Arpit Gupta

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Research Interests

As a systems researcher, I design and build systems that help realize an equitable digital future. Currently, I am focusing on developing "production-ready" ML artifacts for cybersecurity and enabling data-driven policymaking for broadband networks.

Education

May'13-Aug'18	**Princeton University**, *Ph.D.*, Computer Science.
	Dissertation: Flexible and Scalable Systems for Network Management
	Adviser: Nick Feamster
	Honorable Mention, SIGCOMM Dissertation Award
	Note: I started my Ph.D. at Schol of Computer Science at Georgia Tech in May 2013, and transferred to Princeton University in Jan 2015
Jan'15-Jun'16	**Princeton University**, *M.A.*, Computer Science.
Aug'10-May'13	**NC State University**, *M.S.*, Computer Science.
Aug'05-May'09	**Indian Institute of Technology, Roorkee**, *B.Tech.*, Electronics & Comm.

Professional Experience

Jul'19–	**University of California, Santa Barbara**, *Assistant Professor*, Santa Barbara, CA.
Apr'24–	**Lawrence Berkeley National Lab**, *Faculty Scientist*, Berkeley, CA.
Oct'22–	**Beegol Inc.**, *Consultant*, Olímpia, Sao Paulo, Brazil.
Sep'18–Aug'19	**Columbia University**, *Postdoctoral Research Scientist*, New York, NY.
Jan'15–Aug'18	**Princeton University**, *Graduate Research/Teaching Assistant*, Princeton, NJ.
May'16–Aug'16	**Microsoft Research**, *Research Intern*, Redmond, WA.
May'13–Dec'14	**Georgia Tech**, *Graduate Research/Teaching Assistant*, Atlanta, GA.
Aug'11–May'12	**NC State University**, *Graduate Research/Teaching Assistant*, Raleigh, NC.
May'11-Aug'11	**Google**, *Software Engineering Intern*, Mountain View, CA.
Feb'10-Aug'10	**Indian Institute of Science**, *Project Assistant*, Bangalore, India.

Awards

Students

2024	SIGCOMM Dissertation Award—Udit Paul
2024	NSF Graduate Research Fellowship (GRFP)—Haarika Manda
2023	UCSB Outstanding Dissertation Award—Udit Paul
2023	UCSB Outstanding Publication Award—Udit Paul
2023	UCSB Summer Fellowship—Roman Beltiukov
2022	Google' M-Lab Research Fellowship—Sanjay Chandrasekaran
2022	UCSB Outstanding Graduate Research Award—Sanjay Chandrasekaran
2022	UCSB Outstanding Undergraduate Research Award—Chaofan Shou
2022	UCSB Outstanding Teaching Assistant Award—Rohan Bhatia

Self

2023 IETF/IRTF Applied Networking Prize

2022 ACM SIGCOMM IMC Distinguished Paper Award (Long)

2022 Honorable Mention, ACM CCS Best Paper

2018 Honorable Mention, SIGCOMM Dissertation Award

2017 Best Paper Award winner, ACM SOSR

2016 USENIX "Best of the Rest" Paper Award for Best Paper in all USENIX Conferences

2016 USENIX Community Contribution Award, USENIX NSDI

2013 Internet-2 Innovation Award

2010 College of Engineering Fellowship, North Carolina State University

Publications

Conferences

[1] Haarika Manda, Varshika Srinivasavaradhan, Laasya Koduru, Kevin Zhang, Xuanhe Zhou, Udit Paul, Elizabeth Belding, Arpit Gupta, and Tejas Narechania. Assessing the Efficacy of the Connect America Fund in Addressing Internet Access Inequities in the US. In *ACM SIGCOMM*, 2024.

[2] Chris Misa, Ram Durairajan, Arpit Gupta, Reza Rejaie, and Walter Willinger. Leveraging Prefix Structure to Detect Volumetric DDoS Attack Signatures with Programmable Switches. In *IEEE Symposium on Security and Privacy (S&P)*, 2024.

[3] Chaofan Shuo, Rohan Bhatia, Arpit Gupta, Rob Harrison, Daniel Lokshtanov, and Walter Willinger. Query planning for robust and scalable hybrid network telemetry systems. In *ACM Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, 2024.

[4] Roman Beltiukov, Wenbo Guo, Arpit Gupta, and Walter Willinger. In Search of netUnicorn: A Data-Collection Platform to Develop Generalizable ML Models for Network Security Problems. In *ACM Conference on Computer and Communications Security (CCS)*, 2023.

[5] Udit Paul, Vinothini Gunasekaran, Jiamo Liu, Tejas Narechania, Arpit Gupta, and Elizabeth Belding. Decoding the Divide: Analyzing Disparities in Broadband Plans Offered by Major US ISPs. In *ACM SIGCOMM*, 2023.

[6] Taveesh Sharma, Tarun Mangla, Arpit Gupta, Junchen Jiang, and Nick Feamster. Estimating webrtc video qoe metrics without using application headers. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, 2023.

[7] Fuheng Zhao, Punnal Ismail Khan, Divyakant Agrawal, Amr El Abbadi, Arpit Gupta, and Zaoxing Liu. Panakos: Chasing the tails for multidimensional data streams. In *International Conference on Very Large Data Bases (VLDB)*, 2023.

[8] Arthur S Jacobs, Roman Beltiukov, Walter Willinger, Ronaldo A Ferreira, Arpit Gupta, and Lisandro Z Granville. Ai/ml for network security: The emperor has no clothes. In *ACM Conference on Computer and Communications Security (CCS)*, 2022.
IETF/IRTF'23 Applied Networking Research Prize (ANRP)
ACM CCS'22 Best Paper Award (Honorary Mention).

[9] Congcong Miao, Minggang Chen, Arpit Gupta, Zili Meng, Lianjin Ye, Jingyu Xiao, Jie Chen, Zekun He, Xulong Luo, Jilong Wang, and Heng Yu. Detecting Ephemeral Optical Events with OpTel. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2022.

[10] Udit Paul, Jiamo Liu, Arpit Gupta, Mengyang Gu, and Elizabeth Belding. The Importance of Contextualization of Crowdsourced Active Speed Test Measurements. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, 2022. **ACM SIGCOMM IMC'22 Distinguished Paper Award**.

[11] Vivek Adarsh, Michael Nekrasov, Udit Paul, Alexander Ermakov, Arpit Gupta, Morgan Vigil-Hayes, Ellen W Zegura, and Elizabeth M Belding. Coverage is Not Binary: Quantifying Mobile Broadband Quality in Urban, Rural and Tribal Contexts. In *International Conference on Computer Communications and Networks (ICCCN)*, 2021.

[12] Todd Arnold, Ege Gürmeriçliler, Georgia Essig, Arpit Gupta, Matt Calder, Vasileios Giotsas, and Ethan Katz-Bassett. (How Much) Does a Private WAN Improve Cloud Performance? In *IEEE Conference on Computer Communications (INFOCOM)*, 2020.

[13] Arpit Gupta, Rob Harrison, Ankita Pawar, Marco Canini, Nick Feamster, Jennifer Rexford, and Walter Willinger. Sonata: Query-Driven Network Telemetry. In *ACM SIGCOMM*, 2018.

[14] Robert MacDavid, Rüdiger Birkner, Ori Rottenstreich, Arpit Gupta, Nick Feamster, and Jennifer Rexford. Concise Encoding of Flow Attributes in SDN Switches. In *ACM Symposium on SDN Research (SOSR)*, 2017. **ACM SOSR'17 Best Paper Award**.

[15] Arpit Gupta, Robert MacDavid, Rüdiger Birkner, Marco Canini, Nick Feamster, Jennifer Rexford, and Laurent Vanbever. An Industrial-Scale Software Defined Internet Exchange Point. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2016. **NSDI'16 Community Award** **USENIX'16 Best of the Rest**.

[16] Hyojoon Kim, Joshua Reich, Arpit Gupta, Muhammad Shahbaz, Nick Feamster, and Russ Clark. Kinetic: Verifiable Dynamic Network Control. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2015.

[17] Arpit Gupta, Laurent Vanbever, Muhammad Shahbaz, Sean Patrick Donovan, Brandon Schlinker, Nick Feamster, Jennifer Rexford, Scott Shenker, Russ Clark, and Ethan Katz-Bassett. SDX: A Software Defined Internet Exchange. In *ACM SIGCOMM*, 2014. **Internet2 Innovation Award**.

[18] Arpit Gupta, Jeongki Min, and Injong Rhee. Wifox: Scaling wifi performance for large audience environments. In *ACM Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, 2012.

Under Review

[19] Satyandra Guthula, Navya Battula, Roman Beltiukov, Wenbo Guo, and Arpit Gupta. netFound: Foundation Model for Network Security, arXiv:2310.17025 [cs.NI], 2023.

[20] Hyeongseong Lee, Udit Paul, Arpit Gupta, Elizabeth Belding, and Mengyang Gu. Analyzing Disparity and Temporal Progression of Internet Quality through Crowdsourced Measurements with Bias-Correction, arxiv:2106.05420 [cs.NI], 2023.

Workshops & Short Papers

[21] Roman Beltiukov, Sanjay Chandrasekaran, Arpit Gupta, and Walter Willinger. Pinot: Programmable infrastructure for networking. In *Proceedings of the Applied Networking Research Workshop*, 2023.

[22] Arpit Gupta, Ramakrishnan Durairajan, and Walter Willinger. Special issue on the acm sigmetrics workshop on measurements for self-driving networks. *ACM SIGMETRICS Performance Evaluation Review*, 2023.

[23] Vivek Adarsh, Michael Nekrasov, Udit Paul, Alexander Ermakov, Arpit Gupta, Morgan Vigil-Hayes, Ellen W Zegura, and Elizabeth M Belding. Too Late for Playback: Estimation of Video Stream Quality in Rural and Urban Contexts. In *Passive and Active Measurement Conference (PAM)*, 2021.

[24] Todd Arnold, Matt Calder, Arpit Gupta, Italo Cunha, Michael Schapira, and Ethan Katz-Bassett. Beating BGP is Harder than We Thought. In *ACM HotNets*, 2019.

[25] Arpit Gupta, Chris MacStoker, and Walter Willinger. An Effort to Democratize Networking Research in the Era of AI/ML. In *ACM HotNets*, 2019.

[26] Hyojoon Kim and Arpit Gupta. Ontas: Flexible and scalable online network traffic anonymization system. In *ACM SIGCOMM NetAI*, 2019.

[27] Rob Harrison, Qizhe Cai, Arpit Gupta, and Jennifer Rexford. Network-Wide Heavy Hitter Detection with Commodity Switches. In *ACM Symposium on SDN Research (SOSR)*, 2018.

[28] Rüdiger Birkner, Arpit Gupta, Nick Feamster, and Laurent Vanbever. SDX-Based Flexibility or Internet Correctness?: Pick Two! In *ACM Symposium on SDN Research (SOSR)*, 2017.

[29] Arpit Gupta, Rüdiger Birkner, Marco Canini, Nick Feamster, Chris Mac-Stoker, and Walter Willinger. Network Monitoring as a Streaming Analytics Problem. In *ACM Workshop on Hot Topics in Networks (HotNets)*, 2016.

[30] Arpit Gupta, Nick Feamster, and Laurent Vanbever. Authorizing Network Control at Software Defined Internet Exchange Points. In *ACM Symposium on SDN Research (SOSR)*, 2016.

[31] Arpit Gupta, Matt Calder, Nick Feamster, Marshini Chetty, Enrico Calandro, and Ethan Katz-Bassett. Peering at the Internet's Frontier: A First Look at ISP Interconnectivity in Africa. In *Passive and Active Network Measurement (PAM)*, 2014.

Research Proposals and Grants

Telemetry-driven Foundation Models for Self-Driving Networks.
Sponsor: Cisco Research
Investigator(s): A. Gupta
Amount: $ 90 k for 1 year.
Awarded: Spring 2024.

netFound: An AI/ML foundational model for Network.
Sponsor: DoE
Investigator(s): A. Gupta and I. Monga (ESnet)
Amount: $ 3.5 M for 1 year.
Awarded: Winter 2024.

IMR: MT: NetFlex: A Flexible Scalable & Privacy-Preserving Network Measurement Platform to Iteratively Collect Multi-modal Multi-view Network Data from Access Networks.
Sponsor: NSF
Investigator(s): A. Gupta
Amount: $ 600 k for 2 years.
Awarded: Fall 2023.

IMR: RI-P: Programmable Closed-loop Measurement Platform for Last-Mile Networks.
Sponsor: NSF
Investigator(s): A. Gupta and N. Feamster
Amount: $ 100 k for 2 years.
Awarded: Fall 2022.

IMR: MM-1A: ADDRESS: Augment, Denoise and Debias Crowdsourced Measurements for Statistical Synthesis of Internet Access Characterization.
Sponsor: NSF
Investigator(s): E. Belding, A. Gupta, and M. Gu
Amount: $ 600 k for 3 years.
Awarded: Fall 2022.

CC* Integration-Large: Democratizing Networking Research in the Era of AI/ML.
Sponsor: NSF
Investigator(s): A. Gupta, T. Gupta, E. Belding, and N. Feamster
Amount: $ 1 M for 3 years.
Awarded: Fall 2021.

CC* Integration-Large: Bringing Code to Data: A Collaborative Approach to Democratizing Internet Data Science.
Sponsor: NSF
Investigator(s): R. Durairajan, A. Gupta, R. Rezai, J. Miyake, and D. Teach
Amount: $ 1 M for 3 years.
Awarded: Fall 2021.

Scaling Network Security with PISA Switches.
Sponsor: Verizon
Investigator(s): A. Gupta
Amount: $ 200 k for 2 years.
Awarded: December 2019.

Self-Driving Broadband Networks.
Sponsor: Beegol Inc.
Investigator(s): A. Gupta
Amount: $ 35 k for 1 year.
Awarded: July 2020.

Workshop on Next-G Mobile Security.
Sponsor: NSF
Investigator(s): A. Gupta
Amount: $ 49 k for 1 year.
Awarded: July 2020.

MLWiNS: RL-based Self-driving Wireless Network Management System for QoE Optimization.
Sponsor: NSF & Intel
Investigator(s): A. Gupta (PI), E. Belding, Y. Wang
Amount: $ 840 k for 3 years.
Awarded: July 2020.

Professional Activities

Program Committee Chair

2021 ACM SIGCOMM Artifact Evaluation Committee, Virtual

2020 ACM SIGCOMM Student Research Competition, Virtual

2019 ACM SIGCOMM Workshop on Network Meets AI & ML (NetAI), Beijing, CN

Organizing Committee Chair

2023	NSF Workshop on "Bridging the Divide: Answering Internet Policy Questions with Cutting-Edge Network Measurement Algorithms, Datasets, and Platforms", Berkeley, CA
2023	SIGMETRICS Workshop on "Measurements for Self-driving Networks", Orlando, FL
2020	NSF Workshop on NextG Security, Virtual
2019	NSF Workshop on "Measurements for Self-driving Networks", Princeton, NJ

Program Committee Member

2024	ACM SIGMETRICS
2023-24	ACM SIGCOMM IMC
2021-24	USENIX Networked System Design and Implementation (NSDI)
2020-21	ACM SIGCOMM
2020	USENIX Networked System Design and Implementation (NSDI)
2019	ACM Conference on Emerging Networking Experiments and Technologies (CoNEXT)
2019	ACM SIGCOMM Symposium on SDN Research (SOSR)
2018	ACM SIGCOMM Workshop on Self-Driving Networks

Organizing Committee Member

2018	NSF Workshop on Self-driving Networks, Princeton

Panelist

2016	GENI Network Innovators Community Event 2016
2016	CITP Conference on Global Internet Interconnection

External Reviewer

2019	Privacy Enhancing Technologies Symposium (PETS)
2017	ACM SIGCOMM
2016	IEEE International Conference on Network Protocol (ICNP)
2014	USENIX Networked System Design and Implementation (NSDI)

Journal Reviewer

IEEE/ACM Transactions on: Networking (TNET), Mobile Computing (TMC), Network Science and Engineering (TNSE), Computer Networks Journal (COMNET), Photonic Network Communications (PNET) Journal of Network and Computer Applications (JNAC), Cloud Computing, Special Issue: Middleware and Middlecloud (CCMSI), International Journal of Network Management (IJNM)

Teaching

Instructor

2020-2024	ML For Networked Systems, (CS 293N), UCSB
2020-24	Advanced Topics in Internet Computing, (CS 176C), UCSB
2021-23	Programmable Networks, (CS 176B), UCSB
2023-24	ML for Networks, (CS 190N), UCSB

Students

Current Ph.D. Students

Fall 2019 – *	Sanjay Chandrasekaran—M-Lab Research Fellowship
Fall 2021 – *	Roman Beltiukov—ACM CCS'22 Best Paper Award Honorable Mention, IRTF'23 Applied Network Research Prize, UCSB Summer Fellowship'23

Fall 2021 – *   Punnal Ismail Khan

Fall 2022 – *   Satyandra Guthula

Fall 2023 – *   Haarika Manda (co-advised by Prof. Belding)

Past Ph.D. Students

Fall 2018 – 23   Udit Paul, UCSB, Ph.D. (co-advised with Prof. Belding)—ACM SIGCOMM Dissertation Award'24, IMC'22 Distinguished Paper Award, UCSB Outstanding Publication Award'23, UCSB Outstanding Dissertation Award'23

Current MS Students

Fall 2023 – *   Lasya Koduru

Past MS Students

Fall 2019 – 21   Abtin Bateni

Fall 2020 – 22   Irene Pattarachanyakul

Fall 2020 – 22   Rohan Bhatia

Fall 2021 – 23   Navya Battula