Biologist Wins Fulbright Grant for Research in Argentina

From Salta to Patagonia, Robert Espinoza Will Study Lizards' Survival Tactics in Frigid Climates

When he was a small boy, Robert Espinoza's family believed his precocious fascination with creatures that slither would lead to something some day.

The family was right. It has led the associate biology professor to Argentina many times during the past 13 years, and will again in July when, as a Fulbright scholar, he will embark with his own young family on a yearlong adventure in Salta, a province known for the natural beauty of its stark, windswept grassland and the majestic Andes range.

For Espinoza, the lizards of northwestern Argentina—in the genera *Liolaemus* and *Phymaturus*—are the region's main attraction. His Fulbright grant, awarded in January through the prestigious organization's Joint Lecturing and Research Program, will help him pursue the answer to a tantalizing scientific question: How do lizards cope with freezing temperatures?

"We're trying to understand if they use different strategies in the far north, where they live within the limits of the tropics at fairly low latitudes, versus the south in Patagonia at higher latitudes," said Espinoza. "In

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Photo by Ian Choo

Biologist Robert Espinoza, in his lab with one of the scaly creatures whose behaviors have fascinated him since childhood, has won a Fulbright grant to study lizards in Argentina.

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the northern provinces, some of these lizards occur at very high elevations, close to 5,000 meters, or 16,400 feet."

At those elevations, the hardy little northern ectotherms brave freezing temperatures on almost a daily basis, regardless of the season. Argentina's southern regions, on the other hand, are roughly equivalent to the more moderate elevations and weather of New York City. "There you've got a long, deep winter—with freezing temperatures stretched over six months or longer—and a relatively short summer during which it's fairly warm but quite windy, which can be cool for a small lizard," he said.

Espinoza will try to determine if lizards that are closely related but that inhabit different regions use the same survival strategies. Do they employ freeze avoidance, going deep underground to escape the cold? Or supercooling, producing a kind of sugary antifreeze that bathes their tissues, allowing their body temperatures to drop a few degrees below the freezing point?

Or do they use freeze tolerance, actually freezing solid and coming back to life? A botanist colleague of Espinoza's, working at an elevation of about 4,800 meters, once witnessed that strategy in operation.

"A big, fast storm swept through his field site," Espinoza said, "chilling the air so quickly that the lizards froze on the ground surface; they didn't have time to go into their retreats."

The botanist picked up a couple of rock hard corpses, brought them back to camp and placed them in a bucket overnight. Next morning when the sun hit the bucket, out popped two live, frisky lizards. "So we know at least some of them use freeze tolerance," said Espinoza.

What he learns about his cold-blooded subjects will turn up in scientific articles Espinoza will publish when he returns to CSUN in July 2008. His Fulbright grant will cover three months of his working sojourn; his CSUN sabbatical will take him through the rest of the year. While in Argentina, he will work closely with principal colleague Fernando Lobo, professor of comparative anatomy at the *Universidad Nacional de Salta,* where the two will co-teach graduate courses or a herpetology class as part of the Fulbright program.

"His expertise is in comparative anatomy and morphology and mine is in physiology and ecology, so they complement each other well," said Espinoza. Together with biology professor Félix Cruz of the *Universidad Nacional del Comahue,* the two will do field research in Salta's Puna, a high-elevation, flat, open grassland dominated by a golden brown bunch grass called *festuca,* grazing cattle, goats, sheep and llamas. They also will work in the northwestern province of Catamarca and in Río Negro to the south, in the region known as Patagonia.

Espinoza's wife, biologist Cindy Hitchcock, their infant daughter and three-year-old son will arrive in the 800,000-resident colonial city of Salta with little more than their clothing and a few toys for the children.

"We'll have to start from scratch," said the scientist, who did just that as a child, building his collection of lizards, snakes, rats, frogs and mice until their cages lined his room.

He cannot recall a time when he was not fascinated with lizards. "I think it was just sort of a genetic mutation," he said. "Before I could even walk, my family would spot me parting the grass, looking for bugs. As soon as I discovered frogs, lizards and snakes, I begged my parents to take me anywhere, anytime, to go collect them."

Espinoza's mother and sister tolerated escaped critters underfoot and mice and rats in the freezer. "They knew something was going to come of it," he recalled. "They said, 'Well, it keeps him out of trouble, what the heck.'" Their tolerance began to pay off early, when Espinoza's expertise in breeding lizards and snakes funded his undergraduate education at San Diego State, which led to a doctorate from the University of Nevada, Reno, and to his quest in Argentina. ■