

Rabeya Tus Sadia

rabeya-tus-sadia Google Scholar rumi07.github.io

Education

- **PhD candidate, Department of Computer Science** **University of Kentucky**
Lexington, KY, USA *Jul, 2026*
GPA: 4.0/4.0
- **BSc in Computer Science & Engineering** **Rajshahi University of Engineering & Technology**
Rajshahi, Bangladesh *2021*
(10th out of 120)

Professional Experience

- **University of Kentucky** **Lexington, KY, USA**
Graduate Research Assistant, Internal Medicine & Division of Biomedical Informatics *Jan 2026 – Present*
 - Research focuses on generative models and causality-aware methods for multitasks and multimodal datasets. Specially medical imaging and multiomics datasets, leveraging generative AI, Diffusion and foundation models, and large language models (LLMs).
 - Worked on causality-aware imputation for spatial omics datasets and currently developing causality-aware multimodal foundation models and agent-based causal language modeling.
 - Collaborated with the **Biomedical Optics Lab** and **Gluck Equine Research Centre**.
- **University of Kentucky** **Lexington, KY, USA**
Graduate Teaching Assistant, Department of Computer Science *Jan, 25 – Dec, 25*
 - Instructor for CS215 – Introduction to Programming Design, Abstraction, and Problem Solving.
- **Green University of Bangladesh** **Dhaka, Bangladesh**
Lecturer, Department of Computer Science and Engineering *Jan 31, 2022*
 - Taught courses in Discrete Mathematics, Data Communication, Database Systems, and Information System Design.
 - Supervised undergraduate projects and thesis.

Selected Publications

- [1] **Rabeya Tus Sadia**, M. A. Ahamed, and Q. Cheng, "Causalged: Blending causality and diffusion for spatial gene expression generation," in *Proceedings of the 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining V.2*, KDD '25, p. 2466–2477, Association for Computing Machinery, 2025.
- [2] **Rabeya Tus Sadia**, M. A. Ahamed, and Q. Cheng, "Causalgediff: Generative causal diffusion bridges scrna-seq and spatial transcriptomics," *Journal of Biomedical Informatics*, vol. 173, p. 104966, 2026.
- [3] **Rabeya Tus Sadia** and Q. Cheng, "**CrunchLLM: Multitask LLMs for structured business reasoning and outcome prediction**," *Neurocomputing*, vol. 686, p. 133754, 2026.
- [4] **Rabeya Tus Sadia**, Q. Ye, and Q. Cheng, "**CrossLLM-Mamba: Multimodal State Space Fusion of LLMs for RNA Interaction Prediction**," *arXiv preprint arXiv:2602.22236*, 2026. Under review.
- [5] F. Fathi, **Rabeya Tus Sadia**, M. Mohtasebi, P. Mos, C. Bruschini, E. Charbon, L. Chen, J. Chen, and G. Yu, "**Using the latent diffusion model to enhance time-resolved laser speckle contrast imaging (TR-LSCI) of cerebral blood flow**," *Biomedical Optics Express*, vol. 16, no. 10, pp. 3895–3911, 2025.
- [6] **Rabeya Tus Sadia** and Q. Cheng, "Depmicrodiff: Diffusion-based dependency-aware multimodal

- imputation for microbiome data," *Computational and Structural Biotechnology Journal*, vol. 35, no. 1, p. 0150, 2026.
- [7] **Rabeya Tus Sadia**, J. Zhang, and J. Chen, "**Multiscale Latent Diffusion Model for Enhanced Feature Extraction from Medical Images**," 2024.
- [8] **Rabeya Tus Sadia**, J. Chen, and J. Zhang, "**CT image denoising methods for image quality improvement and radiation dose reduction**," *Journal of Applied Clinical Medical Physics*, vol. 25, no. 2, p. e14270, 2024.
- [9] **Rabeya Tus Sadia**, M. A. Ahamed, and M. A. Hossain, "**Multiple weather scene detection utilizing the EfficientNet family**," in *6th International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering(IC4ME2)*, pp. 140–145, 2021. (Published).
- [10] **Rabeya Tus Sadia**, M. A. M. Hasan, and A. Sayeed, "**Classification of skin lesion using transfer-learned CNN and feature concatenation**," in *6th International Conference on Engineering Research, Innovation and Education (ICERIE)*, pp. 89–94, 2021. (Published).
- [11] M. A. Ahamed and **Rabeya Tus Sadia**, "**Examining the behaviour of state-of-the-art convolutional neural networks for brain tumor detection with and without transfer learning**," *arXiv preprint arXiv:2206.01735*, 2022. (Preprint).

Medium Blogs

- How to connect text and images:
Understanding Zero-shot Learning and **Understanding Zero-shot learning with the CLIP model**
- Understanding graph neural network with hands on example:
Part-1 & Part-2
- Deep learning for Classifying Audio of Infant crying with hands-on example
- Medical Image Denoising with CNN

Projects

- **Horse CT Bone Segmentation and Analysis**
Contributed with Gluck Equine Research Centre, University of Kentucky
 - **Description:** Developed segmentation pipelines using SAM and SAM2 models to segment horse leg CT bones and extract detailed bone cluster features.
 - **Contributions:** Led data preprocessing, segmentation optimization, feature extraction, and achieved high segmentation accuracy across varied anatomical regions.
 - **Technologies:** Python, SAM/SAM2, PyTorch, DICOM processing, clustering, feature analysis.
- **Online Book Shopping** (Project for CSE 3200: Software Development Project-II)
Supervisor: Prof. Nazrul Islam Mondal, Department of CSE, RUET, February 2016
 - **Description:** A web application that enables users to purchase books online. The system includes features such as book search, order history management, user authentication, and email verification via RESTful web API services.
 - **Technologies Used:** PHP, HTML5, CSS3, JavaScript, jQuery, JSON, MySQL, Apache Server.
- **Building a Chatbot using Python**
 - **Description:** An AI-based chatbot designed to interact with users in natural language.

Achievements

- Selected to join and present our work in **NAIRR Annual Meeting -2026**
- Selected for **KDD'25 student Travel Award**

- Champion of Huawei Seeds for the Future 2020

Services

- Reviewer of Elsevier Reviewer Hub
- Reviewer of the KDD conference.

Programming Skills

- Proficient in Python, C++, C and Java
- Significant Experience with Python
- Machine Learning & Deep Learning tools & framework PyTorch, Keras & scikit-learn