

Yash Kakade

Pasadena, CA | [LinkedIn](#) | 937-242-8610 | ykakade@caltech.edu

EDUCATION

California Institute of Technology

BS in Electrical Engineering, Intelligent Systems GPA: 3.7

Pasadena, CA

Graduation Date: June 2027

- Relevant Courses: Robotics Planning, Robotics Kinematics, Reinforcement Learning, Deep Learning, Computer Vision, Probability, Experimental Robotics, Robotic Systems, 3D Deep Learning, Control Systems
- Certifications: Lean Six Sigma Green Belt, Advanced Additive Manufacturing

WORK EXPERIENCE

Relativity Space

Robotics Software Engineering Intern

Long Beach, CA

June 2025 – September 2025

- Built a motion-capture system from scratch, leveraging traditional Structure-from-Motion techniques.
- Achieved ~10 micron global accuracy in rigid-body localization, outperforming OptiTrack's published 150 micron benchmark by an order of magnitude, (IR Camera based).
- Developed a fully autonomous, self-calibrating pipeline using a custom calibration stand (no human in the loop) for faster and more robust initialization, with self-healing extrinsics based on epipolar geometry and probabilistic reprojection-error estimation.

Air Force Research Laboratory

Robotics Software Engineering Intern

Dayton, OH

June 2024 - September 2024

- Automated digital twins manufacturing using OptiTrack motion capture and 3D scanning for robo-simulations.
- Integrated ROS2 into the digital twin pipeline and developed a custom Dockerfile for optimized deployment and consistent environments using Kernel-Based Virtual Machines.
- Created a 3D similarity score program via Iterative Closest Point and Hausdorff distance, validate YCB dataset.
- Fine-tuned Meta SAM2 with PyTorch and YOLOv8 to create custom weights, enabling Boston Dynamics Spot to identify lab-specific objects with 92.8% accuracy.

California Institute of Technology

Machine Learning Researcher

Pasadena, CA

July 2023 - September 2023

- Evaluated the impact of adversarial noise on CNN-based machine perception for autonomous driving, identifying a 40% accuracy reduction in critical image regions using Python and TensorFlow.
- Developed a CNN with 52,673 trainable parameters across four layers (convolution, max pooling, flatten, and dense) to assess noise effects using a dataset of 2,000 images.
- Enhanced the robustness of machine perception by retraining the CNN on noise-affected data, achieving a 20% improvement in accuracy for vehicle position identification under adversarial conditions.

PROJECTS

Autonomous Lawnmower

Independent Project

Dayton, OH

Oct 2021 – March 2022

- Developed a fully autonomous lawnmower using a custom-designed and 3D-printed chassis, integrating sensors, LiDAR, ultrasonic, gyro, and using OpenCV cameras to achieve obstacle avoidance.
- Designed the lawnmower's control system with a Raspberry Pi, Arduino and microcontroller, implementing ROS2 2D SLAM algorithms for obstacle avoidance and autonomous operation without manual intervention.
- Achieved a cost-effective build at approximately \$300, demonstrating significant savings compared to commercial models priced at \$4,000, and received national and state level recognition with multiple awards.

Gravity-Based Seed Planting Drone System

Independent Project

Dayton, OH

Oct 2019 – March 2020

- Developed a universal gravity-based seed dropper attachment for drones, publicly releasing CAD files including compatibility with various drone sizes.
- Designed and planted over 10,000 seeds using custom developed natural seed capsules highlighting gelatin, to incorporate phosphorus in order to accelerate and guarantee plant growth with the presence of water.
- Innovated custom seed capsules with a 30-70 ratio of dry clay to potting soil and gelatin covering, ensuring plant growth when exposed to water from which dropped and deployed from seed dropper attachment.

AWARDS & SKILLS

Awards:

- QuestBridge National College Match Scholarship Recipient 2023 (35/20800 Awarded)
- Presidential Recognition Award for Environmental Excellence for Tree Planting Drone 2022
- Superior Rating 40/40 State Ohio Science Fair 2020, 2021, 2022
- 1st Place Ohio State Science Fair for American Military Engineers Award for Autonomous Lawnmower 2022
- 1st Place Overall Ohio State Science Fair for Entrepreneurship Award for Autonomous Lawnmower 2022

Skills: 10+Years CAD, ROS2, SLAM, Python, PyTorch, Java, C++, SAM2, Docker, Vmware, OpenCV, Linux, YOLOv8, GIT, Convolutional Neural Network, Prototyping, GD&T, Motion Capture, CUDA, Perception, GPU Acceleration, Perception, Stereo Cameras, RGB-D Cameras, PCB, Transformers, Large Language Models