Piyush Kumar

Assistant Professor
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Research Interests

I work at the intersection of systems, network, security and privacy. Specifically, I develop frameworks, perform large-scale measurements, and build systems for deploying and facilitating the use of privacy-enhancing technologies to safeguard users' privacy.

Positions

- **Assistant Professor**, **Indian Institute of Technology (IIT)**, Delhi [September 2025–now]
- **Postdoctoral Researcher**, **University of Michigan**, Ann Arbor, US [October 2023–July 2025]
  Hosted by: **Roya Ensafi**, Morris Wellman Associate Professor, University of Michigan
- **Postdoctoral Researcher**, **COSIC, KU Leuven**, Belgium [October 2021–September 2023]
  Hosted by: **Claudia Diaz**. Associate Professor, KU Leuven and Chief Scientist, Nym Technologies

Education

- **PhD** in Computer Science (CGPA: 10/10), **IIIT Delhi**, India [2016-2021]
  Thesis Title: *Building Performant, Privacy-Enhancing, and Blocking-Resistant Communication Systems*
  Advisor: Sambuddho Chakravarty, Associate Professor and Head of Department
  Co-Advisor: Mukulika Maity, Assistant Professor, IIT Madras
  Committee: Amir Houmansadr (UMass), Michalis Polychronakis (Stony Brook), and Kent Seamons (BYU)

Awards

- **Outstanding reviewer** for PETS 2024.
- **FOCI Rising Star award** 2024. Awarded to "recognize the efforts of young and promising researchers who are contributing significantly to the advancement of the field through their innovative work and ideas".
- **Outstanding reviewer** for PETS 2023.
- **Doctoral dissertation award** for the PhD thesis (similar to summa cum laude).

Publications

[1] MVPN-Audit: An Investigative Framework for the Security & Privacy Audit of Mobile VPNs
Wayne Wang, Aaron Ortwein, Enrique Sobrados, Robert Stanley, Afsah Anwar, Piyush Kumar Sharma, and Roya Ensafi
Network and Distributed Systems Security Symposium (**NDSS**) 2026

[2] Blocking Resistant Communication for Traffic Filtering using Push Notification
Piyush Kumar Sharma, Diwen Xue, Cecylia Bocovich, Aaron Ortwein, Harry and Roya Ensafi
Privacy Enhancing Technologies Symposium (**PETS**) 2025 [Acceptance rate: **19.00%** (26/147)]

[3] LAMP: Lightweight Approaches for Latency Minimization in Mixnets with Practical Deployment Considerations
Mahdi Rahimi, Piyush Kumar Sharma and Claudia Diaz.
Network and Distributed Systems Security Symposium (**NDSS**) 2025 [Acceptance rate: **15.04%** (150/997)]

[4] The Discriminative Power of Cross-layer RTTs in Fingerprinting Proxy Traffic
Diwen Xue, Robert Stanley, Piyush Kumar Sharma and Roya Ensafi
Network and Distributed Systems Security Symposium (**NDSS**) 2025 [Acceptance rate: **15.04%** (150/997)]

[5] Is Custom Congestion Control a Bad Idea for Anti-Splintering Tools?
Wayne Wang, Diwen Xue, Piyush Kumar Sharma, Ayush Mishra and Roya Ensafi
Free and Open Communication Over the Internet (**FOCI**) co-located with **PETS** 2025

[6] LARMix: Latency-Aware Routing in Mix Networks
Mahdi Rahimi, Piyush Kumar Sharma and Claudia Diaz
Network and Distributed Systems Security Symposium (**NDSS**) 2024 [Acceptance rate: **20.20%** (140/694)]

[7] PTPerf: On the Performance Evaluation of Tor Pluggable Transports
Zeya Umayya, Dhruv Malik, Devashish Gosain and Piyush Kumar Sharma
ACM Internet Measurements Conference (**IMC**) 2023 [Acceptance rate: **25.87%** (52/201)]

[8] On the Anonymity of Peer-To-Peer Network Anonymity Schemes Used by Cryptocurrencies
Piyush Kumar Sharma, Devashish Gosain and Claudia Diaz
Network and Distributed Systems Security Symposium (**NDSS**) 2023 [Acceptance rate: **16.20%** (94/581)]

[9] Hades: Practical Partitioning Attack on Cryptocurrencies (Poster)
Vinay Shetty, Piyush Kumar Sharma, and Devashish Gosain
Network and Distributed Systems Security Symposium (**NDSS**) 2023

[10] Dolphin: A Cellular Voice Bases Internet Shutdown Resistance System
Piyush Kumar Sharma, Rishi Sharma, Kartikey Singh, Mukulika Maity and Sambuddho Chakravarty
Privacy Enhancing Technologies Symposium (**PETS**) 2023 [Acceptance rate: **21.85%** (123/563)]

[11] Camoufler: Accessing The Censored Web By Utilizing Instant Messaging Channels
Piyush Kumar Sharma, Devashish Gosain and Sambuddho Chakravarty
ACM Asia Conf. Computer and Communication Security (**AsiaCCS**) 2021 [Acceptance rate: **19.33%** (70/362)]

[12] SiegeBreaker: An SDN Based Practical Decoy Routing System
Piyush Kumar Sharma, Devashish Gosain, Himanshu Sagar, Chaitanya Kumar, Aneesh Dogra, Vinayak Naik, H.B. Acharya and Sambuddho Chakravarty
Privacy Enhancing Technologies Symposium (**PETS**) 2020 [Acceptance rate: **23.01%** (78/339)]

[13] The Road Not Taken: Re-thinking The Feasibility of Anonymous Voice Calling Over Tor
Piyush Kumar Sharma, Shashwat Chaudhary, Nikhil Hassija, Mukulika Maity, Sambuddho Chakravarty
Privacy Enhancing Technologies Symposium (**PETS**) 2020 [Acceptance rate: **23.01%** (78/339)]

[14] Maginot Lines and Tourniquets: On the Defendability of National Cyberspace
Devashish Gosain, Madhur Rawat, Piyush Kumar Sharma, H.B. Acharya
Local Computer Network (**LCN**) Symposium 2020

[15] Where The Light Gets In: Analyzing Web Censorship Mechanisms in India
Tarun Kumar Yadav, Akshat Sinha, Devashish Gosain, Piyush Kumar Sharma and Sambuddho Chakravarty
ACM Internet Measurement Conference (**IMC**) 2018 [Acceptance rate: **24.70%** (43/174)]

[16] SiegeBreaker: An SDN Based Practical Decoy Routing System (Work in Progress paper)
Piyush Kumar Sharma, Chaitanya Kumar, Aneesh Dogra, Vinayak Naik, H.B. Acharya and Sambuddho Chakravarty
Annual Computer Security Applications Conference (**ACSAC**) 2017

Ongoing Projects/Under Submission

[1] Practically measuring the privacy-utility tradeoffs in payment channel networks
Satwik Prabhu, Piyush Kumar Sharma, Devashish Gosain and Stefanie Roos

[2] Practical partitioning attacks on Bitcoin due to Tor hidden services
Piyush Kumar Sharma and Devashish Gosain

Teaching Experience

- Substitute lecturer for Computer & Network Security (EECS 588) at the University of Michigan Fall 2024
- Delivered a **lecture on VPNs** as part of the Privacy Technologies course during at KU Leuven. Fall 2023
- Delivered a **lecture about peer-to-peer networks and their security properties** in the course *Advanced Privacy Technologies* at KU Leuven as part of the masters of cybersecurity program. Winter 2023
- **Managed and taught the complete course** *Privacy Technologies* at ESAT, KU Leuven. Fall 2022
- Co-managed and co-taught the course *Privacy and Big Data* at ESAT, KU Leuven Fall 2022
- Delivered a **four-hour seminar on Privacy courses** as part of the Advanced Masters of Cybersecurity program at KU Leuven in 2022. Fall 2022
- Delivered a **lecture on detailed and systematic overview of various (anti) censorship techniques** for the *Privacy Technologies* course at ESAT, KU Leuven. Fall 2021
- Served as a teaching assistant for different courses during my PhD. The courses included Systems Management, Numerical Methods, Network Security and Security Engineering.
- Served as the course instructor for multiple industrial certifications during my internship/part-time employment at CODEC Networks, including EC-Council's CND, CEH, ECSA and Cisco's CCNA. I taught students as well as corporate professionals for the aforementioned certifications for a duration of a year.

Invited Talks

- Presented an invited talk on developing effective solutions for Internet shutdowns. [Splintercon 2023]
- Delivered a **keynote at FOCI 2023** (co-located with PETS 2023) about the motivation and challenges of performing censorship research. [FOCI 2023]
- Presented my work on the analysis of peer-to-peer anonymity schemes used by cryptocurrencies. [Monerokon 2023]
- Delivered a seminar talk about privacy in peer-to-peer networks. [TU Delft 2022]
- Delivered an invited talk on SDN based decoy routing system for the security group. [University of Michigan 2021]

Academic Service

- *Program Committee member:* Usenix Security 2026, IEEE S&P 2026, USENIX Security 2025, PETS 2025, Euro S&P 2025, CCS 2024, WWW 2024, PETS 2024, WiSec 2024, FOCI 2024, PETS 2023, ESORICS 2022
- *External Reviewer:* PETS 2022, PETS 2021, ESORICS 2023
- *Session Chair:* Anonymity and Traffic Analysis Track (PETS 2023), Web Cookies Track (PETS 2024)