

# Amogh S. Joshi

Graduate Research Assistant • Center for Co-Design of Cognitive Systems (CoCoSys)

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🌐 <https://tinyurl.com/2s485um8>

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## Education

**PhD in Electrical Engineering**

GPA: 3.82/4

**B.Tech in Electronics Engineering**

**Graduated Top of Class** GPA: 9.34/10

Purdue University

*2021-present*

University of Mumbai

*2016-2020*

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## Research/Teaching/Work Experience

**Graduate Research Assistant**, Purdue University

*May 22-present*

- Designed an LLM agent to determine maneuver feasibility, and a real-time neuromorphic navigation stack to execute maneuvers deemed to be feasible.
- Developed a framework for using task-specific human intuition to accelerate RL training and enhance explainability, achieving up to 78% and 76% sample efficiency and training time gains, respectively, over the baseline.
- Developed an automatic synthetic dataset generation pipeline for a **first-of-its-kind** aerial navigation dataset. Dataset contains temporally dense and richly annotated ground truth for depth, optical flow, and ego-motion at data rates between 2x and 5x the state of the art across modalities.
- Designed and deployed a real-time, online neuromorphic planning and control framework on a quadrotor. Video available here: [youtu.be/9Gnjpb1k2Lo](https://youtu.be/9Gnjpb1k2Lo)

**Graduate Teaching Assistant**, Purdue University

*Aug 21-May 22*

- Mentored a group of 120+ undergraduate students. Delivered 4 weekly lectures on Calculus

**Project Research Assistant**, Indian Institute of Technology, Bombay

*Jan 21-Aug 21*

- Designed a complete sensory avionics suite for a medium-weight class UAV with automatic docking capabilities. Published research on automatic sizing and design of a mini-aerostat system. Supervised two interns.

**Undergraduate Thesis**, University of Mumbai

*Aug 19-May 20*

- Designed a stabilisation system using active propulsion to maintain safe flight characteristics for an aerostat.

**Undergraduate Researcher**, Indian Institute of Technology, Bombay

*May 19-Aug 19*

- Designed an autonomous safety system to deflate an aerostat in case of emergency. Measured endurance of 15-16 days, 1.5x state of the art. Project won Gold Medal at IIT-Bombay TechConnect 2019

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## Publications

**Amogh Joshi**, Sourav Sanyal, Kaushik Roy: "Neuro-LIFT: A Neuromorphic, LLM-based Interactive Framework for Autonomous Drone Flight at the Edge", 2025 International Joint Conference on Neural Networks (IJCNN) DOI: <https://doi.org/10.48550/arXiv.2501.19259>

**Amogh Joshi**, Adarsh Kosta, Kaushik Roy, "SHIRE: Enhancing Sample Efficiency using Human Intuition in REinforcement Learning", accepted in the 2025 International Conference on Robotics and Automation (ICRA) DOI: <https://arxiv.org/abs/2409.09990>

**Amogh Joshi**, Adarsh Kosta, Wachirawit Ponghiran, Manish Nagaraj, Kaushik Roy, "FEDORA: Flying Event Dataset fOr Reactive behAvior", 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) DOI: <https://ieeexplore.ieee.org/document/10801807>

**Amogh Joshi**, Sourav Sanyal, Kaushik Roy, "Real-Time Neuromorphic Navigation: Integrating Event-Based Vision and Physics-Driven Planning on a Parrot Bebop2 Quadrotor", 2024 40th Anniversary of the IEEE Conference on Robotics and Automation (ICRA@40) DOI: <https://doi.org/10.48550/arXiv.2407.00931>

Saurabh V. Bagare, **Amogh S. Joshi**, and Rajkumar S. Pant, "A Methodology for Sizing of a Mini-Aerostat System", AIAA Aviation Forum 2021, Analytical Studies, Modeling, and Simulation of Lighter-Than-Air Systems Session, August 2021. DOI: <https://doi.org/10.2514/6.2021-2986>

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## Technical Skills

**Areas of Expertise:** Event-based Vision, Reinforcement Learning, Deep Learning, Autonomous Robotics

**Programming Languages:** C, C++, Python, MATLAB

**Hardware Description Languages and FPGA:** VHDL, Verilog, SystemVerilog, RTL Design and Verification

**Software and Tools:** Pytorch, OpenCV, Stable Baselines3, Gazebo sim, Robot Operating System (ROS)