

Md Taufique Hussain

1834 Wake Forest Road
Winston-Salem, NC 27109

Email : hussaint@wfu.edu

Phone : +1-812-361-6636

ORCID: <https://orcid.org/0000-0001-9768-0564>

Website: taufique71.github.io

RESEARCH INTERESTS

Scalable Algorithms for Large-Scale Data Science and AI; Sparse Matrix and Tensor Computation;
Graph and Hypergraph Analytics; Scientific Data Analysis

EDUCATION

- **Indiana University** Bloomington, IN, USA
Ph.D. in Computer Engineering January 2025
Thesis: Graph Clustering at Extreme Scale Using Sparse Matrix Operations (Advisor: Ariful Azad)
- **Bangladesh University of Engineering and Technology** Dhaka, Bangladesh
B.Sc. in Computer Science and Engineering July 2014

RESEARCH EXPERIENCES

- **Computer Science, Wake Forest University** Winston-Salem, NC
Postdoctoral Fellow January 2025 - Present
- **Intelligent Systems Engineering, Indiana University** Bloomington, IN
Research Assistant January 2019 - December 2024
- **Pacific Northwest National Lab** Richland, WA
PhD Intern Summer 2022, 2023

TEACHING EXPERIENCES

- **Intelligent Systems Engineering, Indiana University** Bloomington, IN
Associate Instructor January 2022 - May 2022

OTHER WORK EXPERIENCES

- **Pathao Limited** Dhaka, Bangladesh
Software Engineer June 2018 - November 2018
- **Augmedix Inc.** Dhaka, Bangladesh
Software Engineer August 2017 - March 2018
- **Mukto Software Limited** Dhaka, Bangladesh
Software Engineer July 2014 - July 2017
- **Code Testing Labs** Dhaka, Bangladesh
Junior Software Developer April 2012 - December 2013

PUBLICATIONS

- [ICPP 2026] **Md Taufique Hussain**, Grey Ballard, Aditya Devarakonda, Srinivas Eswar, Naman Pesricha, Vishwas Rao. *High-Performance Star-M SVD for Big Data Compression*.
- [SC 2026]* Hussam Al Daas, Grey Ballard, Laura Grigori, **Md Taufique Hussain**, Suraj Kumar, Johannes Laute, and Kathryn Rouse. *Communication Avoiding Parallel Sketching via Sparse Subspace Embeddings*.
- [SPAA 2026]* Hussam Al Daas, Grey Ballard, Laura Grigori, **Md Taufique Hussain**, Suraj Kumar, Mohammad Marufur Rahman, and Kathryn Rouse. *Communication Lower Bounds and Algorithms for Sketching with Random Dense Matrices*.
- [arXiv preprint arXiv:2509.20776] Elaheh Hassani, **Md Taufique Hussain**, and Ariful Azad. *Distributed-memory Algorithms for Sparse Matrix Permutation, Extraction, and Assignment*.
- [Nature Scientific Report, Vol 15, No 1, 2025] **Md Taufique Hussain**, Mahantesh Halappanavar, Samrat Chatterjee, Filippo Radicchi, Santo Fortunato, Ariful Azad. *Parallel median consensus clustering in complex networks*.
- [SC 2024] Isuru Ranawaka, **Md Taufique Hussain**, Charles Block, Gerasimos Gerogiannis, Josep Torrellas and Ariful Azad. *Distributed-Memory Parallel Algorithms for Sparse Matrix and Sparse Tall-and-Skinny Matrix Multiplication*.
- [SC-W 2024] Elaheh Hassani, **Md Taufique Hussain**, and Ariful Azad. *Batch Updates of Distributed Streaming Graphs using Linear Algebra*.
- [HPEC 2023] Elaheh Hassani, **Md Taufique Hussain** and Ariful Azad. *Parallel Algorithms for Computing Jaccard Weights on Graphs using Linear Algebra*.
- [HST 2022] **Md Taufique Hussain**, Arif Khan, Ariful Azad, Samrat Chatterjee, Robert Brigantic, Mahantesh Halappanavar. *Disruption-Robust Community Detection Using Consensus Clustering in Complex Networks*.
- [IPDPSW 2022] **Md Taufique Hussain**, Guttu Sai Abhishek, Aydin Buluç, Ariful Azad. *Parallel Algorithms for Adding a Collection of Sparse Matrices*.
- [TPDS, Vol 33, No 4, 2021] Ariful Azad, Oguz Selvitopi, **Md Taufique Hussain**, John R. Gilbert, Aydin Buluc. *Combinatorial BLAS 2.0: Scaling combinatorial algorithms on distributed-memory systems*.
- [IPDPS 2021] **Md Taufique Hussain**, Oguz Selvitopi, Aydin Buluç, Ariful Azad. *Communication-Avoiding and Memory-Constrained Sparse Matrix-Matrix Multiplication at Extreme Scale*.
- [IPDPS 2020] Oguz Selvitopi, **Md Taufique Hussain**, Ariful Azad, Aydin Buluç. *Optimizing High Performance Markov Clustering for Pre-Exascale Architectures*.

* Authors listed alphabetically.

TALKS

- ICERM Applied and Computational Discrete Algorithm Workshop 2026
- ILAS 2026, Minisymposium on Recent Advances in Tensor Decompositions for Model and Data Reduction
- Argonne National Lab, LANS Seminar, December 2025
- SIAM DM 2024, Minisymposium on Applied and Computational Discrete Algorithms
- SIAM CSE 2023, Minisymposium on Sparse Computations in Science and Engineering

TECHNICAL SKILLS

- Programming Languages: C, C++, Python

- Parallel & Distributed Computing: MPI, OpenMP, GPU Computing (CUDA), Exascale Systems
- Frameworks and Libraries: CombBLAS, PyTorch, PyTorch Distributed, PyBind11
- Cloud: AWS

SOFTWARE

- **CombBLAS**: A high-performance distributed-memory library providing sparse linear algebra primitives for large-scale graph analytics and data science applications. Demonstrated to scale to thousands of compute nodes on leadership-class supercomputers. Written in C++, MPI, and OpenMP.
- **HipMCL**: A scalable graph clustering library for extracting community structure from massive real-world networks, enabling data-driven scientific discovery in bioinformatics and other domains. Built on sparse matrix operations in CombBLAS. Written in C++, MPI, OpenMP, and CUDA.
- **PAMCON**: A high-performance Python library for consensus clustering — aggregating multiple graph clusterings into a single robust solution. Applicable to ensemble machine learning and community detection in complex networks. Python bindings of an HPC C++ and OpenMP implementation via PyBind11.
- **pystarm**: A high-performance Python library for Star-M SVD — a tensor decomposition method with exact optimality guarantees — bridging HPC performance with Python-based scientific data analysis and data science workflows via PyBind11.

AWARDS

- International Linear Algebra Society Early Career Speaker Award 2026
- Supercomputing Students Travel Award 2021, 2022, 2023
- Indiana University Luddy School Outstanding Service Award 2022
- Runner-up in BUET inter-university AI challenge 2013
- Runner-up in BUET intra-university programming contest 2011

MENTORING

- Mohammad Marufur Rahman (Wake Forest University, Masters student)
- Jessica Dagostini (University of California Santa Cruz, PhD student)
- Elaheh Hassani (Indiana University, PhD student)
- Alex Kiefer (Indiana University, Undergraduate student)
- Noah Probst (Indiana University, Undergraduate student)

RESEARCH RELATED SERVICES

- Program committee member - ICPP 2026
- Program committee member - SC 2025
- Program committee member - IPDPS GrAPL 2024, 2025, 2026
- Program committee member - HiPC 2025.
- Reviewer - Concurrency and Computation: Practice and Experience (CCPE)
- Subreviewer - ALLENEX 2023
- Subreviewer - SC 2023
- Artifact evaluation committee member - SC 2021, 2022.
- Lead student volunteer - SC 2021, 2022 and 2023.
- Student volunteer - SC 2020.

NON-RESEARCH SERVICES

- Volunteer Bike Mechanic, *Bloomington Community Bike Project*.
- General Secretary, *Islamic Center of Bloomington*. May 2021 - April 2023.
- Graduate student ambassador of Indiana University Luddy School (January 2020 - May 2022).
- Instructor, *Foundation in Science and Mathematics* summer school of Indiana University (Summer of 2020, 2021 and 2022).
- Treasurer, *Bangladesh Student Association* at Indiana University(2019-20 and 2020-21 academic year).