

# 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 manipulation tasks focusing on policy generalization to novel tasks in **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  $\epsilon$ -far vs colorable expanders

## RESEARCH INTERNSHIPS

**Quantum Positional Proof Systems** <sup>†</sup> | 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** <sup>†</sup> | 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* <sup>†</sup>

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

<sup>†</sup> Preprints available upon request.