Satadal "Sata" Sengupta

Ph.D. Candidate in Computer Science at Princeton

https://satadalsengupta.github.io

satadal.sengupta@princeton.edu

Research Interests

I design systems that combine Internet measurements and programmable networks to help operators detect problems in real time and improve the security, performance, and scalability of Internet applications. I am now extending this agenda toward AI-driven network control with strong guardrails for safety and robustness.

Key Topics: Programmable Networks, Internet Measurements, Video Delivery, Routing Security, AI/ML for Networking.

Education

Sep 2019 – Apr 2026 **Princeton University**, *Princeton*, USA
Ph.D. Candidate, Computer Science
Dissertation: Network-Boosted Applications
Advisor: Jennifer Rexford

Jan 2016 – Feb 2019 **Indian Institute of Technology (IIT) Kharagpur**, *Kharagpur*, India
MS (By Research), Computer Science and Engineering
Graduated with a 10/10 GPA for thesis work.
Thesis: Network Traffic Regulation Techniques for Experience Differentiation
Advisors: Sandip Chakraborty, Niloy Ganguly

Aug 2009 – May 2013 **National Institute of Technology (NIT) Durgapur**, *Durgapur*, India
B.Tech., Computer Science and Engineering
Graduated with First Class Distinction.
Thesis: Secure Routing in Delay Tolerant Networks
Advisors: Subrata Nandi, Sujoy Saha

Publications

Please visit my Google Scholar profile for a complete list of publications.

- **Publication summary:** 10 Conferences, 2 Workshops, 1 Journal, 10 Posters; 486 Citations; ***h-index:*** 11.
- **Recognition:** Featured twice on the APNIC community blog for the SIGCOMM 2022 and IMC 2022 papers; awarded *Best Academic Poster* (2016) and *Best Academic Demo* (2017) at ACM/IEEE COMSNETS.

Selected Publications

NINeS 2026 **Passive Data-Plane Telemetry to Mitigate Long-Distance BGP Hijacks**,
Satadal Sengupta, *Hyojoon Kim, Daniel Jubas, Maria Apostolaki, Jennifer Rexford*

SIGCOMM 2025 **Scalable Video Conferencing Using SDN Principles**,
Oliver Michel, ***Satadal Sengupta***, *Hyojoon Kim, Ravi Netravali, Jennifer Rexford*

SIGCOMM 2022 **Continuous In-Network Round-Trip Time Monitoring**,
Satadal Sengupta, *Hyojoon Kim, Jennifer Rexford*

IMC 2022 **Enabling Passive Measurement of Zoom Performance in Production Networks**,
Oliver Michel, ***Satadal Sengupta***, *Hyojoon Kim, Ravi Netravali, Jennifer Rexford*

WebConf 2019 **Exploiting Diversity in Android TLS Implementations for Mobile App Traffic Classification**, ***Satadal Sengupta***, *Niloy Ganguly, Pradipta De, Sandip Chakraborty*

ICNP 2018 **HotDASH: Hotspot-Aware Adaptive Video Streaming using Deep Reinforcement Learning**, ***Satadal Sengupta***, *Niloy Ganguly, Sandip Chakraborty, Pradipta De*

Research Experience

Sep 2019 – Apr 2026 **Princeton**, *Research Assistant*, Dept. of Computer Science
Mentors: Jennifer Rexford (advisor), Ravi Netravali, Maria Apostolaki
• Built systems that use programmable networks to improve application visibility, detect routing attacks in real time, and scale video conferencing.

Jun – Aug 2022,
Jun – Aug 2023,
Oct 2023 – Aug 2024 **Netflix**, *Applied Research Intern*, Open Connect
Mentors: Sergey Fedorov (manager), Jordan Holland
• Across three internships, analyzed global-scale measurements to optimize cloud-gaming service placement and characterize latency asymmetry in the network.

Mar – Aug 2019 **ETH Zürich**, *Research Intern*, Network Design and Architecture Lab
Mentors: Ankit Singla (advisor), Debopam Bhattacherjee
• Studied how satellite motion in Starlink-like low-earth-orbit networks affects existing congestion control algorithms.

May 2015 – Feb 2019 **IIT Kharagpur**, *Research Fellow*, Complex Networks Research Group
Mentors: Sandip Chakraborty (advisor), Niloy Ganguly (co-advisor)
• Built machine-learning-based systems for mobile traffic classification and quality-of-experience-driven adaptive video streaming.

Software Engineering Experience

Sep 2013 – Apr 2015 **Oracle**, *Associate Applications Developer*, Financial Services Software
• Developed enhancements to the flagship Oracle FLEXCUBE core banking software for the Japanese market. ⋆ *Received the WeApplaud! award for initiative.*

May – Jul 2012 **Microsoft**, *Software Development Engineer (Intern)*, India Development Center
• Modernized an internal tax data warehousing tool built on extract-transform-load (ETL) workflows through library and dependency upgrades.

Teaching Experience

I have taught for eight semesters across networked & mobile systems and programming & software engineering in university settings, as well as basic mathematics to incarcerated students in a community setting.

Networked and Mobile Systems

Spring 2016
2017, 2018 **Computer Networks**, *Teaching Assistant*, IIT Kharagpur
• Teaching assistant for three semesters of this undergraduate core course, helping design and grade assessments and support students through office hours.

Fall 2017 **Performance Modeling of Computer Networks**, *Teaching Assistant*, IIT Kharagpur
• Selected as teaching assistant for this advanced graduate course; helped grade assessments, held office hours, and delivered guest lectures.

Fall 2016 **Smartphone Computing and Applications**, *Teaching Assistant*, IIT Kharagpur
• Teaching assistant for this graduate course, helping design lectures, grade exams and projects, and support students in a topic closely aligned with my research.

Programming and Software Engineering

Fall 2020,
Spring 2021 **Advanced Programming Techniques**, *Teaching Assistant*, Princeton
• Teaching assistant for two semesters of this advanced course, mentoring multiple full-stack software engineering projects; four were later adopted by Princeton.

Community Teaching

Fall 2024 **Basic Mathematics**, *Co-Instructor*, Princeton Prison Teaching Initiative
• Co-instructed basic mathematics in a maximum-security classroom, developing materials, teaching, and grading; received highly positive feedback from students.

Mentorship Experience

Mentored undergraduate and graduate students on theses, research projects, and internships in network measurement, security, media systems, mobile sensing, and AI-driven applications. Highlights include:

Network Monitoring, Security, and Operations

2025 – 2026 **Characterizing the Network Footprint of AI Chatbots**
Veronika Kitsul, Bachelor's thesis, Princeton
• Co-mentoring Veronika, helping frame questions and methods based on my experience with measurement studies and analysis of browser logs and network traffic.

2020 – 2021, 2024 – 2025 **Detecting BGP Interception Attacks using Round-Trip Time Measurements**
Daniel Jubas, Bachelor's thesis, Princeton and ***Hamza Khalid***, Univ. of Virginia
• Guided Daniel and Hamza on network-traffic analysis, problem scoping, and experiments on a global testbed; this work later informed our NINeS paper.

Video Quality Degradation

2024 – 2025 **Estimating Quality Degradation in Video Conferencing Applications**
Emma Farkash, Master's thesis, Princeton
• Co-mentored Emma, helping shape the methodology and experimental design; the project continues to inform ongoing work.

2015 – 2016 **Characterizing Quality Degradation in Video Streaming Applications**
Dhruv Jain, Swapnil Agarwal, Bachelor's theses, IIT Kharagpur
• Advised Dhruv and Swapnil, guiding experiments and poster writing; the work won the COMSNETS 2016 Best Poster award and informed our ICNP paper.

Mobile Sensing and Inference

Summer 2018 **Leveraging Magnetic Field Changes for Inferring Smartphone App Usage**
Meenu Rani Dey, Summer internship, IIT Kharagpur
• Conceived the idea, recruited Meenu as a summer intern to pursue it, and mentored the experiments and writing that led to a poster at MobiCom.

Fall 2016 **Sensor-based Cricket Shot Identification and Live Commentary**
Ashish Sharma, Jatin Arora, Pritam Khan, Sidhartha Satapathy, Sumit Agarwal
• Co-developed the idea, helped acquire sensors, and co-guided the experiments and writing for the *CommBox* demo that won Best Academic Demo at COMSNETS.

Talks

Invited Talks

Network-Boosted Applications
Jan 2026 University of Pennsylvania, *Philadelphia*, USA

Protocol-Aware Telemetry for In-Network Control
Oct 2025 Illinois Institute of Technology, *Chicago*, USA
Oct 2025 TU Delft, *Delft*, Netherlands

Oct 2025 University of Lisbon, *Lisbon*, Portugal
Oct 2025 ETH Zürich, *Zürich*, Switzerland
Oct 2025 TU Berlin, *Berlin*, Germany

Scalable Video Conferencing Using SDN Principles
Dec 2023 ACM Winter School on Full-Stack Networking, IIIT Delhi, *Online* (Early Version)
Mar 2022 Google Networking Research Summit, *Online* (Early Version, Lightning Talk)

Continuous In-Network Round-Trip Time Monitoring
Jan 2023 NIT Durgapur, *Durgapur*, India

Selected Conference Talks

Passive Data-Plane Telemetry to Mitigate Long-Distance BGP Hijacks
Feb 2026 NINeS Conference, Jane Street, *New York*, USA

Scalable Video Conferencing Using SDN Principles
Sep 2025 SIGCOMM Conference, *Coimbra*, Portugal

Continuous In-Network Round-Trip Time Monitoring
Aug 2022 SIGCOMM Conference, *Amsterdam*, Netherlands

Service

Conference Technical Program Committee

2023 – 2026 **ACM SIGCOMM**, Posters and Demos Track
2026 **IFIP TMA** (Traffic Measurement and Analysis), Main Conference
2025 **ACM CCS** (Computer and Communications Security), Poster Track
2024 – 2025 **IEEE/ACM COMSNETS**, Main Conference (2025), Poster & Graduate Forum (2024)

Journal Reviewer

2026 **ACM TOCS** (Transactions on Computer Systems)
2024 **ACM SIGCOMM CCR** (Computer Communication Review)
2023 **IEEE TNSE** (Transactions on Network Science and Engineering)

References

- **Jennifer Rexford**, *Provost and Professor of Computer Science*, Princeton University
  Ph.D. advisor and research collaborator on the network-boosted applications project.
  Email: jrex@princeton.edu
- **Ravi Netravali**, *Associate Professor of Computer Science*, Princeton University
  Research collaborator on video conferencing systems.
  Email: rnetravali@cs.princeton.edu
- **David Hay**, *Associate Professor of Computer Science and Engineering*, Hebrew University of Jerusalem
  Research collaborator on hardware-software co-design for network security.
  Email: dhay@cs.huji.ac.il
- **Maria Apostolaki**, *Assistant Professor of Electrical and Computer Engineering*, Princeton University
  Research collaborator on routing security.
  Email: apostolaki@princeton.edu
- **Robert Dondero**, *Teaching Faculty of Computer Science*, Princeton University | ***Teaching reference***
  Faculty instructor of the *Advanced Programming Techniques* course I assisted with.
  Email: rdondero@cs.princeton.edu

Last Updated: March 2026.