

## Early tetrapod evolution: Red Queen or Court Jester?

### Supervisors:

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**Project description:** In a Red Queen world, intrinsic factors that regulate biodiversity include body size, breadth of physiological tolerance, or adaptability to hard times. In a Court Jester world, species diversity depends on fluctuations in climate, landscape, and food supply. In reality, of course, both aspects might prevail in different ways and at different times. Behind the colourful allegories is a very simple, and yet key, question: are major differences in clade biodiversity driven by innate characteristics such as key adaptations/ innovations or by the chances of external crises and opportunities?

Early tetrapods provide an excellent case study to explore large-scale adaptive radiations and environmental crises. The project will start with an existing database on early tetrapods (Benton *et al.* 2013), develop and improve this, and then explore key events. The database currently comprises 1388 valid genera, of which 391 are classed as 'Amphibia' (namely stem-tetrapods, Temnospondyli, Lepospondyli, Reptiliomorpha, Lissamphibia) and 997 as Amniota. The focus of the research will be on key events, primarily clade origins and expansions ('adaptive radiations') and mass extinctions. The two primary questions are (a) do adaptive radiations differ from diversifications following mass extinctions, and (b) how much biodiversity at certain times can be attributed to intrinsic factors and how much to extrinsic?

Benton, M.J., Ruta, M., Dunhill, A.M., and Sakamoto, M. 2013. The first half of tetrapod evolution, sampling proxies, and fossil record quality. *Palaeogeography, Palaeoclimatology, Palaeoecology* 372, 18-41.