Bhavina Rajesh Gajghate | **210020048**
Chemical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Female**
DOB: 19/05/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	

Auxiliary Degree: Pursuing a **Minor** in the department of **Industrial Design Centre**, IIT Bombay

INTERNSHIP

Improving Mechanical Properties of Solid Rocket Propellants
DRDO, Government of India | High Energy Materials Laboratory (HEMRL), Pune *(May'23-Jul'23)*
Guide: Dr. Harmeet Singh Dalwani, Scientist 'D', DRDO
Awarded a **Letter of Recommendation** for exemplary work done on the live project during the internship duration

Aim	• Researched feasibility of utilising **anionic HTPB** over conventional **FR-HTPB** in propellant binders • Worked on a live project to produce consistent mechanical properties and desired higher solid loading
Approach	• Performed 1_H **Nuclear Magnetic Resonance spectroscopy** analysis on **15+** anionic HTPB samples • Accurately determined **molecular weight** and **isomeric content** via the method of peak integration • Carried out comparative **curing kinetics** experiment between **anionic** and **FR-HTPB** with **TDI** • Executed **Fourier Transform Infrared (FT-IR) Spectroscopy** analysis over a 10 day time period • Evaluated parameters **PDI** (polydispersity index) and isomeric **1,2 unit** (vinyl) content comparatively • Attempted to determine the molecular weight of anionic HTPB via **gel permeation chromatography**
Impact	• Observed that both variants of HTPB take around 1 day to complete the curing reaction • Devised a **new reference point** to confirm the existing **molecular weight** of anionic HTPB polymer • Determined that **curing time** of anionic HTPB is comparable to FR-HTPB both requiring 1 day

KEY PROJECTS

Enhancing the efficiency of steam condensers using turbulent flow techniques *(Jun '21 - Jun '22)*
Guide: Prof. P. Sunthar | Chemical Engineering Department, IIT Bombay | Course Project
- Collaborated in a dynamic team of **8** to improve **heat transfer rate** through an innovative thermal solution
- Discovered the problem of **inadequate** convectional heat transfer rates in the **laminar flow** through tubes
- Achieved a significant **27.5%** efficiency improvement by integrating **rings** and **fins**, presenting a pioneering solution

Manch 6.0 | Financial Project *(Jan '23 - Apr '23)*
Guide: Beena Shetty | Deutsche Bank | Gender Cell, IIT Bombay
- Conducted a case study on the likelihood of a **subprime-type mortgage crisis** occurring in the Indian subcontinent
- Analysed the **causes** and **consequences** of the **Global Financial crisis, 2008** that happened in the USA
- Attended **20+** hours of training sessions conducted by Deutsche Bank on **finance** and **soft skills development**

Real Time Drowsiness Detection System *(May '23 - Present)*
Seasons of Code | Web and Coding Club, IIT Bombay
- Employed a MobileNetV2-based CNN model in **TensorFlow** and **Keras** to classify eye states as open or closed
- Achieved **99%** accuracy on the validation (test) set by training the CNN model on the comprehensive **MRL dataset**
- Utilized **OpenCV's HaarCascade** algorithm for real-time face and eye detection thereby tracking the drowsiness
- Integrated the trained CNN model with the **eye-tracking system** to continuously monitor and predict the situation

Solar System Dynamics *(May '23 - Present)*
Krittika Summer Project 4.0 | Krittika - The Astronomy Club, IIT Bombay
- Selected for the project by a rigorous process of assessment based on a python assignment among nationwide institutes
- Developed **simulations** of celestial bodies in the solar system using Python libraries like Matplotlib, Numpy, SciPy
- Explored key concepts in Newtonian gravity, the reduced 3-body problem, Lagrangian points, and Virial theorem
- Implemented **Euler** and **Euler-Richardson** integration methods using object-oriented programming principles
- Explored 3-body systems and studied phenomena such as moon orbit precession, Tadpole and Horseshoe orbits

FinSearch *(May '23 - Present)*
Financial Research Project | Finance Club, IIT Bombay
- Created a portfolio of multiple assets using **Asset pricing theory** to identify the optimal mix of assets & indices
- Explored how **Capital Asset Pricing Model** assists in evaluating the relationship between risk & return in markets
- Evaluated the **expected return** on a stock assuming values for beta, risk-free rate and market risk premium

Radio Astronomy *(May '23 - Present)*
Summer of Science | Math and Physics Club, IIT Bombay

- Exploring the discovery of **cosmic radio noise** and mathematical concepts like **Fourier transform model**
- Studying key topics like flux density, polarization, black body radiation, instrumentation like antennas and radiometers

Industrial Visit *(Feb '23)*
Alkyl Amines Chemicals Limited | ChemE Tinkerers' Lab, IIT Bombay

- Visited manufacturing, storage, supply-chain, processing, and quality control section of the production company
- Explored various manufacturing processes, process equipment, and safety practices followed as a Chemical Supplier

POSITIONS OF RESPONSIBILITY

Project Manager | Enactus, IIT Bombay *(May '23 - Present)*
*International non-profit organization promoting social-entrepreneurship | **70K+** students | **1,700+** colleges*

- Leading the **Mumbai Project** with a team of **4+** associates to solve the challenges faced by the urban population
- Engaging in a collaborative effort with **CTARA, IIT Bombay** to execute a business model for **ragi products**

D-AMP Mentor | Department Academic Mentorship Programme (SMP), IIT Bombay *(May '23 - Present)*
*Part of an institute-wide team of **43** mentors selected post rigorous screening & strong peer reviews*

- Appointed as the mentor to **4** students ensuring their holistic development & guiding them in their academic endeavours
- Responsible for timely updating and improvement of the D-AMP blogs catering to over 500+ students

Web Secretary | Chemical Engineering Association, IIT Bombay *(May '22 - Apr '23)*
Part of an 11 membered department council responsible for managing 20+ events with an overall budget of 0.4 Million

- Revamped the ChEA blog to reach a **3K+** audience & uploaded **60+** blogs aiding intern preparation of **400+** students
- Ideated and created Freshers' Introduction Video amassing **22K+** views for the official **YouTube** channel of ChEA

TECHNICAL & SOFTWARE SKILLS

- **Programming Languages:** HTML, CSS, Javascript, C++, Python, MATLAB, Git, LaTeX
- **Design Softwares:** Adobe Photoshop, Adobe Illustrator, Adobe After Effects
- **Libraries:** Numpy, Pandas, Tensorflow, Keras, Matplotlib, OpenCV, SciPy

KEY COURSES UNDERTAKEN

- **Chemical Engineering:** Chemical Engineering Thermodynamics-I & II, Numerical Analysis, Transport Phenomena, Process Fluid Mechanics, Heat Transfer, Chemical Engineering Lab. I
- **Programming Courses:** Computer Programming and Utilization, Computational Methods Lab
- **Maths Courses:** Calculus-I & II, Differential Equations-I & II, Linear Algebra, Intro. to Data Analysis
- **Physics Courses:** Quantum Physics and Application, Electricity and Magnetism
- **Chemistry Courses:** Organic and Inorganic Chemistry, Physical Chemistry
- **Other Courses:** Engineering Graphics and Drawing, Biology, Sociology, Economics

ACCOLADES AND EXTRACURRICULARS

Accolades	• Scored **96.4%** in CBSE (Central Board of Secondary Education) Examination ('19) • Secured **93.67%** in HSC (Higher Secondary Certificate) Examination ('21)
Certificates	• **Machine Learning Specialization** | Andrew NG | Stanford University | Coursera ('23)
Social	• Volunteered for **Global Cancer Concern India's** national programme and helped with **relief efforts** of cancer patients ('14)
Sports	• Bagged **2 Gold** medals in Skating by **Mumbai Speed Skating Cup** (quads) ('16) • Won **Gold** medal in Throwball Tournament by **Mumbai School Sports Association** ('15)
Cultural	• Declared **winner** of Envent - Power Suit Making Competition by **Energy Club**, IITB ('22) • Awarded **2nd position** in Creative Writing Competition organized by **Literati**, IITB ('22)