

Shubham Mishra

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Summary

I am currently employed at Nunam Technologies India Pvt. Ltd. as a Senior Battery Modeling Engineer. My professional expertise includes battery modeling, battery thermal management, and computational fluid dynamics (CFD) for electric vehicle (EV) and battery energy storage system (BESS) applications.

Work Experience

MNNIT ALLAHABAD

ASSITANT PROFESSOR IN THE DEPARTMENT OF MECHANICAL ENGINEERING (CONTRACTUAL BASIS)

Prayagraj, India

Jun. 2017 - Jan. 2018

- Developing curricula and delivering course material
- Providing training and mentoring to teaching assistants and conducting lab for under graduate students
- Conducting research, fieldwork, and investigations, and writing up reports.
- Reviewing methods and teaching materials and making recommendations for improvement.

IIT Kharagpur

RESEARCH SCHOLAR

kharagpur, India

Jan. 2018 - Present

- Analyze, interpret and document research findings
- Perform laboratory activities and operate laboratory equipment effectively and safely
- Present research results in meetings, conferences, and seminars.
- Participate in conferences and publish the research findings
- Perform the teaching assistant duty and assist the undergraduate and postgraduate students in their lab classes

IIT Kharagpur and Tata Motors

BATTERY PACK DEVELOPER FOR HYBRID ELECTRIC VEHICLE

IIT Kharagpur, India

jan 2018 - 2020

- Develop a Air cooled Battery Pack
- Perform Experiments on the cell and Battery pack for heat generation Measurement
- Provide solutions for better thermal management in the battery pack

Nunam Technologies India pvt ltd

BATTERY MODELING AND THERMAL ENGINEER

Bengaluru, India

March 2023 - Present

- Battery Parameter estimation using Equivalent Circuit Model (ECM)
- Battery SOC and SOH estimation
- Remaining useful life (RUL) prediction
- Predictive and Proactive maintenance frameworks leveraging data from BESS and EV systems
- Thermal Simulation of Battery Pack
- Provide solutions for better thermal management in the battery pack

Skills

Programming Languages C | C++ | Python | R

Simulation Softwares Ansys Fluent | OpenFoam | Matlab | star CCM+ | COMSOL

Meshing Tools SnappyHexMesh | ICEM CFD | Fluent Meshing | HyperMesh | Workbench Meshing

CAD softwares SolidWorks | CATIA | Design Modeler | Space Claim

Post-processors Fluent Postprocess | Paraview | Tecplot | Ensignt | Matlab | GNU plot | InkScape

Experimental Skills Sensor Calibration, LABVIEW, NIDAQ Data Acquisition

Academic Achievements

Graduate Aptitude Test (GATE)

- Qualified GATE EXAM with All India Rank 927 in year 2014

Scholarships

- MHRD institute scholarship for the two academic years during M.Tech
- MHRD institute scholarship for pursuing PhD

Research Experience and Projects

Develop Air Cooled Battery Pack

Kharagpur, India

SUPERVISOR: PROF. SUBHRANSU ROY | IIT KHARAGPUR | TATA MOTORS

Jan 2018 - June 2023

- Prepare CAD for air cooled battery Pack for hybrid electric vehicle
- Developing and Optimising Air cooling system for battery pack by using CFD
- Manufacturing of Indigenous Battery Pack
- Steady and unsteady **turbulence modelling** was done through $k - \epsilon$, $k - \omega$, and **LES** models
- Effect of air flow rate, fin size, heat generation rate were investigated.

Develop Battery Pack Heat Generation Measurement Setup

IIT Kharagpur, India

SUPERVISOR: PROF. SUBHRANSU ROY | IIT KHARAGPUR

Jan 2018 - June 2020

- Calibrate the heat flux sensor against constant DC power supply
- Programming in the LABVIEW was done for calibration and data acquisition with the help of NIDAQ
- Environment Chamber and Battery cyclers have been used to measure the heat at various temperature and Charge-Discharge rate .

Develop Passive Cooling System for Battery Pack using Phase Change Material

IIT Kharagpur, India

SUPERVISOR: PROF. SUBHRANSU ROY, ANADROOP BHATTACHARYA | IIT KHARAGPUR

Jan 2018 - June 2023

- Conjugate heat transfer model for battery pack with PCM was developed in the OpenFoam
- Fluctuating heat generation was created inside the battery model and Solidification and Melting source term has been added in the PCM
- For improvement of PCM effective conductivity, PCM with Wire Mesh has been numerically simulated and experimentally validated.

Battery Electrical and Thermal Modeling

Bengaluru, India

NUNAM INDIA PVT LIMITED

March 2023 - Present

- Developed of **ECM Model** For cell parameter estimation
- Developed **EKF and SKPF based SOC algorithm** and deployed it in customer side
- Developed **Predictive and Proactive** maintenance of battery pack based on field data
- Developed pack-level **SOH and RUL estimation and prediction models** for EV and BESS using real-world field data.
- Battery pack **Thermal Simulations** and design suggestions.

Education

Indian Institute of Technology Kharagpur

EX-RESEARCH SCHOLAR)

Jan 2018 - June 2020

Indian Institute of Technology (BHU)

MASTER OF TECHNOLOGY (M.TECH) IN THERMAL AND FLUID ENGINEERING

CGPA : 8.10

July 2014 - May 2016

Government Engineering College, Rewa

BACHELOR OF ENGINEERING (B.E.) IN MECHANICAL ENGINEERING

Percentage : 73.5

July 2008 - May 2012