Om Mihani

Email: om.mihani@iitb.ac.in

I am a final-year Chemical Engineering undergraduate, ranked 3rd out of 155 students in my class. I have research experience in areas spanning Computational Fluid Dynamics, molecular simulations, granular simulations, process plant simulation, modelling and metabolomics. My research interests currently include Catalysis, Biotechnology and Scale-up strategies.

EDUCATION	
Nov '20 - Current	**Indian Institute of Technology (IIT) Bombay** *Bachelor of Technology with Honors in Chemical Engineering* | CPI: **9.52/10**
ACADEMIC HONORS	
2021	Conferred with an **AP grade** in 2 core courses for exceptional performance
2020	Bagged an All India Rank of **708** in JEE Mains out of 1.1 Million students
2020	Attained an All India Rank of **832** in JEE Advanced out of **250,000** candidates
RESEARCH EXPERIENCES	
Prof. P Wangikar, IIT Bombay [Jan '23 - Current]	**PROTOCOL OPTIMISATION FOR GCMS BLOOD ANALYSIS** *Optimisation of Sample collection and extraction steps for human blood metabolomics* ● Explored the use of Liquid-Liquid Extraction to improve Signal to Noise ratio ● Validated volumetric absorptive microsampling for high-accuracy sampling
Prof. P Kusalik, U of Calgary [May '23 - July '23]	**STABILITY OF NANOBUBBLES** *Molecular Dynamics simulations to explore the properties of nanobubbles* ● Performed MD simulations to study stability of nanobubble in Electric Fields ● Developed a suite of simulation analysis tools using Python
Dr Pankaj Doshi, Pfizer [May '22 - July '22]	**CALIBRATION OF POWDERED DRUGS** *Optimisation of granular simulations in ROCKY using coarse-graining* ● Simulated & analysed powders using coarse-graining & Python PrePost scripts ● Developed a method to expedite the calibration of powders to granular models
Prof. J Adhikari, IIT Bombay [Dec '21 - Aug '22]	**HYDROGEN MOBILITY BY STORAGE AS H_2 HYDRATE** *Towhee Molecular Simulations to gauge the feasibility of ice as a Hydrogen carrier* ● Developed an algorithm to inculcate quantum effects into classical potential ● Grasped the usage of MCCCS Towhee software for Molecular Simulations

COURSE PROJECTS	
Prof. Rajdip Bandyopadhyaya [Aug '23 - Nov '23]	**Biosensor for Prostate Cancer** *Novel Biosensor design for real time monitoring of Cancer* — *Report* • Selected polymer and adhesives guided by meticulous literature study • Pinpointed an optimal biomolecule for prostate cancer after analysing various metabolomic studies, yielding a 400 times more cost-effective biosensor
Prof. A K Suresh [Jan '23 - Apr '23]	**DRY REFORMING OF METHANE** *Literature Review of novel ways of modelling* — *Slide Deck* • Grasped the examples of MicroKinetic Modelling & Density Functional Theory • Performed a critical review of the paper to find pros and cons of the approach
Prof. S Mahajani [Nov '22 - Dec '22]	**CARBON DISULPHIDE PROUCTION** *Process Plant Simulation to model a real process* — *Report* • Leveraged DWSim to simulate CS_2 plant, achieving 99.9% end-product purity • Incorporated a H_2S derived S recovery unit, resulting in 30% waste reduction
Prof. Y Shashtri & Prof. M Kannan [Aug '22 - Nov '22]	**EXTRACTION OF CO_2 FROM FLUE GAS** *Simulation based optimisation for efficient Carbon Capture* — *Report* • Developed a mathematical model describing absorption of CO_2 into amines • Analysed the feasibility of flue gas CO_2 as a feedstock source
Prof. P Sunthar & Prof. V Gundabala [Jan '22 - Apr '22]	**THERMOACOUSTIC COOLING OF THERMAL HOTSPOTS** *Use of novel cooling technique for cooling laptops* — *Report* • Devised an approach to lower the cost of cooling by over **170 times** • Improved the energy efficiency by about **23 times** using CFD simulations
Prof. Janani Muralidharan [Jan '22 - Apr '22]	**FLOW PAST NINE CYLINDERS IN SQUARE CONFIGURATION** *OpenFOAM CFD simulations of an experimental case study* — *Case Study* • Studied the effect of spacing ratio & Reynolds number on the flow patterns • Analysed the effect of changing the fluid & published case study on FOSSEE
Prof. Guruswamy [Sep '21 - Dec '21]	**COATING FLOW OF LIQUIDS ON A ROTATING DISC** *Literature review along with experimental observations* — *Report* • Critiqued over four Research papers in the vicinity of the problem statement • Performed experiments to test **Lubrication Theory** which explains the flow
Prof. S Mehra [Jul '21 - Nov '21]	**ODE-BVP** *Case study of Ordinary Differntial Equation* — *Report* • Solved a 2^{nd} order ODE-BVP in MATLAB with varying mesh sizes • Reported effect of mesh size & solving method for optimal solution selection

OTHER PROJECTS	
Data Science Course Project [Sep '21 - Dec '21]	**PREDICTING IPL SCORES**
	Data Science Project with real life data — *Report*
	• Implemented Explorator analysis & cleaning techniques on IPL scores dataset • Performed descriptive & predictive analysis of data to predict the next scores
Institute Technical Summer Project [Apr '21 - Jul '21]	**NEUROCLONE**
	A Thought-Controlled Humanoid Robot — *Github Repository*
	• Conducted an extensive literature study relating thoughts to actions • USed PyTorch, Machine Learning and Deep Learning tools to make a neural network that maps EEG signals to electric signals to the command the robot
TECHNICAL SKILLS	
Simulations and post-processing	OpenFOAM, DWSIM, Ansys, Aspen, ROCKY, GROMACS, Towhee MCCCS, DWSim, OpenModelica, ParaView, VMD, High Power Computing systems
Programming	C++, Python, MATLAB, LATEX
Miscellaneous	MS Office Suite, Canva, Github
Leadership and Teaching Experiences	
Department Academic Mentor [Jun '23 - Current]	• Mentoring **6** students for their academic success and work-life balance • Conducting course-related help & doubt clearing sessions for **250** students
Class Representative [Aug '21 - Current]	• Elected thrice as the CR for a batch of **80** students based on leadership skills • Devised & managed **15** events in coordination with department student council
Teaching Assistant BB 101 - Biology [Jan '22 - Apr '22]	• Mentored over **20** students in 2 disciplines of Biology over 7 tutorial sessions • Part of proctoring team of TAs to help in smooth conduction of examinations
Conveyor Chemistry club [Jun '21 - Apr '22]	• Conceptutalised **Winter School of Chemistry**: crash courses on niche topics • Forged a **Special Interest Group** for Chemistry Enthusiasts to discuss ideas
EXTRACURRICULAR ACTIVITIES	
Sports	• Ranked **3rd** in district level Inline skating competition
Dramatics	• Completed a two-semester course on Dramtics in the freshmen year at college
Competitions	• Participated in the **Hult Competition** for startup ideation in freshmen year • Bagged **Second Positio**n in the PAN India **Light Painting Competition** • Participated in a Consulting competition by **PropertyPistol**
Campaigns	• Compaigned with the **Pranyas Foundation** on "*We always have a choice*"