UNIVERSITY OF LINCOLN

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JOB DESCRIPTION

JOB TITLE	Post Doctoral Research Associate in Evolutionary Palaeobiology				
DEPARTMENT	School of Natural Sciences				
LOCATION	Lincoln Campuses				
JOB NUMBER	CHS208	**GRADE**	7	**DATE**	April 2025
REPORTS TO	Marcello Ruta (Principal Investigator)				

CONTEXT

A key goal of modern biology is to understand how major groups of organisms originate and diversify. Are evolutionary innovations—such as new anatomical features, functional specializations, and ecological shifts—primarily adaptive, driving variation in form and an increase in species? Is evolution inherently directional, leading to sustained, parallel trends across different lineages over time? These questions are central to the study of macroevolution, which examines the dynamics, causes, and effects of biological changes on a large scale. We will explore these questions by examining the fossil record of early tetrapods (limb-bearing vertebrates) and their closest fish relatives, tracing their evolutionary journey from the transition from water to land to the beginnings of the modern tetrapod fauna. The emergence of tetrapods and their subsequent expansion into terrestrial environments represents a major transition in animal evolution, followed by significant adaptive radiation. By uncovering the pace, scale, and trajectory of the transformations underlying these events, we will evaluate the impact of specific innovations on the chronology and modality of tetrapod origin and diversification.

To achieve this goal, we need two essential components: extensive databases and comprehensive phylogenies (evolutionary trees). Although anatomical, ecological, environmental, geographic, and stratigraphic data are available for an increasing number of early tetrapod species, such data require a thorough synthesis. Additionally, existing phylogenies have led to little consensus on the broader affinities and internal relationships of most early tetrapod groups. The absence of a robust and inclusive phylogeny has been a significant gap in our understanding of the evolutionary pace and patterns during the rise of tetrapods. This project aims to address this imbalance.

To reach a comprehensive understanding of the entire transition of tetrapods from water to land, we will develop a new, large-scale, and enhanced phylogeny of all major groups of early tetrapods. This will be the most detailed phylogeny ever assembled, with a comprehensive taxonomic scope (species-level inclusion), temporal span (the first 250 million years of tetrapod history), and geographic distribution (global fossil occurrences). With a well-supported phylogeny in place, we will analyze the extensive data on early tetrapods and their immediate predecessors to uncover the chronology and patterns of morphological differentiation and lineage proliferation at the evolutionary roots of this significant animal group.

JOB PURPOSE

Applications are invited for a full-time **Postdoctoral Researcher Position in Evolutionary Palaeobiology** at the University of Lincoln's School of Natural Sciences to work with Dr Marcello Ruta (Principal Investigator) on phylogenetic, macroevolutionary, and macroecological aspects of tetrapod origin and diversification (start date: 1st July 2025; duration: 36 months, 37 hours/week; University pay scale: Grade 7, Spine Point 30). This post is funded by a Leverhulme Trust Research Project Grant to Dr Marcello Ruta, entitled "***Key Innovations as Evolutionary Drivers of the Fish-Tetrapod Transition***", and is in partnership with the Universities of Bath (Co-Investigator Professor Matthew Wills) and Uppsala (Co-Investigator Professor Per Ahlberg).

As part of an overarching investigation into evolutionary patterns and processes in early tetrapods (the limbed vertebrates) and their fish-like forerunners, the successful applicant will tackle the early diversification of amniotes (including today's reptiles, birds, mammals and all their extinct kin) and near-amniote groups, chiefly from the Palaeozoic and earliest Mesozoic. Their research will seek to disentangle the phylogenetic utility of different categories of skeletal data in resolving conflicting phylogenetic patterns, both near the ancestral roots of amniotes and among a wide range of amniote-like groups. By employing newly built, large-scale, and time-calibrated phylogenies, the research aims to gain insights into rates of morphological change, the ways in which shape variation is partitioned between groups and through time, the directionality (or otherwise) of evolutionary trends, and the link between key innovations and models of group origination and extinction.

The post holder's main tasks are as follows:

1) designing, planning, and conducting a program of scientific investigation within the scope and remits of the grant, in collaboration with Dr Marcello Ruta

2) developing independent and original research ideas and methods for modelling the tempo and mode of evolutionary transformation

3) making a significant contribution to the dissemination of research findings through publications in leading peer-reviewed journals and presentations at national and international conferences

4) working independently and as part of a larger team of researchers, to develop new research links and collaborations and engage in knowledge transfer activities where appropriate

5) co-supervising, mentoring, and collaborating with junior researchers, including the prospective PhD student to be employed on the grant

6) evaluating analytical and statistical protocols and experimental designs devised by other researcher teams and integrating, expanding, amending own research approaches as appropriate

7) applying your skills and expertise to other research projects and proposals within the Evolution and Ecology Research Group at University of Lincoln, where relevant and necessary

8) promoting and maintaining a safe working environment and safeguarding principles of freedom of academic expression and equality in the workplace

While the list above summarizes duties that are deemed necessary in the context of the role, other reasonable duties may be required.

KEY RESPONSIBILITIES

Literature Surveys
Undertake literature surveys and other investigations of the state-of-the-art and prepare reports as required.
Programme of Research
Undertake a programme of research under the direction of the Principal Investigator, demonstrating a significant level of autonomy. Lead in the production of high-quality research outputs, including reports, papers and other publications of national/international standing.
Project Management
Perform project management activities, planning, scheduling, monitoring and reporting on progress of research projects.
Liaison and Networking
Identify and liaise with internal and external collaborators, and with colleagues in the Department, maintaining positive and effective working relationships.
Internal Research Activities
Participate in and help to organise internal research activities, including seminars, research meetings and conferences.
Continuous Professional Development
Undertake continuous professional development activities.
Grant Applications
Contribute to the production of grant applications.
Teaching Support
Engage in teaching support activities, up to a maximum of six hours per week, possibly including leading a small number of units (no more than two per annum). Aid in the supervision of postgraduate research students.

In addition to the above, undertake such duties as may reasonably be requested and that are commensurate with the nature and grade of the post.

ADDITIONAL INFORMATION

Scope and dimensions of the role
Recent detailed phylogenetic studies of amniotes have generated conflicting hypotheses regarding the interrelationships among several well-established groups, as well as revealing unexpected novel branching patterns. This project aims to evaluate the impact of recent re-analyses of various primitive amniote species and newly compiled sets of morphological data on resolving this conflict. The successful candidate will demonstrate great proficiency in a range of analytical, statistical, and practical skills, including: 1) phylogeny reconstruction using a variety of optimality criteria, including maximum parsimony and Bayesian inference and testing the robustness of novel phylogenetic hypotheses 2) use of fossil data in time calibration of phylogenies and redeployment of calibrated phylogenies for evolutionary analyse of diversity, disparity, rates, shifts, and trends 3) applications of advanced phylogenetic comparative methods in the R programming language, including adapting and devising scripting protocols 4) extensive databasing involving a) cross-referencing and critically evaluating published phylogenetic datasets across relevant tetrapod groups, especially from among amniotes and near-amniote relatives; b) removing instances of duplication and redundancy of morphological characters across different datasets, and checking them against specimens or original descriptions to ensure clarity in the formulation and delimitation of character conditions and variation; c) merging and integrating available data with newly generated data arising from this project.

Key working relationships/networks	
Internal	**External**
• Principal Investigator • Head of Research Centre • Head of School • Other research and academic staff within the school	• Research collaborators • Sponsors and clients (if relevant/appropriate)

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PERSON SPECIFICATION

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Selection Criteria	**Essential (E) or Desirable (D)**	**Where Evidenced Application (A) Interview (I) Presentation (P) References (R)**
Qualifications:		
PhD or equivalent (good candidates may be accepted with a PhD pending, subject to publication record)	**E**	**A**
Extensive knowledge specific to project/area	**E**	**A/I**
Experience:		
Extensive experience of relevant research methods	**E**	**A/I**
Authorship of research outputs of national/international standing	**E**	**A/I**
Experience of research in specific project area	**E**	**A/I**
Teaching support	**D**	**A/I**
Skills and Knowledge:		
Ability to design, conduct and project manage original research in the subject area	**E**	**A/I**
Excellent written communication, including the ability to write reports and research outputs	**E**	**A/I**
Ability to prioritise own workload and work to specified deadlines under pressure	**E**	**A/I**
Ability to communicate complex subjects orally	**E**	**A/I**
Skills specific to project/area	**E**	**A/I**
Competencies and Personal Attributes:		
Flexible approach to workload	**E**	**I**
Ability to work on own and as part of a team	**E**	**I**
Enthusiasm and commitment	**E**	**I**

Essential Requirements are those, without which, a candidate would not be able to do the job. **Desirable Requirements** are those which would be useful for the post holder to possess and will be considered when more than one applicant meets the essential requirements.

Author	MR	**PBP**	AG