

#### **4 year Royal Society funded PhD:**

##### **Palaeoproteome Dynamics in Ageing Bone; Insights from Ancient Proteins**

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Bone is a composite material made up of an approximately 25-30% organic component, which is predominantly structural protein, and the remainder an inorganic phase, predominantly calcium phosphate mineral. The bone proteome is the complete set of different proteins that in some way interact with bone tissue, the complexity and decay state of which continues to alter during the remodelling process, which itself changes with biological ageing. Following on from developing the use of proteomics on ancient bone proteins for species identification (Buckley et al. 2009) and phylogenetic inferences from extinct vertebrate species (Buckley 2013; 2015), our group has explored the potential ontogenetic information that can be recovered (Procopio et al. 2017). However, despite some initial progress in this area (e.g., Wadsworth & Buckley 2014), the processes by which proteins change through time remain poorly understood. This project would seek to explore the potential of advanced proteomic-based techniques to understanding biological signatures in bone remodelling, particularly how these differ between individuals of the same species as well as between different species, and how various environmental factors influence this.

The project will explore the practical reproducibility of top-down and bottom-up proteomics methods and evaluate the most appropriate means to measure the changes that occur during the ageing process, supported by mapping of the inorganic phases of the bone tissue. This project would be suitable for either a molecular biologist or analytical chemist with interests in bone biology and learning cutting-edge proteomic techniques or for archaeological scientists that have some expertise in analytical biochemistry.

The student would join a vibrant team of bioarchaeologists and palaeobiologists as part of the Interdisciplinary Centre for Ancient Life (ICAL; <http://www.ical.manchester.ac.uk/>) and be based within the Manchester Institute of Biotechnology where the Principal Investigator is based (<http://www.mib.ac.uk/>). See <http://www.buckley.lab.manchester.ac.uk/> for more details about our research.

The project scope is flexible around the areas of ageing dynamics in bone proteomes and is funded for 4 years by the Royal Society. We also encourage discussions on projects that more specifically relate to the information inferred from palaeoproteomics, such as palaeobiodiversity or phylogenetics for separate applications.