Scientists uncover new fossils—and a new species of ancient human ancestor

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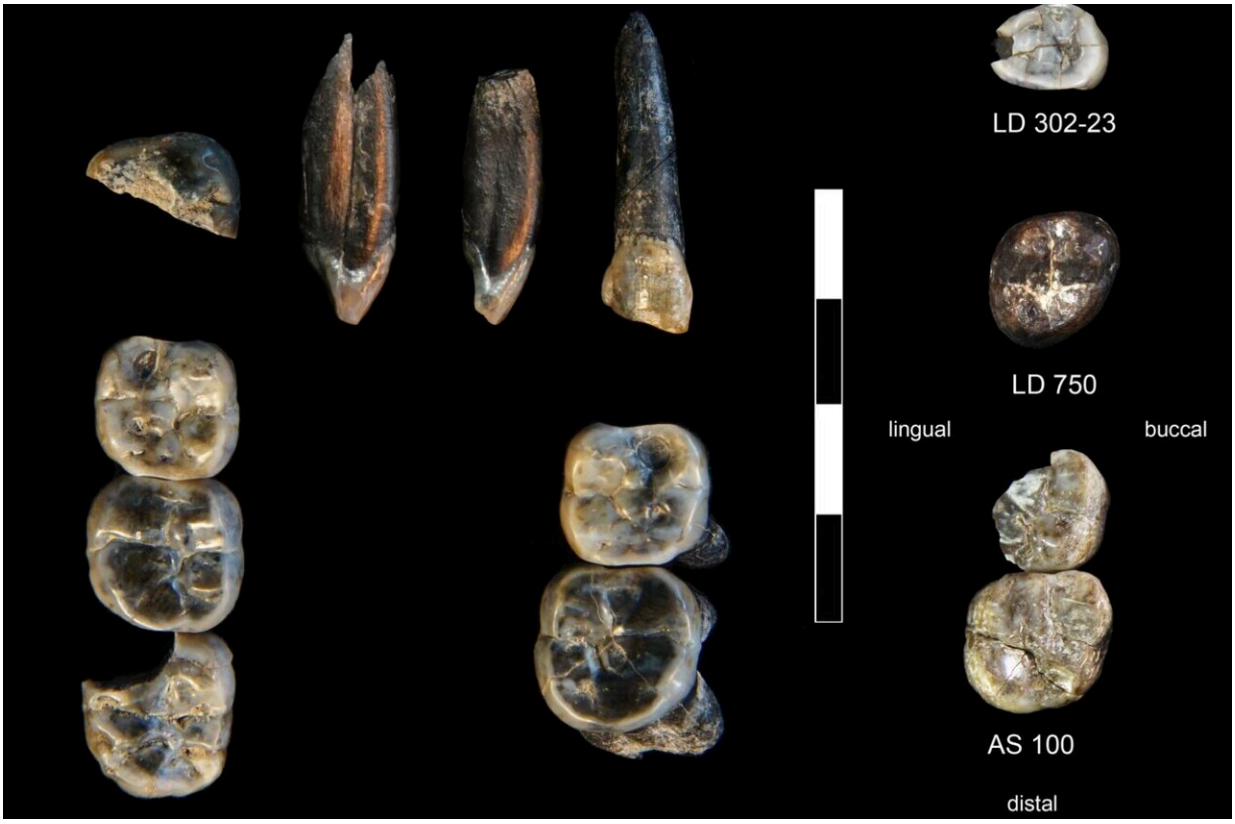

The 13 fossil teeth collected in the Ledi-Geraru Research Area from 2015–2018. The collections at LD 750 and LD 760 localities represent a newly-discovered species of Australopithecus. LD 302 and AS 100 represent early Homo already known from the LD 350 mandible discovered in 2013. Credit: Brian Villmoare: University of Nevada Las Vegas

A team of international scientists has discovered new fossils at a field site in Africa that indicate Australopithecus, and the oldest specimens of Homo, coexisted at the same place in Africa at the same time—between 2.6 and 2.8 million years ago. The paleoanthropologists discovered a new species of Australopithecus that has never been found anywhere.

The paper "New discoveries of Australopithecus and Homo from Ledi-Geraru, Ethiopia," is published in the journal *Nature*.

The Ledi-Geraru Research Project is led by scientists at Arizona State University and the site has revealed the oldest member of the genus Homo and the earliest Oldowan stone tools on the planet.

The research team concluded that the Ledi-Geraru Australopithecus teeth are a new species, rather than belonging to Australopithecus afarensis (the famous "Lucy"), confirming that there is still no evidence of Lucy's kind younger than 2.95 million years ago.

"This new research shows that the image many of us have in our minds of an ape to a Neanderthal to a modern human is not correct—evolution doesn't work like that," said ASU paleoecologist Kaye Reed. "Here we have two hominin species that are together. And human evolution is not linear, it's a bushy tree, there are lifeforms that go extinct."

Reed is a Research Scientist at the Institute of Human Origins and President's Professor Emerita at the School of Human Evolution and Social Change at ASU. She has been co-director of the Ledi-Geraru Research Project since 2002.

Ledi-Geraru

What fossils did they find to help them tell this story? Teeth, 13 of them to be exact.

This field site has been famous before. In 2013, a team led by Reed discovered the jaw of the earliest Homo specimen ever found at 2.8 million years old. This new paper details new teeth found at the site that belong to both the genus Homo and a new species of the genus Australopithecus.

Ledi-Geraru paleontological team searching for fossils in the Lee Adoyta Basin where the genera Homo and Australopithecus have been recovered. Credit: Kaye Reed, Arizona State University

"The new finds of Homo teeth from 2.6–2.8 million-year-old sediments—reported in this paper—confirms the antiquity of our lineage," said Brian Villmoare, lead author and ASU alumnus.

"We know what the teeth and mandible of the earliest Homo look like, but that's it. This emphasizes the critical importance of finding additional fossils to understand the differences between Australopithecus and Homo, and potentially how they were able to overlap in the fossil record at the same location."

The team cannot name the species yet based on the teeth alone; more fossils are needed before that can happen.

How old are the fossils? How do scientists know these fossil teeth are millions of years old?

Volcanoes.

The Afar region is still an active rifting environment. There were a lot of volcanoes and tectonic activity and when these volcanoes erupted ash, the ash contained crystals called feldspars that allow the scientists to date them, explained Christopher Campisano, a geologist at ASU.

"We can date the eruptions that were happening on the landscape when they're deposited," said Campisano, a Research Scientist at the Institute of Human Origins and Associate Professor at the School of Human Evolution and Social Change.

"And we know that these fossils are interbed between those eruptions, so we can date units above and below the fossils. We are dating the volcanic ash of the eruptions that were happening while they were on the landscape."

Finding fossils and dating the landscape not only helps scientists understand the species—it helps them recreate the environment millions of years ago. The modern faulted badlands of Ledi-Geraru, where the fossils were found, are a stark contrast to the landscape these hominins traversed 2.6–2.8 million years ago. Back then, rivers migrated across a vegetated landscape into shallow lakes that expanded and contracted over time.

"These are teeth from Turtle Flat as we were discovering them—you can see what the ground behind looked like, and how amazing it was that Omar Abdulla first saw them on the surface," said Amy Rector, Virginia Commonwealth University scientist. Credit: Amy Rector, Virginia Commonwealth University

Ramon Arrowsmith, a geologist at ASU, has been working with the Ledi-Geraru Research Project since 2002. He explained the area has an interpretable geologic record with good age control for the geologic time range of 2.3 to 2.95 million years ago.

"It is a critical time period for human evolution as this new paper shows," said Arrowsmith, professor at the School of Earth and Space Exploration. "The geology gives us the age and characteristics of the sedimentary deposits containing the fossils. It is essential for age control."

Reed said the team is examining tooth enamel now to find out what they can about what these species were eating. There are still remaining questions the team will continue to work on.

Were the early Homo and this unidentified species of Australopithecus eating the same things? Were they fighting for or sharing resources? Did they pass each other daily? Who were the ancestors of these species?

No one knows—yet.

"Whenever you have an exciting discovery, if you're a paleontologist, you always know that you need more information," said Reed. "You need more fossils. That's why it's an important field to train people in and for people to go out and find their own sites and find places that we haven't found fossils yet."

"More fossils will help us tell the story of what happened to our ancestors a long time ago—but because we're the survivors, we know that it happened to us."

The team of scientists and field team working on this project is widespread and many work at Arizona State University, or are alumni of ASU.

More information: New discoveries of Australopithecus and Homo from Ledi-Geraru, Ethiopia, *Nature* (2025). DOI: 10.1038/s41586-025-09390-4. www.nature.com/articles/s41586-025-09390-4

Reed and Campisano talk more about this project in an in-depth interview.

Provided by Arizona State University

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