

# Arpit Gupta

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## Research Interests

As a systems researcher, I design and build *flexible*, *scalable*, and *trustworthy* systems that solve real-world problems at the intersection of networking, security, and machine learning. Specifically, I am interested in developing self-driving networks that provide highly available, reliable, performant, and secure network connectivity at lower costs to under-served communities.

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## Education

- August 2018 **Princeton University**, *Ph.D.*, Computer Science.  
*Dissertation*: Flexible and Scalable Systems for Network Management  
*Adviser*: Nick Feamster  
*Honorary Mention, SIGCOMM Dissertation Award*
- Spring 2016 **Princeton University**, *M.A.*, Computer Science.
- Spring 2013 **NC State University**, *M.S.*, Computer Science.
- Spring 2009 **Indian Institute of Technology, Roorkee**, *B.Tech.*, Electronics & Comm.

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## Professional Experience

- Summer 2019– **University of California, Santa Barbara**, *Assistant Professor*, Santa Barbara, CA.  
2018–2019 **Columbia University**, *Postdoctoral Research Scientist*, New York, NY.  
2015–2018 **Princeton University**, *Research Assistant*, Princeton, NJ.
- Summer 2016 **Microsoft Research**, *Research Intern*, Redmond, WA.  
2013–2014 **Georgia Tech**, *Research Assistant*, Princeton, NJ.  
2011–2012 **NC State University**, *Research Assistant*, Raleigh, NC.
- Summer 2011 **Google**, *Software Engineering Intern*, Mountain View, CA.  
Spring 2010 **Indian Institute of Science**, *Project Assistant*, Bangalore, India.

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## Awards

- 2022 ACM SIGCOMM IMC Distinguished Paper Award (Long)
- 2022 IETF/IRTF Applied Networking Prize
- 2022 Honorable Mention, ACM CCS Best Paper
- 2018 Honorable Mention, SIGCOMM Dissertation Award
- 2017 Best Paper Award winner, ACM SOSR
- 2017 Facebook Fellowship finalist
- 2016 USENIX “Best of the Rest” Paper Award for Best Paper in all USENIX Conferences
- 2016 USENIX Community Contribution Award, USENIX/ACM Symposium on Networked Systems Design and Implementation
- 2015 Facebook Fellowship finalist
- 2013 Internet-2 Innovation Award winner
- 2013 Meissner Fellowship, Purdue University (declined)
- 2010 College of Engineering Fellowship, North Carolina State University

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## Publications

### Conferences

- [1] 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.
- [2] Fuheng Zhao, Punnaal 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.
- [3] 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 Applied Networking Research Prize (ANRP), Best Paper Award (Honorary Mention).**
- [4] 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.
- [5] 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.  
**Distinguished Paper Award.**
- [6] 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.
- [7] 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.
- [8] 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.
- [9] **Arpit Gupta**, Rob Harrison, Ankita Pawar, Marco Canini, Nick Feamster, Jennifer Rexford, and Walter Willinger. Sonata: Query-Driven Network Telemetry. In *ACM SIGCOMM*, 2018.
- [10] 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.  
**Best Paper Award.**
- [11] **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.  
**Community Award.**

- [12] 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.
- [13] **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**.
- [14] **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.

### **Workshops & Short Papers**

- [15] 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.
- [16] Hyojoon Kim and **Arpit Gupta**. Ontas: Flexible and scalable online network traffic anonymization system. In *ACM SIGCOMM NetAI*, 2019.
- [17] **Arpit Gupta**, Chris MacStoker, and Walter Willinger. An Effort to Democratize Networking Research in the Era of AI/ML. In *ACM HotNets*, 2019.
- [18] 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.
- [19] 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.
- [20] **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.
- [21] **Arpit Gupta**, Nick Feamster, and Laurent Vanbever. Authorizing Network Control at Software Defined Internet Exchange Points. In *ACM Symposium on SDN Research (SOSR)*, 2016.
- [22] **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.

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### **Research Proposals and Grants**

**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

Investigator(s): A. Gupta (PI), E. Belding, Y. Wang

Amount: \$ 560 k for 3 years.

Awarded: July 2020.

**MLWiNS: RL-based Self-driving Wireless Network Management System for QoE Optimization.**

Sponsor: Intel

Investigator(s): A. Gupta (PI), E. Belding, Y. Wang

Amount: \$ 280 k for 3 years.

Awarded: July 2020.

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## **Presentations**

Making the "Net" Work: Flexible and Scalable Systems for Network Management

*Universities: Texas A&M University (02/18), UC Santa Barbara (02/18), Northeastern University (03/18), University of Virginia (03/18), University of Minnesota (04/18), University of Toronto (04/18)*

Sonata: Query-Driven Streaming Network Telemetry

*Conferences: ACM HotNets (11/16), NANOG 70 (05/17), P4 Workshop (05/17)*

*Industry: Comcast (12/16), NIKSUN Inc. (06/17), AT&T (10/17)*

*Universities: New England Networking & Systems Day, Boston University (10/16)*

iSDX: An Industrial-Scale Software Defined IXP

*Conferences: USENIX NSDI (03/16), USENIX ATC (06/16), GENI Network Innovators Community Event (12/16)*

*Industry: AT&T (10/15), Project Endeavour (10/15), Corsa (11/15), CloudRouter (01/16), Open Networking Foundation Webinar (04/16), Appfest (05/16)*

*Universities: Networked Systems Laboratory, USC (08/15))*

Authorizing Network Control at Software Defined IXPs

*Conferences: ACM SOSR (03/16)*

*Industry: Verisign Inc. (08/15)*

SDX: A Software Defined Internet Exchange

*Conferences: ACM SIGCOMM (08/14), GENI Engineering Conference 20 (06/14), NANOG 59 (10/13), OpenIX Summit (04/15))*

*Industry: Facebook Inc. (08/14), Microsoft (08/14)*

*Universities: NetSeminar, Stanford University (10/14)*

Peering at the Internet's Frontier

*Conferences: Workshop on Passive and Active Measurements (03/14)*

WiFox: Scaling WiFi Performance for Large Audience

*Conferences: ACM SIGCOMM CoNEXT (12/12)*

*Universities: Duke University (10/12), UNC Chapel Hill (10/12)*

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**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 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)

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## Teaching

### Instructor

- 2020-2022 ML For Networked Systems, (CS 293N), UCSB
- 2020-23 Advanced Topics in Internet Computing,, (CS 176C), UCSB
- 2021-23 Programmable Networks, (CS 176B), UCSB

### Course Development

- Spring 2016 Securing Cyberspace with Big Data (COS 598E), Princeton University
- Summer 2015 Software Defined Networking, Coursera
- Fall 2014 Software Defined Networking (CS 4270), Georgia Tech
- Summer 2014 Software Defined Networking, Coursera

### Guest Lecture

- Fall 2017 Advanced Computer Networks (COS 561), Princeton University
- Spring 2017 Computer Networks (COS 461), Princeton University

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## Ph.D. Students

### Current

- Fall 2018 – \* Udit Paul, UCSB, Ph.D. (co-advised with Prof. Belding)
- Fall 2019 – \* Sanjay Chandrasekaran, UCSB, Ph.D.
- Fall 2021 – \* Roman Beltiukov, UCSB, Ph.D.
- Fall 2021 – \* Punnak Ismail Khan, UCSB, Ph.D.
- Fall 2022 – \* Satyandra Guthula, UCSB, Ph.D.