Pursuing a Minor Degree in **Systems and Control** with a **minor CPI of 10**

SCHOLASTIC ACHIEVEMENTS

- Currently ranked 2nd in the Department of Electrical Engineering amongst 164 students [2021]
- Received the **AP** (Advanced Performance) grade in Analog Circuits, Digital Systems and 3 other courses [2019, 2020]
- Secured an **All India Rank of 275** in **JEE Advanced** and an **All India Rank of 1130** in **JEE Mains** [2019]
- Recipient of the prestigious **KVPY fellowship** with an All India Rank **266** [2019]
- Scored 1510/1600 in **SAT** and 800/800 in **SAT subject** for each Physics, Chemistry and Math [2019]

WORK EXPERIENCE

IITB Rocket Team [Jun'21 - Present]
Avionics and Control Subsystem *(IIT Bombay)*
- Designed an avionics **flight computer** to interface sensors, perform data logging, communication and deploy parachutes
- Studied flight requirements for preliminary 3km launch and identified hardware, including IMU's & barometric sensors
- Interface was designed in **Eagle** based off a **Rpi4 B hat** using **I2C** to interface sensors and **SPI** for data logging
- Working on flight software for sensor fusion, apogee detection, parachute deployment, data logging & communication

IITB Mars Rover Team [Jun'20 - Present]
Electrical and Hardware Subsystem *(IIT Bombay)*
- Performed **risk analysis** of potential fail points and developed the **subsystem overview report** for **ERC 2021**
- Investigated cause of failure of main onboard computer and proposed solutions to **overcome current ripple effects**
- Analysed performance of various **DC-DC converters** to select **optimal converter** for powering the onboard circuit
- Working on main **PCB design** to reduce electrical footprint, streamline the system and make it robust and shockproof

Data Science Engineering Intern [Mar'20 - Jul'20]
Cormentis Design Corporation, USA *(Remote)*
- Used **Natural Language Processing** and other AI/ML services to identify keywords, relevant information and extract a structured data set from a wide variety of unstructured data gathered from multiple web and social platforms
- Implemented **data scrapping** algorithms to **retrieve targeted data** from various platforms to cross-link web profiles
- Automated and deployed **data retrieval algorithms** to a backend AWS server for integration with a front end UI

RESEARCH PROJECTS

Digital Correlator for GPS Acquisition (IRNSS/NavIC Program) [May'21 - Present]
Summer Undergraduate Research Project | Prof. Rajesh Zele *(IIT Bombay)*
- Designing a **digital circuit** to interface with an **RF receiver** for the **NavIC program** to extract navigation data
- Designed and simulated a circuit in **SIMULINK** to perform **C/A phase acquisition** and fine frequency estimation
- Developed a digital-based tracking circuit to **track acquired GPS signal** and **extract navigation data** at 50 Hz
- Developing the digital circuit using **VHDL** in **Vivado** to test the design on the FPGA **ZC706 development board**
- Further work includes translating to **chip-level** synthesisable logic and developing software to estimate user position

Modeling and Control of Flexibility in Manipulators [Mar'21 - Present]
Summer Research Project | Prof. Ravi Banavar & Prof. Josè Angel Acosta *(University of Seville, Spain)*
- Modelling the kinematics via dynamics of interaction of a **flexible multi-link arm** with a compliant non-rigid surface
- Kinematic force balance derived in **product of exponentials form** via a slow-moving approximation in the dynamics
- Further, a **closed-loop, inverse kinematic algorithm** based on the **transpose Jacobian scheme** will be explored

Design & Testing of modern MPC system for MIMO suspension in LIGO [May'21 - Present]
Research Project | Dr Suresh Doravari *(Inter-University Centre for Astronomy and Astrophysics, India)*
- Modelling the **six degrees of freedom** of a single-stage LIGO suspension module using **Lagrangian Mechanics**
- Modelling **wire bending** and cantilever blade deflection by incorporating relevant potential terms in the Lagrangian
- Developing a **SIMULINK** model for above dynamics to evaluate system response and **simulate control algorithms**
- Future work involves developing an **MPC based algorithm** to compute a control filter for suspension stabilisation

TECHNICAL SKILLS

Programming Languages & Softwares: Python, MATLAB, Simulink, LaTeX, VHDL, Eagle, Kiel, Quartus
Hardware: Arduino, Raspberry Pi

Awards and Recognitions

- Won the award for Social Responsibility at **Rohde & Schwarz Engineering Competition 2021** with team SPINS
- Won **Second Place in Game Jam Titans** Pune(2015), a video game design competition (The Ethical Hackers)