

# Preet Karia

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## EDUCATION

### University of California - Santa Cruz

Bachelor of Science — Double Major in Robotics Engineering and Computer Engineering

Santa Cruz, CA

June 2024 – June 2027

**Relevant Coursework:** Logic Design, Data Structures and Algorithms, Computer Architecture, Applied Discrete Mathematics, Microcontrollers and Design

## TECHNICAL SKILLS/ INTERESTS

**Skills:** C, C++, Python, TypeScript/JavaScript, MATLAB, ROS 2, Gazebo, RTL Design, Sensor Integration, Finite-State Machines, Fixed-Point Arithmetic, GTKWave

**Tools/Frameworks:** FastAPI, Flask, React, Convex, NumPy, Pandas, Docker, Git, RViz

**Interests:** Machine Learning, High-Performance Computing, ML Infrastructure, Artificial Intelligence, Robotics

## EXPERIENCE

### Autonomous Systems Lab at UCSC

Robotics Research Intern

Sep. 2024 – Present

- Implemented real-time sensor fusion pipelines (depth + IR + IMU) in **Python/C++ to enhance SLAM reliability**, and developed modular ROS2 nodes mirroring distributed microservice patterns.
- Refactored Baxter/Sawyer robot software** into clean, testable modules, improving system stability and enabling faster iteration, supported by custom debugging and validation tools.

### Formula Slug

Software Systems Engineer

Jun. 2024 – Present

- Built **internal telemetry processing utilities** used across mechanical, electrical, and software teams, improving data modeling workflows.
- Collaborated with cross-functional engineering groups on **design reviews and system analysis**, strengthening engineering practices and documentation.

## SELECTED SOFTWARE PROJECTS

### Sentinel — Hackathon Winner (AGI Inc. + Partners) | FastAPI, Groq, Telnyx, React, Convex

2025

- Built a real-time AI safety firewall that intercepts high-risk agent actions, scores them using LLM reasoning, and triggers **live Telnyx voice verification** before execution.
- Designed modular safety policies (Data, Ops, Finance) with deterministic routing, risk scoring, and reversible action handling to prevent unsafe behavior.
- Implemented webhook ingestion, approval pipeline, and a React dashboard for real-time monitoring and decision control; **won** the AGI Inc. Autonomous Agent Hackathon.

### Onboardly — CalHacks Winner (Best Workflow Build) | Python, Flask, TypeScript/React, Gemini Vision

2025

- Developed an onboarding engine with a task-graph compiler, role-embedding generator, and **LLM pipeline** to synthesize step-level workflows for new hires.
- Built a Chrome extension using **Gemini Vision** to analyze live DOM state and provide real-time interactive guidance through complex UI tasks.
- Implemented automated Jira provisioning via a distributed Redis-based worker queue, generating epics/subtasks from inferred competency graphs; **won Best Workflow Build** at CalHacks (2,000+ participants).

### OrderFlow Core | Python, NumPy, Pandas, Matplotlib

2025

- Engineered a production-style limit order book (LOB) **matching engine supporting queue priority**, partial fills, depth tracking, event replay, and midprice computation.
- Implemented market-making strategies with inventory controls, spread optimization, and stochastic midprice forecasting.
- Optimized simulation throughput by **35%** using vectorization, caching, and profiling-driven refinements, while analyzing PnL distribution and adverse selection risk via Monte Carlo simulations.

### FlowPilot — Autonomous Scheduling Agent | FastAPI, React, Convex, OMI Voice, Gmail/Calendar API

2025

- Built a **voice-driven scheduling agent** that processes natural-language tasks from OMI voice transcripts and converts them into structured events.
- Integrated Gmail, Google Calendar, Canvas, and Notion APIs to perform real-time time-blocking, conflict detection, and **multi-app automation**.
- Developed **FastAPI backend services** for task pipelines and event updates, with Convex as a reactive data layer and a React UI for timeline visualization and real-time interactions.