

Jake Li

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Education

Columbia University, B.S. Mechanical Engineering and Applied Mathematics Minor New York, NY
School of Engineering and Applied Sciences | J Suchato Scholarship Recipient | GPA: **4.00** May 2028

- **Relevant Coursework:** Machine Learning, Natural Language Processing, Robotics Algorithms and Kinematics, Advanced Programming, Probability Theory, Data Structures and Algorithms, Linear Algebra, Discrete Math, Analysis & Optimization, Ordinary Differential Equations, Heat Transfer, Dynamics & Vibrations, Computer Graphics & Design, Material Processes in Manufacturing, Fluid Mechanics, Thermodynamics, Mechanics of Solids
- **Teaching Assistant:** Fluid Mechanics, Probability Theory, Differential Equations, Intro to Electrical Engineering
- **Activities:** Columbia Org of Rising Entrepreneurs (Fellowship Recipient), Alpha Kappa Psi Business Fraternity

Skills

- **Languages:** Python, Java, C/C++, MATLAB, JavaScript, HTML, CSS
- **Design:** SolidWorks, NX CAD, Fusion 360, Geometric Dimensioning & Tolerancing (GD&T), ANSYS, FEA
- **Machining:** 3-axis CNC Mill, CNC Lathe, CAM, 3D Printing (Resin & SLA), Water Jet, Laser Cutting
- **Data Analysis:** NumPy, SciPy, Pandas, Matplotlib, statistical evaluation (inter-rater agreement/Cohen's κ , confidence intervals, significance testing), language ID (CLD3)

Experience

AI/ML Research Engineer San Francisco, CA
Costream (YC S25) Nov 2025 - Present

- Benchmarked open-source **speech foundation models** (Kyutai Moshi, Sesame CSM, NVIDIA PersonaPlex, Qwen3-Omni, Freeze-Omni) on **latency**, conversational quality, and licensing to select a commercially viable base model
- Built a public **human-preference arena** for TTS and speech-to-speech models: blind pairwise voting (10,000+ votes) across six native **audio-LLM** providers, with a **Bradley-Terry** leaderboard and bootstrap confidence intervals
- Validated 10,000+ **human preference votes** against a 9-model **LLM-as-judge** board scoring each battle in both orderings, using **Cohen's κ** , **Spearman ρ** , and flip rate to separate preference signal from noise and **position bias**
- Built the **preference data pipeline** for a speech **reward model**: a blind **consensus re-vote site** where four voters re-judge each battle, keeping only unanimous or 3-1 majority outcomes as verified **human-preference training data**

Vehicle Software Automation Engineer Los Angeles, CA
Relativity Space May 2026 - Aug 2026

- Developed **state machine-driven PID control loops** for fluid systems in **Python** and **NovaScript**, an in-house language
- Wrote **pytest** suites against edge-case telemetry from proxy hardware, simulating potential valve closure failure modes
- Designed **hardware-in-the-loop (HIL)** test software validating camera and valve behavior under simulated spaceflight conditions, streaming mock telemetry from an external proxy server to flight hardware
- Diagnosed version compatibility issues between **NovaScript** and **C++** packages, testing API calls across versions to isolate dependency conflicts and fix version compatibilities

Manufacturing Engineer New York, NY
Columbia Plasma Physics Laboratory - Principal Investigator Carlos Paz-Soldan Feb 2025 - Present

- Used **Fusion360** to design reactor body and **FEA** to stress test static load of 1000N of shear & radial forces on Tokamak
- Mapped high current cables through toroidal field legs and **CNC machined** cable connectors for in-series configuration
- Conducted 4-point voltage tests to ensure aluminum cable connectors can withstand order of 10000 amperes of current
- Rewired capacitor banks for high-voltage power systems; optimize power unit cable wiring with conduits and cable trays

Projects — PORTFOLIO

Quadruped Robot - SolidWorks, Python, Raspberry Pi Sep 2026 - Present

- Studied IISc's **Stoch**, which hits 0.6 m/s with trot, bound and gallop gaits for under \$300, as proof that capability and **accessibility** coexist: 8 hobby servos, a Raspberry Pi, modular slide-on legs, journal bearings
- Derived its leg kinematics: a parallelogram coupler lets the knee servo set the shank angle, so the co-axial five-bar reduces to **2-link serial inverse kinematics**; adopted this leg with two 35 kg-cm bus servos per hip block
- Writing the Python control stack on a **Raspberry Pi**: gamepad velocity command, 50 Hz trot and bound **gait planner**, per-leg **inverse kinematics**, and **forward kinematics** on servo readback

Don't Get Distracted - Python, OpenCV, YOLO, Arduino, PWM Servo Columbia Hardware Hackathon Nov 2025

- Built a 3-servo robotic arm that detects phone use via camera **object detection** and pokes the user
- **Fine-tuned a pretrained YOLO object detector** on a self-collected dataset of team members' faces and arm placements to distinguish "phone in hand" from "working"; used **OpenCV** for capture, preprocessing, and inference, tuning confidence thresholds and temporal smoothing to suppress false positives
- Drove three servos via **pulse width modulation** from an **Arduino** over serial from Python using a state machine with cooldown logic, so the arm executes a poke trajectory and returns to rest between interrupts