Hasin Rehana

Contact Information
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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:** Fall 2026

- **Research Area:** BioNLP, LLMs, Multimodal Deep Learning
- **Advisor:** Junguk Hur,Ph.D., Associate Professor, Department of Biomedical Sciences, University of North Dakota, Grand Forks, ND, USA
- **Summary:** My area of specialization lies at the intersection of computer science, bioinformatics, and biomedical literature mining. With a keen focus on developing and implementing BioNLP pipelines, I strive to integrate cutting-edge technologies and methodologies to enhance my work in these fields. Utilizing a range of LLMs, such as Bidirectional Encoder Representations from Transformers (BERT), Generative Pretrained Transformer (GPT), Large Language Model Meta AI (Llama), and Gemini, I am dedicated to applying state-of-the-art computational techniques in biomedical literature mining. My ultimate goal is to leverage recent advances in natural language processing and AI to advance biomedical science and facilitate the discovery of novel solutions to complex biological challenges.

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

- **MSc 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. Engg.(4 years) in Computer Science and Engineering
Institution: Rajshahi University of Engineering and Technology, Bangladesh.
Passing Year: 2018
CGPA: 3.63

- **Bachelor Thesis: Spatial-Spectral feature extraction based on Convolutional Neural Network for Hyperspectral Image Classification**
- **Description:** Developed a spatial-spectral feature extraction method using CNNs for high-dimensional hyperspectral data to improve classification accuracy while reducing computational complexity.

Major Courses Attended:

- Intelligent Decision Systems
- Computational Intelligence
- High Performance Computing
- Computer Forensics
- Bioinformatics
- Text Mining
- Artificial Intelligence
- Machine Learning and Data Mining
- Data Engineering and Management
- Theoretical Foundations of Computer Science
- Data Structures
- Database Management Systems
- Object Oriented Programming
- Computer Algorithms
- Digital Image Processing
- Numerical Methods

TECHNICAL PROFICIENCIES

- **Programming Languages:** Python, C++, Java
- **Machine Learning & Deep Learning:** PyTorch, TensorFlow, Keras, Scikit-learn
- **NLP & LLMs:** Transformers, BERT, GPT, Llama, Gemini
- **Data Analysis & Visualization:** Pandas, NumPy, Matplotlib, Seaborn
- **Bioinformatics Tools:** BioPython, R, Cytoscape.
- **Image Processing:** OpenCV, MATLAB
- **Development Tools:** Git, GitHub, Firebase

SELECTED 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**, 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
3. 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
4. **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
5. 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
6. 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
7. **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

8. **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

MANUSCRIPT UNDER REVIEW

H. Rehana, J. Zheng, F.-Y. Yeh, B. Bansal, N.B. Çam, C. Jemiyo, B. McGregor, A. Özgür, Y. He, J. Hur. (2024). *Leveraging large language models for cancer vaccine adjuvant name extraction from biomedical literature*. Submitted to the *AMIA Annual Symposium 2025*.

PREPRINT – NOT PEER REVIEWED

- **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
- 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
- **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

POSTERS AND TALKS

- **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**, 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. (Poster)
- **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. (Poster)
- **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. (Poster)
- **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. (Poster; Presented by J. Hur)
- **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. *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. (Poster)
- **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. (Poster)

- **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. (Poster)
- **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. (Poster; **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. (Poster)
- **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)
- **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. (Poster; **1st place award**)

REVIEWER ROLE

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

AWARDS AND ACHIEVEMENTS

- **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).
- **Participation Certificate:** National Hackathon 2016, Bangladesh.
- **Participation Certificate:** Google Study Jam, Bangladesh.

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, United States.

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

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.

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.

PROJECTS

PhD Projects :

- Web Crawler. [Link: http://undcemcs02.und.edu/~hasin.rehana/515/1/2.html, (Accessible from UND Network)]

- Smartphone Price Prediction Application. [Link: http://undcemcs02.und.edu/~hasin.rehana/515/2/ (Accessible from UND Network, Pass:133056)]

Undergraduate Projects:

- 3rd semester Project: Android Application
- 5th semester project: Web App development using PHP, Javascript, Bootstrap
- 6th Semester project: Bangla Handwritten Digit Recognition using SVM algorithm
- On-demand project: Android Application

IMPORTANT LINKS

- LinkedIn Account : https://www.linkedin.com/in/hasin-rehana-580184140
- ResearchGate Account : https://www.researchgate.net/profile/Hasin_Rehana
- Google Scholar Account https://scholar.google.com/citations?user=q6tQJu0AAAAJ&hl=en&authuser=4

REFERENCE

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