ANANDA SHIKHARA BHAT

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EDUCATION

Johannes Gutenberg University, Mainz, Germany *2024-Present*
PhD student *Supervisor: Hanna Kokko*

Indian Institute of Science Education and Research (IISER), Pune, India *2018-2023*
Integrated Bachelor and Master of Science (BS-MS). Specialization in Biology
MS thesis: "Eco-evolutionary dynamics of finite populations from first principles"

RESEARCH INTERESTS

I am an evolutionary ecologist and PhD student at the Johannes Gutenberg University in Mainz, Germany. I am broadly interested in studying systems with a strong interplay between ecological and evolutionary processes. I believe the best way to approach this is to use the powerful insights provided by rigorous mathematical theory and modelling while relying on empirical data to shape, guide, and verify these mathematical constructs. This approach requires integrative approaches and extensive communication between theorists and empiricists. I am interested in approaching this interface from the theory side, using models informed by empirical insights. I am currently working on modelling senescence. I have previously worked on demographic stochasticity and alternative reproductive tactics.

PUBLICATIONS

Publications that I think are particularly important or notable contributions are in **this colour**. I am the first author on all such highlighted publications and was the primary contributor to all aspects of the manuscript.

Journal Articles († indicates co-first authors)

[6] **Ananda Shikhara Bhat**, Suryadeepto Nag, and Sutirth Dey (2026). "Cooperation destabilizes communities, but competition pays the price". *Journal of Biosciences* 51. DOI: 10.1007/s12038-025-00574-8.

[5] **Ananda Shikhara Bhat** (2025). "A stochastic field theory for the evolution of quantitative traits in finite populations". *Theoretical Population Biology* 161, pp. 1–12. DOI: 10.1016/j.tpb.2024.10.003.

[4] **Ananda Shikhara Bhat** and Vishwesha Guttal (2025). "Eco-Evolutionary Dynamics for Finite Populations and the Noise-Induced Reversal of Selection". *The American Naturalist* 205.1, pp. 1–19. DOI: 10.1086/733196.

[3] Mohammed Aamir Sadiq†, **Ananda Shikhara Bhat**†, Vishwesha Guttal, and Rohini Balakrishnan (2024). "Spatial structure could explain the maintenance of alternative reproductive tactics in tree cricket males". *Biology Open*, bio.060307. DOI: 10.1242/bio.060307.

[2] Abhinava Jagan Madabhushi, **Ananda Shikhara Bhat**, and Anand Krishnan (2023). "Allopatric montane wren-babblers exhibit similar song notes but divergent vocal sequences". *Behavioral Ecology and Sociobiology* 77.10, p. 109. DOI: 10.1007/s00265-023-03385-9.

[1] **Ananda Shikhara Bhat**, Varun Aniruddha Sane, K.S. Seshadri, and Anand Krishnan (2022). "Behavioural context shapes vocal sequences in two anuran species with different repertoire sizes". *Animal Behaviour* 184, pp. 111–129. DOI: 10.1016/j.anbehav.2021.12.004.

Submitted and In Prep (drafts available on request)

[3] **Ananda Shikhara Bhat** and Hanna Kokko (2026). "Demographic senescence as multi-level selection in miniature". *Expected to be on bioRxiv/arXiv by mid/late 2026.*

[2] Bhat, Ananda Shikhara and Hanna Kokko (2026). "Stochastic failure accumulation as a foundation for exponential mortality and selective disappearance". BioRxiv. DOI: 10.64898/2026.05.25.727614.

[1] Gaurav Athreya, **Ananda Shikhara Bhat**, Arvid Ågren, Yagmur Erten, and Thomas Keaney (2026). "Internal Evolutionary Conflicts: A Mathematical Primer". Submitted, *Journal of Evolutionary Biology.*

† co-first authors

TALKS

Invited Talks

[2] Seminar at the Evolutionary and Organismal Biology unit of the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) Bengaluru, 2023. **Title:** "Eco-evolutionary dynamics of finite populations from first principles"

[1] Drosophila Eco-Evo Supergroup India, Monthly Seminar, June 2023 (virtual); **Title:** "Eco-evolutionary dynamics of finite populations from first principles"

Conference and workshop talks

[6] European Society for Evolutionary Biology (ESEB) 2025, Barcelona, Spain; *Title: "Eco-evolutionary dynamics of finite populations from first principles and the noise-induced reversal of selection"*

[5] Gutenberg Workshop on the Evolution of Ageing 2024, Ingelheim, Germany; *Title: "Ageing as an emergent property of complex collectives"*

[4] ESEB STN on Internal Conflicts in Biology 2024, Groningen, Netherlands; *Title: "Ageing as an emergent property of complex collectives"*

[3] European Meeting for PhD Students in Evolutionary Biology (EMPSEB) 2024, Puchberg am Schneeberg, Austria; *Title: "The evolution of ageing as a consequence of limited phenotypic plasticity"*

[2] Mathematical Models in Ecology and Evolution (MMEE) 2024, Vienna, Austria; *Title: "Eco-evolutionary dynamics for finite populations and the noise-induced reversal of selection"*

[1] Society of Integrative and Comparative Biology (SICB) 2022, online conference (Selected as a finalist for the Marlene Zuk best student presentation award); *Title: "Context-dependent changes of vocal sequence structure in anurans"*

Posters

[2] Evolution 2022, Cleveland, USA (funded by an SSE travel grant) - **Cancelled due to excessive visa wait times**
Title: "Spatial structure explains the ecological coexistence of alternative reproductive tactics in a tree cricket"

[1] Bangalore School on Population Genetics and Evolution 2022, International Center for Theoretical Sciences, Bangalore, India; *Title: "Spatial structure explains the ecological coexistence of alternative reproductive tactics in a tree cricket"*

AWARDS AND SCHOLARSHIPS

[4] Selected for the **Princeton EEB Mentors Program** 2022.

[3] **Undergraduate Diversity in Evolution (UDE) award by the Society for the Study of Evolution (SSE)**: a travel grant to attend the Evolution 2022 conference in Cleveland, USA.

[2] **Finalist** for the **Marlene Zuk Best Student Presentation Award at SICB 2022**.

[1] Kishore Vaigyanik Protsah Yojana (KVPY) scholar 2018, All India Rank 494. KVPY is a competitive national fellowship in basic sciences awarded by the Department of Science and Technology (DST), Government of India.

SERVICE

- **Peer Review:** I have reviewed papers for *Animal Behaviour, Behavioral Ecology, Ecology Letters, Evolution Letters, Evolution, Proceedings B, Philosophical Transactions B, Journal of Theoretical Biology, Methods in Ecology and Evolution, Theoretical Population Biology, PLOS Genetics*, and *Physical Review E*.
- **Conference Organisation:** Helped with website creation and miscellaneous organisation for the German Evolutionary Meeting 2027 in Mainz, Germany.

TEACHING

- **JGU, Mainz, Germany**:
  - Course organiser and instructor for **Evolutionary Modelling II**, offered to second year Masters' students in biology.
  - Lecture on **Introductory Evolutionary Game Theory** as part of the course **M14A16: Theoretische Evolutionsbiologie und Ökologie** offered to final year undergraduates.
- **IISc, Bengaluru, India**: Lecture series on **Stochastic Calculus, Master Equations, and Diffusion Approximations** to Masters students and PhD students at the Centre for Ecological Sciences. The last lecture in this series is also available online on YouTube.

OUTREACH

- Helped shoot a short conservation film on the long-billed vulture population around Bengaluru, India. I also helped with the Kannada language translation of a short animation on the same topic, facilitated by the Karnataka forest department.
- Stall on cricket bioacoustics at IISc open day 2023. The open day is a day when staff/students use interactive demonstrations to teach scientific concepts to the general public.
- "Croaking to your audience" (2022), an article on anuran bioacoustics for JLR explore, a platform for showcasing lesser-known aspects of the natural history of Karnataka, India.
- "A Ribetting Performance: Frogs arrange croaks in a context-dependent manner" (2022), an article on our *Animal Behaviour* paper for Herpclub, a science communication initiative to communicate herpetological research on Indian taxa to non-scientific audiences.

COMMITMENT TO OPEN SCIENCE

I have published almost exclusively in society journals; my *TPB* (not society-run) manuscript is published as an open-access article under a CC-BY license. All my publications are available on either arXiv or bioRxiv, and PDFs of the typeset versions are available on my website. All code associated with my publications is uploaded onto GitHub repositories. All recorded online talks that I have given are publicly available on YouTube. I have made the LaTeX associated with my Master's dissertation available on GitHub. I also link to several online resources related to academia and PhD applications (particularly for students from the Global South) on my website.