Sayan Majumder

Curriculum vitae

Heat Transfer and Thermal Power Lab, IIT Madras
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Sayan Majumder

Education

2019–2025 **MS(by Research) and Doctor of Philosophy**, *Indian Institute of Technology, Madras*, Chennai, ***CGPA:*** *9.53/10*

Direct PhD in Mechanical Engineering (Specialization in Thermal Sciences), Mechanical Engineering Department, IIT Madras

2015–2019 **B.Tech, Mechanical Engineering**, *National Institute of Technology, Agartala*, Agartala, ***CGPA:*** *9.11/10*

Graduated in First class with distinction. selected as one of the top two students from the Mechanical Engineering Department under the PhD-MOU scheme between NIT Agartala and IIT Madras.

2015 **Higher Secondary (10+2) Examination**, *Ramkrishna Mission Ashrama Vidayalaya, Narendrapur*, Kolkata, ***Percentage :*** *93%*

Ranked among the top 0.001 percentile of over 1.5 million students who appeared for the Intermediate Level Examination conducted by the West Bengal Council for Higher Secondary Education.

2013 **Secondary (10th Boards) Examination**, *Ramkrishna Mission Ashrama Vidayalaya, Narendrapur*, Kolkata, ***Percentage :*** *93.7%*

Ranked among the top 0.001 percentile of over 2.3 million students who appeared for the Secondary Level Examination conducted by the West Bengal Board of Secondary Education.

PhD thesis

title *Advance thermal management of electronics and Li-ion batteries under constant and transient heat loads*

supervisor Prof. Chakravarthy Balaji

description This thesis investigates phase change material (PCM)-based hybrid cooling systems for thermal management in high-power electronic devices and Li-ion battery packs. It integrates experimental and numerical approaches to improve thermal stability and extend system lifespan under cyclic heat loads. Key findings include the role of PCM (eicosane and docosane) in mitigating temperature fluctuations and enhancing thermal response, with expanded graphite (EG) improving performance. The study also proposes novel heat sink designs and hybrid systems combining PCM and active liquid cooling, demonstrating superior temperature uniformity and fault tolerance. The work provides guidelines for PCM selection, material combinations, and system design optimization.

Professional Experience

Graduate Research and Teaching Assisantship

Spring 2021 **Measurments in Thermal Engineering**, *Instructor: Prof. Ashish Kumar Sen*

Fall 2021 **Inverse methods in Heat Transfer**, *Instructor: Prof. C.Balaji*

Spring 2022 **Design and Optimization of Energy Systems**, *Instructor: Prof. C. Balaji*

Fall 2022 **Heat Transfer**, *Instructor: Prof. C. Balaji*

Spring 2023 **Engineering Thermodynamics**, *Instructor: Prof. Sateesh Gedupudi*

Cumulative achievements

- Assisted the course instructor in preparing the course material, ensuring that it was comprehensive and covered all necessary topics.
- Prepared detailed transcripts for the course (Design and Optimization of Thermal systems, which have been uploaded to the National Programme on Technology Enhanced Learning (NPTEL) site, making the course accessible to a wider audience.
- Conducted tutorial classes to help undergraduate students improve their problem-solving skills and gain a better understanding of the course material.
- Mentored undergraduate students for mini-projects, helping them to develop their research skills and apply their knowledge to practical applications.

UG and PG project mentorship

2023–24 **Thesis title :**, *Topology Optimization of PCM based heat sinks for system on a chip*, Md. Azharuddin, M.Tech Thesis

2023–24 **Thesis title :**, *Experimental study of multiwalled carbon nanotubes and Eiosane based heat sink*, Saumya Mathur, B.tech Project Thesis

2023–24 **Thesis title :**, *Preparation of stable Nano Compoite Organic PCM*, Vishwanatha Gangadharan, B.tech Project Thesis

Languages

Bengali Professional working proficiency

English Professional working proficiency

Hindi Professional working proficiency

Skill matrix

Skill matrix

	Level	Skill	Years	Comment
Software:	■■■□□	MATLAB	4	*Optimization and ANN libraries*
	■■□□□	ANSYS	3	*PCM simulation and Battery modelling*
	■■■■□	LaTeX	3	*Have written multiple article and PhD thesis using LaTeX*

■■■■□	MS Office	10
■■■■□	ORIGIN	4

Published Journals (Scopus indexed)

- **Majumder, S., Akula, R. and Balaji, C.** (2024). Thermal Management of Electronics under Cyclic Heat Loads Using Graphite-Assisted Heat Sink. Heat Transfer Engineering,**1–18**. https://doi.org/10.1080/01457632.2024.2392077
- **Majumder, S., Akula, R. and Balaji, C.** (2024), Design of thermal management system for a battery pack with malfunctioning battery:-a numerical parametric study *In Journal of Physics: Conference Series 9th European Thermal Sciences Conference (Eurotherm 2024)*, Lake Bled, Slovenia, 2024, doi: 10.1088/1742-6596/2766/1/012049
- **Vasista, K. N., Majumder, S., Rangarajan, S., and Balaji, C.** (2024). Double layered wavy surface based minichannel cold plate for thermal management of high powered electronics subjected to power surges. International Communications in Heat and Mass Transfer, 159, 108161.

Publications in conference proceedings

- **Majumder, S., Akula, R. and Balaji, C.**, Thermal management of electronics working on cyclic heat loads: An experimental study. *In International Heat Transfer Conference Digital Library.* Begel House Inc., Cape Town, South Africa, 2023
- **Vasista, K. N., Majumder, S., and Balaji, C.** , Thermal management of high heat flux electronics subjected to power surge using a double layered wavy minichannel. *Proceedings of the 27th National and 5th International ISHMT-ASTFE Heat and Mass Transfer Conference December 14-17, 2023, IIT Patna, Patna-801106, Bihar, India* Begel House Inc.

Extracurricular activities

- **Head, Mess Monitoring and Controlling Committee (2023-25)**
  Led a team of 30+ UG and PG coordinators to manage dining operations across 11 mess halls serving 11,000+ students at IIT Madras. Responsible for menu planning, effective resolution of student complaints, and ensuring food quality control.
- **Head, Global Hyperloop Competition (2024-25)**

Organized the first Hyperloop Competition in Asia, with 10+ student-led teams, securing 6 million INR in funding from Indian Railways, ANSYS, and Arcelor Mittal. Led a team of 50+ UG volunteers and developed the competition rules and regulations manual.

References

Prof. Chkravarthy balaji

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Prof. Ashish Kumar Sen

- Micro Nano Bio Fluidics Unit, IIT Madras
- ashis@iitm.ac.in
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