

Swezey was still there when Kalumuck came back the following January with a group from St. Olaf for a two-week offsite course. He was also there the following summer when she returned to work on a National Science Foundation grant with Epel on fertilization research. And Swezey was still there when Kalumuck returned with more St. Olaf students and then again for another summer research stint. By then Swezey and Kalumuck were looking at two jobs, two locations, and one relationship. “I had the better job,” Kalumuck remembers, “and Rob was actually set to move to Minnesota when a friend took me aside and said, ‘Karen, you know tenure can be security

“I’ve seen Karen make an electrophoresis gel with Tupperware, stainless-steel boxes, and a six-volt battery,” says Lisa Sardinia.

or it can be a noose around your neck.' I didn't have tenure yet, but I could see what she meant." Kalumuck moved to Monterey and she and Swezey got married.

They live in Moss Beach, six miles north up the coast from Half Moon Bay, making their commutes equidistant. Swezey goes south to Menlo Park and contract research work at SRI International. Kalumuck goes north to the city and the Palace of Fine Arts, where the Exploratorium has been encamped since its founding in 1969.

Back at home, Kalumuck grows freshwater snails for work—she says that they're impossible to find at lab supply stores these days—and cares for animals for fun, including two dogs, three cats, assorted fish, and three of the most spoiled guinea pigs in captivity.

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Kalumuck says that she took one more thing from Epel's lab: a membership in the ASCB. The farther afield she goes as a translator of scientific research, the more she feels the need to belong to a scientific research society like ASCB. She is doubly pleased to see the Society putting new energy into K-12 science education. Kalumuck is part of that new energy, having joined the ASCB Education Committee and taken a seat on the editorial board of the ASCB's education journal, *CBE—Life Sciences Education*.

It's all part of a trend, according to Epel, who called to talk about Kalumuck during a meeting break at the Marine Biological Laboratory in Woods Hole, MA. "I'm at the sea urchin meeting. This evening for the first time, they're having a session on science education and how to use sea urchin materials in the classroom." ■

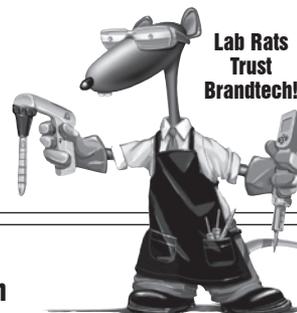
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