

'Spectacular-looking' endangered frog species discovered in Ecuador's cloud forests

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A new species of frog, the Ecuadorian rainfrog, has been discovered in Ecuador's cloud forests. Credit: Juan M. Guayasamin/Universidad San Francisco de Quito

It's not every day someone gets to say, "I've discovered a new species."

It's a claim that Colorado State University biologist Chris Funk can happily make. Funk and his collaborators, who've spent years exploring the tropical climes of South America to study the region's dizzying biodiversity, have documented a new species of rainfrog they've named the Ecuadorian rainfrog (*Pristimantis ecuadorensis*). The name, the researchers write, honors the "overwhelming beauty, and cultural and biological diversity," of the Republic of Ecuador, where the [frog](#) makes its home. The work is described in the journal *PLOS ONE*, publishing online March 22.

The discovery sprouted from a field campaign, headed by paper lead author Juan M. Guayasamin, a professor at Universidad San Francisco de Quito (USFQ), that was primarily intended to study a similar, threatened frog called the ornate rainfrog (*Pristimantis ornatissimus*).

"[Guayasamin], other Ecuadorian and U.S. collaborators, and I were characterizing the genetic differences among populations of the ornate rainfrog, which was thought to be a single species of frog until we uncovered one population that was strikingly different from all others and turned out to be a [distinct species](#)," said Funk, director of the Global Biodiversity Center in the School of Global Environmental Sustainability (SoGES) and an associate professor in the Department of Biology. The new species is considered "endangered" based on International Union for Conservation of Nature guidelines, primarily due to its extremely small range, rarity, and habitat loss from agriculture and logging.

Funk and Guayasamin have been collaborators and friends for 20 years. In 2009, they discovered a species of frog in the eastern Andean slopes of Ecuador that they named *Pristimantis bicantus*, and they are currently involved, with other colleagues, in large-scale projects comparing temperate and tropical diversity patterns.

The tropics are known to contain many more distinct species per unit

area than temperate zones like the U.S. and Canada, which together have about 110 described [frog species](#). Ecuador, about the size of Colorado, has 570 described frog species, and counting.



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For their study, the researchers performed genetic sampling of frogs from sites crisscrossing the western slopes of the Ecuadorian Andes. The country boasts a Pacific coastline, the Amazon basin in the east, and the Andes mountains in its middle. DNA sequencing allowed the scientists to uncover the new frog species, which hails from the Las Pampas

region, located in the Andes. In Ecuador, wildlife species tend to have extremely small ranges, the researchers say, due in part to the diversity of habitats and climates across the impressive altitudinal gradient formed by the Andes.

"We know that there's lots of undescribed biodiversity in Ecuador, so you could think this discovery is not a big deal," said Guayasamin, who has had a hand in identifying several frog species. "But this species, first of all, is spectacular-looking; secondly, it's restricted to a single site which once again emphasizes range-restricted, highly threatened biodiversity in the tropics. And lastly, its name—the Ecuadorean rain frog—will hopefully draw local and international attention to the endangered species and ecosystems of Ecuador."

A variety of processes can lead to speciation—the breaking off of new species from one lineage. One traditional theory is that a population experiences a geographic split, such as a river or a mountain range, which limits gene flow, and allows species to evolve new traits over millions of years, like size, shape and mating calls.

If the old species and the [new species](#) become different enough over time, they can become reproductively isolated, or unable to produce viable offspring. Reproductive isolation is one of the traditionally accepted taxonomic distinctions between species, Funk said. But the Ecuadorian rainfrog appears to have become a distinct species in the absence of geographic barriers, possibly due to environmental differences between low-elevation habitats, where the ornate rainfrog is found, and high-elevation habitats, where the new frog is found.

Funk is a conservation geneticist who studies evolutionary processes using new advances in genomics to inform conservation strategies. And doing research in the tropics is like "being a kid in a candy store," he said. "There is so much diversity in the region—it's the reason we get

into the field. We want to make sure this diversity persists into the future. This is what gets us up in the morning, and gets us excited about what we do."

The Global Biodiversity Center in SoGES acts as a central node connecting biodiversity researchers from many colleges and departments across CSU. It also connects CSU biodiversity researchers to international conservation organizations so that CSU's expertise in biodiversity can be harnessed to improve conservation policy. The center's website includes a map that illustrates many CSU researchers doing such work, all over the world.

"There are CSU researchers doing biodiversity research across the globe, discovering species, and doing research to conserve [species](#)," Funk said. The collaboration between CSU and Universidad San Francisco de Quito is one such example. "Our work is based on mutual interests, which include research, faculty and student exchange, and long-term studies aimed to describe and protect tropical [biodiversity](#)," Guayasamin said.

Provided by Colorado State University

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