



HOMO NALEDI

*Changing the way we
view humanity*

The Cradle of Humankind World Heritage Site is well known for dramatic discoveries that have changed the way we view humanity and the history of human development. On the 10th of September 2015, Wits University announced the discovery of a new species of human relative, which they named Homo naledi (H. naledi).

The reveal had been highly anticipated ever since Professor Lee Berger (Research Professor in Human Evolution from the Evolutionary Studies Institute at the University of the Witwatersrand and a National Geographic Explorer-in-Residence) and a team of researchers, cavers and explorers announced back in November 2013 that they had discovered a significant fossil find in the Dinaledi Chamber of the Rising Star cave system, at the Cradle of Humankind. Cavers Rick Hunter and Steven Tucker had been probing a narrow fracture system to the back of the cave system when they found the entrance into the Dinaledi Chamber and discovered the fossils. They showed pictures of the fossils to Pedro Boshoff, another caver and geologist, who then alerted Professor Lee Berger to the find. Berger is best known for the discovery of Australopithecus sediba at the Malapa site in the COHWH — one of the most significant paleoanthropological discoveries in recent times. The fossils lay in a chamber some 90 meters from the cave entrance, and were only accessible through a very narrow chute that required a special team of very slender individuals to retrieve them. Since the launch of the resulting Rising Star Expedition, the chamber has revealed more than 1,550 numbered fossil elements — the single largest fossil hominin find made to date in Africa.



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The significance of the find

The team has identified parts of at least 15 individuals of the same species, ranging across a broad spectrum of age groups. The find is believed to be only a small fraction of the fossils believed to remain in the chamber. The find is significant for a number of reasons, for example, it showed researchers that key transitional forms in the fossil records have been missed. Berger explains that the unusual combination of characters that we see in the *H. naledi* skulls and skeletons is unlike anything that we have seen in any other early hominin species. The species share some features with australopiths (like *Sediba*, *Lucy*, *Mrs Ples* and the *Taung Child*), some features with *Homo* (the genus that includes Humans, Neanderthals and some other extinct species such as *erectus*), and shows some features that are unique to it, thus it represents something entirely new to science.

To date the research conducted on the fossils has revealed that the brain of *H. naledi* is small and similar to what one sees in australopiths, while the shape of the skull is most similar to specimens of *Homo*. It has distinct brow ridges, weak

postorbital constriction (narrowing of the cranium behind the orbits), widely spaced temporal lines (attachments for chewing muscles), and a slender set of jaws with small teeth, alongside a whole host of other anatomical details that make it appear most similar to specimens of *Homo*. The legs, feet and hands also have several features that are similar to *Homo*.

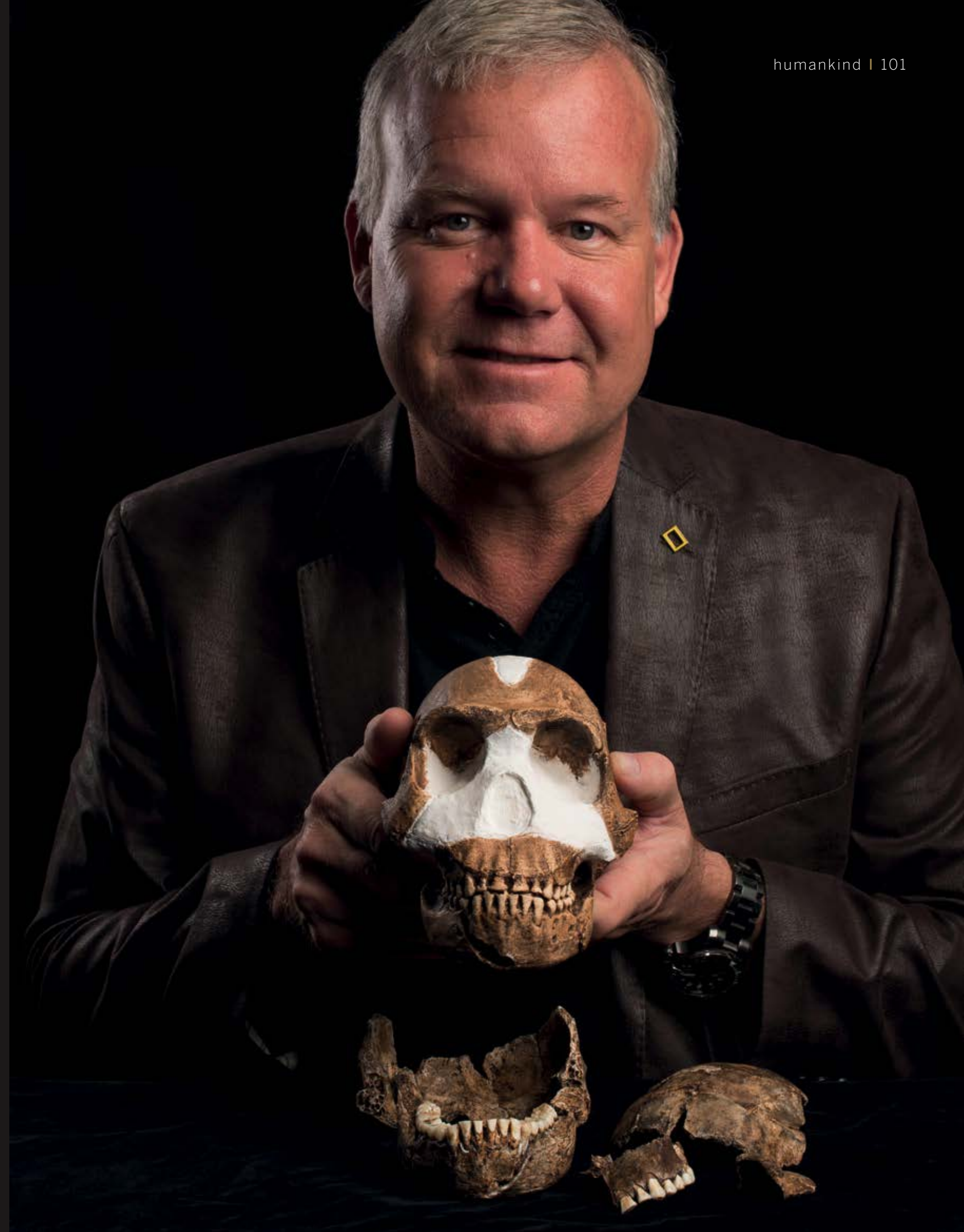
The reason the combined features in *H. naledi* are unusual, or rather unexpected, according to Berger, is because until recently, most anthropologists believed that brain size and tool use emerged together with smaller tooth size, higher-quality diet, larger body size and long legs. "In this view, transformations in the body in early *Homo* were tied to changes in behaviour that influenced diet and the brain. *H. naledi* shows that these relationships are not what anthropologists expected. It has small teeth and hands that seem to have been effective for toolmaking but also a small brain. It has long legs and humanlike feet but also shoulders and fingers that seem effective for climbing. The features that were supposed to go together are not found together in *H. naledi*, and that creates an interesting puzzle that will force us to review our present models of the origins of our genus."

Another reason the find is so significant is that multiple examples of the same bones in the body exist, which means according to Professor Berger, that *Homo naledi* is already practically the best-known fossil member of our lineage. The discovery serves to highlight the fact that we still have much to learn about our own genus across the span of the African continent. There are many unknown fossil species still to be discovered, and that it is important to recognise that some of these and other known species of ancient humans will and have exhibited very human-like behaviours, which in turn will have profound implications for the archaeological record.

Says Berger, "If it turns out that *H. naledi* is old, say older than around 2-million-years, it would represent the earliest appearance of *Homo* that is based on more than just an isolated fragment. On the other hand, if it turns out that *H. naledi* is young, say less than 1-million-years old, it would demonstrate that several different types of ancient humans all existed at the same time in southern Africa, including an especially small-brained form like *H. naledi*. It would also have profound implications for our understanding the origins of complex behaviours previously thought to arise only with the origins of hominins not very different from our own species as recently as 350,000 years ago." To avoid confusion over the fossils' age, the team do not want to publish specific age limits as their three attempts to date them have failed and they are currently working on further attempts.



Photo: © Wits University



Puzzling Behaviour

Besides shedding light on the origins and diversity of our genus, the find has revealed ritualised behaviour patterns previously thought to be limited to humans – specifically the practice of intentionally disposing of, or burying the dead. The sedimentological evidence reveals that the bodies were brought into or dropped into the cave chamber, landing in muddy sediment on the floor. Over time sediments drained out of the chamber and some of the fossils were redistributed across its floor. This suggests that the fossils entered the cave over an extended period of time. That room has “always been isolated from other chambers and never been open directly to the surface,” said Dr Paul Dirks of James Cook University in Queensland, Australia, lead author of the eLife paper on the context of the find. “What’s important for people to understand is that the remains were found practically alone in this remote chamber in the absence of any other major fossil animals.” So remote was the space that out of more than 1,550 fossil elements recovered, only about a dozen are not hominin, and these few pieces are isolated mouse and bird remains, meaning that the chamber attracted few accidental visitors. “Such a situation is unprecedented in the fossil hominin record”, Hawks said. The team notes that the bones bear no marks of scavengers or carnivores or any other signs that non-hominin agents or natural processes, such as moving water, carried these individuals into the chamber. Said Berger, “We explored every alternative scenario, including mass death, an unknown carnivore, water transport from another location,

or accidental death in a death trap, among others. In examining every other option, we were left with intentional body disposal by H. naledi as the most plausible scenario.” Given the fact that it would have been extremely complex navigating the terrain to the Dinaledi Chamber, which has always been in the dark zone, it does suggest that they entered the cave on purpose to deposit the bodies and that they may have used fire to guide them to the location. The team acknowledge this hypothesis is hard to prove definitively and it will require further work. As excavations proceed and the stratigraphy of the deposit is better exposed, and more bones are recovered they will be able to better answer this question. While there is still much to learn about H. naledi, its discovery has not only stimulated healthy public debate and made us all relook our history, it has also served to once again reinforce The Cradle of Humankind’s World Heritage Site stature, as an area of great value in the exploration of humankind’s history. ■ **Lindsay Grubb**

Photo: © Wits University



CRADLE OF HUMANKIND WORLD HERITAGE SITE

The Cradle of Humankind World Heritage Site (COH WHS) is located in the north-western quadrant of the Gauteng province of South Africa. It is a 53, 000 hectare area situated about 45 kilometres north-west of Johannesburg. It gives visitors the opportunity to explore four million years in just one day.

- Was proclaimed a World Heritage Site by UNESCO in 1999 because the area has produced a host of interesting fossils that throw light onto early human ancestors and their relatives, dating back almost 4 million years
- To date more than 900 catalogued fossils hominin specimens have been recovered
- Active since 1966, the Sterkfontein excavation is the world’s longest sustained paleoanthropological excavation
- Mrs. Ples was discovered by Dr Robert Broom at the Sterkfontein Caves in 1947
- “Little Foot” an almost complete 3.3 million year old skeleton of a bipedal specimen belonging to the genus Australopithecus was located in the Sterkfontein Caves in 1997
- Australopithecus sedibawas, which lived 1.977 million years ago, was discovered in 2008 by Dr Lee Berger – to date the fossils of at least six individuals have been identified. The first of them discovered is one of the most complete hominin fossils ever found and is named “Karabo” which means “answer”
- Due to the 35 kilometre of dedicated cycle lanes in a pristine environment, The Cradle of Humankind World Heritage Site attracts an average of 2,000 cyclists per weekend, which increases ahead of major cycling events
- The area is popular for hiking, picnicking and many adventure activities including river rafting, quad-biking, mountain biking and ballooning
- There are many nature reserves and nature-based activities in the area – with more than 250 bird species recorded in the area
- Tours at the Sterkfontein Caves, which start above ground and then take visitors deep into the caves, run every half hour, seven days a week from 9am - 4pm