Niloy Saha

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Profile

Ph.D. candidate in the Systems and Networking Group at the University of Waterloo, supervised by Prof. Raouf Boutaba. Research focuses on network monitoring and automation in 5G/6G and beyond, with expertise in programmable data planes (P4), software-defined networking, and AI/ML-driven analytics. Published in leading venues, with practical experience building full-stack testbeds and collaborating with industry partners on 5G and cloud-native platforms.

Education

Ph.D. **University of Waterloo**, Computer Science — Waterloo, Canada — 2020 – Present
- **GPA:** 95.2 / 100

M.S. **IIT Kharagpur**, Computer Science & Engineering — Kharagpur, India — 2016 – 2019
- **GPA:** 9.51 / 10

B.Tech. **IEM Kolkata**, Electronics & Communication — Kolkata, India — 2011 – 2015
- **GPA:** 9.07 / 10

Research Experience

University of Waterloo, Ph.D. Researcher — Sep 2020 – Present
Thesis: *Efficient High-precision Monitoring of Network Slices for 5G and Beyond Networks*
Supervisor: Prof. Raouf Boutaba
- Published research on SLA-aware slice monitoring, QoS anomaly detection, and closed-loop automation for 5G-and-beyond networks, leveraging programmable data planes and AI/ML.
- Built a full-stack 5G testbed integrating Intel Tofino (P4) switches, telemetry stack, a Kubernetes-based 5G core, and ML pipelines [Monitoring] [5G Core] [5G RAN].
- Collaborated on projects involving automated slice lifecycle management and RAN disaggregation for next-generation networks [Slicing] [OpenRAN].
- Collaborated with Rogers and Expeto on the Waterloo campus private 5G deployment and delivered an executive training on slice orchestration and monitoring [Workshop].

Indian Institute of Technology (IIT) Kharagpur, M.S. Research Scholar — 2016 – 2018
Thesis: *QoS-Aware Software-Defined Networks for IoT Applications*
- Published research on QoS-aware architectures for IoT using SDN; conducted evaluations with POX and ONOS controllers and the Mininet emulator.
- Contributed to a telemedicine project on cloud-assisted WBAN-based healthcare, designing communication architecture, leading field trials, and clinical validation [Project].

Selected Publications

Dynamic SLA-aware Telemetry with Programmable Data Planes — Manuscript, 2025
N. Saha, M. Tahmasbi Arashloo, N. Shahriar, R. Boutaba

Lightweight Sketch-Based Telemetry for QoS Anomaly Detection in 5G User Planes — Manuscript, 2025
N. Saha, N. Limam, Y. Xiao, R. Boutaba

Monarch: Monitoring Architecture for 5G and Beyond Network Slices — IEEE TNSM, 2025
N. Saha, N. Shahriar, M. Sulaiman, N. Limam, R. Boutaba, A. Saleh

Flexible RAN Slicing in Open RAN with Constrained Multi-agent Reinforcement Learning — IEEE JSAC, 2024

M. Zangooei, M. Golkarifard, M. Rouili, N. Saha, R. Boutaba

Deep Reinforcement Learning Approaches to Network Slice Scaling and Placement: A Survey — IEEE CommMag, 2023
N. Saha, M. Zangooei, M. Golkarifard, R. Boutaba

AI-driven Closed-loop Automation in 5G and Beyond Mobile Networks — ACM FlexNets, 2021
R. Boutaba, N. Shahriar, M.A. Salahuddin, S.R. Chowdhury, N. Saha, A. James

Detour: Dynamic Task Offloading in Software-Defined Fog for IoT Applications — IEEE JSAC, 2019
S. Misra, N. Saha

Full list available at: Google Scholar

Teaching Experience

University of Waterloo, Teaching Assistant — 2020 – Present

- CS456 – Computer Networks (multiple terms, 2022–25).
- CS798 – Network Softwarization graduate courses (2022–24).

Indian Institute of Technology, Teaching Assistant — 2016 – 2018

- CS19001 – Programming and Data Structures Lab.

Skills

Programming: Python, C/C++, P4, Bash, Java

Networking & Systems: Mininet, NS-3, ONOS, POX, Intel Tofino (P4), Kubernetes Networking, Open vSwitch (OVS)

Machine Learning: PyTorch, scikit-learn, Reinforcement Learning (RL)

Platforms & Tools: Git, Docker, Kubernetes, Prometheus, Grafana, Linux administration

Awards & Scholarships

Mitacs Accelerate Fellowship, 2021–2024 — 3-year funding for collaborative research on 5G/6G networking with industry partners
International Doctoral Student Award (IDSA), University of Waterloo, 2020–2024
IEEE ComSoc Student Grant, ICC 2020, Dublin, Ireland

Professional Activities

- Web Chair, IEEE/IFIP Network Operations and Management Symposium (NOMS) 2025
- Reviewer for IEEE/ACM journals (ToN, TMC, JSAC, TSC) and conferences (NOMS, GLOBECOM, WCNC, NOF, PIMRC)
- IEEE Graduate Student Member (2016–Present); served as Treasurer and Student Committee Member, IIT Kharagpur Branch

Last updated: September 30, 2025