Kaushal Jha

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EDUCATION

- **Indian Institute Of Technology Mandi, Himachal Pradesh, India** August 2023 – Present
  M.Tech (Research) - Computational Mechanics
  - CGPA: 8/10
  - Research Area: CFD, Radiative Heat Transfer, Porous Media, Collimated Beam
  - Supervisor: Dr. Pradeep Kumar, Associate Professor
  - Coursework: Advanced analytical Techniques, Introduction to Turbulence and its modelling, Thermodynamics of energy systems, Combustion Technology, Multiphase Flows, Numerical Methods, scientific Machine Learning for engineers, and more
- **Dr A P J Abdul Kalam Technical University, Uttar Pradesh, India** June 2023
  B.Tech - Mechanical Engineering
  - CGPA: 7.51/10
  - Coursework: Engineering Mechanics, Fluid Mechanics, Thermodynamics, Heat Transfer, and more
  - Thesis: Design and Development of Portable Spot Welding Machine for Small-Scale Industries
- **Senior Secondary (CBSE)**— 82.8 % May 2019

ACADEMIC / RESEARCH PROJECTS

- **Tunneling Through the Fog for Long-Distance Visibility** (M.Tech Research) April 2025 – Present
  Guide: Dr. Pradeep Kumar, Associate Professor
  - Analysed complex refractive indices of ice and water across microwave, infrared, and visible spectra.
  - Developed a simulation framework for laser heating of fog (water droplets and ice crystals) using Volume-of-Fluids and Monte Carlo ray-tracing methods.
  - Prepared technical poster, presentation, and report highlighting future research directions.
  - **Key Skills:** Fog Modelling, Monte Carlo Ray Tracing, Volume-of-Fluids (Ansys Fluent), Optical Properties, Python, Tecplot.
- **Radiation in Porous Medium for Solar Energy Applications** (M.Tech Research) April 2024 – Present
  Guide: Dr. Pradeep Kumar, Associate Professor
  - Developed a framework to simulate radiative and convective transport in a volumetric solar receiver (VSR).
  - Estimated effective radiative and thermal properties via Monte Carlo ray tracing in ANSYS Fluent.
  - Modelled porous media using Darcy–Forchheimer equation in OpenFOAM.
  - Simulated multi-region fluid flow with custom radiation boundary conditions at the interface.
  - Achieved comparable results to pore-scale simulation using a complete fluid-domain approximation, significantly reducing computational cost.
  - **Key Skills:** Radiative heat transfer, Monte Carlo Ray Tracing, Porous media modelling, OpenFOAM, ANSYS Fluent, SolidWorks, ICEM-CFD, SpaceClaim, Ansys Meshing, C/C++, Python, Matlab, Tecplot.
- **Portable Spot Welding Machine** (B.Tech Major Project) Dec 2022 – May 2023
  Mentor: Bishub Choudhary, Ph.D, Assistant Professor
  - Designed a low-cost resistance spot welding machine (<$60 budget).
  - Used Fusion 360 for 3D design; integrated a 1500A transformer.
  - Published 1 conference paper, 1 book chapter, and a Design Patent (filed, under Review).
  - **Key Skills:** Product Design, Fusion 360, Resistance Welding, Prototyping, Technical Writing.
- **Air Purification System** (Minor Project, B.Tech) Sep 2021 – Jan 2022
  Mentor: Dr. Shailesh Singh, Professor
  - Built a three-stage system (HEPA + electrostatic precipitator + carbon filter) to remove PM2.5 and harmful gases.
  - Designed a high-voltage ESP module powered by a flyback transformer for enhanced particle capture.
  - **Key Skills:** Air Quality Systems, ESP Design, High-Voltage Circuits, Prototype Development.

WORK/INTERNSHIP EXPERIENCE

- **Aktiv Technologies Pvt. Ltd, Faridabad** June 2023 – July 2023
  Intern, Design and Development
  - Applied SolidWorks for reverse engineering, creating 3D solid models and 2D manufacturing drafts.
  - Prepared product catalogues and visualisation materials using CorelDRAW and SolidWorks Visualise.
  - **Key Skills:** SolidWorks, Reverse Engineering, 2D Drafting, Product Visualization, CorelDRAW.
- **Satyam Auto Components Pvt. Ltd, Gurgaon** May 2023 – June 2023
  Graduate Engineer Trainee, Quality Assurance
  - Oversaw heavy press-line production of fuel tanks and air filters for two-wheelers and heavy vehicles.
  - Performed quality assurance for resistance spot welding and stamping operations.
  - **Key Skills:** Quality Assurance, Manufacturing Processes, Resistance Welding, Heavy Press Line Operations.

HONORS, AWARDS & SCHOLARSHIPS

- 1^{st} **place** - poster presentation in 1-Day Symposium on Mechanical and Materials Engineering in IIT Mandi, 2024
- **GATE Qualified** - National level engineering entrance exam, 2023
- **Research Assistantship** (HTRA) - Ministry of Education (MoE), Govt. of India, 2023
- **All India Rank 90** - NCAT, the National Creativity and Aptitude Test (among 23000+ Engineering students), 2020

PUBLICATIONS

- **Kaushal Jha**, Surendra Singh Rathore, Balakrishna Mehta, Pradeep Kumar. "Investigating the role of radiation in porous medium for concentrated solar energy applications". (Journal paper in Review).

- **Kaushal Jha**, Surendra Singh Rathore, Balakrishna Mehta, Pradeep Kumar. "Estimation of Effective Thermal Conductivity of Porous Medium for Volumetric Solar Receiver Cavity-like System". Submitted to International Heat And Mass Transfer Conference (IHMTC 2025) .

- **Kaushal Jha**, Santosh Kumar Tamang, Rajeev Kumar, Bishub Choudhary, "Enhancing Resistance Spot Welding Weld Quality: A Comprehensive Analysis of Influencing Factors and the Role of Modeling and Optimisation," New Materials, Processing and Manufacturability: Fabrication and Processing of Advanced Materials, Chapter 5, Editors: R. Thanigaivelan, Pradeep Kumar Krishnan, Kamalakanta Muduli, Santosh Kumar Tamang, Wiley, **25 July 2024**. https://doi.org/10.1002/9781394212736.ch5.

- **Kaushal Jha**, Akshaj Jumde, Gautam Kumar, Rick Dutta, Krati Hardya, Shailesh Kumar Singh, and Bishub Choudhary. "Design and Development of a Portable Resistance Spot Welding Machine for Small-Scale Industries." Applied Mechanics and Materials, Trans Tech Publications, Ltd., **February 5, 2024**. https://doi.org/10.4028/p-xcpkt9 .

CONFERENCE PRESENTATION

- **Kaushal Jha**, "Design and Development of Portable Resistance Spot Welding Machine for Small Scale Industries," Conference on Advancements in Materials, Manufacturing and Automation (AMMA 2023), Amrita Vishwa Vidyapeetham, 2023.

SKILLS

- **Tools:** OpenFOAM, ANSYS (Fluent, SpaceClaim, ICEM), Fusion 360, SolidWorks
- **Programming:** C, C++, Python, Fortran, MATLAB
- **Platforms:** Windows, Ubuntu
- **Docs:** LaTeX, MS Office

REFERENCES

- Dr. Pradeep Kumar, Associate Professor (M.Tech(R) Supervisor), IIT Mandi, Email: pradeepkumar@iitmandi.ac.in
- Dr. Butunath Majhy, Assistant Professor, IIT Guwahati, Email: majhybutunath@gmail.com
- Dr. Bishub Choudhary, Post-Doc, IISc Bangalore (B.Tech Supervisor), Email: bishub.choudhary73@gmail.com