

Curriculum Vitae

Shreeharsha G Bhat

Final Year, Integrated Dual-Degree

B.Tech in Biological Engineering, Minor in Computational Biology

M.Tech in Quantitative Finance

CGPA : 3.38/4.00

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Online profiles : [LinkedIn](#) & [GitHub](#)



EDUCATION

Indian Institute of Technology, Madras

Integrated Dual Degree, CGPA: 8.46 or 3.38/4.00

Chennai, India

2026 (expected)

The Learning Centre P.U College

Class XII; 94.66%

Mangalore, India

2021

NITK English Medium School

Class X; 94.2%

Mangalore, India

2019

PREPRINTS AND THESIS

- 2025** Shreeharsha G Bhat¹, Daanish Mahajan¹ and Chirag Jain². *Billi: Provably Accurate and Scalable Bubble Detection in Pangenome Graphs*; <https://doi.org/10.1101/2025.11.21.689636> (submitted to RECOMB 2026)
- 2026** Master's thesis, *Cointegration of Time Series for Portfolio Management*, Wadhvani School of Data Science & AI, IIT Madras. (ongoing work)

RESEARCH EXPERIENCE

Department of Computational and Data Sciences, IISc

Research Intern, ATCG Lab, Under the guidance of Dr.Chirag Jain

May '24 – July '24

- Proposed a rigorous definition and performed a systematic analysis of bubbles in bidirected graphs.
- Built an exact algorithm with runtime $O(|V|^2(|V| + |E|))$ and a heuristic algorithm with identical outputs in practice that scales to large graphs.

Wadhvani School of Data Science & AI, IIT Madras

Master's Thesis, Under the guidance of Dr.Nirav Bhatt and Dr.Arun Ayyar

Jun '25 - ongoing

- Performed cointegration analysis on time series data for the Indian equity market.
- Devised various trading strategies to create a portfolio of cointegrated pairs, to maximize risk-adjusted returns.

Computational Neuroscience Lab, IIT Madras

Research Intern, Under the guidance of Dr.Srinivasa Chakravarthy. V

May '23 - Jul '23

- Developed a Python module for text-based spatial audio mapping leveraging pyttax3 and gTTS libraries.
- Model was used to simultaneously map multiple audio files of varying lengths using head-related transfer functions.

SKILLS & COMPETENCIES

Programming Languages: C, C++, MATLAB, R, proficient in Python

Software & Tools: VMD, GROMACS, AutoDock, LigPlus, PyMol, Discovery Studio Biovia, L^AT_EX, Git

Laboratory Techniques:

- Microbiology:** Inoculation, Streaking, Gram Staining, Lactophenol Cotton-blue Staining, Antibiotic Sensitivity Assay, Characterization of intracellular enzymatic activity, Bacterial growth curve measurements.
- Biochemistry:** Estimation of biomolecules by UV/Vis spectrophotometry, GOD-POD assay for glucose estimation, enzyme kinetics measurements, SDS-PAGE, thin layer chromatography, paper chromatography.
- Genetic Engineering:** Plasmid isolation, Agarose gel electrophoresis, restriction digestion, competent cell preparation, ligation, gel extraction, transformation, PCR.

PROJECTS

Protein Interactions: Computational Techniques

Course project for BT6320 ([GitHub](#))

Jul '24 – Nov '24

- Developed and validated a 2D-QSAR model for FDA-approved HIV protease inhibitors.

- Conducted protein interaction studies to identify binding sites and interaction networks for key proteins (2BTF and 1A22) and perform thermodynamic analysis.
- Performed pharmacophore modeling, ADME property analysis, and molecular docking to identify and evaluate 15 potential drug candidates from ZINC15 database.

Foundation of Machine Learning

Jul '24 – Nov '24

Course project for DA5400 ([GitHub](#))

- Implemented and analyzed supervised learning algorithms such as Stochastic Gradient Descent, Ridge regression, and Kernel regression without the use of in-built Python libraries.
- Created a binary spam email classifier from scratch based on email inputs using the Naive Bayes algorithm with the Laplacian smoothing.
- Implemented PCA with reconstruction on the MNIST dataset and Lloyd's algorithm for K-means clustering on another dataset to visualize Voronoi regions, without relying on inbuilt Python libraries.

Computer Simulations of Biomolecular Systems

Jul '23 – Nov '23

Course project for BT5420 ([GitHub](#))

- Replicated the results of molecular modeling and dynamic simulation of chicken Mx proteins with the S631N polymorphism by performing a simulation for 1 ns and measuring the RMSD, SAS, and Rg using GROMACS.
- Analyzed protein molecules and simulated lysosomes in water using VMD and GROMACS. Measured temperature, pressure, & density progression by running a molecular dynamics simulation for 1 ns post equilibrium.
- Developed a python module of generating Ramachandran plots for proteins using input PDB files.

Computational Neuroscience

Jul '23 – Nov '23

Course project for BT6270 ([GitHub](#))

- Simulated the FitzHugh-Nagumo Neuron model using MATLAB to find the threshold currents that shift dynamical behavior in the neuron. Characterized the variation in firing rate (frequency) with external currents.
- Modeled complex-coupled and power-coupled oscillators using Python and used it to find the coupling constants for varied phase differences.

Transport Phenomena in Biological Systems

Jul '23 – Nov '23

Course project for BT5051 ([GitHub](#))

- Analyzed the spread of gossip in a friend group employing principles of graph networks and Fick's Law of Flux.
- Quantified information propagation as a stochastic process based on factors such as popularity, closeness, and information flux, to accurately model the flow of gossip.

SCHOLASTIC ACHIEVEMENTS

- Secured an All India **top 5%** rank in JEE-Adv 2019 and ranked in the **top 1.7%** in JEE-Main '21.
- Bagged a rank of **707** in Karnataka CET examination among 193 thousand candidates.

COURSEWORK

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| 1. Discrete Mathematics for CS | 4. Algorithmic Approaches to Computational Biology | 7. Probability, Statistics, and Stochastic Process |
| 2. Data Structures and Algorithms in Biology | 5. Biostatistics | 8. Chinese |
| 3. Bioinformatics | 6. Computational Biology Lab | 9. Stochastic Calculus |

CO-CURRICULAR ACTIVITIES

Teaching Assistance

Aug'25-Nov'25

BT3051: Data Structures and Algorithms in Biology, offered by Dr. Chitra Babu

- Led weekly lab sessions and doubt-clearing sessions, providing hands-on technical guidance to ensure student comprehension of complex computational topics.
- Developed and curated core assessment material for the course, including creating questions for all examinations and managing the timely and accurate grading of assignments.

EXTRA-CURRICULAR ACTIVITIES

MITR

Aug '22 – ongoing

Dean of Students, Mentoring for Individual Transformation

- Part of a 100+ team of students & professors that help students in mental distress & in need of emotional support.
- Professionally trained by the wellness team to counsel and help students during emotional instability.

Placement Coordinator

Apr '22 – May '24

Academic Affairs Secretary, Placement & Internship Cell

- Served in a 3-tier, 16-member team outreaching companies catering towards Bioengineering and Quantitative Finance students.
- Developed a Python program to reach 4000+ companies in a span of two weeks, establishing contact with 60 new firms.

HOBBIES

- *Trinity College London* certified Grade 5 keyboard player with a knack for playing Western classical music, currently exploring acoustic guitar.
- Among the 30 students selected from 900+ entrants for the prestigious, year-long NCA Dramatics course.
- Trained karate green belt and represented my school in several state-level badminton and table tennis competitions.