MUHAMMAD BAQER MOLLAH

University of Houston, TX 77479
• Email: mmollah@uh.edu • Web: https://mbaqer.github.io/

RESEARCH INTERESTS

My research leverages advanced techniques, such as cryptography, sensing, communications, deep learning, and generative AI, with an emphasis on addressing real-world challenges in cyber-physical systems through theoretical, numerical, and experimental ways. More specifically, my research interests include:

- **Applied Cryptography:** Public-Key Cryptography, Quantum-Safe Cryptography, Blockchain, and Smart Contract
- **Privacy-Preserving Technologies:** Secure Multi-Party Computation, Homomorphic Encryption, and Zero-Knowledge Proof
- **Sensing and Communications:** V2X, AI-Native Wireless, Beyond 5G/6G, RF/Non-RF Sensing, mmWave/Sub-THz/THz, ISAC, and Semantic Communications
- **Deep Learning:** Transformers, Multimodal Learning, and Mixture of Experts
- **Edge Intelligence:** On-Device/Edge AI, TinyML, and Federated Learning/Unlearning
- **Generative AI:** Foundation Model, LoRA, Agentic AI, One-Shot Learning, and Few-Shot Learning

CURRENT POSITION

University of Houston September 2025 - Now
Dept. of Information Science Technology
Post-Doctoral Fellow
Project: USDOT Tier 1 UTC Transportation Cybersecurity Center for Advanced Research and Education (CYBER-CARE)

- Conducting research on ensuring in-vehicle network security by leveraging edge computing and access control encryption techniques
- Designing and evaluating a practical end-to-end security-aware mechanism for connected vehicles by implementing multi-level access control schemes
- Working closely with students to define research directions, plan project milestones, and oversee implementation and paper writing.

EDUCATION

University of Massachusetts Dartmouth Fall 2022 - Summer 2025
PhD in Electrical and Computer Engineering
Advisor: Prof. Honggang Wang, IEEE Fellow
Dissertation: On Enabling Multi-Modal Sensing and Security Techniques for Connected Vehicles
Courses Taken (Selected): Network Security, Multimedia Communications, Advanced Computer Systems, and Dependable & Secure Computing

Jahangirnagar University, Dhaka, Bangladesh 2015 - 2016
MS in Computer Science
Research Project: Secure Data Sharing and Searching at the Edge of Cloud Connected Smart Devices
Advisor: Prof. Md. Abul Kalam Azad
Courses Taken (Selected): Artificial Neural Networks, Mobile & Wireless Communications, Information Theory & Coding System, Distributed Systems, and Cloud Computing

International Islamic University Chittagong, Chittagong, Bangladesh 2009 - 2014
BS in Electrical and Electronic Engineering
Final Year Project: E-Police System for Improved E-Government Services in Bangladesh
Advisor: Prof. Sikder Sunbeam Islam

PAST EXPERIENCES

University of Massachusetts Dartmouth September 2022 - August 2025
Dept. of Electrical and Computer Engineering
Research Assistant
Project: Enabling Machine Learning based Cooperative Perception with mmWave Communication for Autonomous Vehicle Safety (NSF Funded)
Teaching Assistant (Fall 2023)
Course: Introduction to Engineering & Computing (Lab)

Nanyang Technological University, Singapore March 2019 - May 2022
School of Computer Science and Engineering
Research Associate
Lab: Computer Networks and Communications Lab
Topics: AI and Blockchain application to Cyber-Physical Systems

Jahangirnagar University, Dhaka, Bangladesh September 2016 - December 2017
Dept. of Computer Science and Engineering
Research Assistant
Topics: IoT Communications and Security

Bangladesh University of Engineering and Technology, Dhaka February 2015 - August 2015
Dept. of Electrical and Electronic Engineering
Project Engineer
Project: SCADA System Installation, Commissioning and Testing for Dhaka Power Distribution Company Limited 33/11KV Distributed Substations
Responsibilities: Making the SCADA interface boards, preparing the data acquisition (DAQ) module interface for the substation remote terminal unit (RTU), SCADA interface boards installation & wiring in substation breaker panels and SCADA database.

VISITING EXPERIENCE

Singapore University of Technology and Design, Singapore January 2018 to January 2019
Information System Technology and Design Pillar
Group: Automated Systems Security Research Group
Project: Testing and Monitoring Security of Industrial IoT
Host: Prof. Sudipta Chattopadhyay

PUBLICATIONS

Google Scholar Profile: https://scholar.google.com/citations?user=VijQVZYAAAAJ&hl=en

Under Preparation

[3] **M.B. Mollah**, K. Lee, Y. Zhang, "*Practical End-to-End Security-Aware Mechanism for Connected Vehicles by Multi-Level Access Control*", Under Preparation, 2025.

[2] **M.B. Mollah**, K. Lee, Y. Zhang, "*Ensuring In-Vehicle Network Security with Edge Computing and Access Control Encryption*", Under Preparation, 2025.

[1] **M.B. Mollah**, H. Wang, M.A. Karim, H. Fang, "*Ensuring In-Vehicle Network Security with Edge Computing and Access Control Encryption*", Under Preparation, 2025.

Journals/Magazines

[J5] **M.B. Mollah**, H. Wang, M.A. Karim, H. Fang, "*Multi-Modal Sensing and Fusion in mmWave Beamforming for Connected Vehicles: A Transformer Based Framework*", pp. 1-12, Under Major Revision, IEEE Transactions on Vehicular Technology, 2025.

[J5] **M.B. Mollah**, H. Wang, M.A. Karim, H. Fang, "*Multi-Modal Sensing and Fusion in mmWave Beamforming for Connected Vehicles: A Transformer Based Framework*", pp. 1-12, Under Major Revision, IEEE Transactions on Vehicular Technology, 2025.

[J4] **M.B. Mollah**, H. Wang, M.A. Karim, H. Fang, "*Multi-Modality Sensing in mmWave Beamforming for Connected Vehicles Using Deep Learning*", IEEE Transactions on Cognitive Communications and Networking, pp. 1-15, March 2025. Online: https://doi.org/10.1109/TCCN.2025.3558026

[M2] **M.B. Mollah**, H. Wang, M.A. Karim, H. Fang, "*mmWave Enabled Connected Autonomous Vehicles: A Use Case with V2V Cooperative Perception*", IEEE Network, vol. 38, no. 6, pp. 485-492, Nov. 2024. Online: https://doi.org/10.1109/MNET.2023.3321520

[J3] **M.B. Mollah**, M.A.K. Azad, Y. Zhang, "*Secure Targeted Message Dissemination in IoT Using Blockchain Enabled Edge Computing*", IEEE Transactions on Consumer Electronics, vol. 70, no. 3, pp. 5389-5400, Aug. 2024. Online: https://doi.org/10.1109/TCE.2024.3436825

[J2] **M. B. Mollah**, J. Zhao, D. Niyato, Y. L. Guan, C. Yuen, S. Sun, K.-Y. Lam, and L. H. Koh, "*Blockchain for the Internet of Vehicles towards Intelligent Transportation Systems: A Survey*", IEEE Internet of Things Journal, vol. 8, no. 6, pp. 4157-4185, March 2021. Online: https://doi.org/10.1109/JIOT.2020.3028368

[J1] **M. B. Mollah**, J. Zhao, D. Niyato, K.-Y. Lam, X. Zhang, A. M.Y.M. Ghias, L. H. Koh, and L. Yang, "*Blockchain for Future Smart Grid: A Comprehensive Survey*", IEEE Internet of Things Journal, vol. 8, no. 1, pp. 18-43, January 2021. Online: https://doi.org/10.1109/JIOT.2020.2993601

[M1] **M.B. Mollah**, M.A.K. Azad, A. Vasilakos, "*Secure Data Sharing and Searching at the Edge of Cloud-Assisted Internet of Things*", IEEE Cloud Computing, Vol. 4, No. 1, January-February 2017, pp. 34-42. Online: https://doi.org/10.1109/MCC.2017.9

Book Chapter

[B1] **M.B. Mollah**, S. Zeadally, M.A.K. Azad, "*Emerging wireless technologies for Internet of Things applications: Opportunities and challenges*", In Encyclopedia of Wireless Networks, Springer, 2020, pp. 390-400, *Editors: Profs. Xuemin Shen, Xiaodong Lin, and Kuan Zhang.* Online: https://doi.org/10.1007/978-3-319-32903-1_328-1

Conference Proceedings

[C4] **M.B. Mollah**, H. Wang, H. Fang,, "*Evaluating Vulnerabilities of Connected Vehicles Under Cyber Attacks by Attack-Defense Tree*", International Conference on Computing, Networking and Communication (ICNC), Maui, Hawaii, USA, 2026, pp. 1-6 (Submitted).

[C3] **M.B. Mollah**, H. Wang, H. Fang, "*Multi-Modal Sensing Aided mmWave Beamforming for V2V Communications with Transformers*", IEEE Global Communications Conference (GLOBECOM), Taipei, Taiwan, 2025, pp. 1-6. (Accepted) Online: https://arxiv.org/abs/2509.11112

[C2] **M.B. Mollah**, H. Wang, H. Fang, "*Position Aware 60 GHz mmWave Beamforming for V2V Communications Utilizing Deep Learning*", IEEE International Conference on Communications (ICC), Denver, CO, USA, 2024, pp. 4711-4716. Online: https://doi.org/10.1109/ICC51166.2024.10622582

[C1] **M.B. Mollah**, K.R. Islam, S.S. Islam, "*E-Police System for Improved E-Government Services of Developing Countries*", 25th IEEE Annual Canadian Conference on Electrical & Computer Engineering (CCECE), Montreal, Canada, April-May, 2012, pp. 1-6. Online: https://doi.org/10.1109/CCECE.2012.6335057

PROPOSAL WRITING EXPERIENCE

◦ **NSF - Collaborative Research:** CIF: Medium: Towards Fully Deep Learning-based mmWave Communications for Complex Mobile RF Environments, **PIs and Co-PIs:** Prof. Honngang Wang, Prof. Hua Fang, Prof. Hamid Sharif, UNL, **Status:** Not funded, **My Contribution:** One research thrust out of three in total.

RELATED TRAINING

AI Summer School July 2019
AISingapore and National University of Singapore
Singapore.

Server Administration & Cloud Management September 2016 - November 2016
BASIS Institute of Technology & Management (BITM)
Dhaka, Bangladesh.

SERVICES

Web of Science Public Profile: https://www.webofscience.com/wos/author/record/T-4705-2019

Reviewer for Journals/Magazines: IEEE Communications Magazine, IEEE Network, IEEE Wireless Communications Magazine, IEEE Transactions on Wireless Communications, IEEE Wireless Communications Letters, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Mobile Computing, IEEE Transactions on Industrial Informatics, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Information Forensics and Security, IEEE Internet of Things Journal, IEEE Transactions on Network and Service Management, ACM Transactions on Computing for Healthcare, ACM Computing Surveys, Future Generation Computer Systems (Elsevier).

Volunteer: • Student Volunteer at IEEE PES International Conference on Innovative Smart Grid Technologies (ISGT Asia 2018), May 22-25 2018, Singapore.

MEMBERSHIP

Member of • IEEE • IEEE Communications Society • IEEE Vehicular Technology Society

REFERENCES

Dr. Honggang Wang, IEEE Fellow
Professor and Founding Chair
Dept. of Graduate Computer Science & Engg.
Katz School of Science and Health
Yeshiva University, Manhattan, NY 10016
Email: honggang.wang@yu.edu

Dr. Mohammad Ataul Karim, IEEE Fellow
Professor
Dept. of Electrical & Computer Engineering
University of Massachusetts Dartmouth
MA 02747-2300
Email: mkarim@umassd.edu

Dr. Hua Fang
Professor
Dept. of Computer & Information Science
University of Massachusetts Dartmouth
MA 02747-2300
Email: hfang2@umassd.edu

Dr. Kyuin Lee
Assistant Professor
Dept. of Information Science Technology
University of Houston
TX 77479
Email: klee48@central.uh.edu