

Alvin Zhu

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Education

University of California, Los Angeles (UCLA)

Los Angeles, CA

B.S. Computer Engineering | GPA: 3.8

Sept. 2023 - June 2026

Relevant and Upcoming Coursework: Software Construction, Operating Systems, Foundations of Computer Vision, Applied Numerical Computing, Algorithms, Graduate Neural Networks and Deep Learning, Signals and Systems

Work Experience

NVIDIA

Santa Clara, CA

Robotics Platform Software Intern

June 2025–Sept 2025

- Developed a VLM-driven action generation framework to enable multi-robot collaboration from natural language
- Built a fleet control framework to coordinate missions over multiple robot embodiments in simulation and hardware
- Created a JSON task schema to abstract high-level tasks from robot specifics, enabling complex fleet operations

Veqdrive

Los Angeles, CA

Robotics Engineer Intern

November 2024–Current

- Researching deep RL algorithms and scalable simulations for robot planning in unstructured environments
- Constructing perception methods for mobile manipulators to grasp CNC-machined parts under variable conditions

UCLA Robotics & Mechanisms Laboratory (RoMeLa)

Los Angeles, CA

Research Assistant

October 2023–Current

- Pioneered a prompt-to-policy framework using AI agents and GPU-parallelized physics simulation for robot learning
- Integrated RL policies onto humanoid hardware, enabling effective disturbance rejection in outdoor environments
- Conducted experiments with NVIDIA FoundationPose for reliable 6-DOF tracking of static and dynamic objects
- Fused vision transformers with deep learning models for 95% precise instance segmentation for object grasping
- Innovated torque prediction networks for RL simulations, modeling complex, non-linear dynamics with 99% accuracy
- Created a deep learning framework for 96% reliable 8-axis force estimation in humanoid robot end-effectors
- Built custom physics simulation for inertial attitude control of limbed robots in low gravity environments

Perception Team Lead Developer for RoboCup Humanoid Robotics

January 2024–August 2024

- Built humanoid robot ARTEMIS's full perception stack, integrating vision and proximity for full spatial awareness
- Combined YOLOv8 deep learning model with point clouds for detection, 3D pose estimation, and trajectory prediction
- Utilized NVIDIA TensorRT deep learning inference SDK and multi-threading to decrease cycle time by over 66%
- Integrated geometric depth estimation and stereo camera depth handling, increasing reliability by over 50%
- Deployed custom build of YOLOv8 with optimized layers to enhance performance, achieving 20% increased efficiency

Evodyne Robotics

Mountain View, CA

Robotics & Software Engineer Intern

June 2022–Sept 2022

- Developed a quadruped robot with inverse kinematics, machine learning, IMU-based balance, and PID control
- Structured Bezier Curve Pure Pursuit spline pathfinding algorithm for 3D differential drivetrain kinematics
- Designed and manufactured a 3D printed 11:1 gear ratio cycloidal gearbox used for a robotic arm's shoulder joint

Selected Publications

Published 5 IEEE papers on humanoid robots with Prof. Dennis Hong, 3 first-author

- **Zhu, A.***, Tanaka, Y.*, Goldberg, A., & Hong, D.. *AURA: Autonomous Upskilling with Retrieval-Augmented Agents. Presented at CoRL 2025 Workshops, submitted to IEEE ICRA 2026.*
- **Zhu, A.***, Tanaka, Y.*, Wang, Q., & Hong, D.. *Mechanical Intelligence-Aware Curriculum Reinforcement Learning for Humanoids with Parallel Actuation. Accepted to IEEE Humanoids 2025.*
- **Zhu, A.***, Tanaka, Y.*, Rafeedi, F., & Hong, D.. *Cycloidal Quasi-Direct Drive Actuator Designs with Learning-Based Torque Estimation for Legged Robotics. Presented at IEEE ICRA 2025.*
- **Zhu, A.***, Tanaka, Y.*, Lin, R., Mehta, A., & Hong, D.. *Mechanisms and Computational Design of Multi-Modal End-Effector with Force Sensing using Gated Networks. Presented at IEEE ICRA 2025.*

Skills

Software Tools: Python, C++, Java, PyTorch, JAX, ROS2, MuJoCo-MJX, Isaac Sim/Lab, OpenCV, TensorRT, Git

Hardware Tools: Solidworks, AutoCAD, Onshape, FDM/SLA 3D printing, Raspberry Pi, Arduino

Awards

Notable Robotics Awards:

- 2024 RoboCup Humanoid Adult-Size Division World Champions at Eindhoven, Netherlands
- Captain of 2 year international tournament qualifying and 3 year NorCal qualifying and finalist team

Olympiads: 2020-2022 AIME Qualifier – high score: 9/15; 2022 USAPhO Semi-Finalist; USACO Gold Division