320 Sherrerd Hall
Princeton, NJ
✉ arpitg@cs.princeton.edu
www.cs.princeton.edu/~arpitg
agupta13

Arpit Gupta

Education

Summer 2018 (Expected) **Ph.D.**, *Princeton University*, *Computer Science*.
Advisor: Nick Feamster

Spring 2013 **M.S.**, *NC State University*, *Computer Science*.

Spring 2009 **B.Tech.**, *Indian Institute of Technology, Roorkee*, *Electronics & Comm.*

Professional Experience

2015–Present **Research Assistant**, *Princeton University*, Princeton, NJ.
Mentors: Nick Feamster and Jennifer Rexford
Designed and implemented: a network streaming telemetry system, *Sonata*; and an industrial-scale software-defined Internet exchange platform, *iSDX*.

Summer 2016 **Research Intern**, *Microsoft Research*, Redmond, WA.
Mentors: Ratul Mahajan and Monia Ghobadi
Designed and implemented a wide-area network controller, *Roshan*, that configures both the optical (physical) and the network layer to make optimal use of limited available resources under failures.

2013–2014 **Research Assistant**, *Georgia Tech*, Princeton, NJ.
Mentor: Nick Feamster
Designed and implemented: a software-defined Internet exchange platform, *SDX*; and an event based network management tool, *Kinetic*. Also, analysed multiple active and passive measurement dataset to model ISP interconnectivity in developing regions.

2011–2012 **Research Assistant**, *NC State University*, Raleigh, NC.
Mentor: Injong Rhee
Designed and implemented *WiFox*, solving the problem of performance degradation for large audience environments. This technology has been licensed out to Intel.

Summer 2011 **Research Intern**, *Google*, Mountain View, CA.
Mentor: Nandita Dukkipati
Worked on quantifying the role played by TCP time outs on Google's search traffic. Instrumented the TCP stack for Google's front end servers to collect the data required for this measurement study.

Spring 2010 **Project Assistant**, *Indian Institute of Science*, Bangalore, India.
Mentor: Anurag Kumar
Designed and implemented a WiFi AP based scheduling algorithm ensuring fairness to clients with disparate link qualities.

Publications

Conferences

[1] **Arpit Gupta**, Rob Harrison, Ankita Pawar, Rüdiger Birkner, Marco Canini, Nick Feamster, Jennifer Rexford, and Walter Willinger. Sonata: Query-Driven Network Telemetry. *Under Submission*.

[2] 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 (1 out of 77).

[3] **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 NSDI*, 2016.
Community Award (1 out of 255).

[4] Hyojoon Kim, Joshua Reich, **Arpit Gupta**, Muhammad Shahbaz, Nick Feamster, and Russ Clark. Kinetic: Verifiable Dynamic Network Control. In *USENIX NSDI*, 2015.
60 citations till Nov 2017 based on Google Scholar.

[5] **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.
210 citations till Nov 2017 based on Google Scholar.

[6] **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.
50 citations till Nov 2017 based on Google Scholar.

Workshops & Short Papers

[7] Rob Harrison, Cai Qizhe, **Arpit Gupta**, and Jennifer Rexford. Network-Wide Heavy Hitter Detection with Commodity Switches. *Under Submission.*

[8] Xiaohe Hu, **Arpit Gupta**, Aurojit Panda, Nick Feamster, and Scott Shenker. Preserving Privacy at IXPs. *Under Submission.*

[9] 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.

[10] **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.

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

[12] **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.
55 citations till Nov 2017 based on Google Scholar.

Teaching and Advising Experience

Teaching

- Advanced Computer Networks (COS 561), Princeton University — Fall 2017
- Computer Networks (COS 461), Princeton University — Spring 2016
- Securing Cyberspace with Big Data (COS 598E), Princeton University — Spring 2016
- Software Defined Networking (SDN02), Coursera — Summer 2015
- Software Defined Networking (CS 4270), Georgia Tech — Fall 2014
- Software Defined Networking (SDN02), Coursera — Summer 2014
- Computer Organization & Assembly Language, (CSC 236), NCSU — Spring 2013
- Internet Protocols (CSC 573), NCSU — Fall 2012

Guest Lecture

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

Advising

- *Robert MacDavid*, supervised on the iSDX [3] and the PathSets [2] projects. The two projects won the *Community* and *Best Paper* awards at USENIX NSDI and ACM SOSR respectively.
- *Rüdiger Birkner*, supervised on the iSDX [3], SIDR [9], and Sonata [10] projects.
- *Rob Harrison*, supervised on the Sonata [1] project. Currently advising on the distributed Sonata problem.
- *Bridger Hahn*, currently advising on the SonataEdge project, where we are trying to infer attacks for smart-home devices in real time.
- *David Liu*, currently advising on the SonataML project, where we are trying to co-design the algorithms for both machine learning and query planning for network telemetry tasks.
- *Jill Jermyn*, supervised on the Campus IPS project, where we explored how SDN can reduce workload for IPS boxes at Princeton. This project was the precursor to the Sonata [10] project.
- *Joshiah Chavula*, supervised on the African interconnection project, where we modeled the state of interconnection in the African subcontinent using various measurement platforms, such as BISMark, Ripe Atlas etc.

Awards

- Facebook Fellowship finalist — 2017
- Best Paper Award winner, ACM SOSR — 2017
- Community Award winner, USENIX NSDI — 2016
- Juniper/Comcast SDN Throwdown winner — 2016
- Facebook Fellowship finalist — 2015
- Internet-2 Innovation Award winner — 2013
- Meissner Fellowship (Purdue University) winner — 2013
- College of Engineering Fellowship (NC State University) winner, — 2010
- IEEE-Motorola Innovation Award winner — 2007

Presentations

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:* Boston University, New England Network Seminar (10/16)

iSDX: An Industrial-Scale Software Defined Internet Exchange Point

- *Conferences:* USENIX NSDI (03/16), USENIX ATC (06/16), GENI NICE (12/16)
- *Industry:* AT&T (10/15), Project Endeavour (10/15), Corsa (11/15), CloudRouter (01/16), ONF Webinar (04/16), ONF Appfest (05/16)
- *Universities:* USC, Networked Systems Laboratory (08/15)

Authorizing Network Control at Software Defined Internet Exchange Points

- *Conferences:* ACM SOSR (03/16)
- *Industry:* Verisign Inc. (08/15)

SDX: A Software Defined Internet Exchange

- *Conferences:* ACM SIGCOMM (08/14), GEC 20 (06/14), NANOG 59 (10/13), OpenIX Summit (04/15)
- *Industry:* Facebook Inc.(08/14), Microsoft (08/14)
- *Universities:* Stanford NetSeminar (10/14)

WiFox: Scaling WiFi Performance for Large Audience

- *Conferences:* ACM SIGCOMM CoNEXT (12/12)
- *Industry:* Facebook Inc.(08/14), Microsoft (08/14)
- *Universities:* Duke University (10/12), UNC Chapel Hill (10/12)

Professional Activities

Reviewer: NSDI 2014 (Shadow PC), ICNP 2016, SIGCOMM 2017, SIGCOMM 2018 Workshop on Self-Driving Networks, Transactions on Networking, Transactions on Mobile Computing, Computer Networks

Panelist: GENI-NICE 2016, Interconnection at CITP 2016

References

Prof. Jennifer Rexford
Department of Computer Science
Princeton University
35 Olden Street, CS 306
Princeton, NJ 08540
jrex@cs.princeton.edu

Prof. Nick Feamster
Department of Computer Science
Princeton University
310 Sherrerd Hall
Princeton, NJ 08540
feamster@cs.princeton.edu

Prof. Ethan Katz-Bassett
Department of Electrical Engineering
Columbia University
500 West 120th Street
New York, NY 10027
ethan@ee.columbia.edu

Dr. Walter Willinger
NIKSUN Inc.
457 N Harrison St
Princeton, NJ 08540
wwillinger@niksun.com