



**Gurpreet Singh Wadhwa**  
**Computer Science & Engineering**  
**Indian Institute of Technology Bombay**

**200050046**  
**B.Tech.**  
**Gender: Male**  
**DOB: 04/10/2001**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE, New Delhi	Bhavan Vidyalaya, Panchkula	2020	
Matriculation	CBSE, New Delhi	Sacred Heart Senior Secondary School	2018	

Pursuing **Honors in Computer Science & Engineering**

## SCHOLASTIC ACHIEVEMENTS

- Received the **Institute Academic Award** at IIT Bombay for exceptional performance during the first year and (2021) secured **Institute Rank 11** among **1300+** undergraduate students from 18+ departments in IIT, Bombay
- Achieved **All India Rank 23** among 250,000 eligible aspirants in **JEE Advanced** conducted by IITs (2020)
- Achieved **All India Rank 126 (99.99 percentile)** in **JEE Main** out of 1.1 million aspirants all over India (2020)
- Among National **Top 30** science students selected by **Government of India** for **DHRUV** under (2019) **Pradhan Mantri Innovative Learning Programme** for **14 day mentorship** camp at IIT Delhi
- Conferred with **Advanced Performer (AP)** grade (awarded to **Top 1%** among 1300+ students) for exceptional (2021) performance in **Physical Chemistry** and **Biology** during the first year of study at IIT Bombay
- Achieved **All India Rank 1** in South East Asian Mathematical Olympiad (SEAMO) held in over 15 countries (2017)
- Recipient of the **National Talent Search Examination (NTSE)** scholarship, ranked **2nd** in **Stage 1** (2018)

## PROFESSIONAL EXPERIENCE

**Art Gallery Problem & Voronoi Games | Research Internship**

(May'22 - July'22)

Guide: Prof. Sándor P. Fekete, TU Braunschweig

- Came up with a **winning strategy** for **Voronoi Game** with fading on a straight line and on a circle upto two moves
- Simulated and studied various properties of multiple move Voronoi Game with majority winning function on a straight line
- Carried out an in-depth study of various **strategies** involved in solving **Art Gallery Problem** and how to extend those strategies into the **fading variant** of the problem in a polygon

**HealthifyMe Exploratory Data Analysis | Data Science Internship**

(Oct'21 - Feb'22)

Guide: Prof. Sridhar Narayan (Stanford Graduate School of Business) & Prof. Anuj Kapoor (IIM Ahmedabad)

- Worked with my team on managing, cleaning and analysing data of users of HealthifyMe (fitness tracking app) to draw comparison between **AI based fitness coaches** and **Human fitness coaches** by organising data in form of spells
- Employed statistical approaches like **Propensity Score Matching (PSM)** to group similar users for comparison
- Used novel methods like **Surrogate Indices** to predict **long term effects** by coupling various short term effects of users

**Web Caching | Software Development Internship**

(Dec'21)

GreatFour Systems Pvt. Ltd., Hyderabad

- Worked on storing large amounts of data/records in the front end using various storage applications such as **cache storage**, **local storage**, **Indexed DataBase** and **localForage** to speed up loading of pages and search results
- Made use of the **Django's Framework** to create a backend which interacted with the frontend and sent only the updated/modified data rather than the complete data to **improve loading speed** of the page

## KEY PROJECTS

**Modular Object Oriented Dynamic Learning Environment | Course Project** (Sept '21-Nov '21)

Guide: Prof. Amitabha Sanyal, Department of Computer Science & Engineering

- Developed an online **Learning Management System (LMS)** using **Django's Web Development Framework** for backend and HTML, CSS & Bootstrap for creating a user-friendly frontend
- Used **PostgreSQL** to store all records and submission of students and course content posted by teachers
- Implemented functionality of sending broadcast emails, file upload/download, discussion forum and command line interface

**Peer to Peer Network Simulation | Course Project**

(Feb' 22 - April '22)

Guide: Kameswari Chebrolu, Department of Computer Science & Engineering

- Simulated Peer-To-Peer network for any input of network connections in C++ using **socket programming**
- Used multithreading to run parallel connections & **semaphores and barriers** to implement the working of the network
- Incorporated information exchange, file search and file transfer across client nodes upto a **two-link depth**

## Optimisation of Measurement Matrix for Compressed Sensing | Course Project (Mar'22 - Apr'22)

Guide: Prof. Ajit Rajwade, Department of Computer Science & Engineering

- Implemented the discussed gradient descent based algorithm which reduces the **frobenius norm** of the **Gram Matrix** and compared the results with the conventional Elad's Optimisation technique
- Plotted relative errors in reconstruction of signals in randomly generated **Gaussian and DCT representation bases** with varying sparsity and compared **mutual coherence** for unoptimised and optimised sensing matrix

## Flutter App Development | Season of Code

(May '21 - July '21)

Web and Coding Club, IIT Bombay

- Applied **Flutter's Framework** to compose Interactive User Interface and demonstrated the same on **NewsApp**
- Collaborated, ideated and designed a Front End of **Poster Making App** for making customized posters
- Used features such as **OTP** based Authentication System, Customer Directories as per the **User's Phone Directory** and integrated the Flutter Frontend with the Backend to generate desired posters

## MINOR PROJECTS

### Lasso Coin Catching Game | Course Project

(Jan '21 - March '21)

Guide: Prof. Bhaskaran Raman & Kameswari Chebrolu, Department of Computer Science & Engineering

- Utilized **SimpleCpp Graphics Library** to create a working game with an interactive user interface
- Implemented **Object Oriented Programming** principles to ideate and implement classes enabling desired behaviour of lasso and ball objects with well-defined lasso controls and randomized parabolic paths of balls

### Technical versus Fundamental Analysis | Finsearch

(May '21 - July '21)

Finance Club, IIT Bombay

- Undertook a three month-long **research project** to understand the working of **Stock Markets** in India deeply
- Created a report analyzing **Maruti Suzuki's stock** and made predictions on whether to invest & trade in it

### Scotland Yard | Course Project

(Oct '21)

Guide: Prof. Amitabha Sanyal, Department of Computer Science & Engineering

- Applied **concurrency** concepts in **Java** to build the game simulation with **multiple threads** on a  $8 \times 8$  grid and integrated **inter-process communication** with **socket programming** to handle the Client-Server model
- Utilised **synchronisation primitives** like locks and **semaphores** to handle critical sections and exceptions

### Rush Hour | SAT Solver | Course Project

(Feb'22)

Guide: Prof. Ashutosh Gupta

- Encoded the Rush Hour Game into a **clause satisfiability problem** for an  $n \times n$  board with mine blocks
- Used python's **z3 library** to encode the clauses which returned ordered moves to optimally solving the puzzle

## POSITIONS OF RESPONSIBILITY

### Sports Secretary | Computer Science & Engineering Association (CSEA)

(May '21 - April '22)

- Responsible for organizing and administering all **e-sports activities** and events in the department
- Collaborated with rest of the secretaries to keep the students connected in the online semester, by organizing various public engaging activities like Informal Night, Valorant Tournament, etc.

### Teaching Assistant | Department of Mathematics, IIT Bombay

(Dec'21-Mar'22)

- Assisted the professor in planning the **course outline** and oversaw the **logistics** of conducting exams for 1300+ freshmen students in both online and offline mode for MA 106 (Linear Algebra)
- Conducted **weekly tutorial sessions** for a batch of 60+ students for the Calculus courses (MA 109 & MA 111)

## TECHNICAL SKILLS

Programming	C/C++, Python, Java, Dart, Bash, Awk, Sed, Dart, Flutter, VHDL, ARM
Software & Development	Git, L <sup>A</sup> T <sub>E</sub> X, MATLAB, Android Studio, AutoCAD, HTML, CSS, PostgreSQL, Django
Libraries	Matplotlib, Numpy, SciPy, Pandas, Scikit-learn, z3, FLTK

## EXTRACURRICULAR ACTIVITIES

- Stood **Fourth** among 150+ participants for designing and engineering an **Arduino-based**, app-controlled (2021) bot for **XLR8**, a robotics competition organized by Institute Technical Council, IITB
- Understood Fabrication of Micro & Nano Scale devices using **Maskless Optical Lithography** & **Electron Beam Lithography** under Prof. Joby Joseph & Prof. Rajendra Singh, IIT Delhi (2019)
- Stood second in school science fair for creating static model showing causes of **Ozone Layer Depletion** (2017)
- Completed year long voluntary work for **Open Learning Initiative** under **National Service Scheme**, IITB (2021)