

Nurzaman Ahmed

B.Tech., M.Tech., Ph.D., PostDoc.

Member IEEE, Member ACM, & Graduate Member IEEE ComSoc.

✉ nurzaman.ahmed@dartmouth.edu, nurzaman713@gmail.com

🌐 <https://nurzaman7.github.io/>

GS <https://scholar.google.com/citations?user=wUFC3VMAAAAJ&hl=en>

IN <https://www.linkedin.com/in/nurzaman-ahmed-75874892/>

☎ +1-6033221958

Address: Computer Science, Dartmouth College, Hanover, NH- 03766




Research Summary

Area of Interest	IoT, SDN, IBN, WiFi-based long distance network, Machine Learning
Research Experiences	7 Years
Number of Citations (Google Scholar)	676
H-Index (Google Scholar)	9
Number of Publications	49
Number of SCI Indexed Journals	17
Number of Patents Filed	2
Invited as Resource Person	14
Recent Publication Venues	IEEE/ACM/Elsevier Journals, IEEE Comm. letters, INFOCOM Worksp, GLOBE-COM, ICC, HPSR,...
Laboratories	Splice Lab (Dartmouth College, USA), SWAN Lab. (IIT Kharagpur, India), IoT Lab (NEHU, Shillong, India), Rural WiFi Lab. (NEHU, Shillong, India)
Training and Guidance	Deployment of WiFi-based Long Distance (WiLD) Network in Border Out Posts for Border Security Force (BSF), India, 2 March-4 April, 2018
Tutorial	"Programmability for Context-Aware Smart IoT Applications", WCNC'21 , 2021 "Programmable IoT" Invited speaker: ACM India Summer School , 8 July, 2021.
Hardware & Software Platforms	SensorTag (CC2650), OpenMote (CC2538), TelosB (CC2420), RaspberryPi (Gateway), Arduino, and ContikiOS, NS-2, NS-3, Mininet, Ryu,...






Employment History

- Post-Doctoral Scholar:** Computer Science, DARTMOUTH COLLEGE, Hanover, USA (13 Jan 2022 –Till date).
NSF (USA) sponsored Project titled: **Security and Privacy in the Lifecycle of IoT for Consumer Environments**.
Responsibilities- Privacy-preserving smart home:
 - Study on user activity inference attacks, where a passive network observer can infer the private in-home activity of a user by analyzing encrypted IoT traffic metadata (completed)
 - Developing solutions for privacy against inference attacks by local adversaries such as WiFi eavesdroppers, and neighbors (ongoing)
 - Designing an accountable IoT management architecture (ongoing)
- Post-Doctoral Fellow:** Centre for Networked Intelligence, RBCCPS, and ECE, INDIAN INSTITUTE OF SCIENCE, Bengaluru, India (29 Sep 2021 –Dec 2021).
Responsibilities- Designing SDN-enabled Intent-Driven Network Architecture.

Employment History (continued)

- 3  **Research Associate (PostDoc.):** Department of Computer Science & Engineering, INDIAN INSTITUTE OF TECHNOLOGY, Kharagpur, India (21 Aug 2019 –20 Aug 2021).
SERB/IMPRINT-2 (Govt. of India) sponsored Project titled: **Unified Software-Defined Architecture for Industrial Internet of Things.**
Responsibilities- (i) Overall monitoring and coordination of the different components/manpower of the project, and (ii) Designing SDN architecture for IoT.
- 4  **Project Scientist:** Department of Information Technology, School of Technology, NORTH-EASTERN HILL UNIVERSITY, Shillong, India. (6 Nov 2015–19 Aug 2019.)
MeitY (Govt. of India) sponsored Project titled: **QoS Provisioning in Internet of Things (IoT)**
Responsibilities:(i) Overall monitoring and coordination of the different components/manpower of the project, and (ii) Designing MAC protocol for large-scale IoT.
- 5  **Junior Research Fellow-** Information Technology Department, School of Technology, NORTH-EASTERN HILL UNIVERSITY, Shillong, India. (Aug 2013–Jan 2015.)
DeitY (Govt. of India) sponsored Project titled: **QoS Provisioning in WiFi-based Long Distance Wireless Networks for Hilly Terrain Areas.**
Responsibilities: (i) Designing MAC and routing protocol for WiFi-based long distance network, (ii) Implementation and evaluation of proposed schemes over real Atheros driver for OpenWrt router.

Education

- 2016 – 2020  **Ph.D., North-Eastern Hill University, India** in Information Technology (22 Aug 2016-17 Nov 2020).
Thesis title: *Designing IEEE 802.11ah-based scalable network architecture for Internet of Things.*
- 2014 – 2016  **M.Tech., North-Eastern Hill University, India** in Information Technology.
Thesis: *Designing a MAC protocol for Internet of Things (IoT).*
First Class, 79% (14 Aug 2014- 8 Aug 2016)
- 2008 – 2013  **B.Tech., North-Eastern Hill University, India** in Information Technology.
Project: *Extension of NS-2 for Long Distance Wi-Fi support.*
First Class, 70% (21 July 2009- 8 Aug 2013)
- 2006 – 2008  **Higher Secondary, Assam Higher Secondary Education Council, India** in Science.
First Class, 71%, Dakshin Kamrup College (21 July 2006- 3 July 2008)
- 2003 – 2006  **High School Living Certificate, Board of Secondary Education, Assam, India**
First Class, 78%, Padupara Ancholic High School (3 June 2003- 14 May 2006)

Research Publications

Journal Articles

- 1 Das, R. K., **Ahmed, N.**, Maji, A. K., Saha, G. (Oct. 2022). “Nx-IoT: Improvement of conventional IoT Framework by incorporating SDN Infrastructure”. *IEEE Internet of Things Journal*, (**SCI, IF: 10**), Accepted!
- 2 Gazi, F., **Ahmed, N.**, Misra, S., Tiwari, M. K. (Mar. 2022). “ProStream: Programmable Underwater IoT Network for Multimedia Streaming”. *IEEE Internet of Things Journal*, (**SCI, IF: 9.9**). Available at: <https://doi.org/10.1109/JIOT.2022.3159404>.
- 3 Firoj, G., **Ahmed, N.**, Misra, S. (Feb. 2022). “Reinforcement Learning-Based MAC Protocol for Underwater Multimedia Sensor Network”. *ACM Transactions on Sensor Networks* (**SCI, IF: 4.2**). Available at: <https://doi.org/10.1145/3484201>.

- 4 Alam, M., **Ahmed, N.**, Matam, R., Barbhuiya, F. (Jan. 2022). "IEEE 802.11 ah-Enabled Internet-of-Drone Architecture". *IEEE Internet of Things Magazine*. Available at: <https://doi.org/10.1109/IOTM.005.2100099>.
- 5 Gazi, F., **Ahmed, N.**, Misra, S. (2022). "RE-MAC: A Hybrid MAC Protocol for Underwater Multimedia Communication System". *IEEE Systems Journal*, pp. 1–8. DOI: 10.1109/JSYST.2022.3185015.
- 6 **Ahmed, N.**, Hussain, M. I. (Sept. 2021). "Scalable internet of things network design using multi-hop IEEE 802.11ah". *Telecommun Systems (SCI, IF: 2.3)* **78.4**, pp. 577–588.
- 7 **Ahmed, N.**, De, D., Barbhuiya, F. A., Hussain, M. I. (Aug. 2021). "MAC Protocols for IEEE 802.11 ah-Based Internet of Things: A Survey". *IEEE Internet of Things Journal*, (**SCI, IF: 9.9**) **9.2**, pp. 916–938.
- 8 **Ahmed, N.**, Misra, S. (Aug. 2021a). "Collaborative Flow-Identification Mechanism for Software-Defined Internet of Things". *IEEE Internet of Things Journal (SCI, IF: 9.9)*. Available at: <https://doi.org/10.1109/JIOT.2021.3099822>.
- 9 Hussain, M. I., **Ahmed, N.**, Ahmed, Z. I., Sarma, N., Hussain, M. I. (2021). "QoS Provisioning in Wireless Mesh Networks: A Survey". *Wireless Personal Communications (SCI, IF: 1.67)*. Available at: <https://doi.org/10.1007/s11277-021-08893-3>.
- 10 Medhi, K., **Ahmed, N.**, Hussain, M. I. (2021). "Dew-based Offline Computing Architecture for Healthcare IoT". *ICT Express (SCI, IF: 3.4)*. Available at: <https://doi.org/10.1016/j.icte.2021.09.005>.
- 11 Sharmistha, N., **Ahmed, N.**, Misra, S. (2021). "Deep-Learning-Based Reliable Routing Attack Detection Mechanism for the Industrial Internet of Things". *Adhoc Networks (SCI, IF: 4.1)*. Available at: <https://doi.org/10.1016/j.adhoc.2021.102661>.
- 12 **Ahmed, N.**, Hussain, M. I. (Mar. 2020a). "Periodic Traffic Scheduling for IEEE 802.11 ah Networks". *IEEE Communications Letters*, (**SCI, IF: 3.4**) **24.7**, pp. 1510–1513.
- 13 Das, R. K., **Ahmed, N.**, Pohrmen, F. H., Maji, A. K., Saha, G. (2020). "6LE-SDN: An Edge-Based Software-Defined Network for Internet of Things". *IEEE Internet of Things Journal*, (**SCI, IF: 9.9**) **7.8**, pp. 7725–7733.
- 14 Thungun, L., **Ahmed, N.**, Sahana, S., Hussain, M. I. (2020). "A Lightweight Authentication and Key-Exchange Mechanism for 6LoWPAN-based Internet of Things". *Transactions on Emerging Telecommunications Technologies*, (**SCI, IF: 1.49**). DOI: 10.1002/ett.4033.
- 15 **Ahmed, N.**, Das, S. K., Hussain, M. (2019). "Dynamic Bandwidth Allocation Schemes for Multi-hop Wireless Mesh Networks". *International Journal of Next-Generation Computing*, (**ESCI**) **10.2**, pp. 81–90.
- 16 **Ahmed, N.**, De, D., Hussain, I. (2018). "Internet of Things (IoT) for Smart Precision Agriculture and Farming in Rural Areas". *IEEE Internet of Things Journal*, (**SCI, IF: 9.9**) **5.6**, pp. 4890–4899. DOI: 10.1109/JIOT.2018.2879579.
- 17 **Ahmed, N.**, Rahman, H., Hussain, M. I. (2018). "An IEEE 802.11 ah-based scalable network architecture for Internet of Things". *Annals of Telecommunications*, (**SCI, IF: 1.55**) **73.7-8**, pp. 499–509.
- 18 Rahman, H., **Ahmed, N.**, Hussain, M. I. (2018). "A QoS-aware hybrid data aggregation scheme for Internet of Things". *Annals of Telecommunications (SCI, IF: 1.55)* **73.7-8**, pp. 475–486.
- 19 **Ahmed, N.**, Rahman, H., Hussain, M. I. (2016). "A comparison of 802.11 ah and 802.15. 4 for IoT". *ICT Express*, (**SCI, IF: 4.3**) **2.3**, pp. 100–102.

Communicated Journal Articles

1. Alam, Mehbub, **Ahmed, N.**, Matam, R., mukherjee, M., Barbhuiya, FA. (#TII-22-1860) "Pro-Edge: A Programmable Edge Network Architecture for Industrial Internet of Things", *IEEE TII* (major rev).
2. **Ahmed, N.**, Saha, R., Roy, A., Misra, S., (#TNSESI-2021-05-0432) "Federated Learning-based

Collaborative Traffic Classification Scheme for Software-Defined IoT”, *IEEE Transactions on Green Communications and Networking*.

3. R. K. Das, **Ahmed, N.**, Maji, A.K, Saha, G. (#Paper-TW-Oct-21-1422) “Edge Controller-Assisted SDN Architecture for Internet of Things”, *IEEE Transactions on Wireless Communications*.
4. **Ahmed, N.**, Roy, A., Misra, S. (#TGCN-SI-IIoT&SG-21-0018) “Traffic-aware Wake-up Scheduling Scheme for IEEE 802.11ah-based Industrial Internet of Things”, *IEEE Transactions on Green Communications and Networking*.
5. Pal, S. **Ahmed, N.**, Mukherjee, A., Misra, S. (#IoT-15011-2020) “Analytics-on-the-Fly: SDN-Controlled Resource-Tailored Analytics for Healthcare IoT”, *IEEE Internet of Things Journal* (major rev.).
6. **Ahmed, N.**, Roy, A. Misra, S. (ID: Paper-TW-Jul-21-0967) “Programming Edge-based 6TiSCH Networks for Control-Loop Communication”, *IEEE Transactions on Wireless Communications*.
7. Thungun, L.C, **Ahmed, N.**, Hussain, M.I. (ID: COM-2021-6138.R1) “A Survey on 6LoWPAN Security: State-of-the-art and Challenges”, submitted after 1st round of revision to IET Communications.
8. Shukla, A., **Ahmed, N.**, Misra, S.C. (ID: TGCN-SI-MI4SC-21-0015) “Machine Learning-Based Network Slicing for Enabling Green Communication in Smart Cities”, *IEEE Transactions on Green Communications and Networking*.

Conference Proceedings

- 1 Ruelia, S., **Ahmed, N.**, Sudip, M. (July 2022). “Dynamic Fog Intelligence with Flow Control for Green Internet of Things”. *accepted at IEEE GLOBECOM*. IEEE, pp. 1–6.
- 2 Mehbub, A., **Ahmed, N.**, Rakesh, M., Ferdous Ahmed, B. (June 2022). “L3Fog: Fog Node Selection and Task Offloading Framework for Mobile IoT”. *IEEE INFOCOM Workshops’21*. IEEE. Virtual, pp. 1–6.
- 3 **Ahmed, N.**, Arijit, R., Ayan, M., Sudip, M. (2021). “SDN-Based Link Recovery Scheme for Large-Scale Internet of Things”. *IEEE 22nd International Conference on High-Performance Switching and Routing (HPSR)*. IEEE. Virtual (Invited Paper), pp. 1–6.
- 4 **Ahmed, N.**, Misra, S. (2021b). “Programmable IEEE 802.11ah Network for Internet of Things”. *IEEE International Conference on Communications (ICC)*. IEEE, pp. 1–6.
- 5 Mehbub, A., **Ahmed, N.**, Rakesh, M., Ferdous Ahmed, B. (2021). “ioFog: Prediction-based Fog Computing Architecture for Offline IoT”. *IEEE IWCMC’21*. IEEE. Virtual, pp. 1–6.
- 6 Ruelia, S., **Ahmed, N.**, Sudip, M. (2021). “SD-Health: SDN-Controller Triggered Dynamic Decision Control Mechanism for Healthcare”. *IEEE GLOBECOM*. IEEE, pp. 1–6.
- 7 **Ahmed, N.**, Misra, S. (2020). “Channel Access Mechanism for IEEE 802.11 ah-Based Relay Networks”. *IEEE International Conference on Communications (ICC)*. IEEE. Dublin, Ireland, pp. 1–6.
- 8 Gaji, F., Misra, S., **Ahmed, N.**, Mukherjee, A., Kumar, N. (2020). “UnRest: Underwater Reliable Acoustic Communication for Multimedia Streaming”. *Proceedings of IEEE Global Communications Conference (GLOBECOM)*. Taipei, Taiwan (Accepted), pp. 1–6.
- 9 Misra, S., Saha, R., **Ahmed, N.** (2020). “Health-Flow: Criticality-Aware Flow Control for SDN-Based Healthcare IoT”. *Proceedings of IEEE Global Communications Conference (GLOBECOM)*. Taipei, Taiwan (Accepted), pp. 1–6.
- 10 Misra, S., Sarkar, K., **Ahmed, N.** (2020). “Blockchain-Based Controller Recovery in SDN”. *Proceedings of IEEE International Conference on Computer Communications Workshops (INFOCOM Workshops)*. IEEE. Toronto, Canada, pp. 1–6.
- 11 Nayak, S., Misra, S., **Ahmed, N.** (2020). “Blockchain-Based Programmable Fog Architecture for Future Internet of Things Applications”. *Proceedings of IEEE Global Communications Conference (GLOBECOM)*. Taipei, Taiwan (Accepted), pp. 1–6.

- 12 Thungon C., L., **Ahmed, N.**, Hussain, M. I. (2019). "Comparison of AES and PRESENT Block Cipher for 6LoWPAN Based Internet-of-Things". *International Journal of Computational Intelligence & IoT*. Vol. 1. 2. URL: <https://ssrn.com/abstract=3354723>.
- 13 **Ahmed, N.**, De, D., Hussain, M. I. (2018). "A QoS-aware MAC protocol for IEEE 802.11 ah-based Internet of Things". *2018 Fifteenth International Conference on Wireless and Optical Communications Networks (WOCN)*. IEEE, pp. 1–5. DOI: 10.1109/WOCN.2018.8556133.
- 14 Thungun, L. C., **Ahmed, N.**, Hussain, M. (2018). "Comparison of AES and PRESENT Block Cipher for 6LoWPAN based Internet-of-Things". *International Conference on Computational Intelligence & IoT (ICCIoT)*. NIT, Tripura, India, pp. 1–6.
- 15 **Ahmed, N.**, Rahman, H., Hussain, M. I. (2017a). "Scalability Analysis of Medium Access Control Protocols for Internet of Things". *Proceedings of International Conference on Communication and Networks*. Springer, pp. 601–611.
- 16 Kalita, A., **Ahmed, N.**, Rahman, H., Hussain, M. I. (2017). "A QoS-aware MAC protocol for large-scale networks in Internet of Things". *IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)*. IEEE, pp. 1–6. DOI: 10.1109/ANTS.2017.8384132.
- 17 **Ahmed N.**, Hussain, M. I. (2016). "A distributed channel access mechanism for IEEE 802.11 ah". *IEEE 3rd World Forum on Internet of Things (WF-IoT)*. IEEE, pp. 1–6.
- 18 **Ahmed, N.**, Hussain, M. I. (2016). "Relay-based IEEE 802.11 ah network: A Smart City solution". *2016 Cloudification of the Internet of Things (CIoT)*. IEEE, pp. 1–6. DOI: 10.1109/CIOT.2016.7872922.
- 19 Rahman, H., **Ahmed, N.**, Hussain, M. I. (2016). "A hybrid data aggregation scheme for Internet of Things (IoT)". *2016 IEEE Annual India Conference (INDICON)*. IEEE, pp. 1–6.
- 20 Rahman, H., **N. Ahmed**, Hussain, I. (2016). "Comparison of data aggregation techniques in Internet of Things (IoT)". *International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)*, pp. 1296–1300. DOI: 10.1109/WiSPNET.2016.7566346.
- 21 Ahmed, S., Hussain, I., **Ahmed, N.** (2015). "Driver level implementation of TDMA MAC in long distance WiFi". *International Conference on Computational Intelligence and Networks*. IEEE, pp. 80–85. DOI: 10.1109/CINE.2015.25.
- 22 **N. Ahmed**, Ahmed, Z. I., Saikia, S. I., Hussain, I. (2015). "Augmentation of Directional and Sector Antenna Support in NS2". *2015 International Conference on Computational Intelligence and Networks*, pp. 68–73. DOI: 10.1109/CINE.2015.23.
- 23 Rahman, H., **Ahmed, N.**, Hussain, I. (2015). "Internet of Things (IoT): Advances and Research Challenges". *International conference on Computing and Communication Systems (I3CS)*. April. NEHU, Shillong, India, pp. 89–96.
- 24 Hussain, I., **Ahmed, N.**, Saikia, D., Sarma, N. (2014). "A QoS-aware multipath routing protocol for WiFi-based long distance mesh networks". *2nd International Conference on Emerging Technology Trends in Electronics, Communication and Networking*. IEEE, pp. 1–8. DOI: 10.1109/ET2ECN.2014.7044990.
- 25 Hussain, M., Dutta, S. K., **Ahmed, N.**, Hussain, I. (2014). "A Multi-gateway based Reliable Low Cost Network Architecture for Rural Region". *National Conference on Emerging Global Trends in Engineering & Technology (EGTET)*. Don Bosco University, Assam, India, pp. 1–7.

Patents

- 1 Das, R., **Ahmed, N.**, Saha, G., Maji, A. (2021). *Multi-Purpose Switch Adaptable for a Specific SDN Based IoT Architecture*. Indian patent filed on: 04/12/2019, published on: 02/04/2021, number of pages: 37, number of claims: 7 (Ref: 201931049931).
- 2 Saha, G., Das, R., **Ahmed, N.**, Maji, A. (2021). *An improved SDN based IoT system*. Indian patent filed on: 16/04/2021 (Ref: 202131017791).

Books and Chapters

- 1 **Ahmed, N.,** Rahman, H., Hussain, M. I. (2017b). "Scalability Analysis of Medium Access Control Protocols for Internet of Things". *Advances in Intelligent Systems and Computing*. Vol. 508. Springer Singapore, pp. 601–611. DOI: 10.1007/978-981-10-2750-5_62. URL: https://doi.org/10.1007/978-981-10-2750-5_62.

Skills

Languages	■ Strong reading, writing and speaking competencies for English, Hindi, and Assamese.
Coding	■ C,C++,Java, PHP, JSP, Python, SQL, \LaTeX , ASP.NET,TCLscript.
IoT	■ Sensor/Actuator, Contiki, COAP, MQTT, TelosB, CC2650, ESP8266, Arduino, RaspberryPi, iFogSim, Thingspeak, Kaa.
IoT Apps	■ Healthcare IoT, Smart Agriculture, Smart City, Smart Home, and Smart Lighting.
Networking	■ Mikrotik Board, Winbox, OpenWrt, Atheros Driver, Driver Programming, 6Lbr, SDN Switch (DELL EMC), Openflow, P4, Mininet, NS-3, and NS-2
Web Dev	■ Angular 2.0 (above), HTML, CSS, JavaScript, Liferay, Django, Apache Web Server, Tomcat Web Server.
Misc.	■ Academic research, teaching, training, consultation, \LaTeX typesetting and publishing.

Invited as Resource Person

- 1 ■ **Role of AI and ML in Next-generation Communication Networks**, Webinar conducted by ICFAI University Tripura, India, 18-19 July, 2022.
- 2 ■ **Flow Identification for Secure SDN-Based IoT Networks**, SPLICE Webinar Series, Dartmouth College, 15 Feb, 2022
- 3 ■ **Role of Artificial Intelligence/Machine Learning in Next-generation Communication Networks**, International ATAL Faculty Development Programme (IFDP) on Data Analytics and Machine Learning, conducted by Mizoram University, India and North-Eastern Hill University, India, 21-25 March, 2022.
- 4 ■ **Protocols and Platforms for Next Generation IoT**, Five Days AICTE ATAL Faculty Development Programme (FDP) on Internet of Things (IoT), conducted by Department of Computer Science & Information Technology, University of Jammu, Jammu, 1-4 June 2021.
- 5 ■ **Introduction to Contiki-Cooja Simulator: A Demonstration**, Five Days AICTE ATAL Faculty Development Programme (FDP) on Internet of Things (IoT), conducted by Department of Computer Science & Information Technology, University of Jammu, Jammu, 1-4 June 2021
- 6 ■ **Sensors & Actuators with Communication Protocols for Next-Generation IoT**, Five Days AICTE ATAL Online Faculty Development Programme (FDP) *Internet of Things (IoT)*, conducted by department of Information Technology, Mizoram University, Aizwal, 1-4 Feb 2021.
- 7 ■ **Hands on Contiki-OS and Cooja Simulator**, Five Days AICTE ATAL Online Faculty Development Programme (FDP) *Internet of Things (IoT)*, conducted by department of Information Technology, Mizoram University, Aizwal, 1-4 Feb 2021
- 8 ■ **Wireless Sensor & Actuator Network Using Contiki-Cooja Simulator**, Five Days AICTE ATAL Online Faculty Development Programme (FDP) *Internet of Things (IoT)*, conducted by department of Information Technology, Mizoram University, Aizwal, 1-4 Feb 2021
- 9 ■ **Software & Hardware platforms for NextGen IoT Implementation**, in AICTE sponsored workshop on *IoT and its Applications*, conducted by department of IT, NEHU, Shillong and CKolon, 5-9 Oct 2020.

Invited as Resource Person (continued)

- 10 **Implementation of IoT**, in a Two-weeks National workshop-cum-Summer Internship on *IoT and Android Applications Development*, conducted by department of CSE & IT, Assam Don Bosco University, India, 11-23 Jun 2019.
- 11 **Implementation of IoT using 6LoWPAN-based Network**, 2-day MeitY sponsored National workshop on *Internet of Things: It's Inside out*, in the department of IT, NEHU, Shillong, India, 12-13 May 2017
- 12 **Technologies and Protocols for Internet of Things (IoT)**, 2-day MeitY sponsored National workshop on *Internet of Things: It's Inside out*, in the department of IT, NEHU, Shillong, India, 11-23 Jun 2019
- 13 **Protocol Implementation in open source Wireless Local Area (WLAN) driver**, 2-day National workshop on *Trends in Wireless Networks - Protocols and Practice* in the department of IT, NEHU, Shillong, India, 29-30 Jan 2015
- 14 **Protocol Implementation and Simulation using Network Simulator 2 (NS2)**, 2-day National workshop on *Trends in Wireless Networks - Protocols and Practice* in the department of IT, NEHU, Shillong, India, 29-30 Jan 2015.

Tutorials


- 13 **Misra, S. Ahmed, N., Roy, A.** "Programmability for Context-Aware Smart IoT Applications", Half-day tutorial for *WCNC'21*, 29 March - 1 April 2021, Nanjing, China
- 14 **Ahmed, N., Sarkar, K.** "Programmable IoT" Invited speaker: ACM India Summer School, 8 July, 2021.

Paper Presented


- 1 **Programmable IEEE 802.11ah Network for Internet of Things**, in IEEE International Conference on Communications (ICC), Virtual, 2021.
- 2 **SDN-Based Link Recovery Scheme for Large-Scale Internet of Things** in IEEE HPSR'21. IEEE. Virtual, 2021
- 3 **Channel Access Mechanism for IEEE 802.11 ah-Based Relay Networks**, in IEEE International Conference on Communications (ICC), Dublin, Ireland.
- 4 **A QoS-aware MAC protocol for large-scale networks in Internet of Things**, in 11th IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), Bhubaneswar, Odisha, India, June 2020.
- 5 **Augmentation of Directional and Sector Antenna support in NS-2**, in IEEE sponsored International Conference on Computational Intelligence and Networks (CINE) held on January 2015 in KIIT University, Bhubaneswar, Orisha.
- 6 **Driver Level Implementation of TDMA MAC in Long Distance WiFi**, in IEEE sponsored International Conference on Computational Intelligence and Networks (CINE) held on January 2015 in KIIT University, Bhubaneswar, Orisha.
- 7 **A QoS-aware Multipath Routing Protocol for WiFi-based Long Distance Mesh Networks** in 2nd IEEE conference on Emerging Technology Trends in Electronics, Communication and Networking (ET2ECN) held on December 2014 in NIT Surat, Gujrat.


Professional Services

Workshop Committee


May 2017  **Organizing Member**, National workshop on *Internet of Things: It's Inside out*, 12-13 May, 2017, conducted by Department of IT, NEHU, Shillong, India.

Technical Program Committee

IEEE ICC'21 Workshop  COVI-COM: Communication, IoT, and AI Technologies to Counter COVID-19.

IEEE HPSR 2021 Workshop  VNI: Virtualization for Enabling Next-Generation IoT Networks.

Journal Referee


- 1  **IEEE Internet of Things Journal**
- 2  **IEEE Access**
- 3  **IEEE Transaction on Mobile Computing**
- 4  **IEEE Transaction on Vehicular Technology**
- 5  **Iranian Journal of Science and Technology**
- 6  **IEEE Transactions on Green Communications and Networking**
- 7  **IEEE International Conference on Communication**


Miscellaneous


Guidance

Jul 2018  **Guided Border Security Force (BSF) Technical Team**, *Deployment of WiFi-based Long Distance (WiLD) Network in Border Out Posts (BOPs)*, Ftr, HQ BSF Frontier Shillong from 2 March to 4 April 2018.

Workshops and Training

Jul 2012  Undergone an internship programme on **IP addressing** for 7-days at Indian Oil Corporation Limited, Noonmati, Guwahati, Assam.

Mar 2011  Participated in the **Bhuwan** workshop organized by North Eastern Space Applications Center, Umiam, Shillong

Sep 2009  Attended workshop on **C programming** organized by CIPHER (a forum under Department of IT, NEHU)

References

Prof David Kotz

Professor

Department Computer Science
Dartmouth College, Hanover
NH, USA.

☎ +16036461439

✉ david.f.kotz@dartmouth.edu

Prof Iftekhar Hussain

Professor

Department Information Technology
North-Eastern Hill University,
Shillong, India.

☎ +91-9436337792

✉ ihussain@nehu.ac.in

Prof Sudip Misra

Professor

Department Computer Science & Engineering
Indian Institute of Technology, Kharagpur
West Bengal, India.

☎ +91-9734880277

✉ sudipm@iitkgp.ac.in

Declaration

I hereby declare that the information furnished above is correct to the best of my knowledge and I bear the responsibility for the correctness.

NURZAMAN AHMED