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# The Leverhulme Trust

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## Awards in Focus

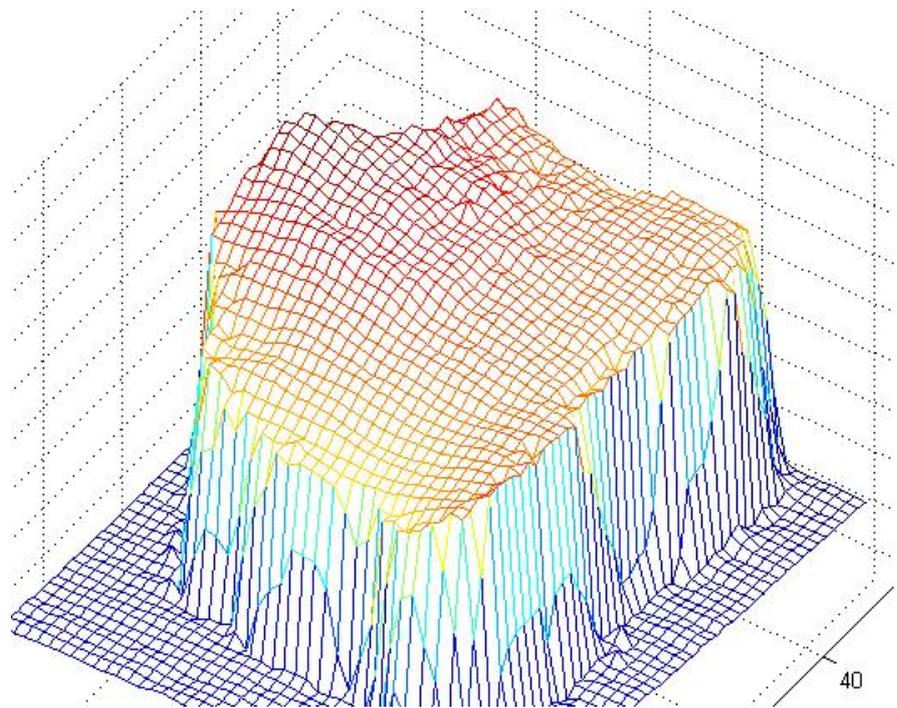
### Laser scanning the evolution of handedness

Predominant right-handedness is a distinctive and defining feature of all living humans, yet we still don't know when or how it evolved. My research will address the question of the mysterious disappearance of our nearest evolutionary cousins, the Neanderthals, by tracing the origins and evolution of handedness in archaeological materials.

Specifically, I am studying prehistoric unmodified stone flakes (the waste left over from making stone tools). Numbering millions throughout the world, unmodified stone flakes are an ideal untapped resource which have existed since the earliest beginnings of human tool-making. I use novel and innovative methods to study archaeological flake collections. Three-dimensional laser scanning, ArcGIS, and Matlab are combined to generate surface maps of the flakes showing the Hertzian bulb of percussion. The angle of the bulb is measured; this tells us the hand preference of the person who made the flake.

This project will generate longitudinal data on handedness in the parallel Neanderthal and human lineages, and in older ancestral species beginning with the earliest known tool-makers 2 million years ago. I am laser-scanning flakes from prehistoric sites with large collections of flakes in Germany, France, Spain, and UK (200,000 to 500,000 years old) and in Africa (1 million to 2.5 million years old). The European collections will allow me to trace the origins and parallel evolution of right-handedness in Neanderthals and modern humans across the crucial time of species divergence. The African collections represent the world's earliest known stone tools. The 3D data will be made public on the Internet and combined with data resulting from a practical workshop of international handedness researchers, which I am organising in 2012.

Together these data will allow me to test the hypothesis that Neanderthals

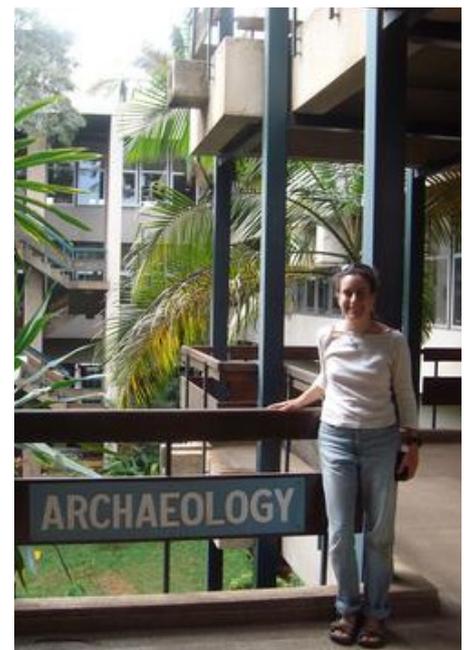


Matlab colour-surface image of a flake surface. Highest points are in red showing the bulb of percussion.

went extinct because they were not lateralised in the same way as humans. Atypical laterality, which is shown for example in mixed-handedness or bilateral language processing in the brain, is linked with mental disorders in living humans. Very extreme laterality to the right or left is also associated with mental disorders. It is possible that Neanderthals' extremely large brains caused them to become very strongly lateralised, which could have been associated with language disorders or cognitive impairments. With this project I aim to contribute crucial archaeological data to the major issues of language origins and our evolutionary relationship to Neanderthals.

**Dr Natalie Uomini**  
**University of Liverpool**

Natalie was awarded an Early Career Fellowship grant in 2010.



Dr Uomini visiting the archaeology department at Nairobi museum, which houses Kenya's oldest stone flakes from Lokalalei (2.3 million years old).