# ANKUR LAHIRY

+1 512 214 3950 | alahiry098@gmail.com | San Marcos, Texas
linkedin.com/in/ankurlahiry | ankurlahiry.github.io | Google Scholar

## Summary


- Ph.D. student in Computer Science at Texas State University applying **machine learning techniques** to achieve **optimal performance**, **efficiency**, and **scalability** in high-performance computing systems.
- Research focuses on building intelligent methods that make complex computing systems **faster**, **more efficient**, and **easier to understand**, with emphasis on performance tuning, anomaly detection, and GPU trace analysis.
- Experience developing **scalable software and data-driven tools** for performance modeling, decision support, and reliability analysis in production and research computing environments.
- Collaborates with **Brookhaven** and **Argonne** on supercomputing performance and reliability, with **5+ years of software engineering experience** building secure payment and communication platforms.


## Education

**Texas State University**, San Marcos, Texas — *Fall 2022 – Present*
*Ph.D. in Computer Science, Department of Computer Science (Exp. Graduation: Summer 2027)* — CGPA: 3.92 / 4.00

**Bangladesh University of Engineering and Technology (BUET)**, Dhaka, Bangladesh — *May 2012 – February 2017*
*B.Sc. in CSE, Department of Computer Science and Engineering* — CGPA: 3.00 / 4.00

## Research Interests

High-performance computing, machine learning, graph representation learning, decision making, anomaly detection, and synthetic performance data generation.

## Research Experience

- **Doctoral Research Assistant, Texas State University, San Marcos, Texas** — *Spring 2023 – Present*
  - Developed **COMPASS**, a decision-intelligence system for HPC configuration recommendation, reconfiguration, and what-if analysis, improving average job turnaround time by **65.93%**, node-usage efficiency by **80.93%**, and scaling to traces with **1.3B samples** (**126 GB**).
  - Designed a constrained generative optimization pipeline with trustworthiness labeling and uncertainty-aware guidance, achieving up to **100x faster training** and **80x faster inference** than generative baselines for large-scale performance tuning workloads.
  - Built a **distributed causal analysis framework** for large GPU traces that parallelizes ingestion and modeling across nodes, improving analysis scalability by **67%** while exposing root causes of performance variability and system bottlenecks.
  - Proposed a **graph-based representation learning** method for HPC telemetry that transforms tabular performance data into graphs, achieving up to **61.67%** lower MSE than DNN baselines on HPC datasets with missing values.
  - Collaborate with **Brookhaven** and **Argonne National Laboratories** to align ML-based performance analysis methods with production supercomputing workflows and reliability needs.
- **Undergraduate Research, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh**
  *2016 – 2017*
  Improved the efficiency and stability of the **Simplex Algorithm** for linear-programming problems by proposing a degeneracy-resolution method that outperformed **Bland's Rule** in computational efficiency while preserving solution accuracy.

## Internship Experience

- **Summer Intern, Brookhaven National Laboratory, Upton, New York** — *June 2023 – August 2023*
  - Worked on the **Chimbuko Project** for real-time monitoring of large workflow applications by detecting performance anomalies caused by inefficient algorithms or hardware issues.
  - Built a graph-based deep learning method for anomaly classification, reaching up to **95% accuracy**, beating a gradient-based baseline, and using XAI to explain model decisions.

## Teaching Experience

- **Doctoral Instructional Assistant, Texas State University** *Fall 2022*
  Supported instruction for **Computer Architecture (CS4310)**.
  - Helped undergraduate students with assignments, labs, and projects.
  - Assisted with lab materials, grading, and student questions during labs and office hours.

## Honors and Awards

- **Texas State University Graduate Retention Scholarship** – for outstanding academic performance.

## Technical Skills

- **Programming:** Python, C, C++, Swift, Java, Go
- **Frameworks and Tools:** PyTorch, Hugging Face, DGL, Dask, Slurm, MPI, CUDA
- **Model Architectures:** Graph Neural Networks, Deep Neural Networks, Large Language Models, Generative AI, recommendation systems
- **Core Techniques:** Representation learning, anomaly detection, explainable AI, feature engineering, transfer learning, retrieval-augmented generation
- **Applications:** Performance analytics in HPC, system behavior modeling, anomaly classification, intelligent monitoring systems, synthetic data generation

## Professional Experience

- **Software Engineer, DeshiPay (DataBird), Dhaka, Bangladesh** *2022*
  Led development of secure mobile payment systems, building real-time financial transaction features and scalable iOS infrastructure in collaboration with cross-functional teams.
- **Software Engineer, Ridmik Labs (DataBird), Dhaka, Bangladesh** *2020 – 2022*
  Developed features for a large-scale real-time communication platform, implementing messaging and VoIP capabilities with WebRTC and XMPP while improving scalability, reliability, and user experience.
- **Senior Software Engineer, Prefeex Ltd., Dhaka, Bangladesh** *2019 – 2020*
  Led development of a reservation platform and its mobile applications, designing core architecture and improving scalability and team execution through Agile practices.
- **Software Engineer, iPay Systems Ltd., Dhaka, Bangladesh** *2017 – 2019*
  Developed secure digital payment applications and reusable SDK frameworks, implementing transaction-security mechanisms and payment modules for third-party integrations.
- **Senior Software Engineer, BellBizzer Inc., Seattle, WA (Remote)**
  Developed scalable iOS architecture for a rental marketplace platform, partnering with product and design teams to improve usability, performance, and long-term maintainability.

## Publications


[1] Ankur Lahiry, Banooqa Banday, Yugesh Bhattarai, Tanzima Z Islam, and Mohammad Zaeed. "COMPASS: A Unified Decision-Intelligence System for Navigating Performance Trade-off in HPC". In: *arXiv preprint arXiv:2604.22688* (2026).

[2] Ankur Lahiry, Banooqa Banday, Yugesh Bhattarai, and Tanzima Z Islam. "WANDER: An Explainable Decision-Support Framework for HPC". In: *arXiv preprint arXiv:2506.04049* (2025).

[3] Ankur Lahiry, Ayush Pokharel, Banooqa Banday, Seth Ockerman, Amal Gueroudji, Mohammad Zaeed, Tanzima Z Islam, and Line Pouchard. "A Distributed Framework for Causal Modeling of Performance Variability in GPU Traces". In: *arXiv preprint arXiv:2510.18300* (2025).

[4] Ankur Lahiry, Ayush Pokharel, Seth Ockerman, Amal Gueroudji, Line Pouchard, and Tanzima Z Islam. "Scalable GPU Performance Variability Analysis framework". In: *arXiv preprint arXiv:2506.20674* (2025).

[5] Chase Phelps, Ankur Lahiry, Tanzima Z Islam, and Line C Pouchard. "Reimagine Application Performance as a Graph: Novel Graph-Based Method for Performance Anomaly Classification in High-Performance Computing". In: *2024 IEEE 48th Annual Computers, Software, and Applications Conference (COMPSAC)*. IEEE. 2024, pp. 240–245.

[6] Chase Phelps, Ankur Lahiry, Tanzima Z Islam, and Christopher Kelly. "Graph Based Anomaly Detection in Chimbuko: Feasible or Fallible?" In: *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC '23)* (2023).

[7] Tarek Ramadan, Ankur Lahiry, and Tanzima Z Islam. "Novel representation learning technique using graphs for performance analytics". In: *2023 International Conference on Machine Learning and Applications (ICMLA)*. IEEE. 2023, pp. 1311–1318.