Arpit Gupta

Research Interests

As a systems researcher, I design and build easy-to-use and scalable systems that solve real-world problems at the intersection of networking, cybersecurity, and data science.

Education

Summer 2018 (Expected)	**Princeton University**, *Ph.D.*, Computer Science. Advisor: Nick Feamster **How can networks run themselves?** My dissertation research centers around answering this question. In particular, to satisfy the increased security, availability, and performance requirements of modern networks; my goal is to design and build self-driving networks that automatically (without humans in the loop) make holistic (not protocol-specific) control decisions in real time.
Spring 2013	**NC State University**, *M.S.*, Computer Science.
Spring 2009	**Indian Institute of Technology, Roorkee**, *B.Tech.*, Electronics & Comm..

Publications

Conferences

[1] **Arpit Gupta**, Rob Harrison, Ankita Pawar, 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 Symposium on Networked Systems Design and Implementation (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 Symposium on Networked Systems Design and Implementation (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, Qizhe Cai, **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.

Professional Experience

2015–Present **Princeton University**, *Research Assistant*, Princeton, NJ.
Mentors: Nick Feamster and Jennifer Rexford
Designed and implemented: a network streaming telemetry system, *Sonata* [10, 1, 7]; and an industrial-scale software-defined Internet exchange platform, *iSDX* [3, 2, 9, 8].

Summer 2016 **Microsoft Research**, *Research Intern*, Redmond, WA.
Mentors: Ratul Mahajan and Monia Ghobadi
Explored the design of 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 **Georgia Tech**, *Research Assistant*, Princeton, NJ.
Mentor: Nick Feamster
Designed and built a software-defined Internet exchange platform, *SDX* [5], helped with the design and implementation of an event based network management tool, *Kinetic* [4]. Also, analysed multiple active and passive measurement datasets to model ISP interconnectivity in developing regions [12].

2011–2012 **NC State University**, *Research Assistant*, Raleigh, NC.
Mentor: Injong Rhee
Developed *WiFox* [6], that solves the problem of WiFi performance degradation for large audience environments. This technology has been licensed out to Intel.

Summer 2011 **Google**, *Software Engineering Intern*, Mountain View, CA.
Mentor: Nandita Dukkipati
Worked on quantifying the effect of TCP timeouts 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 **Indian Institute of Science**, *Project Assistant*, Bangalore, India.
Mentor: Anurag Kumar
Designed and implemented a WiFi AP based scheduling algorithm ensuring fairness to clients with disparate link qualities.

Awards

2017 Best Paper Award winner, ACM SOSR
2017 Facebook Fellowship finalist
2016 Community Award winner, USENIX NSDI
2016 Juniper/Comcast SDN Throwdown winner
2015 Facebook Fellowship finalist
2013 Internet-2 Innovation Award winner
2013 Meissner Fellowship, Purdue University
2010 College of Engineering Fellowship, North Carolina State University

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: 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)

Professional Activities

External Reviewer
NSDI 2014, ICNP 2016, SIGCOMM 2017, IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, Computer Networks, Network Management

Program Committee
Workshop on Self-Driving Networks, SIGCOMM 2018

Teaching and Mentoring Experience

Teaching Assistant

Spring 2016	Computer Networks (COS 461), Princeton University
Summer 2013	Computer Organization & Assembly Language, (CSC 236), NC State University
Fall 2012	Internet Protocols (CSC 573), NC State University

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), Gerogia Tech
Summer 2014	Software Defined Networking, Coursera

Guest Lecture

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

Mentoring

Fall 2017 – *	David Liu, Ph.D.
Summer 2017 – *	Bridger Hahn, M.S.
Fall 2016 – *	Rob Harrison, Ph.D.
2015 – 2017	Rüdiger Birkner, M.S.
2015 – 2016	Robert MacDavid, M.S.

References

Prof. Jennifer Rexford
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Princeton, NJ 08540
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Prof. Nick Feamster
Department of Computer Science
Princeton University
310 Sherrerd Hall
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Prof. Ethan Katz-Bassett
Department of Electrical Engineering
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