Md Abdullah Al Mazid

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Research Profile

PhD candidate in Computer Science developing multimodal and physics-guided machine-learning methods for Earth observation and environmental sensing. Research spans optical–SAR fusion, cloud removal and segmentation, atmospheric correction, spatiotemporal forecasting, and interpretable computer vision.

Research Interests

GeoAI, Remote Sensing, Multimodal Machine Learning, Physics-Guided Machine Learning, Computer Vision, Spatiotemporal Modeling, Interpretable AI

Education

Florida International University, PhD in Computer Science — Expected Spring 2027

Florida International University, MS in Computer Science — July 2024

Khulna University of Engineering and Technology, BS in Computer Science — March 2019

Research Experience

Research Assistant, High Performance Database Research Center (HPDRC), FIU — August 2022 – Present

- Conduct research under Prof. Naphtali Rishe on machine learning for remote sensing, multimodal environmental observations, and spatial and temporal environmental data.
- Contribute to NSF Award #2018611, "MRI: Development of an Instrument for Student and Faculty Research on Multimodal Environmental Observations," supporting AI-driven analysis, visualization, and management of heterogeneous environmental data.
- Develop deep-learning methods for satellite imagery, atmospheric modeling, environmental forecasting, and multimodal data analysis, and contribute to BBROIPS environmental analysis efforts in South Florida.

Current Research

Satellite-Based Wildfire Detection and Progression Prediction — Ongoing PhD Research

- Developing deep learning frameworks for wildfire detection and short-term fire progression forecasting using multitemporal satellite imagery and environmental data.
- Investigating spatiotemporal feature extraction, recency-aware temporal fusion, and historical observation windows to improve burned-area prediction and wildfire spread modeling.

MSCloudr / Multimodal Cloud Removal with Optical and SAR Imagery — Ongoing PhD Research

- Developing a conditional diffusion-bridge formulation for reconstructing cloud-obscured 13-band Sentinel-2 imagery using Sentinel-1 SAR as complementary structural information.
- Investigating mean-reverting bridge dynamics and risk-aware trajectory design to improve the conditioning of the restoration process while preserving radiometric and spatial structure.
- Studying reliability-aware SAR conditioning, cross-modal alignment, bridge consistency, and alternative bridge geometries to characterize when and how radar guidance should influence optical reconstruction.

pKANrtm / Physics-Guided Atmospheric-Correction Surrogate

- Developed a physics-aware multi-fidelity Kolmogorov-Arnold Network that uses low-cost 6S simulations as guidance and learns residual corrections toward high-fidelity libRadtran atmospheric-correction coefficients.
- Predicts path reflectance, total transmittance, and spherical albedo while preserving compatibility with standard coefficient-based surface-reflectance correction equations; published in *Remote Sensing* (2026).

Peer-Reviewed Publications

Object-Grounded Text Priors for Saliency Ranking Detection — WACV 2027

IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), ***accepted****.* Co-author. Developed TSPNet, a language-conditioned saliency-ranking framework aligning caption phrases with object regions to modulate multi-scale visual features without backbone fine-tuning.

Multi-Fidelity Emulation of Atmospheric Correction Coefficients with Physics-Guided Kolmogorov-Arnold Networks — Remote Sensing, 2026

Developed pKANrtm using paired 6S and libRadtran simulations for physics-guided atmospheric-correction coefficient emulation, including standard and out-of-distribution evaluation.

MSCloudCAM: Multi-Scale Context Adaptation with Convolutional Cross-Attention for Multispectral Cloud Segmentation IEEE CAI 2026

Developed a multispectral and multi-sensor model integrating a Vision Transformer backbone, multi-scale context modules, and cross-attention for four-class cloud segmentation on Sentinel-2 and Landsat-8 imagery.

Addressing Irregularities and Enhancing Forecasting for Water Quality Metrics by Integrating Ordinary Differential Equations with BiLSTM IEEE SoutheastCon 2025

Developed methods for irregular water-quality time series with spatial and temporal variation using ordinary differential equations and bidirectional LSTMs.

Climate Change Myths Detection Using Dynamically Weighted Ensemble Based Stance Classifier ACM, 2022

Developed an ensemble-based stance-classification approach for detecting posts that support misconceptions about climate change and global warming.

Invention Disclosure

Multi-Fidelity Emulation of Atmospheric Correction Coefficients with Physics-Guided Kolmogorov-Arnold Networks 2026

FIU Invention Disclosure D2026-0057, *accepted for review*. Physics-aware multi-fidelity surrogate for scalable, interpretable atmospheric-correction coefficient emulation.

Teaching Experience

Teaching Assistant, Florida International University Fall 2024, 2025, 2026

- Supported **CIS 5027 – Computer Systems Fundamentals** and **COP 5725 – Principles of Database Management Systems** through instructional assistance, office hours, student discussions, and course assessment.
- Provided in-class explanations and lecture support and worked with students individually and in groups to clarify challenging systems and database concepts.
- Contributed to instructor-directed course design and reviewed instructional materials, assignments, and assessments at the professor's request.

Selected Research Project

BBROIPS – Biscayne Bay Environmental Data Analysis and Visualization

- Researcher and system developer for visualization, simulation, and AI-driven analysis of environmental data in South Florida through collaboration involving FIU, Biscayne Bay National Park, and the Florida Department of Environmental Protection.

Professional Experience

Senior Software Engineer, Enosis Solutions – Dhaka, Bangladesh June 2019 – August 2022

- Contributed to Denticon, a large-scale cloud-based dental SaaS platform for Planet DDS, spanning software engineering, legacy-system modernization, database development, SQL optimization, and performance improvement.
- Led a development sub-team and contributed to enterprise software quality, maintainability, and data visualization.

Software Engineer Intern, mPower Social Enterprises – Dhaka, Bangladesh May 2019 – June 2019

Technical Skills

Machine Learning: PyTorch, TensorFlow/Keras, deep learning, computer vision, multimodal learning, diffusion models, remote sensing **Programming:** Python, C++, C#, SQL

Research Computing: Linux, CUDA/GPU computing, Docker, Git **Software:** .NET, Microsoft SQL Server, Django, TFS

Selected Activities

Hackathons: ShellHacks (2022–2026) **Programming Contests:** ICPC Dhaka Regional Final (2015); National Collegiate Programming Contest (2016)