Ram Munde

Senior Undergraduate, Materials Science and Engineering
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Ram Munde in | 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** *Agro Molecule Analysis* *May-Jul '23*
  - Enhanced the organization's **Decision Making Power** by creating sophisticated portal of **Chemical Molecule Analysis**. As a result, revenue of $200 million was generated in the following quarter.
  - Developed a strong Machine Learning Model to forecast the viability of chemical molecules for agro-chemical products using **Density Functional Theory**. API integration for characteristics ΔG_H data analysis.

  Received letter of recommendation from Global Manager, United Phosphorus Ltd & Stipend of worth ***₹150k***
- **Cooper Union Edu. New York - Invention Intern** *Ecofriendly Stapler Prototyped at IITGN* *May-July '22*
  - Achieved **Microprocessor Technology** expertise (Arduino, RaspberryPi) & 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 present invention in Lemelson Student Prize at MIT

  Received letter of appreciation and PPA from Cooper Union Edu. New York and Stipend of worth ***₹10000***
  Indian Patent Application Number- 202221043097 | USA Patent Application Number - 63438506
  Patent Attorney Prof. Alan Wolf, USA

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 $Ti_3C_2T_x, Ti3_{N2}T_x$ etc. Modified MAX phase using **terminating modifications (-O), metal atom doping, and nanostructures embedding (Nano-ribbons, Nanodots)**.
- **A Modeling Approach to Study the Performance of Ni-rich Layered Oxide for Lithium-Ion Battery**
  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 $LiNi_0.6Mn_0.2Co_0.2O_2$ **(NMC 622)**, on the performance of the **LIBs with lithium metal anode**.
- **A Deep Learning Approach to Estimate Stress Distribution on Biomaterials**
  Machine Learning 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 satisfy **Static Equilibrium Analysis** of stress.
  - Encoded and Decoded data by implementing Unsupervised Learning using **PCA and SVD** to reduce computation cost. 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 & Growth Process**
  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 **XRD, SEM, EDS**, and CA measurement.
- **Homogeneous Crystal Nucleation In Binary Metallic Melts**
  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* 🗁 *Jan'23 - May'23*
  - **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:** Analysed Pitting, Crevice, Catalytic corrosions. Computed corrosion rates in various environmental conditions. Optimized corrosion resistance using **electrolytic (battery) techniques**.
  - **Materials Selections & Characterization lab:** Analysed Pitting, Crevice, Catalytic corrosions. Computed corrosion rates in various environmental conditions. Optimized corrosion resistance using **electrolytic (battery) techniques**.
  - **Mechanical Behaviour of Materials Lab:** Analysed Pitting, Crevice, Catalytic corrosions. Computed corrosion rates in various environmental conditions. Optimized corrosion resistance using

KEY COURSES

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