Nurzaman Ahmed

B.Tech., M.Tech., Ph.D., PostDoc.
Student Member of IEEE, IEEE ComSoc, and Indian Science Congress
nurzaman713@gmail.com
https://nurzaman7.github.io/
GS https://scholar.google.com/citations?user=wUFC3VMAAAAJ&hl=en
+91-9733162230
Corresponding Address: Vill- Pachaniapra, P.O.- Bongara, Guwahati, Assam -781015
Permanent Address: Vill- Padupara, P.O- Dhupdhara, Goalpara, Assam, India-783123

Research Summary

Area of Interest	IoT, SDN, WiFi-based long distance network
Research Experiences	6.5 Years
Number of Citations (Google Scholar)	417
H-Index (Google Scholar)	7
Number of Publications	38
Number of SCI Indexed Articles	9
Number of Patents	2 (1 published + 1 filed)
Communicated Articles and Conferences	17
Invited as Resource Person	10
Publication Venues	IEEE IoT Journal, IEEE Comm. letters, INFOCOM, GLOBECOM, ICC, WF-IoT,...
Testbeds and Labs worked with	SD-IoT (SWAN Lab., IIT Kharagpur), IoT (IoT Lab. NEHU, Shillong), WiLD (Rural WiFi Lab. NEHU, Shillong)
Training and Guidance	Border Security Force (BSF) Ftr. Technical Team- deployment of WiFi-based Long Distance (WiLD) Network in Border Out Posts from 2 March to 4 April 2018
Tutorial	Presented a half-day tutorial for WCNC'21, topic:"Programmability for Context-Aware Smart IoT Applications", 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

1 **Research Associate**- Department of Computer Science & Engineering, Indian Institute of Technology, Kharagpur, India. (Aug 2019 –Till date) Joined after submission of my PhD thesis.
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 programmable network architecture for flexibility and interoperability in IoT (please refer publications).

2 **Visiting Faculty**- Department of Computer Science & Engineering, MIT University, Shillong, India. (Jan 2019 –May 2019).
Responsibilities: Taught subjects like (i) Computer Network (ii) System Administrations, and (iii) Algorithms.

Employment History (continued)

3 **Project Scientist**- Department of Information Technology, School of Technology, North-Eastern Hill University, Shillong, India. (Nov 2015–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.

4 **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 (Award: 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%***

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%***

2006 – 2008 **Higher Secondary, Assam Higher Secondary Education Council, India** in Science.
First Class ***71%*** Dakshin Kamrup College

2003 – 2006 **High School Living Certificate, Board of Secondary Education, Assam, India**
First Class ***78%*** Padupara Ancholic High School

Research Publications

Patents

1. Saha, G., **Ahmed, N.**, Das, R., 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).

Journal Articles

1. **Ahmed, N.**, De, D., Barbhuiya, F. A., Hussain, M. I. (2021). "MAC protocol for IEEE 802.11ah-based Internet of Things: A Survey". *Accepted for publication in IEEE Internet of Things Journal* (***SCI, IF: 9.9***).
2. **Ahmed, N.**, Misra, S. (2021a). "Collaborative Flow-Identification Mechanism for Software-Defined Internet of Things". *Accepted for publication in IEEE Internet of Things Journal* (***SCI, IF: 9.9***).
3. Hussain, M. I., **Ahmed, N.**, Ahmed, Z. I., Sarma, N., Hussain, M. I. (2021). "QoS Provisioning in Wireless Mesh Networks: A Survey". *Accepted for publication in Wireless Personal Communications* (***SCI, IF: 1.06***).
4. **Ahmed, N.**, Hussain, M. I. (2020a). "Periodic Traffic Scheduling for IEEE 802.11 ah Networks". *IEEE Communications Letters,* (***SCI, IF: 3.4***) **24**.7, pp. 1510–1513.

5. 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**)*. DOI: 10.1109/JIOT.2020.2990936.

6. 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.

7. **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.

8. **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.

9. **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.

10. 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.

11. **Ahmed, N.**, Rahman, H., Hussain, M. I. (2016). "A comparison of 802.11 ah and 802.15. 4 for IoT". *ICT Express, (**SCI**)* **2**.3, pp. 100–102.

12. Hussain, M., **Ahmed, N** (2016). "A Performance Analysis of E-Learning over WiFi-based Long Distance Networks". *Journal of Wireless Networking and Communications* **6**.4, pp. 1–16.

13. Hussain, M. I., Dutta, S., **Ahmed, N.**, Hussain, I. (2015). "A WiFi-based reliable network architecture for rural regions". *ADBU Journal of Engineering Technology* **3**.1, pp. 1–6.

Communicated Articles

1. **Ahmed, N.**, Saha, R., Roy, A., Misra, S., (#TNSESI-2021-05-0432) "Federated Learning-based Collaborative Traffic Classification Scheme for Software-Defined IoT", *ACM Transactions on Sensor Networks*.

2. Gazi, F. **Ahmed, N.**, Misra, S. Wei, W., (#TOSN-2021-0068) "Reinforcement Learning-Based MAC Protocol for Underwater Multimedia Sensor Networks", (Major revision) *ACM Transactions on Sensor Networks*.

3. R. K. Das, **Ahmed, N.**, Maji, A.K, Saha, G. (#TCOM-TPS-21-0503) "Edge Controller-Assisted SDN Architecture for Internet of Things", *IEEE Transactions on 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. **Ahmed, N.**, Roy, A., Misra, S. (#TGCN-SI-GCCT-21-0015) "IEEE Transactions on Green Communications and Networking", *IEEE Transactions on Network Science and Engineering*.

6. Nayak, S., **Ahmed, N.**, Misra, S. (ID: ID: ADHOC-S-21-003) "Deep-Learning-Based Reliable Routing Attack Detection Mechanism for Industrial Internet of Things", (Minor Revision) *Elsevier Ad Hoc Network*.

7. **Ahmed, N.**, Roy, A., Misra, S. (#TNSESI-2020-12-1095) "AI-Driven Flow Control Mechanism for 6G Internet of Things", *IEEE Transactions on Network Science and Engineering*.

8. Gazi, F. **Ahmed, N.**, Misra, S. (#IoT-17306-2021) "RE-MAC: A Hybrid MAC Protocol for Underwater Multimedia Internet of Things", *IEEE Internet of Things Journal*.

9. R. K. Das, **Ahmed, N.**, Maji, A.K, Saha, G. (#Sensors-39804-2021) "Nx-IoT: Improvement of conventional IoT Framework by incorporating SDN Infrastructure", *IEEE Sensor Journal*.

10. 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*.

11. **Ahmed, N.**, Roy, A. Misra, S. (ID: TII-20-3026) "Softwarized Control on 6TSCH-Based Next-Generation Industrial Cyber-Physical Systems", *IEEE Transactions on Industrial Informatics*.

12. Nayak, S., **Ahmed, N.**, Misra, S. (ID: IOT-D-20-00190) "FACT: Fog-Based Scalable Actuation Control Strategy for Blockchain-Enabled Internet of Things", submitted after 1st round of revision to *Elsevier Internet of Things Journal*.

13. Thungun, L.C, **Ahmed, N.**, Hussain, M.I. (ID: COM-2019-6138.R1) "A Survey on 6LoWPAN Security: State-of-the-art and Challenges", submitted after 1st round of revision to IET Communications.

14. **Ahmed, N.**, Hussain, M.I. (ID: TW-Sep-19-1128) "QoS.11ah: A QoS-aware Scheduling-cum-grouping scheme for IEEE 802.11ah", *IEEE Transactions on Wireless Communications*.

15. **Ahmed, N.**, Hussain, M.I. (ID: TELS-D-21-00082) "Scalable Internet of Things Using Multi-hop IEEE 802.11ah Network", (Major Revision) *Telecommunication Systems*.

Conference Proceedings

1. **Ahmed, N.**, A., R., A., M., Misra, S. (2021). "SDN-Based Link Recovery Scheme for Large-Scale Internet of Things". *IEEE HPSR'21*. IEEE. Virtual, pp. 1–6.

2. **Ahmed, N.**, Misra, S. (2021b). "Programmable IEEE 802.11ah Network for Internet of Things". *IEEE International Conference on Communications (ICC)*. IEEE. Virtual, pp. 1–6.

3. **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.

4. 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.

5. 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.

6. 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, Cananda, pp. 1–6.

7. 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.

8. 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.

9. **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.

10. 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 (ICCIIoT)*. NIT, Tripura, India, pp. 1–6.

11. **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.

12. 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.

13. **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.

14. **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.

15. Hussain, M. I., **Ahmed, N.** (2016). "A Performance Analysis of E-Learning over WiFi-based Long Distance Networks". *Journal of Wireless Networking and Communications*. Vol. 6. 4, pp. 85–93.

16. 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.

17. 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.

18. 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.

19. **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.

20. 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.

21. 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.

22. 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.

Communicated Conference Proceedings

1. **Ahmed, N.**, Misra, S. (#705) "FlyConf: Abstracting Data-planes of Heterogeneous Networks", *SigCom'21.*
2. **Ahmed, N.**, Roy, A., Misra, S., Saha, R. (#671) "SCN: A Self-Controlled Network Architecture", *SigCom'21.*
3. Sarkar, K., **Ahmed, N.**, Misra, S. (#454) "FluidSDT: Realizing Fluid Control Across Software Defined IoT Domains", *SigCom'21.*
4. Saha, R., **Ahmed, N.**, Misra, S. (#416) "VSpace: Virtualizing Data Plane Space with IoT Network Slices", *SigCom'21.*
5. **Ahmed, N.**, Saha, R., Misra, S. (#153) "6G-Fi: Fast and Intelligent Flow-control Scheme for 6G Network", *MobiCom'21.*
6. Sarkar, K., **Ahmed, N.**, Misra, S. (#1570667901) "SDN-on-the-Fly: On-demand Softwarized Control of IoT", *INFOCOM'21.*

7. Saha, R. **Ahmed, N.**, Misra, S. (#1570668002) "Go With the Flow: Assuring Priority Flow Through the Access Nodes of Software-Defined IoT", *INFOCOM'21*.

8. Sarkar, K., **Ahmed, N.**, Misra, S. (#1570685280) "xDIoT: Leveraging Reliable Cross-domain Communication Across IoT Networks", *ICC'21*.

9. Saha, R.,**Ahmed, N.**, Misra, S. (#1570685307) "SD-Health: SDN-Controller Triggered Dynamic Decision Control Mechanism for Healthcare IoT", *ICC'21*.

10. Medhi, K., **Ahmed, N.**, Hussain, M.I. (#1570690535) "DC-Health: Dew-based Flexible Computing Architecture for Healthcare IoT", *ICC'21*.

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.
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 **Protocols and Platformns for Next Generation IoT**, Five Days AICTE ATAL Faculty Development Programme (FDP) on Internet of Things (IoT), conducted by conducted by Department of Computer Science & Information Technology, University of Jammu, Jammu, 1-4 June 2021.

2 **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

3 **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.

4 **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

5 **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

6 **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)

7. **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.
8. **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
9. **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
10. **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
11. **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.

Communicated Workshops

15. Misra, S., Mohsen, G., **Ahmed, N.**, Roy, A. (#1570682980) "Programmable Edge Intelligence for Next-Generation Internet-of-Things (NG-IoT)", *Tutorial- ICC'21*
16. Kar, P., Misra, S., Choo, K. R., Pati, B. **Ahmed, N.** (#1570654617) "5G and Beyond for the Next Generation Healthcare Ecosystem", *Workshop- Globecom'20*

Paper Presented

1. **Channel Access Mechanism for IEEE 802.11 ah-Based Relay Networks**, in IEEE International Conference on Communications (ICC), Dublin, Ireland.
2. **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.
3. **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.
4. **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.
5. **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. Sudip Misra
Professor
Department Computer Science & Engineering
Indian Institute of Technology, Kahargpur
West Bengal, India.
+91-9734880277
sudipm@iitkgp.ac.in

Dr. Md. Iftekhar Hussain
Associate Professor
Department Information Technology
North-Eastern Hill University,
Shillong, India.
+91-9436337792
ihussain@nehu.ac.in

Prof. Debashis De
Professor
Department Computer Science & Engineering
Maulana Abul Kalam Azad University of Technology,
West Bengal, India.
+91-8617256060
debashis.de@makautwb.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**