Rathour Param Jitendrakumar | **190070049**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
DOB: 07-10-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	8.56
Intermediate	CBSE	St. Tukaram National Model School Latur	2019	96.60%
Matriculation	CBSE	Podar International School Latur	2017	10

Pursuing **Minor** in **Computer Science & Engineering** and **Honours** in **Electrical Engineering**

Scholastic Achievements

- 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)*
- Scored **418** marks out of 450 in Birla Institute of Science and Technology Admission Test (**BITSAT**) *(2019)*
- Secured **99.92%** percentile in **MHT-CET** among 270 thousand candidates conducted by the Maharashtra Govt. *(2019)*
- Statewise top 1% in the National Standard Examination in Astronomy **(NSEA)** and Chemistry **(NSEC)** *(2019)*

Scholarships and Recognitions

- Recipient of the National Talent Search **(NTS)** Scholarship given by NCERT to 1000 students of country *(2017)*
- Awarded Academic Excellence Scholarship **(AES)** by SOF given to **one student per class per state** *(2017)*
- Recipient of the Maharashtra Talent Search **(MTS)** scholarship with **State Rank 11, 10, 16** respectively *(2015-17)*
- Recipient of State Scholarship by Maharashtra State Council of Examination with **State Rank 5** *(2014)*

Research Projects and Work Experience

Scenario Approach to Robust Optimization
(May 2021 - Present)
Summer Undergraduate Research Program (SURP) *(EnPoWER, IIT Bombay)*
Guide: Prof. Debasish Chatterjee

- Working on improving scenario approach to robust optimization problems in the **moderate to high dimensional** regime
- Studied **concentration of measure** phenomenon for the analysis of randomized algorithms and the scenario approach
- Analysed various randomized algorithms like **MCMC, Propp–Wilson, Simulated annealing** using Finite Markov Chains

IIT Bombay Racing | Electrical Subsystem
Faculty Advisor: Prof. Amber Shrivastava
A cross-functional team of 70+ students which designs, fabricates and assembles an Electric Race Car for Formula Student UK

Junior Design Engineer | LV Safety Subsystem *(Sep 2020 - May 2021)*

- Simulated LV Safety board on **LTSpice** and verified the working of RTDS, Brake Light, Error Blocks of the subsystem
- Explored Electromagnetic Interference (**EMI**) Reductions Techniques to be incorporated into PCB designs
- Mentored 3 trainees in understanding the subsystem through FS rulebook, circuit design tasks and spice simulations

Trainee | Electrical Subsystem *(Jan 2020 - Aug 2020))*

- Investigated the Electronic Control Unit (**ECU**) subsystem, working with **RPM** and **position sensors** and realised working of the steering, acceleration pedal and brake sensors of the car with **Arduino IDE**
- Acquired the knowledge of Controller Area Network (**CAN**) and Data Acquisition (**DAQ**) systems and their implementation, wrote code for wireless communication using **LPC1768 Mbed** microcontroller and **XBee** module

Key Projects

Distributed Deep Learning
(Summer 2020)
Institute Technical Summer Project (ITSP) *(Institute Technical Council, IIT Bombay)*

- Developed a **Hierarchically Distributed Deep CNN** in order to parallelise workload across nodes in the model
- Utilised the model to implement better training on **Super-High-Resolution Datasets** via **spatial segmentation** of each sample and observed increases in **training speed** and decrease in **memory utilisation** per node in the hierarchy network
- Compared the performance of **VGG16, ResNet**, and **AlexNet** when used as the underlying Neural Networks
- Verified the approach by using **Retinal OCT** dataset on Kaggle and analysed loss of information due to spatial-segmentation

Tinkering Bootcamp
(Summer 2020)
Learner's Space (LS) *(Tinkerers' Laboratory, IIT Bombay)*

- Developed a **Self Irrigation System** using Arduino IDE, which toggles according to readings from a **DHT1** humidity sensor and provided manual **control** and **data monitoring** through **Blynk App** by projecting real-time data to Blynk servers
- Made **Human Detection System** using a Passive Infrared **(PIR)** sensor which uses a buzzer module for alarm sound
- **Automated** daily fetching of count of corona cases in India from a website using **ESP32** and **ThingHTTP**
- Simulated a **Invisibility Cloak** by live removal of foreground of range of colours from a webcam using **OpenCV**

Tennis Scoreboard Simulator *(Autumn 2019)*
Guide: Prof. V Raj Babu *(Course Project)*
- Simulated a tennis scoreboard using **Embedded C** in the **best-of-three tiebreak** set format on the **Pt-51** board
- Displayed directions to use and the score, Game Point, Set Point, Match Point for each player using an **LCD Module**
- Used **UART** Module and **RealTerm** software for interfacing between a keyboard and **Atmel AT89C51** micro-controller

Arithmetic Logic Unit *(Autumn 2020)*
Guide: Prof. Virendra Singh *(Course Project)*
- Designed a signed **16-bit ALU** using **structural VHDL** which computes addition, subtraction, NAND & XOR
- Performed signed addition using 16-bit **Kogge–Stone fast adder** that returns output in 17-bit 2's complement form
- Simulated the circuit using **Quartus** by handpicking test vectors covering all edge cases for each operation

Nonlinear Dynamics *(Summer 2020)*
Summer of Science (SoS) *(Maths and Physics Club, IIT Bombay)*
- Analysed Continuous and Discrete Dynamical Systems, **Stochastic Systems** and Chaos & Fractals
- Simulated mathematical models using **MATLAB** (dfield and pplane) and **Python** (SciPy, Pynamical) package

Game Theory *(Summer 2021)*
Summer of Science (SoS) *(Maths and Physics Club, IIT Bombay)*
- Studied Strategic Form Games, Matrix Games, Bayesian Games and concepts in **Non-Cooperative** Game Theory
- Analysed the notion of Pure & Mixed Strategy **Nash Equilibrium**, its Existence and Computational Complexity

Positions of Responsibility

Teaching Assistant | Computer Programming and Utilization *(Spring 2021)*
Guide: Bhaskaran Raman *(Computer Science and Engineering IIT Bombay)*
- Academically guided 14 students, clearing their doubts through weekly sessions and personal interaction
- Ensured the smooth conduction of lab sessions by providing suitable clarifications and hints for problem statements
- Created a **webpage** containing practice problems and relevant resources to enhance understanding of course

Mentor | Summer of Science *(Summer 2021)*
Topic: Linear Algebra and it's Applications *(Maths and Physics Club, IIT Bombay)*
- Mentored a student in exploring the subject and guided him through various interesting topics in Linear Algebra
- Checked the student's progress regularly, personally cleared his doubts and reviewed & evaluated his submissions

Editor | Department Newsletter Team *(2020)*
Background Hum: Team of 20 enthusiastic students *(Electrical Engineering Student Association, IIT Bombay)*
- Ideated and worked on an overview of **exciting labs** in the department to increase awareness among students
- Prepared content recommendations of scientific and engineering marvels to inspire curiosity among readers

Key Courses Undertaken

Electrical	Error Correcting Codes,† Communication Systems†, Signal Processing, Electromagnetic Waves, Control Systems, Microprocessors, Digital Systems Analog Circuits, Electronic Devices
Computer Science	Foundations of Intelligent and Learning Agents†, Design and Analysis of Algorithms†, Data Structures and Algorithms, Logic for CS, Computer Programming and Utilization
Mathematics	Calculus, Complex Analysis, Differential Equations, Linear Algebra, Matrix Computations, Probability and Random Processes, An Introduction to Number Theory and Cryptography†
Coursera	Deep Learning Specialization (deeplearning.ai)

†*to be completed by November 2021*

Technical Skills

Languages	C++, Python, Julia, HTML, CSS, LaTeX, SQL, Embedded C, VHDL, MIPS, 8051, 8086 Assembly
Frameworks & Libraries	NumPy, SciPy, pandas, scikit-learn, OpenCV, TensorFlow, Keras, PyTorch, Jekyll, Qiskit
Softwares	Git, MATLAB, Simulink, EAGLE, LTspice, Quartus, Keil μVision, AutoCAD, Adobe Illustrator
Hardwares	Arduino, ESP32, Raspberry Pi 4, Pt-51, Krypton, Tiva-C

Extracurriculars

Technical *(2019-2020)*
- Built a **RC Bot** capable of negotiating obstacles and designed & made a **RC Trainer Plane**
- Completed **Scientific Computing** & **Data Analytics** Bootcamps and **Quantum Computing** Workshop

NCC *(2019-2020)*
- Completed a year-long **training program** as **NCC Cadet** under 2 MER NCC at IIT Bombay
- Attended ten-day-long NCC **Annual Training Camp** (ATC) held during Nov-Dec 2019
- Part of **Republic Day Parade Contingent** held on 26th January 2020 at IIT Bombay Gymkhana
- Represented IIT Bombay in **Inter-College Cricket** Competition at (ATC) organised by NCC
- Participated in **Group Act Competition**, Cultural GC organised by NCC IIT Bombay

Social Volunteer *(2019-2020)*
- Volunteered for Career Counselling Campaign and A Session on Climate Change for 12,000+ underprivileged students from 8th to 12th conducted by **Abhyuday** in association with **NCC** across 80+ schools in Mumbai
- **Mentored** students appearing for JEE during **COVID-19** crisis as part of **CovEd Education**

Culturals *(2019-2020)*
- Studied **Beginner Music Theory** as a part of Summer School of Cult conducted by ICC

Scholastic achievements and extracurricular activities are not verified by the Placement Cell