

Evolutionary ecology and extinct species: how do fossils change our interpretations of present-day biodiversity patterns?

Evolutionary ecology, the study of patterns and processes at the interface of evolutionary biology and ecology, is an exciting and rapidly growing research area. However, most studies ignore one important factor: extinction. The aim of this PhD project is to test and develop methods for adding fossil species into phylogenies and evolutionary ecology analyses, using primates as a study group.

Primates are a fascinating group in which to study the effects of extinct species because there is substantial extinct diversity in the order. There are currently 376 species in two suborders:

Strepsirrhini (lemurs, lorises, galagos and aye-ayes: 88 species) and Haplorrhini (tarsiers, New

World monkeys, Old World monkeys and apes: 288 species). The earliest primate fossils date from around 55 million years ago during the early Eocene, and come from two major groups; Adapoidea (putative ancestors of Strepsirrhini) and Omomyoidea (putative ancestors of Haplorrhini). These primates were widespread, ranging across North America, Asia, Europe and Africa, and also species rich (nearly 100 species in each group) so apparently represented very successful radiations. However, the majority of these species were extinct by the end of the Eocene. Other fossil primates became extinct more recently, for example, at least one of the 17 species of extinct giant lemurs in Madagascar may have survived into the 17th century. These species are particularly interesting because they range in body mass from approximately 10-160kg, whereas present-day lemurs have a maximum body mass of only around 7kg.

The student will first collate a morphological dataset for extant and extinct primates, using published sources and collecting extra data from museums in the USA and UK. They will then build phylogenies using Bayesian approaches, and finally they will use these phylogenies to tackle interesting evolutionary ecology questions. The exact questions tackled will depend on the interests of the student. However, some potential questions include: (i) Can historical primate extinctions be explained by competition with other species of primate? (ii) Does adding extinct giant lemurs into analyses of primate body size evolution alter our conclusions about rates of evolution in primates, particularly in the Strepsirrhini (lemurs and relatives)? (iii) If all of the presently endangered primates become extinct, what will the consequences be for the morphological and functional diversity of primates? How will this affect the functioning of the ecosystems they inhabit? The results of these analyses will have implications for evolutionary ecology methods, evolutionary theory, and conservation planning.

The project will be supervised by Dr. Natalie Cooper at the School of Natural Sciences, Trinity College Dublin. The School is particularly strong in the area of Ecology and Evolution, with a dedicated seminar series and a range of peer-learning initiatives. The expected start date is September 2012. **Full funding** is provided for a 3 year PhD studentship from Trinity College Dublin. Stipend is **€16,000 per annum plus fees for 3 years**. There are **no limitations on student nationality**.

Applicants must have (or realistically expect to achieve) a first or upper second class Bachelors, or Masters degree in a relevant subject (Biology, Ecology, Anthropology, Palaeontology, Mathematics, Statistics or similar). The candidate will preferably have a high-level of numerical competency. Much of this work is collaborative and the candidate will be expected to be keen, motivated and willing to work as part of a team. In addition, applicants must be competent in written and spoken English and be prepared to travel to the USA and UK for data collection and collaborator meetings.

Applicants should submit a curriculum vitae detailing their qualifications and experience and containing the names and contact details of at least two referees, together with a covering letter explaining why they wish to pursue this project. Please direct any enquiries about the research to Dr. Natalie Cooper (ncooper@tcd.ie). Applications to be received electronically or as hard copy to Fiona Maloney (FIMOLONY@tcd.ie) on or before 15th July 2012.