



RAM MUNDE



Senior Undergraduate, Materials Science and Engineering
Indian Institute of Technology Delhi

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Ram Munde  | Ram Munde 







ACADEMIC QUALIFICATIONS

Degree	Institute	Year of Completion	CPI/%
B.Tech, MSE	IIT Delhi	2023	8.2 / 10
AISSE (MSBSHSE)	Ganesh Public School, Kaij	2020	80.0%
AISE (MSBSHSE)	Saraswati Public School, Latur	2018	96%

INTERNSHIPS

- **United Phosphorous Limited, Bangalore - Research Associate** *Agromolecule Analysis* May-Jul '23
 - Enhanced the organization's decision-making power by creating a sophisticated portal of chemical molecule analysis. Developed a strong machine learning model to forecast the viability of chemical molecules for agro-chemical products using density functional theory. Integrated API from open-source libraries for ΔG_H analysis. Received letter of recommendation from Global Manager, United Phosphorus Ltd 
- **Cooper Union Edu. New York - Invention Intern** *Ecofriendly Stapler Prototyped at IITGN* May-July '22
 - Achieved microprocessor technology expertise (Arduino, Raspberry Pi) & many mechanical tool handling. Extensive experience in SEM, XPS, TEM, XRD, FTIR, AFM, DSC, and characterization tools. Successfully patented a PPA in USA & INDIA and presented invention in Lemelson Student Prize at MIT. Received letter of appreciation and PPA from Cooper Union Edu. New York and Indian Patent Application No- 202221043097 | USA Patent Application No -63438506 Patent Attorney Prof. Alan Wolf 

RESEARCH PROJECTS

- **Computational Insights into Modulating the Performance of Mxene Based Electrocatalyst**
Bachelor Thesis - Quantum Heterostructures Electrocatalyst Prof. Dibyajyoti Ghosh  Jul - Dec '23
 - Reviewed the advantages of MXenes over NPM electrocatalyst using DFT simulation. Computed the electronic band structures & ΔG_H of MXenes using Vienna Ab initio Simulation Package (VASP). Modeled MXenes $Ti_3C_2T_x$, $Ti_3N_2T_x$ etc. Modified MAX phase using terminating modifications (-O), metal atom doping, and nanostructures embedding (Nano-ribbons, Nanodots).
- **Computational Study of the Performance of Ni-rich Layered Oxide for Lithium-Ion Batteries**
Self Project  Jan '23- May '23
 - Presented a pseudo-mesoscale finite element model developed with COMSOL Multiphysics software that describes the effect of the structural properties of the positive electrode, which is $LiNi_{0.6}Mn_{0.2}Co_{0.2}O_2$ (NMC 622), on the performance of the LIBs with lithium metal anode.
- **A Deep Learning Approach to Estimate Stress Distribution on Biomaterials**
APL405, Machine Learning in Mechanics Prof. Sitikantha Roy  Jul- Nov '22
 - Estimated stress on materials using supervised learning demonstrating its feasibility over FEA approach. Deployed CNN with Prewitt Operator to calculate Strain to satisfy static equilibrium analysis of stress. Encoded and Decoded data by implementing unsupervised learning using PCA and SVD to reduce computation costs. Achieved remarkable AME and AE values of approximately 1.8 and 1.6 and generated a comprehensive report using LaTeX. 
- **Superhydrophobic Surfaces on Brass Substrates Fabricated via Micro-Etching**
Winter Project - Advancing Superhydrophobicity Prof. Lakshmi Narayana  May-Jul '21
 - Made a superhydrophobic brass surface using solution immersion method & wet chemical reaction method. The optimized contact angle of the brass substrate by leaching followed by modifications using STA. Operated chemicals & characterization tools of materials like XPS, XRD, SEM, EDS, and CA measurement.
- **Homogeneous Crystal Nucleation In Binary Metallic Melts**
MLL103 Thermodynamics Course Term Paper, Prof. Ankur Goswami  Aug-Nov '21
 - Proposed a quantification method for homogeneous nucleation frequency as a function of the liquid composition and temperature, using the predictions of nucleation theory. The free energy of crystallization is generated using normal solution models for the liquid&solid. It is used to compute the interfacial tension with model-based estimates. As input, thermodynamic quantities are used.

• Department of Materials Science & Engineering Lab Work *Lab Experiments*

- **Functionals Materials Lab:** Preparation & Characterization of transparent conducting oxides. Experimented with the ferroelectric properties of $BaTiO_3$. Designed **Liquid Crystal Thermometer** in the lab.
- **Corrosion Testing Lab (Grade A):** Experimented Pitting, Crevice, and Catalytic corrosion on Mg, Al and steel alloy. Computed corrosion rates in various environmental conditions using CHESTA. Coupling electrodes.
- **Materials Selections & Characterization lab (Grade A):** Designed materials with various constraints and objectives. TEM, SEM, AFM, XPS, XRD, FTIR, UV-Vis Spectroscopy and CA characterization work.
- **Mechanical Behaviour of Materials Lab:** Tensile, Hardness, Creep tests on polymer, metals and alloys.

KEY COURSES

Electromagnetic Waves& Quantum Mechanics (PYL101)	Deep Learning in Solid Mechanics (APL405)
Density Functional Theory (Coursera)	Semiconductor Specialization (Coursera)
Intro. to Electrical Engineering (ELL101)	Advance Chemistry (CML101)
Numerical Methods & Computation (MTL107)	Thermodynamics of Materials (MLL103)
Characterization of Materials (MLL104)	Math. Methods in Materials Eng (MLL212)
Mechanical Behaviour of Materials (MLL251)	Electronic Optical & Magnetism Properties of Materials (MLL213)
Materials Processing (MLL371)	Materials Modelling (MLL213)
Corrosion & Degradation of Materials (MLL452)	Materials Selections & Design (MLL372)
Nanostructures and Nanomaterials (MLL740)	Transport Phenomenon (CLL110)

POSITIONS OF RESPONSIBILITY

- **Technical Overall Coordinator, Offices of Career Services, IITD** (Jan 2023 - Present): Managing a team of coordinators & executives to develop the OCS portal, which is currently being used by **10000+** students and **1000+** recruiters. *Awarded **Best Contribution (2022)** and **Significant Contribution (2023)** to institute recruitment activities by Senate.*
- **Department of Materials Science & Engineering Convener** (March, 2023 - Present): Managing academic administrative concerns for 120+ students. Actively addressed potential issues within the branch, collaborating with faculty and students to develop effective solutions.
- **Coordinator, Board of Sports Activities** (May 2022 - April 2023): Led a 3-tier team with 20+ executives. Spearheaded the organization of the sports fest (**INTER-IIT**) spanning over 15 days with all 13 sports being played after a gap of many years. Introduced LIVE scoring & informal events in 10+ sports.
- **Academic Mentor, Board for Student Welfare** (May 2022 - Dec 2022): Mentoring **20+ freshmen** in their classes to help them adjust to the new IIT academic culture.

TECHNICAL SKILLS

- **Experimental:** VASP, LAMMPS, UV-vis spectroscopy, Glovebox, XRD, SEM, FTIR
- **Languages:** Python, C++, Bash, SML, SQL, Node.js, Matlab, Java, Latex
- **ML/AI Libraries:** PyTorch, Tensorflow, Keras, Matplotlib, Numpy, Flask
- **Tools:** Linux, Git, HPC, OpenMP, MPI, Angular, Android Studio, Firebase, Apache

EXTRA CURRICULAR ACTIVITIES

- **Outstanding Contribution to Office of Career Services** award from **Dean Academics, IITD**.
- **Significant Contribution to Sports Activities** award from **Warden Satpura House, IITD**.
- **Aquatics Captain** (Jun 2022 - May 2023): Managed swim team activities, coordinating training sessions, representing the team in competitions & events. **Won the silver in INTER-IIT** the annual sports fest.
- **Athletics Vice Captain** (Jun 2021 - May 2022)
 - * Won **Silver Medal in 200m** event in Sportech the Institute Annual Sports Fest (Aug 2022)
 - * Won **gold medal in 100m** event in Athletics Premium League (Jun 2021)
 - * Won **gold medal in 4*4 100m relay** in Athletics Premium League (Jun 2021)
 - * Participation in 400m, 800m event in the Annual Sports Fest Sportech 2022 IIT Delhi
- **Materials and Art Competition:** 2nd Winner, Presented memes creating skill using Materials Science concepts.
- **Micron Semiconductor Company Hackathon:** 1st Place Winner, A Champion of the Memory Optimization Hackathon, demonstrating remarkable memory optimization skills.
- **Volunteering Work:**
 - * National Service Scheme, IIT Delhi
 - * House Committee, Satpura House, IIT Delhi
 - * Maintenance Committee, Satpura House, IIT Delhi