

## Md Mamunur Rahaman

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Google Scholar

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## Summary

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I am a researcher at the intersection of biomedical science and artificial intelligence, developing AI models and computational methods for healthcare. My work focuses on multimodal medical AI (histopathology, radiology, molecular, and clinical data) and building robust, clinically meaningful models for diagnosis, prognosis, and treatment stratification.

## Education

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### PhD Candidate in Computer Science and Engineering (2025)

School of Computer Science and Engineering, University of New South Wales, Sydney, Australia.

Advisors: Prof. Dr. Erik Meijering, Prof. Dr. Anant Madabhushi and A/Prof. Dr. Ewan Millar

### Master of Biomedical Engineering (2021)

GPA/Score - 91.5%; Highest Distinction

College of Medicine and Bioinformatics Engineering, Northeastern University, Shenyang, China.

Advisors: Prof. Dr. Yu-Dong Yao and Prof. Dr. Chen Li

### Bachelor of Science in Electrical and Electronic Engineering with High Distinction (2017)

Major Area - Power; CGPA – 3.79 (on a scale of 4.00); High Distinction

BRAC University, Dhaka, Bangladesh.

Advisor: Prof. Dr. Md Mosaddequr Rahman

## Skills

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### Programming / ML

- Python (advanced): PyTorch, TensorFlow; NumPy, scikit-learn; data pipelines and experiment management.
- Deep learning: CNNs, Vision Transformers, contrastive learning, multimodal learning; training at scale (mixed precision, distributed training).
- NLP / LLMs: Prompt engineering and vision–language models; LLM-based workflows/agents for healthcare.
- MATLAB: Signal processing and numerical computing (biomedical applications).
- C/C++: working knowledge.

### Research Computing / HPC

- Linux-based HPC (e.g., NCI Gadi and UNSW Katana clusters); PBS/Slurm job scheduling; multi-GPU training and debugging.
- Environments & reproducibility: conda/mamba; Git/GitHub.

### Tools

- LaTeX; Microsoft Office (Word, PowerPoint, Excel).

### Languages

- English (fluent); Bangla (native).

## Work Experiences

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### Postdoctoral Writing Fellow (Research-only; 0.4 FTE)

School of Computer Science & Engineering, University of New South Wales (UNSW), Sydney, Australia

Nov 2025 – Jan 2026

- Research-only appointment supporting research writing and publication outcomes under the supervision of Professor Erik Meijering.

### Casual Academic Staff

School of Computer Science & Engineering, UNSW, Sydney, Australia

May 2022 – Present

- Tutored courses including Computer Vision (COMP9517), Neural Networks and Deep Learning (COMP9444), and Artificial Intelligence (COMP9814), facilitating student learning and comprehension in complex topics.

### Visiting Researcher

Schüffler Lab (AI for Pathology), Technical University of Munich (TUM), Munich, Germany

October - November 2025

- Delivered a seminar on multimodal pathology AI and engaged with the Schüffler Lab's AI-for-digital-pathology research.

### Visiting Fellow

Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, GA, USA

December 2024 - April 2025

- Collaborated with Professor Anant Madabhushi's research group, focusing on the application of advanced artificial intelligence and machine vision techniques to computational pathology for cancer research.

### Research Assistant

Microscopic Image & Medical Image Analysis Group, Northeastern University, China

January 2021 - January 2022

- Engaged in biomedical image analysis research, contributing to the development of innovative techniques and tools, and participated in the publication of research findings.

### Student Tutor

BRAC University, Dhaka, Bangladesh

September 2015 - April 2017

- Delivered academic support in various courses, including Electromagnetic Waves and Fields, and Signals and Systems, significantly improving student academic performance and conceptual understanding through interactive problem-solving sessions and customized study materials.

## Selected Publications

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I have contributed to over 40 peer-reviewed journal and conference papers, achieving an H-index of 23 and accumulating over 3200 citations on Google Scholar. For a detailed list of my most recent publications, please visit my Google Scholar profile: **Mamunur Rahaman**

### Journal Articles:

1. **Rahaman, M.M.**, Millar, E.K. and Meijering, E., 2025. Leveraging Vision-Language Embeddings for Zero-Shot Learning in Histopathology Images. *IEEE Journal of Biomedical and Health Informatics*.
2. **Rahaman MM**; Millar EKA; Meijering E, 2024, 'Generalized deep learning for histopathology image classification using supervised contrastive learning', *Journal of Advanced Research*.
3. **Rahaman M. M.**; Millar EKA; Meijering E, 2023, 'Breast cancer histopathology image-based gene expression prediction using spatial transcriptomics data and deep learning', *Scientific Reports*, 13.
4. **Rahaman M. M.**; Li C; Yao Y; Kulwa F; Wu X; Li X; Wang Q, 2021, 'DeepCervix: A deep learning-based framework for the classification of cervical cells using hybrid deep feature fusion techniques', *Computers in Biology and Medicine*, 136.
5. **Rahaman M. M.**; Li C; Yao Y; Kulwa F; Rahman MA; Wang Q; Qi S; Kong F; Zhu X; Zhao X, 2020, 'Identification of COVID-19 samples from chest X-Ray images using deep learning: A comparison of transfer learning approaches', *Journal of X-Ray Science and Technology*, 28, pp. 821 - 839.

6. **Rahaman M. M.**; Li C; Wu X; Yao Y; Hu Z; Jiang T; Li X; Qi S, 2020, 'A survey for cervical cytopathology image analysis using deep learning', *IEEE Access*, 8, pp. 61687 - 61710.
7. Han, Y.; Liu, K.; Yuan, L.; **Rahaman, M.**; Grzegorzec, M.; Sun, H.; Li, C.; Chen, H., 2025, 'Channel-Gated Transformers With Affinity CAM for Weakly Supervised Multi-Class Brain Tumor Segmentation', *IEEE Journal of Biomedical and Health Informatics*.
8. Yuan, L.; Chen, Y.; **Rahaman, M.**; Sun, H.; Chen, H.; Grzegorzec, M.; Li, C.; Li, X., 2025, 'Dual-Level Imbalance Mitigation for Single-FoV Colorectal Histopathology Image Classification', *IEEE Journal of Biomedical and Health Informatics*.
9. Du T.; Jiang T.; Li X.; **Rahaman M. M.**; Grzegorzec M.; Li C, 2025. Prediction of TP53 mutations across female reproductive system pan-cancers using deep multimodal PET/CT radiogenomics. *Frontiers in Medicine*, 12, 1608652.
10. Du T.; Li C.; Grzegorzec M.; Huang X.; **Rahaman M. M.**; Wang X.; Sun H, 2025. PET/CT radiomics for non-invasive prediction of immunotherapy efficacy in cervical cancer. *Journal of X-Ray Science and Technology*.
11. Sun Y; Du T; Wang B; **Rahaman MM**; Wang X; Huang X; Jiang T; Grzegorzec M; Sun H; Xu J; Li C, 2025, 'COVID-19CT+: A public dataset of CT images for COVID-19 retrospective analysis.', *Journal of X-Ray Science and Technology*.
12. Li R; Li X; Sun H; Yang J; **Rahaman M**; Grzegorzec M; Jiang T; Huang X; Li C, 2024, 'Few-shot learning based histopathological image classification of colorectal cancer', *Intelligent Medicine*, 4, pp. 256 – 267.
13. Yu Y; Li X; Du T; **Rahaman M**; Grzegorzec MJ; Li C; Sun H, 2024, 'Increasing the accuracy and reproducibility of positron emission tomography radiomics for predicting pelvic lymph node metastasis in patients with cervical cancer using 3D local binary pattern-based texture features', *Intelligent Medicine*, 4, pp. 153 – 160.
14. Chen H; Li X; Li C; **Rahaman M. M.**; Li X; Wu J; Sun H; Grzegorzec M; Li X, 2024, 'What can machine vision do for lymphatic histopathology image analysis: a comprehensive review', *Artificial Intelligence Review*, 57.
15. Hu W; Li C; **Rahaman M. M.**; Chen H; Liu W; Yao Y; Sun H; Grzegorzec M; Li X, 2023, 'EBHI: A new Endoscopy Biopsy Histopathological H&E Image Dataset for image classification evaluation', *Physica Medica*, 107.
16. Kulwa F; Li C; Grzegorzec M; **Rahaman M. M.**; Shirahama K; Kosov S, 2023, 'Segmentation of weakly visible environmental microorganism images using pair-wise deep learning features', *Biomedical Signal Processing and Control*, 79.
17. Li X; Li C; **Rahaman M. M.**; Sun H; Li X; Wu J; Yao Y; Grzegorzec M, 2022, 'A comprehensive review of computer-aided whole-slide image analysis: from datasets to feature extraction, segmentation, classification and detection approaches', *Artificial Intelligence Review*, 55, pp. 4809 - 4878.
18. Liu W; Li C; Xu N; Jiang T; **Rahaman M. M.**; Sun H; Wu X; Hu W; Chen H; Sun C; Yao Y; Grzegorzec M, 2022, 'CVM-Cervix: A hybrid cervical Pap-smear image classification framework using CNN, visual transformer and multilayer perceptron', *Pattern Recognition*, 130.
19. Chen H; Li C; Wang G; Li X; **Rahaman M. M.**; Sun H; Hu W; Li Y; Liu W; Sun C; Ai S; Grzegorzec M, 2022, 'GasHis-Transformer: A multi-scale visual transformer approach for gastric histopathological image detection', *Pattern Recognition*, 130.
20. Li Y; Wu X; Li C; Li X; Chen H; Sun C; **Rahaman M. M.**; Yao Y; Zhang Y; Jiang T, 2022, 'A hierarchical conditional random field-based attention mechanism approach for gastric histopathology image classification', *Applied Intelligence*, 52, pp. 9717 - 9738.
21. Chen H; Li C; Li X; **Rahaman M. M.**; Hu W; Li Y; Liu W; Sun C; Sun H; Huang X; Grzegorzec M, 2022, 'IL-MCAM: An interactive learning and multi-channel attention mechanism-based weakly supervised colorectal histopathology image classification approach', *Computers in Biology and Medicine*, 143.
22. Hu W; Li C; Li X; **Rahaman M. M.**; Ma J; Zhang Y; Chen H; Liu W; Sun C; Yao Y; Sun H; Grzegorzec M, 2022, 'GasHisSDB: A new gastric histopathology image dataset for computer aided diagnosis of gastric cancer', *Computers in Biology and Medicine*, 142.
23. Chen A; Li C; Zou S; **Rahaman M. M.**; Yao Y; Chen H; Yang H; Zhao P; Hu W; Liu W; Grzegorzec M, 2022, 'SVIA dataset: A new dataset of microscopic videos and images for computer-aided sperm analysis', *Biocybernetics and Biomedical Engineering*, 42, pp. 204 – 214.
24. Sun C; Li C; Zhang J; **Rahaman M. M.**; Ai S; Chen H; Kulwa F; Li Y; Li X; Jiang T, 2020, 'Gastric histopathology image segmentation using a hierarchical conditional random field', *Biocybernetics and Biomedical Engineering*, 40, pp. 1535 – 1555.

25. Zhou X; Li C; **Rahaman M. M.**; Yao Y; Ai S; Sun C; Wang Q; Zhang Y; Li M; Li X; Jiang T; Xue D; Qi S; Teng Y, 2020, 'A Comprehensive Review for Breast Histopathology Image Analysis Using Classical and Deep Neural Networks', IEEE Access, 8, pp. 90931 – 90956.

#### Conference Proceedings:

1. **Rahaman M.M.**; Millar EKA; Meijering E, 2024, 'Histopathology image classification using supervised contrastive deep learning', in Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI).
2. Yuan L; **Rahaman M**; Sun H; Li C; Gu Y; Jiang T; Grzegorzec M; Li X, 2024, 'A GAN-Based Data Augmentation Method for Mitigating Class Imbalance Problem in Histopathological Image Classification', in Proceedings - 2024 IEEE International Conference on Bioinformatics and Biomedicine, BIBM 2024, pp. 5327 – 5334.
3. Li R; **Rahaman M.M.**; Li X; Sun H; Yang J; Gao M; Grzegorzec M; Jiang T; Huang X; Li C, 2025, 'An Extended Few-Shot Learning-Based Approach for Histopathological Image Classification of Pan-Cancer in the Digestive System', in Proceedings - 2024 Advanced Data Mining and Applications, ADMA 2024, pp. 140 - 154.
4. Yuan L; **Rahaman M.M.**; Sun H; Li X; Grzegorzec M; Xu N; Li C, 2025, 'MRes-CNN: A Multi-branch Residual CNN for Colorectal Histopathological Image Classification', in Proceedings - 2024 Advanced Data Mining and Applications, ADMA 2024, pp. 125 - 139.
5. Chen A; Fan FL; Zhang J; **Rahaman MM**; Li R; Tao J; Zeng T; Grzegorzec M; Li C, 2024, 'ACTIVE: A Deep Network for Sperm and Impurity Detection in Microscopic Videos', in Proceedings - 2024 IEEE International Conference on Bioinformatics and Biomedicine, BIBM 2024, pp. 5247 – 5256.
6. Zhang J; Zou S; Li C; Yao Y; **Rahaman M.M.**; Qian W; Sun H; Grzegorzec M; Wang G, 2023, 'TOD-Net: Transformer-Based Neural Network for Tiny Object Detection in Sperm Microscopic Videos', in Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI).
7. Li, Y.; Wu, X.; Li, C.; Sun, C.; Li, X.; **Rahaman, M. M.**; Zhang, Y., 2021, 'Intelligent Gastric Histopathology Image Classification Using Hierarchical Conditional Random Field based Attention Mechanism', in Proceedings of the 2021 13th International Conference on Machine Learning and Computing (ICMLC '21), Association for Computing Machinery, New York, NY, USA, pp. 330-335.
8. **Rahaman, M. M.**; Chowdhury, A.; Islam, M.; Rahman, Md. M., 2018, 'CZTS Based Thin Film Solar Cell: An Investigation into the Influence of Dark Current on Cell Performance', in Proceedings of the Joint 7th International Conference on Informatics, Electronics & Vision (ICIEV) and the 2nd International Conference on Imaging, Vision & Pattern Recognition (icIVPR), Kitakyushu, Japan, pp. 87-92. (Published during B.Sc. in EEE from BRAC University)
9. Chowdhury, A.; **Rahaman, M. M.**; Islam, M.; Rahman, Md. M., 2018, 'Effect of Temperature on CZTS Based Thin Film Solar Cell Performance', in Proceedings of the 35th EU PVSEC 2018, Brussels, Belgium, Session 3BV.2.34, pp. 899-902, ISBN 3-936338-50-7. (Published during B.Sc. in EEE from BRAC University)

#### Conference Presentations:

1. **Neural Information Processing Systems (NeurIPS), 2025, San Diego, USA (Oral Presentation – SLC-PFM Challenge Track):** "PathDFM: Pathology Distillation Foundation Model for Multi-Scale WSI Analysis." (Selected as a top-performing submission in the Self-supervised Learning for Cancer Pathology Foundation Models competition).
2. **Advanced Data Mining and Applications (ADMA), 2024, Sydney, Australia (Oral Presentations):**
  - "An Extended Few-Shot Learning-Based Approach for Histopathological Image Classification of Pan-Cancer in the Digestive System."
  - "MRes-CNN: A Multi-branch Residual CNN for Colorectal Histopathological Image Classification".
  - "RBMO-Att-Bi-LSTM: A Red-Billed Blue Magpie Optimiser-Self-attention Mechanism Based Optimisation of Bi-Directional Long- and Short-Term Memory Networks for Classification of COVID-19 CT Images."
  - "RPE-Diff: A Relative Position Encoding Diffusion Model for Perirenal Fat Segmentation in Metabolic Syndrome."
3. **International Symposium on Biomedical Imaging (ISBI), 2024:** Presented the poster titled "MM-SURVNET: Deep Learning-Based Survival Risk Stratification in Breast Cancer Through Multimodal Data Fusion". The work focused on deep learning-based methods for breast cancer survival risk stratification using multimodal data fusion.
4. **Australasian Computer Science Week, UNSW Sydney, 2024:** Presented the poster titled "Predicting Gene Expression in Breast Cancer Using BrST-Net and Spatial Transcriptomics." The work showcased advancements in using neural networks and spatial transcriptomics for cancer research.
5. **AI Symposium, UNSW Sydney, 2023:** Presented poster, highlighting innovative approaches to predicting gene expression in breast cancer and contributing to the field of computational biology.

## Manuscripts in Preparation:

1. **Rahaman, M. M.**, Xu, Y., Singh, A., Tung, P., Gong, D., Song, Y., Millar, E. K. A., & Meijering, E. (In Preparation). **\*PathDFM: Pathology Distillation Foundation Model for Multi-Scale WSI Analysis\***.
2. **Rahaman, M. M.**, Millar, E. K. A., Meijering, E., ....., & Madabhushi, A. (In Preparation). **\*AI-Driven Multi-Modal Histopathological Biomarker for Prognosis and Immunotherapy Response in Head and Neck Squamous Cell Carcinoma\***.
3. **Rahaman, M. M.**, Millar, E. K. A., Meijering, E., ....., & Madabhushi, A. (In Preparation). **\*Spatial Transcriptomics and Deep Learning Predict Docetaxel Benefit in High-Risk Prostate Cancer\***.
4. **Rahaman, M. M.**, Millar, E. K. A., Meijering, E., ....., & Madabhushi, A. (In Preparation). **\*AI Driven Frugality in Emergency Medicine using LLM\***.

## Academic Awards / Honors

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- Arc PGC Research Candidate Award (Faculty of Engineering), Honourable Mention, UNSW Postgraduate Council, 2025, recognised for above-and-beyond contribution to the HDR experience at UNSW.
- DAAD AInet Fellow (Postdoc-NeT-AI – AI for Science), 2024.
- DAAD AInet Research Visit Funding, 2025, Travel and subsistence support for a short-term visit to TUM (Munich, Germany).
- Received a certificate to attend ISBI 2024 in Athens, Greece.
- HDR Travel Funding, UNSW School of Computer Science and Engineering: Received funding to attend an international conference.
- DRTG Funding, UNSW: Received funding for international travel to present at conferences.
- Authored four papers recognized as ESI Highly Cited Papers, each entering the top 1% of the Engineering field.
- My publication in Scientific Reports was ranked among the top 100 cancer research papers of 2023.
- Certificate of Acknowledgment, ISMAR Conference 2023: Recognized for contributions as a local volunteer.
- Received funding to attend the 2022 DICTA Conference in Sydney.
- Awarded the UNSW University International Postgraduate Award (2022-2025).
- Received the Northeastern University Outstanding International Student Award for academic performance in 2019-2020 and 2018-2019.
- Awarded the Chinese Government Scholarship (2018-2021).
- Presented a paper at the ICIEV Conference in Japan, 2018 and received certificates of acknowledgment.
- Graduated with high distinction in Electrical and Electronic Engineering from BRAC University.
- Earned a performance-based scholarship and Dean's certificates for outstanding academic results at BRAC University.
- Certificate for Voluntary Works, Physically Disabled Foundation, July 2014.
- Certificate for Co-curricular Activities, BRAC University, 2013.
- Book Reading Competition Award, British Council, 2013.
- Merit Scholarship, Education Board, Government of Bangladesh, SSC, 2010.
- Merit Scholarship, Education Board, Government of Bangladesh, PSC, 2005.

## Professional Activities

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### Invited Talks & Webinars

- Computational Pathology Seminar (Schüffler Lab – AI for Pathology, Technical University of Munich (TUM), Munich, Germany), 28 Oct 2025 - Invited Speaker, “Multimodal Computational Pathology with Foundation and Vision - Language Models.”
- Datasets through the Looking-Glass (Webinar, IT University of Copenhagen, Denmark), 20 Oct 2025 - Speaker, “Advancing Computational Pathology: Multimodal Datasets & Deep Learning Insights.”

### Conference Organization & Leadership

- Workshop Chair, MVIPT 2025 - Workshop 9: “Few-shot and Incremental Learning for Data-Efficient AI,” 27–29 Sep 2025, Shenyang, China.

### Editorial Board Member

- Associate Editor, Frontiers in Oncology - Breast Cancer section, 2025 – Present
- Executive Editor, AI Medicine Journal, Scilight Press, 2024 – Present
- Review Editor for Machine Learning and Artificial Intelligence:
  - ✓ Frontiers in Big Data, 2022 – Present

- ✓ Frontiers in Artificial Intelligence, 2022 – Present
- Review Editor for Image Retrieval:
  - ✓ Frontiers in Imaging, 2022 – Present

### Society Membership

- IEEE Graduate Student Member, Region 10 (Asia and Pacific), New South Wales Section, 2024 - Present
- Member, IEEE Engineering in Medicine and Biology Society, 2024 - Present
- Member, IEEE Young Professionals, 2024 - Present
- Member, Association for Computing Machinery (ACM), 2021 – Present

### Reviewer

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| • IEEE Transactions on Medical Imaging, 2022 - Present              | • Applied Artificial Intelligence, 2022 - Present                         |
| • IEEE Journal of Biomedical and Health Informatics, 2022 - Present | • Interdisciplinary Sciences: Computational Life Sciences, 2021 - Present |
| • Biomedical Signal Processing and Control, 2022 - Present          | • BMC Cancer, 2022 - Present  |
| • Informatics in Medicine Unlocked, 2022 - Present                  | • BMC Medical Imaging, 2021 - Present                                     |
| • Scientific Reports, 2021 - Present                                | • Cancers, 2022 - Present   |
| • Applied Artificial Intelligence, 2021 - Present                   | • Computers in Biology and Medicine, 2022 - Present                       |
| • IEEE Access, 2020 – Present                                       | • Diagnostics, 2022 - Present   |
| • Expert Systems with Applications, 2022 - Present                  | • Informatics in Medicine Unlocked, 2022 - Present                        |
| • Heliyon, 2022 – Present   | • Artificial Intelligence Review, 2021 - Present                          |
| • Journal of Personalized Medicine, 2022 - Present                  | • Journal of Big Data, 2021 - Present                                     |
| • Sensors, 2022 - Present   | • Technology in Cancer Research & Treatment, 2021 – Present               |

## Extra-Curricular Activities

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- **Group Projects:** Led and designed projects such as memory RAM, SAP1, Temperature Box, Transformer, and Pathfinder Robot during bachelor's studies.
- **Marketing Executive:** BRAC University Community Service Club (October 2013 - September 2016): Spearheaded club fair participation and orientation sessions; coordinated community initiatives including visits to orphanages and distribution of winter clothing.
- **Executive Member:** BRAC University Robotics Club (January 2013 - April 2015): Organized seminars and competitions, participated in Pathfinder Robotics Competition.

## Interests

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Enthusiastic about sports, socializing, and traveling, contributing to a balanced and dynamic personal and professional life.

## References

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Dr. Erik Meijering, (Fellow of IEEE, AAIA)  
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