MD "RAZU" MOHIUDDIN

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GitHub | LinkedIn | Portfolio

TECHNICAL SKILLS

- **Programming Languages:** Python, SQL, C++, Bash
- **Data Science & Machine Learning:** TensorFlow, PyTorch, JAX, NumPyro, Scikit-learn, Statsmodels, MLflow
- **Data Visualization & Analysis:** Matplotlib, Seaborn, Tableau, Pandas, NumPy, SciPy, SAS
- **Tools:** GitHub, Jupyter, Docker, Singularity, Slurm, LSF, PostgreSQL, Google Analytics, Excel, MATLAB, Vertex AI

GENERAL SKILLS

Machine Learning, ML Theory, Deep Learning, Reinforcement Learning, Natural Language Processing, Computer Vision, Time Series Analysis, Monte Carlo Simulation, Bayesian Statistics, Diffusion Models, Statistical Analysis, Data Pipelines, Database Structures & Algorithms, CAD, Web Design, Management, Large Collaboration Communication

RESEARCH AND DATA ANALYTICS EXPERIENCE

Algorithms & Advanced Analytics Summer Intern – Roche Inc. **May 2024 – August 2024**

- Performed advanced data analyses using Monte Carlo simulation and Bayesian inference to create and validate personalized virtual patient models using real world clinical trial data, enhancing insights for diabetes management (*publication in process*)
- Built new data pipelines, improving processing speed of large datasets by 2000%
- Developed multivariate signal-processing algorithms for detecting patient glycemic events, ensuring data quality and accuracy
- Designed and optimized data visualizations to facilitate insights for management and external partners

Graduate Research Scientist — Project 8 Collaboration **January 2020 - Present**

- Led machine learning team of scientists, consolidating analysis efforts for collaboration of 60+ people
- Developed an LSTM-based Recurrent Neural Network classifier using TensorFlow for noisy signal detection; achieved performance metrics aligned with theoretical benchmarks through hyperparameter fine-tuning with MLflow, demonstrating use of natural language processing in signal pattern detection *(publication in process)*
- Worked with team in implementing deep convolutional neural network autoencoder (U-Net) to segment highly class-imbalanced images with GPU+tensorflow framework in Python; built a novel loss function and improved efficiency over traditional methods by more than 20% *(see publication & conference abstract)*
- Collaborated with team to use Stan as our Bayesian inference tool to put limits on Project 8's ultimate sensitivity to neutrino mass (see *publication*)
- Mastered advanced numerical modelling and development of resonant cavity, antenna technology & magnet designs

EDUCATION

Ph.D. in Physics — Case Western Reserve University, Cleveland, OH — Expected 2026

B.S. in Physics — University of Dhaka, Dhaka, Bangladesh — 2018

PUBLICATIONS

- *"Deep learning based event reconstruction for cyclotron radiation emission spectroscopy"* in IOP Machine Learning: Science and Technology
- *"Tritium Beta Spectrum Measurement and Neutrino Mass Limit from Cyclotron Radiation Emission Spectroscopy"* in Physical Review Letters
- *"Bayesian analysis of a future β decay experiment's sensitivity to neutrino mass scale and ordering"* in Physical Review C

Full list of publications available on InspireHEP: https://inspirehep.net/authors/1840725

LEADERSHIP EXPERIENCES, RECOGNISIONS & SOFT SKILLS

- **Visiting Scholar** — Fermi National Accelerator National Laboratory — 2023
- **Graduate Member** — APS-IDEA | Collaborated with faculty to address DEI challenges within the department — 2020 - Present
- **President** — Bangladeshi Student Association | Organized cultural events, mentored new graduate students — 2020 - 2024
- **Laboratory Supervisor** — Physics | Managed TAs and lab helpers, swiftly addressing and resolving unexpected issues — 2022
- **Public Talks** — Delivered numerous public talks on research findings to interdisciplinary audiences