

Ravikumar S

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🌐 [ravikumar-mse.github.io](https://github.com/ravikumar-mse)

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Education

CeNSE @ Indian Institute of Science, Bengaluru

2025 - 2027

MTech in Semiconductor Technology, (GPA: 8.50/10)

Indian Institute of Technology Madras

2021 - 2025

BTech in Metallurgical and Materials Engineering, (GPA: 8.12/10)

Research Experience

Micro and Nano Fabrication Project

Bengaluru, India

National Nano Fabrication Centre (NNfC), Project: ITO thin film fabrication

Sep 2025 - Nov 2025

- Achieved **91.2%** ITO transmission (300 - 700 nm) - the highest obtained on the NNfC e-beam tool for a 100 nm thin-film
- Developed e-beam deposition parameters (1 sccm O₂, 7kV, 0.5 nm/s, 10⁻⁴ Torr, no substrate heating, 10 wt% Sn)
- Applied O₂ diffusion analysis to improve ITO transmission from 2%T and 1100 Ω/sq to 91.2%T and 120 Ω/sq at 400°C
- Executed ITO thin-film fabrication & Characterization in the **Class 1000** cleanroom at the NNfC

Research Intern

Chennai, India

Surface Modifications Lab, IIT Madras

Jan 2025 - May 2025

- Deposited **Ti6Al4V** on SS304 via high-pressure cold spray and achieved a 3.83 mm thick coating with 7.1 MPa N₂ gas
- Performed XRD to ensure the $\alpha + \beta$ phase was preserved during deposition, confirming no phase transformation
- Achieved an average coating hardness of 269 HV (HV0.5) validated through microhardness testing measurements

Research Intern

Chennai, India

Low Dimensional Semiconductors Lab, IIT Madras

Jan 2024 - March 2024

- Analyzed room-temperature photoluminescence of SiC thin-films in the (800 - 900 nm) near-infrared range
- Confirmed single-photon emission through second-order correlation measurements ($g^{(2)}(0) < 0.1$)
- Performed XRD and determined substrate crystallinity by identifying diffraction peaks

Industry Experience

Process Control Intern - Vedanta Sesa Goa

Goa, India

Project: Analysis and mitigation of skull formation in ironmaking

May 2024 - July 2024

- Analyzed 450+ days of blast furnace data (> 95% availability) to identify key inputs that drive skull formation
- Built regression models for three blast furnaces, achieving up to **82% accuracy** in predicting Skull%
- Proposed PCM runner design changes and IoT-based monitoring to reduce spillage and improve ladle health

Course Project

Prediction of Critical Temperature (T_c) of Superconductors Using ML

Jan 2024 - May 2024

- Used a database (14,844 data-points, 81 features) to develop ANN regression models to predict (T_c) values
- Trained two ANN models with ReLU activation and Adam optimizer to minimize the loss function
- Optimized (T_c) predictions through hyperparameter tuning and RFECV achieving over **80% accuracy**

Ongoing Projects

- **Simulation of Wake-Up Free Aqueous La-HZO: A Pathway to Scalable, Energy-Efficient FeRAM**
- **Electrical and C-V Characterization of GaN HEMTs for Channel and Contact Analysis**

Skills

Cleanroom Experience: (Class 1000: E-beam evaporation, annealing, ellipsometry, four-point probe); (Class 100: SEM)

Programming Languages & Software: Python, C, MATLAB, Origin, Vesta, ImageJ, TCAD Silvaco, CrystalMaker

Packages: Scikit-learn, Tensorflow, Keras, Numpy, Pandas, Matplotlib, Matminer, Pymatgen, Seaborn

Relevant Coursework

Graduate: Semiconductor Device Physics; Micro and Nano Fabrication; Materials Design Principles; Materials Synthesis

Undergraduate: Materials Characterization; ML in Materials Science; Physics of Materials; Non-metallic Materials