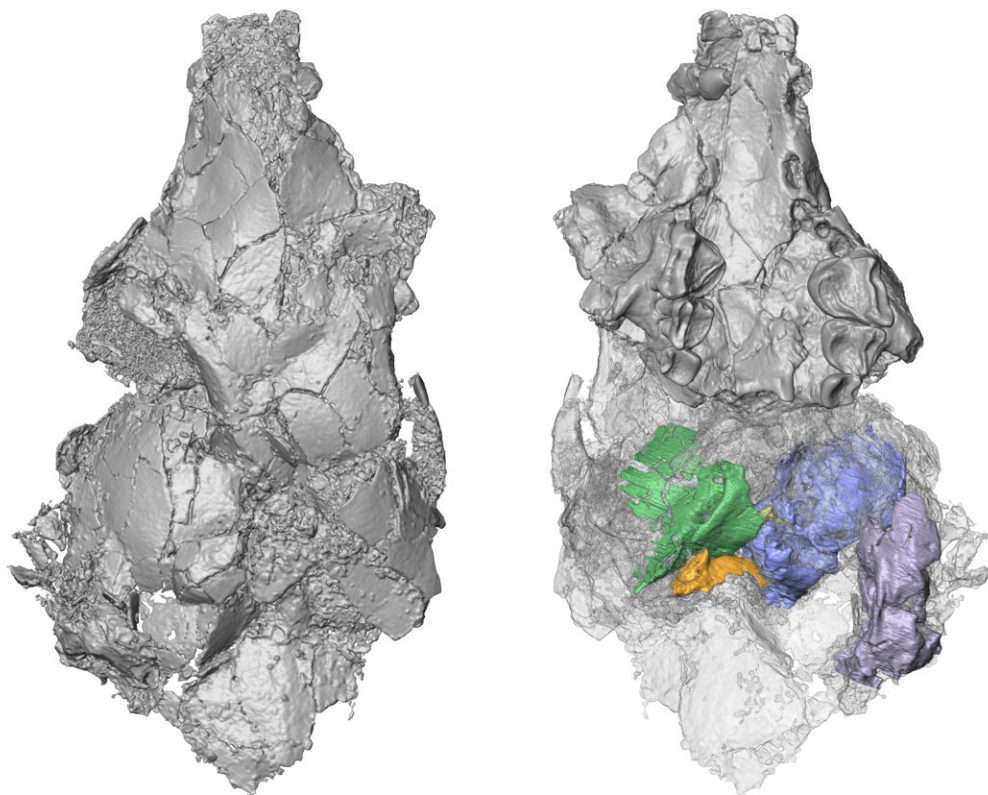# New research sheds light on an old fossil, solving an evolutionary mystery

January 9 2024

Three-dimensional model of the only known picrodontid skull in top (left) and bottom (right) views. CT scan technology revealed previously unknown bones of the skull (colored on the right) that helped demonstrate that picrodontids are not primates as previously believed. Credit: Jordan Crowell

A new research paper published in *Biology Letters* has revealed that picrodontids—an extinct family of placental mammals that lived several million years after the extinction of the dinosaurs—are not primates as previously believed.

The paper—co-authored by Jordan Crowell, an Anthropology Ph.D. candidate at the CUNY Graduate Center; Stephen Chester, an Associate Professor of Anthropology at Brooklyn College and the Graduate Center; and John Wible, Curator of Mammals at the Carnegie Museum of Natural History—is significant in that it settled a paleontological debate that has been brewing for over 100 years while helping to paint a more clear picture of primate evolution.

For the last 50 years, paleontologists have believed picrodontids, which were no larger than a mouse and likely ate foods such as fruit, nectar, and pollen, were primates, based on features of their teeth that they share with living primates. But by using modern CT scan technology to analyze the only known preserved picrodontid skull in Brooklyn College's Mammalian Evolutionary Morphology Laboratory, Crowell, the lead author on the paper, worked with Chester, the paper's senior author, and Wible to determine they are not closely related to primates at all.
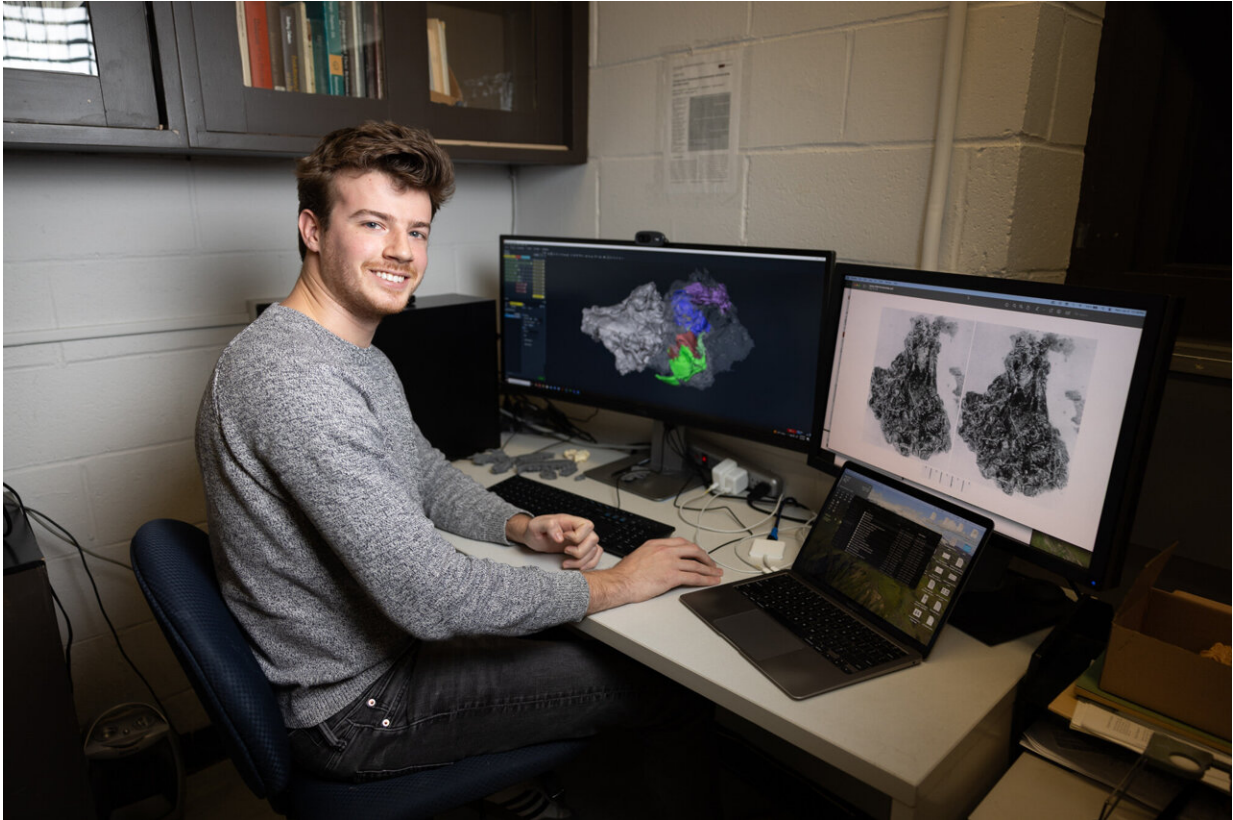
Jordan Crowell, an Anthropology Ph.D. candidate at the CUNY Graduate Center worked with modern CT scan technology to analyze the picrodontid skull in Brooklyn College's Mammalian Evolutionary Morphology Laboratory. Credit: Richard Petrias

"While picrodontids share features of their teeth with living primates, the bones of the skull, specifically the bone that surrounds the ear, are unlike that of any living primate or close fossil relatives of primates," Crowell said. "This suggests picrodontids and primates independently evolved similarities of their teeth likely for similar diets. This study also highlights the importance of revisiting old specimens with updated techniques to examine them."

Chester, who serves as Crowell's Ph.D. adviser, has both a professional

and personal interest in this research. It was Chester's renowned colleague and "academic grandfather," Professor Emeritus Frederick Szalay from CUNY's Hunter College and the Graduate Center, who in 1968 first convincingly classified picrodontids as [primates](#) based on evidence from fossilized teeth. Szalay studied the teeth of the only known picrodontid skull, Zanycteris paleocenus, for his research—the same [skull](#) this team examined with the new technology that led to their discovery.

"The Zanycteris cranium was prepared and partially submerged in plaster around 1917, so researchers studying this important specimen at the American Museum of Natural History were not aware of how much cranial anatomy was hidden over the last 100 years," Chester said. "Micro-CT scanning has revolutionized the field of paleontology and allows researchers to discover so much more about previously studied fossils housed in natural history museum collections."

More information: Basicranial evidence suggests picrodontid mammals are not stem primates, *Biology Letters* (2024). [DOI: 10.1098/rsbl.2023.0335](#). [royalsocietypublishing.org/doi … .1098/rsbl.2023.0335](#)

Provided by Graduate Center, CUNY