KUNAL AREKAR, Ph.D.

Evolutionary Biologist | Bioinformatician

https://kunalarekar.wixsite.com/kunal

LinkedIn

Google Scholar

Twitter

EDUCATION

PhD, Evolutionary Biology and Bioinformatics
Wildlife Institute of India
2018 - 2022

M.Sc., Biodiversity
Pune University
Pune, India 2007 - 2009

B.Sc., Biotechnology
N.B Mehta Science College,
Mumbai University, India
2005 – 2007

COURSES ATTENDED

- **Python Basic and Advance course**
  The Geographic Information Systems (TGIS) lab, Ahmedabad, Gujarat, India
- **Metagenomic analysis workshop**
  QCB Collaboratory, UCLA, California, USA
- **Introduction to Unix command line workshop**
  QCBio, UCLA, California, USA
- **Genome Biology workshop and course**
  Indian Institute of Science, Education and Research (IISER) Thiruvananthpuram, India

ABOUT ME

Scientist with a decade of versatile experience combining strong data analysis and visualisation skills with evidenced-based scientific teaching. My expertise encompasses problem solving and creative solutions, rooted in an interdisciplinary framework that includes genetic and genomic data analysis, ecological modelling, statistics, research design, and programming for bioinformatic analysis with a commitment to inclusive teaching and mentoring practices.

TEACHING EXPERIENCE

University of Arizona, Tucson, USA – Lecturer

INFO 523: Data Mining and Discovery	2024-2025
INFO 410/510: Bayesian Modelling and Inference	2024-2025

Indian Institute of Science, Bangalore, India - Teaching Assistant

EC204: Evolutionary Biology, **Data mining, data analysis and visualisation**	2014 - 2015
Molecular Phylogenetic workshop **Theory and hands-on sessions: Bayesian statistics and maximum likelihood methods for data analysis, molecular dating, biogeography and species delimitation, bootstrap analysis**	2013 - 2021

Workshops

Introductory course on molecular phylogenetics Data analysis and visualisation - Bayesian statistics and maximum likelihood approach to data analysis	June 2022
Theory and applications of molecular phylogenetics	January 2022
Advance molecular phylogentics Molecular dating, biogeography and species delimitation, bootstrap analysis	August 2021
Theory and applications of molecular phylogenetics	August 2021

Invited guest lectures

UGC-STRIDE 2nd Skill Development Programme **Genetics: Data mining, data analysis and visualisation**	August 2022
KTHM, college, Nashik, India **1. Genetic data analysis and biodiversity conservation 2. Molecular and computational tools for genetic data analysis.**	October 2021

RESEARCH EXPERIENCE

Postdoctoral Researcher | Genomic data analysis | Bioinformatics
Centre for Ecological Sciences, Indian Institute of Science
April 2022 – April 2024   Bangalore, India

- Developed **bash** scripts for analysis and visualisation of genomic data
- Analysed ecological data to produce **probability distribution models** using **R** scripting language.
- **Trained undergraduate students** in data collection using standard laboratory protocols and molecular data analysis.
- **Multi-institutional collaboration to generate a genomic database** of all the primate species of the world with the goal of improving research in the areas of human and wildlife health, evolution, and conservation.

Visiting Assistant Project Scientist | Bioinformatician

University of California Los Angeles

🗓 2022 – 2023   📍 Los Angeles, CA, USA

- Created **python scripts** to analyse ddRAD **sequencing data**.
- Developed bash scripts for analysing genomic data **on High Performance Computing (HPC) clusters**.
- Developed scripts for **metagenomic analysis** of gut microbiome data

Research Scholar | Ecological modelling | Genetic data analyst

Indian Institute of Science and Wildlife Institute of India

🗓 2018 – 2022   📍 Bangalore, India

- Led independent research to test multiple evolutionary hypotheses to infer the evolutionary relationship between primates in India and published the findings in prestigious peer-reviewed journals.
- Employed interdisciplinary approaches of **molecular data analysis, ecological modelling, morphological data and statistical analysis.**
- Used **clustering algorithm for sequence analysis** and **model fitting using posterior predictive check** for the genetic data analysis.
- **Trained 11 undergraduate, masters and graduate students** in data mining, molecular data collection, analysis, and visualisation.

Research Assistant | Spatial data analysis | Phylogenetics

Indian Institute of Science

🗓 2012 – 2017   📍 Bangalore, India

- Designed and implemented research proposal embedded in sound research methodology, hypothesis testing, and statistical sampling for data collection to understand mammalian evolution in the Himalayas.
- Analysed genetic data using multiple statistical tools such as **Bayesian statistics, Maximum Likelihood method, bootstrap analysis, probability distribution modeling** and ecological data using mapping tools such as **QGIS** and **ArcGIS**.
- Published my research in peer-reviewed journals and disseminated results to stakeholders for effective changes in policy management and biodiversity conservation.

Project Assistant | Remote Sensing and GIS | Hydrobiology

University of Pune

🗓 2010 – 2012   📍 Pune, India

- Fish diversity mapping to understand the effect of water quality and pollution using **Remote Sensing** and **GIS tools like ArcGIS and QGIS**.

Biodiversity Expert | Naturalist | Data management

Pench tiger reserve
📅 2009 – 2010   📍 Pench, Central India

- **Documented and managed data** on local biodiversity and led nature drives inside the tiger reserve.

PUBLICATIONS

1) **Kunal Arekar**, Neha Tiwari, Sathyakumar S, Mehreen Khaleel, Praveen Karanth. 2022. Geography vs. past climate: the drivers of population genetic structure of the Himalayan langur. *BMC Ecol Evo*. 22,100. https://doi.org/10.1186/s12862-022-02054-1

2) **Kunal Arekar**, Abhijna Parigi, Praveen Karanth. 2021. Understanding the convoluted evolutionary history of the capped-golden langur lineage (Cercopithecidae: Colobinae). *Journal of Genetics*. 100(79). https://doi.org/10.1007/s12041-021-01329-8

3) **Kunal Arekar**, Sathyakumar S, Praveen Karanth. 2020. Integrative taxonomy confirms the species status of the Himalayan langurs, *Semnopithecus schistaceus* Hodgson 1840. *J Zool. Syst. Evol. Res*. https://doi.org/10.1111/jzs.12437.

4) K. Praveen Karanth, Srishti Gautam, **Kunal Arekar**, Divya B. 2019. Phylogenetic diversity as a measure of Biodiversity: Pros and cons. *J. Bombay Nat. Hist. Soc.* 116. http://www.bnhsjournal.org/index.php/bnhs/article/view/120848

Manuscripts in Review

5) Shivakumara Manu, Vinay Teja, Muthuvarmadam S. Ram, Lukas F. K. Kuderna, **Kunal Arekar**, Laksshman Sundaram,………… Govindhaswamy Umapathy. 2024. The global landscape of emerging extinction risk of primates. (**in review at Science)**

6) Mihir Trivedi, **Kunal Arekar**, Govindhaswamy Umapathy. 2023. Historical demography and species distribution models shed light on past speciation in primates of northeast India. *bioRxiv*. https://doi.org/10.1101/2023.02.25.530015 (in review at Current Biology)

7) Elliot Gould, Hannah S Fraser, Timothy H Parker, Shinichi Nakagawa, Simon C Griffith, Peter A Vesk, Fiona Fidler, Daniel G Hamilton, Robin N Abbey-Lee, Jessica K Abbott, Luis A Aguirre, Carles Alcaraz, Irith Aloni, Drew Altschul, **Kunal Arekar**, ……………… , Daniel J Larkin (2023): Same data, different analysts: variation in effect sizes due to analytical decisions in ecology and evolutionary biology. EcoEvoRxiv. https://doi.org/10.32942/X2GG62 (In review at BMC Biology)

8) Shahid Hameed; Md Niamat Ali; Shivakumara Manu; **Kunal Arekar**; Tawqir Bashir; Govindhaswamy Umapathy. 2023. Genetic diversity, geographical structure and demographic history of Kashmir gray langur (*Semnopithecus ajax*, Pocock 1928). (in review at International Journal of Primatology)

ACADEMIC OUTREACH

- Scientific instructor for science day at the Department of Zoology, University of Pune, India. (From 2010 to 2011)

- Scientific instructor for 'Open day' at the Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India (From 2012 to 2021)

OTHER SKILLS

- DNA extraction (from faeces, tissue, blood and hair); PCR amplification; DNA sequencing (Illumina and ONT platforms), gel electrophoresis
- whole genome sequence analysis, ddRAD data analysis
- phylogenetic analyses, species delimitation, species tree estimation, biogeography and phylogeography analyses, hybridisation analyses.
- R and Python programming for genomic data analysis
- Linux/Unix OS working knowledge.
- Field work and team management – led multiple field seasons throughout the Indian Himalayas, the western Ghat mountains and northeast India.
- Lab maintenance and equipment in-charge for PCR machines, UV gel doc, MQ water filter system.
- Mist netting experience for avian malaria project.
- Experience with radio telemetry of small mammals and reptiles in India.
- Handling birds, reptiles, amphibians, small mammals, arachnids; photography, scale counts for reptiles.
- Experience working as naturalist in a tiger reserve in India.

Manuscripts in preparations

9) **Kunal Arekar**. Implications of species resolution on past results: case study of a widespread alloprimate. *Review article*

10) **Kunal Arekar**, Sharwary M. R., Praveen Karanth. Population genetics of Himalayan langurs and it's taxonomic implications

STUDENTS MENTORED

Sharwary M, IISc, Bangalore	2021 – 2023
Undergraduate trainee	
Aranya Dhibar, IISc, Bangalore	2021
Undergraduate trainee	
Namitha Tony, Christ University, Bangalore	2019 – 2020
Master's dissertation	
Vaishnavi Kinnal, St. Joseph's college, Bangalore	2019
Intern for my PhD project, taught lab work and data analysis	
Niyati Bhatt, MS University, Vadodara	2019
Intern for my PhD project, taught lab work and data analysis	
Shahid Dar, PhD student, Wildlife Institute of India	2019
Genetic data analysis and visualisation	
Neha Tiwari, University of Allahabad	2018 – 2019
Intern for my PhD project, training for lab work and data analysis	
Santanu Roy, Presidency University, Kolkata	2018
IAS Summer fellowship project	
Vinod, SACON, Coimbatore	2013 – 2014
PhD proposal development, training in lab work and data analysis	
Rajalekshmi Sukumaran, SACON, Coimbatore	2013
Master's dissertation	
Partha Sarathi Mishra, SACON, Coimbatore	2013
Training for lab work and data analysis	