Aritra Jana (he/him/his)

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WORK EXPERIENCE

ENERGY AND TRANSPORT SCIENCES LABORATORY, PURDUE UNIVERSITY — **West Lafayette, IN, USA**
Experimental investigator in the Energy and Transport Sciences Laboratory under the supervision of Prof. Partha Mukherjee. — *August 2024-Present*

EXXONMOBIL SERVICES AND TECHNOLOGY PRIVATE LIMITED — **Bengaluru, India**
Worked as a Process Design Engineer supporting various projects across the globe with a net TEC of >30M$ in the Brownfield Projects Organization of Exxon Mobil Corporation. — *July 2023–July 2024*

ADVANCED COMPOSITE LABORATORY, IIT ROORKEE — **Roorkee, India**
Worked as a Research Intern under the supervision of Prof. Kaushik Pal on the sensing and detection of gases using mixed matrix membranes. — *May 2022–July 2022*

NEPTUNE LABORATORY, JADAVPUR UNIVERSITY — **Kolkata, India**
Worked as an Undergraduate Research Assistant under Prof. Achintya Mukhopadhyay on the thermal management of batteries. — *March 2021–July 2023*

EDUCATION

PURDUE UNIVERSITY — **West Lafayette, IN, USA**
PhD Student in Mechanical Engineering — *2024-Present*

JADAVPUR UNIVERSITY — **Kolkata, India**
Bachelor of Engineering in Chemical Engineering — *2019-2023*
GPA: 8.98/10 (Class Rank: 11 out of 121 students)

PAPERS PUBLISHED

Early Detection and Management of Thermal Runaway in Batteries using Water Mist for Air Precooling

The effect of water mist precooling of air was studied as a battery thermal management system and its effect on controlling thermal runaway. The precooling of air was modelled using Eulerian fluid modelling, and the reactions inside an 18650 Li-ion cell were modelled using Arrhenius electrochemical reactions in SIMULINK. Two early thermal runaway detection systems were also studied using temperature and SEI layer degradation as bases respectively.

Comparative Technoeconomic Analysis of Algal Biorefineries with and without Methanol Recycle in Aspen Plus

A study was performed on a simulation-based approach in Aspen Plus to modelling a refinery which would convert algal oil to biodiesel for commercial use. Kinetic data was obtained for the transesterification of triolein to fatty acid methyl esters and was utilized to get an estimate of the yield. A sensitivity analysis was also performed on the methanol to algal oil ratio. The study also compares two refineries with and without methanol recycling and performs a techno-economic analysis.

CONFERENCE PRESENTATIONS

Management of Thermal Runaway in Batteries using Water Mist for Air Precooling (26th National and 4th International ISHMT-ASTFE Heat and Mass Transfer Conference**)**

Control of Thermal Runaway in Lithium-Ion Batteries (Advances in Chemical and Material Sciences ‘22**)**

Modeling of Algal Biorefinery in Aspen Plus (International Conference on Chemical Engineering Innovations and Sustainability ‘23**)**

OTHER ACADEMIC PROJECTS

IoT-based early detection of thermal runaway and warning system for Li-Ion Batteries (Patent Pending)

An Arduino based device was made for the early detection of thermal runaway in lithium-ion batteries. An app was also developed in which people can monitor statistics related to their batteries in real time. This device could be easily implemented in electric vehicles such as scooters and due to its low-cost would bring down the cost of manufacturing and make EV's more accessible to people in countries with lower per capita income. This project was awarded a cash grant by the Institute Innovation Cell of Jadavpur University and a patent is currently submitted for approval.

Synthesis of ZIF-11/PEI based Mixed Matrix Membrane for Gas Separation and Selective Gas Sensing

A mixed matrix membrane was created using polyetherimide and a metal organic framework was incorporated into the polymer matrix. The MOF, polymer and the synthesized MMM was characterized using XRD, TGA, SEM, BET and EdX. The separation characteristics and selective gas sensing ability of the MMM formed was tested for pure as well as a mixture of gases. Also designed an enclosure for a handheld version of a gas sensing device using such a membrane in SOLIDWORKS and 3D printed it.

SOFTWARES KNOWN

SIMULINK, ASPEN Plus, Origin Lab Pro, LATEX, SOLIDWORKS, AutoCAD, PRO/II, HTRI, Pegasys#

Programming Languages: MATLAB, Arduino, JAVA, Python and C

CERTIFICATIONS

Neural Networks and Deep Learning

Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

Convolutional Neural Networks

Structuring Machine Learning Projects

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning