Smaran Vallabhaneni

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EDUCATION

Olin College of Engineering — Needham, MA
Bachelor of Science, Engineering in Computing — GPA: 4.00 — *Aug. 2025 – May 2029*
- **Relevant Courses:** Modeling & Simulation, Linear Algebra, Data Science, Multi-Variable Calculus, Software Design (Python), Kernel Development (C), Products & Markets, Introduction to Sensors, Instrumentation & Measurement

SKILLS

Programming Languages: Java, C/C++, Python, pandas, HTML, CSS, JavaScript, Dart, LaTeX, MySQL, C#, R, PBASIC, Bash, Zsh, PowerShell, Swift, MATLAB

Operating Systems / SBCs: Windows, Unix, macOS, Linux (Raspberry Pi OS, Debian, and Arch based), Raspberry Pi, Arduino

Tools: Blender, Fusion360, AutoCAD, Autodesk, SolidWorks, Unity, Figma, Adobe Creative Suite, Excel, Git, IntelliJ, VSCode, Xcode, Overleaf, Node.js, GPL Cver, Simulink, MATLAB, Tableau Desktop, Docker, MissionPlanner, ArduPilot, GitHub Copilot

Frameworks: LLMs, RAG Systems, Django, PyTorch, Kivy, Flutter, SwiftUI, React, AngularJS, .NET, Ollama, System Design, Metal API, ROS/MAVROS

Other: UI/UX, CI/CD Pipelines, ESP32, Computer Vision, Internet of Things, AWS, GCP, Azure, Dev Ops, HuggingFace, NLP, Cryptography, Encryption, Databases, Database Management, Statistical Analysis, Version Control, Embedded Systems, Algorithm Development, Data Structures, Object-Oriented Programming, Testing and Debugging

Languages: English, Spanish, French, Chinese, German (Limited Working), Telugu

PROJECTS

CLOS (Command Line Operating System) | *C++, Java, HTML, CSS, Bash* — Apr. 2023 – Present
- Building a cross-platform centralized terminal and graphical math tool with equation solving, graphing, symbolic calculus, and trigonometry.
- Implementing a custom database engine, AES-based encryption module, high-efficiency symbolic math parser, spreadsheet handler, and a zero-latency 3D rendering library from scratch in pure C++.

ClassicTunes | *Swift, SwiftUI, Metal API* — Oct. 2025 – Present
- Developing an open-source modern remake of iTunes 7–10 for Apple Silicon macOS, faithfully recreating CoverFlow, MiniPlayer, and Smart/Genius Playlists.
- Built custom song/album processing frameworks, universal playlist support, and lrclib API integration for synchronized lyric retrieval using Metal API for GPU-accelerated rendering.

Whoa-Scope | *Python, Kivy* — Feb. 2026 – Present
- Contributing to an open-source oscilloscope software fork used in hardware labs at Olin College, adding themes, revamped file handling, and wave generator snapping.
- Optimized memory management, reducing RAM usage by over 200 MB through profiling and targeted refactoring.

OuroborOS | *Linux, C, Bash* — Jan. 2026
- Designed a "security-by-suicide" Linux distribution that monitors its own system logs and initiates an automated self-destruct sequence and kernel panic upon detection of invalid commands.

EXPERIENCE

Olin College AERO Project Team — Needham, MA
Head of Ground Station Development — Software Engineer — *Sep. 2025 – Present*
- Leading software development for an autonomous fixed-wing aircraft competing in the AUVSI SUAS competition, targeting precision water delivery to GPS-specified targets using image recognition.
- Architected and implemented ground station software integrating ArduPilot, MissionPlanner, and ROS/MAVROS control systems on a CubeSat with an NVIDIA Jetson on-board computer.
- Engineered low-latency fly-by-wire telemetry pipeline for real-time monitoring, safety interlocks, and flight data collection.

Geeky Insights — Remote
Full-Stack Android App Developer — Internship — *Apr. 2024 – Apr. 2025*
- Designed end-to-end UI/UX of a customizable audio alarm clock app using Figma and Adobe Creative Suite, prioritizing accessibility and intuitive design for a diverse user base.
- Engineered full front-end and backend system in Flutter, Dart, and Java; achieved a bug-free, 15 MB package with broad compatibility across Android platforms and versions.
- Conducted rigorous testing and debugging cycles to ensure stability and performance on low-resource Android devices.

ACTIVITIES

Olin ICPC — Needham, MA
Competitive Programmer — Team Member — *Jan. 2026 – Present*
- Solving high-difficulty algorithmic problems under competitive time constraints in bi-weekly ICPC-style contests.
- Applying advanced techniques including segment/Fenwick trees, dynamic programming, graph algorithms, string algorithms, network flow, and computational geometry.

RESEARCH & PUBLICATIONS

C++ and Java Performance in Android Environments — Aug. 2025
- Benchmarked C++ and Java runtime performance across multiple Android devices; demonstrated C++ advantages in resource-intensive workloads and Java advantages in stability and memory safety.

C++ Memory Safety and Integrity Analysis — Oct. 2024
- Analyzed C++ memory safety by constructing targeted leak scenarios and comparing behavior against Java equivalents; findings informed recommendations for language selection in safety-critical mobile systems.