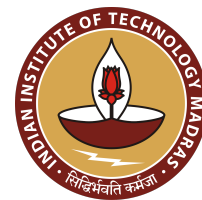


# Curriculum Vitae

## Shreeharsha G Bhat

Final Year, Integrated Dual-Degree  
B.Tech in Biological Engineering, Minor in Computational Biology  
M.Tech in Quantitative Finance  
CGPA : 3.39/4.00  
[be21b037@smail.iitm.ac.in](mailto:be21b037@smail.iitm.ac.in)  
Online profiles : [LinkedIn](#) & [GitHub](#)



## EDUCATION

<b>Indian Institute of Technology, Madras</b> <i>Integrated Dual Degree, CGPA: 8.47 or 3.39/4.00</i>	Chennai, India 2026 (expected)
<b>The Learning Centre P.U College</b> <i>Class XII; 94.66%</i>	Mangalore, India 2021
<b>NITK English Medium School</b> <i>Class X; 94.2%</i>	Mangalore, India 2019

## PREPRINTS AND THESIS

- 2025** Shreeharsha G Bhat<sup>1</sup>, Daanish Mahajan<sup>1</sup> and Chirag Jain<sup>2</sup>. *Billi: Provably Accurate and Scalable Bubble Detection in Pangenome Graphs*; <https://doi.org/10.1101/2025.11.21.689636>
- 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** May '24 – July '24  
*Research Intern, ATCG Lab, Under the guidance of Dr.Chirag Jain*
- 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** Jun '25 - ongoing  
*Master's Thesis, Under the guidance of Dr.Nirav Bhatt and Dr.Arun Ayyar*
- 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** May '23 - Jul '23  
*Research Intern, Under the guidance of Dr.Srinivasa Chakravarthy. V*
- Developed a Python module for text-based spatial audio mapping leveraging pytttsx3 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<sup>A</sup>T<sub>E</sub>X, 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** Jul '24 – Nov '24  
*Course project for BT6320 ([GitHub](#))*
- 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

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- Secured an All India **top 5%** rank in JEE-Adv 2021 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

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### 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

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### **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

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- *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.