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 **Minor** in **Computer Science & Engineering**

Scholastic Achievements

- Secured **All India Rank 926** in **JEE Advanced** among 161 thousand candidates *(2019)*
- Secured **All India Rank 1314** 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)*
- Secured **International Rank 20** in **IMO** Level 1 conducted by Science Olympiad Foundation (SOF) *(2017)*

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)*

Work Experience

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

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

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

Automatic LED Lamp *(Autumn 2019)*

Guide: Prof. BG Fernandes *(Course Project)*

- Used **Schmitt Trigger** Circuit along with **LDR** in conjunction with a relay to make an automatic lamp
- Interfaced the Relay circuit with an LED which would turn on in dark and stay off in light

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

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 **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 **Google 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 *(Summer 2020)*
Learner's Space (LS) *(Analytics Club, IIT Bombay)*
- Utilised **Pandas** and **seaborn** for loading, cleaning, manipulating, analysing and visualising datasets
- Investigated **scikit-learn** for machine learning algorithms to build models and make predictions
- Explored **Model Development** and **Model Evaluation** using numerous statistical techniques

Quantum Computing *(Summer 2020)*
10-day Workshop *(Maths and Physics Club, IIT Bombay)*
- Hands-on experience using **Qiskit**, designing circuits and implementing diverse operations using quantum gates
- Implemented **Deutsch–Jozsa** & Grover's algorithm, **BB84** Protocol, and **Quantum Fourier Transform**

Key Courses Undertaken

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

*to be completed by November 2020 †to be completed by April 2021

Technical Skills

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

Extracurriculars

Culturals *(2019-2020)*
- Working as an **Editor** in the department newsletter team
- Studied **Beginner Music Theory** as a part of Summer School of Cult conducted by ICC

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**
- **Mentored** students appearing for JEE during **COVID-19** crisis as part of **CovEd Education**