

JUNE 01, 2006

From the Reservation to the Research Lab

Cinnamon Spear may be the first teenager from an Indian reservation in Montana who ever tried to sneak into a summer science program at a university.

She first applied to the Montana Apprenticeship Program (MAP) after her freshman year in high school, even though the Montana State University program, supported by an HHMI undergraduate science education grant, accepted only rising juniors and seniors. "I figured the worst that could happen was that they'd say no," she recalls.

"I knew how to purify proteins, and I was only 15."

— Cinnamon Spear

But they said yes. Spear was the first freshman accepted in the history of the program, and her grounding in research that summer enabled her to return for two more summers of research and to co-author a paper recently published in the journal *Microbial Ecology*.

MAP focuses on Native American students—Spear is Northern Cheyenne—and recruits students primarily from Montana's reservations. Three students participated when the program began in 1980, but by 2005, with support from an HHMI grant, there were 21 enrolled. A new HHMI grant will enable MAP and Montana State University's other summer research programs to reach even more students, including those at tribal colleges, encouraging them to pursue bachelor's degrees and graduate studies.

Program participants spend six weeks on the Montana State campus in Bozeman taking classes and participating in research. They also go on field trips, receive pre-college counseling, and learn about financial aid and study skills. MAP students receive an hourly wage for the research they do. "On the reservation there are not many jobs, so I don't know what I would have done otherwise," Spear said.

Spear has loved science as long as she can remember, but her high school's offerings were limited. "By the end of my junior year, I'd already taken all the science classes, so I took an introduction to organic biochemistry course at

the local tribal college," she says. "That was great."

Spear spent her first year in MAP in a chemistry lab. "I learned how to purify proteins, and it's really cool now to think of it," she said. "I knew how to purify proteins, and I was only 15!"

During her second MAP summer, Spear helped develop a novel method for analyzing the microbial diversity in environmental samples, including surface water and soils, research that resulted in her April 2006 paper in *Microbial Ecology*.

"The people were so awesome," she said. "I had a great time working with them and a lot of fun doing the actual work."

Mark Burr, a research scientist at Montana State's Center for Biofilm Engineering and Spear's mentor for the microbial ecology work, admits that he was initially hesitant about having a high school student in the lab. "I was a bit nervous at first, but she quickly showed us she had a strong work ethic," he said. "She learned more quickly than some undergraduates or graduate students. I wouldn't hesitate to mentor another high school student like Cinnamon."

Much more than research took place in the lab where Spear worked that summer. "We've established a really strong friendship and bond with her," Burr said. "It's like we've adopted her, and she's adopted us. She knows she always has a place here."

In 2005, after she graduated from high school, Spear returned to the Center for Biofilm Engineering to help to build a fluorescent protein library. But this summer, having finished her freshman year at Dartmouth College—a university with a long tradition of nurturing Native American students—she's heading "home" to the Center for Biofilm Engineering at Montana State for another round of research.

"I definitely think the MAP program can make a difference in Native American kids' lives," Burr said. "Cinnamon might have succeeded even without the program, but for other students it could be critical."