

# Ranadip Saha

## Personal Profile

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A Second-Year Ph.D. student of Mechanical Engineering at Purdue University with research focused on thermo-electrochemical interactions and metrology in lithium-ion and lithium-metal battery chemistries.

## Education

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<b>Purdue University</b> Ph.D. in Mechanical Engineering GPA - 3.94/4	<i>West Lafayette, USA</i> <i>AUGUST 2023</i>
<b>Jadavpur University</b> B.E in Chemical Engineering CGPA - 8.93/10	<i>Kolkata, India</i> <i>JULY 2019 - JUNE 2023</i>
<b>Patha Bhavan</b> 12th Grade (WBCHSE) Percentage - 92.4	<i>Kolkata, India</i> <i>MARCH 2019</i>
<b>Patha Bhavan</b> 10th Grade (WBBSE) Percentage - 92	<i>Kolkata, India</i> <i>MARCH 2017</i>

## Experience

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<b>Purdue University</b> Ph.D. Student   Supervisor Dr. Partha P. Mukherjee, Mechanical Engineering <ul style="list-style-type: none"><li>Experimental investigation the Thermal and Electrochemical Stability of <b>Lithium Metal Batteries</b> with Liquid Electrolytes.</li><li>Core team member of <b>Center for Advances in Resilient Energy Storage (CARES)</b>, established as a collaboration between Purdue University and Electrochemical Safety Research Institute (ESRI)</li></ul>	<i>West Lafayette, USA</i> <i>August 2023</i>
<b>Jadavpur University</b> Undergraduate Researcher   Supervisor Dr. Achintya Mukhopadhyay, Prof., Mechanical Engineering <ul style="list-style-type: none"><li>Designing a <b>0-D model</b> to study the pre-cooling of air using a water mist spray for the thermal management system of a battery.</li><li><b>Modelling of evaporation, heat transfer, and electrochemical reactions</b> taking place inside a battery based on a 0-D model using MATLAB - SIMULINK.</li><li>Testing of two basic methods of triggering mist precooling based upon temperature of the battery and SEI degradation.</li></ul>	<i>Kolkata, India</i> <i>Feb 2021 - Jan 2023</i>
<b>École Polytechnique de Montréal</b> Mitacs Globalink Research Intern   Supervisor Dr. David Vidal, Asst. Prof., Mechanical Engineering <ul style="list-style-type: none"><li>Working on <b>Exploration of deep learning algorithms for computational fluid dynamics</b>.</li><li>Developed MATLAB code to generate geometries with periodic boundary conditions resembling porous media</li><li>Worked with a pre-existing Lattice Boltzmann method code to simulate flow in a pseudo-porous media</li></ul>	<i>Montréal, Canada</i> <i>May 2022 - August 2022</i>
<b>Jadavpur University</b> Undergraduate Researcher   Supervisor Dr. Sudeshna Saha, Asst. Prof., Chemical Engineering <ul style="list-style-type: none"><li>Working on <b>Thermodynamic considerations of Temperature swing CO2 adsorption</b>.</li><li>Assisting a Graduate student in conducting laboratory experiments</li><li>Developing a membrane to absorb CO2 after surface modification using Bacterial Nanocellulose (BNC)</li></ul>	<i>Kolkata, India</i> <i>Mar 2022 - May 2023</i>

## Publications

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### JOURNALS

<b>A CRITICAL REVIEW ON GRAPHENE AND GRAPHENE-BASED DERIVATIVES FROM NATURAL SOURCES EMPHASIZING ON CO2 ADSORPTION POTENTIAL</b> Environmental Science and Pollution Research, Springer Nature <ul style="list-style-type: none"><li>Authors: Saswata Chakraborty, <b>Ranadip Saha</b>, Sudeshna Saha</li><li>DOI: 10.1007/s11356-023-30093-8</li></ul>	<i>Kolkata, India</i> <i>Sept 2023</i>
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## EARLY DETECTION AND MANAGEMENT OF THERMAL RUNAWAY IN BATTERIES USING WATER MIST FOR AIR PRE-COOLING

Kolkata, India

International Journal of Energy for a Clean Environment, Begell House

Nov 2022

- Authors: Aritra Jana, **Ranadip Saha**, Debamita Pal, Sourav Sarkar, Achintya Mukhopadhyay
- Volume 24, Issue 4, 2023, pp. 1-16
- DOI: 10.1615/InterJEnerCleanEnv.2022043273

## CONFERENCES

### CONTROL OF THERMAL RUNAWAY IN LI-ION BATTERIES USING WATER MIST FOR AIR PRECOOLING

Indian Institute of Chemical Engineers, India

INTERNATIONAL CONFERENCE ON ADVANCES IN CHEMICAL AND MATERIAL SCIENCES

Apr 14-16, 2022

- Authors: **Ranadip Saha**, Debamita Pal, Aritra Jana, Sourav Sarkar, Achintya Mukhopadhyay
- Presented at the International Conference On Advances in Chemical and Material Sciences ACMS - 2022, pp. 209-215
- Organized by Indian Institute of Chemical Engineers, Kolkata in association with National Institute of Technology, Jalandhar, Heritage Institute of Technology, Kolkata, and Osmania University College of Technology, Hyderabad

### MANAGEMENT OF THERMAL RUNAWAY IN BATTERIES USING WATER MIST FOR AIR PRECOOLING

Indian Institute of Technology Madras, India

ISHMT-ASTFE Indian Heat and Mass Transfer Conference

Dec 17-20, 2021

- Authors: Aritra Jana, **Ranadip Saha**, Samriddha Ray, Debamita Pal, Sourav Sarkar, Achintya Mukhopadhyay
- Proceedings of the 26th National and 4th International ISHMT-ASTFE Heat and Mass Transfer Conference, pp. 209-215
- DOI: 10.1615/IHMTC-2021.310

## OTHERS

### VISITING GRADUATE RESEARCHER

University of Michigan, USA

Michigan Battery Lab Visit

Oct 27-31, 2024

- Hands-on training on fabricating single-layer Lithium ion pouch cell batteries alongside researchers from Naval Research Laboratory (NRL) and Iowa State University

### ONLINE BATTERY HEALTH MONITORING SYSTEM FOR ELECTRIC VEHICLES

Jadavpur University, India

Innovation Fair - PRAGYAJU 1.0

5th August, 2023

- Members: Saumendra Nath Mishra, Ajit Das **Ranadip Saha**, Aritra Jana, Achintya Mukhopadhyay, Sourav Sarkar, Swarnendu Sen
- Development of an IoT based cost effective, reliable online battery health monitoring system for electric vehicle which can detect and mitigate thermal runaway successfully for Lithium ion batteries
- Model successfully displayed at the Innovation Fair hosted by Intellectual Property Cell in association with Jadavpur University Entrepreneurship Cell

## Skills

**Programming** MATLAB, Python, C, HTML

**Miscellaneous** MATLAB-SIMULINK, AutoCAD, SOLIDWORKS, ANSYS Fluent, DWSIM, Machine Learning

**Soft Skills** Time Management, Teamwork, Problem-solving, Documentation, Engaging Presentation.

## Achievements and Certifications

2022	<b>316/340</b> , GRE General Test	India
2022	<b>111/120</b> , TOEFL iBT	India
2022	<b>MITACS</b> , Globalink Research Internship Award	Canada
2021	<b>A+</b> , Industrial Training and Internship on SOLIDWORKS and ANSYS by ASD	India
2020	<b>Featured</b> , International Yuva Music Festival	India
2018	<b>2nd</b> , Environmental Quiz Competition organized by West Bengal Pollution Control Board	India

## Interests

**Music** I like to indulge myself in different genres of music and have been playing sitar since 2014

**Photography** I love capturing the blissful moments in nature through a lens.

## Languages

**English** Professional proficiency  
**Bengali** Native proficiency  
**Hindi** Bilingual proficiency  
**French** Basic Reading