

# Nurzaman Ahmed (B.Tech, M.Tech, Ph.D.)

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🌐 <https://nurzaman7.github.io/>

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

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## Employment History

- 1 **Project Scientist** Information Technology Department, School of Technology, NORTH-EASTERN HILL UNIVERSITY, Shillong, India. (Nov 2015–Aug 2019.)  
MeitY (Govt. of India) sponsored Project titled: *QoS Provisioning in WiFi-based Long Distance Wireless Networks for Hilly Terrain Areas.*
- 2 **Junior Research Fellow** Information Technology Department, School of Technology, NORTH-EASTERN HILL UNIVERSITY, Shillong, India. (Aug 2013–Jan 2015.)  
MeitY (Govt. of India) sponsored Project titled: *QoS Provisioning in Internet of Things (IoT).*

## Education

- 2020 – ... **PostDoc., Indian Institute of Technology Kharagpur**  
Department of Computer Science and Engineering.
- 2016 – 2020 **Ph.D., North-Eastern Hill University, India** in Information Technology.  
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 Anchoic High School

## Research Publications

### Journal Articles

- 1 **Ahmed, Nurzaman** & Hussain, M. I. (2020b). Periodic Traffic Scheduling for IEEE 802.11ah Networks. *IEEE Communications Letters, SCI Indexed (IF: 3.4), 24(7), 1510–1513.*
- 2 Das, R. K., **Ahmed, Nurzaman**, 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 Indexed (IF: 9.5).* doi:10.1109/JIOT.2020.2990936
- 3 Thungun, L., **Ahmed, Nurzaman**, 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 Indexed (IF: 1.49).* doi:10.1002/ett.4033

- 4 **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 Indexed*, 10(2), 81–90.
- 5 Thungon, L., C., **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*, 1(2). <https://ssrn.com/abstract=3354723>
- 6 **Ahmed, Nurzaman**, De, D., & Hussain, I. (2018). Internet of Things (IoT) for Smart Precision Agriculture and Farming in Rural Areas. *IEEE Internet of Things Journal, SCI Indexed (IF: 9.5)*, 5(6), 4890–4899. doi:10.1109/JIOT.2018.2879579
- 7 **Ahmed, Nurzaman**, Rahman, H., & Hussain, M. I. (2018). An IEEE 802.11 ah-based scalable network architecture for Internet of Things. *Annals of Telecommunications, SCI Indexed (IF: 1.55)*, 73(7–8), 499–509.
- 8 Rahman, H., **Ahmed, N.**, & Hussain, M. I. (2018). A QoS-aware hybrid data aggregation scheme for Internet of Things. *Annals of Telecommunications, SCI Indexed (IF: 1.55)*, 73(7–8), 475–486.
- 9 **Ahmed, N.**, Rahman, H., & Hussain, M. I. (2016). A comparison of 802.11 ah and 802.15. 4 for IoT. *ICT Express, ESCI Indexed*, 2(3), 100–102.
- 10 Hussain, M. I. & **Ahmed, N.** (2016). A Performance Analysis of E-Learning over WiFi-based Long Distance Networks. *Journal of Wireless Networking and Communications*, 6(4), 85–93.
- 11 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.

## Communicated Articles

- 1 **Ahmed, Nurzaman** & Hussain, M. I. (2020a). Improving Scalability for IEEE 802.11ah-based Smart City Network. Communicated to IEEE IoT Journal.
- 2 **Ahmed, Nurzaman** & Hussain, M. I. (2020c). QoS.11ah: A QoS-aware Scheduling-cum-grouping scheme for IEEE 802.11ah. Communicated to IEEE Transactions on Wireless Communications.
- 3 Thungon, L., **Ahmed, Nurzaman**, & Hussain, M. I. (2020). A Survey on 6LoWPAN Security: State-of-the-art and Challenges. Under 1st round of revision in IET Communications.
- 4 **Ahmed, Nurzaman**, De, D., & Hussain, M. I. (2019). MAC protocol for IEEE 802.11ah-based Internet of Things: A Survey. Under 2nd round of revision in IEEE Communications Surveys & Tutorials.

## Conference Proceedings

- 1 **Ahmed, Nurzaman** & Misra, S. (2020). Channel Access Mechanism for IEEE 802.11 ah-Based Relay Networks. In *IEEE International Conference on Communications (ICC)* (pp. 1–6). IEEE. Dublin, Ireland.
- 2 Misra, S., Sarkar, K., & **Ahmed, Nurzaman**. (2020). Blockchain-Based Controller Recovery in SDN. In *Proceedings of IEEE International Conference on Computer Communications Workshops (INFOCOM Workshops)* (pp. 1–6). IEEE. Toronto, Canada.
- 3 **Ahmed, Nurzaman**, De, D., & Hussain, M. I. (2018). A qos-aware mac protocol for ieee 802.11 ah-based internet of things. In *2018 Fifteenth International Conference on Wireless and Optical Communications Networks (WOCN)* (pp. 1–5). IEEE. doi:10.1109/WOCN.2018.8556133

- 4 Thungun, L. C., **Ahmed, N.**, & Hussain, M. (2018). Comparison of AES and PRESENT Block Cipher for 6LoWPAN based Internet-of-Things. In *International Conference on Computational Intelligence & IoT (ICCIoT)* (pp. 1–6). NIT, Tripura, India.
- 5 **Ahmed, Nurzaman**, Rahman, H., & Hussain, M. I. (2017). Scalability analysis of medium access control protocols for internet of things. In *Proceedings of international conference on communication and networks* (pp. 601–611). Springer.
- 6 Kalita, A., **Ahmed, N.**, Rahman, H., & Hussain, M. I. (2017). A qos-aware mac protocol for large-scale networks in internet of things. In *IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)* (pp. 1–6). IEEE. doi:10.1109/ANTS.2017.8384132
- 7 **Ahmed, N.** & Hussain, M. I. (2016). A distributed channel access mechanism for ieee 802.11 ah. In *IEEE 3rd World Forum on Internet of Things (WF-IoT)* (pp. 1–6). IEEE.
- 8 **Ahmed, Nurzaman** & Hussain, M. I. (2016). Relay-based ieee 802.11 ah network: a smart city solution. In *2016 Cloudification of the Internet of Things (CIoT)* (pp. 1–6). IEEE. doi:10.1109/CIOT.2016.7872922
- 9 Rahman, H., **N. Ahmed**, & Hussain, I. (2016). Comparison of data aggregation techniques in Internet of Things (IoT). In *International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)* (pp. 1296–1300). doi:10.1109/WiSPNET.2016.7566346
- 10 Rahman, H., **Ahmed, Nurzaman**, & Hussain, M. I. (2016). A hybrid data aggregation scheme for provisioning quality of service (qos) in internet of things (iot). In *2016 Cloudification of the Internet of Things (CIoT)* (pp. 1–5). IEEE. doi:10.1109/CIOT.2016.7872917
- 11 Ahmed, S., Hussain, I., & **Ahmed, N.** (2015). Driver level implementation of tdma mac in long distance wifi. In *International Conference on Computational Intelligence and Networks* (pp. 80–85). IEEE. doi:10.1109/CINE.2015.25
- 12 **N. Ahmed**, Ahmed, Z. I., Saikia, S. I., & Hussain, I. (2015). Augmentation of Directional and Sector Antenna Support in NS2. In *2015 international conference on computational intelligence and networks* (pp. 68–73). doi:10.1109/CINE.2015.23
- 13 Rahman, H., **Ahmed, N.**, Hussain, & I. (2015). Internet of things (iot): advances and research challenges. In *International conference on computing and communication systems (i3cs)* (April, pp. 89–96). NEHU, Shillong, India.
- 14 Hussain, I., **Ahmed, N.**, Saikia, D., & Sarma, N. (2014). A qos-aware multipath routing protocol for wifi-based long distance mesh networks. In *2nd International Conference on Emerging Technology Trends in Electronics, Communication and Networking* (pp. 1–8). IEEE. doi:10.1109/ET2ECN.2014.7044990
- 15 Hussain, M., Dutta, S. K., **Ahmed, N.**, & Hussain, I. (2014). A Multi-gateway based Reliable Low Cost Network Architecture for Rural Region. In *National Conference on Emerging Global Trends in Engineering & Technology (EGTET)* (pp. 1–7). Don Bosco University, Assam, India.

## Books and Chapters

- 1 Ahmed, N., Rahman, H., & Hussain, M. I. (2017). Scalability analysis of medium access control protocols for internet of things. In *Advances in intelligent systems and computing* (Vol. 508, pp. 601–611). Springer Singapore. doi:10.1007/978-981-10-2750-5\_62

## Skills

Languages	■ Strong reading, writing and speaking competencies for English, Hindi, Assamese, Bengali.
Coding	■ C,C++,Java, PHP, JSP, Python, SQL, L <sup>A</sup> T <sub>E</sub> X, ASP.NET,TCLscript.
IoT	■ Sensor/Actuator, Contiki, COAP, MQTT, TelosB, CC2650, ESP8266, Arduino, RaspberryPi, iFogSim, Thingspeak.
IoT Apps	■ <b>Rural Farming, Smart Agriculture</b> , 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, L <sup>A</sup> T <sub>E</sub> X typesetting and publishing.

## Lectures and Presentations

### Lectures & Demonstrations

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

### Paper Presented

June 2020	■ <b>Channel Access Mechanism for IEEE 802.11 ah-Based Relay Networks</b> , in IEEE International Conference on Communications (ICC), Dublin, Ireland.
Jan 2018	■ <b>A QoS-aware MAC protocol for large-scale networks in Internet of Things</b> , in 11th IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), Bhubaneswar, Odisha, India.
Jan 2015	■ <b>Augmentation of Directional and Sector Antenna support in NS-2</b> , in IEEE sponsored International Conference on Computational Intelligence and Networks (CINE) held on January 2015 in KIIT University, Bhubaneswar, Orisha.
"	■ <b>Level Implementation of TDMA MAC in Long Distance WiFi</b> , in IEEE sponsored International Conference on Computational Intelligence and Networks (CINE) held on January 2015 in KIIT University, Bhubaneswar, Orisha.

## Lectures and Presentations (continued)

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- Dec 2014    ■ **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.

## Miscellaneous

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### Guidance

- Jul 2018    ■ **Guided 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.

### Workshop Committees

- 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.

### Journal Referee

- 1    ■ **IEEE's IoT Journal**, 8 times
- 2    ■ **Springer's WPC**, 2 times
- 3    ■ **Springer's IJST**, 2 times

### 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

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Available on Request

## Declaration

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