

# Muhammad Sohel Rana

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## Objective

Apply my expertise in machine learning, data science and scalable optimal transport to develop innovative and scalable solutions in an industrial focused research role.

## Education

Ph.D. candidate, Mathematics and Data Science, The University of Texas at Arlington, USA Expected: 2025  
Research : Manifold learning, optimal transport, scalable optimal transport, dimensionality reduction.

## 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**, Phuong Trinh, Ryan Bui, Keaton Hamm. "Optimal transport based dimensionality reduction." (Submitted)
- ◇ 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." (Submitted)
- ◇ 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*  
*manuscripts in preparation*
- ◇ **Muhammad Rana**, Keaton Hamm. "Unbalanced Optimal transport based dimensionality reduction."
- ◇ Md. Mehedi Hasan, Mohammad Abdul Halim, **Muhammad Rana**, Salma Yeasmin Jannaty, M. J. Uddin. "Analysis of Natural Convection Nanofluid Flow in Annular Regions Bounded by a Trapezoidal Outer Wall and Inner Wall Configurations of Triangular, Circular, and Square Geometries: A Comparative Study"
- ◇ Muhammad Rana, Md Abul Hossain Mamun, Md. Nur E Alam, Sanjida Akter. "Access to Higher Education: Examining the Barriers Encountered by Married Female Students in Bangladesh."

## 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.