

Niloy Saha

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EDUCATION

University of Waterloo, Waterloo, Ontario, Canada

- Ph.D. student in Computer Science 2020 – Present
 - Advisor: Prof. Raouf Boutaba
 - Cumulative GPA: 95.20 / 100.00

Indian Institute of Technology, Kharagpur, West Bengal, India

- M.S. in Computer Science and Engineering 2016 – 2019
 - Thesis: QoS-Aware Software-Defined Networks for IoT Applications
 - Advisor: Prof. Sudip Misra
 - Cumulative GPA: 9.51 / 10.00

Institute of Engineering and Management, Kolkata, West Bengal, India

- B.Tech. in Electronics and Communication Engineering 2011 – 2015
 - Cumulative GPA: 9.07 / 10.00

South Point School, Kolkata, West Bengal, India

- Higher Secondary, Science 2009 – 2011
 - Percentage: 86.28%
- Secondary, General 2009
 - Percentage: 86.11%

AREAS OF INTEREST

5G and Beyond Networks, Network Management and Orchestration, Software-Defined Networking (SDN), Network Function Virtualization (NFV), Internet of Things (IoT), Wireless Communications.

PUBLICATIONS

JOURNALS

- [1] [N. Saha](#), M. Zangoeei, M. Golkarifard and R. Boutaba, “Deep Reinforcement Learning Approaches to Network Slice Scaling and Placement: A Survey,” *IEEE Communications Magazine*, vol. 61, no. 2, pp. 82-87, February 2023, doi: 10.1109/MCOM.006.2200534.
- [2] M. Zangoeei, [N. Saha](#), M. Golkarifard and R. Boutaba, “Reinforcement Learning for Radio Resource Management in RAN Slicing: A Survey,” *IEEE Communications Magazine*, vol. 61, no. 2, pp. 118-124, February 2023, doi: 10.1109/MCOM.004.2200532.
- [3] [N. Saha](#), S. Bera and S. Misra, “Q-Flag: QoS-Aware Flow-Rule Aggregation in Software-Defined IoT Networks,” *IEEE Internet of Things Journal*, vol. 9, no. 7, pp. 9675-9682, April 2022, doi: 10.1109/JIOT.2021.3113777.
- [4] S. Bera, S. Misra, [N. Saha](#) and H. Sharif, “Q-Soft: QoS-Aware Traffic Forwarding in Software-Defined Cyber-Physical Systems,” *IEEE Internet of Things Journal*, vol. 9, no. 12, pp. 9675-9682, June 2022, doi: 10.1109/JIOT.2021.3138391.
- [5] S. Bera, S. Misra and [N. Saha](#), “Traffic-Aware Dynamic Controller Assignment in SDN,” *IEEE Transactions on Communications*, vol. 68, no. 7, pp. 4375-4382, July 2020, doi: 10.1109/TCOMM.2020.2983168.
- [6] S. Misra and [N. Saha](#), “Detour: Dynamic Task Offloading in Software-Defined Fog for IoT Applications,” *IEEE Journal on Selected Areas in Communications*, vol. 37, no. 5, pp. 1159-1166, May 2019, doi: 10.1109/JSAC.2019.2906793.
- [7] [N. Saha](#), S. Bera and S. Misra, “Sway: Traffic-Aware QoS Routing in Software-Defined IoT,” *IEEE Transactions on Emerging Topics in Computing*, vol. 9, no. 1, March 2021, doi: 10.1109/TETC.2018.2847296.

CONFERENCES

- [1] [N. Saha](#), N. Shahriar, R. Boutaba and A. Saleh, “MonArch: Network Slice Monitoring Architecture for Cloud Native 5G Deployments”, in *Proceedings of the IEEE/IFIP Network Operations and Management Symposium (NOMS)*, Miami, Florida, USA, 8 - 12 May, 2023.

- [2] M. S. Khan, B. Farzaneh, N. Shahriar, N. Saha and R. Boutaba, “SliceSecure: Impact and Detection of DoS/DDoS Attacks on 5G Network Slices”, in *Proceedings of the Symposium on Security for 5G and Future Networks at IEEE Future Networks World Forum*, Montreal, Canada, 12 - 14 October, 2022.
- [3] N. Saha, A. James, N. Shahriar, R. Boutaba and A. Saleh, “Demonstrating Network Slice KPI Monitoring in a 5G Testbed”, in *Proceedings of the IEEE/IFIP Network Operations and Management Symposium (NOMS)*, Budapest, Hungary, 25 - 29 April, 2022. doi: 10.1109/NOMS54207.2022.9789904.
- [4] R. Boutaba, N. Shahriar, M. A. Salahuddin, S. R. Chowdhury, N. Saha and A. James, “AI-driven Closed-loop Automation in 5G and beyond Mobile Networks”, in *Proceedings of the 4th ACM SIGCOMM Workshop on Flexible Networks Artificial Intelligence Supported Network Flexibility and Agility (FlexNets)*. Virtual Conference, 23 - 27 August, 2021. doi: 10.1145/3472735.3474458.
- [5] N. Saha and S. Misra, “Dynamic Network Slice Assignment in Software-Defined IoT Networks,” in *Proc. of the IEEE GLOBECOM*, Taipei, Taiwan, 2020.
- [6] S. Misra, N. Saha and R. Bhakta, “Traffic-Aware Rule-Cache Assignment in SDN: Security Implications,” in *Proc. of the IEEE International Conference on Communications Workshops (ICC Workshops)*, Dublin, Ireland, 2020, pp. 1-6, doi: 10.1109/ICCWorkshops49005.2020.9145299.
- [7] S. Bera, S. Misra, and N. Saha, “DynamITE: Dynamic Traffic Engineering in Software-Defined Cyber Physical Systems,” in *Proc. of the IEEE ICC Workshop on Communication, Computing, and Networking in Cyber Physical Systems*, Kansas City, Kansas, USA, 2018. DOI: 10.1109/ICCW.2018.8403550.
- [8] N. Saha, S. Misra and S. Bera, “QoS-Aware Adaptive Flow-rule Aggregation in Software-Defined IoT”, in *Proc. of the IEEE GLOBECOM, Abu Dhabi, UAE*, 2018. DOI: 10.1109/GLOCOM.2018.8647471

RESEARCH EXPERIENCE

University of Waterloo, Waterloo, Ontario, Canada

- Part of the team working on the research project titled “5G-ELITE: AI-driven 5G Network Slice Operations & Management” Sep 2020 – Present
- Part of the team working on the research project titled “5G-LEAP: Flexible Open RAN Platform for 5G and beyond networks” Sep 2021 – Present

Indian Institute of Technology, Kharagpur, West Bengal, India

- MS Research Scholar Jul 2016 – Dec 2018
 - Investigated how a software-defined architecture can help in addressing the challenges in IoT, such as quality of service and traffic-engineering.
 - Conducted experimental evaluations using POX and ONOS SDN controllers, and Mininet network emulator.
- Junior Research Fellow Jun 2016 – Jun 2017
 - Part of research project titled “Cloud-assisted WBAN-based Ubiquitous Healthcare Management System and its Application in Telemedicine”.
 - Conducted field research, involved in development of communication architecture, and led experimental verification and clinical trials.

AWARDS & SCHOLARSHIPS

- **IEEE ComSoc Student Grant**, IEEE International Conference on Communications (ICC) 2020, Dublin, Ireland

PROFESSIONAL AFFILIATIONS & ACTIVITIES

Institute of Electrical and Electronics Engineers (IEEE)

- Graduate Student Member 2016 – Present
- Student Activity Committee, IIT Kharagpur Student Branch 2017 – 2018
- Treasurer, IIT Kharagpur Student Branch 2019 – 2020

Reviewer, Peer-Review Journals

- IEEE Transactions on Mobile Computing, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Services Computing, IEEE Systems Journal

Reviewer, Conferences

- IEEE NOMS '22, IEEE WCNC '22, NOF '21, IEEE PIMRC '18, '19

**TEACHING
EXPERIENCE**

- Teaching Assistant**, University of Waterloo 2020 – Present
- Computer Networks (CS456) (S'22, F'22)
 - Network Softwarization: Principles and Foundations (CS798-001)
and Network Softwarization: Technologies and Enablers (CS798-002) (W'22, W'23)
- Teaching Assistant**, IIT Kharagpur 2016 – 2018
- Programming and Data Structures Lab (CS19001)

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