# TANVEER HOSSAIN MUNIM

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## EDUCATION

**Bangladesh University of Engineering and Technology (BUET)**  April 2018 – September 2023
*Dhaka, Bangladesh*

- Bachelor of Science in Computer Science and Engineering, CGPA: 3.62/4.00
- **Thesis:** *ShasthoSheba: Leveraging an mHealth Solution for Providing Healthcare Service to Orphanages.*

## RESEARCH EXPERIENCE

**Bangladesh Space Research and Remote Sensing Organization (SPARRSO)**  August 2025 – Present
*Research Associate*

- **Project:** *A Geospatial Analysis of the Atypical August 2024 Flood in Eastern Bangladesh.*
- Developing deep learning models (U-Net, ConvLSTM) with the goal of improving pixel-level flood segmentation accuracy and providing a quantitative basis for updating early warning systems.

**Regional Integrated Multi-Hazard Early Warning System (RIMES)**  July 2025 – Present
*Lead Researcher (Concurrent with Senior SWE role)*

- **Project:** *Long-Lead ENSO Forecasting with Physics-Informed Foundation Models*
- Fine-tuning a weather foundation model (Prithvi-WxC) using LoRA adapters and a novel, differentiable physics-informed loss function to enforce the Bjerknes feedback mechanism.

**Self-Directed Research Initiative**  April 2025 – September 2025
*Project Lead*

- **Project:** *Breaking the Statistical Similarity Trap in Extreme Convection Detection*
- Developed **DART**, a novel dual-decoder architecture, achieving operational skill (**CSI=0.273**) that exceeds the performance of established convection-allowing numerical weather models.
- Quantified the **Statistical Similarity Trap**, a critical evaluation flaw in meteorological AI, showing that models can achieve 97.9% correlation while possessing zero operational skill (CSI=0.00).
- Culminated in a sole-authored manuscript detailing these findings, under review at **npj Climate and Atmospheric Science** and available as an arXiv preprint.

## PUBLICATIONS

- **Peer-Reviewed Articles**
  - Eliza, I. J., Urmi, M. A., Anan, M. T. T., **Munim, M. T. H.**, Galib, F. Z. I., & Islam, A. A. A. (2024). "eDakterBari: A human-centered solution enabling online medical consultation and information dissemination for resource-constrained communities in Bangladesh." *Heliyon*, 10(1), e23308. https://doi.org/10.1016/j.heliyon.2023.e23308
- **Preprints & Submissions**
  - **Munim, M. T. H.** (2025). "Breaking the Statistical Similarity Trap in Extreme Convection Detection." *arXiv preprint arXiv:2509.09195*. (Under review at *npj Climate and Atmospheric Science*).
  - **Munim, M. T. H.**, Anan, M. T. T., Galib, F. Z. I., Salem, B. A., & Islam, A. B. M. A. A. (2025). "ShasthoSheba: Leveraging an mHealth Solution for Providing Healthcare Service to Orphanages." (Under review at *ACM CHI 2026*).

## PROFESSIONAL EXPERIENCE

**Regional Integrated Multi-Hazard Early Warning System (RIMES)**    August 2024 – Present
*Senior Software Engineer*

- Architected real-time data pipelines for the FFWC Decision Support System (World Bank project), a system that protects over 9 million vulnerable people from flood hazards.
- Served as the sole backend engineer for Timor-Leste's national meteorological application (UN GCF project), building a system to process over 1TB of geospatial data daily.

**Interactive Cares**    June 2023 – August 2024
*Chief Technology Officer*

- Scaled platform 13x to 100K users and grew the engineering team from 2 to 8 members.

**Survey of Bangladesh (SoB), Ministry of Defence**    September 2022 – August 2023
*Data Engineer (Part-time)*

- Engineered a data automation pipeline that reduced manual processing time by 80% for the National Spatial Data Infrastructure project, saving an estimated 2,400+ person-hours annually.

## PROJECTS AND OPEN SOURCE CONTRIBUTIONS

**MIRA AI - Conversational Sales Agent**    June 2025 – Present
*Architect*

- Architected conversational AI sales agent using LangGraph, FastAPI, and RAG-powered vector database for 10,000+ products, enabling multichannel deployment with Redis-based state management.

**wis2downloader Library - World Meteorological Organization**    March 2025 - September 2025
*Contributor*

- Refactored monolithic architecture to distributed system using Celery, reducing data latency from 4 hours to 130 milliseconds.

## TECHNICAL SKILLS

**AI/ML & Data Science**
LangChain, LangGraph, GANs, Computer Vision, XAI, RAG, PyTorch, Apache Airflow, ETL Pipelines

**Backend & APIs**
Python, Django, Flask, FastAPI, Celery, REST/GraphQL

**Languages**
Python, JavaScript, Java, C++, SQL

**Cloud & Infrastructure**
AWS (EC2, S3, RDS), Docker, Kubernetes, CI/CD

**Databases**
PostgreSQL, MySQL, Pinecone, MongoDB, Redis

**Geospatial Analysis Tools**
Python (xarray, GeoPandas, Rasterio), QGIS, GDAL, PostGIS

**Natural Languages**
English (IELTS: 8.0), Bengali (Native)

## AWARDS & HONORS

- **NVIDIA Inception Program Acceptance** (2025) - For MIRA AI startup.
- **Accelerating Asia Winner** (2023) - Placed in the top 9 from 500+ startups with Interactive Cares.
- **Champion, Bangladesh Mathematical Olympiad** (2016) - Shortlisted for the IMO team of Bangladesh.