K T Prajwal Prathiksh | **180010027**
Aerospace Engineering | **UG Third Year (B.Tech.)**
Indian Institute of Technology Bombay | **Male**
DOB: 13/05/2000

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	8.67
Intermediate/+2	CBSE	JSS Public School, Bangalore	2018	95.60
Matriculation	ICSE	Chinmaya Vidyalaya, Bangalore	2016	97.16

Pursuing a **Minor** degree in the **Department of Electrical Engineering**

PUBLICATIONS

- Ranade, A.R., **Prathiksh, K.,** et al. "*Survey and Analysis of Payloads for Missions on PSLV's Orbital Platform*", under review, **2021 AIAA SciTech Forum**, Nashville, Tennessee

TECHNICAL PROJECTS

• Smoothed Particle Hydrodynamics

Research Project *(Dec 2019 - Present)*
Supervisor - Prof. Prabhu Ramachandran, Department of Aerospace, IIT Bombay

- Studied key concepts and applications of Smoothed Particle Hydrodynamics (SPH) - a **Lagrangian, mesh-free, particle method** used for simulating the mechanics of fluid flow, and simulated problems in Python
- Implemented the **WCSPH scheme** using the **Numba library**, to solve the **1D Sod shock-tube problem** as well as the **2D dam-break problem** in Python, resulting in a decreased runtime over native Python code
- Implemented the **δ^+-SPH** scheme to solve the **2D Taylor-Green vortex problem** in **PySPH** and analysed the **performance and accuracy** of the scheme against the results generated using other conventional schemes
- Working on the simulation of a self-propulsive motion of a **fish-like swimmer** using the **δ^+-SPH** scheme

• Atmospheric-based Ionic Propulsion

Institute Technical Summer Project (ITSP), Institute Technical Council, IIT Bombay *(Mar 2019 - Jul 2019)*
Part of a three-member team working on a solid-state propulsion system

- Built a **High Voltage Power Circuit** (HVPC) based on a fly-back driver capable of generating **120 kV DC**
- Engineered prototypes of **cylindrical cathodes** and **lifters** to demonstrate laminar airflow in its vicinity as a **proof-of-concept**, and successfully measured the **thrust** ($\approx$ 1 mN) using a **Ballistic Thrust Plate** (BTP)
- Amongst the **top three** that were awarded **Best Project** for showcasing exceptional work out of **60+** teams

In-Semester ITSP (ITSP++), Institute Technical Council, IIT Bombay *(Jul 2019 - Present)*
Supervisor - Prof. Kowsik Bodi, Department of Aerospace, IIT Bombay

- Qualified for **ITSP++** to further study and develop the project in-semester, under the guidance of professors
- Developed a **sensitive and reliable** experimental technique to **measure the thrust density** using **hexagonal electrodes** in the controlled environment of the anechoic chamber, resulting in a **10X** higher resolution
- Surveyed numerical techniques to simulate the phenomenon of **electrohydrodynamic thrust** caused due to corona-induced ionic winds, and currently working on its implementation in **COMSOL Multiphysics**

• Student Satellite Program

A 70-member student team dedicated to the vision of making IIT Bombay a centre of excellence in space technology

Guidance, Navigation & Control Subsystem, STADS *(Aug 2019 - Present)*
A CubeSat-compatible Star Tracker-based Attitude Determination System (STADS) to be tested on-board the PS4-OP

- Surveyed **star-matching** algorithms based on the performance and accuracy constraints of **STADS**, for identifying and matching guide stars in an image, a step required for the **attitude determination process**
- Implemented the **4-Star Matching Method** in MATLAB, along with a novel **verification step** that ensures accurate detection and removal of false star matches, resulting in a reduction of **85%** of such false matches
- Contributed to the quality-assured **Open Loop Simulation (OLS)** framework, which simulates space environmental conditions to test **image feature extraction**, **star-matching** and **attitude estimation** algorithms

Attitude Determination and Control Subsystem, Advitiy *(Feb 2019 - Jun 2019)*
Advitiy is the 2nd student satellite of IITB, technically advanced and efficient version of the 1st, Pratham

- Compared the accuracy of **Cowel's method** against the **Simplified General Perturbations Model 4** (SGP4) for orbit-propagation of a **Low-Earth-Orbit** (LEO) satellite in Python using its **Two-Line-Element** (TLE)
- Implemented **Cowel's method** with a **drag model** generated from **linear regression**, and verified the results against the data generated by **GMAT**, an open-source, multi-mission software developed by **NASA**

SCHOLASTIC ACHIEVEMENTS

- Recipient of the **National Talent Search Examination (NTSE)** Scholarship given by NCERT *(2016)*
- Completed a **20-hours** advanced course on **'Mechanics from a Geometric Viewpoint'** *(2019)*
- Currently ranked **seventh** in the department among a batch of 60+ undergraduate students *(Present)*

POSITIONS OF RESPONSIBILITY

Manager

Controls & Dynamical Systems Student Reading Group (CDS-SRG) *(Mar 2020 - Present)*
Institute Technical Council, IIT Bombay

- Conceptualised and organised a **series of introductory lectures** to introduce newcomers to **key concepts in control theory** like PID control, Kalman filtering, rigid body dynamics as well as its **industrial applications**
- Hosted research talks delivered by students and professors to spread awareness of **systems and control engineering** amongst the undergraduate students and to drive students to **pursue research** in these areas
- Ideated and coordinated the **Summer Learning Projects-2020**, which provided a platform for over **20+** students to study and work collaboratively on fundamental topics from various domains of control theory
- Managed and tailored online content for the **CDS-SRG Facebook page** with a reach of over **2500+ students**

Subsystem Head

Guidance, Navigation & Control *(Jan 2020 - Present)*
Student Satellite Program, IIT Bombay

- Executed a **three-step recruitment** process to select **7 students** for the subsystem out of **60+ applicants**
- Compiled rigorous **quality assurance practices** for MATLAB codes and simulation practices, and refined existing practices to ensure reliability and reproducibility in results across various simulation tasks
- Identified & analysed the demonstration of an **active thermal control system** for CubeSats & deployment of **inflatable UHF/VHF antenna** as payloads on-board **ISRO's PSLV Stage 4 - Orbital Platform** (PS4-OP)

Mentorship

Institute Student Mentor *(July 2020 - Present)*
Student Mentor Program, IIT Bombay

- One of the only **12** third-year undergraduate students selected via a rigorous procedure comprising of **SOP, peer reviews and interviews**, to mentor a group of incoming freshmen among a batch of **1000+** students

Department Academic Mentor *(Jun 2019 - Present)*
Department of Aerospace, IIT Bombay

- Selected into a team of **19 mentors** based on extensive **peer reviews and interviews**, to monitor the academic performance of **6** second-year undergraduate students and provide academic guidance and counsel
- Involved in bridging the student-faculty gap, thereby enhancing the students' academic experience

Teaching Assistant

BB 101 - Biology *(Sept 2019 - Nov 2019)*
Guide - Prof. Ambarish Kunwar, Department of Biosciences and Bioengineering, IIT Bombay

- Managed a batch of **50+** UG students, and conducted tutorial sessions and quizzes on a weekly basis
- Personally clarified doubts of academically weaker students to motivate them and boost their performance

Volunteer

Prevention of Sexual Harassment (PoSH) Champion *(Jun 2019 - Present)*
Gender Cell, IIT Bombay

- Attended a **two-day** training workshop conducted by **PoSH at Work** on understanding *Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013* and creating awareness about it
- Conducted sessions on **gender sensitisation** as well as the institute's policy on sexual harassment and its redressal on behalf of the Gender Cell, IIT - Bombay, for **100+** first-year undergraduate students

EXTRACURRICULAR ACTIVITIES

- **Authored** an article on **Biomimicry** and its applications in the domain of aerospace engineering, which was featured in the **Airspace magazine** - *India's first national student magazine on aerospace engineering* *(Jun 2020)*
- Completed **80 hrs** of mandatory volunteering service for **National Service Scheme** (NSS) *(Jul 2018 - Apr 2019)*
- Secured **First place** in **EnB Buzz Competition** out of **100+ teams** for **exceptional** performance in presenting a fictitious business idea, and a corresponding **Business Model Canvas** in the form of a pitch deck *(Aug 2018)*
- Completed the **Machine Learning Bootcamp** under the Learner's Space initiative by IIT Bombay *(Jun 2019)*
- An avid reader; particularly enjoy genres such as science-fiction, dystopian, coming-of-age, comedy, etc.
- An active squash and badminton player; passionately follow tennis and Liverpool F.C.