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Nahid Ul Islam, Ph.D.

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SUMMARY

- Ph.D. in Computer Science at Arizona State University (ASU); developed foundation models for large-scale image analysis in collaboration with **Mayo Clinic**; published **6 conference and 2 journal papers** with **180+ citations** with **h-index 7**.
- AI/ML Researcher and Engineer specializing in **Computer Vision** and **Deep Learning** with expertise in **foundation model pretraining**, **multi-task learning, Swin Transformer, and Vision Transformers** for large-scale image analysis.
- Inventor of **3 granted U.S. patents** and recipient of the **ASU President's Award for Innovation** in AI and Deep Learning research.
- Experienced in **model development**: large-scale experiment design, benchmarking, and optimization across diverse imaging tasks.
- Completed **2 industry internships** in Machine Learning and Computer Vision at **Intel Corporation**.
- Proficient in **Python**, **MATLAB , C/C++**, and **Java**, with expertise in deep learning frameworks such as **PyTorch** and **TensorFlow**.

EDUCATION

- **Doctor of Philosophy (Ph.D.) in Computer Science** 2018 – 2026
  Arizona State University, USA | Research: Computer Vision, Deep Learning, Foundation Models GPA: 4.00/4.00
  Dissertation: Maximizing the Utility of Expert Annotations for Medical Image Analysis
- **Master of Science (M.Sc.) in Computer Science** 2015 – 2017
  University of Texas at San Antonio, USA | Research: Computer Vision, Machine Learning, Image Processing GPA: 3.90/4.00
  Thesis: Face Detection and Age-Gender Estimation Using Patch-Based DCT and HOG Features
- **Bachelor of Science (B.Sc.) in Computer Science** 2010 – 2014
  BRAC University, Bangladesh | Research: Image Processing
  Thesis: Automated Parking Lot Management via License Plate and Bengali Text Recognition Using Image Processing

WORK EXPERIENCE

Arizona State University Tempe, AZ
Graduate Research Assistant *(ASU-Mayo Clinic Joint Research Collaboration)* Aug 2018 – May 2026

- Published **8 peer-reviewed papers** (**6** conference, **2** journal) on Deep Learning, Computer Vision, and Image Analysis.
- Inventor of **3 granted** and **5 pending U.S. patents** in AI and Deep Learning, developed in collaboration with **Mayo Clinic**.
- Built scalable AI/ML frameworks on High-Performance Computing (HPC) GPU infrastructure using distributed training, Linux/SLURM-based remote computing, workflow orchestration, and large-scale data pipelines to support model training.
- Developed a systematic benchmark comparing 12 CNN architectures, Vision/Swin Transformers, and 19 self-supervised models for image classification; proposed **Embedding-based ViT (EViT)**, a two-stage framework that aggregates image-level representations across variable-length image sequences for volume-level prediction, improving AUC by 2.22% over prior state-of-the-art; achieved 94.3% average AUC in zero-shot transfer, with model attention verified against ground-truth regions.
- Designed **Foundation X/X+**, an end-to-end multi-task foundation model framework integrating image classification, object detection, and segmentation; pretrained on 11 datasets (~826k images) spanning 11 classification, 6 detection, and 3 segmentation tasks; introduced Lock-Release Pretraining to reduce task-specific overfitting; outperformed single-task baselines across all datasets, with average gains of +1.0% AUC, +8.4% mAP, +3.7% Dice, and strong cross-task/cross-dataset generalization.
- Developed **Foundation CTPA**, a unified 3D foundation model integrating image-level classification, volume-level classification, detection, and segmentation in one framework; pretrained on over 1.5 million image slices from 3D volumes; introduced Region-Guided ROI Alignment to transfer detection cues to segmentation; achieved gains over single-task baselines, averaging +6.7% image AUC, +2.6% volume AUC, +16.5% mAP, and +5.8% Dice, with strong generalization and cross-domain transferability.

Intel Corporation Hillsboro, OR
Graduate Technical Intern — Machine Learning and Computer Vision May 2017 – Aug 2017

- Benchmarked R-CNN, Fast R-CNN, Faster R-CNN, and Mask R-CNN for real-time obstacle detection, classification, and collision prediction for moving objects.
- Evaluated model performance and presented experimental findings and actionable recommendations to the team, contributing to pathfinding and technical readiness decisions.

Intel Corporation Hillsboro, OR
Graduate Software Engineering Intern — Machine Learning and Computer Vision Feb 2017 – May 2017

- Researched deep learning approaches for human activity recognition from videos to enable smart home applications.
- Developed an activity recognition system combining CNNs and optical flow for temporal modeling; conducted iterative experiments to improve model accuracy and robustness.

TECHNICAL SKILLS

- **Programming Languages**
  Python, C/C++, Java, MATLAB, Bash/Shell
- **Machine Learning Framework/Library**
  PyTorch, TensorFlow, Hugging Face Transformers, Scikit-Learn, OpenCV, NumPy, Pandas, Weights & Biases, Git/GitHub
- **Computing & Infrastructure**
  High-Performance Computing (HPC), Distributed Training, Linux, SLURM, Large-Scale Data Pipelines
- **Core Artificial Intelligence (AI) & Machine Learning (ML)**
  Deep Learning, Foundation Models, Large-scale Pretraining, Transfer Learning, Fine-tuning, Multitask Learning, Supervised/Self-Supervised Learning, CNNs, Large Language Models (LLMs), Transformer Architectures (Vision/Swin)
- **Model Development, Experimentation & Analysis**
  Experiment Design, Ablation Studies, Statistical Significance Testing, Benchmarking, Qualitative/Quantitative Analysis, Explainable AI, Attention/Embedding Analysis (Grad-CAM/t-SNE), Model Monitoring/Debugging

PUBLICATIONS

[**Google Scholar:** Citations 180+ | h-index 7]

Peer-refereed Journal Publications (Selected)

(2 Published | 2 Under Review)

1. **Islam, N. U.**, Zhou, Z., Gehlot, S., Gotway, M. B., & Liang, J. (2024). *Seeking an optimal approach for Computer-aided Diagnosis of Pulmonary Embolism.* Medical Image Analysis *(Impact Factor 14.0)*, 91, 102988.
2. Guo, Z., **Islam, N. U.**, Gotway, M. B., & Liang, J. (2024). *Stepwise incremental pretraining for integrating discriminative, restorative, and adversarial learning.* Medical Image Analysis *(Impact Factor 14.0)*, 95, 103159.

Peer-refereed Conference Publications (Selected)

1. **Islam, N. U.**, Ma, D., Pang, J., Senthil Velan, S., Gotway, M. B., & Liang, J. (2025). *Foundation X: Integrating Classification, Localization, and Segmentation through Lock-Release Pretraining Strategy for Chest X-ray Analysis.* In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV).
2. **Islam, N. U.**, Ma, D., Gotway, M. B., & Liang, J. (2026). *A Generic 3D Foundation Model Utilizing 2D and 3D Annotations for Classification, Localization, and Segmentation in CT Pulmonary Angiography. Large Foundation Models in Biology and Biomedicine (LFMBio 2026*), in conjunction with IEEE/CVF WACV 2026.
3. **Islam, N. U.**, Gehlot, S., Zhou, Z., Gotway, M. B., & Liang, J. (2021). *Seeking an optimal approach for computer-aided pulmonary embolism detection.* Machine Learning in Medical Imaging, in conjunction with MICCAI 2021.
4. Guo, Z., **Islam, N. U.**, Gotway, M. B., & Liang, J. (2022). *Discriminative, restorative, and adversarial learning: Stepwise incremental pretraining.* Domain Adaptation and Representation Transfer, in conjunction with MICCAI 2022.

PATENTS

[**Granted:** 3 | **Pending**: 5+]

Granted

1. U.S. Patent No. 12,572,813, "*Systems, methods, and apparatuses for implementing discriminative, restorative, and adversarial (DiRA) learning using stepwise incremental pre-training for medical image analysis*," issued Mar 10, 2026.
2. U.S. Patent No. 12,394,186, "*Systems, methods, and apparatuses for implementing self-supervised domain-adaptive pre-training via a transformer for use with medical image classification*," issued Aug 19, 2025.
3. U.S. Patent No. 12,236,592, "*Systems, methods, and apparatuses for systematically determining an optimal approach for the computer-aided diagnosis of a pulmonary embolism*," issued Feb 25, 2025.

Pending (Selected)

1. U.S. Patent Application No. 19/447,985, "*Method and Apparatus for Integrating Classification, Localization, and Segmentation Through Lock-Release Pretraining Strategy for Chest X-Ray Analysis*," filed Jan 13, 2026.
2. U.S. Patent Application No. 18/904,995, "*Systems, Methods and Apparatuses for Computer-Aided Diagnosis of Pulmonary Embolism*," filed Oct 2, 2024.
3. U.S. Patent Application No. 18/776,010, "*Systems, methods, and apparatuses for implementing stepwise incremental pre-training for integrating discriminative, restorative, and adversarial learning into an AI model*," filed Jul 17, 2024.

AWARDS AND HONORS

- Earned **SUN Award**, Arizona State University, for invited research talk and providing subject matter expert feedback — Apr 2026
- Received the prestigious **President's Award for Innovation**, Arizona State University
  Project Title: '*Annotation-efficient Deep Learning for Computer-aided Diagnosis in Medical Imaging*' — Dec 2024
- Awarded prestigious **Doctoral Fellowship** at Arizona State University — Aug 2018
- Honored by **VC's List Award** for securing highest GPA (4.0 out of 4.0) in the last semester at BRAC University — Dec 2014