



Professor Katharine Robson Brown
B.A., Ph.D.(Cantab.)

Professor in Mechanical Engineering

Director of the Jean Golding Institute

Professor of Biological Anthropology

Senate House,
Tyndall Avenue, Clifton BS8 1TH

[\(See a map\)](#)

+44 (0) 117 954 6081

[kate.robson-brown@](mailto:kate.robson-brown@bristol.ac.uk)

bristol.ac.uk

Summary

My research explores the microstructure of living tissues and their response to changing and extreme environments; innovating methodologies for the capture, computational modelling, analysis and interpretation of data describing complex material and structural characterisation.

Biological anthropological applications of these methods include forensic identification, the regulation of hard tissue growth and development, and the study of biomechanical systems in extinct species. This includes exploring human evolution, and functional anatomy at the level of microstructure, osteoarchaeology, and the African diaspora, postcranial morphological variation within modern human populations, biomechanics of the spine in humans and other animal models,

Engineering applications include employing the ontogeny of tissue microstructure as a model of programmed transformation in 4D materials, biomimetics in engineering design, and multi-scale modelling of complex hierarchical structures and systems.

Biography

I am Professor of Biological Anthropology and Mechanical Engineering, and Director of the Anthropology Micro CT Imaging Laboratory and Research Group. I am also the Director of the Jean Golding Institute for Data Science and Data Intensive Research, and the Turing University Lead for University of Bristol membership of the national Alan Turing Institute.

Following my first degree in Archaeology and Anthropology, and PhD in phylogenetics at the University of Cambridge, I joined the University of Bristol in 1997. My research seeks to understand how the hard tissues of the human body hold a signature of life history, innovating methodologies for the analysis and interpretation of material structure and characterisation to address a range of challenges posed by forensic, developmental, evolutionary, biomechanical, and biomedical applications. A key thread running through my work has been the development of imaging modalities such as micro-computed tomography, and novel methods of analysis employing computational modelling. In the early 2000's I developed the first tomography laboratory within a forensic or physical anthropology department in the UK, and in the years since I have taken the lead in both primary technological developments and applications. Throughout my career I have continued to undertake forensic medico-legal and anthropological research projects, leading multi-disciplinary and multi-institutional research teams in the reporting and analysis of these remains, including providing expert witness statements. I have shown how bone microstructure and biomolecular signature varies between the sexes and within and between species, across different populations, during life history, in response to extreme environments, and how to use this information to improve estimations of age at death and health status.

My current funded research interests include the response of the body to microgravity environments, including the development of an experiment to run on the ISS (UK Space Agency); the growth and development of human cancellous bone architecture; bio-inspired engineering structures for microgravity environments (in collaboration with NASA Ames Research Center and funded by the Royal Society); novel 3D assessment of growth increments in dental tissue for studying discrete life history events (PSI); characterising the molecular changes underpinning osteophyte formation and vertebral disc degeneration (ARUK); and developing research methodologies for the assessment of artificial gravity as a countermeasure to bone loss (ESA).

Public Service

I am Co-Director of the Human Spaceflight Capitalisation Office (Harwell Science Campus), which builds networks and research communities actively engaging in human spaceflight related activities within the UK.

I am currently serving as a Lay representative for NHS Health Education Southwest (the Severn Deanery). The Deanery delivers medical education to postgraduate doctors in the Severn region, and my responsibilities include chairing interview panels and contributing to education quality assurance panels.

In 2009 was appointed as an Ambassador for Increasing Diversity in Public Appointments. This is an appointment by the Minister of State for Women and Equalities. My responsibilities include speaking at events sponsored by the Government Equalities Office, and mentoring newly appointed members.

From 2005-2010 I served as a founder member of the Human Tissue Authority, which regulates the removal, storage, use and disposal of human bodies, organs and tissue in England, Wales and Northern Ireland for a number of purposes such as research, public display, transplantation and education.

Imaging Laboratory

The Anthropology MicroCT Laboratory provides scanning and image analysis facilities for collaborative projects related to biological anthropology, bone health, and archaeology. For further information please contact me at kate.robson-brown@bristol.ac.uk.

Teaching

Introduction to Bioarchaeology;

Early Human Origins;

Human Skeletons from Archaeological Sites;

Memberships

Organisations

[Department of Archaeology and Anthropology](#)

[Department of Mechanical Engineering](#)

[Research and Enterprise Development](#)

Other sites

- [Engineering](#)
- [Mecheng](#)

Academics by department

- [Anthropology and Archaeology](#)

Links

-  [EU MARIE CURIE RESEARCH TRAINING NETWORK](#)

Selected publications

- Brown, KR, R, A & N, C, 2011, '[Acquiring microstructural data for the La Ferrassie infant neanderthal vertebrae using micro-computed tomography](#)'. in: R Macchiarelli, Weniger G-C (eds) *Pleistocene Databases: Acquisition, Storing, Sharing. Pleistozäne Datenbanken: Datenerwerb, Speicherung, Austausch.*. Wissenschaftliche Schriften des Neanderthal Museums, pp. 75 - 84
- Brown, KR, Kramer, R, Khoury, H & Khoury, H, 2009, '[Skeletal dosimetry for external exposures to photons based on \$\mu\$ CT images of spongiosa: Consideration of voxel resolution, number of micro matrices and medullary bone surfaces](#)'. *Medical Physics*, vol 36., pp. 5007 - 5016
- Brown, KR, 2011, '[The Hominins](#)'. in: Alice Roberts (eds) *The Human Story*. Dorling Kindersley, pp. 56 - 173
- Minter, NJ, Franks, NR & Brown, KAR, 2012, '[Morphogenesis of an extended phenotype: four-dimensional ant nest architecture](#)'. *Journal of the Royal Society Interface*, vol 9., pp. 586-595
- Brown, KR, Kramer, R, Richardson, R, Cassola, V, Viera, J, Khoury, H & Brayner, C, 2011, '[Electron absorbed fractions of energy and S-values in an adult human skeleton based on \$\mu\$ CT images of trabecular bone](#)'. *Physics in Medicine and Biology*, vol 56., pp. 1803 - 1836
- Roberts, A & Brown, KR, 2007, '[The specificity of palaeopathological diagnosis: a case of bilateral scapholunate advanced collapse in a Romano-British skeleton from Ancaster](#)'. in: KA Robson Brown, AM Roberts (eds) *BABAO 2004: Proceedings of the 6th BABAO annual conference of the British Association for Biological Anthropology and Osteoarchaeology*, University of Bristol. Archaeopress, pp. 65 - 73

- Roberts, A, Peters, T & Brown, KR, 2007, '[New light on old shoulders: palaeopathological patterns of arthropathy and enthesopathy in the shoulder complex](#)'. *Journal of Anatomy*, vol 211 (4)., pp. 485 - 492

[Read more >](#)

Recent publications

- Brown, KR, Bacheva, D & Trask, RS, 2019, '[The structural efficiency of the sea sponge Euplectella aspergillum skeleton: Bio-inspiration for 3D printed architectures](#)'. *Journal of the Royal Society Interface*, vol 16.

[View complete publications list](#) in the University of Bristol publications system