Rishabh Tole

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Education

University of Pennsylvania — Philadelphia, PA
B.S.E. in Artificial Intelligence — Minor: Mathematics — *2025 – 2029*

Experience & Research

Researcher | Perception and Autonomous Robotics (PeAR) Lab — Summer 2025 – Present
Worcester Polytechnic Institute — *Worcester, MA*

- **Trained, tested**, and iterated on a multi pinhole camera to depth perception-to-control pipeline for quadrotor obstacle avoidance.
- Collected a **15k-image** dataset using a multi-pinhole lensless imaging setup and designed model architectures and training pipelines for **UNet CNNs, ViTs, and Diffusion models**.
- Optimized inference using **TensorRT**, improving performance from **8 FPS to 30 FPS** on **Jetson Nano**.
- Intended for submission to *IEEE Robotics and Automation Letters (RA-L).*

Founder & Engineer | Pingin — Nov 2025 – Present
AI College Admissions Platform

- Building an agentic AI platform for college admissions consulting using full stack development and **RAG systems**.
- Designed and implemented core system architecture for scalable AI-driven advising.
- Secured **$50K in first-round funding** and led early-stage product development and iteration.

Autonomy Software Engineer | Penn Aerial Robotics Club — Aug 2025 – Present
Penn Aerial Robotics Software Team — *Philadelphia, PA*

- Developed autonomy software using **ROS** and **PX4**, integrating perception with control for aerial robots.
- Built a **Gazebo** simulation environment for rapid iteration and validation of quadrotor behaviors.
- Implemented and validated a system to detect and dodge aerial hoops in simulation and real-world flight tests.

Software Engineering Intern — Summer 2024
Breeze Travel & Ekal Vidyalaya — *Boston, MA*

- Breeze travel: **Redesigned and modernized UI** to support transition from B2C to B2B SaaS.
- Ekal: Automated the creation and sending of personalized thank-you notes to donors

Projects

Tiny Slot-BERT: Self-Supervised Object-Centric Video Learning — 2025 – Present
Deep Learning, Computer Vision Research Project

- Based on a recent ICLR paper, implemented an object-centric pipeline using **Slot Attention** and a **temporal transformer** to learn persistent object representations from unlabeled video.
- Training on **MOVi** for benchmarking and a self-collected dataset for real-world evaluation.
- Extending the architecture toward **online / streaming inference** for real-time perception applications.

SedLev | Storm Drain Sediment Monitoring System — Jun 2023 – Jun 2025
Embedded Sensing, Systems Engineering

- Designed a low-cost sensor system to monitor sediment accumulation in storm drains to help prevent flooding.
- Demonstrated a working prototype; engaged with local municipal stakeholders on pilot deployment discussions.

Technical Skills

Languages: Python, Java, OCaml, Bash, LaTeX
ML / Vision: PyTorch, Slot Attention, Vision Transformers, UNet, Diffusion Models, OpenCV, NumPy
Robotics: ROS, PX4, Gazebo
Embedded / Systems: Jetson Nano, TensorRT, Raspberry Pi
Tools: Git, Docker, OnShape, Excel