Mehul Vijay Chanda | **200260029**
Engineering Physics | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 21/12/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Sagar Public School, Saket Nagar	2020	97.60%
Matriculation	CBSE	Sagar Public School, Saket Nagar	2018	94.60%

Pursuing a **minor** in **Systems & Controls Engineering**

Scholastic Achievements

- **Ranked 1st** out of 66 students in the department in Engineering Physics batch of 2024 *Jul'22*
- Secured **All India Rank 433** out of 10,00,000 candidates in JEE Main *Jul'20*
- Secured **All India Rank 806** out of 1,50,000 candidates in JEE Advanced *Oct'20*
- Among the **top 458**, out of 54,000 candidates, qualified to appear for the Indian National Physics Olympiad *Dec'19*
- Among the **top 802**, out of 50,000 candidates, qualified to appear for the Indian National Chemistry Olympiad *Dec'19*
- Selected with **All India Rank 562** out of 50,000 candidates for the **KVPY** fellowship provided by IISc *Apr'19*

Technical Experience

Design Engineer & Junior Design Engineer | Path Panning & Controls | IIT Bombay Racing *Aug'21-present*

Part of a team of 60+ students working on design and fabrication of formula type electric race cars for competing in Formula Student International Engineering Competition held at Silverstone, UK and the driver-less version held in Germany

- Won the **1st Prize** for designing an **Advanced Driver Assistance System** in System Intelligence competition by Ather
- Optimized longitudinal control based on the bicycle model and utilizing **PID** to generate throttle and brake commands
- Utilized concept of **Bezier Curves** to interpolate generated reference path to ensure stable and accurate tracking
- Implemented lateral dynamics control usin to generate required steering command
- Conducted **learning modules** for trainees roductory knowledge of the subsystem
- Ideating on implementing **Vehicle Dynam** improve performance and robustness of control algorithm, and incorporating the concept of race lines in path planning algorithm to improve turning times
- Preparing to shift from Python API to ROS based client for vehicle control to ensure better system integration

SuryaDrishti | ISRO's Mid Prep Problem Statement | 10th Inter IIT Tech Meet *Feb-Apr'22*

Standalone, web-based application developed using Python and Angular to identify and categorize Solar Flares

- Bagged the **1st Prize** along with a **Gold Medal** after presenting the tool to a panel of ISRO scientists and engineers
- Created primarily for facilitating research on **XSM** data but target audience also includes larger astronomy community
- Developed an **Online Machine Learning** model utilizing neural networks to identify and remove false positive detections of X-ray bursts by the statistical model and also reduce the amount of data required for training and validation

Simulating response of Daksha to cosmic radiation | STAR Lab, IIT Bombay *Dec'21-present*

*Daksha is a proposed **Space Telescope** mission, led by IIT Bombay, working closely with TIFR, PRL, IUCAA, RRI etc. It will search for high energy transients and will be the world's most sensitive high energy transient telescope by a large margin*

- Modelling the chemical composition and geometry of Daksha satellite using **Geant4**, a toolkit developed by CERN
- Learning the physics and electronics of **CZT Detectors** to simulate their response to incoming gamma rays
- Designing innovative **experiments** to verify and quantify the extent of charge-sharing occurring in CZT detectors

AI Based Music Generator | Institute Technical Summer Project *Apr-Jul'21*

- As part of a team of 4, successfully created and tuned a **Neural Network** on **Python**, which could generate novel and melodic music on being seeded with an initial set of musical elements comprising of notes, chords and rests
- Used the Music21 library to handle musical information like notes, chords, octaves and beats in the MIDI files
- The neural network comprised of a **LSTM** model with Attention Mechanism, packaged inside a **Encoder-Decoder** layer

Controls Theory | Electronics and Robotics Club, IIT Bombay *Jul'21*

- Successfully completed a 4 week course on Controls Theory conducted by ERC as part of Learner's space
- Learnt the basics of **Control Systems** and the mathematical tools required for their modelling - ordinary differential equations, transfer functions, concepts of stability and controllability of linear and tangentially linear systems
- Used PID to design and simulate a line follower on Python and stabilize an inverted pendulum on **MATLAB** and **Simulink**

Other Projects

Mess Food Management System | **Prof. Maniraj Mahalingam** *Mar-Apr'22*
Course Project (Digital Systems)

- Designed an innovative system for removing human verification of mess cards and streamlining mess food payment
- Created the circuit from scratch by utilizing components like **Comparators, Multiplexers, Registers, RAM and HDD**
- Incorporated a bar code scanner to use ID cards for digital verification of identity, thereby reducing wait time in messes
- Implemented a central **Data Storage** system which allows easy calculation of mess fee for individuals at end of semester

Measurement of net-charge fluctuations in $\mathbf{p-p}$ collisions | **Prof. Sadhana Dash** *Oct-Nov'21*
Course Project (Data Analysis and Interpretation)

- Analyzed charge fluctuations in data generated using PYTHIA 8 using **ROOT**, a data processing framework by CERN
- Examined trends and correlations between relevant parameters to gain a better understanding of underlying processes

Audio Amplifier | **Prof. S. Umasankar** *Jun'21*
Course Project (Introduction to Electronics)

- Designed an audio amplifier working on 15V cells, using an **OpAmp** and **transistors** for signal amplification
- Modified the idea of a bidirectional **Current Booster** to get non-inverted output satisfying the power requirements

Coin and Lasso Game | **Prof. Kameswari Chebrolu** *Feb'21*
Course Project (Computer Programming and Utilization)

- Ideated and implemented multiple novel features and enhancements to a coin and lasso game written in **C++**
- Utilized the concepts of **Heap Memory**, **OOP** and the Standard Library to make the game entertaining and user-friendly

High Energy Astrophysics | **Maths and Physics Club, IIT Bombay** *Apr-Jul'21*

- Completed reading project on High Energy Astrophysics by submitting a detailed $\mathbf{80+}$ pages report and video presentation
- Covered topics included Tensor Algebra, Special Theory of Relativity, General Theory of Relativity, Stellar Evolution, Stellar Death and physical process like Ionization Losses, Bremmstrahlung radiation and Synchrotron radiation

Technical Skills

Languages	Verilog, Python, C++, MATLAB, HTML
Software	LTspice, Simulink, ROS, ROOT, Geant4, SolidWorks, Quartus, LaTeX
Packages	PyTorch, Pandas, NumPy, Astropy, SciPy, Matplotlib

Key Courses

Electronics	Microprocessors lab*, Analog Circuits Lab, OpAmp Circuits Lab, Digital Electronics Lab, Analog Electronics, Digital Systems
Systems & Control	Mathematical Structures for Control, Signals and Feedback, Linear and Non-Linear Systems*
Physics	General and Special Theory of Relativity, Data Analysis and Interpretation, Classical Mechanics, Waves & Oscillations, Quantum Mechanics*, Basics of Electricity & Magnetism
Mathematics	Differential Calculus, Integral Calculus, Ordinary Differential Equations, Partial Differential Equations, Linear Algebra, Complex Analysis, Numerical Analysis

** indicates ongoing courses*

Positions of Responsibility

Institute Student Mentor | **Student Mentorship Program** *Jun'22-present*

- **One of the only 15** third-year mentors selected after a rigorous process comprising a SoP, peer reviews and interviews
- Will be mentoring a group of incoming **UG Freshmen** by helping them with their academic and extracurricular activities

Department Academic Mentor | **Dept. of Physics, IIT Bombay** *May'22-present*

- Mentoring a group of **6 Sophomores** from the department by providing academic guidance and general counselling
- Responsible for conducting information sessions, updating program website and bridging the student-faculty gap

Class Representative | **Engineering Physics batch of 2024** *Dec'20-present*

- Responsible for general classroom **administration**, information dissemination and **mediation** between the department and students to ensure smooth running of courses and optimal scheduling of exams and submission deadlines

Teaching Assistant | **MA109, MA111, MA108** *Dec'21-Jun'22*

- Assisted **120+ UG freshmen** academically by conducting problem solving and doubt clearing sessions for **3 courses**

Extra-Curricular Activities

- Won the **1st prize** in **inter-college basketball tournament** organized by K.J. Somaiya College of Engineering *Apr'22*
- Secured **Runners-up** position in basketball organized as part of Aavhan, IIT Bombay's annual Sports Festival *Apr'22*
- **Organized** a 3-day cultural event named Weeknd Trauma, which saw an outreach of **1000+ students** across the years of study, with the other first year class representatives on the institute level *Feb'21*
- Awarded the titles of **All Rounder** and **Best Student** out of **400+** students from the graduating batch of 2020 by Sagar Public School, for displaying **excellence** in various fields like academics, sports and arts *Dec'19*