Vishal Bharti

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Delhi, India

My Portfolio Website

https://github.com/visvikbharti/deep_learning

ORCID

https://www.linkedin.com/in/the-vishal-bharti/

I grew up in a small town in Jharkhand, where my curiosity about the natural world first took shape. As a first-generation engineer, I've dedicated myself to connecting the dots between electronics, biotechnology, and broader scientific challenges. Throughout my academic and research journey, I've not only pushed my own boundaries, but also worked to support and mentor others from similar backgrounds. My goal is to apply science and technology in ways that genuinely improve human health and expand our understanding of life—always guided by humility, perseverance, and compassion.

Education

Sep 2020 – Jun 2022
Guwahati, India

Master of Technology (MTech) in Biotechnology,
Indian Institute of Technology Guwahati (IITG).
CGPA: 8.75

Aug 2014 – Jun 2018
Kolkata, India

Bachelor of Technology (BTech) in Electronics and Communication,
Institute of Engineering & Management (IEM), Kolkata
CGPA : 8.19

Apr 2011 – Mar 2013
Hazaribagh, India

All India Senior School Certificate Examination (AISSCE),
Sri Ramakrishna Sarada Math & Mission Vivekananda Central School, Hazaribagh
Percentage: 88.20 | Subjects: Physics, Chemistry, Mathematics, English, Information Practices

Research Experience

Feb 2023 – present
Delhi, India

Human Forebrain Assembloids and Polymeric Nanofiber Scaffolds

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty | IGIB CSIR, New Delhi
Role: Lead Computational Analyst,

- Conducted comprehensive computational analyses, including *RNA seq*, *PPI network*, and *pan tissue analysis*, to elucidate interneuron migration disorders in human forebrain organoids.

Deciphering DNA Repair Mechanisms through Multi-Layer Inference Analysis

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty | IGIB CSIR, New Delhi
Role: Lead Computational Analyst

- Developed an innovative three-layer computational pipeline to decipher repair factor requirements in staggered versus blunt-end DNA breaks using scRNA-seq data
- Implemented stringent QC workflow and optimized data integration approach (nFeature: 500-6500, nCount: 1000-45000)
- Identified and validated pathway-specific genes through multiple statistical layers (77 FZ+, 5 SZ+ unique genes; 23 FZ+/SZ-, 2 SZ+/FZ- overlaps)

TRIPinRNA - Intramolecular RNA Triple Helix Structure Prediction

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty & Dr Souvik Maiti | IGIB CSIR, New Delhi
Role: Lead Developer,

- Developed 'TRIPinRNA,' a Python-based tool for predicting intramolecular RNA triple helix structures, focusing on X chromosome inactivation and gene regulation.

Modeling MLC disease to understand its etiology and developing a cost-effective diagnostic platform that can help reveal the prevalence of 132dupC MLC1 gene mutation in the population

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty | IGIB CSIR, New Delhi
Role: Lead Computational Analyst,

- Led RNA seq data analysis and developed a diagnostic platform to identify the 132dupC MLC1 gene mutation, enhancing understanding of MLC disease and brain development.

Exploring the role of G-Quadruplexes in the Regulation of a versatile gene, CCN1

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty & Dr Mary K. Ekka | IGIB CSIR, New Delhi

Role: Lead Computational Analyst,

- Conducted comprehensive computational analyses, analysed proteomics data, and helped to design the project further.

Jun 2022 – Sep 2022
Guwahati, India

Mechanistic investigations on the efficacy and mode of action of Ashwagandha and Yogaraj Guggulu, using a hybrid Proteomics-Cheminformatics-Network medicine approach for the treatment of Osteoarthritis.

Junior Research Fellow | Supervisor: Dr Vibin Ramakrishnan | Indian Institute of Technology Guwahati (IIT-G)
Role: Lead computational Analyst

- Analyzed protein-protein interactions and employed drug repurposing using a hybrid Proteomics-Cheminformatics-Network medicine approach.

Mar 2021 – May 2022
Guwahati, India

Identification and functional enrichment analysis of NMD transcripts in UPF3b KO HEK293 Cells

Master's thesis | Supervisor: Dr Kusum K Singh | Indian Institute of Technology Guwahati (IIT-G)
Role: Project leader

- Conducted RNA-seq analysis to classify transcripts susceptible to Nonsense Mediated mRNA Decay (NMD) and *explored cellular behaviors* in the absence of the UPF3B gene.

Sep 2017 – Apr 2018
Kolkata, India

DNA Sequence Analysis and the Protein Structure Visualization

Bachelor's thesis | Supervisor: Prof. Indranil Basu | Institute of Engineering & Management (IEM) Kolkata
Role: Project leader

- Created a platform integrating NCBI BLAST and PDB databases for protein image retrieval and detailed analysis, using Jupyter Notebook and API implementation.

Publications

Publications:

1) Isha Rakheja*, **Vishal Bharti***., et al. "**Development of an In Silico Platform (TRIPinRNA) for the Identification of Novel RNA Intramolecular Triple Helices and Their Validation Using Biophysical Techniques**." (DOI: https://pubs.acs.org/doi/10.1021/acs.biochem.4c00334)
(* *I.R. and V.B. contributed equally to this work*)

2)Rana, P., Rajat, U., **Bharti, V.**, et al. "**IGF2BP1-Mediated Regulation of CCN1 Expression by Specific Binding to G-Quadruplex Structure in its 3´UTR**." (DOI: https://doi.org/10.1021/acs.biochem.4c00172)

3) Rauthan, R., **Bharti, V.,** et al. "**An Interface of Genetically Engineered Human Forebrain Assembloids and Polymeric Nanofiber Scaffolds for Multiscale Profiling of Interneuron Migration Disorders.**" (***DOI***: https://doi.org/10.21203/rs.3.rs-3831019/v1) (under revision @ Stem Cell Reports)

4) Sharma, S., **Bharti, V**., Das, P.K., et al. "**MLC1 alteration in iPSCs give rise to disease-like cellular vacuolation phenotype in the astrocyte lineage**." (**doi:** https://doi.org/10.1101/2025.01.06.631607)

5) Das, P. K., Aich, M., Adu, P., **Bharti, V.**, Maiti, S., Chakraborty, D. "**CRISPR-Cas Diagnostics (CRISPR-Dx) of Viral Pathogens in Low and Limited-Resource Areas: Current State and Future Directions**." *TrAC – Trends in Analytical Chemistry* (Review). **Revised manuscript (rebuttal) submitted Aug 24, 2025; under review.**

Poster Presentation:

- **Bharti, V.,** Chakraborty, D. Presented a poster titled "**Boundary Without Fence**" at the international conference "**Frontiers in Genome Engineering 2023**," BITS Pilani Goa Campus.

Manuscripts & Preprints

1) **Bharti, V.**, Chakraborty, D. "**StickForStats: An Intelligent Statistical Analysis Platform with Integrated Educational Framework and Semi-Automatic Workflow Guidance**." **Manuscript complete; app deployment in progress; preprint planned upon public release (target mid-Sep 2025).**

Software Development

Apr 2024 – present
New Delhi, India

Advanced Statistics for Researchers Web App

Project Associate - II | Supervisor: Dr Debojyoti Chakraborty | IGIB CSIR, New Delhi

- Developed a Python-based web application using the Streamlit framework, designed to enable researchers with minimal statistical background to perform advanced statistical analyses. The app intelligently suggests appropriate statistical tests based on data distribution and nature, including tools for experimental design and inferential statistics. It also helps users determine adequate sample sizes and identify potential confounding variables.
- **Status**: **Status:** Manuscript complete (v3.0). Public deployment in progress; preprint will be posted upon release (target mid-Sep 2025).

Awards

Sep 2020 — **Graduate Assistantship: Received financial assistantship (2020-2022),** Ministry of Education, Government of India

Mar 2020 — **Secured All India Rank 127 (Top 1 percentile) in Graduate Aptitude Test in Engineering (GATE) Biotechnology (BT),** The Department of Higher Education, Ministry of Education (MoE), Government of India

Mar 2018 — **Qualified and stood in the top 3 percentile in GATE in Electronics and Communication (EC),** The Department of Higher Education, Ministry of Education (MoE), Government of India.

Mar 2017 — **Vocational Training in Advanced Telecom,** Completed a 4-week vocational training at CTTC BSNL Kolkata with excellent performance, recognized as the top student in the batch.

Mar 2016 — **First Prize at Robowar, NIT Jamshedpur,** Awarded first prize with my team at the Robowar event during OJASS 2016 at the National Institute of Technology, Jamshedpur.

Skills

Technical Skills

- **Programming Languages:** Python, R, C, Matlab
- **Bioinformatics:** scRNA-Seq analysis, RNA-Seq, Chip-seq, PyMOL, Molecular docking, Network Analysis
- **Data Analysis:** Proficient in Pandas, Numpy; experienced in Dynamic Light Scattering, FT-IR Spectrometer
- **Network Medicine:** HPLC, Cytoscape, STRING, Gene Ontology

Soft Skills

- Effective in time management, teamwork, and problem-solving
- Strong communication, leadership, and accountability

Miscellaneous

- Deep learning, Pandas, Numpy, Dynamic Light Scattering (DLS), Fourier Transform InfraRed (FT-IR) Spectrometer, Linear Algebra, Probability, Calculus

Mini Projects

Aug 2021 – Sep 2021

Comparison of "Optimization Algorithms"

- Evaluated various optimization algorithms, including SGD, Momentum, RMSProp, and Adam, on a Saddle Point and MNIST dataset, comparing their efficacy.

Jul 2021 – Aug 2021

DNA Sequence Classification using LSTM (RNN),
Implementation of recurrent neural network

- Implemented LSTM to classify DNA sequences into categories based on intronic, exonic regions, and intron-exon boundaries, achieving improved accuracy over CNN.

Jun 2021 – Jul 2021

Predicting DNA N6-Methyladenine Sites in Rice Genome using CNN and LSTM

Developed a model using CNN and LSTM for predicting N6-Methyladenine sites in rice genome datasets, comparing algorithmic performances and accuracies.

Position of Responsibility

Nov 2023
BITS Pilani Goa, India

Conferences and Workshops

Core Organizing Team Member, ***Frontiers in Genome Engineering 2023 (FGE2023)***, BITS Pilani Goa Campus

- **Led the IT team** for a 3-day hybrid conference, ensuring seamless virtual participation of international speakers.
- **Designed** conference logos, standees, and flexes, showcasing creative and technical skills.
- **Managed** logistics and technical setups for online talks, demonstrating *organizational capabilities* and attention to detail.

Dec 2021
IIT Guwahati, India

Departmental retreat sports volunteer, BSBE departmental, IIT Guwahati

- **volunteered** in the departmental retreat of BSBE department in the sports of Volleyball and Badminton of more that 50 players.
- Participated in the sport of Volleyball as a vice captain.

Courses

Jan 2021 – Sep 2021

Deep Learning and Specialization, DeepLearning.AI

Completed the deep learning specialization of five courses | Dr Andrew Ng | Coursera

Sep 2023 – Nov 2023

Data Structures and Algorithms, geeksforgeeks

Completed the course on DSA.

Jul 2020 – Jul 2020

Principle of Biochemistry, Harvard University (edX)

Completed the course "Principle of Biochemistry" from Harvard University on the edX platform.
I also learned to use PyMOL software and completed all assessments through this course.

Apr 2020 – May 2020

Introduction to Genomic Technologies, Johns Hopkins University (Coursera)

Completed the course, an online non-credit course authorised by Johns Hopkins University | Coursera

Extracurricular and Volunteer Activities

One Week One Lab at CSIR IGIB Delhi (2023): Volunteered in the OWOL programme, managing and guiding a group of students from UP, India, providing mentorship and support.

Teaching Assistant at IIT Guwahati (2020 – 2022): Assisted in test administration and grading, supporting professors in managing a class of over 300 students.

IEEE Member and Symposium Organizer (2016 – 2018): Actively involved in IEEE Circuits and Systems Society and IEEE Electron Devices Society, organizing symposiums at IEM Kolkata.

Internship (2017): advanced telecommunication exchange networks and their features at Bharat Sanchar Nigam Limited (BSNL), Circle Telecom Training Center.

Robowars at NIT Jamshedpur (2016): Achieved 1st place in the Kurukshetra (Robowar) event at OJASS, NIT Jamshedpur.

Science Exhibition Participant and Winner (2006 – 2012): Received First Prize in Science Exhibition (2006) and consistently placed in top positions, representing the school at regional levels.

Interests and Freelancing

Computational Biology Freelancer: Collaborated with a postdoctoral researcher from **UC Berkeley**, focusing on automating biological data pipelines using R and Python. Provided expertise in computational biology, contributing to advanced research projects and developed automated pipeline.

Interests: Brainstorming, Flute, Piano, Chess, Cricket, Volleyball.