Project Title **Quantitative Measures of Quaternary Palaeobiodiversity Using Proteomic Methods**

Supervisors **Dr Mike Buckley, Professor Andrew Chamberlain and** (Faculty of Life Sciences, University of Manchester) & **Professor Phil Manning** (SEAES, University of Manchester)

Introduction:

The causes and consequences of changes in biodiversity are research questions of central interest to ecology and palaeontology, and the assessment of biodiversity is fundamental to informing decisions in conservation biology. In present-day ecosytems, biodiversity can be assessed through the morphological and molecular identification of evolutionarily significant taxonomic units (usually species and subspecies) but for fossil assemblages this approach can be confounded by sedimentological and taphonomic processes as well as the limitations of morphologically-based systematics. The primary aim of this doctoral project will be to use state-of-art biomolecular methods (bone protein fingerprinting) to develop measures of biodiversity that can be applied to the Pleistocene and early Holocene fossil record.

Project Summary:

The student will apply high-throughput proteomic methods alongside conventional morphological procedures to determine measures of palaeobiodiversity in well stratified and dated assemblages of fossil remains from archaeological and palaeontological sites in Britain and the Caribbean. The methods will also be applied to modern bone assemblages generated by key terrestrial and avian bone accumulators (e.g. fox, barn owl) in order to assess biases attributable to prey selection and bone survival. Diversity measures appropriate for molecular data will also be assessed.

The University of Manchester will provide training in appropriate research skills including mass spectrometry, bioinformatics, palaeontological and zooarchaeological methods.

For further enquiries contact m.buckley@manchester.ac.uk

References:

Buckley, M., Collins, M.J., Thomas-Oates, J., Wilson, J. (2009). Species identification by analysis of bone collagen using matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry. *Rapid Communications in Mass Spectrometry*, 23(23), 3843-3854.

Carrasco 2013. The impact of taxonomic bias when comparing past and present species diversity. *Palaeogeography, Palaeoclimatology, Palaeoecology* 372: 130-137.

Rull, V. 2012. Palaeobiodiversity and taxonomic resolution: linking past trends with present patterns. *Journal of Biogeography* 39: 1005-1006.