JOSHUA LEE

lee.joshua173@gmail.com
(661) 436-9385
Santa Clarita, CA
www.linkedin.com/in/joshuah-lee

EDUCATION

Stanford University
September.'23 - Present

M.S. Mechanical Engineering 2025

Depth in Automatic Controls

Relevant Coursework: Robotic Autonomy, Advanced Dynamics, Control Design Techniques, Optimal and Learning-Based Control, Engineering Optimization, Decision-Making Under Uncertainty

California Institute of Technology
September.'19 - June.'23

B.S. Mechanical Engineering 2023

GPA: 3.7/4.0

Depth in Robotics

Coursework: Engineering Design Laboratory, Data and Dimensional Analysis, Thermal Science, Mechanics, Design and Fabrication, Robotics, CS Fundamentals (Data Structures, Software Design, Computing Systems)

EXPERIENCE

Mach Industries
Huntington Beach, California

GNC Intern
June.'24 - September.'24

- Simulated error model of various sensor configurations to estimate deviations in state estimation and navigation from the ground truth state in INS systems with various initial conditions and desired trajectories
- Developed tools to streamline the implementation of an optimal control framework for flight controllers, enabling faster and more efficient control optimization, namely LQR and MPC classes
- Contributed to the guidance module in the control stack for an autonomous controller, facilitating precise actuation of control surfaces and added functionality to the extended kalman filter for sensor fusion module for improved state estimation in navigation stack

Field AI
Mission Viejo, California

Mechatronics Intern
January.'23 - August.'23

- Directed 9-month walking robot payload project, integrating sensors and an aesthetically pleasing, mechanically sound computation unit.
- Improved design by addressing and rectifying issues in sensor systems and computation, enhancing overall functionality.
- Innovatively conceptualized solutions, managed prototyping, and oversaw manufacturing for successful project realization.
- Orchestrated mechatronics integration, ensuring seamless wiring, electronics, and mounting cohesion.
- Optimized data utilization by aligning sensor field-of-view with algorithmic requirements, enhancing system efficiency.

Jet Propulsion Laboratory
Pasadena, California

Hardware Intern
May.'21 - September.'22

NAISR SOCOM Team

- Designed, tested, and maintained sensor mounts for Spot payload.
- Ensured safety during testing to demonstrate robot capabilities.
- Integrated a State Machine structure for behavior switching in diverse environments.
- Managed lab and testing areas for comprehensive robot subsystem testing.

CoSTAR Nebula Team (DARPA SubT Competition)

- Designed, assembled, and tested impact-protective foam with an emphasis on weight, occlusion, and overheating minimization.
- Designed and built a Competition-Replica Calibration Gate.

PROJECTS

Agentic AI Robotic Exploration and Task Planning
October.'24 - Present

- Integrated scene graphs with large language models (LLMs) to enable dynamic task-based reasoning for autonomous agents, facilitating more sophisticated spatial awareness and goal-directed exploration in unstructured environments.
- Engineered a scene graph-based reflection mechanism to enhance real-time decision-making, allowing autonomous agents to correct spatial and relational errors based on ground truth data during task execution.

Salisbury Robotics Cabled Arm
January.'24 - June.'24

- optimized PID controller of a dynamically unstable system of a robot actuated with springs connected to cables
- simulated an optimal LQR solution compared with optimized PID gains controller
- implemented controller on hardware using gains found using constrained optimization for arbitrary safety constraints on the value and reward functions to create qualitatively safe desired behavior of spring loaded arm

ASL Freeflyer
September.'23 - December.'23

- Floating platform actuated with CO2 gas thrusters to simulate space environments and dynamics
- Replace existing pd controller with a robust MPC controller
- Carry out hardware experiments to test behavior of the platform as well as characterize, diagnose, and solve hardware integration issues

NASA Big Idea Challenge: Extreme Terrain Mobility, LATTICE
October.'21 - December.'22

- Designed robotic systems for alternative rover locomotion to navigate extreme lunar terrain, transporting payloads and experiments into craters (patent pending, Shuttle Team).
- Designed manufacturable parts for in-house machining or procurement, ensuring seamless integration with specialty components.
- Conducted FEA failure analysis with a minimum Factor of Safety (FoS) of 1.5 for high-load components.
- Led the design and testing of a tensioning system capable of safely traversing cables and stakes, bearing 4kN loads and supporting a 16kg robot 0.5m above the lunar surface.

SKILLS

Design: Solidworks, Machine Prototyping, Ansys (FEA)

Computation: Matlab, Mathematica, Data Analysis

Code: Java, C, Python, C++, Rust