Personal Details

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Language Proficiency:
Bangla: Native
English: Proficient
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Web of Science: www.webofscience.com/wos/author/record/HNS-1384-2023
Scopus: www.scopus.com/authid/detail.uri?authorId=57267619000
Google Scholar**:** scholar.google.com/citations?hl=en&user=Xvc4eokAAAAJ
ResearchGate**:** www.researchgate.net/profile/Abdullah-Marzan
LinkedIn: www.linkedin.com/in/marzan25
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Educational Qualifications and Academic Awards

Master of Science (January 2021- September 2023)
Dept. of Biochemistry and Molecular Biology
Shahjalal University of Science and Technology
Sylhet-3114, Bangladesh
CGPA: 3.55 out of 4.00
Thesis Dissertation Title: Identification of Convenient Diagnosis Methods of Premature Membrane Rupture (PROM) for Rural Areas of Developing Countries: A Multicenter Case-Control Study
Thesis Dissertation Word Length: 20,169 words

Bachelor of Science (February 2017- December 2020)
Dept. of Biochemistry and Molecular Biology
Shahjalal University of Science and Technology
Sylhet-3114, Bangladesh
CGPA: 3.44 out of 4.00
University Merit Scholarship (2018)
Final Year Project Title: Variant Specific Deleterious Mutations of SARS-CoV-2 Associated with Immune Response
Project Word Length: 6,709

Professional Affiliations and Memberships

Community of Biotechnology (January 2018- Present)
Committee Member

Employment History

1. **Clinical Data Manager (**December 2023 – Present)
   CCBOC-RCT Clinical Trial (Phase III)
   Toxicology Society of Bangladesh
   https://tsb.org.bd
   14/14, Block: A, Road No: 1, Shugandha R/A
   Panchlaish, Chattogram-4203, Bangladesh

   Key Responsibilities:
   - Data Management, monitor and analysis the assessment of Clinical Trial (Phase 3)
   - Data Analysis, Visualization: statistical analysis using bioinformatics tools (SPSS, SAS, R) and creating detailed visualizations and reports to communicate data trends and outcomes.
   - Database Quality Development

   Achievements:
   - Developed several scripts and programs (Python, R, SQL) to automate data processing tasks, improving efficiency and reducing errors, and implemented automated systems for real-time data monitoring and quality control, ensuring continuous data accuracy and integrity
   - Developed the monitoring system by upgrading the dashboard (full functional dashboard)
   - Updated the eCRF through a rigorous review process
   - Identified and solved the existing database issues

2. **Medical Research Officer (**February 2023 – December 2023)
   Advanced Molecular Lab
   President Abdul Hamid Medical College Hospital
   https://pahmc.edu.bd
   Jafrabad, Karimganj, Kishoreganj, Bangladesh

   Key Responsibilities:
   - Molecular Lab: Viral and bacterial RNA & DNA sample screening, processing, preparation, cDNA library preparation, qRT-PCR run, antibody and viral antigen detection, and concentration measurement by ELISA
   - Microbiology Lab: Bacterial culture, isolation, identification, biochemical analysis, antibiotic resistance pattern analysis
   - Bioinformatics Lab: Primer design and validation, data processing, statistical analysis, data visualization, report writing and presentation

Achievements:
- Identified the biomarkers responsible for the Premature Rupture of Membrane (PROM) scenario of pregnant women in Bangladesh
- Increased awareness among women in rural backgrounds through cervical cancer assessment
- Involved in infertile patient inspection and further assessment
- Involved in the diagnosis and assessment of eclampsia patients (pregnant women)
- Accomplished vaccination and assessment against Human papillomavirus (HPV)

Other Research Experiences

1. **Bioinformatician** (January 2024 – Present)
   Bioinformatics Lab
   Department of Biochemistry and Molecular Biology
   Shahjalal University of Science and Technology
   Sylhet-3114, Bangladesh

   Key Responsibilities:
   - Conducted secondary structure prediction and accessibility modeling for viral and non-coding RNAs using RNAfold, CentroidFold, and mfold
   - Designed deep learning-based models (CNNs, Transformers) to predict miRNA–mRNA interactions and RNA–protein binding affinity
   - Integrated multi-omics datasets (genomic, transcriptomic) for biomarker discovery and gene regulation studies
   - Automated pipelines using Python, Biopython, Scikit-learn, and pandas for high-throughput data preprocessing
   - Collaborated on manuscript writing, data interpretation, and model validation with cross-disciplinary teams

   Achievements:
   - Developed and validated a deep learning pipeline for predicting structural compatibility between HIV RRE and designed miRNA sequences
   - Built a custom database integrating known and predicted miRNA binding sites on RRE elements for potential therapeutic design
   - Identified structural regions in RRE (e.g., Stem IIB) as key miRNA targeting hotspots using base-pairing energy metrics
   - Designed and executed computational pipelines for cross-species analysis of conserved miRNA regulatory networks
   - Created reusable bioinformatics scripts and workflows for miRNA-target prediction models with accessibility and GC-content constraints

2. **Molecular Biologist** (December 2023 – Present)
   Bioinformatics Lab
   Department of Biochemistry and Molecular Biology
   Shahjalal University of Science and Technology
   Sylhet-3114, Bangladesh

   Key Responsibilities:
   - Performed molecular diagnostics for infectious diseases including sample processing, RNA/DNA isolation, cDNA synthesis, and qRT-PCR execution
   - Conducted viral antigen and antibody detection assays using ELISA and concentration quantification techniques
   - Designed and validated primers for pathogen-specific assays and conducted performance assessments

- Executed microbiological workflows including bacterial culture, isolation, biochemical identification, and antibiotic resistance profiling
- Led data management, statistical analysis (using SPSS, Python, and R), and graphical representation of clinical findings
- Prepared comprehensive research reports, data presentations, and ethics documentation for internal review boards

Achievements:

- Identified biomarkers associated with PROM (Premature Rupture of Membrane) for clinical diagnostic development
- Contributed to the HPV screening and vaccination assessment among at-risk rural populations
- Supported infertility diagnostics and further clinical assessment for reproductive health cases
- Participated in eclampsia-related diagnostic evaluations for pregnant women and recommended molecular workups
- Enhanced clinical lab protocols by integrating molecular and microbiological workflows for better diagnostic precision
- Co-authored manuscripts on infectious disease diagnostics and women's health molecular assessments
- Played a critical role in field-based implementation of molecular assays in underserved regions

3. **Research Assistant** (April 2021 – January 2023)
   Bioinformatics Lab
   Department of Biochemistry and Molecular Biology
   Shahjalal University of Science and Technology
   Sylhet-3114, Bangladesh

   Key responsibilities:
   - Mutational Spectrum analysis of SARS-CoV-2 variant
   - Immunoinformatic analysis (IEDB)
   - Statistical analysis using "Python", "SPSS" and "R"
   - Graphical Illustration using "Adobe Illustrator" and "Adobe Photoshop"

   Achievements:
   - Discovered the common and unique mutational pattern across SARS-CoV-2 variants
   - Identified the most transmissible variant
   - Established the similarities and dissimilarities between the "Delta" & "Omicron" variants in the context of the mutational spectrum
   - Explored the evolution of spike protein during the pandemic

4. **Research Assistant (Remote)** (February 2020 – December 2021)
   The Red Green Research Center
   https://grc-bd.org
   Farmgate, Dhaka, Bangladesh

Key responsibilities:
- Mutational analysis based on NGS protocol
- MD Simulation analysis using "YASARA" and "DESMOND"
- Statistical analysis using "Python", "SPSS" and "R"
- Graphical Illustration using "Adobe Illustrator" and "Adobe Photoshop"

Achievements:
- Designed possible ligands that can bind with the RBD domain of SARS-CoV-2 more efficiently by Molecular Dynamic Simulation
- Developed the Linux-based simulation technique (GROMACS)

5. **Research Assistant** (December 2020 – March 2021)
   Covid-19 Testing Lab
   Department of Microbiology
   Noakhali Science and Technology University
   Noakhali-3814, Bangladesh

   Key responsibilities:
   - Sample Collection (Both from patient and environment) from different districts of Bangladesh
   - Sample screening, processing, preparation
   - COVID-19 Testing
   - Data Analysis & Visualization
   - Report Writing

   Achievements:
   - Detected COVID-19 positive cases
   - Identified genetic fragment of SARS-CoV-2 in wastewater
   - Developed a surveillance system to monitor the prevalence of SARS-CoV-2 in developing nations

6. **Research Assistant** (November 2020 – June 2021)
   Environment Lab
   Department of Civil & Environment Engineering
   Shahjalal University of Science and Technology
   Sylhet-3114, Bangladesh

   Key responsibilities:
   - Culture of cyanobacteria (Blue-Green Algae)
   - Wastewater treatment with cyanobacteria

   Achievements:
   - Production of Blue-Green algae

- Measured the absorption rate of heavy metals by cyanobacteria

Research Outputs

A. Published Article

1. Islam, M. A., **Marzan, A. Al**, Arman, M. S., Shahi, S., Sakif, T. I., Hossain, M., Islam, T., & Hoque, M. N. (2023). Some common deleterious mutations are shared in SARS-CoV-2 genomes from deceased COVID-19 patients across continents. Scientific Reports, 13(1), 18644. https://doi.org/10.1038/s41598-023-45517-1.

Article Metrics:
5-year impact factor: 4.9
Article Accesses: 2322
Citation Indexes: 2
Altmetric: 108

Contributions: Assisted in concept and methodology development by reviewing literature. Analyzed 5724 high-quality SARS-CoV-2 genomes (GISAID) from deceased patients using phylogenetic and mutation profiling tools. Conducted statistical analysis (SPSS, R) identifying significant mutation impacts ($p < 0.05$, FDR < 5%). Created figures (Adobe-Illustrator) and contributed to drafting and editing manuscript.

2. **Marzan, A. Al**, Shahi, S., Arman, M. S., Hasan, M. Z., & Ghosh, A. (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. https://doi.org/10.1016/j.abst.2023.10.001.

Article Metrics: Captured Readers: 11

Contributions: Reviewed literature to aid in concept and methodology. Acquired and curated datasets from NCBI GEO, ensuring quality and human sample inclusion. Identified gene expression patterns, characterized pathways, and unraveled protein-protein interactions. Investigated transcription factor and miRNA interactions, enhancing understanding of disease mechanisms. Contributed to drafting and manuscript editing, creating figures in Adobe Illustrator.

3. Islam, M. A., **Marzan, A. Al**, Bhattacharya, P., Khan, A., & Haque, M. A. (2023). Bird flu threat: An urgent call to take action to control the global spread. Journal of Infection and Public Health, 16(9), 1510–1511. https://doi.org/10.1016/j.jiph.2023.06.013.

Article Metrics:
Impact Factor: 6.7
Captured Readers: 6

Citation Indexes: 4

Contributions: Assisted in concept development through literature review. Drafted the initial manuscript, created figure illustrations using Adobe Illustrator, reviewed the manuscript, and made necessary edits.

4. Kaifa, F. H., Bhattacharya, P., **Marzan, A. Al**, & Islam, M. A. (2023). Tanzania - The new habitat of Marburg virus. New Microbes and New Infections, 53, 101145. https://doi.org/10.1016/j.nmni.2023.101145.

Article Metrics:
Impact Factor: 4
Captured Readers: 8

Contributions: Assisted in concept development through literature review. Drafted the initial manuscript, created figure illustrations using Adobe Illustrator, reviewed the manuscript, and made necessary edits.

5. Kabir, M. I., Chowdhury, S. A., Banik, B. K., Hoque, M. A., & **Marzan, A. Al**. (2023). Biosorption of pollutants from chemically derived wastewater using Microcoleus sp. AQUA — Water Infrastructure, Ecosystems and Society, 72(5), 750–761. https://doi.org/10.2166/aqua.2023.021.

Article Metrics:
Impact Factor: 4.3
Citation Indexes: 1

Contributions: Contributed to microalgae sample preparation and experimental setup for synthetic wastewater treatment. Optimized environmental conditions and conducted batch experiments with varying doses and retention times. Analyzed data using spectrophotometry, calculated removal efficiency, and performed biosorption modeling. Involved in figure illustration (Adobe Illustrator, R), manuscript reviewing, and editing process.

6. Islam, M. A., Shahi, S., **Marzan, A. Al**, Amin, M. R., Hasan, M. N., Hoque, M. N., Ghosh, A., Barua, A., Khan, A., Dhama, K., Chakraborty, C., Bhattacharya, P., & Wei, D.-Q. (2023). Variant-specific deleterious mutations in the SARS-CoV-2 genome reveal immune responses and potentials for prophylactic vaccine development. Frontiers in Pharmacology, 14. https://doi.org/10.3389/fphar.2023.1090717.

Article Metrics:
Impact Factor: 5.6
Citation Indexes: 20
Total views: 3,299, Downloads: 991

Contributions: Filtered 214,459 SARS-CoV-2 sequences from GISAID, selecting 10,531 complete genomes for analysis. Conducted mutation analysis with NextClade, PredictSNP etc., predicted immune

responses for B and T cells, and assessed mutation impacts on protein stability using DynaMut and mCSM-PPI2. Normalized data and validated (five-fold cross-validation) findings with machine learning classifiers.

7. Jakariya, M., Ahmed, F., Islam, M. A., **Al Marzan, A.**, Hasan, M. N., Hossain, M., Ahmed, T., Hossain, A., Reza, H. M., Hossen, F., Nahla, T., Rahman, M. M., Bahadur, N. M., Islam, M. T., Didar-ul-Alam, M., Mow, N., Jahan, H., Barceló, D., Bibby, K., & Bhattacharya, P. (2022). Wastewater-based epidemiological surveillance to monitor the prevalence of SARS-CoV-2 in developing countries with onsite sanitation facilities. Environmental Pollution, 311, 119679. https://doi.org/10.1016/j.envpol.2022.119679.

Article Metrics:
Impact Factor: 8.9
Citation Indexes: 51,
Captured Readers: 66, Social Media Shares, Likes & Comments: 53

Contributions: Collected samples from wastewater, and was involved in extracting RNA, preparing cDNA library, as well as in performing qRT-PCR. Analyzed the derived data and visualized it with R programming. Involved in figure illustration (Adobe Illustrator, R), manuscript reviewing, and editing process.

8. Islam, M. A., Hossen, F., Rahman, M. A., Sultana, K. F., Hasan, M. N., Haque, M. A., Sosa-Hernández, J. E., Oyervides-Muñoz, M. A., Parra-Saldívar, R., Ahmed, T., Islam, M. T., Dhama, K., Sangkham, S., Bahadur, N. M., Reza, H. M., Jakariya, M., **Al Marzan, A.**, Bhattacharya, P., Sonne, C., & Ahmed, F. (2023). An opinion on Wastewater-Based Epidemiological Monitoring (WBEM) with Clinical Diagnostic Test (CDT) for detecting high-prevalence areas of community COVID-19 infections. Current Opinion in Environmental Science & Health, 31, 100396. https://doi.org/10.1016/j.coesh.2022.100396.

Article Metrics:
Impact Factor: 8.1
Citation Indexes: 36,
Captured Readers: 35, Social Media Shares, Likes & Comments: 18

Contributions: Assisted in concept development through literature review. Drafted the initial manuscript, created figure illustrations using Adobe Illustrator, reviewed the manuscript, and made necessary edits.

9. Islam, M. A., Haque, M. A., Rahman, M. A., Hossen, F., Reza, M., Barua, A., **Marzan, A. Al**, Das, T., Kumar Baral, S., He, C., Ahmed, F., Bhattacharya, P., & Jakariya, M. (2022). A Review on Measures to Rejuvenate Immune System: Natural Mode of Protection Against Coronavirus Infection. Frontiers in Immunology, 13. https://doi.org/10.3389/fimmu.2022.837290.

Article Metrics:

Impact Factor: 7.3
Citation Indexes: 34
Total views: 11,887, Downloads: 2,300

Contributions: Assisted in concept development through literature review. Drafted the initial manuscript, created figure illustrations using Adobe Illustrator, reviewed the manuscript, and made necessary edits.

10. Hossen, S., Islam, N., Pramanik, E., **Marzan, A. Al**, Rahman, H., Biswas, P., Amin, M., Chowdhury, R., Islam, A., Bhattacharya, P. Molecular characterization and prediction of inhibitors for protein arginine methyltransferase 2 using in silico methods. Informatics in Medicine Unlocked (https://www.sciencedirect.com/journal/informatics-in-medicine-unlocked). **(Under Review)**

Article Metrics:
Cite Score: 8

Contributions: Assisted in obtaining the human PRMT2 sequence from UniProtKB, used PSIPRED, SOPMA, and Swiss Model for secondary and 3D structure prediction, validated with PROCHECK, ERRAT, and PyMOL. Finally performed molecular docking with 45 ligands using PyRx and BIOVINA, and analyzed dynamics and binding free energy with Desmond.

B. Bacterial Partial Genomes Submission in NCBI

1. **Marzan, A. A**. and Islam, A., Characterization of Food Borne Pathogenic Bacteria, *Bacillus cereus*, NCBI Accession: OP672318.1

2. Islam, A. and **Marzan, A. A.**, Characterization of Food Borne Pathogenic Bacteria, *Kurthia gibsonii*, NCBI Accession: OP672310

3. **Marzan, A. A.** and Islam, A., Characterization of Food Borne Pathogenic Bacteria, *Bacillus amyloliquefaciens*, NCBI Accession: OP660549.1

4. **Marzan, A. A.** and Islam, A., Characterization of Food Borne Pathogenic Bacteria, *Bacillus velezensis*, NCBI Accession: OP659039.1

5. Islam, A. and **Marzan, A. A.**, Characterization of Food Borne Pathogenic Bacteria, *Bacillus thuringiensis*, NCBI Accession: OP659032.1

6. Islam, A. and **Marzan, A. A.**, Characterization of Food Borne Pathogenic Bacteria, *Bacillus subtilis*, NCBI Accession: OP659031.1

7. Islam, A. and **Marzan, A. A.**, Characterization of Food Borne Pathogenic Bacteria, *Bacillus subtilis*, NCBI Accession: OP659028.1

8. Islam, A. and **Marzan, A**. **A.**, Characterization of Food Borne Pathogenic Bacteria, *Bacillus cereus*, NCBI Accession: OP659027.1

C. Poster Presentation:

Association of variant-specific deleterious mutations of SARS-CoV-2 with immune response and opportunity for prophylactic vaccine designing. International Conference on Genomics, Nanotech, and Bioengineering-2022 (ICGNB-2022).

Research Grants and Relevant Awards

Name of granting body & country: The Ministry of Science and Technology, Bangladesh
Name of the grant: National Science and Technology (NST) Fellowships
Year: 2022
Amount: 54,000 BDT
Title of Application: Wastewater-based epidemiological surveillance to monitor the prevalence of rota and dengue in developing countries with onsite sanitation facilities.

Research Achievements Relative to Opportunity

Throughout my academic and professional journey, I have faced significant financial and personal challenges that shaped my research achievements. Coming from a financially disadvantaged background, I supported my education and family by tutoring college students, often working late into the night. Despite these constraints, I actively sought free online resources, workshops, and conferences to expand my knowledge and skills in research, programming, and bioinformatics. I overcame institutional barriers by seeking permission from various universities to conduct wet lab research, demonstrating my determination to pursue scientific inquiry.

During the pandemic, I volunteered at a COVID-19 lab as a research assistant to gain practical experience and enhance my research capabilities. My father's job loss during this time intensified my responsibilities, impacting my academic performance in my final year. Nevertheless, I secured an A+ in my master's thesis course through perseverance and hard work. My commitment to research continued as I took on a role as a Medical Research Officer, completing a government-funded project on the early diagnosis and prevention of PROM. Currently serving as a Clinical Data Associate in a phase 3 clinical trial, I am consistently enhancing my research skills, which underscores my unwavering commitment and perseverance.

Academic Referees

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