# Michael Liang

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## Experience

**Overview Energy** Ashburn, VA
*Hardware Engineer* *Jun. 2024 – Present*

- Owned and lead the airborne laser control stack—state machine, safety interlock system, and operation GUIs—directly enabling the company's **first successful airborne laser test**
- Developed embedded service architecture across **multiple subsystems** (gimbal, FSM, beacon acquisition, ground, photodiode, thermal, aircraft, ground site) including cutting control latency of these systems from 5 seconds to **250ms** using Python and C/C++
- Implemented real-time thermal monitoring with OpenCV that detects fiber optic failure in **under a second** during live high-power test, preventing multiple instances of extensive hardware damage
- Engineered a 5ms gimbal and FSM tracking control loop, applying Nyquist sampling theory to tune the minimum sampling rate that preserves stability margins, reducing unnecessary CPU load while maintaining full closed-loop performance
- Designed and built **15+ systems end-to-end**—mechanical CAD, electrical integration, embedded firmware, and control GUIs—including automated gantries, gimbal tracking rigs, and photodiode measurement fixtures
- Architected telemetry pipeline with InfluxDB, Grafana, and all flight and post-flight dashboards

**Tesla** Fremont, CA
*Manufacturing Engineering Intern* *Jan. 2022 – Jul. 2022*

- Built a C# application that automated defect image retrieval for quality assurance, processing **10,000+ images** across **3 manufacturing lines** and reducing manual review time by **80%**
- Developed **5 KPI and BI dashboards** with Django, Python, and MSSQL to surface manpower-to-quality trends and defect rates across production shifts, used weekly by engineering leads
- Automated **weekly checklist scraping** of **200+ inspection items** with pandas, Selenium, and MySQL, eliminating **6+ hours/week** of manual data entry

## Projects

**TubeSort — Autonomous Puzzle-Solving Robot** | *Python, OpenCV, Raspberry Pi, Stepper/Servo* 2023

- Engineered a **CNC gantry robot** that photographs a puzzle game via Pi Camera, extracts game state through an OpenCV pipeline (perspective warp, contour detection, K-Means color segmentation), solves it with a **DFS backtracking algorithm**, and physically executes moves by driving stepper motors and a servo gripper through GPIO

**Homelab Infrastructure** | *Proxmox, k3s, TrueNAS/ZFS, MinIO, HAProxy, UniFi* 2024 – Present

- Architected a self-hosted production-style stack on Proxmox VE with **11 VLAN-segmented subnets**, clustered databases (**3-node** PostgreSQL, MariaDB, Redis), **4-node** MinIO S3 object store, HAProxy failover, k3s Kubernetes, ZFS-backed NAS, and Tailscale mesh VPN

## Education

**Cornell University** Ithaca, NY
*M.P.S in Information Science — Focus on Web Development and Robotics* *Jan. 2024 – Dec. 2024*

- Teaching Assistant — mentored **5 capstone project teams** through contractual client engagements

**Cornell University** Ithaca, NY
*B.S in Electrical and Computer Engineering* *Aug. 2020 – May 2024*

- **2024 ECE Undergraduate TA Excellence Award**
- Coursework: Computer Vision, Embedded Operating Systems, Microcontrollers, Autonomous Mobile Robots, Big Data (Hadoop), OOP & Data Structures

## Technical Skills

**Languages**: Python, C/C++, C#, TypeScript, SQL (PostgreSQL, MySQL, MSSQL), Java, HTML/CSS
**Embedded & Hardware**: Raspberry Pi, GPIO, Serial/UART, I2C, SPI, Stepper/Servo Motor Control, Sensor Integration, State Machines
**CAD & Design**: SolidWorks (**CSWP** [License #XXXXX]), Siemens NX, Fusion 360, KiCad
**Infrastructure**: Proxmox, Docker, k3s/Kubernetes, TrueNAS/ZFS, MinIO, HAProxy, Nginx, Tailscale, UniFi/VLANs
**Frameworks & Libraries**: React, Next.js, Django, Flask, Node.js, InfluxDB, OpenCV, pandas, NumPy, PyTorch, Git