Swapnadeep Mandal

1st Yr Ph.D student
Department of Materials Engineering, IISc Bangalore

Email : swapnadeepm1@iisc.ac.in
Phone : +91-6289580224

Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2026 - Present	Ph.D	Indian Institute of Science, Bangalore	NA
2024 - 2026	M.Tech	Indian Institute of Technology, Kanpur	8.38/10
2024	B.Tech	IIEST, Shibpur	8.42/10
2020	WBCHSE(XII)	Bidya Bhaban(H.S.)	90%
2018	WBBSE(X)	ST. Francis Elite School	89.43%

Scholastic Achievements

- Secured **All India Rank 113** in **GATE 2024 (MT)** and **All India Rank 290** in **GATE 2024 (XE)** .
- Secured **All India Rank 22569** in **JEE Advanced 2021**.
- Among the Top 5% of 223 candidates registered for **NPTEL** Certification Exam on **Advances in Welding and Joining Technologies Oct'22**

Key Projects

- **B.Tech Project : Virtual 3D Microstructure-based Simulation of Elasto-Plastic Deformation in Single phase FCC Metals using Crystal Plasticity via DIGIMAT Fast Fourier Transform** (*Aug'23- May'24*)
  Mentor: Dr. Kaushik Das, Department of Metallurgy and Materials Engineering, IIEST.
  - Modelled Uniaxial Tensile deformation behaviour of Single Phase Single Crystalline Copper(Cu), Aluminium(Al) and Polycrystalline Al 1050 and Cu under **Crystal Plasticity Framework**.
  - Studied the effect of grain aspect ratio on Tensile properties in Single Phase Polycrystalline Cu.
  - Tried to explore the extent of hardening in the above mentioned materials under **Asaro-Needleman and Voce Hardnening** rules.

- **M.Tech Project : Development of Fe-C-Cu-Sn alloy via Liquid Phase Sintering for automotive applications** (*May'25-May'26*)
  Mentor: Prof. Anish Upadhyaya, Department of Materials Science and Engineering, IIT Kanpur.
  - Studied the **Densification behaviour** and **Bulk Hardness** of Powder Metallurgy(PM) processed Fe-0.8C alloy with Bronze(Cu-10Sn) addition via **Liquid Phase Sintering**.
  - Learning the effect of variation of sintering temperature on the properties PM processed Fe-C-Cu-Sn alloy.
  - To model deformation behaviour of PM processed Fe-C-cu-Sn alloy

- **M.Tech Course Project(MSE667) : Electrodes for Lithium-Ion Batteries for Electric Vehicle(EV) Applications** (*Jan'25-April'25*)
  Mentor: Dr. Niraj Mohan Chawake, Department of Materials Science and Engineering, IIT Kanpur
  - Explored different categories of materials used in batteries of Electric Vehicles(EVs). Also did a comparative study of **Specific Power** and **Specific Energy** of the battery materials.
  - Applied **ANSYS GRANTA SELECTOR** for methodical selection of materials to be used in Lithium ion batteries for EV applications.

- **M.Tech Course Project(MSE643) : Phase Prediction of High Entropy Alloys using Machine Learning Approach** (*Feb'25- April'25*)
  Mentor: Dr. Krishanu Biswas, Department of Materials Science and Engineering, IIT Kanpur
  - Pre-processed the published thermodynamic dataset on High Entropy Alloys(HEAs) determining the co-relation coefficients between input features and feature importance in the dataset.
  - Aoolied different ML models like **SVM**, **DTC**, **KNN**, **ANN** and compared the accuracies of the models in prediction the phases of HEAs.

- **Term Paper (MSE659) : Insights on Fabrication of High Speed Steel Products through Powder Metallurgy Route** (*Sept'24- Oct'24*)
  Mentor: Dr. Shobit Omar, Department of Materials Science and Engineering, IIT Kanpur
  - To examine the impact of key PM processing parameters like microstructural refinement, alloying and sintering conditions on mechanical properties and performance of different grades of High Speed Steel(HSS)

Internships

- **Summer Research Internship'23 ,IISc Bangalore : Syhthesis and optimization of Indium Oxide Nanobundles for thin film transistor applications** (*May'23-July'23*)
  Mentor: Dr. Subho Dasgupta, Department of Materials Science and Engineering, IISc Bangalore

  - Various synthesis routes such as solid-state reaction, sol–gel, co-precipitation, solvothermal, and mechanical alloying have been explored, and in this work the precipitation method was employed to synthesize In_2O_3 nanobundles.
  - Examined the conductivity of the In_2O_3 nanobundles for horizontal and vertical channel architecture.
  - Performed SEM imaging analysis of In_2O_3 nanobundles using **ImageJ**.

Technical Skills

- **Programming Languages:** Python(Spyder) LaTeX, MATLAB
- **Software :** DIGIMAT(FE, MF), ABAQUS(Standard), ANSYS Mechanical, Origin, ImageJ, Arduino, TinkerCad.

Relevant Courses

Structure and Characterization of Materials	Metallurgical Thermodynamics
Transport Phenomena and Rate Processes	Manufacturing Technology
Powder Metallurgy	Advances in Welding and Joining Technologies
Design and Selection of Engineering Materials	AI and AL in Materials Science and Engineering
Fracture Mechanics	Heat Treatment Technology
Ceramic and Composite Materials	Mechanical Testing of Materials

Certificate Courses

- Completed 1 month IIT Kanpur Certificate Program on **Python for Artificial Intelligence Machine Learning and Deep Learning**. (*1st Dec'24 - 27th Dec'24*)
- Completed **Online NPTEL Certification** course on Advances in Welding and Joining Technologies. (*Aug'22 - Oct'22*)
- Completed an Online internship course on **IoT** at **1Stop.ai** . (*15th Nov'24 - 31st Dec'24*)

Conferences and Workshops

- Workshop on **Nanoindentation and Nanomechanics**, ACMS IIT Kanpur. (*7th Feb'25*)
- Workshop on **WD-XRF and Stable Isotope Ratio Mass Spectroscopy (IRMS)**, ACMS IIT Kanpur. (*30th May'25*)
- Attended **IITK Samanvay 2024**, an Industry-Academia Thought-Leadership Symposium. (*29th Nov'24*)

Extra-Curricular Activities

- Quialified 1st Yr Examination on **Rabindra Sangeet** conducted by **Prayag Sangeet Samiti, Allahabad** with **1st Dision** and **Distinction(Practical)** dated **17th June 2014** .