Postdoctoral Researcher in Molecular Evolution & Phylogenetics

Macroevolution & Macroecology Group
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Project title: Evolving Rates: Foundations For The Next Generation Of Molecular Clocks
Supervised by: Prof Lindell Bromham, Dr Xia Hua
Application details: www.seek.com.au/job/38278747 Applications due 6th March 2019

Project summary: Molecular data have an ever-expanding reach in biology, used to understand evolutionary past and processes, as well as practical applications such as epidemiology and conservation. All of these applications rely on the accuracy of DNA-based estimates of time and genetic distance, which rest on assumptions about rates of genomic change. But current analyses may be inaccurate if variation in molecular rates show systematic biological patterns**.** We know rates of molecular evolution are influenced by species traits (e.g. body size) and history (e.g. diversification rate), creating complex patterns of rate change that may not be captured by current models. Assumptions about rates influence estimates of dates. How can we judge reliability if we don't know whether our models are accurately modelling rate change? We hope to contribute to the formation of the next generation of molecular clocks which will draw on a richer understanding of molecular evolution. If we understand more about the biological causes of rate variation, then we have the opportunity to use a wider range of biological information to ground-truth the rate estimates, including life history traits, morphology, environmental information, palaeontology and biogeography. In this way, we hope to more fully exploit the Bayesian framework for including all relevant prior information in our estimation of rates.

Aim 1: Test the generality of rate patterns, examine consistent correlates of rate variation, and develop quantitative descriptions that can be used to parameterise rate models.
Aim 2: Evaluate the performance of current methods used in real-world applications under these empirically verified patterns of rate change.
Aim 3: Develop and test innovative models of evolving rates using information on species, environment or evolutionary history to parameterise phylogenetic analyses

We seek an enthusiastic and motivated researcher to work on this project. Our ideal candidate would have a solid understanding of principles of molecular evolution; skills associated with analysis of DNA sequence data; and an ability to develop new analytical methods. Coding experience, particularly in Java, would be an advantage. Two years full-time funding with the possibility of extension to up to four years. We are happy to consider flexible employment arrangements, or splitting the position (e.g. making two concurrent short-term positions). Please do feel free to contact us to discuss your suitability for this position, or any other

About us: We value colleagues who can work well in collaborative teams, but who are also able to direct independent research projects, and are able to produce publishable research on relevant topics in a timely manner. Our research group provides a friendly environment in which faculty, postdocs and students work together on a wide range of projects in molecular evolution, phylogenetics, macroevolution and macroecology (see our website macroevoeco.com for more details). We value and support diversity and will consider flexible employment options. Please contact us if you wish to discuss your situation or learn more about this research project.

About the ANU: The Australian National University is one of the highest ranked research institutions in Australia. Canberra is a small but vibrant city which offers a relaxed pace of life, and easy access to lots of excellent environments including alpine areas, superb beaches, mountains and forests, and in easy reach of Sydney. We encourage national and international applicants: the ANU will provide assistance with visa applications for the successful candidate.

For more information, contact Lindell.Bromham@anu.edu.au and Xia.Hua@anu.edu.au