

Aditya Nair

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EDUCATION

University of Florida

Gainesville, FL

B.S. Mechanical Engineering; Computer Engineering Dual Major (in progress) — GPA: 3.75/4.00 Expected Dec. 2028

- Relevant Coursework: Programming Fundamentals I & II, Data Structures & Algorithms, Statics, Differential Equations.
- Honors & Certifications: Dean's List; Certified SolidWorks Associate (CSWA); Florida Academic Scholars (Bright Futures).

PROJECTS

Homelab & Secure Network Infrastructure | *Linux, virtualization, Docker, PKI*

- Design and operate a multi-node virtualization cluster running container and VM workloads on redundant storage, with the network segmented into isolated tiers.
- Configured least-privilege firewalling between tiers, with intrusion detection on internal and internet-facing services.
- Built an internal certificate authority for automated TLS and certificate-based SSH authentication, and publish select services through an encrypted tunnel with single sign-on.
- Run recurring read-only infrastructure audits that diff live state against prior baselines, remediating misconfigurations (unauthenticated exposure, over-broad firewall rules) with each fix verified live.

Multi-User Linux Services & Administration | *Debian, Arch, systemd*

- Maintain a multi-user Linux environment hosting shared services for a group of users, with ongoing patching, backups, and account management.
- Designed a layered trust model isolating infrastructure, hosted services, and external users behind per-tier access boundaries.

BikeLoop — Self-Hosted Route Generation Service | *Python, FastAPI, Docker, CI/CD*

- Built and deployed a self-hosted web service that generates distance-targeted cycling routes over ~18.1M OpenStreetMap road segments, packaged as a containerized 3-service stack (API, frontend, routing engine).
- Stood up a self-hosted CI/CD pipeline with a strict quality gate — linting, strict typing (mypy), and ≥85% branch coverage across ~90 tests — gating every deploy; reachable at bloop.mdracc.org.
- Designed the routing core as a framework-free, dependency-injected library with an explicit error taxonomy and structured logging behind a thin FastAPI shell.

Custom Quadcopter Flight Controller | *STM32, C/C++, KiCad*

- Designed a custom STM32 flight controller on a self-made KiCad PCB with 8 kHz SPI sensor acquisition, a 4 kHz real-time control loop, and DShot300 motor output.
- Wrote deterministic bare-metal C/C++ firmware with 6-axis attitude estimation and configurable filtering, holding control-loop jitter under 1% at 4 kHz.

Off-Grid LoRa Mesh Network | *ESP32-C3, LoRa, solar/battery*

- Built a 6-node off-grid LoRa mesh on ESP32-C3 with 1–3 km node spacing along a walking trail, providing multi-hop telemetry and paging where no network infrastructure reaches.
- Engineered solar-recharged battery nodes for ~36 h of no-sun runtime on a ~3-week service interval, with LoRa as the primary long-range link.

TECHNICAL SKILLS

Languages & Scripting: Python, Bash, SQL, C, C++, JavaScript

Systems & Virtualization: Linux (Debian, Arch), Proxmox, KVM/QEMU, LXC, Docker, ZFS, NFS, systemd

Networking: VLANs, routing, firewalling, nftables/iptables, WireGuard/VPNs, DNS, reverse proxying (nginx), packet analysis (Wireshark/tcpdump)

Security & PKI: TLS/PKI, SSH certificate auth, IDS/IPS, SSO, Ghidra

DevOps & Observability: Git, CI/CD (GitHub/Gitea Actions), Docker, pytest, Grafana, Loki, InfluxDB

Embedded & Engineering: STM32, ESP32, PCB design (KiCad), LoRa, SolidWorks, MATLAB