

Tarandeep Singh Thukral

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EDUCATION	University of Illinois at Urbana-Champaign , Urbana-Champaign, IL Candidate for Doctor of Philosophy in Mechanical Engineering <ul style="list-style-type: none">• GPA 4.0/4.0	<i>Aug '21 - present</i>
	Indian Institute of Technology Delhi , New Delhi, India Bachelor of Technology, Mechanical Engineering <ul style="list-style-type: none">• CGPA: 9.33/10.00	<i>Jul '17 - May'21</i>
	KTH Royal Institute of Technology , Stockholm, Sweden Exchange Student, School of Engineering	<i>Aug '19 - Jan '20</i>
RESEARCH EXPERIENCE	Graduate Research Assistant <i>Guide:</i> Prof. Nenad Miljkovic, Energy Transport Research Laboratory, UIUC <ul style="list-style-type: none">• Developing self-healing, functional and corrosion-resistant and coatings using silane and epoxy formulations for applications in HVAC&R systems• Testing the performance and durability of coatings using ASTM G-85 and B-117 tests• Designing and building a test rig to test flow boiling durability of structured and coated surfaces	<i>Aug'21 - present</i>
	Bachelor's Thesis: Imbibition in Microfluidic Devices <i>Guide:</i> Prof. Supreet Singh Bahga, Department of Mechanical Engineering, IIT Delhi <ul style="list-style-type: none">• Developed a generalized imbibition model incorporating non-Newtonian (power-law) viscosity effects of the imbibing and the displaced fluid for uniform, horizontal capillaries• Extended the model for capillary descent in straight capillary tubes and symmetric, axially varying 2D channels channels• Numerically solved the models developed using in-built solvers in MATLAB and compared with available experimental results• Validated the model developed for straight capillaries through simulation in COMSOL Multi-physics	<i>Aug'20 - May '21</i>
	Filtration of Soft Particles in Biodiesel <i>Guide:</i> Research Engineer Botond Csontos, Dept. of I.C Engines, KTH, Sweden <ul style="list-style-type: none">• Developed a MATLAB model of a pump-driven dead-end filtration process to predict process lifetimes and back-pressure build-up during biodiesel filtration in engine fuel-filters• Experimentally validated the model in the laboratory filter rig driven by a piston pump using freshly stirred suspensions of diesel and glycol to mimic biodiesel• Formulated a model for filtration efficiency calculation incorporating inertial and interception effects for modeling membrane filters in series	<i>Aug'19 - Dec'19</i>
	Redesign of Forging Furnaces <i>Guide:</i> Prof. M.R Ravi, Department of Mechanical Engineering, IIT Delhi <ul style="list-style-type: none">• Analyzed the existing furnace design to identify flaws and introduced design changes to prevent flame roll-out, minimize flue gas leakage and install a regeneration system• Modeled the new design as a counter-flow heat exchanger to calculate the temperature acquired by the load and enthalpy loss through the exhaust• Simulated the steady-state furnace operation in ANSYS Fluent to study flow and pressure patterns inside the furnace chamber, validate the theoretical predictions and finalize the design parameters• The new design predicted a reduction in daily fuel consumption by ≈ 60 liters and an increase in thermal efficiency by $\approx 22\%$	<i>May '19 - Jul '19</i>

	Modeling coal-carrying pipe for industrial furnace	Nov '18 - Dec '18
	<i>Guide:</i> Prof. M.R Ravi, IIT Delhi	
	<ul style="list-style-type: none"> • Modeled a pipe with multiple bends carrying pulverised coal and air using the discrete phase particle model in Ansys Fluent • Studied the distribution of coal across the pipe cross section and optimized the air velocity and coal particle size to achieve a uniform distribution to prevent pipe blockage near bends 	
INDUSTRY EXPERIENCE	Acoustic Designer (Summer Trainee, work-from-home)	Jun'20 - Jul'20
	<i>Akustikdoktorn Sweden AB, Stockholm, Sweden</i>	
	<ul style="list-style-type: none"> • Analyzed vertical vibrations in railcars induced by point-irregularities in rail tracks through a simplified 1-D model by representing the railcar as a uniform spring-supported beam • Developed a model to analyze the dynamic effects of attaching tuned vibration absorber (TVA) systems to the beam using the receptance method • Adapted the model to railcars - vibration suppression by tuning on-board system suspensions to act as TVAs • The model predicted a 63% reduction in the fundamental mode amplitude for 5% damping of in the TVA, a major improvement in ride quality and passenger comfort 	
TEACHING EXPERIENCE	Graduate Teaching Assistant - Fluid Dynamics Lab	Jan '22 - May '22
	<i>Course Coordinator:</i> Dr. Blake Johnson, University of Illinois	
	<ul style="list-style-type: none"> • Responsible for lab demonstrations and evaluation of reports for 20+ students 	
	Undergraduate Teaching Assistant - Energy Systems and Technologies	Feb '21 - May '21
	<i>Course Coordinator:</i> Prof. Krishnakant Agrawal, IIT Delhi	
	<ul style="list-style-type: none"> • Responsible for preparation of study material, evaluation of assignments, online weekly tutorial and doubt-clearing sessions for 90+ students 	
TECHNICAL SKILLS	<ul style="list-style-type: none"> • Programming Languages: C, C++, Python, MATLAB. • Softwares and Tools: Ansys Fluent, SolidWorks, Surface Evolver, AutoDesk Inventor, LaTeX 	
EXTRA- CURRICULAR ENDEAVOURS	Core Team Member, Alo Learning	Apr '18 - Jul '19
	<i>EdTech venture for experiential career discovery and skill development</i>	
	<ul style="list-style-type: none"> • Led the design, implementation, and marketing of an experiential learning curriculum in Mechanical Engineering and Product Design • Selected for a six-month incubation in <i>UIncept Startup Accelerator</i> (2018) 	
	Associate Member, Enactus IIT Delhi	Nov '17 - Apr '19
	<i>Student Organisation in Empowerment through Entrepreneurship</i>	
	<ul style="list-style-type: none"> • <u>Project Titli</u>: Developed cloth-based washable sanitary napkins for underprivileged women in villages around the Delhi - NCR region to improve menstrual hygiene • <u>Project Nirmalya</u>: Developed a composting-mesh for household waste and collaborated with housing societies in New Delhi for its installation • Represented Enactus IIT Delhi at the Enactus Nationals competition, 2018 	
	Student Mentor, Board of Student Welfare	Jul '19 - Sep '20
	<ul style="list-style-type: none"> • Mentored 5 freshmen to smoothen their academic and social transition into college 	
	Volunteer Work	
	<ul style="list-style-type: none"> • Mission Buniyaad, Govt. of Delhi (Jun '18): Oversaw the implementation of the fundamental reading, writing and arithmetic summer curriculum in 7 govt. run schools • National Service Scheme, IIT Delhi (Feb '18 - present): Active volunteer in projects <i>Aarohan</i> and <i>Vidya</i>, teaching science and mathematics to /underprivileged school students 	