

Bakhshish Preet Singh

POST GRADUATE, MECHANICAL ENGINEERING

10, Phase-3, Dugri, Urban Estate Basant Avenue, Ludhiana-141013

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Education

INDIAN INSTITUTE OF TECHNOLOGY, Bombay

Jul'15 - Jun'20

BACHELORS OF TECHNOLOGY IN MECHANICAL ENGINEERING

GPA: 9.13/10

MASTERS OF TECHNOLOGY IN THERMAL AND FLUIDS ENGINEERING

- Ranked 4 in the Dual Degree batch of Mechanical Engineering

BCM Senior Secondary School, Ludhiana, Punjab

May'13-Mar'15

CENTRAL BOARD OF SECONDARY EDUCATION(INTERMEDIATE/+2)

97.2 %

- Honoured with Letter of Appreciation from Union HRD Minister for exceptional academic performance

Research Interests

Heat Transfer, Refrigeration, Thermal Management in Electronics

Research Experience

Numerical and Experimental study of Pulsating Heat Pipes

Jul'19 - Jun'20

MASTER'S THESIS | GUIDE: PROF. MILIND ATREY, DEPARTMENT OF MECHANICAL ENGINEERING

IITB, Mumbai

Pulsating Heat Pipe is a passive heat transfer device involving thermally driven oscillation of vapor and liquid plugs.

- Theoretically analysed various phenomena of heat mass transfer occurring inside the system
- Replicated and validated a mobile phase change heat transfer model numerical model on MATLAB for a multi turn pulsating heat pipe; errors less than 15%
- Extended the model to cryogenic conditions with nitrogen as working fluid
- Performing numerical investigations pertaining to six design parameters: inner diameter, fill ratio, number of turns, heat input, angle of inclination, section lengths
- Formulating a design methodology for a general cryogenic PHP given the heat input and length of adiabatic section
- Fabricating a Pulsating Heat Pipe based on the above methodology with a cryo-cooler at the cold end to validate the procedure
- Running extensive experimental routines on the setup to gain insights into the dependence of overall performance and thermal resistance on the design parameters

Optimization Under Uncertainty(OUU) of Battery Thermal Management System

Aug'18 - May'19

GUIDE: PROF. S. KRISHNAN, DEPARTMENT OF MECHANICAL ENGINEERING

Typical design methodology involves using a factor of safety post the design process to account for uncertainties. Our aim was to quantify those aleatory uncertainties beforehand and hence optimize the design taking them into account

- Developed a framework using DAKOTA as a toolkit for optimization and ANSYS Fluent as simulator
- Coded python scripts to manipulate the ANSYS journals and link data exchange between DAKOTA and ANSYS workbench
- Replicated three dimensional fin cooling study from available literature with a mean error of (INSERT NUMBER HERE) %
- Identified key uncertainties in an air cooled battery thermal management system: current, air inlet temperature and flow rate
- Analysed various probability distributions functions and performed regression of data available in literature pertaining to the uncertain parameters into the functions
- Optimised the longitudinal and transverse spacing between cells for minimising the power consumption of cooling system. Other constraints included volume restriction of the whole pack, max temperature of a cell and maximum temperature difference in adjacent cell

Key Projects

Modeling of Oscillating FLOW in Cryogenic Regenerators

Jan'19 - Apr'19

PROF. MILIND ATREY, DEPARTMENT OF MECHANICAL ENGINEERING

IITB, Mumbai

- Performed steady and transient numerical studies on the heat transfer characteristics in Ansys Fluent
- Built an empirical model using exponential regression for Nusselt number; 7 maximum error limit achieved

Digital Holography Applications on Large Curvature Objects

Aug'19 – Present

PROF. ATUL SRIVASTAVA, DEPARTMENT OF MECHANICAL ENGINEERING

IITB, Mumbai

- Prepared experimental setup to record digital holograms of temperature fields inside incandescent light bulbs
- Reconstructed the holograms using three different algorithms; Fresnel transformation, Angular spectrum and convolution approach

Turbulence Modelling in FSI Induced Oscillations

Jan'19 – Apr'19

PROF. ABHILASH CHANDY, DEPARTMENT OF MECHANICAL ENGINEERING

IITB, Mumbai

- Characterised the FSI-induced 2D limit-cycle oscillation (LCO) of a flexible structure in uniform flows
- A two-way system coupling was implemented in Ansys workbench using K-omega SST turbulence model

Teaching and Mentorship Experience

Teaching Assistant | Computer Science | Fluid Mechanics

Jan'19 – Present

FACULTY : PROF GANESH, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IITB, Mumbai

PROF ARUNKUMAR SRIDHARAN, DEPARTMENT OF MECHANICAL ENGINEERING

- Assisted group of 60+ students in practical sessions aiding them in understanding the basics of programming
- Conducted tutorial sessions for 80+ students throughout the semester for improvement in problem solving

Institute Student Mentor (ISMP)

Apr'18 – Present

ONE AMONG 108 MENTORS OUT OF 300+ APPLICANTS SELECTED VIA RIGOROUS PEER REVIEWS AND INTERVIEWS

IITB, Mumbai

- Heading a sub-group of 12 mentors ; Currently carrying out the Second term as a senior ISMP mentor
- Guided and mentored 24 undergraduate freshmen in their academic and extra-curricular pursuits on campus

Department Student Mentor (DAMP)

Apr'19 – Present

PART OF A 32 MEMBER TEAM SELECTED FROM 95+ APPLICANTS MENTORING 185+ STUDENTS

IITB, Mumbai

- Mentoring 2 Academic Rehabilitation Program students; aided them in academics and time management issues

Internship

Increment of Thermal Efficiency in VAM Refrigeration Units

May'18 – July'18]

ITC LIMITED | PAPERBOARDS AND SPECIALITY PAPER DIVISION

Telangana

- Adopted DMAIC approach for a 6-sigma efficient solution; Identified 10+ critical failure modes for the system
- Carried out a Thermal Energy Balance and built a theoretical model for targeted efficiency calculations
- Executed month long lab scale chemical tests and on-line controlled experimental routine for proof of concept
- Introduced new standard for coolant quality estimation and developed feedback based maintenance system
- Solution implemented ; minimum 20 % increase in efficiency achieved in all five refrigeration units individually

Skills

Programming Python, C/C++, LaTeX

Software Packages ANSYS (Fluent, Mechanical, Explicit Dynamics), Matlab, Solidworks, AutoCad, Powershape, DAKOTA

Coursework

Fluid Engineering

Hydrodynamic Stability Theory, Essentials of Turbulence, Fluid Structure Interaction, Steam and Gas Turbines, Fluid Dynamics, Fluid Mechanics

Thermal Engineering

Cryogenic Engineering, Combustion in Automobiles and Gas Turbine Engines, Advance Heat Transfer, Heat Transfer, Advance Thermodynamics and Combustion, Applied Thermodynamics, Thermodynamics

Mathematics and IEOR

Engineering Design Optimization, Optimization Models, Operations Analysis, Probabilistic Models, Calculus, Differential Equations, Linear Algebra, Numerical Analysis

Additional

Machine Design, Advance Stereology, Optical Methods in Mechanical Engineering, Fracture Mechanics, Computer Aided Simulation of Machines

Scholastic Achievements

- Achieved All India Rank 64 in JEE Mains Exam amongst 1.3 million students Jun'15
- Ranked 471 amongst 0.15 million students in JEE Advance Exam Jun'15
- Recipient of prestigious KVPY(Kishore Vaigyaik Protsahan Yojana) fellowship awarded to top 0.1% students nationwide by the Govt. of India Apr'15