

ADITYA SINGLA

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Education

Ph.D., Mechanical Engineering Purdue University, West Lafayette, IN, USA Advisor: Prof. Partha P. Mukherjee	2021-Present GPA: 4.00/4.00
M.Tech., Thermal Engineering Indian Institute of Technology, Delhi (IITD), New Delhi, India Advisor: Prof. Bahni Ray	2020-21 GPA: 10.00/10.00
B.Tech., Mechanical Engineering Indian Institute of Technology, Delhi (IITD), New Delhi, India	2016-2020 GPA: 9.00/10.00

Honors and Awards

Perfect Ten Gold Medal: Highest Distinction among the graduating Masters class, IIT Delhi	2021
Man Mohan Suri Project Award for Best Masters Thesis, IIT Delhi	2021
Best Poster Award , 2nd International Conference on Fluids under Confinement (FUC)	2021
Department Rank 1 , Class of M.Tech., IIT Delhi	2021
Top 7% Semester Merit Award (Undergraduate) , six semesters, IIT Delhi	2017-20
NTU-India Connect Research Award , Nanyang Technological University (NTU), Singapore	2019
Sumant Sinha Sustainability Leadership Award for work on sustainability and climate change	2018
All India Scholarship Entrance Examination (AISEE) Merit Scholarship for Engineering	2016
Merit Award for 1 st Rank (Science Division) in Higher Secondary Examination (Standard XII)	2016
Merit Award for 1 st Rank in Secondary Examination (Standard X)	2014

Journal Publications

- [1] **A. Singla** and B. Ray, “Effects of surface topography on low Reynolds number droplet/bubble flow through constricted passage,” *Physics of Fluids* 33, 011301 (2021); <https://doi.org/10.1063/5.0031255>

Conference Presentations

- [1] **A. Singla**, K. G. Naik, B. S. Vishnugopi, and P. P. Mukherjee, “Role of Mechanics-Driven Kinetic Interactions in Electrodeposition Stability,” 242nd ECS Meeting, Atlanta, GA, USA (2022)
- [2] **A. Singla** and B. Ray, “Effects of surface topography on droplet/bubble flow through a constricted passage,” 2nd International Conference on Fluids under Confinement (FUC), Indian Institute of Technology (IIT) Kharagpur, West Bengal, India (2021) [Poster]

Research Experience

Stable Interfaces in Solid-State Batteries for Enhanced Performance Aug, 2021 - Present

Supervisor: Prof. Partha Mukherjee, Purdue University

- Examining the role of internal stresses and molar volumes of interacting species in reaction kinetics at the anode-SE interface and ionic transport within the solid-electrolyte using the open source Python tool, FEniCS.
- Modeling the mechanics in the underlying reaction and transport processes in solid-state batteries (SSBs) by analyzing the electrochemical, mechanical, material and geometric parameters involved.

Masters Thesis: Droplet flow through a Constricted Microchannel Aug, 2019 - July, 2021

Supervisor: Prof. Bahni Ray, Indian Institute of Technology, Delhi

- Modeled the effect of various surface parameters such as constriction shape, length, height and spacing on drop deformation using the open source Computational Fluid Dynamics (CFD) tool, OpenFOAM, written in C++
- Evaluated how surface geometry influences multiphase phenomena such as drop break-up and coalescence.

Design of a Reconstructed Heart Valve for Pediatric Surgery May, 2019 - July, 2019

Supervisor: Prof. Yeo Joon Hock, Micro-systems Lab, Nanyang Technological University (NTU), Singapore

Summer Research Internship, NTU-India Connect Programme

- Designed a heart valve using SolidWorks and modeled it using the softwares ANSYS Fluent and ABAQUS.
- Studied the behavior of the design by performing stress analysis and blood flow simulations in an artery by implementing the Finite Element Method (FEM).

Design and Manufacturing of a Safety Capsule for Bike July, 2019 - Nov, 2019

Supervisor: Prof. Sangeeta Kohli, Indian Institute of Technology, Delhi

- In a team of 4, designed a capsule involving a system of flaps which enclose the biker in case of severe bike tilt using actuation and cascading mechanisms.
- Constructed a CAD model in SolidWorks and manufactured a prototype of the proposed design.

Mechanics of Wing Deformation during Flapping Flight of Insects May, 2018 - Oct, 2018

Supervisor: Prof. Ajeet Kumar, Indian Institute of Technology, Delhi

- Computational modeling of wing deformation during insect flight for applications in micro aerial vehicles (MAVs).
- Employed Non-Linear Beam Theory to implement both static and dynamic aspects of the problem by applying force and displacement boundary conditions in MATLAB.

Monitoring Theft in Warehouses using Reverberation Time Oct, 2017- Mar, 2018

Supervisor: Prof A.K. Darpe, Indian Institute of Technology, Delhi

- In a team of 3, developed a device, consisting of a sensor and a source, which uses reverberation time to detect the difference in occupancy levels in food warehouses.
- Used MATLAB, REW and LMS Test.Xpress to obtain and analyze the acoustic data for the warehouse.

Teaching

• Postgraduate (PG) Teaching Assistant

Intermediate Heat Transfer (MCL347) Spring 2021

Thermofluid Analysis of Biosystems (MCL442) Fall 2020

• Undergraduate (UG) Teaching Assistant

Engineering Mechanics (APL100) Spring 2020

Linear Algebra and Differential Equations (MTL101) Fall 2019

• Volunteer at All India Academy of Teacher Education (Ambala, India)

Taught STEM subjects to students of grades 5th-12th in government schools May, 2016 - July, 2016

Service and Leadership

Vice-President , The Electrochemical Society (ECS) Student Chapter - Purdue University	2022-23
Treasurer , The Electrochemical Society (ECS) Student Chapter - Purdue University	2021-22
Judge , Poster and Oral Presentations, Purdue Undergraduate Research Conference (PURC)	2022
Secretary , National Service Scheme (NSS), Indian Institute of Technology, Delhi	2018-19
Executive , National Service Scheme (NSS), Indian Institute of Technology, Delhi	2017-18
<ul style="list-style-type: none">○ Led and volunteered in various social service projects in the domains of education, health and environment aimed towards the welfare of the society○ Award for Outstanding Contribution to NSS at All Boards' Night, IIT Delhi○ Best Volunteer of the Year Award from Director, IIT Delhi	
Representative , Alumni Affairs and International Programmes (AAIP)	2017-18
<ul style="list-style-type: none">○ Mentored two foreign exchange students from Ethiopia studying at IIT Delhi	