Aakash Bothra

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Education

Bellevue College (Running Start Dual Enrollment) | Bellevue, WA

Focus: Information Security Essentials (IT 128), Modern Architecture & Design (ART 101), Academic Composition

High School | Bothell, WA

Honors Coursework: AP Computer Science Advance, AP Environmental Science, AP U.S. History, AP English Literature, Pre-Calculus

Technical Skills

• **Robotics & Embedded Systems:** Quadcopter Airframe Assembly & Rigging, Flight Controller Tuning, Betaflight, ESP32 / ESP32-S3 (Camera & mmWave Radar), I2C/SPI Bus Communication, Servo Actuation, RF Telemetry

• **CAD & Prototyping:** Onshape, OpenSCAD, FDM 3D Printing (Bambu Lab, Engineering Filaments), Mechanical Linkage Design, Soldering, Power Distribution Wiring

• **Software Development:** Python, JavaScript/TypeScript, React/Next.js, FastAPI, Bash, C/C++ (Arduino / ESP-IDF)

• **Systems, Networks & Cloud:** Proxmox VE Hypervisor, Linux (Ubuntu/Debian), TrueNAS ZFS, Docker, Nginx Proxy Manager, Cloudflare Workers & D1/KV, Managed VLAN Segmentation, Git / GitHub Actions CI/CD

Robotics & Engineering Leadership

Team Captain & Lead Flight Systems Engineer | TSA UAV Drone Challenge

National 4th Place (2026) & National 6th Place (2025) — Technology Student Association

• Spearheaded mechanical assembly, electrical power delivery, flight controller tuning, and custom payload integration for a multi-rotor competitive drone across two consecutive national finals.

• Self-taught parametric CAD (Onshape & OpenSCAD) and mechanical linkage design on the fly under strict competition deadlines to model, prototype, and fabricate a custom servo-driven payload claw from scratch.

• Iteratively tested print geometries to maximize grip force and structural rigidity while minimizing component weight and battery current draw.

• Piloted the aircraft through timed, high-precision flight courses featuring narrow-corridor navigation, obstacle avoidance, and payload deployment under line-of-sight conditions.

• Trained and mentored a pit crew of peers in electrical wiring, pre-flight safety protocols, battery telemetry, and mechanical troubleshooting, enabling the team to excel in technical design evaluations and judge interviews.

Featured Engineering Projects

ESP32-S3 Edge Vision & Gesture Automation | C++, ESP-IDF/Arduino, ESP32-S3 Sense, Embedded Hardware

• Programmed an edge-computing automation unit pairing an ESP32-S3 Sense microcontroller and onboard camera to identify and classify dynamic hand swipes in real time.

• Routed low-latency peripheral interrupts to control ambient household lighting and hardware over local network protocols without relying on external cloud APIs.

• Modeled custom enclosures in CAD with tailored thermal venting and lens clearances for continuous 24/7 bench operation.

SpaceyBoi – High-Scale Distributed Application | JavaScript, Node.js, Cloudflare, MongoDB/D1, Self-Hosted Docker

• Maintained a production utility service serving **~400,000 active users** across thousands of server communities with consistent 99.9%+ operational availability.

• Executed a zero-downtime database migration from MongoDB to Cloudflare edge storage (D1/KV), drastically lowering query latency and eliminating external hosting overhead.

• Hosted core services on home infrastructure within Docker containers, managing ingress routing, automated failure recovery, and reverse proxy security.

F1-ELO Rating Engine & Telemetry Analytics | Python, FastAPI, FastF1, Blazar Statistics, React

• Collaborated with a partner to build an open-source rating engine and REST API evaluating driver skill coefficients across 75+ years of Formula 1 telemetry.

• Applied Blazar statistical modeling to isolate driver performance from car pace, factoring in teammate head-to-head deltas and mechanical failure rates.

• Shipped a public-facing visualizer delivering sub-second queries and interactive graphs that make high-dimensional telemetry intuitive for casual users.

Murmur – Voice Preservation Dictation Workflow | Python, Whisper ASR, macOS Accessibility APIs, CI/CD

• Built a client-side dictation tool that preserves natural human voice, syntax, and sentence cadence for academic writing rather than flattening phrasing via generic AI rewrites.

• Engineered custom algorithms for punctuation boundary detection, token slice validation, and phonetically similar word-swaps.

Shelfmate – AI Physical Inventory System | Python, Computer Vision, Edge API, CAD

• Prototyped an automated physical asset indexing system combining vision pipelines and local asset indexing to catalog household tools and hardware bins.

Systems Administration & Infrastructure

Homelab Hypervisor & Remote Agent Host (Calvin & TrueNAS)

• Architected a multi-node virtualization environment (Proxmox VE + TrueNAS) with ZFS RAID storage and automated remote snapshot replication.

• Segmented home network infrastructure across managed VLANs, isolating untrusted IoT and microcontroller devices from core compute nodes.

• Deployed isolated virtual machines dedicated to running autonomous AI coding agents, allowing long-running tasks to execute uninterrupted with remote mobile access.

Athletics & Personal Discipline

• **Endurance Road Cycling:** Logged ~**3,000 outdoor road miles in 2026**, participating in competitive club group rides and regional endurance centuries; demonstrates sustained work ethic, meticulous equipment fit/maintenance, and physical endurance.