Om Mihani | CV

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I am a third-year Chemical Engineering major, currently ranked **1st out of 155** students in my class. I have one year of research experience in areas spanning computational fluid dynamics, molecular simulations and granular mechanics. I am especially proficient at computing in MATLAB. My ever-growing research interests currently include Green energy, applications of granular mechanics in Pharmaceutical industry and CFD for Heat transfer problems.

Education

Indian Institute of Technology (IIT) Bombay, Mumbai, India — Nov '20 - Present
Bachelor of Technology with Honors in Chemical Engineering | CPI: **9.38/10**

Academic Honors and Achievements

- Conferred with **AP grade** in Introduction to Chemical Engineering & Numerical Analysis Methods
- Bagged an All India Rank of **708** in JEE Mains out of **1.1 Million** appearing students
- Attained an All India Rank of **832** in JEE Advanced out of **250,000** eligible candidates
- Bagged **100 percentile** in National genius Search Examination Mains conducted by NGSF

Internship

Process Modeler at Pfizer

- Developed a DEM model to simulate pharmaceutical powders using custom-built python codes
- Devised a method to expedite the calibration of powders to granular models by numerical methods
- Calibrated pharmaceutical powders using Discrete Element Method simulations on a HPC
- Implemented a coarse-graining algorithm, leading to a speed-up in execution of the calibration
- Grasped the usage of Python PrePost scripts to analyse and operate DEM simulations on ROCKY

Content Creation for a Departmental Course at CRAMMN

- Curated a written course summary for the course CL 152: Introduction to Chemical Engineering
- Effectively concluded the course in an hour-long duration format by creating an extensive playlist

Research Project

- **Hydrogen Mobility by storage as H2-Hydrate** — Dec '21 - Present
  Ongoing Project| *Guide - Prof. Jhumpa Adhikari, IIT Bombay*
  - Grasped the usage of the opensource MCCCS Towhee Software for molecular simulations
  - Devised a method to implement quantum effects in classical potential by using numerical techniques

Course Projects

- **Thermo Acoustic Cooling of Thermal Hotspots** — Jan 2021 - Apr 2021
  Heat Transfer | *Guide: Prof. P. Sunthar & Prof. Venkat Gundabala, IIT Bombay* — *Report*
  - Spearheaded a team of 8 students to generate an innovative approach to cooling
  - Discovered Thermal Hotspots as the bottleneck for the computational power of microprocessors
  - Brainstormed to compare the Thermo-acoustic cooler against two conventional cooling methods
  - Used a combination of **Ansys and OpenFOAM** to lower cost by **over 170 times** considering energy and hardware requirements, also improving the cooling efficiency by around **22 times**

- **Coating flow of liquids on a rotating Disc** Sep 2021 - Dec 2021
  Transport Phenomena | *Guide: Prof. Guruswamy Kumaraswamy, IIT Bombay* *Report*
  - Critiqued over **4** Research papers on various concepts in the vicinity of the problem statement
  - Performed experimentation to implement **Lubrication Theory** which describes the flow of fluids
- **Flow past nine cylinders in square configuration** Jan 2022 - Apr 2022
  CFD and HT lab | *Guide: Prof. Janani Muralidharan, IIT Bombay* *Case study*
  - Studied the effect of the spacing ratio & Reynolds number on the flow of fluids past 9 cylinders
  - Analysed the effect of changing the fluid and published the case study on FOSSEE
- **ODE-BVP** Jul 2021 - Nov 2021
  Numerical Methods | *Guide: Prof. Sarika Mehra, IIT Bombay* *Report*
  - Solved a second order ODE-BVP problem in MATLAB & analyzed the effect of varying mesh size
  - Reported the effect of varying mesh size and solving methods to reveal the best possible method

Other Projects

- **NeuroClone** Apr 2021 - Jul 2021
  Institute Technical Council, IIT Bombay | *Institute Technical Summer Project* *Github Repository*
  - Spearheaded a team of **5** in ideation, planning & execution of this project of making a thought-controlled robot that will improve the lives of the paralysed by providing artificial mobility
  - Used Pytorch, Machine Learning & Deep Learning tools to create the neural network that converts EEG signals from 32 channels of the brain to electrical signals for the functioning of the robot
- **Creating own Solver in OpenFOAM** May 2022
  Skill-Lync Online training platform | *Independent Project* *Report*
  - Modified the IcoFOAM solver to create a new solver for scalar fields called ScalarFoam
  - Developed a new differential equation for the newly introduced scalar field to be considered
- **Predicting IPL Scores** Sep 2021 - Dec 2021
  Introduction to Data Science | *Course Project* *Report*
  - Implemented exploratory analysis and cleaning techniques on a dataset of IPL scores
  - Performed descriptive & predictive analysis of scores given the match conditions and the players
- **Lasso Game** Nov 2020 - Jul 2021
  CS 101 | *Guide: Prof. B. Raman & Prof. K. Chebrolu, IIT Bombay*
  - Applied Graphics Library of SimpleCPP in C++ to handle Keyboard and mouse-click events
  - Employed dynamic data display for score and created multiple game levels with varying difficulties
  - Handled live responses of mouse & keyboard inputs via functions using multiway branch statements

Relevant Coursework

- **Engineering:** Introduction to Chemical Engineering, Thermodynamics I & II, Transport phenomena, Numerical Methods, Computational Methods Lab, Heat Transfer, Process Fluid Mechanics, CFD and HT Lab, Chemical Engineering Lab I, Introduction to OpenFOAM Development*, Solid Mechanics**, Mass Transfer I**, Chemical Reaction Engineering**, Chemical Engineering Lab II**, Advanced Transport Phenomena**, Colloidal and Interfacial Science**, Supervised Learning Project I**
- **Mathematics:** Calculus, Linear Algebra, Differential Equations, Numerical Analysis, Data Analysis
- **Miscellaneous:** Computer Programming, Engineering Graphics, Chemistry, Biology, Basic Electricity and Magnetism, Electrical and Electronic Circuits**, Economics, Reading Literature, Machine Learning*, Deep Learning*

**Online courses, **To be completed by Nov 2022*

Technical Skills

- **Simulations and post-processing:** OpenFOAM (CFD), ROCKY (DEM), Towhee MCCCS (Molecular simulations), Ansys(CFD), DWSIM, OpenMODELICA, ParaView, VMD, Delta HPC
- **Programming:** C++, Python, MATLAB, LaTeX
- **Miscellaneous:** MS Office Suite, Canva, Github

Leading and Teaching Experience

- **Teaching Assistant**, BB 101 - Biology (Spring 2022)
  - Mentored over **20** students in 2 disciplines of Biology by explaining 7 tutorials & clearing doubts
  - Part of a proctoring team of TAs, which helped in the smooth conduction of the examinations
- **Class Representative**, Department Of Chemical Engineering, IIT Bombay
  - Elected as CR twice for **150+** students based on communication & interpersonal skills
  - Voicing student opinions & scheduling lectures and exams throughout the year for 150+ students
  - Assisted in successfully launching of the ChEA LinkedIn page, thus increasing the outreach
  - Devised & managed **15+** department events in coordination with the ChEA council
- **Convener**, Chemistry Club, IIT Bombay June 2021 - April 2022
  - Selected as a convener due to interest, good networking, communication and organisational skills
  - Conceptualised **Winter School of Chemistry**, a series of crash courses on niche topics
  - Forged a **Special Interest Group** for Chemistry enthusiasts to discuss advanced topics
  - **Organised talks** for SIG on *"How to present a paper" & "Cutting edge technology in Chemistry"*

Extra-Curricular Activities

- Ranked **3rd** in district level Inline skating competition by the sports and youth service office, Pune
- Completed a two-semester course on **Dramatics** in the first year under **NSO**
- Participated in the **Hult competition** for startup ideation that has a budget of **USD 1,000,000**
- Participated in an awareness campaign by the **Pranyas Foundation** on *"We always have a choice"*
- Participated in a Consulting competiton by **PropertyPistol**, which has a budget of **INR 50,000**
- Bagged **Second Position** in the PAN India **Light Painting Competition** organised by Techfest