Purav Patel

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B.Tech. in Mechanical Engg. and M.Tech. in Thermal Science and Engg. +1-2179795571

Education

University of Illinois Urbana Champaign Aug 2020 - Present
PhD in Mechanical Engineering
GPA 3.76/4.0

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 aims to improve the operating range of a heat pump system by introducing a novel storage heat pump concept that can operate at low ambient temperature while maintaining high discharge temperatures. Instead of using a more costly two stage compression approach, the new concept uses thermal storage to first pump heat to an intermediate temperature level before the heating energy is then lifted to the desired high temperature in a second step.

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 variable were expressed in the form 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 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 Intern at Institute of Materials Technology Bremen, Germany May - June 2017
with Prof. Udo Fritsching

Simulative tasks: Computational Fluid Dynamics simulation of a gas quenching system
Modelled the quenching chamber in ANSYS Fluent and analysed mathematical model underlying the CFD simulation in the software. Simulated transient flow development and heat transfer in the chamber and determined temperature variations in quenching gas.
Experimental tasks: Study of spray quenching of plane steel surface
I got the opportunity to get involved in experimental work carried out by Prof. Fritsching's research group on study of spray quenching on plane steel surfaces.I assisted in performing experiments to study effect of volumetric flow and droplet size distribution of sprays used for cooling applications in metal processing industry.

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 form 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	