Soham Shirish Phanse
Aerospace Engineering
Indian Institute of Technology Bombay

19D170030
UG Second Year
Male
DOB: 26/11/2000

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	8.72
Intermediate/+2	Maharashtra State Board	Mahila Samiti Jr. College	2018	92.46
Matriculation	Maharashtra State Board	VidyaNiketan High School	2016	95.80

- Pursuing **Minor** in **Systems and Control Engineering, IIT Bombay**
  (Relevant courses: Mathematical Structures for Control)

Scholastic Achievements

- Secured a merit-based **Branch Change** to Department of **Aerospace Engineering** *(2020)*
- Ranked 85^{th} in **MHT-CET** 2018 among 1,30,000+ candidates *(2018)*
- Awarded **Scholarship for Higher Education** (SHE) under **INSPIRE** by virtue of performance within the **top 1%** of the Maharashtra State Board at the Class XII level *(2018)*
- Recipient of Dr. Homi Bhabha Young Scientist Scholarship, **Gold Medalist** *(2011)*
- Recipient of Ganit Pradnya Scholarship, **Silver Medalist** *(2010)*

Publications

- Katla V., **Phanse S.** et al, "*An Approach to Star Tracker Design for Nano-Satellite Applications*" extended abstract presented in **National Conference on Small Satellite Technology and Applications**, Trivandrum, India, 2020

Technical Projects

IIT Bombay Student Satellite Program *(Jan 2020 - Present)*

A 70-member student team dedicated to the vision of making IITB a center of excellence in space technology

- ***Star Tracker based Attitude Determination System | PS4-OP***
  The mission aims to design a space-based experiment to be flown on ISRO's PSLV Stage-4 Orbital Platform
  - Worked on the **structural design** for the system and prepared **CAD** Models on **SolidWorks**
  - Performed **static structural**, **modal**, **harmonic response** and **random vibration** analysis in **ANSYS** (FEM) to simulate launch loads from PSLV and check for structural integrity of the system
  - Conceptualized and Designed two different configurations for the system and finalized **one** after comparing perspectives of modelling, simulations, manufacturing methods, and integration practices
  - Worked on **ICD** (Interface Control Document) listing all components, **Interface Matrix**, details of interfaces, and **Integration Sequence** for better trace-ability of each interface

- ***Analysis of Mesh Methods in ANSYS | Mini-Project***
  - Analysed the effect of different types of meshing methods in static structural simulations
  - Implemented **automatic**, **multizone**, **hex-dominant** and **sweep** meshing on different geometries
  - Compared the methods for optimal values with features like **mesh metrics** and **convergence study**

Scramjet Engine Analysis | Course Project *(Jul 2020 - Nov 2020)*

Guide: Prof. Krishnendu Sinha, Department of Aerospace Engineering

- Studied about compressible fluids, total enthalpy, normal and oblique shocks, **ram effect**, choked flows etc.
- Studied and analysed *Intake*, *Combustor*, and *Nozzle* of a **Scramjet** Engine in the hypersonic flow regime
- Analysed and plotted relations between parameters like Thrust, Mach number, Ramp Angle of Nozzle, Area Ratio, Base Expansion Factor in Python considering Quasi 1D flow and adiabatic nozzle walls
- Analysed effect of Nozzle Geometry on thrust and **Single Ramp Expansion Nozzle** with different values of the **Base Expansion factor** to calculate maximum value of thrust

Energy Balance of Indian Industry | Research Project *(Jul 2020 - Present)*

Guide: Prof. Rangan Banerjee, Department of Energy Science and Engineering

- Analyzed the energy usage and process flows across various industrial sectors
- Designed and implemented an algorithm on **Python** to filter out circular flows from energy usage data
- Implemented an interface matrix to create an energy balance of an **Integrated Steel Plant** (ISP), **Primary Aluminium Plant** (Bayer-Hall Process) and **Pulp & Paper Plant**

Low Cost Solar Cooker | Course Project *(Jan 2020 - Feb 2020)*

Guide: Prof. Shireesh Kedare, Department of Energy Science and Engineering

- Designed and developed a cost-effective solar cooker from basic equipment and eco-friendly materials
- Calculated the **first figure of merit** for the solar cooker and documented the **input**, **output**, **design** and **performance** parameters for the cooker and prepared solar cooked maggi

Wireless Remote Controlled Airplane | Hobby Project *(Sep 2019 - Oct 2019)*

Aeromodelling Club, IIT Bombay

- Built a remote-controlled trainer aircraft considering factors such as **aerofoil structure**, **aspect ratio**
- Operated **Ailerons**, **flaps** and **servo** motors and used **Li-Po 3S** battery for motor and propeller
- Optimized the aircraft for stable flight and ease of control, maximising the glide time within the constraints

Technical Skills

Programming Languages	C++, Python, MATLAB, HTML
Simulation and CAD Softwares	SolidWorks, ANSYS and AutoCAD
Libraries	Numpy, Scipy, Matplotlib

Relevant Courses Undertaken

Aerospace Engineering	Mathematics	Inter-Disciplinary
Thermodynamics and Propulsion	Multivariate Calculus	Computer Programming in C++
Incompressible Fluid Mechanics	Linear Algebra	Python Data Structures†
Solid Mechanics	Differential Equations	Introduction to Energy Engineering
Aircraft Propulsion*	Mathematical Structures for Control	Introduction to Electrical Engineering
Compressible Fluid Mechanics*	Introduction to Numerical Analysis*	Quantum Physics
Aerospace Structural Mechanics*	Introduction to Probability#	Economics
Spaceflight Mechanics*		

** to be completed by Spring 2021 #completed from HarvardX, edX †completed from University of Michigan, Coursera*

Extra-Curricular Activities

Workshops and Conferences

- Volunteered for management of **International Conference on Advances on Energy Research (ICAER) 2019** consisting of delegates from India and Abroad *(2019)*
- Authored an article on experience at **ICAER** which was published in the department newsletter *(2020)*
- Volunteered for **Student Solar Workshop - 2019**, a one-day training program for school students to learn the assembly of their own solar study lamps under **Solar Urja Lamp (SoULS)** project *(2019)*
  - **Guinness World Record** for lighting the most number (6800+) of solar LED lamps simultaneously
- Volunteered as a Mentor for Glider Workshop, conducted for hands-on experience of Glider-making for freshman year undergraduates by Aeromodelling Club of IIT Bombay *(2020)*

Leadership

- Served as the **Student Representative** for the school and worked in a team of **8** which represented interests of **200+** students for improving academic experience of students *(2013 - 2014)*

Music

- Learned playing acoustic and non-acoustic **Guitars** in a 3 year long course *(2013 - 2015)*
- Learned playing **Harmonium** via self-studying and practising *(2020)*

Social Work

- Devoted **80** hrs of social service towards **environment** and **sustainability** as a part of the **National Service Scheme** (NSS), IIT Bombay *(2019 - 2020)*