Zadid Habib

Morgantown, WV, USA

PhD Candidate in Computer Science | Machine Learning Researcher

Representation Learning • Foundation Models • Multimodal Learning • Generative Modeling • AI for Biomedical Data

ah00069@mix.wvu.edu • **Website** • **GitHub** • **Scholar** • **LinkedIn** • **OpenReview**

Research Profile

Machine learning researcher developing methods for **structured, high-dimensional, and multimodal scientific data**, with emphasis on representation learning, foundation model adaptation, generative modeling, and **High-Dimensional Low-Sample Size (HDLSS)** learning relevant to scientific and biomedical data. Research combines new algorithms with rigorous empirical evaluation and reproducible open-source implementations. **NSF NRT Bridges in Digital Health Fellow** with interdisciplinary training in AI and biomedical data analysis. Recent first-authored works were published or accepted at **NeurIPS 2026**, **ICML 2026**, **ECCV 2026**, **ECML PKDD 2026**, and **ICPR 2026**.

Education

West Virginia University - PhD, Computer Science — Aug 2021 - Expected Fall 2026
NSF NRT Bridges in Digital Health Fellow • Advisor: Dr. Donald A. Adjeroh • PhD candidacy and dissertation proposal defense completed, Aug 2026.
Dissertation: *Reordering in Representation Learning: Feature Sequencing for Tabular, Foundation, and Multimodal Models*
Graduate Certificate in Digital Health *(in progress)*

Jahangirnagar University - MSc, Computer Science — 2020

Khulna University of Engineering & Technology - BSc, Electronics & Communication Engineering — 2017

Selected Research Projects

BSTabDiff - Generative Modeling for High-Dimensional Tabular Data — **NeurIPS 2026**
Latent block-subunits with diffusion / flow priors for stable high-dimensional tabular generation under HDLSS regimes. **Accepted at NeurIPS 2026.** Earlier version presented at the **ICLR 2026 DeLTa Workshop**.
ICLR Workshop • **Paper** • **arXiv** • **Code** • **PyPI**

GOTabPFN - Adaptation of Foundation Models for High-Dimensional Data — **ICML 2026**
Graph-guided Ordering with Local Refinement (GO-LR) and Neuro-inspired Subunit Compression (NSC) adapt a frozen TabPFN-2.5 predictor to high-dimensional / HDLSS tabular data, including regimes commonly encountered in omics and gene-expression analysis.
ICML • **Paper** • **arXiv** • **Code** • **Project Webpage** • **PyPI** • **Demo**

iSyncTab - Cross-Modal Representation Learning via Neural Synchrony — **ECCV 2026**
Neural Synchrony-guided Paired Feature Sequencing (NS-PFS) learns synchronized cross-modal token orderings before an Order-aware Memory-augmented Transformer (OMT); studied across image-tabular and audio-video multimodal learning.
ECCV • **Paper** • **Code** • **Project Webpage** • **PyPI** • **Demo** • **Weights**

DynaTab - Dynamic Feature Ordering as Neural Rewiring — **AAAI 2026 NeuroAI**
NeuroAI-inspired dynamic feature reordering with positional encoding, importance gating, and masked attention for sequence-sensitive representation learning on high-dimensional tabular data.
Paper • **arXiv** • **Code** • **PyPI**

iStructTab - Structured Feature Sequencing for Multimodal Learning — **ICPR 2026**
Graph-Enhanced Descriptor Sequencing (GEDS) learns a global permutation of image and tabular tokens before an Order-aware Efficient Memory-augmented Transformer (OEMT).
Paper • **arXiv** • **Code** • **Project Webpage** • **PyPI**

AugTab - Learnable Feature Augmentation for Structured Data — **ECML PKDD 2026**
A learnable Feature Augmentation Layer (FAL) combines nonlinear projections, explicit cross-interactions, input-adaptive gating, and budget/stability regularization; evaluated across 15 classification and regression benchmarks.
Paper • **Code** • **PyPI** • Research Track

ZAYAN - Contrastive Representation Learning for Remote-Sensing Data — **ICPR 2026 | RRPR Badge**
Feature-level contrastive representation learning for heterogeneous remote-sensing and environmental tabular data, followed by a Transformer classifier that preserves learned feature geometry.
Paper • **arXiv** • **Code** • **Project Webpage** • **PyPI** • **RRPR Badge**

TabSeq - Sequential Feature Ordering for Tabular Deep Learning — **ICPR 2024**
Feature ordering framework that clusters and sequences related tabular variables before attention-based representation learning, establishing the ordering direction developed in later work.
Paper • **arXiv** • **Code** • **PyPI**

Selected Publications

AZSB Habib, MY Ahamed, PK Gyawali, G Doretto, DA Adjeroh. "BSTabDiff: Block-Subunit Diffusion Priors for High-Dimensional Tabular Data Generation." *NeurIPS 2026. Earlier version presented at the ICLR 2026 DeLTa Workshop.* ***[Paper]*** ***[arXiv]***

AZSB Habib, MY Ahamed, PK Gyawali, G Doretto, DA Adjeroh. "GOTabPFN: From Feature Ordering to Compact Tokenization for Tabular Foundation Models on High-Dimensional Data." *ICML 2026.* ***[Paper]*** ***[arXiv]***

AZSB Habib, MY Ahamed, PK Gyawali, G Doretto, DA Adjeroh. "iSyncTab: Learning Cross-Modal Feature Sequencing for Image-Tabular Data via Neural Synchrony." *ECCV 2026.* ***[Paper]*** ***[PDF]***

AZSB Habib, MY Ahamed, PK Gyawali, G Doretto, DA Adjeroh. "iStructTab: Structured Feature Sequencing for Multimodal Learning of Image and Tabular Data." *ICPR 2026.* ***[Paper]*** ***[arXiv]***

AZSB Habib, G Doretto, DA Adjeroh. "DynaTab: Dynamic Feature Ordering as Neural Rewiring for High-Dimensional Tabular Data." *AAAI 2026 NeuroAI Workshop Proceedings, PMLR.* ***[Paper]*** ***[arXiv]***

AZSB Habib, MY Ahamed, MAB Syed, MS Islam, M Tabasum, T Tasnim, ME Islam. "AugTab: Learnable Feature Augmentation for Low-Dimensional Tabular Data." *ECML PKDD 2026 Research Track.* ***[Paper]***

AZSB Habib, T Tasnim, ME Islam, M Tabasum. "ZAYAN: Disentangled Contrastive Transformer for Tabular Remote Sensing Data." *ICPR 2026.* ***RRPR Reproducibility Badge.*** ***[Paper]*** ***[arXiv]*** ***[Badge]***

AZSB Habib, K Wang, M-A Hartley, G Doretto, DA Adjeroh. "TabSeq: A Framework for Deep Learning on Tabular Data via Sequential Ordering" *ICPR 2024.* ***[Paper]*** ***[arXiv]***

Full record: **Google Scholar** • **Publications**

Research & Technical Expertise

Research Areas	AI for scientific and biomedical data; representation learning; foundation models; multimodal learning; generative modeling; high-dimensional machine learning; structured and tabular data
Learning Methods	Transformers and attention; contrastive learning; diffusion models; foundation model adaptation; cross-modal alignment; feature ordering/sequencing; memory-augmented architectures
Research Practice	Algorithm and model design; rigorous empirical evaluation; ablation and sensitivity analysis; controlled benchmarking; statistical validation; hyperparameter optimization; reproducible machine learning
ML Engineering	Python; PyTorch; TensorFlow/Keras; scikit-learn; Hugging Face; CUDA/GPU experimentation; NumPy/SciPy; Optuna; Git/GitHub; open-source model and software releases

Scientific & Biomedical ML Relevance

HDLSS / Omics	Methods for High-Dimensional, Low-Sample Size learning regimes relevant to gene-expression and omics data
Digital Health	NSF NRT Bridges in Digital Health Fellow with interdisciplinary training in machine learning and biomedical data analysis
Scientific ML	Multimodal representation learning and generative modeling for structured, high-dimensional data

Research & Professional Experience

West Virginia University - Graduate Research / Teaching Assistant 2021 - Present

Research in high-dimensional, structured, and multimodal machine learning; development of reproducible experimental pipelines and open-source research software. Primary-instructor / teaching experience across programming, data structures, computer engineering, and electrical engineering laboratories.

NSF NRT Bridges in Digital Health - Fellow 2025 - Present

Interdisciplinary training spanning machine learning, digital health, biomedical data analysis, and cross-domain collaboration.

Fiber@Home Limited - Engineer, IP Transmission Network 2017 - 2018

Network deployment and operations for a nationwide government ICT infrastructure project in Bangladesh.

Selected Honors, Leadership & Research Service

- **ICPR 2026:** IAPR Travel Stipend and **RRPR Reproducibility Badge** for *ZAYAN*.
- **President, Graduate & Professional Student Senate (GPSS)**, West Virginia University, 2024-2025; led GPSS when it received WVU's **2024-2025 Outstanding Graduate Student Organization Award**. Statler College Senator, 2023-2024.
- Peer reviewer for **NeurIPS 2026, ICLR 2025/2026/2027, AAAI 2026/2027, AISTATS 2026, and ICPR 2024/2026**, plus associated workshops.

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