

Muhammad Sohel Rana

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Objective

Leverage my research in machine learning, data science, and optimal transport to contribute to the department's research profile while fostering student engagement through effective teaching and mentorship.

Education

Ph.D. candidate, Mathematics and Data Science, The University of Texas at Arlington, USA Expected: May, 2026
Research : Manifold learning, optimal transport, dimensionality reduction, federated learning.

Experience

Graduate Research Assistant, UT Arlington, USA June 2023 – Present

- ◇ Improved manifold learning techniques implemented for supervised and unsupervised machine learning.
- ◇ worked in a capstone project as a group leader of undergraduate students of the division of data science.

Graduate Teaching Assistant, UT Arlington, USA September 2019-May 2021, September 2022 - May 2023

- ◇ Mentoring student in the interactive problem solving session, provided guidance during weekly projects, handling grading on technology (canvass, blackboard)

Lecturer

Department of Mathematics and Physics, North South University, Bangladesh

January 2022 - August 2022

- ◇ Taught precalculus and Calculus and Analytic Geometry-I to 360+ students in 9 sections.

Graduate Teaching Assistant, Western Kentucky University, USA

August 2015 - December 2015

Senior Officer, Pubali Bank Limited, Bangladesh

June 2012- July 2015

Technical skills

- ◇ **Languages:** Python, LaTeX, Mathematica, C, Fortran
- ◇ **Tools:** Numpy, Pandas, scikit-learn, keras, Pytorch, Tensorflow, NLTK, Matplotlib, PostgreSQL
- **Expertise:** Computer vision, NLP, Manifold learning techniques, supervised and unsupervised machine learning

Publications

- ◇ **Muhammad Rana**, Abiy Tasissa, HanQin Cai, Yakov Gavriylov, and Keaton Hamm, Recovering Wasserstein Distance Matrices from Few Measurements. (Under review)
- ◇ **Muhammad Rana**, Keaton Hamm. Neighbor Embeddings Using Unbalanced Optimal Transport Metrics. (Under review)
- ◇ **Muhammad Rana**, Phuong Trinh, Ryan Bui, Keaton Hamm. On Wasserstein distance neighbor embeddings. (Under review)
- ◇ Md Abul Hossain Mamun, **Muhammad Rana**. Factors Influencing women's total children ever born and current contraceptive use in urban and rural areas: Evidence from BDHS 2017-18. (Under review)
- ◇ Md. Mehedi Hasan, Mohammad Abdul Halim, **Muhammad Rana**, Salma Yeasmin Jannaty, M. J. Uddin. Nanofluid Natural Convection in Trapezoidal Annuli: Comparative Effects of Triangular, Circular, and Square Inner Walls. (Under review)
- ◇ Zahidur Talukder, **Muhammad Rana**, Keaton Hamm, Mohammad A. Islam. Empowering Clients: Self-Adaptive Federated Learning for Data Quality Challenges. *IEEE International Conference on Edge Computing and Communications, 2025*

Recognition

- ◇ **Math Academic Excellence Scholarship**, Mathematics Department, The University of Texas at Arlington, 2025.
- ◇ **Glenn and Virginia Powers Memorial Scholarship**, Mathematics Department, Western Kentucky University, 2016.
- ◇ **Honors Results Based Merit Scholarship**, Fazlul Huq Muslim Hall, Dhaka University, 2010.