

Mentors lead students bitten by science bug

By Joanna Frazier
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Most students who have the science bug dutifully make pretend volcanoes in high school chemistry classes while they daydream about finding a cure for cancer.

But after school and on weekends, dozens of science-curious Inland area students turn to the real thing.

They drop the plastic beakers for nuclear magnetic-resonance machines and other whirlwinds of science offered through mentorship programs at the University of California, Riverside, and Loma Linda University Medical Center. Some professors at Riverside and La Sierra University in Riverside individually take in students who knock on their doors with an idea and some enthusiasm.

Many graduates of the programs and professors' labs hit the Ivy League, several steps ahead of their counterparts who skipped college-level research. While in high school, some compete in the national Westinghouse Science Talent Search, a distinction that has been likened to a junior version of the Nobel Prize.

Kushal Bhakta, a 1992 North High School graduate and Westinghouse semifinalist, went through UCR's College of Natural and Agricultural Sciences mentorship program between the 11th and 12th grades.

The program annually pairs up to 10 Riverside County and San Bernardino County juniors and seniors with professors. Students work on a project for one or two years and receive \$600 to use as they please.

After studying the biodegradation rates of household items with a UCR professor, Bhakta, 22, was accepted into Johns Hopkins University in Baltimore. He graduated in three years and is now in his second year of medical school at Baylor College of Medicine in Houston.

Bhakta said doing original research in high school helped lay the groundwork for later success.

"It's really the first experience to design your own project," Bhakta said. "In high school, it was almost like a cookbook sort of thing. You get directions and you know what you're supposed to end up with."

It is difficult to measure whether the ranks of high school students working in university labs are swelling or shrinking. No comprehensive listing of programs exists, said Judd Freeman, a program director for the National Science Foundation.

Until last year, the Arlington, Va., foundation had been spending about \$5 million annually on similar projects nationwide to place 3,400 to 9,200 seventh- through 12th-graders on university campuses.

But because funding for such programs faded, the federal agency has developed a new plan where a smaller number of students and their teachers will spend time together in college labs. Those programs will begin this summer and be funded for up to three years, Freeman said.

The truly driven students don't wait for a program to come along like they wait for bacterial cultures to grow in a warm room.

They do what Corona High School senior Ann Kromsky did as a 10th-grader: They read technical journals and interview professors to determine who they want to work with.

Kromsky, who emigrated from the former Soviet Union to the United States with her family four years ago, hand-picked UCR psychology professor Curt Burgess to help nurture her idea about how children acquire languages.

"It can be intimidating," said Ann, who speaks English, Russian and a little French. "But it shouldn't scare people. You should know that those people behind those tables and labs are really down to earth. If you have good ideas, they will help you."

It sounds simple, coming from a 17-year-old who earns straight A's and has been accepted on full scholarship to New York University. She is one of about 40 finalists in this year's Westinghouse competition.

But not all scientists seek the smartest students for their programs.

James B. Slater, director of radiopharmaceutical laboratories at Loma Linda University and coordinator of the institution's eight-week course for high school students, breaks it down like this: Creativity reigns over sky-high grade-point averages.

The Loma Linda program started informally in 1989 and became more solid in 1992. Students participate from Redlands, Loma Linda, San Bernardino, Riverside and, just this year, Colton. About 90 students meet on Sundays for one-hour lectures and tours of the high-tech facility.

"To me, the biggest thing is imagination," Slater said. "This teaches them that when the results don't come out the way they want, they need to go back and look at it and determine what went wrong and

why. You have to have perseverance. If it doesn't work out the first time, you go back and pound it out again until it works."

Students who show interest in a project they begin with Slater may stay on through the summer and longer on a space-available basis, he said.

Stella Lii, a 1996 Riverside North High School graduate, was so intrigued by Slater's cancer research that she stayed on. Now a sophomore studying biomedical sciences at UCR, Lii said she was inspired when she saw that she could publish papers in professional journals as a teenager.

"We got to see the non-glamorous side of science," Lii said. "If your experiment works, you get it published. Or maybe you have to repeat the research and try to do it over."

She said the lecture-tour setup of the Loma Linda program helped her make more realistic choices about a career in medicine.

"When you're growing up, you think, 'Oh, I want to be a doctor.' But you don't really know what it takes," Lii said.

She said she learned about magnetic-resonance imaging scanners that use magnets to create 3-D pictures of internal organs. She used computerized axial tomographic scanners, which are X-ray machines that show a cross-sectional view of a patient's body.

For some students, their first fascination with science comes on field trips.

Some educators, like Corona High School biology teacher Lisa Parr, take students who have the spark of an interest on excursions to the California Museum of Science and Industry in Los Angeles.

The museum runs a junior science and humanities symposium every year for Southern California high school students. Students in the program work with scientists on research projects and display their work.

Corona High sophomore Jackie Zorio said she was spurred on to pursue science after a museum visit where she saw other students' displays.

With Parr's help, Zorio sought out La Sierra biology professor Jim Wilson. Zorio is Wilson's second Corona High School protegee. He had worked with Zojella Flores, who spent several years researching the shape of brain tumor cells while in high school. Flores now attends the Massachusetts Institute of Technology.

Zorio is studying why some cancer cells grow faster than others. She wants to help come up with medicine that can be adjusted to zap the slower cells that keep growing in a body, as well as the speedier ones.

"It opens my eyes and makes me more analytical," said Zorio, who wants to be a lawyer. "I wasn't really good at science at first but I try to be the best at everything. Mostly the stuff that I'm not good at, I really strive for that."

Redlands East Valley High School chemistry teacher Ray Cruickshank said any work that students do outside the classroom is a plus.

"They get to interact with the business

world, the real world," Cruickshank said. "It makes them a little more aware of how what they're doing in high school applies to life."

Corona High's Ann Kromsky said she pushes herself to succeed in science. Ann, who wants to go to medical school and study neural science, said more students should take advantage of professors and programs that can offer them high-tech hands-on experience.

"I think it's mostly what I think is fun for me," Ann said. "If I can do something and find fun in that, that's good. I get to meet people and I apply for different scholarships and I get to go places. I get to meet Nobel laureates."