NETHRA BALACHANDAR

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Materials Engineer with hands-on experience in semiconductor process optimization, defect detection, and battery degradation analysis. Skilled in DOE, JMP, and SPC, with practical exposure to etch, deposition, photolithography, and material characterization using FTIR, SEM, and XRD.

EDUCATION

Purdue University – West Lafayette, IN – Masters in Materials Science Engineering **Aug 2023 – May 2025**

Relevant Coursework: Solid State Device Physics, Failure Analysis, Thin Films Deposition, Plasma Lab, MEMS Fab

Sri Sivasubramaniya Nadar College of Engineering – Chennai, India –B. Tech Chemical Engineering **Jun 2018 – May 2022**

Relevant Coursework: Electrochemistry, Mass Transport, Chemical Kinetics, Advanced Thermodynamics

ACADEMIC PROJECTS

Yield Optimization in Semiconductor Manufacturing using DOE (Python, JMP) – Applied DOE and XGBoost-based modeling on SECOM sensor data using Python and JMP to identify critical semiconductor process variables, improving yield classification accuracy by 85% and enabling data-driven process control recommendations.

Automated Wafer Defect Detection via Custom CNN - Developed a custom CNN for wafer defect classification, achieving 90% validation accuracy and reducing manual inspection effort through optimized learning rate and model architecture tuning.

Integrating a GUI with GNN for Efficient Prediction of Material Properties - Built an interactive Python GUI to visualize predictions and feature relevance of crystal property models using GNNs, improving user accessibility and model explainability for researchers.

RESEARCH EXPERIENCE

Graduate Research Assistant - Purdue University **Aug 2023 – May 2024**

- Improved lithium-ion battery electrode stability, increasing cycle life by 15% and reducing capacity fade by 10% through thermodynamic modeling and material degradation analysis.
- Reviewed thermodynamic properties of metals (enthalpy, entropy, Gibbs free energy) across various environments for material selection and modeled phase equilibria and transformations in alloys using computational modeling techniques.
- Presented research findings through technical reports and presentations, ensuring clear communication with team members and advisors.

Graduate Teaching Assistant for MSE 335 – Materials Characterization Lab – Purdue University **Jan 2024 – Apr 2024**

- Instructed 30 undergraduate students in advanced analytical methods for material structure and composition characterization, including FTIR spectroscopy, XRD, SEM, and EDS, achieving a 95% course satisfaction rate.
- Ensured safe laboratory practices by instructing students on lab safety protocols, proper equipment handling, and hazard mitigation, fostering a culture of safety and compliance in materials characterization labs.

Sri Sivasubramaniya Nadar College of Engineering - Undergraduate Research Assistant **May 2021 – Dec 2022**

- Formulated a Deep Eutectic Solvent that removed approximately 98% of Cr (VI) from aqueous solutions in a single cycle. Led the validation using ICP–OES analysis and optimized solvent formulation, improving removal efficiency by 20% and reducing costs by 15% through systematic experimental designs.

PROFESSIONAL EXPERIENCE

E-Mobility Intern - BMW Head of Technology Office, Mountain View, CA **May 2024 – Aug 2024**

- Automated battery R&D data workflows (collection, analysis, and visualization), increasing efficiency by 30% and supporting degradation analysis with FTIR and other spectroscopic tools, compiled and synthesized key trends from R&D activities at 20+ US universities, influencing strategic research directions.
- Collaborated with cross-functional teams to recommend advanced battery materials in terms of performance, cost, and sustainability.

Operations Manager Intern - Amazon India, Hyderabad, India **Feb 2022 – Jul 2022**

- Led Lean Six Sigma project to eliminate redundant workflows, cutting overtime by 30% and automating 30 hours/week of manual reporting via SQL scripts and proposed and standardized SOPs, improving operational quality metrics by 15%.

TECHNICAL SKILLS AND ADDITIONAL COURSES

- Programming Languages: Python, C, C++, R
- Design Software: AutoCAD, SolidWorks, Fusion360, CATIA
- Data/ Numerical Analysis: JMP, MATLAB, SQL
- Simulation Tools: Ansys, ThermoCalc

Additional Courses:

- Design of Experiments, Arizona State University
- Semiconductor Fabrication 101, Purdue University
- Lean Six Sigma, Black Belt
- Machine Language and its Application, IIT Madras