Rathour Param Jitendrakumar | **190070049**
Electrical Engineering | **UG Second Year**
Indian Institute of Technology Bombay | **Male**
DOB: 07/10/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	9.24
Intermediate/+2	CBSE	St. Tukaram National Model School Latur	2019	96.60
Matriculation	CBSE	Podar International School Latur	2017	10.00

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

Scholastic Achievements

- Secured **All India Rank 926** in **JEE Advanced** among 161 thousand candidates *(2019)*
- Secured **99.9%** percentile in **JEE Main** among 1.1 million candidates *(2019)*
- Scored **418** marks out of 450 in **BITSAT** *(2019)*
- Secured **99.92%** percentile in **MHT-CET** among 270 thousand candidates *(2019)*
- Statewise top 1% in the National Standard Examination in Astronomy **(NSEA)** and National Standard Examination in Chemistry **(NSEC)** conducted by Indian Association of Physics Teachers **(IAPT)** *(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 given by Centre for Talent Search and Excellence N. Wadia College, Pune with **State Rank 11, 10, 16** respectively *(2015-17)*
- Recipient of State Scholarship by Maharashtra State Council of Examination with **State Rank 5** *(2014)*

Key Projects

Distributed Deep Learning *(Summer 2020)*
Institute Technical Summer Project (ITSP) *(Institute Technical Council, IIT Bombay)*
- Developed a **Hierarchically Distributed Deep CNN** to parallelise workload across nodes in the system
- Utilised the model to implement better training on Super-High-Resolution Datasets via **spatial segmentation** of sample and observed increases in **training speed** and decrease in **memory utilisation** per node
- Compared the performance of **VGG16, ResNet**, and **DenseNet** when used as the underlying neural network
- Verified the approach by using **Retinal OCT** and analysing loss of information due to spatial-segmentation

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 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
- Explored its application with mathematical models in Physics, Biology, Chemistry and Engineering
- Simulated mathematical models using **MATLAB** (dfield and pplane) and **Python** (SciPy, Pynamical) package

DC Power Supply *(Autumn 2019)*
Guide: Prof. Joseph John *(Course Project)*
- Created regulated voltage supplier of 5V, 12V and –12V using **IC 7805**, **Zener Diodes** and electrical elements
- Used transformer along with full-wave bridge rectifier in conjunction with a capacitive filter to get rectified wave
- Designed a suitable circuit and realised complete setup on a PCB and Prototype Box for use in future labs

Digital Counter and Object Detector *(Autumn 2019)*
Guide: Prof. Joseph John *(Course Project)*
- Interfaced LED-IR detector pair to 7490, 7447A and LT-542 7-segment display for **object sensing** and counter

Remote Control Plane *(Autumn 2019)*
RC Plane Competition *(Aeromodelling Club, IIT Bombay)*
- Designed and constructed an RC trainer plane with a proper estimation of wing, body and tail dimensions
- Integrated **BLDC rotors, RF receivers** and **Servo Motors** to achieve controlled flight

Remote Control Obstacle Manoeuvring Bot *(Autumn 2019)*
XLR8 *(Electronics and Robotics Club, IIT Bombay)*
- Made a **Bluetooth controlled bot**, using AT-tiny 2313 microcontroller and L293D motor driver
- Successfully steered the bot along an obstacle-ridden path using the Bluetooth module HC-05

Positions of Responsibility

Trainee | IIT Bombay Racing *(Spring 2020)*
Guide: Prof. Amber Shrivastava *(IIT Bombay)*
A cross-functional team of students which designs, fabricates and assembles an Electric Race Car for Formula Student UK
First Indian team to win the Engineering Design event in the history of FSUK (4^{th} overall out of 73 teams)

- Explored the **LV Safety** subsystem, the **Shutdown Sequence** of the car and its elements
- Investigated the **Electronic Control Unit** (ECU) subsystem, working with **RPM** and **position sensors** and realised the working of the steering, acceleration pedal and the brake sensors 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

Teaching Assistant | Computer Programming and Utilization *(Ongoing)*
Guide: Bhaskaran Raman *(Computer Science and Engineering IIT Bombay)*

- Academically guiding 13 students, clearing their doubts through personal interaction
- Created a webpage containing practice problems and relevant resources to enhance understanding of course

Editor | Department Newsletter Team *(Ongoing)*
Background Hum: Team of 20 enthusiastic students *(Electrical Engineering Student Association, IIT Bombay)*

- Ideated and working on an overview of exciting labs in the department
- Preparing content recommendations of scientific and engineering marvels to inspire curiosity among readers

Bootcamps and Workshops

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

Self Irrigation System
- Developed a system using Arduino IDE, which toggles according to readings from a **DHT1** humidity sensor
- Manual **control** and **data monitoring** through **Blynk App** by projecting real-time data to Blynk servers

Human Detection Alarm
- Made human detection system using a Passive Infrared **(PIR)** sensor which uses a buzzer module for alarm

Corona Cases Tracker
- **Automated** daily fetching of count of corona cases in India from a website using **ESP32** and **ThingHTTP**

Harry Potter's Invisibility Cloak
- Live **removal of foreground** of range of colours from a webcam using **OpenCV** to induce transparency

Scientific Computation and Mathematical Modelling in Python *(Summer 2020)*
Learner's Space (LS) *(Maths and Physics Club, IIT Bombay)*

- Simulated mathematical models for **heat transfer**, **economic model**, **predator-prey** and **epidemiology**
- Implemented algorithms like **PageRank Algorithm**, Euler's Method and **Runge-Kutta Algorithm**
- Animated cellular automaton such as **Game of Life** and **Langton's Ant** using **FuncAnimation** of Matplotlib

Data Analytics Bootcamp by Analytics Club & **Quantum Computing Workshop** by MnP Club

Key Courses Undertaken

Electrical	**Signal Processing**, **Digital Systems**, **Microprocessors**†, **Control Systems**†, Power Engineering†, Analog Circuits, Electronic Devices and Circuits†
Computer Science	**Logic for Computer Science**, **Introduction to Machine Learning**† Computer Programming and Utilization
Mathematics	Calculus, Linear Algebra, Differential Equations, Complex Analysis, Probability and Random Processes, **Matrix Computations**†
Coursera	**Deep Learning Specialization** (deeplearning.ai), Algorithmic Toolbox† (UC San Diego)

†*to be completed by April 2021*

Technical Skills

Languages	C++, Python, Julia, HTML, CSS, LaTeX, SQL
Frameworks & Libraries	NumPy, SciPy, SymPy, pandas, seaborn, scikit-learn, OpenCV, PyTesseract, TensorFlow, Keras, PyTorch,Selenium, Beautiful Soup, PyAutoGUI, Jekyll, Qiskit
Softwares	Git, MATLAB, Simulink, EAGLE, LTspice, Quartus, AutoCAD, SOLIDWORKS
Hardwares	Arduino, ESP32, Raspberry Pi 4, Krypton, VHDL

Extracurriculars

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 26^{th} 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 8^{th} to 12^{th} conducted by **Abhyuday** in association with **NCC**
- **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