

Shihabur Rahman Chowdhury

CONTACT INFORMATION	DAVID R. CHERITON SCHOOL OF COMPUTER SCIENCE, UNIVERSITY OF WATERLOO 200 UNIVERSITY AVENUE WEST, WATERLOO, ON N2L 3G1, CANADA PHONE: +1-226-600-6566 EMAIL: shihab.buet@gmail.com, sr2chowdhury@uwaterloo.ca(alternate) HOMEPAGE: https://cs.uwaterloo.ca/~sr2chowd
RESEARCH INTERESTS	Networks, Systems, Algorithms
EDUCATION	PhD , Computer Science, <i>May 2012 - present</i> David R. Cheriton School of Computer Science, University of Waterloo Average: 92.6% Supervisor: Prof. Raouf Boutaba, David R. Cheriton School of Computer Science University of Waterloo B.Sc. in Computer Science and Engineering , <i>Dec 2004 - October 2009</i> Bangladesh University of Engineering and Technology (BUET) CGPA: 3.93/4.00 Rank: 2nd in a class of 125 Thesis: Algorithms in Bioinformatics Thesis Supervisor: Prof. Masud Hasan, Department of CSE, BUET
EMPLOYMENT	Research & Teaching Assistant MAY, 2012 - PRESENT David R. Cheriton School of Computer Science University of Waterloo, Canada Software Engineering Intern (Technical Infrastructure) MAY, 2014 - AUG, 2014 Google Inc. Mountain View, CA, USA Summer Research Intern (Services Research) MAY, 2013 - SEPT, 2013 IBM T.J. Watson Research Centre Yorktown Heights, NY, USA Lecturer NOVEMBER 2009 - APRIL 2012 Department of CSE, BUET, Dhaka, Bangladesh Instructor JANUARY 2010 - APRIL 2012 Bangladesh Korea Information Access Center Department of CSE, BUET, Dhaka, Bangladesh
AWARDS AND ACHIEVEMENTS	<ul style="list-style-type: none">• Ontario Graduate Scholarship, University of Waterloo, 2017 – 2018, 2015 – 2016• President Graduate Scholarship, University of Waterloo, 2017 – 2018, 2015 – 2016• Graduate Excellence Scholarship, University of Waterloo, 2016 – 2017• Student Travel Grant, IFIP/IEEE IM 2017• Student Travel Grant, IEEE/IFIP NOMS 2016 (not availed), 2014• Best Paper Runner-up Award, HotPOST 2013 (in conjunction with IEEE ICDCS 2013)• GoBell Scholarship, University of Waterloo, 2013 – 2015• University Merit Scholarship, BUET, 2005 – 2008• Dean's List Award, BUET, 2005 – 2009• 6th Place, ACM ICPC Regional Contest Dhaka Site, 2007• Champion, DIPC 2007 (2nd Daffodil Inter University Programming Contest)• 8th Place, ACM ICPC Regional Contest Dhaka Site, 2006• 1st Place, Math Olympiad 2003, Organized by Ministry of Science & ICT, Bangladesh

PUBLICATIONS

Articles in Peer Reviewed Journals

- [J7] Shahriar, N., Ahmed, R., **Chowdhury, S.R.**, Khan, A., Boutaba, R., and Mitra, J. Generalized Recovery from Node Failure in Virtual Network Embedding. *IEEE Transactions on Network and Service Management* (Accepted April 2017).
- [J6] **Chowdhury, S.R.**, Ahmed, R., Khan, M.M.A., Shahriar, N., Boutaba, R., Mitra, J., and Feng, Z. Dedicated Protection for Survivable Virtual Network Embedding. *IEEE Transactions on Network and Service Management* 13(4): 913–926.
- [J5] Bari, M.F, **Chowdhury, S.R.**, Ahmed, R., Boutaba, R., and Duarte, O. Orchestrating Virtualized Network Functions. *IEEE Transactions on Network and Service Management* 13(4): 725–739.
- [J4] Ahmed, R., Bari, M.F, **Chowdhury, S.R.**, Rabbani, M., Boutaba, R., and Mathieu, B. α Route: Routing on Names. *IEEE/ACM Transactions on Networking* 24(5): 3070–3083.
- [J3] **Chowdhury, S.R.**, Roy, A.R., Shaikh, M., and Daudjee, K. A Taxonomy of Decentralized Online Social Networks. *Peer-to-Peer Networking and Applications, Springer* 8(3): 367–383.
- [J2] **Chowdhury, S.R.**, Hasan, M.M., Iqbal, S., and Rahman, M.S. Computing a Longest Common Palindromic Subsequence. *Fundamenta Informaticae, IOS Press* 129(4):329–340.
- [J1] Bari, M.F, **Chowdhury, S.R.**, Ahmed, R., Boutaba, R., and Mathieu, B. A Survey of naming and routing in Information Centric Networks. *IEEE Communications Magazine*, 50(12) : 44–53.

Articles in Peer Reviewed Conferences & Workshops

- [C17] **Chowdhury, S.R.**, Ahmed, R., Shahriar, N., Khan, A., Boutaba, R., Mitra, J, and Liu, L. ReViNE: Reallocation of Virtual Network Embedding to Eliminate Substrate Bottlenecks. *IEEE/IFIP Integrated Network Management Symposium (IM)*, 2017, pp. 116–124.
- [C16] Shahriar, N., Ahmed, R., Khan, A., **Chowdhury, S.R.**, Boutaba, R., and Mitra, J. ReNoVatE: Recovery from Node Failure in Virtual Network Embedding. *ACM/IEEE/IFIP Conference on Network and Service Management (CNSM)*, 2016, pp. 19–27.
- [C15] Roy, A.R, **Chowdhury, S.R.**, Bari, M.F, Ahmed, R., and Boutaba, R. Emulating an Infrastructure with EASE. *IEEE/ACM/IFIP Conference on Network and Service Management (CNSM)*, 2016 (Mini-Conference), pp. 167–173.
- [C14] **Chowdhury, S.R.**, Ahmed, R., Khan, M.M.A., Shahriar, N., Boutaba, R., Mitra, J., and Zeng, F. Protecting Virtual Networks with DRONE. *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, 2016, pp. 78–86. **[Runner-up for Best Paper Award]**
- [C13] Shahriar, N., Ahmed, R., **Chowdhury, S.R.**, Khan, M.M.A., Boutaba, R., Mitra, J., and Zeng, F. Connectivity-aware Virtual Network Embedding. *IFIP Networking Conference*, 2016, pp. 46–54.
- [C12] Dolberg, L., François, J., **Chowdhury, S.R.**, Ahmed, R., Boutaba, R., and Engel, T. A Generic Framework to Support Application-Level Flow Management in Software-Defined Networks. *IEEE Conference on Network Softwarization*, 2016, pp. 121–125. (Short paper)
- [C11] Bari, M.F, **Chowdhury, S.R.**, Ahmed, R., and Boutaba, R. nf.io: A File System Abstraction for NFV Orchestration. *IEEE NFV-SDN Conference*, 2015, pp. 135–141.
- [C10] Bari, M.F, **Chowdhury, S.R.**, Ahmed, R., and Boutaba, R. On Orchestrating Virtual Network Functions. *IEEE/ACM/IFIP Conference on Network and Service Management (CNSM)*, 2015, pp. 50–56.
- [C9] Ahmed, R., **Chowdhury, S.R.**, Pokluda, A., Bari, M.F, Boutaba, R., and Mathieu, B. pWeb: A Personal Interface to the World Wide Web. *IFIP Networking Conference*, 2014, pp. 1–9.

- [C8] **Chowdhury, S.R.**, Adam, C., Wu, F., Rofrano, J. and Boutaba, R. Managing the File System from the Kernel. *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, 2014, pp. 1–8.
- [C7] **Chowdhury, S.R.**, Bari, M.F., Ahmed, R., and Boutaba, R. PayLess: A Low Cost Network Monitoring Framework for Software Defined Networks. *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, 2014, pp. 1–9.
- [C6] Bari, M.F., **Chowdhury, S.R.**, Ahmed, R., and Boutaba, R. PolicyCop: An Autonomic QoS Policy Enforcement Framework for Software Defined Networks. In proceedings of *IEEE SDN for Future Network and Services (SDN4FNS)*, 2013, pp. 1–7.
- [C5] Bari, M.F., Roy, A.R., **Chowdhury, S.R.**, Zhang, Q., Zhani, M.F., Ahmed, R., and Boutaba, R. Dynamic Controller Provisioning in Software Defined Networks. *IEEE/ACM/IFIP Conference on Network and Service Management (CNSM)*, 2013, pp. 18–25. [**Runner-up for Best Paper Award**]
- [C4] Shahriar, N., **Chowdhury, S.R.**, Sharmin, M., Ahmed, R., Boutaba, R., and Mathieu, B. Ensuring β -availability in P2P Social Networks. *Workshop on Hot Topics in Peer-to-peer Computing and Online Social Networking, 2013 (IEEE ICDCS 2013 Workshops)*, pp. 150–155. [**Best Paper Runner-up Award**]
- [C3] Ahmed, R., Bari, M.F., **Chowdhury, S.R.**, Rabbani, M., Boutaba, R., and Mathieu, B. α Route: A Name Based Routing Scheme for Information Centric Networks. *IEEE INFOCOM*, 2013, pp. 90–94.
- [C2] **Chowdhury, S.R.**, Iqbal, S., Hasan, M.M., and Rahman, M.S. Computing a Longest Common Palindromic Subsequence. *International Workshop on Combinatorial Algorithms (IWCOA) 2012*, LNCS 7643:219–223.
- [C1] Iqbal, S., **Chowdhury, S.R.**, Hyder, C.S., Vasilakos, A.V., and Wang C. Vehicular Communication: Protocol Design, Testbed Implementation and Performance Analysis. *ACM International Conference on Wireless Communication and Mobile Computing (IWCMC)*, 2009, pp. 410–415.

Patent Applications

- [P4] Shahriar, N., Khan, A., Ahmed, R., Mitra, J., **Chowdhury, S.R.**, and Boutaba, R. System and Method for Joint Embedding and Backup Provisioning in Virtual Networks. US Provisional Patent Application No. 62/368,936, July 2016.
- [P3] Shahriar, N., Mitra, J., **Chowdhury, S.R.**, Ahmed, R., and Boutaba, R. Methods and Systems for Failure Recovery in a Virtual Network Environment. US Patent Application No. 15/267,696, May 2016.
- [P2] **Chowdhury, S.R.**, Mitra, J., Ahmed, R., Shahriar, N., and Boutaba, R. Dedicated Protection for Virtual Network Embedding. US Provisional Patent Application No. 62/218,052, September 2015
- [P1] Ahmed, R., Mitra, J., Shahriar, N., **Chowdhury, S.R.**, and Boutaba, R. Connectivity-Aware Virtual Network Embedding. US Patent Application No. 15/048,573., July 2015

Book Chapter(s)

- [B1] Dolberg, L., François, J., **Chowdhury, S.R.**, Ahmed, R., Boutaba, R., and Engel, T. Network Configuration and Flow Scheduling for Big Data Applications. *Networking for Big Data*. S. Yu, X. Lin, J. Mistic, and X. Shen (editors). pp. 121–138, CRC Press, 2015.

Posters and Demos

- [D1] Bari, M.F., **Chowdhury, S.R.**, Ahmed, R., and Boutaba, R. nf.io: A File System Abstraction for NFV Orchestration. *ACM SIGCOMM 2015*, London, UK.

Talks

- [T10] ReViNE: Reallocation of Virtual Network Embedding to Eliminate Substrate Bottlenecks. *IFIP/IEEE IM, 2017, Lisbon, Portugal.*
- [T9] Emulating an Infrastructure with EASE. *IEEE/ACM/IFIP CNSM Mini-conference, 2016, Montreal, Canada.*
- [T8] Management and Orchestration of Service Function Chains in NFV. *BUET ACM Chapter Talk Series, 2015, Dhaka, Bangladesh.*
- [T7] nf.io: A File System Abstraction for NFV Orchestration. *IEEE NFV-SDN Conference 2015, San Francisco, USA.*
- [T6] PayLess: A Low Cost Network Monitoring Framework for Software Defined Networks. *IEEE/IFIP NOMS 2014, Krakow, Poland.*
- [T5] Managing the Filesystem from the Kernel. *IEEE/IFIP NOMS 2014, Krakow, Poland.*
- [T4] Towards Autonomic Management of File Systems. *Services Research Seminar Series, IBM T.J. Watson Research Center, Yorktown Heights, NY, USA.*
- [T3] Ensuring β -availability in P2P Social Networks. *HotPOST 2013 workshop, Philadelphia, USA*
- [T2] α Route: A Name Based Routing Scheme for Information Centric Networks. *ICN Workshop, Orange Labs, France. June 2013.*
- [T1] α Route: A Name Based Routing Scheme for Information Centric Networks. *IEEE INFOCOM 2013, Turin, Italy.*

RESEARCH EXPERIENCES

- Currently working under the supervision of Prof. Raouf Boutaba on the following topics:
 - Network softwarization
 - Resource allocation in Virtual Networks
- Worked with Dr. Khuzaima Daudjee (University of Waterloo) on devising a taxonomy of Decentralized Online Social Networks.
- Worked at Services Research division, IBM TJ Watson Research Centre on autonomic management of file systems.
- Worked with Prof. M. Sohel Rahman (CSE, BUET) on the following topics:
 - Algorithm for variants of sequence alignment problem.
 - Meta-heuristic algorithms for *Vehicle Routing Problem with Soft Time Windows*.
- Worked with Prof. Masud Hasan (CSE, BUET) on algorithms for variants of sequence alignment problems.

TECHNICAL SKILLS

Language	C/C++, Java, Python, x86 Assembly, PHP, HTML, Bash Script, \LaTeX
API and Frameworks	OpenGL, IBM ILOG CPLEX, Symphony2, Propel, Floodlight Controller
Infrastructure tools	OpenStack, Docker, Libvirt
Database	Oracle 9i/10g, MySQL, SQLite, Cassandra, MongoDB
Simulators	Packet Tracer, Mininet, ns3

SELECTED LIST OF ACADEMIC PROJECTS

- Virtual Network Function Orchestration in NFV Environment
- Visualization of crime data published by Waterloo Regional Police Department
- Dynamic controller provisioning in Software Defined Networks
- A stripped down version of a Remote Procedure Call interface
- A prefetching scheme for YouTube videos based on popular tags
- An Android based mobile health and learning application for children
- Protocol design and testbed implementation for vehicular communication
- Modelling of BUET Cafeteria using OpenGL
- Design and implementation of a 4-bit 2-stage pipelined microprocessor

**PROFESSIONAL
ACTIVITIES**

- Member, Organizing Committee, *WALCOM* 2010 and 2012.
- External reviewer: FONDECYT-CHILE – National Fund for Scientific and Technological Development (Chile), ACM/IEEE Transactions on Networking, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Cloud Computing, IEEE Transactions on Network and Service Management, IEEE Transactions on Communications, IEEE Communications Magazine, IEEE Network Magazine, IEEE Communication Letters, Elsevier Computer Networks, Elsevier Computer Communications, PLoS One, IEEE ICDCS 2016, IEEE/IFIP IM 2017, IEEE ICC 2017, IEEE/IFIP NOMS 2014/2016, IEEE NFV-SDN 2016, IEEE SDN4FNS 2013, IEEE CCGrid 2014, IFIP Networking 2014/2015, *WALCOM* 2011.

REFERENCES

Available upon request.