Hasin Rehana

Contact Information
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North Dakota, USA

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RESEARCH INTEREST

Artificial Intelligence in Biomedicine, Biomedical Natural Language Processing (BioNLP), Large Language Models (LLMs), Multimodal Learning, Biomedical Text and Relation Mining, Machine Learning for Health Informatics, and Applied Bioinformatics.

EDUCATION

Ph.D. in Computer Science
University of North Dakota, Grand Forks, ND, USA
GPA: 4.00
Expected Completion: Spring 2027

- Research areas: BioNLP, multimodal deep learning, medical AI.
- Frameworks: PyTorch, MONAI, CUDA, TensorRT.
- Thesis direction (proposed): *Risk Prediction to Improve Outcomes in Transcatheter Aortic Valve Replacement using Multimodal Artificial Intelligence.*

M.Sc. in Computer Science and Engineering
University of Dhaka, Bangladesh.
Passing Year: 2022
CGPA: 3.73

- Thesis: *Plant Leaf Disease Detection Using Deep Learning*
- Description: Designed a Faster Region-based Convolutional Neural Network architecture to detect and classify plant leaf diseases, achieving high predictive accuracy on benchmark datasets.

B.Sc. in Computer Science and Engineering
Rajshahi University of Engineering and Technology, Bangladesh.
Passing Year: 2018
CGPA: 3.63

- Thesis: *Spatial–Spectral CNN Feature Extraction for Hyperspectral Image Classification.*
- Designed a CNN approach to reduce dimensionality while improving classification accuracy.

TECHNICAL PROFICIENCIES

- **Programming:** Python, C++, Java
- **GPU Acceleration & HPC:** CUDA, cuDNN, PyTorch DDP, Slurm
- **Deep Learning & Multimodal AI:** PyTorch, MONAI, TensorFlow, Hugging Face Transformers
- **Imaging & Medical Data:** Hyperspectral Imaging, DICOM, 3D Slicer, OpenCV, MATLAB
- **Data Science & Analytics:** Pandas, NumPy, Scikit-learn, Matplotlib, Seaborn
- **NLP & LLMs:** Transformers, BERT, GPT, Llama, Gemini
- **Development & Deployment:** Git, TensorRT

PUBLICATIONS

1. **H. Rehana**, N. Bengisu Çam, M. Basmaci, J. Zheng, C. Jemiyo, Y. He, A. Özgür, J. Hur. (2024). *Evaluating GPT and BERT models for protein–protein interaction identification in biomedical text.* Bioinformatics Advances (Q1), 4(1), vbae133. https://doi.org/10.1093/bioadv/vbae133
2. **H. Rehana**, J. Zheng, F.-Y. Yeh, B. Bansal, N.B. Çam, C. Jemiyo, B. McGregor, A. Özgür, Y. He, J. Hur. (2025). *Leveraging large language models for cancer vaccine adjuvant name extraction from biomedical literature.* Proceedings of the AMIA Annual Symposium 2025, Atlanta, GA, November 15–19, 2025. (Accepted)
3. **H. Rehana**, B. Bansal, N. Bengisu Çam, J. Zheng, Y. He, A. Özgür, J. Hur. (2024). *Nested named entity recognition using multilayer BERT-based model.* CLEF Working Notes. https://ceur-ws.org/Vol-3740/paper-18.pdf
4. C. Jemiyo, B.A. McGregor, **H. Rehana**, J. Hur. (2025). *Adverse childhood experiences and chronic health outcomes: evidence from 33 US states in the Behavioral Risk Factor Surveillance System, 2019–2023. BMC Public Health (Q1)*, 25(1), 1650. https://doi.org/10.1186/s12889-025-22785-2
5. **H. Rehana**, M.R. Ahmed, R. Chakma, S. Asaduzzaman, M. Raihan. (2021). *A bioinformatics approach for identification of the core ontologies and signature genes of pulmonary disease and associated disease.* Gene Reports, 24, 101206. https://doi.org/10.1016/j.genrep.2021.101206
6. S. Asaduzzaman, M.R. Ahmed, **H. Rehana**, S. Chakraborty, M.S. Islam. (2021). *Machine learning to reveal an astute risk predictive framework for Gynecologic Cancer and its impact on women psychology: Bangladeshi perspective.* BMC Bioinformatics (Q1). https://doi.org/10.1186/s12859-021-04131-6
7. Md. Raihan Ahmed, **H. Rehana**, S. Asaduzzaman. (2021). *Protein interaction network and drug design of stomach cancer and associated disease: a bioinformatics approach.* Journal of Proteins and Proteomics. https://doi.org/10.1007/s42485-020-00054-7
8. **H. Rehana**, S. Asaduzzaman, R. Chakma. (2021, August). *3D-2D BCNN based Automated Feature Extraction & Classification for Hyperspectral Imaging.* Proceedings of the 2021 Joint 10th International Conference on Informatics, Electronics & Vision (ICIEV) and 2021 5th International Conference on Imaging, Vision & Pattern Recognition (icIVPR), IEEE. https://doi.org/10.1109/ICIEVicIVPR52578.2021.9563967
9. S. Islam, **H. Rehana**, S. Asaduzzaman, S.M. Hossen, R. Hossain, T. Bhuiyan, M.S. Uddin, N. Akter. (2020). *Automated risk prediction by measuring pneumothorax size using deep learning.* In *2020 IEEE Region 10 Symposium (TENSYMP)* (pp. 1747–1751). IEEE. https://doi.org/10.1109/TENSYMP50017.2020.9230752
10. **H. Rehana**. (2017). *Bangla handwritten digit classification and recognition using SVM algorithm with HOG features.* Proceedings of the IEEE Conference on Electrical and Computer Engineering (EICT). https://doi.org/10.1109/EICT.2017.8275203

PREPRINTS

1. J. Zheng, A.Y. Lin, A. Huffman, ... , **H. Rehana**, ... , Y. He, et al. (2025). *VO: The Vaccine Ontology.* bioRxiv preprint. https://doi.org/10.1101/2025.08.12.669998
2. **H. Rehana**, J. Zheng, L. Yeh, B. Bansal, N.B. Çam, C. Jemiyo, B. McGregor, A. Özgür, Y. He, J. Hur. (2024). *Cancer vaccine adjuvant name recognition from biomedical literature using large language models.* arXiv preprint arXiv:2502.09659. https://doi.org/10.48550/arXiv.2502.09659
3. N.B. Çam, **H. Rehana**, J. Zheng, B. Bansal, Y. He, J. Hur, A. Özgür. (2024). *Ontology-based protein–protein interaction explanation using large language models.* bioRxiv preprint. https://doi.org/10.1101/2025.04.07.647599
4. **H. Rehana**, M. Ibrahim, H. Ali. (2023). *Plant disease detection using region-based convolutional neural network.* arXiv preprint arXiv:2303.09063. https://doi.org/10.48550/arXiv.2303.09063

TALKS (Oral Presentations)

- **H. Rehana**, J. Zheng, L. Yeh, B. Bansal, N.B. Çam, C. Jemiyo, B. McGregor, A. Özgür, Y. He, J. Hur. *Identifying cancer vaccine adjuvants in biomedical literature using large language models.* Great Lakes Bioinformatics Conference (GLBIO), May 12–15, 2025. (Talk)
- **H. Rehana**, Y. He, J. Hur. *Cancer vaccine adjuvant name recognition from clinical trial data using large language models.* 13th VDOS Workshop, July 22, 2024. University of Twente, Enschede, The Netherlands. (Talk; Virtual)
- **H. Rehana**, J. Zheng, Y. He, J. Hur. *ChatGPT to identify drug-drug interactions from biomedical texts.* 14th ICBO – VDOS Workshop, August 28–September 1, 2023. Brasília, Brazil. (Talk; Virtual)

POSTERS

- **H. Rehana**, J. Zheng, L. Yeh, B. Bansal, N.B. Çam, C. Jemiyo, B. McGregor, A. Özgür, Y. He, J. Hur. *Leveraging large language models to identify vaccine adjuvants from biomedical literature.* University of North Dakota Frank Low Research Day, April 22–23, 2025. Grand Forks, ND.
- **H. Rehana**, B. Bansal, N.B. Çam, J. Zheng, Y. He, A. Özgür, J. Hur. *Recognition of biomedical nested named entities using a multilayer BERT-based model.* University of North Dakota Graduate Research Achievement Day (GRAD), February 26–27, 2025. Grand Forks, ND.
- **H. Rehana**, B. McGregor, Y. He, J. Hur. *Recognizing cancer vaccine adjuvant names from clinical trial data with large language models.* ND EPSCoR State Conference: Bio & Biomedical Computation Seminar, November 21, 2024. Grand Forks, ND.
- **H. Rehana**, B. McGregor, Y. He, J. Hur. *Cancer vaccine adjuvant name recognition from clinical trial data using large language models.* ISV Annual Congress, October 21–23, 2024. Seoul, Korea. (Presented by J. Hur)
- **H. Rehana**, J. Zheng, Y. He, J. Hur. *Identifying drug-drug interactions from biomedical texts using large language models.* University of North Dakota Frank Low Research Day, April 11, 2024. Grand Forks, ND.
- **H. Rehana**, J. Zheng, Y. He, J. Hur. *Identifying drug-drug interactions from biomedical texts using large language models.* Northern Plains Biological Symposium (NPBS), March 28, 2024. North Dakota.
- **H. Rehana**, N.B. Çam, M. Basmaci, J. Zheng, C. Jemiyo, Y. He, A. Özgür, J. Hur. *Extracting protein-protein interactions from biomedical literature using large language models.* University of North Dakota Graduate Research Achievement Day (GRAD), February 28–29, 2024. Grand Forks, ND.
- **H. Rehana**, N.B. Çam, M. Basmaci, A. Özgür, Y. He, J. Hur. *Leveraging large language models for extracting protein-protein interactions from biomedical corpora.* South Dakota State University Data Science Symposium, February 5–6, 2024. Sioux Falls, SD. (**Travel Award**)
- **H. Rehana**, N.B. Çam, M. Basmaci, A. Özgür, Y. He, J. Hur. *Evaluation of GPT-3 on identifying protein-protein interactions from biomedical text.* University of North Dakota Graduate Research Achievement Day (GRAD), March 2–3, 2023. Grand Forks, ND.
- **H. Rehana**, N.B. Çam, M. Basmaci, A. Özgür, Y. He, J. Hur. *Identifying protein-protein interaction from biomedical text using generative pre-trained transformer.* University of North Dakota Cybersecurity Awareness and Research Symposium (CARS), October 30–31, 2023. Grand Forks, ND. (**1st place award**)

REVIEWER ROLE

Served as peer reviewer for two journal manuscripts submitted to *Scientific Reports* (Springer Nature).

AWARDS AND ACHIEVEMENTS

- **Challenge Award:** BioASQ12 Task BioNNE 2024, 2nd Place in Bilingual, English, and Russian Nested NER Tracks (sponsored by Google, Elsevier, and Ovid)
- **Travel Award for Poster Presentation:** Data Science Symposium 2024, South Dakota State University.
- **Best Poster Presentation Award:** Cyber Awareness and Research Symposium, University of North Dakota, USA, 2023.
- **Master's Research Fellowship:** Awarded by the ICT Division, Government of the People's Republic of Bangladesh (2020–2022).

WORKSHOPS

- **Programming with ChatGPT**, South Dakota State University 2024 Data Science Symposium. February 5, 2024. SD.
- **Technical Writing**, Student Association of India, University of North Dakota & Association of Students from India, North Dakota State University, USA.
  October 12, 2023.
- **National Hackathon 2016**, Police Staff College, PSC Convention Hall Organization, Bangladesh.
  April 13, 2016 - April 16, 2016.
- **Course on Android Study Jam**, Dept of CSE, Rajshahi University of Engineering & Technology, Bangladesh.
  August 19, 2015.
- **Workshop on Research and Development of Bangla Speech Recognition**, Dept of CSE, Rajshahi University of Engineering & Technology, organized by Ministry of ICT, Bangladesh.
  June 21, 2017.
- **EATL Prothom Alo App Contest**, Dept of CSE, Rajshahi University of Engineering & Technology, Bangladesh.
  August 8, 2016.
- **MozAwareness**, Dept of CSE, Rajshahi University of Engineering & Technology, Bangladesh
  March 27, 2015.

MEMBERSHIPS

- IEEE – Student Member
- ACM – Student Member
- ISCB – Student Member
- Robotics Club, University of North Dakota
- Engineers Without Borders, University of North Dakota
- ACM Student Chapter, University of North Dakota

WORKING EXPERIENCE

Graduate Research Assistant
January 2023 – Present
Department of Biomedical Sciences, School of Medical and Health Sciences, University of North Dakota, USA

- Developed and evaluated BioNLP pipelines using GPT, BERT, and Llama models for biomedical information extraction tasks.
- Co-authored multiple peer-reviewed publications and presented posters/talks at conferences and symposiums.

Clinical Research Study Team Member
June 2025 – Present
Sanford Research, Fargo, ND, USA
(Project: *AI-Powered Risk Prediction to Improve Outcomes in Transcatheter Aortic Valve Replacement*)

Lecturer (on Study Leave)
January 2019 – Present
Department of Computer Science and Engineering, Daffodil International University, Dhaka, Bangladesh

- Delivered undergraduate courses on Algorithms, Numerical Methods, Computer Graphics.
- Mentored final-year thesis students in deep learning and NLP applications.
- Served as the Convener of the Girls' Computer Programming Club, mentoring students and organizing seminars, webinars, and technical workshops to foster academic engagement and coding skills among female students.

RESEARCH AND ONLINE PROFILES

- **Personal Website:** https://hasin-ruet13.github.io/hasinrehana.github.io/
- **Google Scholar:** https://scholar.google.com/citations?user=q6tQJu0AAAAJ
- **ResearchGate:** https://www.researchgate.net/profile/Hasin_Rehana
- **LinkedIn:** https://www.linkedin.com/in/hasin-rehana-580184140
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REFERENCE

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Yongqun "Oliver" He, DVM, PhD
Professor, Unit for Laboratory Animal Medicine
Center for Computational Medicine and Biology
Department of Learning Health Science and Rogel Cancer Center
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