Arush Gaur
Chemical Engineering
Indian Institute of Technology Bombay

210020022
B.Tech.
Gender: Male
DOB: 28/10/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	CBSE	Deens Academy	2021	
Matriculation	CBSE	Deens Academy	2019	

Pursuing a **Minor** degree in the Department of **Energy Science and Engineering** at IIT Bombay

Scholastic Achievements

- Ranked **12th** academically in the Chemical Engineering Department consisting of **140+ students** [Present]
- Awarded **perfect 10 (AA grade)** for outstanding performance in **6** out of 12 core courses till date [Present]
- Secured percentile of **98.91** in JEE Advanced out of **1.5 lakh+** applicants across the nation [2021]
- Achieved **99.43** percentile in JEE Mains amongst **1 million+** candidates across the country [2021]
- Qualified for **second stage** of interview round in prestigious **KVPY SA** examination [2019]
- Secured 100% **score in Mathematics** and ranked **3rd in school** in **CBSE Board** exam in class 10 [2019]
- Consistently ranked in **top 3** at school in National Science Olympiad (**NSO**), **IMO** and **ASSET** Exam [2014-19]

Professional Experience

R & D Intern | **IFP Petro** | **Used Oil Re-refining** [Jun - July 2023]
Guide: Sahil Bhargava, Aman Singh | *IFP Petro Products Pvt. Ltd. Plant, Ghaziabad*

- Studied re-refining of used lubricant oils with Indian market size of **1.4 billion+ USD** and its role in maintaining a sustainable **circular economy** guided by Extended Producer Responsibility **(EPR)**
- Performed **mass and energy balances** on oil inventory data of existing plant assuming **75%** electrical efficiency
- Reviewed literature on solvent extraction and catalytic hydro treatment of oil in proposed **pilot plant**

Key Projects

Modelling and Optimisation of Sustainable Solar Heat Pipe Collectors [Jan - April 2023]
Guide: Prof. P Sunthar, Chemical Engineering, IIT Bombay | *Heat Transfer* | *Course Project*

- Led a team of **8** in modelling convection, conduction and radiation in a heat pipe evacuated tube collector
- Achieved water heating rate of **6 min/kg** from radiation **energy balance** on heat pipe as control volume
- Computed heat transfer coefficient using **Nusselt number** correlations for free convection boiling and predicted excess boiling temperature of **3.94 K** given parameters like system dimensions and solar insolation
- Plotted conduction **temperature profile** within copper heat pipe and temporal variation of heating rate and outer heat pipe temperature (due to sun's diurnal cycle) using **MATLAB** software

Is Climate Engineering a Solution to Climate Change? [Dec 2022 - Present]
Guide: Prof. Angshuman Modak, Climate Studies, IIT Bombay | *In-Semester UG Research Program*

- Reviewed 2 research articles **Bala et al. 2008** and **Bala Caldeira 2000** on impact of artificially reduced solar radiation on Earth with **increased CO2** on surface **temperature** and **rainfall** compared to undisturbed climate
- Imported meteorological data of Geoengineering Model Intercomparison Project **(GeoMIP)** from **CMIP6** simulation on parameters like precipitation, surface temperature in **NetCDF** format into Jupyter Notebook
- Performed **time series analysis** of parameters for period of **1200 and 100 years** in G1 and Preindustrial control simulation using libraries **NetCDF4, Xarray** and **Matplotlib** and analysed results

Metal recovery from Spent Batteries and Electronic Waste [Dec 2022 - Present]
Guide: Prof. Abhijit Chatterjee, Chemical Engineering, IIT Bombay | *ChemETL - Reactorious*

- Developed a **Daniel cell** from scratch with materials from Chemical Engineering Tinkerer's Laboratory
- Measured concentration of dilute **copper sulfate electrolyte** in electrolysis using **UV spectrophotometer** and developing a calibration curve between concentration and absorbance of dilute sample using **linear regression**
- Analyzed variation of **voltage with time** in Daniel Cell (due to **discharging**)

Technical Activities

Summer of Science Project | **Solar Thermal Power** | Maths & Physics Club, IIT Bombay [May-July 2022]

- Comprehensively reviewed physics of solar radiation, design and functioning of **6** types of solar thermal collectors
- Comparatively analysed solar collectors for efficiency and cost, and learnt basic functioning of **solar PV cells**

Team Shunya Trainee Program | Team Shunya, IIT Bombay [Apr-Aug 2022]

- Learnt about global scenario of economical and **carbon footprint** aspects of **sustainable housing**
- Studied material selection, Life Cycle Analysis, HVAC, solar PV and home automation systems in housing

Startup Pitching on Electric Vehicles | EnB Buzz Competition | E-Cell, IIT Bombay [Dec 2021]

- Proposed an **app based startup** to solve problems of lack of charging stations and long charging time for **electric vehicles**, which informs user on nearest available station and provides battery bookings in advance

Positions of Responsibility

Department Research Coordinator Undergraduate Academic Council, IIT Bombay [Jun 2023 - Present]

*Responsible for boosting research culture in Chemical Department involving **40+ professors and 800+ students***

- Organised **Sophomore 101** session to introduce core research opportunities and curriculum for **160+ students**
- Coordinating between **7 professors** and **10+ students** for smooth selection and execution of **SURP** projects
- Collaborating with **DAMP** team and **ChEA** Council to produce core research project reviews and research videos to inform students on **7 research areas** in chemical department, impacting **400+ students**
- Working with **Enpower** to create **core research groups** and promote research activities in chemical department

Team Member | **Student Satellite Program** | Mechanical Subsystem [Apr - Jul 2022]

- Worked in a team of **5+** members and performed simulations on **SPENVIS** software on satellite trajectory, radiation dosage effects(ionising and non ionising) on satellites, and used **Sector Shielding Analysis Tool**
- **Designed** basic structure of a cube shaped satellite (**CubeSat**) on **SolidWorks**, with literature review

Technical Skills

Programming - MATLAB, C++, Python (Numpy, Pandas, Matplotlib, Xarray, NetCDF4 libraries)
Softwares- OpenFOAM, ParaView, SolidWorks, Latex, SPENVIS, MS Office, Canva, Jupyter IDE

Courses Undertaken

Core Courses - Transport Phenomena, Numerical Analysis, Thermodynamics I & II, Process Fluid Mechanics, Data Analysis, Heat Transfer, Computational Methods Lab, ChemE Lab I, Solid Mechanics*, Mass Transfer I*, Chemical Reaction Engineering*, ChemE Lab II*, Introduction to Electrical and Electronic Circuits*

Interdisciplinary courses- Computer Programming (C++) and Utilisation, Economics, Quantum Physics and Application, Sociology, Electricity and Magnetism, Inorganic and Organic Chemistry, Quantum Chemistry, Molecular and Cellular Biology, Engineering Drawing, Differential Equations, Linear Algebra, Calculus I & II

Environmental courses - Energy& Sustainability Fundamentals, Energy Policy & International Relations, Introduction to Renewable Energy Technologies, Atmospheric Thermodynamics

** To be by completed by Nov '23*

Extracurricular Activities

General Events	• Among top **5** winners in **Pan-India** competition on video creation on "Experience with Environment in Lockdown" held by **NEERI** Nagpur and **Vibha Foundation** in 2020 • Represented the African country **Guinea Bissau** in Model United Nations **(MUN)** 2018 • Received **Goethe A1** (Fit in Deutsch 1) certificate for **German proficiency** in 2017 • Represented school in **WISSEN 2018**, an inter-school science quiz competition
Social Activities	• Won **first prize** in **debating** on social and environmental topics as a team of 6 in **SSD, NSS** • Ideated on irrigation technology in droughts in collaboration with **Hara Jeevan Foundation** • Received positive **acknowledgment** from **Prime Minister's Office** to a **letter** complaining and advising on **public cleanliness** especially on highways and petrol pumps in Jan 2016 • Participated in **inter house skit** competition with theme **economic sustainability** in 2017
Sports	• Participated in various Bengaluru **cyclathons** for **social causes** (distances **10 - 40 km**) • Completed a **6 hour trek** at Naneghat in Sahaydri range of **Western Ghats** at **2,600 feet** • Participated in **inter house swimming** and **athletics competition** in school