

ABRAR HOSSAIN

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EDUCATION

The University of Toledo	Toledo, Ohio
PhD, Computer Science, GPA -/4.00	August 2025 – Dec 2027
The University of Toledo	Toledo, Ohio
Master's, Computer Science, GPA 3.90/4.00	August 2023 – August 2025
Chittagong University of Engineering and Technology	Chittagong, Bangladesh
Bachelors, Electrical Engineering, GPA 3.23/4.00	March 2015 – September 2019

EXPERIENCE

Graduate Research Assistant	August 2023 – Present
The University of Toledo	Toledo, OH
<ul style="list-style-type: none">Developed TARDIS, a power-aware HPC scheduler using GNNs, cost reduction: 18% (temporal), 10-20% (spatial)Developed LASP, a MAB-based HPC tuner on edge devices, achieving 2.5% average performance gain over defaultDeveloped a SST-based scalable job scheduler, ensuring high accuracy in wait times, node usage, parallelization	
Intern	June 2025 – August 2025
National Center for Supercomputing Applications	Urbana, IL
<ul style="list-style-type: none">Built parser for eBPF maps for 80+ VLANs and ports with configurable polling intervals via REST APIIntegrated with InfluxDB for efficient storage and Grafana for real-time visualizationAdded configurable logging, reducing manual reconfiguration time by 40%	
Visitor	August 2024 – December 2024
NSF National Center for Atmospheric Research	Remote
<ul style="list-style-type: none">Set up CouchDB, Chords, and Streampipes on ACCESS Jetstreams for community weather data storageBuilt data orchestrator for efficient data routing, achieving 39% transmission efficiency gainReduced deployment costs by 22% for communities implementing the project	
Intern	May 2024 – August 2024
NSF National Center for Atmospheric Research	Boulder, CO
<ul style="list-style-type: none">Designed private LoRa network for 6+ data types with Raspberry Pi gateways and central server.Improved wind forecasting with edge-ML, achieving 26% accuracy gain on Raspberry PiImage analysis with TensorFlow, 23% accuracy gain, 3x faster training, and 93% precision on 10,000+ images	

PUBLICATIONS

- [Paper] • (JSSPP 2025) • Abrar Hossain, Abubeker Abdurahman, Mohammad Atiqul Islam, Kishwar Ahmed. **Power-Aware Scheduling for Multi-Center HPC Electricity Cost Optimization**
- [Paper] • (HiPC 2024) • Abrar Hossain, Abdel-Hameed Badawy, Mohammad Atiqul Islam, Tapasya Patki, Kishwar Ahmed. **HPC Application Parameter Autotuning on Edge Devices: A Bandit Learning Approach**
- [Paper] • (WSC 2024) • Abubeker Abdurahman, Abrar Hossain, Kevin A Brown, Kazutomo Yoshii, Kishwar Ahmed. **Scalable HPC Job Scheduling and Resource Management in SST**
- [Paper] • (PASC 2026) • Abrar Hossain, Kishwar Ahmed **XOR Bidding and Knapsack Formulations for HPC Network Resource Allocation**
- [Paper] • (IoTBDS 2025) • Tasnimul Hasan, Abrar Hossain, Mufakir Qamar Ansari, Talha Hussain Syed **Enhanced Intrusion Detection in IIoT Networks: A Lightweight Approach with Autoencoder-Based Feature Learning**
- [Paper (Under Review)] • (ICS 2026) • Md. Azahar Alam, Abrar Hossain, Kishwar Ahmed. **Dynamic Instrumentation for Dataflow Accelerators**
- [Paper (In Preparation)] • (HPDC 2026) • Abrar Hossain, Kishwar Ahmed. **Structured Reinforcement Learning for Loop Transformation in MLIR**
- [Paper (In Preparation)] • (SC 2026) • Abrar Hossain, Kishwar Ahmed. **Risk-Controlling Multi-Fidelity Conformal Prediction**

[Journal Paper (Under Review)] • (ACM TOPC) • Abrar Hossain, Xingfu Wu, Jason Liu, Tapasya Patki, Kishwar Ahmed. Autotuning Across the High-Performance Computing Stack: Hardware, Software, and Application Optimization Techniques

[Workshop Paper] • (EduHiPC 2024) • Abubeker Abdurahman, Arihant Singh, Abrar Hossain, Kishwar Ahmed. A Hands-On Approach To Teaching Parallel and Heterogeneous Computing

[Book Chapter] • (TPCPD 2025) • Abubeker Abdurahman, Abrar Hossain, Kishwar Ahmed. An Interactive Learning Module for Introducing Parallel Computing

[Poster] • (SC 2025) • Abrar Hossain, Kishwar Ahmed. CROSS-HPC System Bayesian Optimization with Adaptive Transfer

[Poster] • (eScience 2025) • Abrar Hossain, Kishwar Ahmed. Bandwidth Allocation for Heterogeneous HPC Data Ingestion using Dynamic Auctions

[Poster] • (AGU 2024) • Abrar Hossain, Keith Maull, Agbeli Ameko. Environmental Data Sensing and Monitoring System Using Community-based Private LoRa Network

[Poster] • (SC 2023) • Abrar Hossain, Kishwar Ahmed. Automating HPC Model Selection on Edge Devices

HONORS AND AWARDS

- 2025 SGX3 Rising Star of the Year award
- 2025 SIParCS Student Travel Grant
- 2025 USRSE25 Building Engagement (BE) Travel Grant
- 2025 eScience 2025 NSF Travel Grant
- 2025 Cluster 2025 NSF Travel Grant
- 2025 UToledo Graduate Research Assistant Recognition Award
- 2025 Midwest RCD Symposium Scholarship
- 2024 CRA-WP Grad Cohort for IDEALS Scholarship
- 2024 SIParCS Student Travel Grant
- 2024 AGU Student Travel Grant
- 2024 Friends Education Fund Scholarship
- 2024 IEEE HiPC TCPP Travel Grant
- 2024 Bangaldesh Sweden Trust Fund Scholarship

PROFESSIONAL AND VOLUNTEER ACTIVITIES

Professional Engagements:

- Student Champion for *NSF ACCESS*
- Reviewer for *HPEC'25 – Extended Abstracts*
- Reviewer for *PEARC'25 – Tutorials and Workshops*
- Reviewer for *PEARC'25 – Posters and Visualization*

Conference Volunteer Roles:

- Student Volunteer at *PEARC'25 – Practice and Experience in Advanced Research Computing*
- Student Volunteer at *HiPC'24 – International Conference on High Performance Computing, Data, and Analytics*
- Student Volunteer at *AGU'24 – American Geophysical Union Fall Meeting*

TECHNICAL SKILLS

Operating Systems: Linux (Ubuntu, CentOS, Debian), Windows Server (Active Directory, Group Policy)

Networking: TCP/IP, DNS, DHCP, Firewalls (iptables, ufw), VPN (WireGuard, OpenVPN)

Automation & Scripting: Bash, Python, PowerShell, Ansible, Terraform

Cloud Platforms: Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure

Virtualization & Containers: VMware, KVM, Docker, Kubernetes, Proxmox

Monitoring & Logging: Prometheus, Grafana, ELK Stack (Elasticsearch, Logstash, Kibana), Nagios

Backup & Disaster Recovery: Rsync, Bacula, Veeam, RAID

Version Control & CI/CD: Git, GitHub, GitLab, Jenkins, ArgoCD