Vasudha Kulkarni

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Education

Institute of Science and Technology Austria (ISTA) Sept 2024 - Present
Ph.D.

Indian Institute of Science Education and Research (IISER), Pune Aug 2019 - May 2024
BS-MS in Biology CGPA: 8.7

Master's Thesis

Behavioural Synchrony in Common Marmosets June 2023 - May 2024
with Prof. Judith Burkart and Nikhil Phaniraj at the University of Zurich (Thesis)
Establishing an automated 3D pose-tracking pipeline to study gaze following, interpersonal behavioural synchrony and posture imitation in common marmosets using DeepLabCut.

Research Experience

Reinforcement-induced reduction of number of INs in Zebra Finches Spring 2023
with Dr. Raghav Rajan at IISER Pune (Report)
I conducted a closed-loop behavioural assay using syllable variance measured in real-time to provide negative reinforcement against a high number of introductory note syllables (INs). We saw a significant reduction in the mean number of INs in a test bird.

Comparative Analysis of Introductory Notes across Four Estrildid bird species Fall 2022
with Dr. Raghav Rajan and Nandu T. S. at IISER Pune (Report)
We compared the song sequences of four Estrildid species using vocal recordings and found that the progression of initial syllables in the song is similar to the patterns observed in introductory notes of Zebra finches.

Effect of Recent Pathogen Experience on Sanitary Brood Care in Ants Summer 2022
with Prof. Sylvia Cremer and L. Sartoris at the Institute of Science and Technology Austria (Report)
In this project, we first exposed ants to a fungal pathogen for a brief period and later to contaminated larvae, to test if recent pathogen experience modulates grooming behaviour, but we didn't find any effect. Using quantitative PCR, we concluded that a low-level contamination is lethal for isolated larvae, but not adult ants.

Reading and Writing Project on Animal Behaviour Summer 2021
with Prof. Raghavendra Gadagkar at the Indian Institute of Science (Report)
This summer project involved reading several books on animal behaviour, and writing articles based on them, one of which got published on a science communication platform. I also did a literature review of common principles across social and individual immunity.

Poster Presentations and Talks

- **Kulkarni, V.** Phaniraj, N. Burkart, J. Automated Tracking of Behavioural Synchrony in Common Marmosets. Gesellschaft fur Primatologie (GfP) Conference, Konstanz. March 2024

- **Kulkarni, V.** Phaniraj, N. Burkart, J. Behavioural Synchrony in Common Marmosets. Institute of Evolutionary Anthropology (UZH) Symposium talk. Nov 2023
- **Kulkarni, V.** Rajan, R. Reinforcement-induced Reduction of number of Introductory Notes. IISER Pune Biology Undergraduate Poster Session. April 2023

Relevant Coursework

- **Biology** - Animal Behaviour, Neurobiology I, Evolution, Ecology I and II, Animal Physiology I and II, Chemical Ecology, Mathematical and Computational Biology, Statistics for Life Scientists, Physiology, Genetics, Cell Biology, Biology of Systems
- **Data Science** - Data Analysis, Bioinformatics, Introduction to Statistical Learning, Generalized Linear Models and their Applications
- **Mathematics** - Multivariable Calculus, Linear Algebra, Introduction to Probability and Statistics
- **Humanities** - History of Science, Science and Society, Political Ecology, Political Thought in India, Disasters and Society, Diseases and Discourse, Contemporary Stories from the Subcontinent

Skills

- **Programming Languages and Applications:** Python, R, Julia, Matlab, Shell scripting; DeepLabCut, Formicidae-Tracker, Python-based recording and annotation programs, Inkscape
- **Libraries:** Numpy, Matplotlib, Pandas, Scipy, Statsmodels, PyQt in Python; Graphs and GLMakie in Julia, Computer Vision Toolbox in Matlab
- **Ethological and wet lab skills:** Expertise in handling and maintaining ant colonies, zebra finches and marmosets; behavioural annotation, designing and building experimental tasks, DNA extraction and quantitative PCR
- **Languages:** Fluent in English, Kannada, and Hindi; familiar with Sanskrit

Scholarships and Awards

- **A H Schultz Grant** (16,100 CHF) - A support grant from the A H Schultz Foundation for my master's thesis at the University of Zurich
- **KVPY Fellow** ($\approx$ 5,600 USD) - Kishore Vaigyanik Protsahan Yojna (Young Scientist Encouragement Program), 2019 - 2024, Department of Science and Technology, Government of India

References

Prof. Sylvia Cremer (ISTA)
Email: Sylvia.Cremer@ist.ac.at

Prof. Judith Burkart (University of Zurich)
Email: judith.burkart@aim.uzh.ch