



Guillermo Rougier was part of a team that unearthed *Cronopio dentiacutus*, an early mammal whose discovery is shedding new light on what life was like during the time of dinosaurs.

PREHISTORIC PASSION



Guillermo Rougier turned a fascination with early life on Earth into a robust career that's bringing new perspectives to budding physicians.

MEDICAL SCHOOL PROFESSOR BRINGS WORLD-CLASS RESEARCH TO THE CLASSROOM

The ancient creatures that made up our world eons ago still hold our fascination today. We marvel at their reconstructed fossils in museums, take in movies like “Ice Age” and “The Land Before Time,” and decorate our children’s rooms with wallpaper and bedding featuring the well-known *Stegosaurus* and *Tyrannosaurus*. The appeal for many of us is cursory or fleeting, but for Guillermo Rougier it’s a passion that has encompassed his life and career.

Rougier is a professor in the Department of Anatomical Sciences and Neurobiology at the School of Medicine. In the classroom, he teaches gross anatomy, a first-year course that correlates the human body’s structure to its functions. But for nearly five months each year, he traverses the planet from Mongolia to Patagonia, uncovering the fossilized remains of creatures that roamed the planet 65 million years ago or more.

Rougier’s thirst to learn about Earth’s early history began when he was a boy in Argentina.

“When I was five or six years old, I really wanted to be a paleontologist. Back then fossils were basically unknown. There were no books about dinosaurs. There were no books about woolly mammoths. “Jurassic Park” was still many years in the future,” he said.

While the desire stayed with Rougier through his childhood, it wasn’t until he was 12 years old that he received his first serious book on fossils as a gift from an uncle who worked at a local university. From that point on, Rougier absorbed everything he could learn about paleontology.

“I remember going to the library and looking at encyclopedias and finding a name of a dinosaur, like *Tyrannosaurus*. I always felt a sense of wonder with regard to a past for which we had very little knowledge. Like any kid, it was an issue related to my imagination.”

At 16, Rougier volunteered at the Department of Paleontology at the Museo Histórico Nacional in Buenos Aires, where he was given the opportunity to go into the field for the first time. It was here that his imagination came alive, helping scientists and researchers dig in the field to search for dinosaur fossils. Rougier’s education took him to Universidad de Buenos Aires, where he studied biology with a specialization in paleontology. After earning his PhD



Rougier, pictured above, in the early years of his field research. Rougier's digs have taken him from Mongolia to Patagonia, where his current efforts are helping unlock evolutionary mysteries about some of the earliest ancestors of humans.

in 1993, Rougier accepted a post-doctoral position in Germany to broaden his knowledge of the subject.

"A lot of the features that are present in animals are not preserved as fossils — soft tissues, genetic information, hair, muscles, nerves, veins, arteries and so on. Working with fossils, you only get a very reduced picture of what an animal was in the past. And I wanted to really integrate the biology of the living forms into the fossils. These fossils were alive at one point," he explained.

Being able to integrate the existing anatomical science with fossils to gain a better understanding of how these creatures lived is what differentiated

Rougier from his colleagues early on in his career.

Rougier spent a few years at the American Museum of Natural History in New York before accepting his position at UofL.

So what's a paleontologist doing at a medical school? According to Rougier, anatomy instruction is a highly traveled route for paleontologists.

"Paleontology is ultimately the study of the anatomy of animals. And that's very similar to what we do in medical school. We study the anatomy of a particular mammal — humans — and I'm able to integrate osteology, which I know from my paleontological background, and the soft-tissue background, which I know from my post-doctoral experience."

Rougier approaches his instruction of anatomy with the same passion he has for his first love of paleontology. As a gross anatomy instructor, he makes his classes as engaging and informative as possible.

First-year School of Medicine student Sarah Couch, 11GA, values the insights and views Rougier brings to his class instruction.

"He is full of knowledge and willing to help with students who have questions. Gross anatomy has a habit of always just relating to humans, but his research relates a lot to what has come before us. He would always throw in some anecdotes from

his experience and research. It was always appreciated to have another perspective in the lab," she said.

When he's not busy teaching future physicians, Rougier is in the field, working to gain a better understanding of early mammalian life, particularly in South America, where his specific subject of research is in its infancy.

Recent discoveries have advanced the paleontological discussion of early mammalian life. In 2011, Rougier and his team discovered *Cronopio denticacutus* in a remote region of Patagonia in Argentina. *Cronopio* was a small mammal that lived alongside dinosaurs more than 100 million years ago and looked basically like a saber-toothed squirrel. The discovery is significant because it is rare to find fossils of mammals that lived during this period.

"We knew it was important, based on the age of the rocks and because we found skulls," Rougier said. "Usually we find teeth or bone fragments of this age. Most of what we know of early mammals has been determined through teeth because enamel is the hardest substance in our bodies and survives well the passage of time; it is usually what we have left to study.

"The skull, however, provides us with features of the biology of the animal, making it possible for us to determine this is the first of its kind dating to the early Late Cretaceous period in South America," he said. "This time period in South America was somewhat of a blank slate to us. Now we have a mammal as a starting point for further study of the lineage of all mammals, humans included."

More recently, Rougier's 2012 analysis of a species first identified in 1891 sent shock waves through the paleontology community. *Necrolestes patagonensis*, which translates into "grave robber" because of the creature's tendency for living underground, was classified as a marsupial. Rougier challenged this

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notion, gathering evidence to support the reclassification of the species to another branch of the evolutionary tree that was thought to have died out 45 million years earlier. The new classification holds major significance because it sheds light on the cataclysmic event that wiped out the dinosaurs but allowed some other species, including our earliest ancestors, not only to survive, but also to thrive.

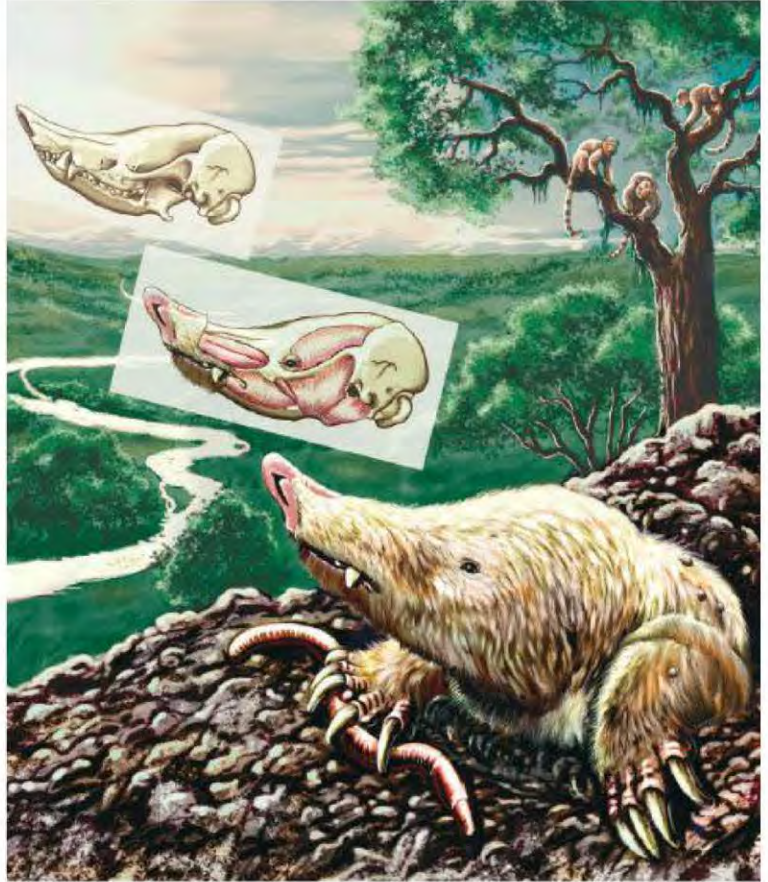
These discoveries, added to Rougier's entire body of work, have led to his ascension as one of the world's foremost experts in prehistoric mammalian life.

John Wible, curator of mammals at the Carnegie Museum of Natural History in Pittsburgh, is familiar with Rougier's work. "He is without a doubt the leading expert on early mammals from Gondwana, the supercontinent made up of the southern continents. Prior to his discoveries, almost all that was known of early mammal history came from the northern continents. It is now evident the evolution of mammals in Gondwana took a very different path,

with some unique animals, like *Cronopio*. There is nothing like that known from the north."

Rougier is a shining example of how following passion can translate into success both personally and professionally. "You have to work on what you want to work on, but at the same time, you have to contribute in a meaningful way," he said.

That's exactly what Rougier is doing.



Rougier's discoveries may involve small fragments, but they often result in big revelations. His unique dual experiences as a field paleontologist and anatomy expert make him a vital contributor to current conversations about some of the earliest mammals on the planet — especially in under-researched areas, like current-day South America. With these discoveries and assessments comes a wealth of knowledge (and often more questions) that affect the way we think of human physiology today.

