

# Ranadip Saha

## Personal Profile

---

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

---

### Purdue University

Ph.D. in Mechanical Engineering  
GPA - 3.94/4

West Lafayette, USA

AUGUST 2023

### Jadavpur University

B.E in Chemical Engineering  
CGPA - 8.93/10

Kolkata, India

JULY 2019 - JUNE 2023

## Experience

---

### Purdue University

Ph.D. Student | Supervisor Dr. Partha P. Mukherjee, Mechanical Engineering

West Lafayette, USA

August 2023

- Experimental investigation of the Thermal and Electrochemical Stability of **Lithium Metal Batteries** with Liquid Electrolytes.
- Core team member of **Center for Advances in Resilient Energy Storage (CARES)**, established as a collaboration between Purdue University and Electrochemical Safety Research Institute (ESRI)

### Jadavpur University

Undergraduate Researcher | Supervisor Dr. Achintya Mukhopadhyay, Prof., Mechanical Engineering

Kolkata, India

Feb 2021 - Jan 2023

- Designing a **0-D model** to study the pre-cooling of air using a water mist spray for the thermal management system of a battery.
- **Modelling of evaporation, heat transfer, and electrochemical reactions** taking place inside a battery based on a 0-D model using MATLAB - SIMULINK.
- Testing of two basic methods of triggering mist precooling based upon temperature of the battery and SEI degradation.

### École Polytechnique de Montréal

Mitacs Globalink Research Intern | Supervisor Dr. David Vidal, Asst. Prof., Mechanical Engineering

Montréal, Canada

May 2022 - August 2022

- Working on **Exploration of deep learning algorithms for computational fluid dynamics**.
- Developed MATLAB code to generate geometries with periodic boundary conditions resembling porous media
- Worked with a pre-existing Lattice Boltzmann method code to simulate flow in a pseudo-porous media

### Jadavpur University

Undergraduate Researcher | Supervisor Dr. Sudeshna Saha, Asst. Prof., Chemical Engineering

Kolkata, India

Mar 2022 - May 2023

- Working on **Thermodynamic considerations of Temperature swing CO2 adsorption**.
- Assisting a Graduate student in conducting laboratory experiments
- Developing a membrane to absorb CO2 after surface modification using Bacterial Nanocellulose (BNC)

## Publications

---

### JOURNALS

#### A CRITICAL REVIEW ON GRAPHENE AND GRAPHENE-BASED DERIVATIVES FROM NATURAL SOURCES EMPHASIZING ON CO2 ADSORPTION POTENTIAL

Environmental Science and Pollution Research, Springer Nature

Kolkata, India

Sept 2023

- Authors: Saswata Chakraborty, **Ranadip Saha**, Sudeshna Saha
- DOI: 10.1007/s11356-023-30093-8

#### EARLY DETECTION AND MANAGEMENT OF THERMAL RUNAWAY IN BATTERIES USING WATER MIST FOR AIR PRE-COOLING

International Journal of Energy for a Clean Environment, Begell House

Kolkata, India

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