# Shalini Majumder

shalini23e | sxm2220@student.bham.ac.uk | Shalini Majumder | Shalini Majumder | | +44 7344331870

3 College Walk, Birmingham, B29 6LF


## Education

| | | |
|---|---|---|
| 2025 - Present | MSc in Bioinformatics, **University of Birmingham, UK** | |
| 2023 - 2025 | MSc in Genetics (Gold Medalist, First Class First), A+ Grade,**University of Calcutta** | (CGPA: 8.647/10.0) |
| 2020 - 2023 | BSc in Zoology (Honours), A++ Grade, **Bethune College, University of Calcutta** | (CGPA: 9.041/10.0) |
| 2018 - 2020 | Class 11th & 12th, **Rahara Bhabanath Institution for Girls, WBCHSE** | (94.20%) |
| 2012 - 2018 | Class 5th - 10th, **Rahara Bhabanath Institution for Girls, WBBSE** | (92.71%) |

## Research Experience

**Group Research Project** (2025 - present)

- Currently working under the supervision of Dr. Lindsey Compton, Associate Professor in Genetics, School of Biosciences, University of Birmingham, UK
  **Research Topic:** Optimising GWAS pipelines to uncover genetic loci underlying canopy architecture and yield (complex traits) in autotetraploid potato using SNP and phenotyping datasets, enabling enhanced precision breeding for climate-resilient crop improvement. The work integrates population structure analysis (DAPC and STRUCTURE), environmental correction using Best Linear Unbiased Estimates (BLUEs), and comparative statistical models to improve trait–locus associations. Gaining hands-on experience in developing a robust polyploid GWAS workflow using R and Linux.

**Research Internship** (2023 - 2025)

- Pursued under the supervision of Dr. Tapan Chowdhury, Head and Associate Professor, Department of Computer Science and Engineering, Techno Main Salt Lake, Kolkata, India
  **Research Domain:** Signaling Pathway Analysis, Molecular Docking, Deep Learning for Protein-Ligand Binding Affinity Prediction

**Summer Research Internship** (2024)

- Under the supervision of Dr. Arpita Konar, Assistant Professor, Institute of Health Sciences, Presidency University, Kolkata
  **Dissertation Topic:** *In silico* Characterization and Tissue-specific Expression Analysis of Mouse lncRNA Gm26809. Used various bioinformatics tools (e.g., RNAfold, CPC2, lncLocator, LncRRISearch, etc.) to characterize the lncRNA and used qPCR to quantify and validate the tissue-specific expression profiling.

## Publications-Journal

[1] **S. Majumder**, E. Lodh, and T. Chowdhury, "Implications of trinodal inhibitions and drug repurposing in MAPK pathway: A putative remedy for breast cancer," *Computational Biology and Chemistry*, vol. 113, p. 108255, Oct. 2024, doi: 10.1016/j.compbiolchem.2024.108255.

[2] T. Chowdhury, E. Lodh, and **S. Majumder**, "A Novel Method for Drug Application on Signaling Pathways with Concurrent Faults Using Probabilistic Boolean Networks," *Computational Intelligence*, Feb. 2025, (Under Revision).

[3] E. Lodh, **S. Majumder**, and T. Chowdhury, "PAM50GenePath: A CatBoost-Driven Framework for Enhanced Invasive Breast Cancer Subtype Classification," *Sādhanā*, Feb. 2025, (Under Review).

[4] E. Lodh, T. Chowdhury, and **S. Majumder**, "BioAlignNet: A GPU-Accelerated Framework for Efficient Global Sequence Alignment Across Genomics and Proteomics Scales," *Computational Intelligence*, Mar. 2025, (Under Review).

[5] E. Lodh, **S. Majumder**, T. Chowdhury, and M. De, "RLBindDeep: A ResNet-LSTM Based Novel Framework for Protein-Ligand Binding Affinity Prediction," *Journal of Molecular Graphics and Modelling*, Jun. 2025, (Under Revision).

[6] T. Chowdhury, S. Samanta, P. Sil, S. Banerjee, S. Banerjee, E. Lodh, **S. Majumder**, and M.De, "Biomarker Discovery For Breast Cancer Subtype Detection Using Deep Learning Based Approach," *SN Computer Science*, Oct. 2025, (Under Review).

[7] E. Lodh, T. Chowdhury, **S. Majumder**, M. De, and S.Singha, "SkinEnsemNet: A Novel Ensemble Deep Learning Framework for Skin Cancer Classification," *Multimedia Tools and Applications*, Oct. 2025, (Submitted).

[8] T. Chowdhury, A. Maitra, A. Agarwal, A. Sur, S. Sarkar, E. Lodh, and **S. Majumder**, "Multiple Fault Analysis and Drug Therapy on Signaling Pathways Using GPU-Accelerated Dynamic Bayesian Network-based Model," *The Journal of Supercomputing*, Oct. 2025, (Submitted).

[9] **S. Majumder**, E. Lodh, T. De, and T. Chowdhury "In silico Characterization of Melanoma-derived Mouse lncRNA Gm26982 and Comparative Analyses with Human Ortholog," *Molecular Genetics and Genomics*, Nov. 2025, (Under Review).

[10] E. Lodh, T. Chowdhury, A. Shaw, D. Bedajna, S. Bera, **S. Majumder**, and M. De "A Stacked Ensemble Meta-Classifier Framework for PAM50 Breast Cancer Subtype Prediction from Gene Expression Signatures," *Network Modeling Analysis in Health Informatics and Bioinformatics*, Nov. 2025, (Submitted).

## Publication-Conference

[1] E. Lodh, **S. Majumder** and T. Chowdhury, "CGDeepAff: Deep Learning-Based Approach for Protein-Ligand Binding Affinity Estimation Using CNN-GRU," *2025 8th International Conference on Electronics, Materials Engineering & Nano-Technology (IEMENTech)*, Kolkata, India, 2025, pp. 1-6, doi: 10.1109/IEMENTech65115.2025.10959578. (**Presenter**)

[2] E. Lodh, **S. Majumder**, T. De, T. Chowdhury, and M. De, "GeneDeepNet: A Differential Expression and Deep Learning Based Novel Framework for Detecting Invasive Breast Cancer Subtypes," *4th International Conference on Machine Learning and Data Engineering (ICMLDE-2025), Procedia Computer Science*, 2025 (Accepted, In Press).

## Projects

**DELLY_VCF_Trio Structural Variant (SV) Analysis Pipeline** (GitHub) (2025)

- The pipeline processes a Delly-generated VCF, performs sample detection (child and parents), parent detection (who father and who mother), sex determination of the child, SV extraction, de novo detection, family-based inference, BED-based annotation, and high-quality visualisation.
- It combines shell scripting, AWK and Python scripts, ANNOVAR and ClinVar databases, and BEDTools-based comparisons.
- This can analyse a Delly VCF file of any family of trio (father, mother, child) for their structural variants. It can be applied to other Delly VCF files by tweaking the file and folder names a bit and changing the code.

## Professional Membership

**IEEE (Institute of Electrical and Electronics Engineers) Member** (2025 - present)

- Member of IEEE Young Professionals

## Leadership

| | |
|---|---|
| 2025 - present | Postgraduate Student Ambassador, **University of Birmingham** |
| 2025 - present | Student Rep, MSc Bioinformatics, **University of Birmingham** |
| 2023 - 2025 | Class Representative, Department of Genetics, **University of Calcutta** |
| 2022 - 2023 | Secretary of Science & Environment Club, **Bethune College Students' Committee (BCSC), Bethune College** |

## Skills

**Programming Languages** R, Python, Bash, Awk

**Bioinformatics Tools**

- Proficiency in molecular docking and real-time simulation tools (e.g., **UCSF Chimera, PyRx, AutoDock Vina 1.2.5, ClusPro 2.0, Discovery Studio (BIOVIA)**)
- Familiar with in silico ncRNA chracterization tools (e.g., **RNAfold, LncRRISearch, LncBase v.3, lncLocator, iLOC-LncRNA(2.0), CPC2, RNAinter v4.0, NPInter v5.0**)
- Familiar with primer tools (e.g., **NEBcutter V2.0, Primer3 Input**)
- Done working with plant regulome analysis tools (e.g., **PlantPAN 4.0, Phytozome v13**)

**High-performance Computing Skill** Gained experience in running large-scale genomics workflows in BlueBEAR HPC (University of Birmingham)

**Wet laboratory Skills**

- Proficient experience in PCR, qPCR, RNA, gDNA & plasmid DNA isolation, cDNA synthesis, native and SDS PAGE, agarose gel electrophoresis, RFLP, bacterial culture, plant tissue culture, and Karyotyping
- Basic experience in Agroinfiltration, Y1H assay, Y2H assay
- Gained experience in handling autoclave, centrifuge, vortex, nanodrop & spectrophotometer

**Digital Skills** Microsoft Office tools, Canva, DATAtab, Cytoscape

## Competitions

**INDUSTRIAL CARNIVAL 4.0, a 36 Hours Ideathon** (2021)

- Organised by SPE-VIT (Vellore Institute of Technology), School of Chemical Engineering
- **Position:** Qualified to the finals

**LOKNITI, Policy Conclave 2021** (2021)
- Organised by Public Policy & Opinion Cell, Indian Institute of Technology (IIT) Kanpur
- **Project:** Proposed and presented a sustainable technology proposal, which is the **ACCEPTaB** (Activated, controllable, cost-effective, eco-friendly, perennial, thermo-absorbent Bio-generator)
- **Position:** 1st

**ENVITIATIVE, Public Policy Hackathon 2021** (2021)
- Organised by Environment Cell, University Business School, Punjab University
- **Project:** ACCEPTaB
- **Position:** 3rd

**Most Innovative Research Presentation** (2018)
- Organised by Rahara Ramakrishna Mission Boys' Home High School
- **Project:** Presented an innovative model on **Hydroponics** to a general audience.
- **Position:** 1st

## Academic Achievements

**Jyotsna Manna Memorial Prize** for highest proficiency in Zoology Honours in BSc Exams from Bethune college (2024)
**Kamalmani Sarma Memorial Prize** for highest proficiency in Zoology Honours in BSc Exams from the college (2024)
**Minati Banik Memorial Prize** for highest proficiency in Zoology Honours in BSc Exams from Bethune College (2024)
**Special Staff Prize** for securing First class in Zoology Honours in BSc Exams from Bethune College (2024)
**Special College Prize** for securing 1st position in Zoology BSc Honours Semester I-IV Exams in Bethune College (2024)
**Chandramukhi Basu Memorial Gold Medal** for being the best all-rounder student of Bethune College (2023)
**Nalini Das Silver Medal** for being the best all-rounder student of Bethune College (2023)

## Language Qualifications

**IELTS**, Overall Band Score: 7.5 (Listening: 8.0, Reading: 8.0, Writing: 7.5, Speaking: 7.0), CEFR level: C1 (2025)
**Goethe Start Deutsch A1**, Goethe-Institut, Score: 78/100, Befriedigend (2024)

## Courses & Certifications

**Python for Genomic Data Science** from Johns Hopkins University, Coursera (2025)
**Introduction to Python Programming** from University of Pennsylvania, Coursera (2025)
**Hands-on Biotechnology Training** as a Member at Biotechnology lab in BITM Kolkata (Jul - Dec 2022)
**Immunology**, Indian Institute of Technology (IIT) Kharagpur, NPTEL (2021)

## Extracurriculum

Participation in the cultural programme at the Jahresabschlussfeier (yearly social) at Goethe-Institut Kolkata (2024)
Participation in Conservation Entrepreneurship workshop, RUSA 2.0, Alipore Zoological Garden (2024)
Active Participation in Science & Environment Club 2023, BCSC, Bethune College (2023)
Active Participation in Literary Club 2021, BCSC, Bethune College (2022)
Participation in HISTORY UNVEILED, a national essay writing competition, by JIM Indore (2021)
Secured 3rd position in IMPULSE, an Instant Speech Competition 2021, by Heramba Chandra College (2021)
Participation in SIYAAHI (English), a Writing Competition, by Heramba Chandra College (2021)