Satyandra Guthula

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TB-scale foundation models for network telemetry — 4 years at VMware, Google SWE intern, NeurIPS 2025, 3 patents filed.

Education

University of California Santa Barbara — Santa Barbara, USA
Ph.D. in Computer Science, GPA: 3.76/4 — *Sept 2022 – Expected Sept 2027*

Indian Institute of Technology, Kanpur — Kanpur, India
M.Tech. in Computer Science — *July 2016 – July 2018*

University of Mumbai — Mumbai, India
B.E. in Computer Engineering — *June 2012 – June 2016*

Experience

Graduate Student Researcher — Sept 2022 – Present
UC Santa Barbara — Systems and Networking Lab (advisor: Arpit Gupta) — *Santa Barbara, USA*

- **netFound** (under review): multi-modal hierarchical foundation model pretrained on 1 TB of raw traces (packets, bursts, flows); outperforms all baselines across security tasks (**+15% F1**) and resists shortcuts. Mentored M.S. students on the project.
- **NetBurst** (under review): Hawkes-inspired foundation model for sparse, bursty time series; outperforms state-of-the-art temporal models, including Amazon's Chronos, in traffic forecasting by **2.07×–200×**.
- **netomics** (ongoing): graph neural foundation model over host/subnet graphs, hierarchically aggregating temporal backbones.
- **Demystifying Network Foundation Models** (NeurIPS 2025, 2nd author): interprets pretrained NFMs without downstream tasks; found anisotropy and inconsistent feature sensitivity, whose fixes raised F1 by **up to 0.35**.
- **Pramana** (HotNets 2026, co-author): co-built the **agentic framework**; built agents driving our ML models (netFound, NetBurst).

Student Researcher — Oct 2026 – Present
Google — *Sunnyvale, USA (Remote)*

- Extending diagnosis to **localize physical faults** and warn before IP impact, scoring shared optical equipment via topology.

Software Engineering Intern — Summer 2026
Google — *Bengaluru, India*

- Redesigned an LLM-based diagnosis pipeline for optical-network time series around **retrieval over foundation-model embeddings**.
- Reached **93.76% diagnosis accuracy**, validated with an **LLM-as-a-judge**.
- Sent only low-confidence cases to the LLM, keeping **92% of tickets off the LLM path** with no accuracy loss.
- Cut diagnosis latency **20×** on CPU and 4000× on accelerators at lower cost, enabling **always-on monitoring**.

Research Intern — Summer 2024, 2025
ESnet (Dept. of Energy) — *Berkeley, USA*

- Time-series foundation model for sparse, heavy-tailed **IPFIX** traffic: **10× lower MSE vs Chronos**, 94% app-classification accuracy.
- Task-aware pretraining losses for netFound (**+42% linear-probe gain**); reproduced 82% accuracy on ESnet production data.
- Deployed netFound at ESnet; **student-teacher distillation** on 100 GB cut parameters **50%** at $<$5% loss.
- PyArrow/Parquet vectorized reads (**5× faster**); scaled training with Spark and **PyTorch DDP** on NERSC (SLURM).

Member of Technical Staff 2 — July 2018 – July 2022
VMware (now Broadcom) — vRealize Network Insight (data center network monitoring & analytics) — *Bengaluru, India*

- **Owned vRNI's network domain** — firewall support and VM-to-VM path stitching; developed and mentored 4 new graduates.
- Built an in-memory emulator of the full product pipeline, adopted as a **Jenkins CI gate** on every PR to main/alpha/beta.
- Cut memory **12 GB** $\rightarrow$ **1 GB** and raised throughput **8×** by redesigning telemetry pollers (multithreading, data-model refactor).
- Interactive polling framework for SSH/HTTP collection; closed **8 large-scale escalations** from crashes and data loss.
- Hardened the platform with **Kerberos** across Flink, Kafka and Zookeeper; built upgrade checks and scripts for new releases.
- **RL polling scheduler** keying on correlated BGP/config changes across related devices; patent filed.
- Prototyped an **LSTM+CNN intrusion-detection model**: 85% accuracy on 25k IPFIX flows, 5k simulated attacks; patent filed.
- Reachability metric with DBSCAN/OPTICS to cluster applications and similar VMs; **VMware Radio** (16% acceptance); patent filed.

Technical Skills

- **Programming Languages**: Python, C/C++, Java, SQL, Bash
- **ML Libraries**: PyTorch, JAX, PyTorch Geometric, DGL, Hugging Face, Lightning, scikit-learn, UMAP, HDBSCAN
- **Foundation Models**: TimesFM, Chronos; Gemini / Vertex AI, OpenAI API, Anthropic API; MCP (Model Context Protocol)
- **Data Processing**: NumPy, pandas, Spark (PySpark), Kafka, Flink, PyArrow/Parquet
- **Databases**: MySQL, PostgreSQL, MongoDB, Elasticsearch; vector: FAISS, Milvus
- **Networking**: IPFIX/NetFlow, sFlow, SNMP, BGP, tcpdump, Wireshark/tshark, Mininet, tc/netem
- **Infra & DevOps**: Docker, Kubernetes, gRPC/protobuf, REST/FastAPI, pytest, Jenkins, Grafana
- **Cloud & HPC**: GCP (TPU), AWS, Azure; NERSC (SLURM); distributed training with PyTorch DDP on A100/H100 GPUs