Narrator
Hi, my name is Sergio Salgado and I'm part of a team called OpenSciEd that provides freely available, high quality science instructional materials. We recently spoke with two paleontologists from the United States and Peru who discovered a fossil of a giant penguin in Peru. We wanted to better understand the impact of their research and findings.

Señor Altamirano
The site where Pedro was found is called the Yumaque Peninsula, which is in the Paracas National Reserve at the southern coast of Peru. It's around four hours south of Lima. It's a completely arid region; it's a whole desert. The only source of life, or discernible life, is actually in the sea. Much of the rest is a complete desert.

Narrator
That was Ali Altamirano, a researcher at the Natural History Museum in Lima, Peru, in the department of Vertebrate Paleontology. In 2006, as an intern, he found the remains of a fossilized penguin that came to be known as Pedro. He worked with his mentor and leader of the lab, Dr. Rodolfo Salas, on the excavation of Pedro. We asked him to describe their initial excitement of the discovery.

Señor Altamirano
And it was amazing because it was very well preserved. We start excavating, and when it came out, it was the set of scales of this fossilized penguin foot. At that moment we were yelling out of our own amazement that we have discovered these fossilized penguin remains. We took this very small sample, just to make sure that anybody believed us that the discovery was as amazing as we thought it was. And we urgently contact Dr. Clarke so we can do more research in the same area.
Narrator
Mr. Altamirano and Dr. Salas are part of an international, collaborative research group that worked on excavating and researching fossils like Pedro. Research on Pedro was led by Dr. Julia Clarke.

Dr. Clarke
When Ali and Rodolfo contacted me, I was in the US, and they sent me an email, and I believe it was pictures of the scales. And I got super-duper excited because we have no fossil penguins with any kind of soft tissue remains that had been previously known. That was just exciting, even if there were just scales, but somehow having seen other fossils from around the world that preserved some soft tissue, like scales, they often also preserve others that are related in terms of their chemistry and being skin structures. So I was like, I bet there are feathers in that fossil. So we got to work.

Narrator
And she was right. They did find intact feathers on Pedro. Dr. Julia Clarke is a professor of paleontology at the University of Texas at Austin, and she is an expert on birds. She tells us more about the excavation of Pedro.

Dr. Clarke
First, this fossil would need to be excavated, and then it would need to be moved to Lima, and then it would need to be soaked to remove the salt from the specimen before we could even start looking at the structures that Ali had glimpsed in the field—the scales. And I could be there to look and check, the way I had been familiar with from looking at other fossils with feathers from around the world.

Narrator
Dr. Clarke saw similarities to living penguins early on, so we asked her and Mr. Altamirano to tell us more about how they knew that Pedro was a penguin.

Dr. Clarke
We had a wing of feathering—all of the organization of the feathers of the wing that were these identical popsicle stick-shaped feathers that made up this wing.

And then we also had these body feathers that showed this flattening and this color gradient from white to dark near the tips that was identical to what we see in living penguins. I was in the lab and starting to find the first evidence of fossil feathers in the wing area.
What you see is these really flat, flat bones, the hand, the tip of the wing bones, and the proximal arm bone, called the humerus, is really stout.

And in these giant penguins, like Pedro, these are essentially nearly solid bones, and what that density of the bone is related to is resisting buoyancy. We see these nearly solid bones in parts of animals that are deep divers.

**Señor Altamirano**
These bones were actually very peculiar, because they were very stout. He was really built, he was amazingly heavy. It’s like seeing the modern penguin toe bones, only ten times size. And it was amazing because there is nothing, in my mind, that can match such size.

**Dr. Clarke**
Pedro is, you know, a giant penguin. So it’s, it’s somewhere in the five-foot range. The foot was almost the size of a human hand.

**Narrator**
Though Pedro shares a lot of similarities with living penguins, there are some distinct differences.

**Dr. Clarke**
What Pedro had was a long and pointed beak, very different from living penguins today, which in general the beak is just about the same length or a little longer than the back of the skull.

**Narrator**
These fascinating findings helped us understand what Pedro was like, but we wanted to know more about the region and time period Pedro would have lived in.

**Dr. Clarke**
The ecosystem around this time period, about 36 million years ago, you have these enormous whales, very different looking from living whales today, with teeth. And then you have these long body shapes and sharks, that Ali’s an expert in, that range from tiny to giant. And you have an archipelago, maybe some small islands, maybe less-abrupt cliffs along this coastline.

And we’re able to date fossil remains like Pedro by looking, not just at what we know about the distribution and ages of animals from the site where Pedro was found itself, but we can also, in this case, we dated an ash layer that’s just above the rocks that contain Pedro. In this case, we got an age of around 36 million years.
**Señor Altamirano**

Well, it’s amazing that this very strange-looking penguin, huge in size, have thrived in this arid coast, which, even now, the modern Humboldt penguin is still alive.

Penguins have thrived for millions of years, in the entire Peruvian coast, and it has tell us, in some way, that this long-lived bird has been here for way longer than us, the humans.

**Narrator**

As penguins still live in the area where Pedro was found, it got us wondering how those alive today might be connected to the penguins that lived long ago, like Pedro.

Finding a fossil specimen as intact as Pedro is rare. Dr. Clarke, Mr. Altamirano, and the rest of their team have been able to examine and contribute meaningful data on this question thanks to their work on Pedro.

We wanted to close by asking them about their approach to and motivations in paleontology.

**Dr. Clarke**

When I was a kid, I loved art. I loved building things and making things. And what I truly believe is that creativity and the sense of optimism are embedded at the center of doing science. And the creativity can be in where you look, where you choose to go, but also, more so, how you bring what we know of living animals together with data from fossils in new ways.

And so there’s always new things to discover because each one of us is going to approach that question or any questions like that in different ways.

To be a paleontologist, you have to be incredibly optimistic. You have to believe that the next time that you’re walking in the desert, be it in Peru or, or Mongolia or Antarctica, you have to believe that you’re going to potentially find something new to science. But, we don’t always realize it in that moment.

**Señor Altamirano**

When I was walking in this desert area at the Paracas Reserve, I was around 12, 13, I came out some pointing reddish thing. And I look into it, it look exactly like a shark tooth. And I was jumping out of happiness because I never found myself one shark tooth all by myself. And I went back to my teacher and said, “Well, look, I just found these shark teeth. It means that there may be more shark teeth and maybe some other more things.” And that was the first time that I ever get to find one of these amazing fossils.

After the years have passed, my interest in animals, in biodiversity in the area, has never stopped.

And one day, I actually found these fossils at the Yumaque area, where one of them turned out to be Pedro, the giant penguin.