

## Fahim Tahmid Chowdhury

### EDUCATION

**Florida State University**, Tallahassee, Florida

Ph.D. candidate, Computer Science, currently enrolled, *CGPA 4.00/4.00*

**Florida State University**, Tallahassee, Florida

M.S., Computer Science, May 2020, *CGPA 4.00/4.00*

**Bangladesh University of Engineering and Technology**, Dhaka, Bangladesh

BSc., Computer Science and Engineering, February 2013, *CGPA 3.54/4.00*

### RESEARCH INTERESTS

- **Systems and Infrastructure:** High-performance Computing (HPC) Systems and Cloud Infrastructure, HPC and Cloud Storage Stack, Workload and Resource Management, Scientific Application Workflows.
- **Artificial Intelligence:** Machine Learning (ML) for Systems, Deep Learning (DL) at Scale.

### EXPERIENCE

**Department of Computer Science, Florida State University**

*Graduate Research Assistant*

**Aug 2017 - Present**

- Ph.D. student researcher at *Computer Architecture and SysTems Research Lab (CASTL)* supervised by *Professor Dr. Weikuan Yu*, specializing in workload-aware optimization of HPC storage resource usage.

**Amazon Web Services (AWS)**, East Palo Alto, CA (Remote)

*Software Development Engineer Intern*

**May 2021 - Aug 2021**

- Developed ML strategies for predicting computation resource usage by cloud workloads on *Amazon Redshift*.

**Department of Computer Science, Florida State University**

*Graduate Teaching Assistant*

**Aug 2021 - Dec 2021, May 2020 - July 2020**

- Lectured the recitation sessions for MIPS Assembly Programming Language to a class of 25 students enrolled in the Computer Organization (CDA3100) course instructed by Dr. Gary Tyson. Held office hours for CDA3100, Computer Fluency (CGS2060) and Microcomputer Applications for Business (CGS2100).

**Center for Applied Scientific Computing (CASC), Lawrence Livermore National Laboratory (LLNL).**

*Student Intern*

**May 2019 - Aug 2019**

- Worked on optimizing I/O strategies in HPC application workflows like Cancer Moonshot Pilot 2 in the *Data Analysis Group* at CASC. Demonstrated 84.7% latency improvement by using burst buffers on *Lassen*.

**National Energy Research Scientific Computing Center (NERSC), Lawrence Berkeley National Laboratory (LBNL), Berkeley, California**

*Student Assistant* (Summer intern)

**May 2018 - Aug 2018**

- Worked in the *Data Analytics and Services* group at NERSC. Analyzed scalable data pipeline for distributed DL atop TensorFlow and Horovod. Determined I/O bottleneck of upto 11.04% in DL training time.

### SELECTED PUBLICATIONS

- **F. Chowdhury**, F. Di Natale, A. Moody, K. Mohror, and W. Yu, "DFMan: A Graph-based Optimization of Dataflow Scheduling on High-Performance Computing Systems," in *36th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2022)*, [Research Paper](#), May. 2022.
- **F. Chowdhury**, Y. Zhu, F. Di Natale, A. Moody, E. Gonsiorowski, K. Mohror, and W. Yu, "Emulating I/O Behavior in Scientific Workflows on High Performance Computing Systems," in *5th International Parallel Data Systems Workshop (PDSW 2020)*, [Research Paper](#), Nov. 2020.
- **F. Chowdhury**, Y. Zhu, T. Heer, S. Paredes, A. Moody, R. Goldstone, K. Mohror, and W. Yu, "I/O Characterization and Performance Evaluation of BeeGFS for Deep Learning," in *48th International Conference on Parallel Processing (ICPP 2019)*, [Research Paper](#), Aug. 2019.
- Y. Zhu, **F. Chowdhury**, H. Fu, A. Moody, K. Mohror, K. Sato, and W. Yu, "Entropy-Aware I/O Pipelining for Large-Scale Deep Learning on HPC Systems," in *IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2018)*, [Research Paper](#), Sep. 2018.

### RESEARCH PROJECTS

- **HPC Workflow I/O Optimization:** Developed DFMan, a system- and workload-aware optimization framework for scientific application workflows using graph algorithms and linear programming. Built *Wemul*, an HPC workflow emulation framework during internship at CASC to analyze HPC I/O issues in DL training I/O, producer-consumer, workflow DAG, etc.
- **BeeGFS Performance Evaluation:** Performed performance evaluation of *BeeGFS* parallel cluster file system using IOR and MDTest, and DL applications atop TensorFlow, Horovod and LBANN.
- **Scalable Data Pipeline for Distributed Deep Learning:** Analyzed and profiled I/O behavior posed by DL applications at scale by using a [logging framework](#) developed during internship at NERSC.

TECHNICAL  
SKILLS

- Programming Languages: **C/C++**, **Python**, **C#**, **MATLAB**, **Java**, **Assembly**.
- Libraries: **MPI**, **HDF5**, **BSD sockets**, **WinSock**, **OpenGL**, **Boost**, **Windows API**, **Google Test**.
- Frameworks: **TensorFlow**, **Horovod**, **LBANN**, **SPDK**, **Qt Framework**, **MFC**, **.NET Framework**.
- Distributed File Systems: **BeeGFS**, **Lustre**, **UnifyFS**.
- Profiling Tools: **Darshan**, **mpiP**, **Intel VTune**, **Intel Advisor**.

SELECTED  
ACADEMIC  
PROJECTS

- **Clustering for Parallelizing Graph Algorithms:** A project on the usage of graph clustering for enabling parallelism in graph algorithms on the graph representation of geographical data.
- **F2PUnifyCR:** A Flash-friendly Persistent Burst-Buffer File System implemented on top of UnifyFS
- **Network Text Editor:** A C++ application to facilitate collaborative editing in a LAN.
- **CSE Office Management:** An integrated system for automating all the official tasks (i.e. Inventory management, Notice board, Teachers' profile, Peer-to-peer communication etc.) of BUET CSE.
- **micro-C Compiler:** A simple compiler implementation for C-like programming language.
- **Automated Water Faucet:** A portable hardware device that can be put on any water tape to control the flow of water and avoid wastage automatically by detecting human presence using PIR sensor.
- **Digital Watch with Timer:** A digital watch with timer developed using ATMEGA 8 Microcontroller.
- **LAN Messenger:** A software developed in Java for chatting with the contacts that are in a LAN.
- **Surveillance System for Dhaka:** A software developed as a prototype of the undergraduate thesis. Developed graph representation of Dhaka's transportation system, designed shortest path algorithms with heuristics to find the fastest route between two positions of the city, and applied 2-approximation vertex cover algorithm for detecting surveillance point location.

INDUSTRY  
EXPERIENCE IN  
BANGLADESH

**IPvision Canada Inc**, Dhaka, Bangladesh

**Software Analyst**

**Oct 2016 - Jul 2017**

- Developed the authentication submodule of cross platform SDK for the social networking platform named *ringID* that has 200K+ users.

**Vizrt**, Dhaka, Bangladesh

**Software Engineer**

**Jul 2014 - Sept 2016**

- Worked on regular feature development and bug fixes in Viz Libero. Implemented web service using infrastructure at Vizrt Switzerland for automatically testing *Viz Libero* and *Viz Arena*. Integrated test service in development process via Jenkins.

**Enosis Solutions**, Dhaka, Bangladesh

**Software Engineer**

**Feb 2013 - Jun 2014**

- Worked on development and bug fixes of *Visual-Host*, an SDK framework for *Visual-Environment*.

VOLUNTARY  
EXPERIENCE

- **Student Volunteer at SC 2018:** Worked as a student volunteer at the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC 2018) in Dallas, Texas, USA, November, 2018.
- **Gaming Application for Differently Abled Children:** A car racing game interfaced with cycling machine for encouraging the Active Range Of Motion Exercise (AROME) for the children having weakness in *Quadriceps femoris muscle*, conducted in Feroza Bari Disabled Children Hospital, Dhaka.
- **Software for ReCAP:** A software for prioritizing the roads and highways by simulating an algorithm that is developed by *Department of Urban and Regional Planning*, BUET.

COMMUNITY  
WORK

**Engineering Students' Association of Bangladesh**

*A common platform for all the engineering students of Bangladesh*

**President**

**Oct 2011 - Nov 2013**

**Pioneered** the voluntary association along with a bunch of energetic people and served as the organizational head.

AWARDS AND  
SCHOLARSHIPS

- Graduate Student Research **Award** 2022 from Department of Computer Science at FSU.
- 2020 BeeGFS Community Contribution **Award**.
- Student Volunteer Program Scholarship for attending the SC 2018 Conference.
- Intra-Department Project Competition Champion at BUET for the project CSE Office Management.