Kshitij Tripathi

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Professional Experience

Rubberatkins LTD. Aberdeen, United Kingdom

Graduate Non-Linear Simulation Engineer 05/2024 - Present

- Developing a machine learning framework for lifecycle prediction of rubber products by integrating data from FEA, CFD, material datasets, and experimental results, aiming to surpass traditional Arrhenius-based models.
- Utilized SIGMASOFT mould flow simulations with to optimize manufacturing strategies for rubber components.
- Led sub-gasket development for hydrogen electrolysers, conducting permeation, ageing, and chemical compatibility testing while conducting FEA (Abaqus) and CFD (OpenFOAM) simulations to evaluate mechanical and flow-induced stresses on sub-gaskets.
- Performed Compression Stress Relaxation (CSR), Moving Die Rheometer (MDR) testing, tensile testing, and chemical ageing while adhering to ISO standards and developed Python-based semi-deterministic data processing tools for analysing experimental non-linear material data
- Contributed to strategic planning for material selection and testing protocols for semiconductor applications.
- Developed frameworks for accelerated ageing testing abiding by ISO and NACE standards for lifetime predictions
- Implementing LBM simulations using lbmpy for flow and pressure modeling and plasma erosion on hyperelastic material frameworks.

Space Renaissance Initiative New Delhi, India

Robotics and Hardware Intern 06/2021 - 07/2021

- Developed a method of transmitting power from electric motor to translational motion, incorporating a damping system for shocks and tolerance within given spatial constraint.
- Modelled a Darrieus Vertical Axis Wind Turbine design for kinematic analyses using ANSYS rigid dynamics.

Shakti Pulley Manufacturing Company New Delhi, India

Mechanical Engineering Intern 12/2020 - 01/2021

- Assisted in manufacturing operations of pulleys and mechanical couplings and examined standard operating procedures with an evaluation of existing design methodology of components using finite element analysis modelling and simulations
- Introduced Solidworks PDM for ease of material inventory management, and introduced Gantt Charts for assembly level work in the factory

Projects

Uncertainty of CFD Predictions of Boiling in a Nuclear Reactor Fuel Channel Manchester, United Kingdom

Postgraduate Researcher, Project Advisor: Dr. Giovanni Giustini 09/2022 – 08/2023

- Estimated peak cladding temperatures (PCT) in nuclear reactor fuel channels using computational multiphase fluid dynamics (CMFD) with Eulerian Multiphase (EMP) models on Siemens StarCCM+.
- Modelled macroscopic wall boiling using the RPI heat transfer model, simulated using Java macros, and sampling operating conditions from a Gaussian distribution of boiling variables.
- Applied GRI uncertainty quantification models to propagate input uncertainty and achieve engineered PCT estimates under varying reactor conditions.

Formula Student - Team Defianz Racing New Delhi, India

Powertrain, Cost Lead, Project Advisor: Prof. Qasim Murtaza 09/2018 – 03/2020

- Led the university's Formula Student team, ranked Second Best Asian Team at Formula Student Czech 2020 and Best Indian team in 2019.
- Optimized FSAE intake and exhaust manifold systems using CFD on StarCCM+ and Ricardo, converting FSAE nozzle from venturi design to deLaval using pressure plots.
- Simulated fuel sloshing in the fuel tank under running conditions using multiphase CFD, eliminating the need for baffles and optimizing spatial constraints.
- Spearheaded cost and manufacturing analysis, using the Westinghouse system to evaluate resource investment and documented the Costed Bill of Materials.
- Built and wired vehicle ECU, auxiliary sensors, and traction control, overseeing telemetry and data acquisition systems.

MeitY Motor Controller for Electric Vehicle Project New Delhi, India
Undergraduate Project Research Lead, Project Advisor: Prof. Mini Sreejeth 05/2021 – 08/2021

- Performed thermal analysis on MOSFET heat sinks, comparing Indian and Chinese technologies under the Ministry of Electronics and Information Technology R&D Project.
- Simulated convection heat transfer characteristics of heat sinks in Neighborhood Electric Vehicles using thermal CFD solvers.

Investigation into Multi-Metal Usage in Grid-Stiffened Structures New Delhi, India
Undergraduate Researcher, Project Advisor: Prof. Vikas Rastogi 09/2021 – 05/2022

- Examined buckling and bending characteristics of grid-stiffened structures under vertical compression tests using ANSYS.
- Modelled thermal constraints on isogrid elements to study the effect of using titanium and nickel-based alloys under thermal differential.
- Implemented multi-metal orthogrid on transonic/supersonic nozzles using fluid-structure interaction (FSI) in ANSYS Fluent.

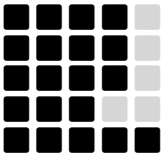
Education

University of Manchester Manchester, United Kingdom
MSc., Thermal Power and Fluid Engineering 08/2022 - 12/2023

Delhi Technological University New Delhi, India
BTech., Mechanical Engineering 08/2018 - 05/2022

Skills

CFD: ANSYS (Fluent, ICEPAK), Siemens StarCCM+, OpenFOAM, RICARDO WAVE 1-D
FEA: ANSYS (Mechanical), Abaqus, Siemens FEMAP, SolidWorks
Coding: Python, MATLAB, C++
Instrumentation and Control: NI Labview, Bash
Technical Documentation, Management and Communication: Microsoft Office Suite, LaTeX



Publications

- Tripathi, K., Ghosh, A., Mangal, A., Sreejeth, M., & Indu, S. (2023). Thermal study of MOSFET heat sinks for motor controller in neighbourhood electric vehicles. International Journal of Electric and Hybrid Vehicles, 15(3), 256-271.
- Tripathi, Kshitij et al. (2022). "Static Analysis of Multi-Metal Usage in Grid Stiffened Structures". In: vol. 27. 18, pp. 285–290.
- Tripathi, K. et al. (2022). "Fabrication of Isogrids by Conventional and Unconventional Techniques: A Comparative Review Study". In: Recent Advances in Industrial Production. Ed. by Rajeev Agrawal et al. Singapore: Springer Singapore, pp. 429–436
- Kshitij Tripathi, Kunal Kukreja and AK Madan, Evolution in Manufacturing of Grid Stiffened Structures through CAM and Additive Techniques, International Journal of Advanced Research in Engineering and Technology (IJARET), 12(4), 2021, pp. 217-225.

Certifications

Excel Skills for Business: Essentials – Macquarie University	11/2021
Mastering Programming with MATLAB – Vanderbilt University	11/2021
TOEFL (113/120) and GRE (315/340)	10/2021
Neural Networks and Deep Learning – DeepLearning.AI	07/2021
Finite Element Method for Problems in Physics – University of Michigan	05/2021
Introduction to Self-Driving Cars – University of Michigan	04/2021
2-course Graduate-level Certification in Python and Data Structures	04/2020

Volunteer Work

Invictus, Delhi Technological University 02/2019 - 02/2020
Logistics and Hospitality Team Member

Engifest, Delhi Technological University 01/2019 - 01/2020
Logistics Team Member, Lead

Society of Automotive Engineers (SAE) Chapter, Delhi Technological University 09/2018 - 09/2020
Administration Team Member