P. RAMYA BALA / Email: pramyabala@gmail.com | Phone: (+91) 9481026646

F1, Maitree Apartments, 6th Main Road, Malleshwaram, Bengaluru – 560003, Karnataka, INDIA

Languages: Fluent - English, Tamil, Telugu, Kannada, Hindi, Basic - French (A1)

WORK EXPERIENCE

Aug 2021 –	: DST-INSPIRE Faculty, National Institute of Advanced Studies (NIAS), Bengaluru, India
Mar 2019 – Mar 2020	: Fulbright Kalam Climate Change Post-Doctoral Fellow,
	University of Pennsylvania, Philadelphia, USA
Jan 2018 – Jan 2019	: SERB Overseas Post-Doctoral Research Fellow (OPDF),
	EcoLab, Toulouse, France
Aug 2016 – Oct 2017	: Research Associate, Divecha Centre for Climate Change, Bengaluru, India

EDUCATION

28/07/2009 – 24/09/2016Interdisciplinary PhD ProgrammeThesis title 'Evaluating geochemical proxies for paleoclimate reconstruction in tropical montane peat: a case study from
Nilgiris, southern India', Coursework CGPA 6.71 (upon 8)Centre for Earth Sciences & Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India.

01/07/2005 – 15/05/2009 **Bachelor of Technology in Industrial Biotechnology First Class** CGPA 8.4 (upon 10), Centre for Biotechnology, Anna University, Chennai, India

AWARDS AND ACHIEVEMENTS

- December 2024 INQUA Early Career Researcher Award for training in France on sedimentary ancient DNA
- March 2022 Featured by Infosys Prize, <u>'Women In Science' Online Campaign</u>
- March 2020 to current Honorary Visiting Scholarship, University of Pennsylvania
- August 2017 SERB National Post-Doctoral Fellowship award, declined
- March 2009 National rank 66 in Graduate Aptitude Test in Engineering (GATE) Life Sciences

PUBLICATIONS (*Corresponding author)

Nithin K., <u>Ramya Bala P.*</u>, Behera D., Anoop A., Binisia A., Vinoj V., Sukumar R. Wind direction dominates the transport and deposition of fire proxies in tropical dry forest landscapes of the Western Ghats. *Global and Planetary Change*. *Under revision, submitted 3 September 2024*.

Agarwala M, <u>Ramya Bala P.</u>, Kulkarni C., Sukumar R., Quamar MF., Balasubramanian K., Tripathi S., Anupama K. 2024. Learning from the past: Collaborating across times for landscape management for conservation. *Current Science*. *Volume 127(8)*, *893-894*.

<u>Ramya Bala P.*</u>, Sarath P.K., Tayasu I., Yoshimizu C., Thirumalai K., Sajeev K., Sukumar R. 2022. Paleovegetation dynamics in a montane vegetation mosaic in the Western Ghats, India: evidence for alternative stable states in the past? *The Holocene*. Volume 32(4), 297–307.

Sarath, P.K., <u>Ramya Bala P.</u>, Kumar. P., Ghosh, D., Sukumar, R. 2020. Climate change and the migration of a pastoralist people c.3500 cal. years BP inferred from paleofire and lipid biomarker records in the montane Western Ghats, India. *Environmental Archeology*. Volume 28(3), 192-206.

Ramya Bala P., Nakamura, T., Sajeev, K. & Sukumar, R. 2016. High-resolution age-depth chronology from tropical montane minerotrophic peat in the Sandynallah valley, Western Ghats, southern India: Analytical issues and implications. *Quaternary Geochronology* 34, 12-23.

Under preparation for 2025:

Yuwan Wang, Ted R. Feldpausch, Graeme Swindles, Patrick Moss, Hamish A. McGowan, Thomas Sim, Adam Benfield, Colin Courtney-Mustaphi, David Wahl, Esther Githumbi, Euridice N. Honorio Coronado, Femke Augustijns, Gert Verstraeten, Jess O'Donnell, John Tibby, Juan C.arlos Benavides, Karsten Schittek, K. Anggi Hapsari, Khairun Nisha Mohamed Ramdzan, Kunshan Bao, Lydia Cole, Lysanna Anderson, Magdalena Sobol, Mariusz Gałka, Encarni Montoya, Orijemie Emuobosa Akpo, Paul Strobel, <u>Prabhakaran Ramya Bala</u>, René Dommain, Rob Marchant, Sakonvan Chawchai, Sarah Finkelstein, Scott Mooney, Thomas J. Kelly, Yang Gao, Paul J. Morris, Apostolos Voulgarakis, Arnoud Boom, Chantelle Burton, Juan Carlos Berrio, Kelly Ribeiro, Liana O. Anderson, Mark Hardiman, Molly Spater, Raman Sukumar, Sarath Pullyottum Kavil, Susan E. Page, Angela Gallego-Sala. Peatland burning in the tropics over the past 2,000 years. *Under preparation for Global Change Biology*.

Nithin K., <u>Ramya Bala P.*</u>, Behera D., Anoop A., Sukumar R. Fire-Vegetation-Climate inter-relationships from the moist deciduous forest of Mudumalai National Park. *Under preparation for Fire Ecology*.

<u>Ramya Bala P.*</u>, Bauer, A., Velinsky, D., Lycett, M., Morrison, K. Using stable carbon and nitrogen isotopes to understand evolution of historic land-cover and land-use around a culturally modified hill-top rock pool at Kadebagilu, Tungabhadra River valley. *In preparation for submission to The Journal of Archeological Sciences: Reports.*

DiverseK 2024 Workshop Participants (including <u>Ramya Bala P.</u>) Mountain Biodiversity: The Past, The Present, The Future. *Policy Brief to be submitted to Nature Sustainability*.

INVITED TALKS & CONFERENCE PRESENTATIONS

- June 2024: Posters on 'Forest Fire-Vegetation-Human inter-relationships in Mudumalai National Park', Indian Wildlife Ecology Conference (IWEC 2024), Bengaluru; 'Understanding Paleoenvironments and Historical Land-Use Around a Culturally Modified Hill-Top Reservoir at Kadebagilu, Tungabhadra River Valley', at the 2nd Indian Quaternary Congress (IQC), Mohali, India
- April 2024: Virtual poster 'Reconstructing human-fire-vegetation inter-relationships in a protected dry tropical forest, Mudumalai National Park. Southern India', European Geosciences Union, **vEGU24**.
- January 2024: *Invited talk* on 'Forest, savanna, or both? Using paleoecology for landscape conservation in the Nilgiris' at the Laboratory for Conservation of Endangered Species (LACONES), Centre for Cellular and Molecular Biology (CCMB), Hyderabad, India.
- August 2023: *Invited talk* on 'Reconstructing the environmental history of the Nilgiris Biosphere Reserve vegetation, climate, humans, and fires', **Georg-August-Universität, Göttingen,** Germany.
- July 2023: Talk titled 'Settling the debate on anthropogenic origins of high-elevation grasslands in the Nilgiris, southern India: implications for ecosystem management', **INQUA XXI Congress**, Roma, Italy.
- March 2023: Talk on 'Paleovegetation dynamics in a montane vegetation mosaic in the Western Ghats, India: evidence for alternative stable states in the past?', INQUA-HaBCom LEM2023, Amravati, India.
- December 2022: American Geophysical Union (AGU 2022), co-authored 1 oral and 2 posters, titled 'Reconstructing environmental history using fire and non-aromatic and polycyclic aromatic hydrocarbons in a tropical dry forest, Mudumalai Tiger Reserve, southern India', 'Surface sampling of wetlands in a tropical dry forest after a large fire: Wind direction dominates macrocharcoal deposition'.
- December 2021: Virtual posters in AGU 2021, 'The role of short-term disturbances in paleovegetation dynamics in a
 montane forest-grassland vegetation mosaic, Western Ghats, India' & 'Using Stable Carbon and Nitrogen isotopes to
 understand paleo-environments and historical land-use around a culturally modified hill-top reservoir at Kadebakele,
 Tungabhadra River Valley, peninsular India'.
- April 2021: Virtual presentation 'Rare Earth Elements as geochemical tracers of paleo-environments in tropical montane peat, Western Ghats, India', **vEGU21**.
- June 2018: Posters on 'Comparative analysis of pollutants in polar, high- and low-altitude cryoconites' POLAR 2018 Davos, Switzerland, & CNFRA, Strasbourg, France (14th Scientific Days Polar Research.
- January 2016: Poster on 'Using proxies unexplored in Indian peat: a case study from Sandynullah, the Nilgiris', INQUA-HaBCom workshop 'Prehistory, Plants and People', Puducherry & Chennai, India.
- August 2014: Talk on 'Variations associated with pre-treatment method in radiocarbon age measurement from mineral rich peat, India', Radiocarbon in the Environment, Belfast, N. Ireland.

RESEARCH GRANTS

I have been awarded the Direct-Aid Program funding from the Australian Government (~6000 USD) under two pillars – 'Women in Tech' & 'Agriculture, Climate & Environment'.

I initiated project CRYO-OHM I with Dr. Gaël LeRoux at EcoLab, Toulouse, on multidisciplinary characterization of cryoconites from glaciers in the Pyrenees, southern France. I led the 2018 expedition and **co-authored funding applications** using the preliminary results for CRYO-OHM II (6000 EUR) and CRYO-LEGACY (15,500 EUR) **successfully**.

I **contributed to the funding application** for National Geographic: Enduring Impacts – Archaeology of Sustainability (50,000 USD) with Prof. Kathleen Morrison at University of Pennsylvania to gather new paleo-data to infer human-environment-climate interactions in the Holocene (6000 yrs) in India.

As part of a Memorandum of Understanding with Ghent University at my current host institution NIAS, I wrote a proposal for the **Flemish Research Council Young Investigators' Grant** with Dr. Daniela De Simone for 20,000 EUR.

RESEARCH HIGHLIGHTS

- The sediment profile from the wettest site in Mudumalai Tiger Reserve shows a low-burning history with no major changes in fire in the past 800 years, a first result from this region (poster preprint available AGU 2022).
- We found that wind is the major factor for deposition of fire proxies during an active forest fire in the Bandipur Tiger Reserve, a first report on an active forest fire in India (Nithin Kumar et al. 2023)
- I found the second recorded evidence in the world for the existence of alternative stable states in the past in the Sandynallah peat valley, Nilgiris (Ramya Bala et al. 2022)
- We found the first evidence for the existence of a pastoralist community that managed their environment with fires at 1500 BCE in the upper Nilgiris through fecal biomarkers, charcoal and dung fungal spores, this work was covered by popular English national daily <u>Times of India</u> (Kavil et al. 2021).
- We found evidence indicative of change in fodder or crop cultivation synchronous with the establishment of the historic capital city Hampi in the Vijayanagara empire, I also found highly enriched N isotope indicative of animal husbandry (poster preprint available AGU 2021).
- I showed that the radiocarbon pretreatment laboratory errors were 1-2 orders of magnitude more than the internal statistical error of the AMS (Ramya Bala et al. 2016)
- I reported for the very first time inorganic geochemical indices, Rock-Eval indices and C/N ratios from Indian peatlands (Ramya Bala, PhD thesis)
- We showed a very high concentration of nuclear accident artificial radionuclides in the glaciers, also found radiation-resistant bacteria, the first report from the Pyrenées, France (under preparation for submission).

INTERNATIONAL COLLABORATIONS, NETWORKING EXPERIENCE

My enthusiasm for hands-on laboratory experience has taken me around the globe. I have active collaborations spread across multiple cities in India, in addition to Japan, France, Germany, Belgium, and the USA. Currently I have been inducted into an **MoU with Ghent University** to contribute to the 'Nilgiris Archeological Project'. I made my host lab in France a member of the European Consortium for tracer analysis from glaciers. In the USA, I made lab visits to Penn State University (biomarkers), University of Minnesota (LacCore - coring logistics), United States Geological Survey - USGS Menlo Park (automatized charcoal counting), Drexel University (stable C, N isotopes), successfully setting up collaborations.

LABORATORY EXPERIENCE

I have been fortunate to get trained in laboratories in many parts of the world and in several cities across India. Listed below are some of my laboratory trainings and experiences -

- Stable carbon isotope analysis on bulk peat at Physical Research Laboratory (PRL), Ahmedabad, plant samples and cellulose extracts at Centre for Earth Sciences, Indian Institute of Science (IISc), Bengaluru, sediment samples at Drexel University, Philadelphia.
- *Total Organic Carbon, Nitrogen* analysis at PRL, Ahmedabad, on peat samples and National Centre for Biological Sciences (NCBS), Bengaluru, on plant samples to build a modern baseline C/N ratio.

- *Rock-Eval analysis* at National Geophysical Research Institute (NGRI), Hyderabad, to evaluate Rock-Eval indices as indicators of decomposition in peat.
- Inductively Coupled Plasma Optical Emission Spectroscopy and Mass Spectrometry (ICP-OES & ICP-MS) at EcoLab, Toulouse, France. Learnt clean-room techniques for extraction of the inorganic constituents in peat (using hot plate method) and analysis of the extracts to track paleoenvironments.
- *Radiocarbon dating* at the TANDETRON AMS Lab, Division for Chronological Research, Nagoya University, Japan. Trained in Acid-Alkali-Acid chemical pre-treatment and graphitization.
- DNA extraction and amplification (16S rRNA, prokaryote gene) to determine the microbiome.
- *Gamma Spectrometry* to measure radioactive nuclides, both natural and artificial.
- *Clean room class 1000* training to prepare water samples for ICPMS.
- I installed a pilot setup for *3D photogrammetry* to study the evolution of cryoconite holes.
- Mercury analysis *Direct Mercury Analyzer (DMA)* at Geosciences Environnement Toulouse (GET).
- Radiocarbon target preparation in Graphitization Lab, Inter-University Accelerator Centre, New Delhi.
- Extraction of biomarkers for plants, fires: ASE extraction and column chromatography for LC-MS-MS and GC-MS (Georg-August University of Goettingen, Germany)

SCIENCE WRITING AND OUTREACH

My enthusiasm to spread the word about the science I do made me pursue *science writing* as a serious hobby. I am on the team of writers at Research Matters which provides press releases which simplify science for lay persons and journalists, one of <u>my press releases</u> was published in Deccan Herald, an English language daily.

Museum Work - I volunteered at Penn Museum to lead <u>The Daily Dig</u> series, communicating research on museum objects, and in outreach at Academy of Natural Sciences, Drexel University, a dinosaur-centric museum.

LABORATORY SETUP AND LEAD ROLES

I set up laboratories – purchase, procurement, installation, and clearances during my PhD (IISc) and postdoc (UPenn). I was given the lead role in the CRYO-OHM project at EcoLab, France, which involved decisions of sampling protocols, purchase, expedition preparation in addition to sample processing.

ACADEMIC MENTORSHIP, TEACHING

I mentored 2 master's students during my PhD. I am mentoring a PhD student and have advised 3 bachelor's student final year dissertations in my current stint at NIAS.

I teach PhD-level course on 'A Primer to Reconstructing Environmental and Climatic History' at NIAS. I have given guest lectures on Radiocarbon dating in an Undergraduate-graduate level course 'Archeobotany' at University of Pennsylvania.

RESPONSIBILITIES UNDERTAKEN

- ***** Reviewer for the Journal of Tropical Ecology (Cambridge Core)
- ***** Reviewer for Student Conference on Conservation Science (SCCS) 2023
- Co-convenor, for Symposium 'Learning from the past for landscape management and conservation' at IWEC 2024.

2024: Organized NIAS Social Mixer for student annual symposium

2023 - Master of the ceremony and co-organizer of NIAS Foundation Day 2023

2015 – Organized conference: 'Ecology in Space and Time' hosted by the Centre for Ecological Sciences, IISc, workshop: 'Geochronology: Challenges and possibilities' hosted by Centre for Earth Sciences, IISc.

2012-14 – Headed and coordinated activities of the Hostels and Social Initiatives committees, under the Students' Council, Indian Institute of Science, Bangalore.

2012 - Convened annual In-house symposium at Centre for Earth Sciences, Indian Institute of Science.

2008 - Head of Organization committee for international symposium, Biotechcellence'08, Anna University, Chennai.

FIELD EXPERIENCE

- I continue to organize sampling both excavation and manual coring in the seasonal wetlands of the Mudumalai Tiger Reserve, I also sampled surface waters and surface sediments.
- During my first post-doc, I took part in expeditions in sub-zero temperatures for sample collection from the sea-ice in Gulf of Bothnia and from the Ossoue glacier in the Pyrenees, France. I was also part of expeditions to high-altitude peatlands in the Pyrenees for routine monitoring.
- For my PhD, I undertook several short field expeditions to my field site at Sandynullah, Nilgiris, for collection of plants, groundwater monitoring as well as rainwater collection. I organized a team expedition to procure core samples (using a manual corer) from the peat at the same site.
- I have completed a two-week long adventure training camp conducted by the National Institute for Mountaineering and Allied Sports at Dirang, Arunachal Pradesh.
- As a Nature Club member at IISc, I participated in weekend camps for Rock climbing and Aquatic Sports conducted by the General Thimmayya National Academy of Adventure, Karnataka.
- I participated in the 39th and 40th *Shodh Yatras*, a walk of learning covering ~100 km in a week through remote rural areas, aimed at discovering creativity and innovation at the grassroots. This journey exposed me to the extreme summer (Bargad, Odisha) and extreme winter (Gurez valley, Kashmir) and associated hardships of rural India.

COMMUNITY ENGAGEMENT

- Convener of the *Social Initiatives committee*, Students' Council (2012-13) at IISc, we organized an activity: 'Help the Needy' for donation of reusable materials such as clothing, books, toys and bedding to the underprivileged in our city. We collected useful materials from the institute community and distributed them to various recipients such as slum/shack dwellers and orphanages for the blind. In this committee, we also populated and maintained a blood donor database for the institute community.
- As a part of the *Women's welfare committee* at IISc, I helped to organize a workshop 'Blank Noise' about street sexual abuse, popularly known as eve-teasing in India.
- At IISc, I volunteered and continue to volunteer for *Notebook Drive*, an organization that engages in educational activities for the underprivileged. I taught English at a local school for three years (2015-16, and currently in 2022) on Saturdays, to help underprivileged children (10–12-year-olds). I wrote about my experience in our campus newsletter, that can be found <u>here</u>.
- I also volunteered for SWAMII, *Solid Waste Management Initiative* at IISc. This involved setting up labelled bins for solid waste segregation, spreading awareness among visitors and residents about segregation guidelines.
- I participated in the 39th and 40th Shodh Yatra, a walk of learning through rural India. As a team, we documented traditional knowledge, traditional recipes with forgotten/rare plants, and agricultural hacks that farmers had developed for local challenges. We felicitated rural artisans, biodiversity conservationists and innovators. The experience was transformative, and I have written a short piece about it in CONNECT, IISc's campus magazine.

REFERENCES

- 1. Shailesh Nayak Director, National Institute of Advanced Studies, Bengaluru 560012 <u>director@nias.res.in</u>
- 2. Sajeev Krishnan Professor, Centre for Earth Sciences, Indian Institute of Science, Bengaluru 560012 sajeev@iisc.ac.in
- 3. Raman Sukumar Hon. Professor, Centre for Ecological Sciences, Indian Institute of Science, Bengaluru 560012, <u>rsuku@iisc.ac.in</u>
- 4. Kathleen Morrison Chairperson, Department of Anthropology, University of Pennsylvania, Philadelphia, USA, <u>kathy.morrison@sas.upenn.edu</u>
- 5. Gael Le Roux Research Director, CNRS, EcoLab, ENSAT, Toulouse, France gael.leroux@toulouse-inp.fr, gael.leroux@ensat.fr