Dr. Thejasvi **Beleyur**

Postdoctoral researcher

thejasvib@gmail.com | thejasvibr.github.io | thejasvibr

Work Experience

Research group leader (soon to be)
Centre for the Advanced Study of Collective Behaviour (CASCB), Konstanz, Germany
March 2024 onwards

Group leader of the 'Active Sensing Collectives' research group

CASCB Postdoc Award
CASCB, Uni. Konstanz
Dec 1 2023 - Feb 28 2024

Competitive award for promising postdocs looking to start their own groups.

DFG Postdoctoral grant holder
Dept. of Biology, Uni Konstanz, Germany
Aug 1 2022- Nov 30 2024

DFG Walter Benjamin Awardee

Postdoctoral researcher
CASCB, Uni. Konstanz
April 1 2022-June 30 2022

Extension contract for CASCB work

Postdoctoral researcher
CASCB, Uni Konstanz
March 15 2021-March 14 2022

Developing analysis workflows to analyse the Ushichka dataset

Doctoral work on IMPRS contract
Max-Planck Institute for Ornithology, Seewiesen, Germany
June 1 2020- Nov 31 2020

Modelling and multi-sensor tracking of free-flying bat groups

Doctoral work on DAAD scholarship
Max-Planck Institute for Ornithology, Seewiesen, Germany
Sep 1 2015- Feb 28 2020

Modelling and multi-sensor tracking of free-flying bat groups

Research assistant and lab manager
Azim Premji University, Bengaluru, India
Aug 1 2014 - July 31 2015

Social spider web construction and setting up undergraduate laboratory facilities

Breaks/part-time work in career

- 29/12/2022 - 28/2/2023 : full-time parental leave (Elternzeit)
- 29/12/2023 - 28/4/2024 : 60% full-time work on parental leave (Elternzeit)

Education

PhD
University of Konstanz, Germany
2015-2021 (Defence: 10th June 2021)

PhD thesis: Theoretical and empirical investigations of echolocation in bat groups

BS-MS dual degree in Biological Sciences
IISER-Thiruvananthapuram, India
2008-2013

Masters thesis: Task differentiation during prey capture and retreat-mate recognition in the Indian social spider, Stegodyphus sarasinorum (eresidae)

Awards and grants

Carl Zeiss Nexus grant
CASCB, Uni. Konstanz
2024

Research group grant promoting interdisciplinary science

CASCB Postdoc Award
CASCB, Uni. Konstanz
2023

Competitive award for promising postdocs looking to start their own groups.

CASCB Postdoc grant
CASCB, Uni. Konstanz
2023

Postdoc grant for promising early-career researchers

CASCB Small grant — *CASCB, Uni. Konstanz*

Pilot grant to build a robotic bat platform — *2023*

Best Early Career Researcher talk — *International Bioacoustics Society conference, Japan,2023*

IBAC 2023 — *2023*

Walter Benjamin Position — *Department of Biology, Uni. Konstanz*

DFG Postdoctoral Grant — *2022.*

Young Scholar Fund Award — *CASCB, Uni. Konstanz*

Bridge fellowship — *2022*

CASCB Medium Grant — *CASCB, Uni Konstanz*

Post doc grant — *2021-2022*

IMPRS Bridge Award — *IMPRS for Organismal Biology*

Award to wrap up PhD — *June 2020- Nov 2020*

DAAD-GSSP scholarship — *German Academic Exchange Service (DAAD)*

Scholarship awarded to pursue doctoral studies — *2015-2020*

IMPRS best paper award — *IMPRS for Organismal Biology*

Annual award given to best papers submitted in the graduate school. — *2020*

Google Cloud Platfrom Research Credits — *Google Cloud*

A 1000$ grant that provides access to cloud computing resources to execute simulations for Beleyur & Goerlitz 2019 — *2019*

IMPRS travel grant — *IMPRS for Organismal Biology*

Travel grant awarded to attend the SNAK 2018 acoustics course in Odense, Denmark — *2017*

Publications

1. Jandeleit, J., Beleyur, T., & Goldlücke, B. (2024). Aligning thermal cameras with LiDAR scenes in subterranean environments. *CV4Animals Workshop (CVPR Seattle 2024)*. `https://www.cv4animals.com/`
2. Framond, L. de, Beleyur, T., Lewanzik, D., & Goerlitz, H. R. (2023). Calibrated microphone array recordings reveal that a gleaning bat emits low-intensity echolocation calls even in open-space habitat. *Journal of Experimental Biology*. `https://doi.org/10.1242/jeb.245801`
3. Beleyur, T. (2022). beamshapes: A Python package to generate directivity patterns for various sound source models. *Journal of Open Source Software*, *7*(69), 3740. `https://doi.org/10.21105/joss.03740`
4. Beleyur, T., Murthy, T. G., Singh, S., Somanathan, H., & Uma, D. (2021). Web architecture, dynamics and silk investment in the social spider Stegodyphus sarasinorum. *Animal Behaviour*, *179*, 139–146.
5. Beleyur, T., & Goerlitz, H. R. (2019). Modeling active sensing reveals echo detection even in large groups of bats. *Proceedings of the National Academy of Sciences*, *116*(52), 26662–26668.
6. Batstone, K., Flood, G., Beleyur, T., Larsson, V., Goerlitz, H. R., Oskarsson, M., & Astroem, K. (2019). Robust self-calibration of constant offset time-difference-of-arrival. *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 4410–4414.
7. Beleyur, T., Bellur, D. U., & Somanathan, H. (2015). Long-term behavioural consistency in prey capture but not in web maintenance in a social spider. *Behavioral Ecology and Sociobiology*, *69*(6), 1019–1028.
8. Beleyur, T., Abdul Kareem, V. K., Shaji, A., & Prasad, K. (2013). A mathematical basis for plant patterning derived from physico-chemical phenomena. *Bioessays*, *35*(4), 366–376.

Mentoring

Name	Year	Title	Degree	Affiliation	Co-supervisors
Gabriele Baroli	2024	To be finalised (thesis building an active-sensing echolocating robotic platform)	Masters in Audio Engineering	Polytechnic University of Milan	Dr. Andreagiovanni Reina, Prof. Heiko Hamman
Alberto Doimo	2024	RO-BAT: A bat-inspired approach on mobile robot navigation using Direction of Arrival estimation	Masters in Audio Engineering	Polytechnic University of Milan	Dr. Andreagiovanni Reina, Prof. Heiko Hamman
Julian Jandeleit	2021	Lidar assisted depth estimation for thermal cameras	Bachelors in Computer Science	University of Konstanz	Prof. Bastian Goldluecke
Giray Tandogan	2021	3d trajectory reconstruction for animal data	Masters in Computer Science	University of Konstanz	Dr. Hemal Naik, Prof. Oliver Deussen
Aditya Krishna	2018	Examining the behavioural and acoustic adaptations of free-flying horseshoe bats in response to jamming	BS-MS integrated	IISER Mohali	Neetash Mysuru, Dr. habil. Holger R Goerlitz
Claire Guerin	2016	Quantifying potential sensory interference in bat aggregations	Erasmus Mundus project	LMU Munich	Dr. habil. Holger R Goerlitz

Teaching

Lectures

- 2024 'Animal Behaviour' undergraduate course (Uni. Konstanz) lecture on *Sensory ecology, animal behaviour and collectives*
- 2023 lecturer at the Konstanz School of Collective Behaviour, Uni. Konstanz, *Acoustic tracking from easy to crazy*

In-house talks and workshops on software and coding practices

- *Version Control for Organismal Biologists*: introductory workshop on why one should use version control and how to do it with Git (3 workshops so far)
- *Python for Organismal Biologists*: introductory workshop on using Python for scientific computing with example code and Jupyter notebooks that participants run during the workshop (2 workshops so far)

Scientific software packages

I strive to make the code I write for various projects as modular and re-usable as possible while adopting software development best practices. A selection of packages that I've written, along with a short description.

- `beamshapes`: computational implementations of various sound-radiation models. The models can be used to perform predictions for planned experiments, or parameter inference. *Paper hyperlink*. *Online docs hyperlink*
- `itsfm`: segments sounds based on frequency modulation. Various inbuilt and custom measurements can also be performed on the segmented audio. *Preprint hyperlink*. *Online docs hyperlink*
- `batracker` (*under development*): a bat-centric acoustic tracking package developed to handle simple (single-few bats, clean recordings) to complex (multiple bats, overlapping calls, reverberance) datasets using the latest in signal analysis and tracking algorithms. To my knowledge, this is the first bat-centric open-source package in development. *Online docs hyperlink*

Technical skills

- Acoustic and video tracking of animals
- Design, execution and analysis of bioacoustics and animal behaviour experiments
- Experience handling animals (ants, spiders, bats) and managing field work
- Signal and image analysis, digital data acquisition methods
- Writing readable and reproducible scientific code
- Coding in order of language proficiency: Python, R, MATLAB
- Writing and maintaining scientific software packages

Other Competencies

- Scientific manuscript and grant writing
- Track record of working in interdisciplinary environments

Languages spoken (self-assessed CEFR levels)

The CEFR (link) has three divisions (A: basic user, B: independent user, C: proficient user). Each divisons has two levels (1,2).

- English: C2 (proficiency)
- German: B1 (upper intermediate)
- Kannada: B1
- Hindi: B1
- Bahasa Indonesia: A2 (elementary)

Public outreach

My German is good enough to allow semi-technical conversations that convey my enthusiasm for bats, echolocation and the techniques we use to study them. I use the various opportunities to interact with the public:

- September 2018, 'Fledermausführung': I co-led a 'bat walk' session for a group of school children while talking about the biology, behaviour and techniques related to bats.
- July 2017, BIOTOPIA Stadtteilfest: I was in charge of explaining various exhibits highlighting animal and plant forms as part of a one-day even to increase public awareness of the then newly opened BIOTOPIA museum.
- June 2017, Tag der Oeffenen Tür: Open day at the Max-Planck Institute for Ornithology, Seewiesen. I was part of an exhibit showcasing various aspects of bat biology and echolocation research done in my former lab.
- January 2017, BIOTOPIA inauguration event: I had an exhibit showing a live feed of a single thermal camera as people walked by, explaining how it works, and how we use them in our research studying bats in the dark.