

Purav Patel

B.Tech. in Mechanical Engg. and M.Tech. in Thermal Science and Engg.

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Education

University of Illinois Urbana Champaign Aug 2020 - Present
PhD in Mechanical Engineering
GPA 3.78/4.0

Indian Institute of Technology Kharagpur Jul 2014 - Apr 2019
B.Tech. in Mechanical Engg., M.Tech. in Thermal Science and Engg.
5 Year Dual Degree Program
GPA 9.26/10.0

ASIA English School Jul 2012 - Apr 2014
Higher Secondary Certificate, Gujarat Higher Secondary Education Board (GHSEB)
Percentage score 83%

ASIA English School Jul 2011 - Apr 2012
Secondary School Certificate, Gujarat Secondary Education Board (GSEB)
Percentage score 93%

Internships and Projects

PhD Thesis, University of Illinois Urbana Champaign 2021 - Present
Storage heat pump for increased operating temperature range
Advisor: Prof. Stefan Elbel

This project is aimed at increasing the operating temperature range of heat pump system by introducing a new storage heat pump concept. Although not limited to water heating, the concept will be first demonstrated using a heat pump water heater system. This project addresses the numerical simulation and experimental aspects of a heat pump water heater system operating on the storage heat pump cycle.

Articles in Conference Proceedings

Patel,P.,Elbel,S.,2022, "Model Of Heat Pump Water Heater Operating On A New Storage Heat Pump Cycle To Achieve Higher Operating Range".Int. Refrigeration and Air Conditioning Conference.Paper 2353.
Patel,P.,Elbel,S.,2022, "Study Of A Conventional Heat Pump Water Heater System For Implementation Of A New Storage Heat Pump Concept". Int. Refrigeration and Air Conditioning Conference. Paper 2354.

Bachelor's Thesis, Indian Institute of Technology Kharagpur 2017 - 2018
Lattice Boltzmann Method for simulation of pool boiling on a plane surface
Advisor: Prof. Anandaroop Bhattacharya

This project was a part of the ongoing research efforts of Prof. Bhattacharya's research group on Experimental and Numerical studies of pool boiling in porous medium. Lattice Boltzmann Method was applied to simulate pool boiling on plane isothermal surface. The objective of studying and using Lattice Boltzmann Method for a phase change simulation was achieved through this work, and it can be extended to perform simulation of boiling on a porous or structured surface.

Master's Thesis, Indian Institute of Technology Kharagpur 2018 - 2019
Analytical and Numerical study of fluid flow in curved pipe
Advisor: Prof. Sandipan Ghosh Moulic

Aim of this project was to study secondary flow patterns and its effects on wall shear stress and flow rate, for flow in a curved pipe. The Fourier Series method was used to perform this numerical simulation. The flow variables were expressed in the form of a Fourier series and substituted in the Dean's equations of motion for flow in curved pipe. The resulting coupled ordinary differential equations were then solved numerically using the Finite Difference Method. A novel aspect of this numerical solution was the implementation of the influence matrix method to accurately model no-slip condition at pipe wall. Results obtained showed a reduction in flow rate in curved pipe as compared to that of a straight pipe under the same pressure gradient. Plots of secondary flow streamlines and wall shear stress for different Dean numbers were also obtained.

Research and Development Intern at Bajaj Auto Limited, Pune, India May - June 2018
Vibration isolation of plastic body parts subjected to high frequency vibration using rubber grommets
Mentor: Mr. Vinit Kadam

Studied principles of vibration isolation using elastomers and derived mathematical model to obtain vibration transmission from chassis to part. Theoretically obtained vibration transmissibility curves to determine the effect of damper geometry and material on vibration isolation. We carried out experiments on a vibration test system and presented conclusions after comparison of experimental and theoretical results. This work would enable selection of rubber grommets to achieve effective vibration isolation of plastic parts.

Academic Achievements

Awarded DAAD WISE Scholarship by German Academic Exchange Service to pursue research internship of two months duration at a German Institution.

Secured all India rank 3703 out of 1.5 lac students in JEE Advanced exam (Joint Entrance Exam) 2014.

Technical Skills

Software and Languages: Solidworks, Engineering Equation Solver, ANSYS Workbench, Fluent, Microsoft Office, C, C++, Fortran, MATLAB

Relevant Coursework

Thermodynamics	Heat Transfer	Advanced Fluid Mechanics
Applied Thermo-Fluids I and II	Microfluidics	Computational Fluid Dynamics
Engineering Mathematics	Materials Engineering	Air Conditioning and Refrigeration
Convective Heat Transfer	IC Engines	