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UCT researchers name 400 000-year-old fossilised termite nests after Little Karoo town

Dr Miengah Abrahams (right) with two UCT MSc students, Rabia Jacobs and Senate Marakabei, during fieldwork in the Little Karoo.

Photo: Robert Muir.

University of Cape Town (UCT) researchers recently named a series of approximately 400 000-year-old fossilised underground nests of an extinct termite species after Calitzdorp, the Little Karoo town near which they were found. In October 2026, the research team returned to the town to donate a poster documenting their discovery to the Calitzdorp Museum, helping to connect local communities with the region's remarkable fossil heritage.

The study, published in the *Journal of Quaternary Science*, was led by Dr Miengah Abrahams, a senior lecturer in UCT's Department of Geological Sciences. The research involved colleagues from UCT and other institutions in South Africa, Argentina and Australia.

Columnanidus calitzdorpensis is a new ichnogenus and ichnospecies of termite, identified through the unique cylindrical, meter-deep structures formed by burrows and chambers. Eight remarkably preserved examples of these structures have been found at a single site in Calitzdorp.

"Ichnology is a branch of palaeontology that studies trace fossils. These offer a unique window into past ecosystems, capturing the behaviours and interactions of ancient life as well as environmental conditions. The words 'ichnogenus' and 'ichnospecies' refer to the scientific name ichnologists give to the specific type of hardened trace fossil, evidence or remains preserved of a particular organism, such as its burrow, nest or footprint, rather than the body fossil of the organism itself," explained Dr Abrahams, co-convenor of the Ichnology Symposium at the ongoing 7th International Palaeontology Conference (IPC7), taking place at UCT from 30 November to 3 December 2026.

Dr Abrahams, who leads the Continental Trace Studies group (CONTRAST) at UCT, combines her expertise in geology and ichnology to describe the structure and shape of trace fossils, such as hardened burrows, nests and footprints, and to understand how these have been preserved over geological time.

She said it was an honour to present a poster about the discovery to the Calitzdorp Museum and its enthusiastic volunteers.

"Engaging with locals about the fossil heritage on their doorsteps is a rewarding aspect of science. We hope visitors to the museum, especially children, will gain a deeper appreciation for the natural world around them," she added.

Discovery
A local artist discovered the unusual pipe-like features in the early 2000s. At first, the structures were thought to be remnants of ovens used by early human inhabitants of the Little Karoo. One of the structures is housed at the Calitzdorp Museum.

Research began in 2021, following advice from Dr Abrahams's former PhD supervisor, Professor Emese Bordy, also of UCT's Department of Geological Sciences and co-convenor of the Ichnology Symposium at IPC7. Professor Bordy had first noticed the features in a palaeontological impact assessment conducted in the mid-2000s by palaeontology consultant Dr John Almond, who is now also a co-author of the *Journal of Quaternary Science* paper.

An extraordinary glimpse into the underground world of ancient termites
The remarkably preserved fossilised nests provide a rare glimpse into the underground world of an ancient termite species. Each nest is about one metre deep and 65 cm across. A central cavity is surrounded by a thick nest wall containing a network of galleries and chambers, revealing the complex construction abilities of the termites that built them.

Sections of the structures were CT-scanned, using an imaging technique similar to X-rays, allowing researchers to examine the distinct internal burrows and chambers in greater detail.

"We determined that these were a unique ichnogenus and ichnospecies, because of their distinct cylindric nature. The distinct zones in the shapes of the burrows and chambers within the nest wall have not been seen anywhere else before either," explained Abrahams.

According to uranium-series dating, the structures are between 323 000 and 401 000 years old, placing them in the Middle Pleistocene. The nests survived because termite activity encouraged minerals, including calcium carbonate, to accumulate in the sand used to construct them. This process, known as calcretisation, hardened and fossilised the sand, preserving the structures long after the soft-bodied insects and organic material had disappeared.

"We know from the example of modern-day termites how these insects modify the chemistry and hydraulic properties of the soil in which they live. In ancient times such activity would have also provided good conditions for carbonate minerals to build up in the nests and be preserved," said Dr Abrahams.

Beyond revealing how ancient termites constructed their nests, the fossils offer valuable evidence of past ecosystems, landscapes and animal behaviour.

"Trace fossils help us better understand evolutionary changes of ancient animals through time."

Researchers are planning further investigations into similar fossilised termite and ant nests in the Northern Cape and around Western Cape towns such as Ceres and Worcester.

UCT to host first International Palaeontology Conference in Africa

Dr Abrahams was accompanied to the Calitzdorp Museum by one of her UCT students, Chandré Janse van Rensburg. She will present some of her postgraduate research on the microcarbonate minerals that helped preserve the *Columnanidus calitzdorpensis* nests at IPC7.

Dr Abrahams and Professor Bordy are convening the Ichnology Symposium at IPC7, which UCT will host. The conference marks the first time this major international gathering of the palaeontology community, held every four years, will take place in Africa.

"Participants in the IPC7 Ichnology symposium will explore the role of ichnology in palaeoenvironmental reconstruction, from depositional contexts to ecological dynamics. We will be covering topics such as ichnotaxonomy, methods for trace analysis, and how to integrate modern analogs into paleaecological interpretations in continental and marine realms across geological time," concluded Abrahams.

ENDS

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