Mohammad Imran Hossain

PhD Applicant in AI for Healthcare

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Research engineer with training across computational pathology, multimodal AI, and medical image analysis. Current work at Institut Curie focuses on integrating histopathology and spatial transcriptomics to study the tumor microenvironment. Seeking PhD positions for the 2026/2027 intake in multimodal medical AI, computational pathology, and medical image analysis.

Research Interests

Computational pathology; multimodal AI for healthcare; medical image analysis; spatial transcriptomics; weakly supervised learning; self-supervised learning; segmentation; registration; image reconstruction; AI-assisted diagnosis.

Research Experience

Research Engineer - Bioinformatics & AI

Institut Curie - PSL Research University, Paris, France | Oct 2025 - Present

• Developing multimodal computational pipelines integrating histopathology and spatial transcriptomics to study tumor microenvironment dynamics.

• Contributing to clinically grounded AI workflows for cancer biology with a focus on reproducible analysis and manuscript preparation.

Research Intern - Bioinformatics & Spatial Transcriptomics

Institut Curie / Sanofi collaboration, Paris, France | Feb 2025 - Aug 2025

• Built analysis pipelines for Visium V2 and Visium HD spatial transcriptomics data.

• Identified eight candidate genes potentially mediating CAF-driven T-cell exclusion in lung squamous cell carcinoma.

• Contributed to ongoing manuscript preparation.

Research Intern - Computational Pathology

National Center for Scientific Research (CNRS), France | Feb 2024 - Jul 2024

• Benchmarked fully supervised, weakly supervised, and self-supervised methods for homologous recombination deficiency detection in breast and ovarian cancer whole-slide images.

• Evaluated attention-based multiple instance learning and foundation-model-based pipelines.

• Best performance reached AUC 0.78 on breast cancer and 0.68 on ovarian cancer.

Visiting Researcher - Medical Image Analysis

Diagnostic Image Analysis Group, Radboud University Medical Center, Netherlands | Aug 2023 - Oct 2023

• Developed preprocessing pipelines for k-space undersampling and evaluated deep learning models for real-time MRI reconstruction in interventional radiology.

Education

Master of Computer Science, Bioinformatics and Modeling

Sorbonne University, France | 2024 - 2025

Grade: 14.85/20 | Rank: 1st of 8 | Best Thesis Award
Thesis: Identification of Tumor Gene Signatures Underlying Fibroblast-Mediated T Cell Exclusion in Lung Cancer Using Spatial Transcriptomics.

Erasmus Mundus Joint Master's in Medical Imaging and Applications

University of Girona, University of Cassino, University of Burgundy | 2022 - 2024

Grade: 8.30/10 | Fully funded by the European Union (EUR 42,000).

17th EXCITE Summer School on Biomedical Imaging
ETH Zurich and University of Zurich, Switzerland | 2023
4 ECTS.

B.Sc. in Electrical and Electronic Engineering
United International University, Bangladesh | 2018 - 2022
GPA: 3.97/4.00 | Summa Cum Laude | Rank: 1st of 120.

Preprints and Manuscripts

Tumor Gene Signatures Underlying Fibroblast-Mediated T Cell Exclusion in Lung Cancer
Institut Curie / Sanofi collaboration | In preparation
Hossain M.I. et al. Manuscript in preparation, 2026.

Comparative Study of Probabilistic Atlas and Deep Learning for Brain Tissue Segmentation
ArXiv 2024
Hossain M.I., Amin M.Z., et al. arXiv:2411.05456

Deep Learning and Classical Computer Vision in Medical Image Analysis
ArXiv 2025
Tweneboah A.D., Hossain M.I. (co-author), et al. arXiv:2502.19258

Selected Projects

Spatial Transcriptomics Analysis of Tumor Immune Exclusion
Institut Curie / Sanofi | 2025
Visium HD pipeline for identifying CAF-mediated T-cell exclusion signatures in lung squamous cell carcinoma.

HRD Detection in Cancer WSIs via Foundation Models and MIL
CNRS | 2024
Benchmarked AB-MIL, CLAM, Trans-MIL, and foundation models for homologous recombination deficiency detection.

Cardiac Structure Segmentation from 2D Echocardiograms
Sorbonne University | 2025
nnU-Net pipeline for echocardiogram segmentation. Dice scores: LV endocardium 0.94, LV epicardium 0.91, left atrium 0.93.

Breast Cancer Subtype Classification via Multi-omics Integration
Sorbonne University | 2024
XGBoost pipeline integrating DNA methylation, CNV, mRNA, and miRNA data for subtype classification. Balanced multiclass accuracy: 0.90.

Awards and Distinctions

• Best Thesis Award, Sorbonne University.

• Ranked 2nd in the MAIA Brain Tissue Segmentation Challenge, University of Girona.

• Erasmus Mundus Scholarship awarded by the European Union.

• Summa Cum Laude, United International University.