# Abdullah Al Marzan

Dhaka, Bangladesh | +880 1749-287028 | marzansust16@gmail.com | [LinkedIn](#) | [Google Scholar](#) | [ORCID](#)

## Summary

Highly motivated Molecular Biology and Bioinformatics Researcher with dual expertise in wet-lab diagnostics and advanced computational analysis, particularly in infectious disease and genomics. Proven ability to translate complex biomedical data into clinical insights and solutions, demonstrated through diverse roles in clinical trials, medical research, and bioinformatics. Actively seeking fully funded PhD opportunities in Computational Biology, Infectious Disease Modeling, and Precision Diagnostics.

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## Education

**Master of Science in Biochemistry and Molecular Biology** | Shahjalal University of Science and Technology, Sylhet, Bangladesh

- *January 2021 – September 2023*
- CGPA: 3.55/4.00
- Thesis: Identification of Convenient Diagnosis Methods of Premature Membrane Rupture (PROM) for Rural Areas of Developing Countries: A Multicenter Case-Control Study

**Bachelor of Science in Biochemistry and Molecular Biology** | Shahjalal University of Science and Technology, Sylhet, Bangladesh

- *February 2017 – December 2020*
- CGPA: 3.44/4.00 | University Merit Scholarship (2018)
- Final Year Project: Variant Specific Deleterious Mutations of SARS-CoV-2 Associated with Immune Response

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## Research & Professional Experience

**Bioinformatics & Infectious Disease Researcher (Remote)** | Dept. of Biochemistry and Molecular Biology, SUST, Bangladesh

- *January 2024 – Present (24/7)*
- Develop deep learning models (CNNs, Transformers) for miRNA-mRNA and RNA-protein binding prediction.
- Conduct secondary structure prediction and accessibility modeling for viral and non-coding RNAs (RNAfold, CentroidFold).
- Automate high-throughput data preprocessing pipelines using Python, Biopython, Scikit-learn, and pandas.

- **Achieved:** Developed deep learning pipeline for predicting HIV RRE structural compatibility with miRNA, identified key miRNA targeting hotspots.

**Molecular and Infectious Disease Researcher** | President Abdul Hamid Medical College Hospital, Kishoreganj, Bangladesh

- *February 2023 – December 2023 (Thursday – Saturday)*
- Performed viral/bacterial RNA & DNA screening, cDNA library prep, qRT-PCR, and ELISA for antigen/antibody detection.
- Conducted bacterial culture, isolation, identification, and antibiotic resistance profiling.
- Applied bioinformatics for primer design/validation, data processing, statistical analysis (SPSS, R), and visualization.
- **Achieved:** Identified biomarkers for Premature Rupture of Membrane (PROM); contributed to HPV screening and eclampsia diagnostics.

**Clinical Data Manager** | Toxicology Society of Bangladesh, Chattogram, Bangladesh

- *December 2023 – Present (Sunday – Wednesday)*
- Manage, monitor, and analyze data for a Phase III Clinical Trial.
- Perform statistical analysis using SPSS, SAS, and R, creating detailed visualizations and reports.
- **Achieved:** Developed Python/R/SQL scripts to automate data processing and implemented real-time monitoring, enhancing data accuracy and efficiency.

**Research Assistant** | Bioinformatics Lab, Dept. of Biochemistry and Molecular Biology, SUST, Bangladesh

- *April 2021 – January 2023*
- Conducted mutational spectrum analysis of SARS-CoV-2 variants and immunoinformatic analysis (IEDB).
- Performed statistical analysis (Python, SPSS, R) and graphical illustration (Adobe Illustrator/Photoshop).
- **Achieved:** Discovered common/unique mutational patterns across SARS-CoV-2 variants and explored spike protein evolution.

**Research Assistant (Remote)** | The Red Green Research Center, Dhaka, Bangladesh

- *February 2020 – December 2021*
- Performed mutational analysis via NGS protocol and Molecular Dynamics (MD) Simulation (YASARA, DESMOND).
- **Achieved:** Designed ligands for improved SARS-CoV-2 RBD binding and developed Linux-based simulation techniques (GROMACS).

**Research Assistant** | Covid-19 Testing Lab, Noakhali Science and Technology University, Bangladesh

- *December 2020 – March 2021*

- Involved in sample collection, screening, processing, and COVID-19 testing.

- **Achieved:** Identified SARS-CoV-2 genetic fragments in wastewater, contributing to surveillance system development.

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**Publications (Selected)**

1. **Marzan, A. Al**, et al. (2023). Probing biological network in concurrent carcinomas and Type-2 diabetes for potential biomarker screening: An advanced computational paradigm. *Advances in Biomarker Sciences and Technology*, 5, 89–104.

2. Islam, M. A., **Marzan, A. Al**, et al. (2023). Some common deleterious mutations are shared in SARS-CoV-2 genomes from deceased COVID-19 patients across continents. *Scientific Reports*, 13(1), 18644.

3. Islam, M. A., Shahi, S., **Marzan, A. Al**, et al. (2023). Variant-specific deleterious mutations in the SARS-CoV-2 genome reveal immune responses and potentials for prophylactic vaccine development. *Frontiers in Pharmacology*, 14.

4. Jakariya, M., Ahmed, F., Islam, M. A., **Al Marzan, A.**, et al. (2022). Wastewater-based epidemiological surveillance to monitor the prevalence of SARS-CoV-2 in developing countries with onsite sanitation facilities. *Environmental Pollution*, 311, 119679.

5. Islam, M. A., Haque, M. A., Rahman, M. A., Hossen, F., Reza, M., Barua, A., **Marzan, A. Al**, et al. (2022). A Review on Measures to Rejuvenate Immune System: Natural Mode of Protection Against Coronavirus Infection. *Frontiers in Immunology*, 13.

6. **Marzan, A. A.** and Islam, A. (2022-2023). Characterization of Food Borne Pathogenic Bacteria (*Bacillus cereus*, *Kurthia gibsonii*, *Bacillus amyloliquefaciens*, *Bacillus velezensis*, *Bacillus thuringiensis*, *Bacillus subtilis*). NCBI Accessions: OP672318.1, OP672310, OP660549.1, OP659039.1, OP659032.1, OP659031.1, OP659028.1, OP659027.1.

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**Awards & Grants**

- **National Science and Technology (NST) Fellowship** | The Ministry of Science and Technology, Bangladesh (2022) - BDT 54,000

  - Application Title: Wastewater-based epidemiological surveillance to monitor the prevalence of rota and dengue in developing countries with onsite sanitation facilities.

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**Skills & Tools**

- **Molecular Biology:** RNA/DNA Isolation, cDNA Synthesis, qRT-PCR, ELISA, Microbial Culture, Primer Design, Antibody/Antigen Detection

- **Bioinformatics:** Viral Genomics, Mutational Analysis, Sequence Alignment, Phylogenetic Analysis, Immunoinformatics (IEDB), Molecular Dynamics Simulation (YASARA, DESMOND, GROMACS), Secondary Structure Prediction (RNAfold, CentroidFold, mfold), Deep Learning Models (CNNs, Transformers for miRNA-mRNA/RNA-protein prediction), Multi-omics Integration.

- **Data Analysis & Programming:** R, Python (Biopython, Scikit-learn, pandas), SPSS, SAS, SQL, Statistical Analysis, Data Visualization (Adobe Illustrator, R, Python libraries).

- **Clinical Data Management:** Data Monitoring, Quality Control, eCRF Review, Automated Data Processing.

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This version is about 1.5 pages and covers all the crucial aspects. For an even more condensed 1-page version, you might further trim job descriptions to 1-2 bullets each and select the top 3-4 most impactful publications.