Muhammad Sohel Rana

Assistant Professor of Mathematics
Mathematics Program, School of Liberal Arts and Sciences
University of North Texas at Dallas
7300 University Hills Blvd, Dallas, TX 75241

muhammad.rana@untdallas.edu
LinkedIn | GitHub | Google Scholar
(682) 376-4133

EDUCATION

Ph.D. in Mathematics (Data Science Track), University of Texas at Arlington 2026

- Advisor: Keaton Hamm
- Dissertation: *Neighborhood Embeddings and Scalable Learning for Optimal Transport and Unbalanced Optimal Transport*

M.S. in Mathematics, Western Kentucky University 2017

- Supervisor: Mark Robinson

M.S. in Applied Mathematics, University of Dhaka 2008

B.S. in Mathematics, University of Dhaka 2007

ACADEMIC EMPLOYMENT

Assistant Professor of Mathematics, University of North Texas at Dallas 2026–Present
Graduate Research Assistant, University of Texas at Arlington 2023–2026
Graduate Teaching Assistant, University of Texas at Arlington 2022–2023
Lecturer, North South University 2022
Graduate Teaching Assistant, University of Texas at Arlington 2019–2021
Graduate Teaching Assistant, Western Kentucky University 2015–2017

RESEARCH INTERESTS

Optimal Transport; Unbalanced Optimal Transport; Machine Learning; Geometric Data Analysis; Dimensionality Reduction; Matrix Completion; Scalable Learning; Scientific Machine Learning.

PUBLICATIONS AND MANUSCRIPTS

Peer-Reviewed Publications

1. Muhammad Rana, Abiy Tasissa, HanQin Cai, Yakov Gavriyelov, and Keaton Hamm. "Recovering Wasserstein Distance Matrices from Few Measurements." In *Proceedings of the 2026 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Barcelona, Spain, May 3–8, 2026. [PDF]

2. Md. Mehedi Hasan, Mohammad Abdul Halim, Muhammad Sohel Rana, Salma Yeasmin Jannaty, and M. J. Uddin. "Nanofluid Natural Convection in Trapezoidal Annuli: Comparative Effects of Triangular, Circular, and Square Inner Walls." *International Journal of Thermofluids*, 2025. [PDF]

3. Zahidur Talukder, Muhammad Rana, Keaton Hamm, and Mohammad Islam. "Empowering Clients: Self-Adaptive Federated Learning for Data Quality Challenges." In *Proceedings of the 2025 IEEE International Conference on Edge Computing and Communications (EDGE)*, Helsinki, Finland, July 7–12, 2025. [PDF]

Manuscripts Under Revision

1. Muhammad Rana and Keaton Hamm. "Neighbor Embeddings Using Unbalanced Optimal Transport Metrics." Manuscript under revision. [Preprint]

Manuscripts in Preparation

1. Muhammad Rana, Phuong Trinh, Ryan Bui, and Keaton Hamm. "On Wasserstein Distance Neighbor Embeddings." Manuscript in preparation.

AWARDS AND HONORS

- Mathematics Academic Excellence Scholarship, University of Texas at Arlington
- Dr. R. Glenn and Virginia Powers Scholarship, Western Kentucky University
- Honors Merit Scholarship, University of Dhaka

PRESENTATIONS

Invited Talks

- "Empowering Clients: Self-Adaptive Federated Learning for Data Quality Challenges." Teatime Event, Division of Data Science, University of Texas at Arlington, Arlington, TX, February 21, 2025.
- "Optimal Transport-Based Dimensionality Reduction." CodEx Student/Postdoctoral Series Mini-Conference (virtual), May 27, 2025.

Poster Presentations

- "Recovering Wasserstein Distance Matrices from Few Measurements." Discover 2026 Student Research Symposium, University of Texas at Arlington, Arlington, TX, April 2026.

TEACHING EXPERIENCE

University of North Texas at Dallas, Assistant Professor 2026–Present

- MATH 1316: Trigonometry – Fall 2026
- MATH 3315: Linear Algebra and Vector Space Theory – Fall 2026
- MATH 1332: A Survey of Mathematics with Applications – Fall 2026
- MATH 1303: Fundamentals of Mathematics with Applications – Fall 2026

University of Texas at Arlington, Graduate Teaching Assistant 2019–2023

- MATH 1426: Calculus I – Fall 2019
- MATH 2425: Calculus II – Spring 2020, Fall 2020, Spring 2021, Fall 2022, Spring 2023
- STAT 1308: Elementary Statistical Analysis – Summer 2020

North South University, Lecturer 2022

- MATH 116: Precalculus (5 sections) – Spring and Summer 2022
- MATH 120: Calculus and Analytic Geometry I (4 sections) – Spring and Summer 2022

Western Kentucky University, Graduate Teaching Assistant 2015–2017

- MATH 136: Calculus I – Fall 2015
- MATH 137: Calculus II – Spring 2016, Fall 2016, Spring 2017, Fall 2017

ACADEMIC SERVICE

- Peer Reviewer, *American Journal of Undergraduate Research*, 2026
- Volunteer, UTA Calculus Bowl, 2020, 2021, 2023, and 2024

TECHNICAL SKILLS

- **Programming:** Python, C, Fortran, Mathematica, LaTeX
- **Python:** NumPy, Pandas, SciPy, scikit-learn, PyTorch, TensorFlow, Matplotlib
- **Methods:** Machine Learning, Optimal Transport, Dimensionality Reduction, Numerical Linear Algebra, Scientific Computing, and Data Analysis