Akilan Ramakrishnan

Curriculum Vitae

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Academic Details

Jan 2021–Expected Dec 2025 **BS-MS Dual Degree**, *Indian Institute of Science Education and Research (IISER) Pune*, India, *CGPA: 8.0/10 (First 4 years)*

Master's Thesis (Game Theory,)

Jan 2025 - Dec 2025 Investigating the role of social and environmental information in promoting long-term collective action under the risk of catastrophic climate change

Supervisor **Dr. Wolfram Barfuss**, University of Bonn, Germany

- Simulating 'Ecological Public Goods Game' to understanding different informational conditions to compare cooperation levels
- Implementing **multi-agent reinforcement learning** with **partial observability**
- **Metagame analysis** to extract dominant strategies; contributing to **PyCRLD python package**

Publications

2025 **Effects of Interspecific Mating on Population Viability**.Ramakrishnan, A., Keaney, T., & Kokko, H. (in preparation)

Research Projects

Jan 2024–Nov 2024 **Summer Internship (Mathematical Biology)**, *with Prof. Hanna Kokko, JGU, Mainz, Germany*,
Objective: Developing a mathematical model to study ecological and evolutionary consequences of interspecific mating
Key learnings: Fundamentals of Theoretical Evolutionary Ecology, Mathematical modelling of a complex, dynamic system, Simulation, Data Visualisation

Jan 2024–April 2024 **Semester Project (Data Science)**, *with Prof. Joy Merwin Monteiro, IISER Pune*,
Objective: Studying agent-based models in ecology, with a focus on replicating existing models and improving their computational efficiency
Key learnings: Simulation, Code Optimisation, Object-Oriented Programming

Aug 2023–Dec 2023 **Semester Project (Computational Biology)**, *with Prof. Sutirth Dey, IISER Pune*,
Objective: Exploring the effects of life-history traits on *Drosophila* metapopulation dynamics using individual-based simulations, validated against empirical data
Key learnings: Metapopulation theory, agent-based modeling, statistical validation techniques.

Jun–Aug 2022 **Summer Internship (Computational Biology)**, *with Dr. Milind Watve*
Objective: Developed a deterministic simulation model to study the evolution of 'selfishness' under multi-level selection.
Key learnings: Python programming, Simulation Development

Dec 2021–Jan 2022 **Winter Internship (Computational Biology)**, *with Prof. Rohini Balakrishnan, CES, Indian Institute of Science*
Objective: Analyzed katydid signaling behavior across lunar phases and its impact on predation risk using statistical methods in R.
Key learnings: Data organization, R programming, data visualization, data analysis, hypothesis testing

Aug 2024–Nov 2024 **Semester Project (Philosophy and Cognitive Science)**, *with Prof. G Nagarjuna, IISER Pune*,
Objective: Critically evaluating Chalmers' "Hard Problem" and its implications for the scientific study of consciousness. Key learnings: Critical Inquiry, Conceptual Analysis

Aug 2022–Nov 2022 **Semester Project (Experimental Biology)**, *with Prof. Sutirth Dey, IISER Pune*, Objective: Investigated the effect of gut microbes on Drosophila mating behavior using behavioral assays.

Conferences

Mar 2025 **Decisions, Games & Evolution, ICTS**, *Presented poster on role of information on cooperation under risk of ecological collapse*

Oct 2024 **Indian Society of Evolutionary Biologists Conference (ISEB5)**, *Presented poster on Eco-Evolutionary Consequences of Interspecfic Mating*

July 2023 **Understanding Behaviour Conference, IISER Kolkata**

Feb 2023 **Indian Evolutionary Biology Conference, Ahmedabad University**

2022, Dec **Non-Linear Systems and Dynamics, IISER Pune**

Workshops & Courses

2023 Dec **Workshop on Evolutionary Game Theory, SNU, Delhi, India**
Explored mathematical models of strategic interactions and learned about cooperation, decision-making, and adaptation in various domains including Economics, Physics, Chemistry, Biology and Sociology

2024 Aug - Oct 2024 **Course on Inquiry and Integration in Research, ThinQ Foundation**
Honed critical thinking and interdisciplinary problem-solving skills through structured inquiry, improving research methodology and analytical reasoning.

Feb 2024 **NIRMAN Youth Social Change-Making workshop**
Gained insights into social impact and strategies to solve real world challenges

Relevant Courses

Data Science and Statistical Learning | Bioinformatics | Bayesian Inference | Deep Neural Networks | Systems and Database | Graph Theory | Statistical Learning | Applied Mathematical Methods | Mathematical and Computational Biology | Mathematical Methods in Physics | Numerical Computation | Parameter Estimation and Inverse Theory | Nonlinear Dynamics | Discrete Structures | Linear Algebra | Probability Theory | Cognitive Basis of Science

Academic Achievements

- KVPY Indian National Science Fellowship (*99.7 %ile*)
- Qualified JEE Advanced (*99.5 %ile)*
- INSPIRE fellowship by the Dept. of Science & Technology, India

Skills

AI & ML: Reinforcement Learning, Multi-agent systems, Deep Neural Networks (Image Processing)
Libraries: PyCRLD, TensorFlow, Keras, Git

Mathematical Foundation: Game Theory, Non-Linear Dynamics, Graph Theory & Networks

Statistics: Statistical Modelling, Bayesian Inference, Hypothesis Testing, Data Wrangling & Visualisation
Libraries: NumPy, SciPy, Pandas, Tidyverse

Programming: Python, R, MATLAB, C, SQL, Bash

Modelling: Agent-Based Simulation, Ecological and Evolutionary Dynamics, Equation-Based Models

Scientific Workflow: Literature Review and Synthesis, Scientific Writing, Presentation, Collaborative Teamwork

Extracurricular Activities

- Helpline Volunteer, 1Life India, Mental Health & Suicide Prevention NGO Supported individuals in distress through active listening and crisis intervention (Jan 2025 - Present)
- State-level Chess player *FIDE Rating 1520*
- Volunteer at ConnectingTrust, Pune for mental health outreach.

Languages: **English**: Proficient ; **Hindi, Tamil**: Intermediate ; **German**: Beginner

Referees

- Prof. Wolfram Barfuss ✉ wbarfuss@uni-bonn.de
- Prof. Joy Monteiro ✉ joy@iiserpune.ac.in
- Prof. Hanna Kokko ✉ hkokko@uni-mainz.de