Project title: **Resolving the timescale of south-central African palaeoenvironments and their impact on human behaviour and evolution**

**Supervisor name(s): Dr. Kirsty Penkman (University of York) and Prof. Larry Barham (University of Liverpool)**

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**Project Description:**

Timing is everything: accurate dating of the geological record is essential to an understanding of our planet’s history, but beyond the limit of radiocarbon dating (~50,000 years) material becomes difficult to date. The Quaternary period (the last ~2.5 million years) is characterized by climate change, and this rich palaeoenvironmental record is vital for testing the usefulness of climate models to predict future climate change. However it is severely underused because of a lack of chronology; recent advances in amino acid dating can overcome this impasse.

Amino acid geochronology uses the time-dependent breakdown of proteins in biominerals (e.g. shells, teeth). Our recent breakthrough has been to isolate entrapped proteins, which behave as a closed system, neither losing products nor gaining reactants over >30 million years. This provides an extremely powerful dating tool for terrestrial deposits. By focusing on a range of different biominerals (molluscs, ostracods, enamel etc.), this PhD will exploit these advances to develop a chronology for southern Africa, a region with a rich but understudied Pleistocene palaeoclimate record and a critical area for a full understanding of human evolution. Stretching beyond the range of the other dating methods available, this will enable the palaeoenvironmental record to be constrained, also allowing us to study the interactions between humans and the changing environment.

The project (based in the NERC-recognised amino acid facility at the University of York) offers an enviable range of multidisciplinary training; the student will gain hands-on expertise in state-of-the-art techniques for analytical method development as well as experience of fieldwork and sampling approaches. The supervisory team combines expertise in geochronology and analytical chemistry (Penkman; York) and southern African Palaeolithic archaeology and palaeoenvironments (Barham; Liverpool).

The project is open to students with at least a 2.1 degree (and ideally a Masters) in Chemistry, Earth/Environmental Sciences or a closely-related subject. For informal discussion please contact the main supervisor (kirsty.penkman@york.ac.uk).

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**Training:**

This studentship is part of the **ACCE (Adapting to the Challenges of a Changing Environment) Doctoral Training Partnership (DTP)**, a prestigious NERC-funded DTP that brings together the very best in environmental, ecological and evolutionary research across the Universities of York, Sheffield and Liverpool, together with the Centre for Ecology and Hydrology (CEH). Students will benefit from a PhD training programme that has interdisciplinary collaboration at its core. The aim is to produce multi-skilled researchers equipped to tackle cutting edge environmental science of global significance, embedded within a unique, supportive training environment.

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Additionally, you will have access to the **innovative Doctoral Training in Chemistry (iDTC)**, with cohort-based training to support the development of scientific, transferable and employability skills.
Equality and Diversity:
The Department of Chemistry holds an Athena SWAN Gold Award and is committed to supporting equality and diversity for all staff and students. The Department strives to provide a working environment which allows all staff and students to contribute fully, to flourish, and to excel. Chemistry at York was the first academic department in the UK to receive the Athena SWAN Gold award, first attained in 2007 and then renewed in October 2010 and in April 2015. This PhD project is available to study full-time or part-time (50%).

Funding:
Value: The studentships are fully funded for 3.5 years in the first instance, and students must complete their PhD in four years. The studentships cover: (i) a tax-free annual stipend at the standard Research Council rate (£14,533 for 2017-2018, to be confirmed for 2018-2019 but typically increases annually in line with inflation), (ii) research costs, and (iii) tuition fees at the UK/EU rate. Studentships can be extended for another six months on a case-by-case basis: for example 3 months extra funding is guaranteed if students opt to take a 3 month internship during their PhD.

Eligibility: The studentships are available to UK and EU students who meet the UK residency requirements. Students from EU countries who do not meet the residency requirements may still be eligible for a fees-only award. Further information about eligibility for Research Council UK funding

Candidate selection process:
- Applicants should submit an application for a PhD in Chemistry by Tuesday 9 January 2018
- Supervisors will contact their preferred candidates either by email, telephone, web-chat or in person
- Supervisors may nominate up to two candidates to the assessment panel
- The assessment panel will shortlist candidates for interview from all those nominated
- Shortlisted candidates will be invited to a panel interview at the University of York on Thursday 15 February 2018
- The York NERC ACCE awarding committee will award studentships following the panel interviews
- Candidates will be notified of the outcome of the panel’s decision by email

For more information contact chemgrad@york.ac.uk or see our web page: http://www.york.ac.uk/chemistry/postgraduate/