SIDDHANT MADHUKAR

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EDUCATION

Purdue University, West Lafayette, IN *Aug. 2025 - Present*
Master of Science in Mechanical Engineering
Coursework- Heat and Mass Transfer, Analysis of Thermal Systems, Electronics Cooling, Battery Thermal Management

Indian Institute of Information Technology, Jabalpur *Jul. 2019 - Jul. 2023*
Bachelor of Technology in Mechanical in Engineering. CGPA : 8.1/10.0
Coursework- Design of Mechanical Components, Computational Materials Science.

TECHNICAL SKILLS

- **Software:** SolidWorks, AutoCAD, Altair HyperMesh/OptiStruct, ANSYS, CATIA, Fusion 360
- **Hardware/Tools:** Battery pack assembly & testing, Structural adhesives & encapsulants, FPC-based sensing systems.
- **Manufacturing Processes:** HPDC, Sheet metal forming, Machining, Additive manufacturing, TIG/MIG/Laser welding, Aluminium extrusion, Vacuum furnace brazing, Deep-draw surfacing, DFM report analysis, Plastic Injection Moulding.
- **Standards & Methods:** FMEA/DFMEA, SAE J2380, AIS 038/156, Design reviews, Supplier audits, Manufacturing-BOM & Engineering-BOM preparation

EXPERIENCE

Energy and Transport Sciences Lab *West Lafayette, IN*
Graduate Student Researcher *Sept 2024 – Present*

- Working on the optimization of thermal management systems for lithium-ion batteries, focusing on integrating active and passive techniques to improve temperature regulation and mitigate thermal runaway risks..

Euler Motors *Delhi, India*
Senior Engineer - Battery Technology *Jun 2024 – Jul 2025*

- Reduced battery box cost by 8% by switching from steel to aluminum and implementing advanced welding techniques, achieving better leak resistance and enhanced durability in SAE J2380 and AIS 038 vibration tests.
- Hands-on experience in performing laser welding on battery cells, ensuring high-precision joints that meet quality and durability standards.
- Optimized welding parameters to minimize defects and improve structural integrity of battery module joints, with familiarity in welding standards applicable to battery manufacturing.
- Conducted design reviews, FMEAs, & supplier audits, ensuring manufacturing feasibility & smooth production handover
- Reduced module structure weight by 30% using topology optimization and ADC12 HPDC, ensuring uniform compression of prismatic cells for improved structural efficiency and reliability.
- Innovated a cooling strategy achieving 4°C lower temperatures than standard methods by designing optimized cooling channels, reducing assembly time, cost by 10%, and coolant leakage issues in the battery pack.

Battery R&D Engineer *Dec 2022 – Jun 2024*

- Created a laser weldable aluminum busbar for prismatic cells, enabling series/parallel configurations with a fuse that melts under high voltage imbalance to enhance battery safety.
- Decreased module weight by 15% by replacing metals and plastics with encapsulants and structural adhesives, optimizing material use and reducing overall weight.
- Developed modular battery sizes adaptable for vehicles with varying voltage and kWh configurations, enabling flexible integration across models.
- Performed FEA simulations in Altair HyperMesh, including meshing and modal analysis of EV battery packs, to evaluate dynamic behavior under road-induced vibrations.
- Analyzed load cases (potholes, cornering, braking) to ensure the battery pack could withstand heavy torsional loads from the chassis and act as a structural member, enhancing durability and vehicle integration.
- Generated 2D drawings for parts, part assembly, & installation, including the Engineering-BOM & Manufacturing-BOM.

Northway Motorsport *Pune, India*
Research and Development Intern *May 2022 – Jul 2022*

- Contributed to the design and development of battery packs and retrofit EV powertrain kits, including India's fastest-charging 4W commercial retrofit vehicle (2022).

PROJECTS

Vehicle Dynamics and Suspension System Development for SAE Student Formula Car *Jabalpur, India*

- Developed suspension & steering system for SAE Formula Car, achieving 20% weight reduction and 99.8% Ackermann accuracy.
- Validated design with 100+ hrs of FEA and simulations in Lotus, SolidWorks, and Ansys, meeting FSAE standards.