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CURRICULUM VITAE

Md. Joshem Uddin

Dept of Mathematical Science, The University of Texas at Dallas, USA

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Research Interests

1. Topological and Geometric Machine Learning

2. Graph representation learning

3. Statistical Machine Learning & Data Science

4. Relational deep learning

5. Temporal and Spatio-Temporal Modeling

6. Cyberattack detection and smart grid resiliency

7. Applied and Computational Mathematics

Education

PhD in Mathematics

🏛Dept. of Mathematical Science, University of Texas at Dallas, USA 🎓 Expected: 2026

M.S. in Applied Mathematics

🏛Dept. of Mathematical Science, University of Texas at Dallas, USA 🎓 Conferred: 2025

▷ GPA: 3.834/4.00 (all courses)

Graduate Certificate in Data Science (12 credit hours)

🏛Dept. of Mathematical Science, University of Texas at Dallas, USA 🎓 Conferred: 2025

M.S. in Applied Mathematics

🏛University of Dhaka, Dhaka-1000, Bangladesh 🎓 Conferred: 2018 (held in 2017)

▷ GPA: 4.00/4.00

B.S. in Mathematics

🏛University of Dhaka, Dhaka-1000, Bangladesh 🎓 Conferred: 2017 (held in 2016)

▷ CGPA: 3.95/4.00

Publications

Published

[1] *TopoFormer: Topology Meets Attention for Graph Learning*. **M.J. Uddin**, A. Tola, C. Akcora, B. Coskunuzer, **International Conference on Learning Representations (ICLR), 2026**. (Accepted)

[2] *T3former: Temporal Graph Classification with Topological Machine Learning*. **M.J. Uddin**, S. Changani, B. Coskunuzer, **AAAI Conference on Artificial Intelligence (AAAI), 2026**.

[3] *MP-Grid: Detecting Power Grid Outages with Topological Machine Learning*. **M.J. Uddin**, D. Olojede, R.A. Jacob, J. Zhang, B. Coskunuzer, **Applied Energy, 2026**.

[4] *SCNode: Spatial and Contextual Coordinates for Graph Representation Learning*. **M.J. Uddin**, A. Tola, V. Sikand, C. Akcora, B. Coskunuzer, **Transactions on Machine Learning Research (TMLR), 2025**.

[5] *Topology Informed Transformer for Cyber Attack Detection in Grid-Connected PV Systems*. **M.J. Uddin**, D. Olojede, R.A. Jacob, B. Coskunuzer, J. Zhang, **IEEE Transactions on Sustainable Energy, 2025**.

[6] *Cyber Attack Detection in Electric Vehicle Charging Stations Using Topological Data Aided Learning*. **M.J. Uddin**, R.A. Jacob, J. Wang, B. Coskunuzer, J. Zhang, **IEEE Power & Energy Society General Meeting (PESGM), 2025**.

[7] *OcuViT: A Vision Transformer-Based Approach for Automated Diabetic Retinopathy and AMD Classification*. F. Ahmed and **M.J. Uddin**, **Journal of Imaging Informatics in Medicine, 2025**.

[8] *Cyber Attack Detection in Distribution Networks with Topological Data Analytics aided Learning*. **M.J. Uddin**, D. Olojede, R.A. Jacob, B. Coskunuzer, J. Zhang, **IEEE Kansas Power and Energy Conference (KPEC), 2024**.

[9] *Estimating Option Prices with Discrete Dividend Payment Using Finite Difference Method and Monte Carlo Simulation: A Comparative Study*. **M.J. Uddin**, S. Hossain, A. Hossain, S. Parvin, A. Rahman, M.H. Sohel. **Journal of Applied Mathematics and Computation**, 6(4), pp. 472–481, **2022**.

[10] *Impact of Horizontal Grid Resolutions for Thunderstorms Simulation over Bangladesh Using WRF-ARW Model*. **M.J. Uddin**, M.A. Samad, M.A.K. Mallik. **Dhaka University Journal of Science**, Vol. 69(1), pp. 43–51, **2021**.

[11] *Track and Landfall Characteristics of Very Severe Cyclonic Storm Fani over the Bay of Bengal using WRF Model*. S. Hossain, M.A. Samad, R. Sultana, M.A.K. Mallik, M.J. Uddin. **Dhaka University Journal of Science**, Vol. 69(2), pp. 101–108, **2021**.

Under Review

[1] *From Nodes to Pixels: Topological and Structural Two-View Graph Imaging*. M.J. Uddin, S. Changani, S.K. Navuluru, C. Akcora, B. Coskunuzer, **under review at International Conference on Machine Learning (ICML), 2026**.

[2] *PowerBench: Benchmark Datasets for Robust Power Grid Monitoring and Security*. **M.J. Uddin**, R.A. Jacob, D. Olojede, J. Zhang, B. Coskunuzer, **under review at Journal of Data-centric Machine Learning Research (DMLR)**.

[3] *Temporal Graph Transformers for PMU-Based Cyberattack Detection in Power Grids*. **M.J. Uddin**, D. Olojede, K. Hutchison, R.A. Jacob, B. Coskunuzer, J. Zhang, **under review at IEEE Power & Energy Society General Meeting (PESGM), 2026**.

[4] *Cross-View Topology-Aware Graph Representation Learning*. A.S. Korkmaz, S. Coskunuzer, **M.J. Uddin**, **under review at PAKDD, 2026***.

∗ The work in Item [4] was conducted with two undergraduate students under my supervision.

Research and Academic Experience

Graduate/Ph.D. Researcher 2022 – Present
Department of Mathematical Sciences, University of Texas at Dallas
Advisor: Prof. Baris Coskunuzer

- Designed and implemented novel machine learning and deep learning architectures (e.g., **TopoFormer**, **SCNode**, **T3Former**) for both static and temporal graph learning tasks.

- Contributing to multiple **NSF-funded projects** (AMPS, ATD) focused on developing topological graph neural networks for *power grid resilience* and *anomaly detection*.

- Co-authored multiple submissions to premier venues, including *ICML*, *IEEE*, and *PAKDD*.

Lecturer 2018 – 2021
Department of Applied Mathematics, University of Dhaka, Bangladesh

- Taught undergraduate and graduate-level courses in applied mathematics and computational modeling.

- Conducted research on numerical modeling of real-world phenomena, including *option pricing* and *atmospheric modeling*.

- Published multiple peer-reviewed journal articles in applied mathematics and computational science.

Graduate Researcher 2017 – 2018
Department of Applied Mathematics, University of Dhaka, Bangladesh

- Conducted research as part of M.S. thesis on *mathematical modeling of atmospheric phenomena*.

- Developed numerical simulations and theoretical models for environmental systems.

Conference Presentations and Posters

- *T3former: Temporal Graph Classification with Topological Machine Learning*, **AAAI 2026**, Singapore Expo, Singapore, Jan 20-26, 2026.

- *WISE-GNN: Enhancing GNNs with Wise Embedding and Topological Encoding*, **SIAM Conference** on "Geometric and Topological Approaches in Data Science and Machine Learning", Baylor University, October 2024. (Invited Talk)

- *Topological Transformers for Graph Representation Learning*, **AMS Southeastern Sectional Meeting** on "Computational Topology and Geometry in Data Science", Tulane University, October 2025. (Invited Talk)

- *MP-Grid: Detecting Power Grid Outages with Topological Machine Learning*, **AMS Southeastern Sectional Meeting** on "Advances in Applied Topology and Topological Data Analysis", Tulane University, October 2025. (Invited Talk)

- *Outage Detection in Power Grids: A Topological Machine Learning Approach*, **Algorithms for Threat Detection (ATD) and Algorithms for Modern Power Systems (AMPS) Joint PI Workshop**, George Mason University, October 10-12, 2023. (Poster presentation)

- *Wise-GNN: Enhancing GNNs with Wise Embeddings*, **TACCSTER, Texas advance computing center**, The University of Texas at Austin,September 23-25, 2024. (Poster presentation)

- *Enhancing Cyber Attack Detection in Grid-Connected PV Systems: A Topological Machine Learning Approach*, **Algorithms for Threat Detection (ATD) and Algorithms for Modern Power Systems (AMPS) Joint PI Workshop**, Washington DC-October 7-9, 2024. (Poster presentation)

Teaching Experience

Lecturer (Research track)	Department of Applied Mathematics, University of Dhaka[*], Bangladesh (**Nov 2018–Aug 2021**, On Study Leave) Courses Taught: – AMTH 103: Coordinate and Vector Geometry – AMTH 204: Advanced Linear Algebra – AMTH 304: Mathematical Methods – AMTH 413: Mathematical Modeling in Biology and Physiology
Teaching Assistant	Department of Mathematical Science, The University of Texas at Dallas, USA (**Aug 2021–Present**) Courses Assisted: – MATH 2413: Differential Calculus – MATH 1325: Applied Calculus I – MATH 2415: Calculus of Several Variables – MATH 2418: Linear Algebra – MATH 2419: Calculus II
Lecturer	Department of Mathematics, American International University Bangladesh (**May 2018–Nov 2018**) Courses Taught: – Engineering Mathematics – Ordinary Differential Equations

Highlighted Coursework

PURE MATHEMATICS	Real Analysis, Functional Analysis, Complex Analysis, Abstract Algebra, Topology, Combinatorics & Graph Theory
APPLIED MATHEMATICS	Numerical Analysis, Scientific Computing, Optimization, Principles & Techniques in Applied Mathematics, Ordinary Differential Equations
STATISTICS	Probability & Statistics for Data Science, Statistical & Machine Learning
COMPUTER SCIENCE	Algorithms & Data Structures, Machine Learning, Big Data Management, Computer Science I

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[*]World University Rankings: QS=584, Time Higher Education= 1001–1200th

Student Mentorship

- Supervised two undergraduate researchers from Texas A&M and Virginia Tech on graph classification using topological data analysis and machine learning, UT Dallas, Summer 2025.

- Supervised one undergraduate researcher from UT San Antonio on molecular property prediction using topological machine learning, UT Dallas, Summer 2024.

- Guided four senior-year undergraduate students on a capstone project involving numerical modeling of stock prices, University of Dhaka, 2020.

Programming Skills

Languages:

| Python | C++ | Java | R | Matlab | Fortran | Mathematica |

Machine Learning & TDA Libraries:

| PyTorch | TensorFlow | scikit-learn | NetworkX / PyG | Giotto-TDA |
| GUDHI | Ripser / Dionysus |

Big Data & Distributed Systems:

| Apache Spark | MLlib | Cluster Computing | Distributed Systems |

Database & Data Engineering:

| SQL / NoSQL | Pandas / NumPy | Data Preprocessing & ETL Tools |

Foundational Knowledge:

| Algorithms & Data Structures | Numerical Methods | Scientific Computing |

Honors and Awards

- **First Place**, NSF-Algorithms for Modern Power Systems (AMPS) Challenge, 2024
  - Developed a novel deep learning model to detect when cyber-attacks happen in power systems.

- AAAI-26 Scholarship & Volunteer Award

- The 21st A. F. Mujibur Rahman Foundation Gold Medal Awards (B.S.), University of Dhaka-2015

- The 23rd A. F. Mujibur Rahman Foundation Gold Medal Awards (M.S.), University of Dhaka-2016

- Dean's Award, Faculty of Sciences, University of Dhaka-2015

- Swargia Anima Rani Saha Memorial Gold Medal, University of Dhaka-2015

- University Grants Commission (Bangladesh) merit scholarship -2015.

- National Science and Technology (NST) Fellowship, 2016-2017

Professional Service

- Organized a Mini-symposium at SIAM TA-LA section conference, 2024.

- Member, Organizing Committee, International Mathematics Conference, University of Dhaka, 2019.

Professional Membership

- Student Member, American Mathematical Society (AMS)

- Student Member, The Association for the Advancement of Artificial Intelligence

- Student Member, Institute of Electrical and Electronics Engineers (IEEE)

- Student Member, Society for Industrial and Applied Mathematics (SIAM)

- Member, Bangladesh Mathematical Society (BMS)