

POOJA GUPTA

Evolutionary Biologist

10+ years of research experience in molecular ecology, phylogenetics and evolution; focusing on molecular lab techniques, leading sequencing projects, and conducting population genetics and phylogenetic analyses. Skilled in generating pathogen genomic data and analyzing high throughput sequencing data using bioinformatics tools. Interested in integrating pathogen genomics with epidemiology to improve human/wildlife health.

Contact

Address

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WWW

github.com/poojasgupta/bird-malaria-uce-phylo

WWW

poojasgupta.weebly.com

Skills

Phylogenetic analysis

Whole genome sequencing and target capture data analysis

Bioinformatics tools: samtools, illumiprocessor, bwa, trinity, qualimap

Programming: R, Python, bash; Github, conda, HPC environment

Familiar working with NCBI, GISAID

DNA/RNA extraction, PCR, qPCR, gene sequencing, genotyping, NGS library preparation

Statistical data analysis

Scientific Writing

Education

2016-08 - Doctor of Philosophy

2020-08 *University of Georgia - Athens, GA*

- Dissertation: *Avian Haemosporidian dynamics in the Western Ghats Sky Island bird system*

2008-08 - Master of Science: Biotechnology

2010-05 *University of Madras - Madras, India*

2005-08 - Bachelor of Science: Biotechnology

2008-05 *M.G.M College, R.D. University - Jabalpur, India*

Work Experience

2021-05 - Genomic Data Specialist

Current *Illinois Department of Public Health, USA*

- Conduct whole genome sequencing analysis on SARS-CoV-2 wastewater specimens for surveillance purposes and variant detection using various bioinformatics tools.
- Perform SARS-CoV-2 high-throughput sequencing data analyses with data available on public databases (such as GISAID) for creating local Nextstrain build.
- Assist core epidemiology team with COVID-19 data management, analysis and visualization using various R packages (e.g., dplyr, tidyr, ggplot2, sp, leaflet).

2016-08 - Graduate Research Assistant

2020-08 *University of Georgia, Athens, GA*

- Planned and executed molecular study aimed at investigating transmission dynamics, evolution and genomics of malaria parasites infecting birds.

- Generated malaria parasite sequence data via Sanger sequencing, performed sequence data analysis in Geneious and built parasite phylogenies in RAxML and MrBayes, resulting in the first molecular study of avian malaria parasites from the Western Ghats, India.
- Performed statistical data analysis using R-packages (e.g., ape, picante, mcmcglmm) to assess parasite prevalence patterns, genetic diversity and malaria transmission dynamics.
- Developed and tested novel target enrichment (sequence capture) approach for generating genomic data for avian and mammalian malaria parasites leading to significant improvements over existing methods for malaria parasite genomics.
- Performed NGS library preparation using commercial kits and some custom modifications
- Conducted whole genome sequencing analysis of malaria parasite data using bioinformatics tools and phylogenomic analytic pipelines to study phylogenetic relationships among malaria parasites.

**2014-08 -
2016-07**

Junior Research Fellow

*Indian Institute of Science Education and Research,
Kolkata, India*

- Literature review and proposal writing for avian malaria research.
- Designed and optimized PCR and RFLP protocols to detect parasite infection.
- Generated parasite genetic data for 1200 blood samples across 28 bird species to characterize parasite infection and assess genetic diversity.

**2012-09 -
2014-07**

Junior Research Fellow

*National Centre For Biological Sciences, Bangalore,
India*

- Co-led a molecular study to assess the effect of biogeographic gaps on population genetic structure of 25 bird species in the Western Ghats mountains, India; leading to the discovery of two new genera of songbirds.
- Generated and analyzed mitochondrial and nuclear gene dataset for 1200 wild bird samples.

- Conducted gene sequence alignment in Geneious, built phylogenies, and helped with phylogeographic analyses.

2010-08 - 2012-08 **Junior Research Fellow**

National Centre For Biological Sciences, Bangalore, India

- Spearheaded the molecular genetics aspect of a project, studying the effects of habitat fragmentation in two tropical mountain bird species.
- Reviewed literature and mined public databases for bird-specific microsatellite primers.
- Performed genomic DNA extractions, optimized 30 selected microsatellite loci and genotyped 22 loci for 218 bird samples.
- Conducted fragment analysis with microsatellite data and population genetic data analysis to assess species' population genetic structure and gene flow.

Research Publications

- Dharmarajan, G., **Gupta, P.**, Vishnudas, C.K., & Robin, V.V. (2021). Anthropogenic disturbance increases disease emergence risk through predictable changes in parasite community structure, *Ecology Letters*.
- **Gupta, P.**, Vishnudas, C. K., Robin, V. V., & Dharmarajan, G. (2020). Host Phylogeny Matters: Examining Sources of Variation in Infection Risk by Blood Parasites Across a Tropical Montane Bird Community in India. *Parasites and Vectors*, 13(1), 536.
- **Gupta, P.**, Robin, V. V., & Dharmarajan, G. (2020). Towards a more healthy conservation paradigm: Integrating disease and molecular ecology to aid biological conservation. *Journal of Genetics*, 99(1), 1-26.
- **Gupta, P.**, Vishnudas, C. K., Ramakrishnan, U., Robin, V. V., & Dharmarajan, G. (2019). Geographical and host species barriers differentially affect generalist and specialist parasite community structure in a tropical sky-island archipelago. *Proceedings of the Royal Society B*, 286(1904), 20190439.
- Sapp, S. G., **Gupta, P.**, Martin, M. K., Murray, M. H., Niedringhaus, K. D., Pfaff, M. A., & Yabsley, M. J. (2017). Beyond the raccoon roundworm: The natural history of non-raccoon Baylisascaris species in the New World. *International Journal for Parasitology: Parasites and Wildlife*, 6(2), 85-99.
- Robin, V. V., Vishnudas, C. K., **Gupta, P.**, Rheindt, F. E., Hooper, D. M., Ramakrishnan, U., & Reddy, S. (2017). Two new genera of

songbirds represent endemic radiations from the Shola Sky Islands of the Western Ghats, India. *BMC evolutionary biology*, 17(1), 31.

- Robin, V. V., **Gupta, P.***, Vishnudas*, C. K., & Ramakrishnan, U. (2015). Deep and wide valleys drive nested phylogeographic patterns across a montane bird community. *Proceedings of the Royal Society B: Biological Sciences*, 282(1810), 20150861.
- Robin, V. V.*, **Gupta, P.***, Thatte, P., & Ramakrishnan, U. (2015). Islands within islands: two montane palaeo-endemic birds impacted by recent anthropogenic fragmentation. *Molecular ecology*, 24(14), 3572-3584.
- **Gupta, P.**, Faircloth, B., Dharmarajan, G. & Glenn, T. (*In Prep*). A novel target enrichment bait set to illuminate genome-scale phylogeny of *Plasmodium* and other related haemosporidian blood parasites.

Fellowships and Awards

- Graduate Research Assistantship, University of Georgia
- Travel award by University of Georgia Graduate School - **\$650**
- Junior Research Fellowship, Indian Institute of Science Education and Research, Kolkata, India
- Travel grant by NSF-sponsored Malaria Research Coordination Network - **\$1000**
- Scholarship award towards registration costs by the Department of Biostatistics, University of Washington - **\$900**
- Travel grant by Indian Institute of Science Education and Research, Kolkata - **\$1300**

Conferences

ORAL PRESENTATIONS

- Host phylogeny matters: Examining sources of variation in infection risk by blood parasites across a tropical montane bird community in India. **SICB Annual Meeting, Virtual. January 2021**
- Eco-evolutionary dynamics of avian haemosporidian parasites in a tropical sky island archipelago of Western Ghats, India. **Evolution, Providence, Rhode Island, USA. June 2019**
- Biogeography of Haemosporidian Parasites Infecting Diverse Bird Communities in the Shola Sky Islands of the Western Ghats, India. **9th Biennial Conference International Biogeography Society, Malaga, Spain. January 2019**
- Bugs in birds: Hitch-hiking across the tropical sky-island bird community of Western Ghats India. **4th International Workshop on Avian Malaria, National Conservation Training Center, Shepherdstown, USA. September 2015**

- Exploring the effects of patchiness and fragmentation: genetic connectivity of a sky island bird in the Western Ghats, **Student conference on Conservation Science, Indian Institute of Science, Bangalore, India. September 2013**

POSTER PRESENTATIONS

- Host and Environmental Factors Differentially Affect Parasite Community Structure and Infection Dynamics in a Montane Biodiversity Hotspot. **Evolution, Providence, RI, USA. June 2019**
- Host and Environmental Factors Differentially Affect Parasite Community Structure and Infection Dynamics in a Montane Biodiversity Hotspot. **29th Molecular Parasitology & Vector Biology Symposium, CTEGD, Athens, GA, USA. May 2019**
- Avian malaria dynamics in a tropical sky-island bird community of Western Ghats, Southern India. **Warnell Graduate Student Symposium, Athens, GA, USA. January 2018**
- Bugs in birds: Hitch-hiking across the tropical sky-island bird community of Western Ghats India. **Frontiers in Modern Biology, IISER, Kolkata, India. December 2015**
- Mind the Gap: effect of geographical barriers and rivers on genetic structure in animals. **Annual talks, National Centre for Biological Sciences, Bangalore, India. January 2013**

Workshops Attended

- 7th Summer Institute in Statistics and Modeling in Infectious Diseases, **University of Washington, Seattle, Washington, USA. July 2015**
- Winter School on Analysis of Massively parallel sequencing (NGS) data, **National Institute of Biomedical Genomics, Kolkata, West Bengal, India. March 2015**

Professional Service

- Co-organized Graduate Student Symposium at the Savannah River Ecology Laboratory, July 2019 - Planned symposium content, coordinated with students and faculty, oversaw multiple Symposium committees and aided personnel communication
- Served as Facilities Committee Representative as part of the Graduate Student Organization at SREL. Aug 2019 – May 2020
- Reviewer for: Molecular Ecology, International Journal for Parasitology, Indian Institute of Science
- Member: Ecological Society of America, Society for the Study of Evolution, Society for Integrative & Comparative Biology

Teaching Experience

Teaching Assistant - May 2019

Savannah River Ecology Laboratory, University of Georgia

- Assisted with instruction of molecular genetics module of a 10-day course on Field and Molecular Techniques in Wildlife Research and Management
- Created course structure and prepared class activities focusing on lab techniques
- Trained undergraduate and graduate students in basic molecular techniques (e.g., DNA extraction, PCR, disease diagnostics), population genetics and phylogenetics

Training and Management

- Helped set-up PI's new molecular lab, ordered lab supplies, managed inventory, performed routine organization and maintenance of lab
- Trained five newly hired Research Technicians in molecular techniques (e.g., DNA extraction, quantification, PCR) and microsatellite genotyping while at SREL
- **Lab manager (Aug 2013- Dec 2014)** – Maintained lab spaces, ensured lab cleanliness, and administered lab safety protocols
- **Purchase in-charge (Dec 2010- Dec 2012)** – Handled ordering of lab consumables, cataloging inventory, and coordinated with company representatives
- Trained four visiting students and three intern students in basic molecular techniques and population genetics data analysis during my time at NCBS

References

- **Dr. Guha Dharmarajan, Assistant Research Scientist**
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- **Dr. Travis C. Glenn, Professor**
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- **Dr. Robin Vijayan, Assistant Professor**
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