

Md Rajib Hossen

500 UTA Blvd #201, Arlington, Texas, 76013
(682) 367 3826
mdrajib.hossen@mavs.uta.edu

www.linkedin.com/in/rajibhossen
<https://github.com/rajibhossen>
<https://www.rajib-hossen.com/>

Education

Ph.D. In Computer Science

Expected: August 2024

Thesis Topics: Resource Management and Elasticity of microservices and HPC applications in the cloud

Supervisor: Dr. Mohammad A. Islam

The University of Texas at Arlington

B.Sc. In Computer Science

May 2015

GPA: 3.63/4.0

Khulna University of Engineering & Technology, Bangladesh

Research Overview

My research falls in the intersection of **cloud computing** and **high-performance computing** where I'm interested in **resource management** and **elasticity** of cloud applications as well as scientific workflows.

Work In Progress

- **[Under Review] Md Rajib Hossen**, Vanessa Sochat, Abhik Sarkar, Mohammad Islam, Daniel Milroy. Exploring the Benefits of Resource Autoscaling in Converged HPC and Cloud Environments.

Conference

- **[HPCA'23] Md Rajib Hossen**, Kishwar Ahmed, Mohammad Islam. 2023. Market Mechanism-Based User-in-the-Loop Scalable Power Oversubscription for HPC Systems. The 29th IEEE High-Performance Computer Architecture.
- **[HPDC'22] Md Rajib Hossen**, Mohammad Islam, Kishwar Ahmed. 2022. Practical Efficient Microservice Autoscaling with QoS Assurance. The 31st Symposium on High-Performance Parallel and Distributed Computing
- **[Cloud Computing'22] Md Rajib Hossen**, Mohammad Islam. 2022. Towards Efficient Microservices Management Through Opportunistic Resource Reduction. The 13th Conference on Cloud Computing, GRIDs, and Virtualization
- **[IEEE EICT'14] A. K. Paul, Md Rajib Hossen, B. Sarker and M. C. Urmi**, "An approach to demand side load curtailment for the future intelligent and smart power grid of Bangladesh," 2014 International Conference on Electrical Engineering and Information & Communication Technology, 2014, pp. 1-7.

Workshops and Posters

- **[Sigmetrics'23] Md Rajib Hossen**, Mohammad Islam. 2022. PEMA+: A comprehensive resource manager for microservices. ACM International Conference on Measurement and Modeling of Computer Systems
- **[Sigmetrics'22] Md Rajib Hossen**, Mohammad Islam. 2022. Practical Efficient Microservice Autoscaling. ACM International Conference on Measurement and Modeling of Computer Systems
- **[WAIN'20] Md Rajib Hossen**, Mohammad Islam. 2020. Mobile Task Offloading Under Unreliable Edge Performance. Workshop on AI in Networks and Distributed Systems (WAIN 2020, collocated with Performance'20)

Awards & Honor's

H7. Travel Grant Award from HPDC'22, Sigmetrics'22, 23, KubeCon'23, SC'23.

H7. One of the tops at LLNL Summer SLAM Research Competition – August'23

The Summer SLAM competition is for all summer interns where interns present their work in front of the judges. Few presenters are selected to present their talk in front of the higher management and receives gifts.

H6. I-Engage Mentorship Summer Research Grant'2022

Office of Graduate School at UTA, The I-Engage program offers doctoral students an opportunity to mentor undergraduate students and conduct research. The funding covers the research expense and remuneration.

H5. Recognized as a Rising star of the Machine Learning and Systems Rising Stars program'2023

Inaugural MLCommons Rising Stars cohort of 35 early-to-late-stage and recently graduated PhD students working at the intersection of Machine Learning (ML) and Systems research. <https://mlcommons.org/en/rising-stars-2023/>

- H4. Best Poster Awards (Honorable Mention)** **Feb 2022**
 Student Computing Research Festival (SCRF)@The University of Texas at Arlington
- H3. 2nd Place in Best App (Mobile and Desktop) Development** **Mar 2014**
 App Development Hackathon by Dhaka University IT Society
- H2. Dean's List Award** **Feb 2013 – May 2015**
 Khulna University of Engineering and Technology, Dean's List Award for outstanding academic results (GPA > 3.75/4.0) for 2 consecutive years
- H1. Bangladesh Sweden Trust Fund Scholarship, July 2019**

National Laboratory and Industry Experiences

-
- Computing Scholar Intern | Lawrence Livermore National Laboratory | Livermore, CA** **May 2023 – August 2023**
- Improve the end-to-end runtime of HPC scientific workflows by enabling elasticity and running them in the cloud.
 - Studied HPC applications scalability behavior to understand their performance when running in the cloud (AWS).
 - **Kubescaler:** Developed a tool and scripts to perform scalability, deployment of EKS cluster, managed node groups, flux (HPC Framework) operator, cluster autoscaling, application oriented autoscaling, and HPC-Cloud integration.
 - **Flux-Terraform:** Developed terraform script to automate the deployment of Kubernetes (k3s) with ML/HPC framework tasks. The framework can decide to execute tasks inside Kubernetes to take advantage of autoscaling.
- Graduate Student Researcher | The University of Texas at Arlington | Arlington, TX** **Aug 2018 – Cont.**
- Reduced CPU resources of microservices by 33% compared to commercial resource managers (e.g., Kubernetes)
 - Improved energy savings by 20%, execution time by 25% of mobile apps by developing a mobile edge offloader.
 - **PEMA:** Developed a resource autoscaler on top of Kubernetes that autoscale resources of containers based on custom metrics using Prometheus, Service Mesh, and finds efficient resource allocations for microservices.
 - **DeepTO:** Implemented an edge offloading engine that takes mobile tasks as inputs and decides to execute the tasks in either mobile or edge or cloud.
- Software Engineer | Goava Sales Intelligence AB | Dhaka, Bangladesh** **Jan 2018 - July 2018**
- Accelerated development phase and conserved resources of the company by introducing APIs for providing personalized recommendations, custom filtering, and targeted companies for B2B.
 - Developed APIs from data stored in S3 and by utilizing Elasticsearch and machine learning algorithms for B2B.
 - **Data Processing Pipeline:** Developed an API Server that provides results of queries from Elasticsearch and S3 and applies Machine Learning to satisfy client requirements.
- Software Engineer | IPvision Soft Ltd | Dhaka, Bangladesh** **Sep 2016 - Dec 2017**
- Improved the efficiency of a cluster deployment of 50 Node by 75% using automation scripts in Python
 - Reduced cloud computing cost by 83% compared with Amazon AWS by deploying a private cluster
 - Incorporated a cloud dashboard using Django framework to provide monitoring for the private cluster using OpenStack, Ceph, GlusterFS, and custom API
 - Wrote automation scripts in python to deploy private cloud using OpenStack, Ceph storage system integration, Hadoop Cluster deployment.
 - **Private Cloud Deployment:** Wrote automation scripts in python to deploy private cloud using OpenStack, Ceph storage system integration, Hadoop Cluster deployment.
 - **Cloud Watch:** Incorporated a cloud dashboard using Django framework to provide monitoring for the private cluster using OpenStack, Ceph, GlusterFS, and custom API.
 - **File Sync and OwnCloud:** A dropbox like file syncing and file sharing mechanism from scratch using distributed protocol, multi-threaded client server.
- Jr. Software Engineer | Workspace Infotech Ltd | Dhaka, Bangladesh** **July 2015 - Aug 2016**
- Delivered mobile application backend several weeks earlier than the deadline, boosted client's business.
 - Proven Adaptability in software development by working with back-end and front-end systems simultaneously.
 - **Ezeepix:** Contributed as a back-end developer to develop a complete mobile and web application. The application provides photo printing services for users with their own pictures and preview the final product before ordering.

Skills

- **Programming Languages:** Python, SQL, C++, Java
- **Tools and Technologies:** Kubernetes, Docker, Terraform, Prometheus, Linux, AWS/Azure, Pytorch, Hadoop, Django

Featured

F2. UTA College of Engineering – [Link]

F1. SuperComputing'2023 – I am HPC – [Link]

Talks

T6. MLCommons Rising Star, Research overview talks in the MLCommons Rising Star workshop program, August 2023

T5. CASC, LLNL, Scalability Study for the Convergence of HPC and Cloud, August 2023

T4. Sigmetrics, PEMA+: A comprehensive resource manager for microservices, July 2023

T3. UTA SCRF, PEMA: Practical Efficient Resource Management for Microservices, March 2022

T2. Cloud Computing, Towards Efficient Microservices Management Through Opportunistic Resource Reduction

T1. WAIN, Mobile task offloading under unreliable edge performance, December 2020

Professional Services

- Shadow PC - EuroSys'2023
- TPC – IARIA Cloud Computing 2023, 2024
- Judge – UTA Innovation Day'2022
- Student Volunteer and Lead - OOPSLA'2020, SPLASH'2020, SC'22, SC'23 (Lead), EICT'2014
- President – Bangladesh Student Organization at University of Texas at Arlington'2021-2022
- Member - ACM Student Member, IEEE Student Member

Teaching Experience

- **Algorithm Analysis and Design:** Fall and Spring of 2019, 2020, 2021, 2022, 2023.
- **Introduction to Computer Science:** Summer of 2020, 2021
- **Professional Practice:** Summer 2022

Mentoring Experience

- Murphy Balsomi, Undergraduate Student, The University of Texas at Arlington.
- Md Ahnaf Kamal Tajwar, Undergraduate Student, The University of Texas at Arlington.

References

Mohammad A. Islam

Assistant Professor, The University of Texas at Arlington

PhD Supervisor

Email: mislam@uta.edu

Phone:

Jia Rao

Associate Professor, The University of Texas at Arlington

Email: jia.rao@uta.edu

Phone: 817 272 0770

Daniel Milroy

Computer Scientist, Lawrence Livermore National Laboratory

Email: milroy1@llnl.gov