# DHRUVAL JAVIA

*Dhruval is an ingenious mechanical engineer, enthusiastic about solving global climate and energy problems through innovation and sustainability-driven outlook. With two years of experience, he is adept in thermal and electrochemical system modelling and analysis.*

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## EDUCATION

| Year | Institute | Qualification | CGPA |
|---|---|---|---|
| 2024 – present (Expected 06/2026) | Stanford University (CA, United States) | M.S. in Mechanical Engineering (Depth in Energy Systems) | 3.739/4 |
| 2018-2022 | Indian Institute of Technology, Bhubaneswar (Odisha, India) | B. Tech. in Mechanical Engineering | 9.39/10 |

## WORK EXPERIENCE

**THERMAX LTD. | Advent Trainee | August 2022 – July 2024**

- Performed tasks such as **boiler furnace modelling** in EXCEL using **stirred reactor** and **plug flow models**, **data driven modelling of boiler**, *tracking a boiler unit on factory shop floor stage-wise end-to-end and suggesting points for manufacturing process improvement and automation,* site visit & subsequent report generation for **Residual Life Analysis (RLA)** and **Root Cause Analysis (RCA)** activities.
- Lead a team project on **standardization of the design and techno-commercial offering of a biomass-fired thermal oil heater**, leading to a **7.4% reduction in total weight** and a **10.2% decrease in total footprint area** as compared to the previous design. Activities involved include *grate & BOP/auxiliary equipment sizing, layout preparation, thermal & pressure drop simulations, and maximum film temperature & efficiency* calculations.
- As part of the project, developed a **thermal model** of the **APH**, **Economizer** and **MPA furnace** in **EXCEL** with **VBA automation** *to iteratively design the heater*, and *validated it with existing data*. The model provided *inlet/outlet temperature values* within **2%**, **6%** and **10% error** in APH, Economizer and MPA furnace respectively.

## ACADEMIC PROJECTS

**EFFICIENT BATTERY THERMAL MANAGEMENT SYSTEMS FOR EV |** COMSOL, Electrochemical Modelling
**2021-2022 | Final Year B. Tech. Thesis Project | Supervisor: Dr. B. R. Pattabhi**

- Performed degradation studies through **multiphysics numerical simulations** using **COMSOL** software by employing a **coupled 1-D electrochemical and 2-D thermal model of the battery pack** integrated with a **capacity fade model**.
- Published the work in the **"Energy Storage"** journal having an *impact factor of* **3.2.**

**MACRO-SCALE DESIGN ASPECTS OF EV BATTERY PACK |** MATLAB, Excel, Battery Pack Design
**2021 | Summer Research Internship Project | Supervisors: Dr. Sundararajan Natarajan (IIT Madras) and Dr. B. R. Pattabhi (IIT Bhubaneswar)**

- *Performed battery pack design calculations* by developing a system of equations in **EXCEL** and implementing it in a **MATLAB app**. The app sliders be used to *analyse the effect of battery pack design parameters on EV performance.*
- Developed **MATLAB code** for *generating data for single cell current variation with time based on the adopted vehicle velocity profile* by using **vehicle dynamics equation**.

**AEROCASE |** Sheet Metal Working, TIG Welding, Sand Casting, Wood Working, 3D Printing, Fusion 360
**2025 | Individual Course Project | ME 203: Design and Manufacturing, Stanford University**

- *Designed* and *fabricated* a compact, innovative, and functional instrument case that ensures the safe storage of Aerodrum instruments while reflecting the aesthetic essence of music.
- Materials used include *Al 5052 aluminum sheet, A356 cast aluminum, pine wood, Duron,* and *polyurethane foam.*

**GAS DYNAMICS SIMULATOR |** MATLAB, Vector Algebra, Hash Grid Optimization
**2025 | Individual Personal Summer Project**

- Built a **MATLAB-based simulator** for *particle dynamics and association chemical reactions in an ideal gas*, implementing **hash grid optimization** to *reduce collision detection algorithm complexity*.
- Developed an interactive MATLAB app with *numeric and GUI-based input to improve user experience*, providing time-series plots and dynamic animations as post-processing outputs for analysis.

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| **TECHNICAL SKILLS** | SolidWorks | ANSYS | COMSOL | Arduino | Python | MATLAB | Cantera |
| **COURSEWORK** | Thermodynamics | Spectroscopy | Heat Transfer | Physical Gas Dynamics | Chemical Kinetics | | |

## EXTRA-CURRICULAR ACTIVITES

- Associated with the **robotics society** and **music society** *(as a drummer)* at IIT Bhubaneswar (2018-2022).
- Held the position of **Student Placement Coordinator** (2022) and *coordinated with various internal and external stakeholders* such as institute's placement cell, company recruiters and students for ensuring a smooth placement process.
- *Participated and lead* a team of 4 members in the **annual e-yantra robotics competition** (eYRC 2019-2020) organized by IIT Bombay.
- Achieved **5th rank** out of 82 participants in the **GrabCAD shop challenge** (2020) held online on the GrabCAD community website. The challenge involved *designing an innovative product which can be 3d printed*; have made a *2-in-1 mechanical hand blender cum egg beater*, and have submitted CAD files along with a stress analysis report. **SolidWorks** and **ANSYS** was used for CAD modelling and analysis.
- Achieved **2nd rank** in the *eastern fusion group music competition* – **"Sargam"** organized as a part of Spring Fest 2020 at IIT Kharagpur.