Md Ashiqur Rahman

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Skills

Coding & Tools: **C, C++**; familiar with Scala, Python, Java, C#, Shell scripting, GDB, Docker, NS-3, CSIM, MySQL, Git, Linux.
Research: Internet Architecture, Computer Networks, Probabilistic routing, Protocol design, Scheduling algorithms.
Other topics: Database Systems, Operating Systems, Information Retrieval, Object-oriented Design, Data Structures.

Education

PhD Candidate in Computer Science *Aug 2016 - May 2022*
The University of Arizona, Tucson, AZ, USA (GPA: 3.75 / 4.00)
Dissertation topic: Data-centric Wireless Networks.

Master of Science in Computer Science *Aug 2016 - May 2020*
The University of Arizona, Tucson, AZ, USA (GPA: 3.75 / 4.00)

Bachelor of Science in Computer Science and Engineering *Feb 2011 - May 2015*
Khulna University of Engineering & Technology (KUET), Khulna, Bangladesh (GPA: 3.60 / 4.00)

Work Experience

Graduate Associate (RA/TA) *Aug 2016 - Present*
Computer Science, The University of Arizona, Tucson, AZ, USA

- **Network Research Lab:** Analyzing Named Data Networking (NDN) and its protocol stack optimization in wireless networks.
- **Software Development:** Student developer, Named Data Forwarding Daemon.
- **Teaching Associate:** Computer Networks, Operating Systems.

Summer Instructor *Jun - Aug (2020, 2021)*
Computer Science, The University of Arizona, Tucson, AZ, USA

- **2021:** Systems Programming and UNIX (C programming, FILE I/O, memory management, and Shell scripting).
- **2020:** Software Development (development practices, testing, algorithms, and data structures using Java).

Lecturer *Sep 2015 - Jul 2016*
Computer Science and Engineering, Daffodil Intl. University (DIU), Dhaka, Bangladesh

- **Mentor:** Competitive Programming (beginner and intermediate).
- **Courses instructed:** Algorithms, Data Structures, Programming and Problem Solving, Software Engineering.

Key Projects

NDN in wireless, ad-hoc, and delay-tolerant networks (C++, NS-3). *2016 - Ongoing*

- Optimizing NDN's data-centric approach in wireless networks.
- **Application and transport layer:** Implemented a dynamic interest lifetime (DIL) protocol alongside congestion window limit to reduce data redundancy and channel contention. Achieves 16.44% more throughput than TCP-IP.
- **Network layer:** Implemented a data-centric ad hoc forwarding (DAF) strategy that reduces network latency and overhead and improves application retrieval rate. Proves that NDN is better than IP in mobile ad hoc networks.
- **Link layer:** Implemented an Interest bundling technique (BLEnD) which improves channel availability for data flow. Improves throughput by 30% than "one Interest, one data" policy.

Network Coded Data Dissemination in RSU-based Vehicular networks (C, CSIM). *2014 - 2019*

- Minimizing wireless broadcast and Vehicle-to-RSU communication latency for improving road-safety and infotainment.
- Achieved significant lower latency and wireless broadcast overhead with high data-retrieval rate.

Supporting Multi-Level Annotations for Medical Literature (Python, Tensorflow, Docker) *Aug - Dec 2018*

- Implemented a probabilistic dropout technique to capture higher contextual information near all hot-words.
- Near-SotA performance with 40% lower model training time.

Implemented Heapfile manager, Buffer manager, B+ tree in a DBMS (C, MINIBASE). *Aug - Dec 2017*

Software router with ARP and PWOSPF protocols for shortest path forwarding (C). *Aug - Dec 2016*

Honors & Awards

Mar 2021	**Winner**, 11th NDN Hackathon (Building Mini-NDN Docker package.)	*Virtual*
Mar 2019	**2nd Runners-up**, 8th NDN Hackathon at University of California, Los Angeles	*LA, CA, U.S.A*
May 2018	**Winner**, 6th NDN Hackathon at Florida International University	*Miami, FL, U.S.A*
Mar 2017	**Winner**, 4th NDN Hackathon at University of Memphis	*Memphis, TN, U.S.A*
2014-15	**Dean's list award**, Academic excellence, KUET	*Khulna, Bangladesh*
Jul 2014	**Position 24**, IUT 6th National ICT Fest 2014 Programming Contest	*Dhaka, Bangladesh*
Jun 2012	**2nd Runner-up**, GPIT CSE Festival 2012 Programming Contest, KUET	*Khulna, Bangladesh*

Publications (Google Scholar)

BLEnD: Improving NDN Performance Over Wireless Links Using Interest Bundling *Nov - Dec 2021*
2021 Military Communications Conference (MILCOM) [Accepted] *San Diego, CA, USA*
- Md Ashiqur Rahman, Beichuan Zhang

On the Analysis of Adaptive-Rate Applications in Data-Centric Wireless Ad-Hoc Networks *Oct 2021*
2021 IEEE 46th Conference on Local Computer Networks (LCN) [Accepted] *Edmonton, Canada*
- Md Ashiqur Rahman, Beichuan Zhang

On Data-centric Forwarding in Mobile Ad-hoc Networks: Baseline Design and Simulation Analysis *Jul 2021*
The 30th International Conference on Computer Communications and Networks (ICCCN 2021) *Athens, Greece*
- Md Ashiqur Rahman, Beichuan Zhang

Enabling Named Data Networking Forwarder to Work Out-of-the-box at Edge Networks *Jun 2020*
2020 IEEE International Conference on Communications Workshops (ICC Workshops) *Virtual*
- Teng Liang, Ju Pan, Md Ashiqur Rahman, Junxiao Shi, Davide Pesavento, Alexander Afanasyev, Beichuan Zhang

Cooperative Cache Transfer-based On-demand Network Coded Broadcast in Vehicular Networks *May 2019*
ACM Transaction on Embedded Computing Systems *ACM*
- G. G. MD. Nawaz Ali; MD. Noor-A-Rahim; Md. Ashiqur Rahman; Beshah Ayalew; Peter H. J. Chong; Yong Liang Guan

An Efficient Cross-layer Coding-assisted Heterogeneous Data Access in Vehicular Networks *May 2018*
2018 IEEE International Conference on Communications (ICC) *Kansas City, MO, USA*
- GGM Nawaz Ali, Md Noor-A-Rahim, Md A Rahman, Syeda Khairunnesa Samantha, Peter HJ Chong, Yong Liang Guan

Efficient Real-time Coding-assisted Heterogeneous Data Access in Vehicular Networks *Apr 2018*
IEEE Internet of Things Journal *IEEE*
- G. G. Md. Nawaz Ali, Md. Noor-A-Rahim, Md. Ashiqur Rahman, Syeda K. Samantha, Peter Han Joo Chong, Yong Liang Guan

Efficient coding based heterogeneous data access in vehicular networks *May 2017*
2017 IEEE International Conference on Communications (ICC) *Paris, France*
- G. G. M. Nawaz Ali, Md. A. Rahman, S. K. Samantha, Yumeng Gao, Peter H.J. Chong, Y. L. Guan

On Accessing Heterogeneous Data Items Using Network Coding in Wireless Broadcast *Sep 2016*
2016 IEEE 84th Vehicular Technology Conference (VTC-Fall) *Montreal, QC, Canada*
- Md. Ashiqur Rahman, G. G. Md. Nawaz Ali, Yumeng Gao, Syeda K. Samantha, Peter H. J. Chong

On Scheduling Real-Time Multi-item Query with Network Coding in Multi-RSU VANETs *Aug 2016*
2016 IEEE 22nd Intl. Conf. on Embedded and Real-Time Computing Systems and Applications (RTCSA) *Daegu, S. Korea*
- Md. A. Rahman, G.G.M. Nawaz Ali, Peter H.J. Chong, S.K. Samantha, M.F. Muntasir, C. Chen

On Efficient Data Dissemination Using Network Coding in Multi-RSU VANETs *May 2016*
2016 IEEE 83rd Vehicular Technology Conference (VTC Spring) *Nanjing, China*
- G. G. Md. Nawaz Ali, Md. Ashiqur Rahman, Peter Han Joo Chong, Syeda Khairunnesa Samantha