

## UMA RAMAKRISHNAN

Assistant Professor  
National Centre for Biological Sciences  
Tata Institute of Fundamental Research  
GKVK Campus, Bellary Road  
Bangalore-560065, Karnataka  
uramakri@ncbs.res.in



Uma obtained her PhD from the University of California, San Diego on population genetics and the effects of mating systems on genetic variation. She conducted postdoctoral research at Stanford University on the genetic impacts of climatic change. She stated her position at NCBS in 2005, and has set up a laboratory investigating population genetics and the evolutionary history of mammals. Because of the escalating rates of habitat destruction, she also applies these molecular tools to understand more about endangered species.

### RESEARCH DESCRIPTION

Natural environments around us are changing at unprecedented rates. As wildlands shrink, human populations increase and the temperature escalates, we scramble to understand how the species around us will respond. We hope that such understanding will aid in stewarding species survival in the future. Integral to this stewardship are the fields of ecology and evolution. My work focuses on the interface of these fields. I study the processes governing the response of species to environmental history, climatic perturbation and human history in the context of species ecologies, and hence gain a better understanding of their evolution.

Much of my research over the last few years has focused on the Indian subcontinent because of its geographic setting, geologic history, ancient human presence, and most importantly, the lack of data in this region.

Our research attempts to address the following core questions: What drives patterns of diversity in the Indian subcontinent? What are the impacts of climate on temporal changes in diversity? What is the cryptic biodiversity of India and how can we safeguard its future?

So far, our results reveal the importance of species ecology in peninsular India, and that of rugged, mountainous geography in the northeast. Our data from tigers (Mondol et al., 2009a) reveal what might become the paradigm for large mammals of the Indian subcontinent: India is a region that mammals have colonized secondarily, following which they have accumulated high levels of genetic variability, possibly because of the relatively continuous (until recently) and diverse habitats available for colonization. Testing the predictions with rodents, a group with very different life histories and evolutionary diversification rates, is now underway. We have also initiated research into the genetic mechanisms behind the evolution of commensalism using a model *Mus* system.

### SELECTED PUBLICATIONS

- Robin VV, Sinha A & Ramakrishnan, U (2010) Ancient Geographical Gaps and Paleo-climate Shape the Phylogeography of an Endemic Bird in the Sky Islands of Southern India. *PLoS ONE* 5(10): e13321. doi:10.1371/journal.pone.0013321.
- Mondol, S, Karanth, KU & Ramakrishnan, U. (2009a) Why India holds the key to tiger recovery. *PLoS Genetics*, 5(8): e1000603.
- Mondol, S, Karanth, KU, Kumar, S, Gopalswamy, A, Andheria, A & Ramakrishnan, U (2009b) Evaluation of non-invasive genetic sampling methods for estimating tiger population size. *Biological Conservation*, 142: 2350-2360.
- Ramakrishnan, U, Hadly, EA & Mountain, JL (2005) Detecting past population bottlenecks using temporal genetic data. *Molecular Ecology*, 14(10):2915-2922.
- Hadly EA, Ramakrishnan U, Chan YL, van Tuinen M, O'Keefe K, Spaeth P & Conroy CJ (2004) Genetic response to climatic change: Insights from ancient DNA and phylochronology. *PLoS Biology* 2(10): e290.