Jaber Daneshamooz

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RESEARCH INTERESTS

Machine learning and agentic AI for networking: data generation and emulation, network measurement, foundation models for traffic, and AI-era networking education. Focus on performance, fairness, security, and reliability.

EDUCATION

Ph.D., Computer Science (Machine Learning in Computer Networks), UC Santa Barbara 2021 – Exp. Sep. 2027
Advisor: Prof. Arpit Gupta, Systems and Networking Lab | GPA 3.8/4.0 | Academic excellence award ($2,000)

Master in Technology Management, UC Santa Barbara Completed

B.S., Computer Engineering – Information Technology, Isfahan University of Technology (IUT), Iran Sep. 2014 – Jan. 2019
GPA 3.7/4.0 | Ranked 1st in Information Technology among all B.Sc. students of the 2014 entrance cohort

PUBLICATIONS

Published (2026)

[1] **J. Daneshamooz**, E. Vuong, A. Ramanathan, M. Moghimi, H. Manda, S. Kumar, S. Thode, S. Guthula, S. Beltiukov, D. Han, T. Mangla, S. Abdu Jyothi, W. Willinger, A. Gupta. *Pramana: A Composable, Domain-Specific Backend for Empirical Networking Research.* **The 25th ACM Workshop on Hot Topics in Networks (HotNets '26)**, Salt Lake City, UT. DOI 10.1145/3847290.3859953.

[2] **J. Daneshamooz**, S. Guthula, J. Nguyen, W. Chen, A. Gupta, W. Willinger, A. Gupta. *NetReplica: A Bottleneck-Regime Substrate for Reproducible Network Data Generation.* **Network Traffic Classification – Reloaded (NTC-R '26)**, co-located with ACM CoNEXT 2026, Utrecht. Short paper. DOI 10.1145/3843199.3857224.

[3] **J. Daneshamooz**, H. Manda, M. Moghimi, S. Beltiukov, W. Willinger, A. Gupta. *Rethinking Network Foundation Models: From Bigger Models to Better Data.* **NTC-R '26**, Utrecht. DOI 10.1145/3843199.3857225.

[4] **J. Daneshamooz**, S. Chandrasekaran, A. Gupta. *A First-Principles Framework for Networking Education.* **SIGCOMM Education Workshop 2026 (A4NE: Networking Education for the AI Generation)**, Denver.

Accepted / to appear / under submission

[5] **J. Daneshamooz**, et al. *Facilitating Experiential Learning in Networking Education.* **ACM SIGCSE Technical Symposium (SIGCSE TS) 2027**, Sacramento, CA.

[6] **J. Daneshamooz**, et al. *Beyond Throughput: Enhancing Speed Tests with Diagnostic Data.* **Under submission.**

Other published works / preprints

[7] **J. Daneshamooz**, E. Vuong, L. Koduru, S. Chandrasekaran, A. Gupta. *NetGent: Agent-Based Automation of Network Application Workflows.* **NeurIPS 2025 Workshop on ML for Systems.**

[8] S. Guthula, **J. Daneshamooz**, C. Fleming, K. Wu, W. Willinger, A. Gupta. *NetBurst: Event-Centric Forecasting of Bursty, Intermittent Time Series.* arXiv:2510.22397, 2025.

[9] S. Beltiukov, S. Guthula, H. Manda, **J. Daneshamooz**, W. Guo, W. Willinger, et al. *netFound: Principled Design for Network Foundation Models.* arXiv:2310.17025, 2025.

[10] L. Koduru, S. Beltiukov, A. Nguyen, E. Vuong, **J. Daneshamooz**, et al. *Robust and Extensible Measurement of Broadband Plans with BQT+.* arXiv:2602.16969, 2026.

[11] L. Koduru, S. Beltiukov, **J. Daneshamooz**, E. Vuong, A. Gupta, E. Belding, et al. *Enabling Data-Driven Policymaking Using Broadband-Plan Querying Tool (BQT+).* **ACM IMC 2025 PRIME Workshop.**

[12] S. Chandrasekaran, **J. Daneshamooz**, O. Michel, A. Gupta. *Uncovering Lesser-Studied RTC Applications using RTP.* **ACM Internet Measurement Conference (IMC) 2025**, pp. 1044–1045.

[13] C. Guok, E. Balas, S. Balasubramanian, J. Balcas, **J. Daneshamooz**, et al. *ESnet Data and AI Workshop Report.* 2025.

[14] **J. Daneshamooz**, M. Yu, S. Maddury. *Seagull: Privacy-Preserving Network Verification System.* arXiv:2402.08956, 2024.

RESEARCH PROJECTS

Pramana — natural-language intent to executed network experiments (*HotNets '26*) 2025 – 2026

- Designed a composable, domain-specific backend (a "thin waist") that compiles natural-language intents into executable network experiments over NetReplica and NetGent; only the compile step uses a language model (2.7 s), and everything below it replays existing artifacts deterministically.
- Built a corpus of 255 data-generation intents from 66 published papers: the intent specification expresses all of them, while no existing tool covers more than 11%; the prototype covers 27% (53% with ten additional capabilities) and regenerates CCAnalyzer's main experiment across 15 congestion-control algorithms.
- Deployed as the experimental backend in an upper-division networking course (70 students).

NetGent — agent-based automation of application workflows (*NeurIPS ML4Sys 2025*) 2025

- Developed an AI-agent framework that automates complex application workflows for networking data generation across 50+ applications, in about 2 minutes per workflow with minimal human effort.

NetReplica — bottleneck-centric network data generation (*NTC-R 2026*) 2023 – 2026

- Built a network emulation platform with high controllability that separates a bottleneck's static envelope from its dynamic congestion pressure and integrates real passive traces as cross traffic (Cross-Traffic Profiles).
- Reduced ABR model (Fugu) transmission-time prediction error by up to 47%; reproduced a deployed congestion-control classifier's central experiment in an independent execution context (18 of 20 runs matched).
- Audited 387 experiments from 66 measurement papers and found 66% generate network conditions live, motivating reproducible regime specification.

netFound — foundation model for network security (*arXiv*) 2023 – 2025

- Built a foundation model for network security learning from large-scale traffic and attack data; improved detection and generalization to unseen threats by up to 100% over traditional ML systems.

NetBurst — event-centric forecasting of bursty time series (*arXiv*) 2024 – 2025

- Hawkes-inspired time-series foundation model for sparse, bursty data; outperforms state-of-the-art temporal models such as Amazon's Chronos by 2.07× up to 200× in traffic forecasting.

Seagull — privacy-preserving network verification (*arXiv*) 2021 – 2023

- Built an MPC-based system that verifies BGP configurations without leaking policies; completed queries on a 4,800-node network in under 80 seconds.

TraceNeck — locating the bottleneck in speed tests (*under submission*) Aug. 2024 – Present

- Built a lightweight tool that runs alongside unmodified Ookla and M-Lab NDT speed tests and sends TTL-limited probes to every hop; the speed test self-congests the path, so the hop whose delay grows most under load is the bottleneck. Located it correctly across 1–500 Mbps links, under CoDel and under bursty cross traffic (validated on NetReplica).
- Deployed on Raspberry Pi devices in 41 homes for a month (1,912 speed tests): the bottleneck lies mostly in the last mile, but in the home network in 14.5–32.1% of tests despite wired devices, concentrated at ~100 Mbps and gigabit speeds.

True Detective — detecting devices behind NAT Jul. 2023 – Jan. 2024

- Trained a generalizable ML model that identifies devices behind NAT and their flows from realistic traces (91% accuracy on real-world data); also serves as an OS fingerprinting tool.

CAIDA-Mate — CAIDA Hackathon project

- Built an agentic framework (MCP server) that lets users run CAIDA measurement tools and use its datasets, with guardrails, using only natural language.

Bit-flips and bit-squatting honeypot (Go, Python, Linux, nginx) Apr. 2022 – Jan. 2023

- Deployed a honeypot measuring the prevalence and sources of bit-flips in DNS requests; captured 100K+ DNS and 2K web requests per day across 10 bit-flipped domains.

Course projects

- Scalable Pokémon forum and social platform (Ruby on Rails, AWS) supporting 2,000 concurrent users under Tsung stress tests.
- Distributed blockchain with Chandy–Lamport global snapshot and RAFT (Python); full Linux file system in kernel space using FUSE (C, CentOS).
- Open source: debugged and improved LibreQoS to provide better internet for communities (2023).

INDUSTRY & PRIOR EXPERIENCE

Graduate Research Assistant, Systems and Networking Lab, UC Santa Barbara (advisor: Prof. Arpit Gupta) 2021 – Present

- Lead research and engineering on data-generation systems (NetReplica, NetGent, Pramana) and foundation models for networking; mentor undergraduate and graduate researchers.

Software Developer, Fin-Tech Industry | Python, Git Aug. 2020 – Jan. 2021

- Developed a stock-market trading assistant app that automates financial analysis, reducing analysis time by 90%, using agile development.

Software Engineer, Water Resource Department | Django, MySQL, Arduino, C, Java Jan. 2020 – Aug. 2020

- Developed a system to manage and monitor agricultural water resources in remote areas, saving 20% of costs without on-site measurements.
- Led a team of two hardware engineers.

Full Stack Developer, R&D Startup | Java, Linux, Raspberry Pi Jan. 2019 – Jan. 2020

- Developed a system to run, control, and analyze tests in collaboration with a team of 6 mechanical and electrical engineers.

Networking Subject-Matter Expert, Institute for Artificial Intelligence | Java, Python, Tableau Sep. 2018 – Jan. 2019

- Improved targeted-advertisement accuracy by 27% by analyzing web-cache proxy server logs.
- Tracked users via HTTP header information without breaching privacy and identified 150+ worms and viruses.

Research & Developer, IUT-LTE (university-based startup) | Linux, C, Java Jan. 2018 – Sep. 2018

- Deployed and tested a full LTE network with OAI as a testbed for a 5G research team and telecom startup.
- Deployed a full IP Multimedia Subsystem (Clearwater) to improve VoIP-over-LTE quality of service.

Intern, Municipal Insurance Company | SQL, Windows Server Jun. 2017 – Sep. 2017

- Managed the database and access controls; resolved network and security issues.

TEACHING

Teaching Assistant, UCSB: Python programming; Data structures and algorithms (×5); Computer architecture 2021 – 2023

Guest Lecturer, UCSB: two upper-division courses (6 sessions) 2024 – 2025

Instructor, IUT: C programming lab; Computer networks lab 2018

Teaching Assistant, IUT: Computer networks (×2), Digital system design (×3), IT engineering, Computer architecture, Network lab 2016 – 2019

Education research: A4NE (SIGCOMM Education Workshop 2026) and SIGCSE TS 2027 papers (publications [4], [5]).

MENTORSHIP

Research mentor to 13 students through the UCSB Research Mentorship Program (RMP), Cal-Bridge, and the Emerging Research Scholars Program (ERSP), 2023 – present. Mentees have gone on to MIT, Stanford, Cornell, Duke, UCLA, and UCSB graduate programs, and several co-authored papers above (NetReplica, NetGent, Seagull).

HONORS & AWARDS

Finalist, UCSB New Venture Competition — as technical lead and founder of NetSplit 2025

Winner, Global Entrepreneur in Residence, California NanoSystems Institute (CNSI) 2025

NSF I-Corps ZAP and BOOM completed; invited to national I-Corps 2024

Harold Frank Innovation Scholarship — two-time recipient 2023, 2024

CSAW '23 — second place, logic-locking competition; travel grant to present 2023

Academic excellence award ($2,000), UCSB

Computer Olympiad — top 15 nationally, Iran 2019

Exempted from the M.Sc. entrance exam (Konkur) as an exceptional-talent student, Iran 2018

Ranked 1st in Information Technology among all IUT B.Sc. students of the 2014 entrance 2018

SERVICE, LEADERSHIP & OUTREACH

Shadow Technical Program Committee, ACM Internet Measurement Conference (IMC) 2025

Reviewer, SIGCSE Technical Symposium — poster session 2026

Graduate representative, Student Engagement Committee, UCSB Computer Science (restarted CS Coffee Hour; Alumni Talks) 2025

President, Iranian Graduate Students Association (IGSA), UCSB 2021 – 2022

PhD Application Support Program, UCSB CS — reviewed CVs and statements for underserved applicants (3 years)

Graduate representative, Vice Chancellor for Student Affairs (VCSA) cabinet, UCSB

Panelist, “Beyond Academia” (industry career paths); **guest speaker** at CNSI and the New Venture Competition

CAIDA Hackathon participant (CAIDA-Mate)

TECHNICAL SKILLS

Advanced: ML, AI agents, Python, C, C++, Java, Linux, object-oriented design, SDN, Ruby on Rails, team management

Experienced: Go, Rust, Ruby, SQL, P4, JavaScript, Cisco routing and switching, virtualization, web development, networking tools

ML & Data: LangChain, PyTorch, scikit-learn, Spark, InfluxDB, PostgreSQL

Tools: Docker, AWS, network emulation, Tsung, OAI/Clearwater (LTE/IMS)