

Roshan Kumar Gupta

Research Engineer & Systems Architect

Chandigarh, India

+91 9334098565

✉ roshankumargupta.sh@gmail.com

🌐 tars.earth

Summary

Research Engineer & Systems Architect specializing in the intersection of **Physics-Constrained ML**, **HPC**, and **Deterministic Runtimes**. Successfully managing a diverse portfolio of research including a **\$5,500 Emergent Ventures grant** and novel architectures for memory management and GPU integrity. Expert in building high-performance primitives that outperform enterprise-grade hardware.

Systems Engineering & Strategic Research

Scaling **Project TARS**, *Emergent Ventures Grantee*, ML Pipeline

- Scaling a physics-constrained ML pipeline for NASA TESS exoplanet validation; achieved **70.1% precision**.
- Awarded **\$5,500 grant** to scale research into broader astronomical and planetary systems.

GPU/HPC **FieldChain**, *HPC Architecture*, Active Research

- Engineered a GPU-centric storage integrity layer sustaining **7GB/s sequential writes** via PCIe 4.0.
- Outperformed **enterprise-grade specialized DPUs by 4.2x** (166.86 GiB/s peak bandwidth) via custom Vulkan backend.

Thesis **QUANTA**, *Entropic Noise Boundary*, Working Paper

- Authored whitepaper defining an operational info-horizon for NISQ circuits via entropic noise metrics.
- Formulated an exponential scaling law and mapped the "Undead Zone" (extractability vs. protection).

Algorithms **Roshan Arch** | **HSA***, *Systems Research*

- **Roshan Arch**: Architected a deterministic memory framework and bit-packed state protocol that **eliminates GC pauses**.
- **HSA***: Formulated a routing engine using an **inverse square law heuristic for safety weights**, achieving paths in **97μs** (140x faster than Dijkstra).

Web-development **Cryptic**, *DAO Treasury Dashboard*, ZeroToOne Hackathon

- **Frontend Lead & UI/UX Designer**: Architected high-fidelity dashboard for automating \$20B+ in idle capital; engineered custom UI/UX primitives and secure React architecture.

Experience & Leadership

Dec 2025–Jan 2026 **L3 IT Intern**, *SMG Electric Scooters Ltd*, Chandigarh

- Designed and developed an **internal CRM portal** to automate logistics and vendor development workflows.

Oct 2025–Present **Student Representative**, *Chandigarh University*, Mohali, Punjab

- Primary liaison between student body and university administration to resolve academic/infrastructure issues.

Education

B.Tech (CS) Chandigarh University, Mohali | Expected 2029

Technical Skills

Low-Level CUDA, Vulkan, PTX, C++, Deterministic Runtimes, Memory Architectures.

Systems React (Architecture), PyTorch (Physics-ML), Figma (UI Primitives).

Honors & Certifications

Awards Winner | Zinnovatio, ZeroToOne; 15+ Hackathons participation.

Certs **Scientific Writing** (Polytechnique), **Azure AI Cert** (Vision, NLP).