Krishna N Agaram

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Education

University of Illinois Urbana-Champaign, MS (Thesis track), CS — **Urbana, IL**
Advisor: Prof. Saurabh Gupta — Aug. 2025 – May. 2027

Indian Institute of Technology Bombay, B.Tech (with Honors), CS — **Mumbai, India**
GPA: **9.86/10**, ranked **3/194** overall; minors in **machine intelligence** and **mathematics** — Nov. 2021 – May. 2025

- Selected coursework: RL, Robotics, Stat learning, Kernel methods, Formal methods for ML, Crypto, Adv. compilers, Discrete Math/Algo/Automata, Arch/Net/OS/DB/Compilers, Real/Complex/Fourier analysis, Linear/Abstract algebra

Research Experience

Sim-to-real Robotic Manipulation | Guide: Prof. Saurabh Gupta — Aug. 2025 – present, **UIUC**
- Work on sim2real transfer for **bimanual manipulation** tasks focusing on policy generalization to novel environments
- Techniques unite ideas from abstract scene **representation**, model distillation & RL **exploration** with few demonstrations

Sycophancy in multi-agent systems | Guide: Prof. Dilek Hakkani-Tür — Aug. 2025 – present, **UIUC**
- Quantitative evaluation of sycophantic behavior of a hierarchy of **cooperative multi-agent** systems across various tasks
- Designing a pipeline to learn interaction weights between agents and reduce sycophantic behavior of the overall system

Towards proving the Neural Feature Ansatz | Guide: Prof. Parthe Pandit — Jun. 2025 – present, **IIT Bombay**
- Working to prove the **Deep Neural Feature Ansatz** for the cosine kernel; provably affords **fast neural feature learning**
- Proofs involve the use of neural tangent kernels, infinite matrix theory, some Fourier and functional analysis

Lower bounds on testing 3-colorability | Guide: Prof. Akash Kumar — Jan. 2024 – Apr. 2024, **IIT Bombay**
- Established **optimal** linear lower bound for one-sided 3-colorability testing on $(1/3 - \epsilon)$-far vs colorable expander graphs
- Studied various **lower bound constructions** in an attempt to prove two-sided bound for ϵ-far vs colorable expanders

Research Internships

Quantum Positional Proof Systems † | Guide: Prof. Nick Spooner — Jun. 2024 – Sep. 2025, **EPFL**
- Formalized positional interactive proof systems; **characterized** complexity-theoretic expressivity in the classical setting
- Proved that quantum resources can improve expressivity using techniques from nonlocal games & **no-signaling theory**
- Solved the XOR-variant of the well-known **monogamy-of-entanglement** game; proved anti-parallel-repetition as corollary

RL for quantum state preparation † | Guide: Prof. Vikas Garg — Jun. 2023 – Sep. 2024, **Aalto University**
- Improved the quantum state preparation pipeline with an RL agent capable of constructing 9-qubit stabilizer states **zero-shot** ($\sim 4 \times 10^{16}$ states in total) while being **30%** more efficient than baselines; exploration solved via novel dense reward
- Proved that this efficiency holds for **at least 95%** of all states despite seeing **only** 10^{-8}% of all states throughout training

Academic Experience

- *Preparing arbitrary stabilizer states via disentangling and path-aware reinforcement learning* † — Nov. 2025
  K. Agaram, S. Midha, A. Müller and V. Garg. Accepted to **QIP 2025** and **ML4PS@NeurIPS 2025**
- *Quantum state preparation with reinforcement learning*, **oral** at the **APS Global Physics Summit 2025** — Mar. 2025
- Invited to and participated in the Cornell-Maryland-Max Planck Pre-doctoral Research School, Saarbrücken — Aug. 2024

Other Projects

Mobile Robot Localization | Guide: Prof. Leena Vachhani — Oct. 2024 – Nov. 2024, **final project: Robotics**
- Wrote a ROS package for mobile robot navigation using MoCap+trilateration with Kalman filtering to offset sensor noise

Video Style Transfer | Guide: Prof. Preethi Jyothi — Aug. 2023 – Nov. 2023, **final project: ML**
- Implemented style transfer for **videos**, preserving style of moving objects across frames via occlusion-aware optical flow

Scholastic Achievements

- Received the **Institute Academic Prize** given to the **top 1%** of students for stellar academic record — 2022, 2024
- Placed **1st, 2nd, 2nd** in India and **8th** (thrice) overall at the **Simon Marais Mathematics Competition** — 2022, 2023, 2024
- Secured All India Rank **40** in **JEE Advanced** and 122 in JEE Main among 140K+ and 1M+ aspirants respectively — 2021
- Among the **top 35** students (twice) invited to the **International Mathematics Olympiad Training Camp** — 2020, 2021
- Qualified for the International Olympiad on Astronomy and Astrophysics Team Selection Camp (IOAA OCSC) — 2020
- Conferred with the prestigious **KVPY** (All India Rank 23) and **NTSE** (ranked 2nd in Stage 1) scholarships — 2019, 2020

Technical Skills

Languages	Python, C/C++, Java, x86 assembly, SQL, bash, MATLAB, Javascript, LaTeX
Libraries	PyTorch, TensorFlow, NVIDIA IsaacGym, OpenAI Gym, NumPy, Pandas, *et al.*, IBM Qiskit, Manim

† Preprints available upon request.