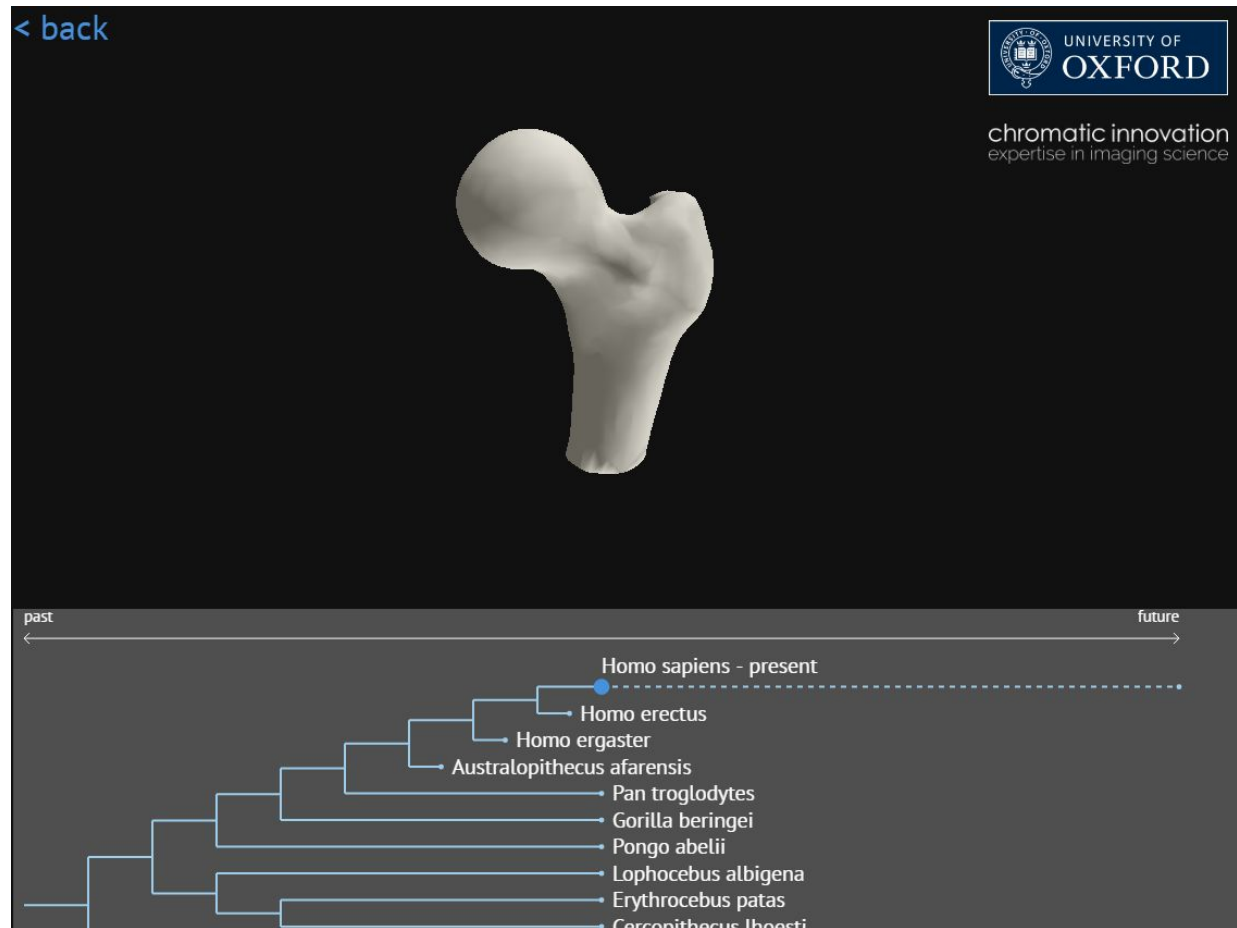


# Scientists 3-D print human of the future

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Interactive 3-D models of human joints, showing how common medical complaints have arisen and how we are likely to evolve in the future, have been created at Oxford University.

The Oxford researchers made the 3-D computer models by compiling 128 slice CT scans of bones from humans, early hominids, primates and dinosaurs. In all, they scanned 224 bone specimens, spanning 350 million years from the Devonian period to the modern day.

By using 3-D engineering and mathematical methods the group has produced 3-D 'morphs' to plot changes in the shapes of species throughout the human lineage. This has provided new insights into the morphological trends associated with common orthopaedic complaints, such as anterior knee pain and [shoulder pain](#).

Extrapolation of these trends has allowed 3-D printing of possible [future](#) skeletal shapes as humans evolve.

Samples used in the study were from shoulders, hips and knees, and have enabled the researchers to make mathematical comparisons that could be used as planning tools for [orthopaedic surgery](#). By comparing the modern and ancient samples, the team hopes to gain a better insight into the origins and solutions to common orthopaedic complaints.

Dr Paul Monk, who led the research at the Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, said: "Throughout our lineage we have been adapting the shape of our joints, which leads to a range of new challenges for orthopaedic surgeons. Recently there has been an increase in common problems such as anterior knee pain, and shoulder pain when reaching overhead, which led us to look at how joints originally came to look and function the way they do.

"These models will enable us to identify the root causes of many modern joint conditions, as well as enabling us to anticipate future problems that are likely to begin to appear based on lifestyle and genetic changes.

"Current trends reveal that the modern shapes of joint replacements won't work in the future, meaning that we will need to re-think our approach for many common surgeries.

"We also wanted to see what we're all going to look like in the future, and to answer questions such as 'are we evolving to be taller and faster or weaker', and 'might we be evolving to need hip replacements earlier in the future?'"

The specimens scanned include amphibious reptiles (eg. Hellbender), dinosaurs, shrews, tupaiae, lemurs, primates, A. Afarensis (Lucy), H. Erectus (Turkana Boy) and H. Neanderthalis.

**More information:** The full set of morphs can be viewed here: [chromaticinnovation.com/trilennium-man/](http://chromaticinnovation.com/trilennium-man/)

Provided by University of Oxford

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