

Abhinav Kannan

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EDUCATION

- Indian Institute of Science Education and Research (IISER), Pune** Aug 2021 – Present
BS-MS in Biology | CGPA: 8.1
- Chinmaya Vidyalaya Higher Secondary School, Chennai** 2021
Central Board of Secondary Education (Grade 12) | Percentage: 97.2%

RESEARCH EXPERIENCE

- Eco-Evolutionary Dynamics of Cancer Stem Cells in Spatially Explicit Environments** June 2025 – Present
Master's Thesis Student with Prof. Dominik Wodarz UC San Diego
– Developing models of feedback and feedforward regulation within spatially explicit cell lineages to investigate how evolutionary processes affect the maintenance and adaptation of cancer stem cells (CSCs)
– Analyzing how interactions between CSCs and the extracellular matrix influence the evolution of CSC phenotypes
- Investigating the role of the V-domain in regulating Drp1's binding to its adaptor** Aug 2024 – Dec 2024
Undergraduate Researcher with Prof. Thomas Pucadyil (Report) IISER Pune
– Characterized the regulatory role of a specific protein-binding domain in Drp1's interaction with mitochondrial adaptor proteins using biochemical approaches
– Gained expertise in recombinant protein expression in *E. coli*, affinity chromatography, molecular cloning, and protein-protein interaction assays (dot-blot)
- Systems-level analysis of cellular plasticity in estrogen receptor-positive (ER+) breast cancer** May 2023 – Aug 2024
Undergraduate Researcher with Prof. Mohit Kumar Jolly IISc Bangalore
– Developed and analyzed a minimalistic regulatory network model of cancer cell plasticity using both discrete (Boolean) and continuous (ODE-based) simulations
– Investigated the high-dimensional phenotypic space to identify coupled transitions between epithelial-mesenchymal states, metabolic reprogramming, and therapy resistance

PUBLICATIONS

- Interconnected axes of phenotypic plasticity drive coordinated cellular behaviour** 2025
R. K. Meena, Y. Fan, Soundharya R, A. J Pandey, A. Kannan, et al.
Pre-print available on bioRxiv — <https://doi.org/10.1101/2025.11.23.688595>

SKILLS

- Computational Modeling:** Agent-based modeling, stochastic cellular automata, ODE/PDE systems, Gillespie simulations, network dynamics
- Programming:** Julia, Python, Bash, LaTeX; **Languages:** English (fluent), Tamil (native), Hindi (proficient), Sanskrit (basic)
- Experimental Methods:** Protein purification, cloning, PCR, Western blotting

RELEVANT COURSEWORK

- Biology:** Animal Behavior, Bioinformatics, Cell Biology, Computational & Functional Genomics, Developmental Biology, Ecology, Evolution, Genetics, Immunology, Mathematical & Computational Biology, Molecular Biology, Neurobiology, Physiology, Systems Biology
- Mathematics & Physics:** Algorithms, Applied Mathematical Methods, Bayesian Theory, Data Analysis, Graph Theory, Probability, Statistical Learning, Signal Processing, Multivariate Calculus, Numerical Linear Algebra, Nonlinear Dynamics, Statistical Mechanics

WORKSHOPS AND PROFESSIONAL TRAINING

- Workshop — Unifying Theories in High-Dimensional Biophysics** July 2025
Selected Participant ICTS Bangalore
– Engaged with frameworks for interpreting high-dimensional biological data across development, neuroscience, and evolution
- Workshop — Decisions, Games and Evolution** March 2025
Selected Participant ICTS Bangalore
– Studied evolution of cooperation and collective behavior using evolutionary game theory and network dynamics
- Workshop — Spins, Games and Networks** Dec 2024
Selected Participant IISc Chennai
– Studied complex system tool-kits (game theory, evolutionary dynamics, complex networks, time-series analysis) and completed a two-week long group project titled '*Simulating Social Dynamics in Party-like Scenarios*' using network-based modeling
- Workshop — Flags, Landscapes and Signaling** May 2024
Selected Participant IISc Chennai
– Studied developmental pattern formation, breakdown leading to cancer, and evolutionary mechanisms

SCHOLARSHIPS AND HONORS

- INSPIRE-SHE Scholar** (\approx 4,500 USD) – Department of Science & Technology, Government of India, for academic excellence in science 2021 – Present
- IISER Aptitude Test (IAT)** – All India Rank 200 / 20,000 2021

REFERENCES

Prof. Dominik Wodarz (UC San Diego)
Email: dwodarz@ucsd.edu

Prof. Mohit Kumar Jolly (IISc Bangalore)
Email: mkjolly@iisc.ac.in