



**Rathour Param Jitendrakumar**  
**Electrical Engineering**  
**Indian Institute of Technology Bombay**  
**Specialization: Control and Computing**

**190070049**  
**Dual Degree (B.Tech. + M.Tech.)**  
**Gender: Male**  
**DOB: 07/10/2001**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	8.99

Pursuing a **Minor in Computer Science & Engineering**

## Scholastic Achievements

- Achieved a perfect **10 SPI** (Semester Performance Index) with 36 credits during the 8<sup>th</sup> semester at IIT Bombay (2023)
- Secured **All India Rank 926** in Joint Entrance Examination (JEE) **Advanced** among 161 thousand candidates (2019)
- Secured **99.9%** percentile in Joint Entrance Examination (JEE) **Main** among 1.1 million candidates (2019)
- Recipient of the National Talent Search (NTS) Scholarship received by the top 1000 students in the country (2017)

## Work Experience

### NVIDIA | ASIC Intern | GPU Subsystem

(May 2022 - Jul 2022)

Guide: Raghuram L

- Worked on enhancing the NVLink interconnect performance model to incorporate multiple pipes per High-Speed Hub
- Integrated a 1-D arbiter class template to the NVLink performance model while thoroughly maintaining its functionality

## Key Projects

### Intelligent and Learning Agents

(Jul 2021 - Nov 2021)

Guide: Prof. Shivaram Kalyanakrishnan

(CS747 | Foundations of Intelligent and Learning Agents | Course Project)

- Implemented and compared  $\epsilon$ -greedy, **UCB**, **KL-UCB** and **Thompson Sampling** for a stochastic multi-armed bandit framework
- Performed **MDP Planning** using Value Iteration, Howard's Policy Iteration and Linear Programming with **PuLP** in Python
- Propelled up a car placed at the bottom of a sinusoidal valley using **Sarsa** with **Tile Coding** in the **OpenAI Gym** environment

### Autonomous Robotic Systems and Control

(Jan 2023 - May 2023)

Guide: Prof. Debasattam Pal

(EE615 | Control and Computing Lab | Course Project)

- Realised **path planning** and **obstacle avoidance** of autonomous mobile robots in **MATLAB** using Vector Field Histogram
- Executed **sensor fusion** using complementary & **Kalman filter** for estimating the orientation of inertial measurement units
- Implemented stabilisation of Rotary Inverted Pendulum using **Swing-Up Control** and **Linear-Quadratic Regulator** Control

### Coded Computing for Straggler Mitigation, Security and Privacy

(Sep 2021 - Nov 2021)

Guide: Prof. Nikhil Karamchandani

(EE605 | Error Correcting Codes | Course Project)

- Investigated polynomial coding and Lagrange Coded Computing (LCC) techniques to mitigate fundamental bottlenecks in Large-Scale Distributed Computing for computing matrix multiplications and evaluating arbitrary multivariate polynomials
- Explored applications of LCC in secure & private **Multi-Party Computing** (MPC) and **privacy-preserving** machine learning

### Distributed Deep Learning

(Mar 2020 - Jul 2020)

Institute Technical Summer Project (ITSP)

(Institute Technical Council, IIT Bombay)

- Developed a Hierarchically-Distributed Deep CNN learning model for training **super-high-resolution datasets** via spatial segmentation of each sample and observed an increase in **training speed** and a decrease in **memory utilisation** per node
- Verified the approach by using Kaggle's **Retinal OCT** dataset and analysed loss of information due to spatial segmentation

### Dining Philosophers: A Synchronisation Problem

(Jan 2022 - May 2022)

Guide: Prof. Mythili Vutukuru

(CS347 | Operating Systems | Course Project)

- Modelled the threads by creating custom semaphores using condition variables and mutex abstractions of **pthread** API
- Devised and implemented two solutions by using **semaphores** and **condition variables** each and proved their correctness

## Positions of Responsibility

### Teaching Assistant | Computer Programming and Utilisation (Autumn 2020, Autumn 2021, Spring 2022, Autumn 2022)

- Academically guided **50** students, personally cleared their doubts, prepared and evaluated examinations & lab problems
- Brainstormed **60+** **practice problems** for CS101, shared via a personal **webpage** with tips and resources to boost interest

### IIT Bombay Racing | Junior Design Engineer | Electrical Subsystem

(Sep 2020 - May 2021)

- Simulated the LV Safety board on **LTSpice** and verified the working of RTDS, brake light, and error blocks of the subsystem
- Explored Electromagnetic Interference (EMI) reduction techniques to be incorporated into PCB designs of the subsystem

## Technical Skills

<b>Languages</b>	C, C++, Python, Julia, MATLAB, Scilab, $\text{\LaTeX}$ , HTML, CSS, SQL, Embedded C, VHDL, MIPS, 8086
<b>Frameworks</b>	Git, Docker, SageMath, Qiskit, NumPy, SciPy, pandas, scikit-learn, OpenCV, TensorFlow, Keras, Jekyll

## Extracurriculars

<b>Volunteering</b> (2019-2022)	<ul style="list-style-type: none"><li>Contributed to Career Counselling Campaign for 12,000+ indigent students by <b>Abhyuday</b> and <b>NCC</b></li><li><b>Mentored</b> students appearing for JEE during the <b>COVID-19</b> crisis as a part of <b>CovEd Education</b></li></ul>
<b>Miscellaneous</b> (2019-2022)	<ul style="list-style-type: none"><li>Composed articles on exciting labs and scientific content as an <b>Editor</b> of the Department Newsletter</li><li>Completed a year-long <b>training program</b> as <b>NCC Cadet</b> under 2 MER NCC at IIT Bombay</li><li>Part of the <b>Inter-Department E-Sports</b> Fest winning squad representing the <b>Smashkarts</b> team</li></ul>