

PhD Student, Applied CS / Maths

Experience in Research / Engineering / Development

Experience

2023 - Present	PhD, CS / Maths [1, 3]	Fresnel Inst., Maths Inst. of Marseille, Aix-Marseille Univ.
2023 (6 mon)	Research Intern [4]	Maths Inst. of Marseille
2022 (3 mon)	Research Intern [5]	Stony Brook Univ., NY
2021 (6 mon)	Framework Dev. Intern	Quantiphi Inc., Mumbai
2019 (3 mon)	Research Intern [8]	IIT Patna
2019 (6 mon)	Research Intern [9]	Calcutta Univ.

Evidence based skills

1. Algorithm and data structure design

- Designed and benchmarked an attention-Bayesian hybrid framework for multiple particle tracking [1]
- Prototyped methods for supervised segmentation, 3D reconstruction, and morphological axis analysis of bile duct structures in liver organoids. [2]
- Designed a multi-omics gene clustering algorithm [8]

2. Architectural adaptation and innovation

- Applied a standard transformer architecture as a proof-of-concept for multi-object tracking [4]
- Prototyped an in-built BERT-like transformer classifier to understand large-window context in human DNA sequences [5]
- Enhanced image classification by coupling deep learning with optimisation heuristics [6]
- Developed a framework to optimise network structures using soft-computing approaches [7]

3. Interpretable methods and low energy models

- Interpreted attention weights to combine its latent space with Kalman filtering for a more trustworthy particle tracking strategy [1]
- Benchmarked classical vs. transformer tracking models for compute cost [3, 4]
- Tested simulations for minimising energy expense in sensor networks [7]

Publications and Archived Work

- Mishra & Roudot; Attention Bayesian Hybrid Approach to Modular Multiple Particle Tracking, arXiv, 2025
- Rajendiran et al; Bioscaffold guidance drives liver periportal area tubulogenesis in hPSC organoids, biorXiv, 2025
- Mishra & Roudot; Comparative study of transformer robustness for multiple particle tracking without clutter, EUSIPCO, 2024
- Mishra; Comparative Study of stochastic filtering and attention based approaches for intracellular dynamics estimation, I2M, 2023
- Mishra; Understanding the human genome language with natural language models, SUNY, 2022
- Mishra et al; Disease diagnosis in grapevines—a hybrid resnet-jaya approach
- Mishra et al; Minimised Jaya algorithm based structure optimisation for heterogeneous WSNs, ICCCS, 2020
- Dutta et al; Incomplete multi-view gene clustering with data regeneration using shape boltzmann machine, Computers in Biology and Medicine, 2020
- Mishra et al; Human activity recognition using deep neural network, ICDSE, 2019

Technical stack: Python, Pytorch, Tensorflow, Git, Linux

Languages: English, French, Hindi, Odia

Education

- PhD, CS / Maths, Aix-Marseille University and CNRS
- MS, Computational and Mathematical Biology, Aix-Marseille University (18.13 / 20)
- B.Tech, Computer Science and Engineering, IIIT-BBSR (8.51 / 10)

2023 - 2026

2021 - 2023

2017 - 2021