Ahmedur Rahman Shovon

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Education

PhD in Computer Science **2025**
University of Illinois Chicago Chicago, IL
Dissertation: **Declarative Analytics on Heterogeneous HPC Systems**
Advisor: Dr. Sidharth Kumar
GPA: 4.00/4.00

MS in Information Technology **2018**
Jahangirnagar University Dhaka, Bangladesh
Thesis: A RESTful E-Governance Application Framework for People Identity Verification in Cloud
Advisor: Dr. Md Whaiduzzaman
GPA: 3.67/4.00

BS in Information Technology **2016**
Jahangirnagar University Dhaka, Bangladesh
Project: EasyC: A Platform for Learning C Programming
Advisor: Dr. Risala Tasin Khan
GPA: 3.73/4.00

Research Interest

High Performance Computing, Data Analytics, Cloud Computing, Software Engineering

Experience

Postdoctoral Appointee **08/2025 - cont**
Argonne National Lab Lemont, IL
- Designing system software and runtime support for energy-efficient HPC platforms.
- Implementing deployment and monitoring tools for scientific data streaming workflows.
- Evaluating performance and energy efficiency on novel architectures and accelerators.

Graduate Research and Teaching Assistant **08/2023 - 08/2025**
University of Illinois Chicago Chicago, IL
- Developed the first multi-node, multi-GPU Datalog engine for heterogeneous systems.
- Designed topological clustering pipelines for high-dimensional brain connectivity data.
- Performed GPU portability and power analysis of GPU-accelerated Datalog engines.

Graduate Student Intern (WJ Cody Associate) **05/2023 - 08/2023**
Argonne National Lab Lemont, IL
- Enhanced Rosetta-Bench, a benchmark suite for evaluating parallel programming model performance.
- Integrated HIP benchmarks and refined benchmark report generation.
- Collaborated with HPC engineers on integrating the benchmark suite in HPC systems.

Graduate Research Assistant (Blazer Fellow) **08/2021 - 08/2023**
University of Alabama at Birmingham Birmingham, AL
- Built a GPU-accelerated relational algebra backend for Datalog-like applications.
- Developed a visualization tool to create Kaplan Meier survival probability graph for cancer data analysis.
- Designed a topological data analysis pipeline using persistent homology on rs-fMRI brain networks.

Assistant Programmer **06/2019 - 08/2021**
ICT Division, Government of Bangladesh Dhaka, Bangladesh
- Developed a web application visualizing e-File usage data across root-level government offices.
- Led cross-functional teams in developing and delivering multiple e-Governance applications.
- Integrated technology-driven solutions to advance Sustainable Development Goals (SDG).

Software Engineer **12/2017 - 06/2019**
Cefalo Bangladesh Ltd. Dhaka, Bangladesh
- Developed and maintained five publications of this Norwegian media conglomerate in a global team.
- Re-designed the digital subscription model that reduced the subscription completion time by 75%.
- Automated multi-tiered web application deployment process by designing a CI/CD pipeline.

Software Engineer **10/2016 - 11/2017**
Codalo Dhaka, Bangladesh
- Developed a Education as a Service(EaaS) application.
- Created real time fingerprint based attendance system with instant messaging service.
- Designed a CI/CD pipeline for web application deployment.

Teaching Experience

Graduate Teaching Assistant **Spring 2025**
Department of Computer Science, University of Illinois Chicago Chicago, IL
Course: *Introduction to High-Performance Computing*
- Evaluated assignments, projects, and theoretical tasks related to parallel computing and HPC concepts.
- Created scripts using Github APIs for grading and organizing students assignment on Github classroom.
- Assisted students on their projects on ALCF and campus HPC resources.

Graduate Teaching Assistant **Fall 2024**
Department of Computer Science, University of Illinois Chicago Chicago, IL
Course: *Database Systems*
- Designed and evaluated SQL programming assignments, projects, and exams.
- Configured Gradescope's Autograder for autograding programming assignments.
- Delivered a guest lecture on optimizing database performance by caching queries using Redis.

Graduate Teaching Assistant **01/2016 - 12/2016**
Institute of Information Technology, Jahangirnagar University Dhaka, Bangladesh
Course: *Operating Systems*
- Conducted weekly lab sessions focused on shell scripting, process management, and system calls.
- Assisted students in implementing OS-related projects, debugging code, and understanding core concepts.
- Designed and graded bi-weekly tests on operating system topics.

Bibliometrics

Journal Articles: 3, Book Chapter: 1, Conference Papers: 8, Workshop Papers: 2
Citations: 1979, h-index: 7 (retrieved from Google Scholar on August 19, 2025)

Journal Articles

[**J3**] Sidharth Kumar, **Ahmedur Rahman Shovon**, Gopikrishna Deshpande, **The robustness of persistent homology of brain networks to data acquisition-related non-neural variability in resting state fMRI**, In: *Human Brain Mapping*. DOI: 10.1002/hbm.26403. (Q1).

[**J2**] Darshan Shimoga Chandrashekar, Santhosh Kumar Karthikeyan, Praveen Kumar Korla, Henalben Patel, **Ahmedur Rahman Shovon**, Mohammad Athar, George J Netto, Zhaohui S Qin, Sidharth Kumar, Upender Manne, Chad J Crieghton, and Sooryanarayana Varambally, **UALCAN: An update to the integrated cancer data analysis platform**, In: *Neoplasia*. DOI: 10.1016/j.neo.2022.01.001. (Q1).

[**J1**] Md Whaiduzzaman, Md. Razon Hossain, **Ahmedur Rahman Shovon**, Shanto Roy, Aron Laszka, Rajkumar Buyya, and Alistair Barros, **A Privacy-preserving Mobile and Fog Computing Framework to Trace and Prevent COVID-19 Community Transmission**, In: *IEEE Journal of Biomedical and Health Informatics (J-BHI)*. DOI: 10.1109/JBHI.2020.3026060. (Q1).

Book Chapters

[**B1**] **Ahmedur Rahman Shovon**, Shanto Roy, Tanusree Sharma, and Md. Whaiduzzaman, **A RESTful E-Governance Application Framework for People Identity Verification in Cloud**, In: *Luo M., Zhang LJ. (eds) Cloud Computing – CLOUD 2018. Lecture Notes in Computer Science, vol 10967. Springer, Cham.* DOI: 10.1007/978-3-319-94295-7_19.

Conference Papers

[**C8**] **Ahmedur Rahman Shovon**, Yihao Sun, Thomas Gilray, Kristopher Micinski, Sidharth Kumar, **Multi-Node Multi-GPU Datalog**, In: *ACM International Conference on Supercomputing 2025 (ICS 2025)*, DOI: 10.1145/3721145.3730431.

[**C7**] Yihao Sun, **Ahmedur Rahman Shovon**, Thomas Gilray, Kristopher Micinski, Sidharth Kumar, **Optimizing Datalog for the GPU**, In: *2025 the ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2025)*, DOI: 10.1145/3669940.3707274.

[**C6**] Andres Sewell, Ke Fan, **Ahmedur Rahman Shovon**, Landon Dyken, Sidharth Kumar, Steve Petruzza, **Bruck Algorithm Performance Analysis for Multi-GPU All-to-All Communication**, In: *Proceedings of the International Conference on High Performance Computing in Asia-Pacific Region (HPCAsia 2024)*, Nagoya, Japan, 2024 pp. 127–133. DOI: 10.1145/3635035.3635047.

[**C5**] **Ahmedur Rahman Shovon**, Thomas Gilray, Kristopher Micinski, Sidharth Kumar, **Towards Iterative Relational Algebra on the GPU**, In: *2023 USENIX Annual Technical Conference (USENIX ATC 23)*, Boston, MA, USA, 2023 pp. 1009-1016. ISBN: 978-1-939133-35-9.

[**C4**] Md Whaiduzzaman, Alistair Barros, **Ahmedur Rahman Shovon**, Md Razon Hossain, and Colin Fidge, **A Resilient Fog-IoT Framework for Seamless Microservice Execution**, In: *IEEE International Conference on Services Computing (SCC) - 2021*, pp. 213-221. DOI: 10.1109/SCC53864.2021.00034.

[**C3**] Md Shahriare Satu, Md Khalilur Rahman, Maksud Alam Rony, **Ahmedur Rahman Shovon**, Md Jane Alam Adnan, Koushik Chandra Howlader, and M Shamim Kaiser, **COVID-19: Update, Forecast and Assistant-An Interactive Web Portal to Provide Real-Time Information and Forecast COVID-19 Cases in Bangladesh**, In: *International Conference on Information and Communication Technology for Sustainable Development - 2021*, pp. 456-460. DOI: 10.1109/ICICT4SD50815.2021.9396786.

[**C2**] **Ahmedur Rahman Shovon**, Shanto Roy, Arnab Kumar Shil, and Tanjila Atik, **GDPR Compliance: Implementation Use Cases for User Data Privacy in News Media Industry**, In: *International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT) - 2019*, pp. 1-6. DOI: 10.1109/ICASERT.2019.8934660.

[**C1**] Shanto Roy, **Ahmedur Rahman Shovon**, and Md. Whaiduzzaman, **Combined approach of Tokenization and Mining to secure and optimize Big Data in Cloud Storage**, In: *IEEE R10 Humanitarian Technology Conference (R10-HTC) - 2017*, pp. 83-88. DOI: 10.1109/R10-HTC.2017.8288912.

Workshop Papers

[**W2**] Kashyap Balakavi, Rushitha Janga, **Ahmedur Rahman Shovon**, Don Dempsey, Elliot Lefkowitz, and Sidarth Kumar, **Scalable, interactive and hierarchical visualization of virus taxonomic data**, In: *2021 IEEE Workshop on Visual Analytics in Healthcare (VAHC)*, Melbourne, Australia, 2023, in conjunction with IEEE VIS 2023, DOI: 10.1109/VAHC60858.2023.00012.

[**W1**] **Ahmedur Rahman Shovon**, Landon Richard Dyken, Oded Green, Thomas Gilray, and Sidharth Kumar, **Accelerating Datalog applications with cuDF**, In: *2022 IEEE/ACM Workshop on Irregular Applications: Architectures and Algorithms (IA3)*, Dallas, TX, USA, 2022 pp. 41-45 in conjunction with SC22. DOI: 10.1109/IA356718.2022.00012.

Reviewer Recognition

Journal: Sustainable Cities and Society (SCS)
Impact Factor: 7.58, Publisher: *Elsevier*.

Awards

USENIX ATC Student Grant 2023
Awarded by the USENIX Association.

Blazer Graduate Research Fellowship 2021-2022
Awarded by the University of Alabama at Birmingham.

National Science and Technology (NST) Fellowship 2016-2017
Awarded by the Ministry of Science and Technology, Bangladesh.

University Merit Scholarships 2012-2016
Awarded by the Jahangirnagar University.

Achievements

3rd @ Computational Research Symposium Poster Presentation 2025 04/2025
Presented posted on our multi-node multi-GPU Datalog engine (MNMGDatalog).

Winner @ oneAPI Hackathon: CUDA to SYCL Migration 10/2023
Ported CUDA project to SYCL with automatic and manual interventions.

Participant @ Argonne GPU Hackathon 2022 07/2022
Benchmarked transitive closure computation, nested loop join on ThetaGPU.

1st @ Hackerrank Python and Security domain 07/2016
Solved all Python and Security domain related challenges at Hackerrank.

7th @ IEEEXtreme Programming Competition 9.0 10/2015
Achieved 7th position out of 2,477 teams, Team: *JUIITCoders*.

Technical Skills

Languages: Python, C++, JavaScript, Java, SQL, Bash, PHP.
Parallel programming models: CUDA, MPI, Thrust, SYCL, HIP, OpenMP, CuDF.
Data analytics: Pandas, NumPy, Scikit-learn, Gudhi, Matplotlib, D3.js.
Web tools: Flask, Django, React, jQuery, CodeIgniter, Redis, AWS.
CI/CD: Docker, GitHub Actions, Travis CI, Jenkins, Boto3, Kubernetes.

Training

Hands-on HPC Workshop @ ALCF 10/2023
Covers topics to porting applications to heterogeneous architectures.

AI for Science on Supercomputers @ ALCF 12/2022
Covers topics to develop AI solutions and scale AI training on ThetaGPU supercomputer. *(certificate link)*

Hands-On HPC @ OLCF 12/2022
Covers HPC tools (MPI, OpenMP, and CUDA) using Summit supercomputer. *(certificate link)*

Fundamentals of Accelerated Computing @ NVIDIA 06/2022
Covers topics of accelerating applications on GPUs utilizing CUDA programming model. *(certificate link)*

Effective Object Oriented Programming @ Cefalo 05/2018
Covers core principles of Object Oriented Programming. Achievement: *Certificate of Excellence*

Community Contributions

Top 3% contributor @ StackOverflow Username: *arshovon*
Gained 13600+ reputation in *StackOverflow*.

Contribution @ PyPI Username: *arsho*
Developed *Powerlog*, *Bangla*, *AutoLike*, *Opener*, and *CopyUSB* PyPI listed packages.

Judge @ UIC Undergraduate Research Forum 2024 04/2024
Served as a judge under Office of Undergraduate Research and External Fellowships.

Judge @ Research Expo, UAB 08/2021 - 08/2023
Served as a judge under Service Learning and Undergraduate Research, UAB.

Volunteer @ The World Games 2022, Birmingham, USA 07/2022
Served as a volunteer for the International World Games Association (IWGA).

Webmaster @ IEEE Student Branch, JU 05/2015 - 10/2016
Developed and maintained IEEE SB, JU website.