Pursuing a **minor** in **Systems & Control Engineering**.

Scholastic Achievements

- Currently **Department Rank 1** out of 66 students in Engineering Physics batch of 2024. *Oct'21*
- Successfully completed a 4 week course on **Controls Theory** conducted by Electronics and Robotics Club (ERC), IIT Bombay as part of Learner's Space. Learnt about control systems and **PID controllers**. Simulated a line follower bot on Python and stabilized an inverted pendulum on MATLAB using PID. *Jul'21*
- Secured **All India Rank 806** out of 1,50,000 candidates in JEE Advanced, and **All India Rank 433** out of 10,00,000 candidates in JEE Main, nation wide entrance examinations for various engineering institutes. *Oct'20*
- Among the **top 458**, out of 54,000 candidates, qualified to appear for the Indian National Physics Olympiad (**INPhO-2020**) conducted by the Indian Association of Physics Teachers (IAPT). *Dec'19*
- Among the **top 802**, out of 50,000 candidates, qualified to appear for the Indian National Chemistry Olympiad (**INChO-2020**) conducted by the Assosciation of Chemistry Teachers (ACT) . *Dec'19*
- Selected for the Kishore Vaigyanik Protsahan Yojana (**KVPY**) fellowship in SA category, provided by **IISc** to assist students pursuing research in basic sciences, with **All India Rank 562** out of 50,000 candidates. *Apr'19*
- Cleared both the stages of National Talent Search Examination (**NTSE**), a national level scholarship program by the **Government of India**, to became a National Talent Search Scheme scholar. *Dec'18*
- Secured **1st rank** in the State Level Camp Examination of Vidyarthi Vigyan Manthan (VVM), a national program conducted by National Council of Educational Reserach & Training (**NCERT**), Vijnana Bharti (VIBHA) and Vigyan Prasar (VP) to popularize science among high school students. *Feb'18*
- Awarded the **Certificate of Excellence** for being in the **top 1%** of India in the Australian National Chemistry Quiz (ANCQ), an international quiz organized by the **Royal Australian Chemical Institute**. *Nov'17*
- Presented a project on Biofuels in the 24th National Children's Science Congress (**NCSC-2016**). *Dec'16*

Projects

AI Based Music Generator | **Institute Summer Technical Project** *Apr-Jul'21*
Institute Technical Council, IIT Bombay

- 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 extract from MIDI files musical information like notes, chords, octaves, note duration and tempo and also repackage the music generated by the neural network into playable MIDI files.
- The neural network was created on **PyTorch** and comprised of a **Long-Short Term Memory (LSTM)** model with **Attention Mechanism** packaged inside a **Encoder-Decoder** layer.
- The LSTM learnt relations in the time-domain between the musical elements and therefore could generate more elements on being fed a seed. Attention Mechanism helped strengthen the LSTM's generation capabilities by allowing the neural network to focus on the parts of the input that are important for generating the subsequent elements. Encoder-Decoder reduced the memory requirement and made the training of the neural network faster.

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

- Completed a reading project on High Energy Astrophysics. Typed a detailed report on the material covered and also submitted a small video presentation wherein parts of the project were explained in detail.
- Started the project by covering prerequisite topics like **tensor algebra**, the **special theory of relativity** and the **general theory of relativity** so as to get the knowledge necessary for understanding complex astrophysical phenomena.
- Moved ahead by learning about **stellar evolution** in detail. Read about stellar composition, different types of evolution tracks of a star based on its mass and composition and mass loss mechanisms of a star. Also briefly covered parts of stellar death like **supernovae, white dwarfs, neutron stars** and **black holes**.
- Read about physical processes like ionisation losses, **Bremmstrahlung radiation** and **synchrotron emission**.

Audio Amplifier *Jun'21*

Course: Electronics, Instructor: Prof. S. Umasankar

- Designed an audio amplifier working on 15 V cells using **Operational Amplifiers (OpAmps)**, **BJTs** and resistors.
- Used an OpAmp to amplify the input voltages and modified the idea of a bidirectional current booster to get non-inverted output and amplify the current and get the required power output.
- Used a circuit simulator applet for analysing the response of the circuit to various inputs and ensuring consistency.

Coin and Lasso Game *Feb'21*

Course: Computer Programming and Utilization, Instructor: Prof. Kameswari Chebrolu

- Added multiple novel features and enhancements to a coin and lasso game written in **C++**.
- Utilized the concepts of **heap memory** and **OOP** like classes and class inheritance, to model different features of the game and used the **I/O** capabilities offered by C++ to make the game user friendly.

Positions Of Responsibility

Controls Trainee *Feb-Jul'21*

IIT Bombay Racing

*IIT Bombay Racing is a team of around 70 students working on the design and fabrication of electric race cars which compete in **Formula Student International Engineering Competition** held annually at Silverstone, UK and driver-less version of the competition held annually in Germany.*

- Underwent a competitive selection process and a rigorous 5 month long training to become a part of the team.
- Learnt about the various software related aspects of a driver-less race car like - localization and mapping, specifically the **SLAM** algorithm; path-planning, controls, actuation using MATLAB and Simulink; electronic control units and the connected networks presents inside the car; basics of **ROS** for simulating and testing the car.

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

Department of Physics, IIT Bombay

- Responsible for handling **classroom administration** and **mediating** between the professors and students for smooth running of courses and **optimal scheduling** of exams and submission deadlines.

House Captain | **School Cabinet** *May'17-Apr'18*

Sagar Public School, Saket Nagar, Bhopal

- Selected to **lead** one of the four school houses and be an **integral** part of the 20 member school cabinet.
- Responsible for conducting activities such as the daily assembly, intra-school events and cabinet briefings. Also responsible for maintaining decorum on the school campus and ensuring smooth functioning of the school.

Technical Skills

Languages	Python, C++, HTML, MATLAB, LaTeX
Software Packages	PyTorch, Pandas, NumPy, Matplotlib, Simulink, ROS, ROOT

Courses Completed

Physics	Data Analysis and Interpretation*, Introduction to Special Theory of Relativity, Classical Mechanics*, Quantum Physics and Application, Basics of Electricity & Magnetism, Thermal Physics*
Mathematics	Differential Calculus, Integral Calculus, Ordinary Differential Equations, Partial Differential Equations*, Linear Algebra, Complex Analysis, Mathematical Structures for Control*
Labs	Basic Circuits*, Op Amp Circuits*
Others	Computer Programming and Utilization, Introduction to Electronics, Economics*, Physical Chemistry, Organic & Inorganic Chemistry, Engineering Graphics & Drawing, Biology

** indicates ongoing courses*

Extra-Curricular Activities

- Completed a year-long training in **Basketball** under the National Sports Organisation (**NSO**). *Nov'20-Jun'21*
- Won the title of **All Rounder** for possessing **finesse** in various fields like academics, sports and arts. *Dec'19*
- Conferred with the award of **Best Student** for exceptional academic performance. *Nov'19*
- Participated in district level and state level competitions as part of the **school basketball team**. *'18-'20*
- Participated in and won multiple intra- and inter-school **music competitions**. *'16-'17*
- Won the **1st prize** in the intra-school **Mathematics Quiz** which comprised of questions based on logical reasoning, arithmetic and geometry. *Oct'17*
- Won the **1st prize** from among 100+ participants in the **Essay Writing Competition** on natural wetlands organized by the Regional Museum of Natural History. *Feb'17*
- Secured the **1st position** in 2015 and **3rd position** in 2016 in the Junior and Senior **IT Quiz** respectively during the Sanskaar Tech Fest organized annually by the Sanskaar Valley School. *Oct'15, Oct'16*
- Won **1st prize** in the **Math-e-Magician** inter-school state level quiz conducted by the National Institute of Information Technology (**NIIT**). *Dec'15*
- Started playing the **guitar** and **singing** in high-school and have pursued these hobbies actively.