Md Ashiqur Rahman

RESEARCHER · PROBLEM SOLVER · MENTOR

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Education

Ph.D. Candidate, Computer Science (GPA: 3.75/4.00 ; exp. grad. May 2022) *Aug 2016 - Present*
THE UNIVERSITY OF ARIZONA, TUCSON, AZ, USA
Dissertation topic: Data-centric Wireless Networks.

Master of Science in Computer Science (GPA: 3.75/4.00) *Aug 2016 - May 2020*
THE UNIVERSITY OF ARIZONA, TUCSON, AZ, USA

Bachelor of Science in Computer Science and Engineering (GPA: 3.60/4.00) *Feb 2011 - May 2015*
KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY (KUET), KHULNA, BANGLADESH
Earned Dean's List award for academic year of 2014

Skills

Research	Internet Architecture, Information-Centric Networking (ICN) with Named Data Networking (NDN), Probabilistic routing, Protocol design and performance optimization in wireless networks, Scheduling algorithms with network coding in RSU-based VANETs.
Coding & Tools	**C/C++** ; familiar with Scala, Python, Java ; Shell scripting, Lucene, GDB, Docker, Jenkins, NS-3, CSIM.
Topics	Computer Networks, Database Systems, Operating Systems, Information Retrieval, Algorithms, Data Structures, Object-oriented Design.
Others	Teaching, Project management.

Experience (Research)

Graduate Research Associate (Ph.D. advisor: Dr. Beichuan Zhang) *Aug 2016 - Present*
NETWORK RESEARCH LAB, COMPUTER SCIENCE, THE UNIVERSITY OF ARIZONA, TUCSON, AZ, USA
- Studying NDN as a Future Internet Architecture and optimizing data-centric approach in wireless networks.
- Architectural differences between NDN and IP in mobile ad-hoc networks
- Performance optimization and NDN protocol design at the transport, network, and link layers in wireless networks.
- Analyzing application challenges and designing optimization techniques for NDN in Delay-tolerant Networks (DTN).

Undergraduate Researcher (Thesis advisor: Dr. G.G. Nawaz Ali) *Apr 2014 - May 2015*
COMPUTER SCIENCE AND ENGINEERING, KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY (KUET),
KHULNA, BANGLADESH
- Studying applications of Network Coding in scheduling algorithms for Vehicular Ad-hoc Networks (V2I).
- Minimize wireless broadcast and Vehicle-to-RSU latency for better road-safety and infotainment.
  - Optimizing scheduling in multi-item query applications.
  - Designing passive cache-transfer policy in multi-RSU environment.
  - Optimizing maximal clique finding with dynamic threshold in heterogeneous data access.

Experience (Teaching)

Graduate Teaching Associate (Grading, Project management, discussion)   *Aug 2016 - Present*
Computer Science, The University of Arizona, Tucson, AZ, USA
- CSC 452 Operating Systems: Fall 2019, 2020, 2021.
- CSC 425 Computer Networks: Spring 2017, 2020, 2021, Fall 2017.
- CSC 477/577 Introduction to Computer Vision: Fall 2016.

Summer Instructor   *Jun - Aug (2020-21)*
Computer Science, The University of Arizona, Tucson, AZ, USA
- **2021:** CSC 352 Systems Programming and UNIX,
  - Teaching basics of C programming, FILE I/O, memory management, UNIX commands, and Shell scripting.
- **2020:** CSC 210 Software Development,
  - Teaching fundamentals of algorithms, data structures, design, and unit-testing using Java.

Lecturer   *Sep 2015 - Jul 2016*
Computer Science and Engineering, Daffodil International University (DIU), Dhaka, Bangladesh
- CSE 221/222 Algorithms (Fall 2015, Spring 2016),
  - Searching, sorting, basic graphs traversal and dynamic programming.
- CSE 134/135 Data Structures (Fall 2015, Spring-Summer 2016),
  - Covered fundamental structures such as arrays, linked-lists, trees, heaps, hash-maps.
- CSE 122/123 Programming and Problem Solving (Fall 2015, Spring-Summer 2016),
  - C programming, solving ad-hoc problems with basic data types, arrays, strings.
- CSE 334 Wireless Programming (Fall 2015, Spring 2016),
  - Designing and implementing graphics logic with Unity for mobile applications.
- CSE 332 Software Engineering (Summer 2016),
  - Software development models, project management, testing and debugging.

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.
- Improved application data retrieval rate and throughput by reducing network latency and overhead.
- **Publications** in IC3N, and LNC 2021, ICC Workshops 2020.

Network Coded Data Dissemination in RSU-based Vehicular networks (C, CSIM).   *2014 - 2019*
- Achieved significant lower latency and wireless broadcast overhead with high data-retrieval rate.
- **Publications**; two as first, two as second and three as third author.

Supporting Multi-Level Annotations for Medical Literature (Python, Docker)   *Aug - Dec 2018*
- Capturing higher context information near all hot-word neighbors.
- Near-SotA performance with significantly 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*

Leadership

Organizer, 11th NDN Hackathon (Virtual) *May 2021*

Mentor: Competitive Programming (beginner and intermediate). *Sep 2015 - Jul 2016*
COMPUTER SCIENCE AND ENGINEERING, DIU, DHAKA, BANGLADESH
- Host training sessions on technical topics for fast programming.
- Organized intra and inter-university programming contests.
  - 2015 ACM ICPC Dhaka Regional, DIU, Dhaka, Bangladesh.
  - 2016 National Girls Programming Contest (NGPC), DIU, Dhaka, Bangladesh.

Workshop Manager and Instructor *Feb 2012 - Apr 2015*
SGIPC (SPECIAL GROUP OF INTEREST IN PROGRAMMING CONTESTS), KUET, KHULNA, BANGLADESH
- Host workshop sessions on technical topics for ACM ICPC participation.
- Organized intra and inter-university programming contests.
  - 2012 GPIT CSE Festival Programming Contest, KUET, Khulna, Bangladesh.

Chair, Workshop Manager and Instructor *Feb 2014 - Apr 2015*
IEEE STUDENT BRANCH, KUET, KHULNA, BANGLADESH
- Organize workshops, manage funding and student outreach program.
- Instructor of workshop on Introduction to Python (2014).

Chair, Microsoft Student Campus Representative *Aug 2014 - Apr 2015*
MICROSOFT STUDENT, KUET, KHULNA, BANGLADESH
- Organize workshops, instructor, manage microsoft campus student accounts.
- Instructor of Introduction to Building Windows Phone Applications with Visual Studio (2014).

Extracurricular

Member, DREAM: A voluntary blood donation society. *Feb 2011 - May 2015*
KUET, KHULNA, BANGLADESH

Member, IEEE Student Branch, KUET *Aug 2012 - May 2015*
KUET, KHULNA, BANGLADESH

Member, Microsoft Student Campus Representative *Feb 2012 - May 2015*
KUET, KHULNA, BANGLADESH

Member, Association for Computing Machinery (ACM) *Nov 2013 - Oct 2015*
KUET, KHULNA, BANGLADESH

Member, KUETPS: KUET Photographic Society *Feb 2011 - Jun 2013*
KUET, KHULNA, BANGLADESH

Honors & Awards

May 2021	**Winner**, 11th NDN Hackathon	*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*
Sep 2015	**Best Research Poster Award**, University Day Poster Competition, KUET	*Khulna, Bangladesh*
Dec 2014	**Position 75**, ACM ICPC 2014 Asia Regional Dhaka Site	*Dhaka, 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*

Presentations

On Data-centric Forwarding in Mobile Ad-hoc Networks: Baseline Design and Simulation Analysis
30TH INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS AND NETWORKS (ICCCN), *Athens, Greece*, *Jul 2021*.

NB-Cache: Non-Blocking In-Network Caching for High-Speed Content Routers
IEEE/ACM INTERNATIONAL SYMPOSIUM ON QUALITY OF SERVICE (IWQoS), *Phoenix, AZ, USA*, *Jun 2019*.

On Accessing Heterogeneous Data Items Using Network Coding in Wireless Broadcast
UNIVERSITY DAY POSTER COMPETITION, KUET, *Khulna, Bangladesh*, *Sep 2015*.

Publications

On the Analysis of Adaptive-Rate Applications in Data-Centric Wireless Ad-Hoc Networks
2021 IEEE 46TH CONFERENCE ON LOCAL COMPUTER NETWORKS (LCN) [ACCEPTED], *Edmonton, Canada*, *October 2021*.
  - Md Ashiqur Rahman ; Beichuan Zhang

On Data-centric Forwarding in Mobile Ad-hoc Networks: Baseline Design and Simulation Analysis
30TH INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS AND NETWORKS (ICCCN), *Athens, Greece*, *July 2021*.
  - Md Ashiqur Rahman ; Beichuan Zhang

Enabling Named Data Networking Forwarder to Work Out-of-the-box at Edge Networks
2020 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS WORKSHOPS (ICC WORKSHOPS), *Virtual*, *June 2020*.
  - 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
ACM TRANSACTION ON EMBEDDED COMPUTING SYSTEMS, *ACM*, *May, 2019*.
  - 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
2018 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS (ICC), *Kansas City, MO, USA*, *May. 2018*.
  - 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
IEEE INTERNET OF THINGS JOURNAL, *IEEE*, *Apr. 2018*.
  - G. G. Md. Nawaz Ali ; Md. Noor-A-Rahim ; Md. Ashiqur Rahman ; Syeda Khairunnesa Samantha ; Peter Han Joo Chong ; Yong Liang Guan

Efficient coding based heterogeneous data access in vehicular networks
2017 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS (ICC), *Paris, France*, *May. 2017*.
  - 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
2016 IEEE 84TH VEHICULAR TECHNOLOGY CONFERENCE (VTC-FALL), *Montreal, QC, Canada*, *Sept. 2016*.
  - 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
2016 IEEE 22ND INTL. CONF. ON EMBEDDED AND REAL-TIME COMPUTING SYSTEMS AND APPLICATIONS (RTCSA), *Daegu, S. Korea*, *Aug. 2016*.
  - 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
2016 IEEE 83RD VEHICULAR TECHNOLOGY CONFERENCE (VTC SPRING), *Nanjing, China*, *May. 2016*.
  - G. G. Md. Nawaz Ali ; Md. Ashiqur Rahman ; Peter Han Joo Chong ; Syeda Khairunnesa Samantha