Arif Arman

Room #211, L.F. Peterson Building, 435 Nagle St, College Station, TX 77843
+1 979 422 0133 | arman@tamu.edu | arif-arman.github.io | arifarman

Summary

Ph.D. in Computer Science specializing in **high-performance computing** and **micro-architectural optimization**. Proven expertise in low-latency C++ systems, coupled with a strong publication record in **parallel algorithms** and **big-data** workloads. Motivated to contribute to and build skills in leading research facilities.

Education

Texas A&M University, College Station, TX
Doctor of Philosophy in Computer Science, *Exp: Jul. 2026*
Dissertation: High-performance SIMD-Accelerated Sorting of Large-Scale Datasets
Advisor: Dr. Dmitri Loguinov

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh
Bachelor of Science in Computer Science and Engineering, *Mar. 2016*
CGPA **3.88**/4.00; Ranked 10^{th} in a graduating class of 142 students
Thesis: Continuous Maximum Visibility Query for a Moving Target
Advisor: Dr. Mohammed Eunus Ali

Research Experience

Microsoft Research, Azure SQL Data Warehouse
Research Intern, *May - Aug. 2024*

- Developed an efficient SIMD sorter for data stored in columnar format (e.g., Parquet) for operations involving sorting multiple columns.
- Optimized sort performance by utilizing metadata and encodings from the columnar storage.
- Tools/Platforms: C++, SIMD (AVX-512), x86 Assembly, Intel VTune, Parquet

Google System and Infrastructure, Data Analytics and Storage Performance
Ph.D. Software Engineering Intern, *Jun - Aug. 2021*

- Accelerating analytics: Identified acceleration opportunities in Google's analytics engines such as Dremel and F1. In addition, build an analytical model to perform what-if analysis for different accelerator types.
- Investigated root cause of IPC variance for Google's globally distributed database service Spanner.
- Tools/Platforms: C++, x86 Assembly, Dremel, F1, Spanner

Texas A&M University, Department of Computer Science and Engineering
Graduate Research Assistant, with Dr. Dmitri Loguinov, *Sep. 2018 - Current*

- Worked on a *streaming* framework that provides programmers with seemingly infinite buffers and a novel in-place MSD Radix-sort using the framework that is $3-4\times$ faster than SOTA *(Vortex, ASPLOS 2020)*.
- Developed a high-performance parallel SIMD merge-sort framework that maximizes SIMD register usage and reduces branch misprediction penalties, up to $2\times$ over SOTA *(Origami, VLDB 2022)*.
- Developed an efficient key partition engine that resolves slowdowns caused by memory disambiguation, resulting in $2-3\times$ speedup over SOTA *(Typhoon, Bigdata, 2025)*.
- Working on a high-performance SIMD sorter of small chunks that is useful for segmented sorts and dealing with smaller arrays in base cases of several sorts (MSD-radix, Merge, Quick etc.).
- Tools/Platforms: C++, x86 Assembly, SIMD, Intel VTune, AMD μProf

Bangladesh University of Engineering and Technology, Dept. of Computer Science and Engineering.
Research Assistant, with Dr. Mohammed Eunus Ali, *May. 2015 - Jul. 2018*

- Developed efficient algorithms to process queries on spatial databases: Maximum visibility of a moving target *(ADC 2016)*, reverse k-nearest neighbors of trajectories *(ADC 2018)*.
- Developed demonstration tools for various visibility query processing *(SIGSPATIAL 2016, CIKM 2017)*.
- Developed a variant of R*-Tree to improve performance of novel visibility queries, in collaboration with RMIT University, Australia.
- Tools/Platform: C++, OpenGL, Python

Publications

Peer Reviewed

1. Z. Liu, **A. Arman**, and D. Loguinov. "Typhoon: A Slice-Scrambled In-Place LSD Sort". IEEE **Bigdata**, 2025 (18.7%). ***Best Paper Nominee.***
2. **A. Arman** and D. Loguinov. "Origami: A High-Performance Mergesort Framework" Proceedings of the **VLDB** Endowment Vol. 15 No. 2, 2022 (18.0%).
3. C. Hanel, **A. Arman**, D. Xiao, J. Keech, and D. Loguinov. "Vortex: Extreme-Performance Memory Abstractions for Data-Intensive Streaming Applications". ACM **ASPLOS**, 2020 (18.0%).
4. T. A. Rahat, **A. Arman**, M. E. Ali. "Maximizing Reverse k-Nearest Neighbors for Trajectories". 29^{th} Australasian Database Conference (**ADC**), 2018.
5. **A. Arman**, M. E. Ali, F. M. Choudhury, and K. Abdullah. "VizQ: A System for Scalable Processing of Visibility Queries in 3D Spatial Databases". ACM **CIKM**, 2017.
6. **A. Arman**, K. Abdullah, I. E. Rabban, and M. E. Ali. "IndVizCMap: Visibility Color Map in an Indoor 3D Space". International Workshop on Indoor Spatial Awareness at ACM **SIGSPATIAL**, 2016.
7. C. M. R. Haider, **A. Arman**, M. E. Ali, and F. M. Choudhury. "Continuous Maximum Visibility Query for a Moving Target". 27^{th} Australasian Database Conference (**ADC**), 2016. ***Best Poster Award.***

Under Review

1. **A. Arman** and D. Loguinov. "F5: A Robust SIMD-Accelerated In-place MSD Radix-Sort".

Teaching Experience

Texas A&M University, Department of Computer Science and Engineering
Graduate Teaching Assistant, *Aug. 2020 - Current*

- Conducted labs, held office hours, prepared exams, and occasionally provided lectures.
- Courses: Networks and Distributed Processing (CSCE 612), Operating Systems (CSCE 611), Machine Learning (CSCE 633), Introduction to Computer Systems (hon's) (CSCE 313H), Data Structures and Algorithms (hon's) (CSCE 221H).

United International University, Department of Computer Science and Engineering
Lecturer, *May. 2016 - Jul. 2018*

- Designed courses, prepared syllabus and exams, conducted lectures, mentored students.
- Courses: Algorithms (CSI 227), Discrete Mathematics (CSI 219), Object Oriented Programming (CSI 221), Structured Programming Language (CSI 121)
- Organized an international conference and inter-university hackathon.

Additional Information

Advanced Language and Platform Proficiency:

- C/C++, x86 Assembly, SIMD (SSE, AVX, AVX-512), Profiling (Intel VTune, AMD μProf), Python, Git

Invited Talks:

- "Origami: A High-Performance Mergesort Framework", at Microsoft Research Gray Systems Lab.

Leadership and Participation:

- Vice President and Treasurer, Bangladesh Student Association at Texas A&M University. 2021-2023.
- Organizer and Mentor, UX Design Contest, Project Showcasing and Problem Setter at UIU CSE Festival, 2017.
- Organizer, International Conference on Medical Engineering, Health Informatics and Technology, 2016.
- Co-Founder and former General Secretary, Science Club of the Laboratorians.
- Top 12, Microsoft Imagine Cup 2013, with project Solvencia; a communication platform for supershop and farmers using IVR (Interactive Voice Response).

US Employment Eligibility:

- US Permanent Resident, Citizen of Bangladesh.

Honors and Awards

- **CIKM/SIGIR Travel Grant** to attend and present paper in International Conference on Information and Knowledge Management (CIKM) at Pan Pacific, Singapore, 2017.
- **Best Poster Award** for Continuous Maximum Visibility Query for a Moving Target in Poster Session of Australassian Database Conference, Sydney, Australia, 2016.
- **Dean's List Award** and **Several Merit Scholarships** for Outstanding Undergraduate Results, Bangladesh University of Engineering and Technology, 2012-2016.
- **Best Information System Design** for Automation of City Development Authority, Bangladesh University of Engineering and Technology., 2014.
- **One of Top Ten Database Projects** for Chain Shop Management System, Bangladesh University of Engineering and Technology, 2014.

References

Dr. Dmitri Loguinov
Professor
Department of Computer Science and Engineering
Texas A&M University - College Station
Email: dmitri@cse.tamu.edu

Conor Cunningham
Partner Architect and Engineering Site Lead
Azure SQL Data Warehouse
Microsoft, Austin
Email: conor.cunningham@microsoft.com

Dr. Riccardo Bettati
Professor and Associate Department Head
Department of Computer Science and Engineering
Texas A&M University - College Station
Email: bettati@cse.tamu.edu

Dr. Abdullah Muzahid
Associate Professor
Department of Computer Science and Engineering
Texas A&M University - College Station
Email: abdullah.muzahid@cse.tamu.edu

Dr. Khanh Nguyen
Assistant Professor
Department of Computer Science and Engineering
Texas A&M University - College Station
Email: khanhtn@tamu.edu

Dr. Mohammed Eunus Ali
Professor
Department of Computer Science and Engineering
Bangladesh University of Engineering and Technology
Email: eunus@cse.buet.ac.bd