# Krishna Narasimhan Agaram

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## Education

**University of Illinois at Urbana-Champaign**, MS (thesis), CS — Urbana, IL
Advisor: Prof. Saurabh Gupta; work on *sim-to-real* robotic manipulation — Aug. 2025 – May. 2027

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

- Selected coursework: Robotics, RL, 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** — University of Illinois at Urbana-Champaign
Guide: Prof. Saurabh Gupta — Aug. 2025 – present
- Working on sim-to-real transfer for manipulation tasks focusing on quicker exploration and policy generalization

**Sycophancy evaluation in LLMs** — University of Illinois at Urbana-Champaign
Guide: Prof. Dilek Hakkani-Tür — Aug. 2025 – present
- Evaluating, quantitatively, the sycophantic behavior in a hierarchy of multi-agent systems relative to that of single agents

**Towards proving the Neural Feature Ansatz** — Indian Institute of Technology Bombay
Guide: Prof. Parthe Pandit — May. 2025 – Jul. 2025
- Working on showing the Neural Feature Ansatz for a nonlinear kernel using tools from Fourier and functional analysis

**Quantum Positional Proof Systems** † — EPFL, Switzerland
Guide: Prof. Nick Spooner — Jun. 2024 – Sep. 2025
- Formalized positional proof systems with multiple provers and proved that quantum resources can improve their complexity-theoretic expressivity, using techniques from nonlocal games and no-signaling theory
- Found the value and all optimal solutions of the XOR-version of the parallel monogamy-of-entanglement game

**RL for efficient Stabilizer state Preparation** † — Aalto University, Finland
Guide: Prof. Vikas Garg — Jun. 2023 – Sep. 2024
- Improved the quantum stabilizer preparation pipeline with an RL agent capable of constructing arbitrary stabilizer states zero-shot on up to 9 qubits with 30% fewer gates than prior methods
- Trained agents are guaranteed superior efficiency on at least 95% of stabilizers despite training on only $10^{-8}$% of states

**Lower bounds on testing 3-colorability** — Indian Institute of Technology Bombay
Guide: Prof. Akash Kumar, IIT Bombay — Jan. 2024 – Apr. 2024
- Established a linear lower-bound for 1-sided testing of 3-colorability on $(1/3 - \epsilon)$-far vs colorable expander graphs

## Other Projects

**Optimizing compiler for (a subset of) Java** — Course Project: Advanced Compilers
Guide: Prof. Manas Thakur — Jan. 2025 – Apr. 2025
- Wrote a `javacc`-based compiler for a Java-like language with **liveness analysis**, class-hierarchy analysis, variable renaming and **alias analysis** supported over an **control-flow graph** over a TAC intermediate representation
- Performed optimizations such as constant folding, linear-scan register allocation and compile-time de-virtualization

**Video Style Transfer** — Course Project: Machine Learning
Guide: Prof. Preethi Jyothi — Aug. 2023 – Nov. 2023
- Implemented convolution-based **style transfer** for images and **videos**, following Gatys et al and Ruder et al
- Enforced temporal coherence of output videos using **optical flow**, preserving style of moving objects across frames

**FastChat: mini WhatsApp** — Course Project: Software Systems Lab
Guide: Prof. Kavi Arya — Oct. 2022 – Dec. 2022
- Built **chat service** with a distributed server architecture, **end-to-end** encryption and a dedicated **load-balancer**; users can choose to chat privately or in an admin-moderated **group** and can also send **arbitrarily large** files reliably
- Used a standard **message protocol** packet around messages; a message buffer ensures messages are **not lost**

## 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** (×3) overall at the **Simon Marais Mathematics Competition** — 2022–2024
- Among the **top 35** students (×2) invited to the **International Mathematics Olympiad Training Camp** — 2020, 2021
- Secured All India Rank **40** in **JEE Advanced** and 122 in JEE Main among 140K+ and 1M+ aspirants respectively — 2021
- Qualified for the **International Olympiad on Astronomy and Astrophysics** Team Selection Camp (IOAA OCSC) — 2020
- Conferred with the **AP** (top 2%) grade (×7) for exceptional performance in Compilers Lab, Logic in CS, Discrete Structures, Data Analysis, Quantum Physics, Physical Chemistry and Differential Equations — 2021–2024

## Technical Skills

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

† Preprints available upon request.