Aditya Agarwal | **22B2195**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 05/09/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2026	
Intermediate	CBSE	Sanfort World School	2022	97.00%
Matriculation	CBSE	Delhi Public School	2020	98.80%

Pursuing a **Minor** degree in **Data Science** at the **Centre for Machine Intelligence and Data Science**

Scholastic Achievements

- **Department Rank 11** in a batch of **190+** students in the Mechanical Engineering Department *(Present)*
- Achieved **99.27** percentile among **0.16 Million+** students appeared in **JEE Advanced** examination *(2022)*
- Ranked **top 3** among **225** students with **Advanced Performer (AP)** grade in **thermodynamics** *(2023)*
- Proposed and led a project at **Carnegie Mellon University** selected among 15 doctorate proposals *(2024)*
- Secured **99.75** percentile among **0.9 Million+** students appeared in **JEE Main** examination *(2022)*
- Qualified for **Indian National Physics Olympiad** among **21k+** students in NSEP examination *(2021)*
- Awarded **Certificate Of Merit** for securing position in **top 300** students in **IOQM** examination *(2021)*
- Secured a score of **94** percentile among **50k+** students appeared in **KVPY SX** examination *(2022)*
- Secured **3rd rank** in district and **1st rank** in Delhi Public School in **class X**, CBSE examination *(2020)*
- Secured **1st rank** among **250+** students in Sanfort World School in **class XII**, CBSE examination *(2022)*

Professional Experience

Thermal Conductivity Simulation Error Management | **Carnegie Mellon University** *(Jun'24-Jul'24)*
Worked with Prof. Alan J. H. McGaughey, Nanoscale Transport Phenomena Laboratory | Research Internship

- Quantified errors in the **Green-Kubo method** for thermal conductivity calculations of solid argon at 70K
- Determined optimal correlation time and total simulation time to manage integration error and fluctuations
- Employed a **random walk analogy** to identify **noise** and enhance thermal conductivity measurements
- Awarded a **Letter of Recommendation** for exemplary work done on the project during the internship

Wall-Pressure Study in Turbulent Boundary Layers | **University of Melbourne** *(May'24-Jun'24)*
Worked with Research Fellow Dr. Rahul Deshpande | Research Internship

- Conducted in-depth analysis of a **Direct Numerical Simulation** database of a turbulent boundary layer
- Estimated sources of **Wall-Pressure fluctuations** from datasets, enhancing **turbulence** understanding
- Quantified **velocity gradient** estimation errors from **under-resolved** datasets, enhancing **CFD** methods
- Submitted a **research paper** on these findings to **FMFP India's premier fluid mechanics conference**

VC Industry Deal Sourcing | **RevRoad** *(Jun'24-Jul'24)*
Worked with Assistant Program Manager Saima Rahman, Extern | Externship

- Conducted market **analysis** to identify emerging trends and growth opportunities in the **EdTech** sector
- Researched and sourced startups aligned with **RevRoad's investment thesis**, ensuring **strategic fit**
- Performed **due diligence** and prepared investment summaries highlighting startup **viability** and potential

Key Projects

Mathematical Modeling and Simulation of Biological Tumors *(Dec'23-Apr'24)*
Guide: Prof. Dnyanesh Pawaskar | In-Semester Undergraduate Research Programme, IIT Bombay

- Modeled **necrotic core temperature** and flux distributions, enhancing **tumor** behaviour understanding
- Utilized FEM simulations in **ANSYS**, achieving **98%** accuracy in modeling tumor temperature distribution
- Identified the impact of compressive stress on tumor **growth dynamics** within the immediate environment

Super Resolution : Enhancing Images using Deep Learning *(Dec'23-Jan'24)*
Winter in Data Science | IIT Bombay

- Implemented Enhanced SRGAN (**ESRGAN**) by incorporating techniques such as the Residual-in-Residual Dense Block (**RRDB**) and Relativistic average GAN (**RaGAN**) for sharper and more realistic **texture**
- Leveraged large and diverse datasets, such as **DIV2K** and **Flickr2K**, to comprehensively train models

Classification of Metal Oxides with GAN-Generated Synthetic Data *(Mar'24-May'24)*

Guide: Prof. Alankar Alankar | Course Project: Applied Data Science and Machine Learning

- Implemented **Conditional GANs** to generate synthetic crystallographic data, enhancing dataset diversity
- Evaluated **SVM**, **Random Forest**, and **k-NN** classifiers, achieving up to **86.72%** accuracy post **PCA**
- Achieved **89%** accuracy using **cyclical learning rates** and **SOM** for optimal neural network training

Peaucellier-Lipkin Linkage Mechanism Design and Analysis *(Mar'24-May'24)*

Guide: Prof. Amit Singh | Course Project: Kinematics and Dynamics of Machines

- Engineered a Peaucellier-Lipkin linkage for precise **straight-line motion** conversion from **rotary input**
- Evaluated impact of **varying forces** on velocity and acceleration through **static and dynamic analysis**
- Developed and validated a **python program** to cross-verify **kinematic** results from simulation software

Logistics and Supply Chain and Services of Delhivery *(May'23-Jun'23)*

Guide: Prof. Mayank Pareek | Course Project: Introduction to Management

- Analyzed Delhivery's logistics operations, focusing on **inventory management** and **demand forecasting**
- Leveraged analytics to track **KPIs** and create reports, driving process improvements and metric monitoring
- Implemented data-driven solutions to optimize **routes** and enhance overall **supply chain performance**

Load Cell for Soft Solids *(Oct'23-Nov'23)*

Guide: Prof. V. Kartik | Course Project: Solid Mechanics Lab

- Designed and executed a **customized load cell** for measurement of **soft solids** weighing a few grams
- Used **acrylic** as the load cell material, achieving accurate **linear calibration curves** for known weights
- Applied hands-on skills in **laser cutting**, **strain gauge mounting**, **epoxy application** and **soldering**

Exit Strategies by Venture Capital Firms *(Jul'24-Present)*

A research-driven program in the field of Finance and Investment: Finsearch | IIT Bombay

- Outlining investment stages for startups for comprehensive understanding of the **VC investment lifecycle**
- Assessing factors influencing VC investment decisions to determine their impact on **investment outcomes**
- Developing recommendations on **exit strategies** based on the analysis of VC exit outcomes and **returns**

Line Follower Bot with Magnetic Separation Feature *(Nov'22-Feb'23)*

Guide: Prof. Abhishek Gupta | Course Project: Makerspace

- Enhanced line-following accuracy of an autonomous bot by **20%** by virtue of IR sensors and Arduino IDE
- Designed and integrated a **L293D motor shield** and multiple sensors for enhanced navigation and control
- Utilized **IR proximity sensors** to efficiently detect and track black lines, ensuring consistent performance

Technical Skills

Programming Languages	C, C++, Python, HTML
Software	Fusion 360, Ansys, MATLAB, LAMMPS, Microsoft Office, LaTeX
Libraries	NumPy, SciPy, Pandas, Matplotlib, Seaborn, Scikit-learn, PyTorch

Relevant Courses Undertaken

Mechanical	Solid Mechanics, Structural Materials, Thermodynamics, Heat Transfer*, Fluid Mechanics Lab, Kinematics and Dynamics of Machines, Fluid Mechanics, Mechanical Processing of Materials, Applied Thermodynamics*
Mathematics	Calculus, Linear Algebra, Differential Equations
Computer Science	Computer Programming, Programming for Data Science, Introduction to ML
Miscellaneous	Physical, Organic and Inorganic Chemistry, Biology, Quantum Physics and Application, Introduction to Special Theory of Relativity, Introduction to Design, Introduction to Management

*(*to be completed by Nov'24)*

Extracurricular Activities

- Played **guitar** for **5** years and performed at Inter-DPS Orchestra Festival in Delhi Public School, Faridabad
- Practised **drum** for **2+** years and played at various school level events in Delhi Public School, Moradabad
- Performed **80+** hours of community service under the **National Service Scheme (NSS)** at IIT Bombay
- Achieved grade A in **Japanese Language Course** in a batch of **50** at Delhi Public School, Moradabad
- Achieved **Scholar Gown** and **The Certificate of Merit** for **4 Years** at Delhi Public School, Moradabad
- Granted an esteemed **10k** worth scholarship for excellent performance in **Spot The Einstein Challenge**
- Awarded a **silver medal** in essay writing contest under Sub Junior Division conducted by **Schoolsindia**
- Secured **1st** Rank in **fabric block painting** competition organized by Delhi Public School, Moradabad
- Secured **3rd** Rank in **english quiz** at the **Youth Festival** organized by Delhi Public School, Moradabad