



Indian Institute of Technology Madras  
Office of Alumni and Corporate Relations

# Celebrating the generosity of



Impact of your  
giving in 2023

**Mr. Swaroop Kittu Kolluri**



## Director's Message

**Prof. Kamakoti Veezhinathan**

**Director, IITM**

Greetings!

IIT Madras continues to retain her top position for the eighth consecutive year, in the National Institute Ranking Framework, thanks to the world-class research of its faculty and students. The contribution and support of *Alumni and well-wishers like you* has crucially helped this standing and stature. Our achievements in research, education, innovation and entrepreneurship have also earned us the recognition of an 'Institute of Eminence' as well as the top position in the Atal Innovation Ranking from the Government of India.

The institute is making an indelible mark with her 'research with impact' in several areas including quantum computing, drinking water technology, industrially relevant mathematical models for governance, rendering cancer-cure more effective. Our centres of excellence, the Center for Innovation, Nirmaan – the pre-incubator, the Incubation Cell, technology centres such as 'IITM-Pravartak' and others, work in unison for not just our nation's building, but societies world-wide. We aspire to be locally impactful and globally relevant through all these efforts.

Towards exploring new research frontiers, a Department of Medical Sciences and Technology has been launched in May 2023 to conjoin medicine and engineering. Similarly, a School of Sustainability was also created in October 2023 to research sustainable practices in the Global South. The campus is moving towards a 'carbon-net-zero' goal through water conservation by 100% recycling, efficient garbage disposal, and electrification of vehicles. The traditional education system is undergoing a paradigm shift, with our online Bachelor of Science programme in Data Sciences and the National Program of Technology Enhanced Learning, that have won Gold in the 'Lifelong Learning' category and Silver in the 'Best Online Program' category of the Wharton-QS Reimagine Education Awards 2022 respectively. IIT Madras is leading this revolution from the front.

Such achievements are not possible without the deep-rooted faith and support of alumni and well-wishers such as yourself. We are indebted to you for your generous, bountiful, and impactful contributions. On behalf of IIT Madras, I offer you our deepest gratitude for continuing to strengthen the Institute. Together with your support, we are confident of building an IIT Madras that is more inclusive, diverse, and enabled by an ecosystem to be nationally relevant and globally recognised.

Thank you!

## Dean's Message

**Prof. Mahesh Panchagnula**

**Dean, Alumni & Corporate Relations, IITM**



Greetings!

I express my heartfelt gratitude to you for your generous support to IIT Madras. We appreciate your passion in supporting the causes you do and I assure you that your contributions will be optimally utilized. This report has been compiled to convey how your largesse has touched lives and made a difference at IIT Madras. In keeping with the rapid, contemporary strides in science, technology we have set ambitious goals for ourselves - your continued enthusiasm and support will help us greatly in these endeavors.

IIT Madras is far more diverse in its set of pursuits, more green and more research-focused. And yet, it remains unchanged over these years, it is still the best Institute in the country, and attracts the best students that India has to offer to come and make a mark. I also cordially invite you to visit your campus to see for yourself, the impact of your contribution, and the growth and transformation the Institute has undergone over the years.

We can never express our gratitude enough for all that you have done - Thank You!

**"GIVING IS NOT JUST ABOUT  
MAKING A DONATION -  
IT'S ABOUT  
MAKING A DIFFERENCE"**





# Summary of your Contributions

IITMF  
Operational  
Fund

IITM Innovation  
and  
Entrepreneurship  
Endowment Fund

T.T. Narendran  
Institute Chair

Prof. M. S. Ananth  
Endowment Fund

## IITMF Operational Fund

IIT Madras Foundation Operations manage the confluence of functions needed to achieve the IIT Madras Foundation goals. Critical activities that the Operations delivers include enabling the volunteer driven efforts to raise awareness through marketing and personal engagement of alumni, managing and deploying funds raised, working with IITM. The Operations at IITMF are managed to provide the level of transparency and accountability necessary to not only maintain the non-profit status and rating that the organization strives for, but more crucially, to provide the confidence to our donors that their philanthropic gifts are utilized as intended. The operational funds support the systems and processes as well as personnel that the organization engages to deliver these important outcomes. IITMF has consistently achieved a four-star rating with Charity Navigator for its Accountability & Finance excellence.





# IITM Innovation and Entrepreneurship Endowment Fund

The Avishkar student team at IIT Madras have developed several versions of a sub scale hyperloop pod and participated in the International Hyperloop Competition every year since 2018. Last year, IIT Madras received a grant of Rs. 8.34 crores to create a 400m sub-scale vacuum tube hyperloop infrastructure at the IITM Discovery campus. Per the direction from Prof. Kamakoti, we have agreed to develop a hyperloop pod prototype with a higher degree of commercialization potential when compared to the Avishkar student team pod for operation in this facility. He also suggested that to achieve this goal, the engineers from TuTr Hyperloop and Avishkar students should work as a single team for the IIT Madras Hyperloop initiative to get this prototype ready by early next year.

The material costs for developing this prototype pod are being covered by the funds available in the Railways grant. The Rs. 75 Lakhs received from the Innovation and Entrepreneurship Fund is being utilized to meet the manpower cost of the full time engineers who are working with the IITM students for a period of seven months beginning September 2023. Dr. Aravind Bharadwaj (CTO- TuTr Hyperloop) has agreed to mentor, free of charge, the Avishkar student team and the TuTr engineers to develop this prototype pod and the pod for the student competition next year under a common IIT Madras hyperloop initiative – Hyperloop Technology Centre (HyTeC@IITM).

To view their website

[CLICK HERE](#)



For more info on Avishkar Hyperloop

[CLICK HERE](#)



For a recent press release

[CLICK HERE](#)



# T.T. Narendran Institute Chair

T.T.Narendran most popularly known as MAMA endeared well to student's community across generations. Our eminent Professor joined IIT Madras in 1971 and obtained his PhD in Industrial Engineering. He then joined the services of the Institute in 1976 as a Lecturer. Later, he was an Associate Professor and a Professor in 1991 and 1995 respectively.

During his career, he has guided many research scholars published more than a hundred research articles in reputed Journals and prestigious conferences. His papers have been cited by the most prolific authors in these disciplines and he was among their top 10 contributor's worldwide over a decade.

Professor T.T.Narendran has proved himself an exemplary teacher who has enthusiastically offered courses outside his academic moorings and his humour that characterized him, the power of bringing smile in every student. His name will always be associated with the courses on Operations Research, Simulation and Production Management.

As a honour to Professor T.T.Narendran, Department of Management Studies proposes to set up a chair in his name which will be called as T.T. NARENDRAN INSTITUTE CHAIR at IIT Madras. This will be used to support a Professor who will occupy this chair.

## About the Chair Occupant:

Prof. C. Balaji from the Department of Mechanical Engineering, was awarded the T.T Narendran Institute Chair professorship. Dr. C. Balaji received his Ph.D. from IIT Madras in 1995.

His research interests include Computational Heat transfer, Computational Radiation, Optimization in Thermal Sciences, Inverse Heat Transfer, Satellite Meteorology, Numerical Weather Prediction etc. He has authored more than 220 journal publications. He is also the author of four books, which include 2 graduate level textbooks on thermal system design and optimization and radiation heat transfer.

Prof. C. Balaji's research has been in 3 domains namely: Heat Transfer and Optimization in electronic cooling, Inverse problems in Heat Transfer and Numerical Weather Prediction and Radiance Assimilation in the field of electronic cooling. Prof. C. Balaji and his research group have demonstrated the importance of multi-objective optimization in the design of heat sinks with phase change materials using a numerical and experimental data driven approach. In the domain of inverse heat transfer, Prof. C. Balaji has introduced Bayesian methods in the heat transfer field and intuitive ways of generating priors to solve ill-posed inverse problems.



**Prof. T.T.Narendran**  
Department of Management Studies



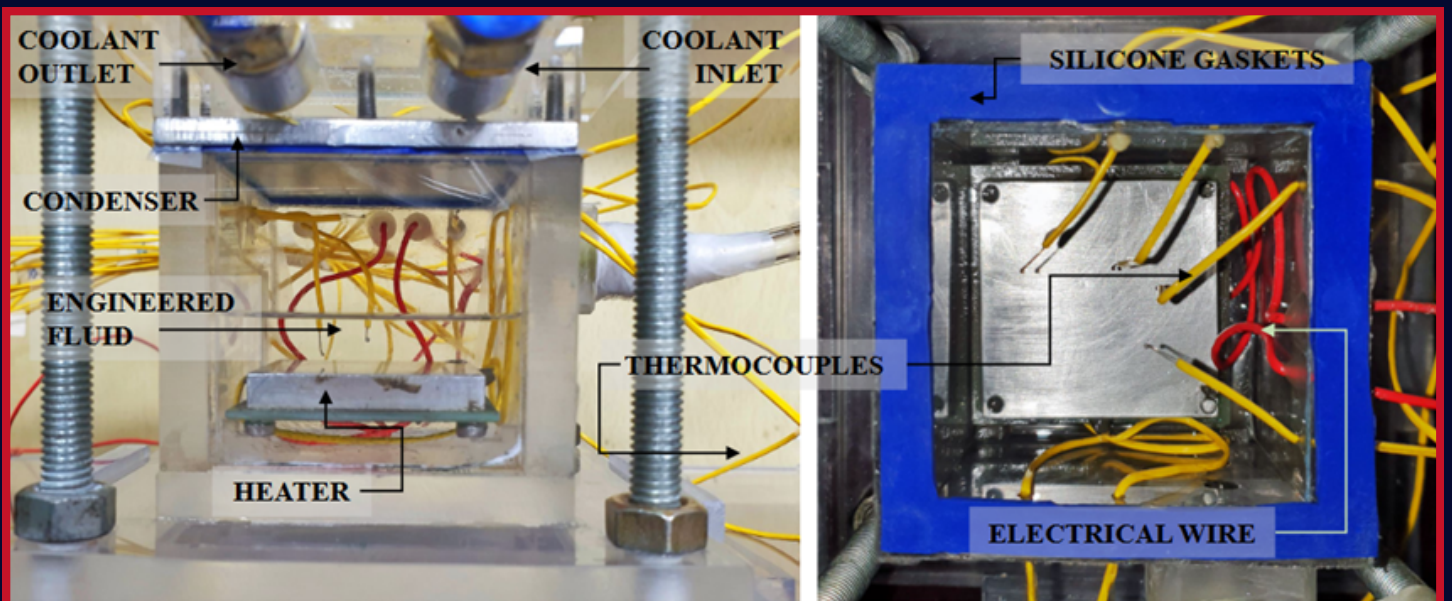
**Prof. C. Balaji**  
Department of Mechanical Engineering  
T.T. Narendran Institute Chair Professor



Prof. C. Balaji's research group has demonstrated this approach in a wide range of problems from heat transfer to atmospheric science. They have developed new algorithms for ingesting microwave radiances from Indian satellites to improve the prediction of the Indian monsoon and tropical cyclones in the Bay of Bengal.

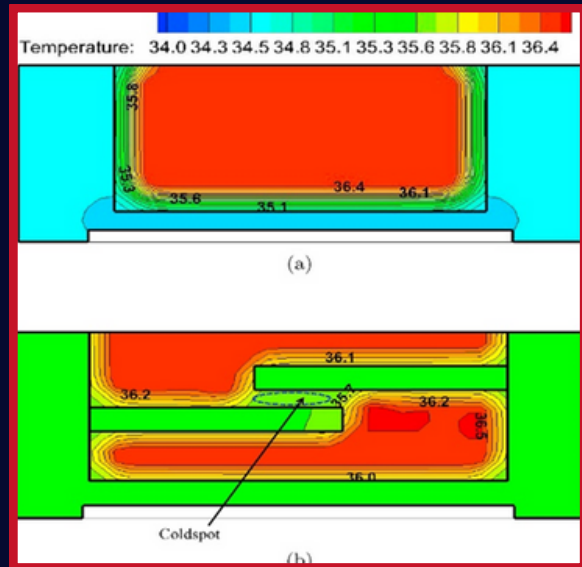
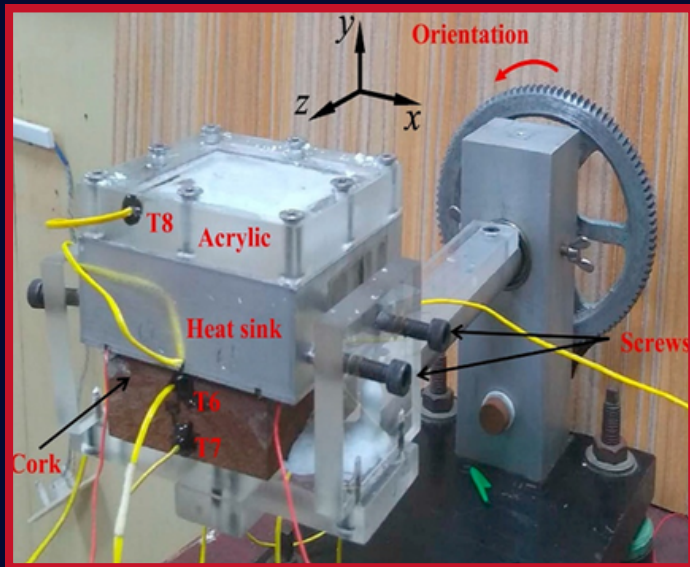


## MAJOR AND RECENT RESEARCH CONDUCTED

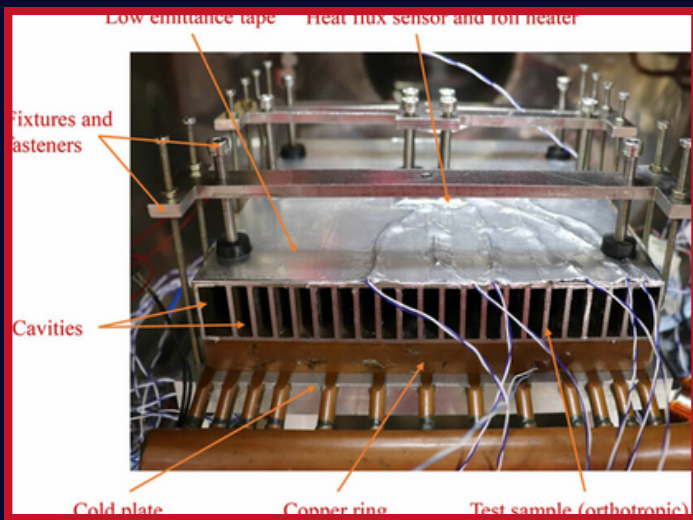


THERMAL PREDICTION FOR TWO-PHASE IMMERSION COOLING DATA CENTRES BASED ON MACHINE LEARNING

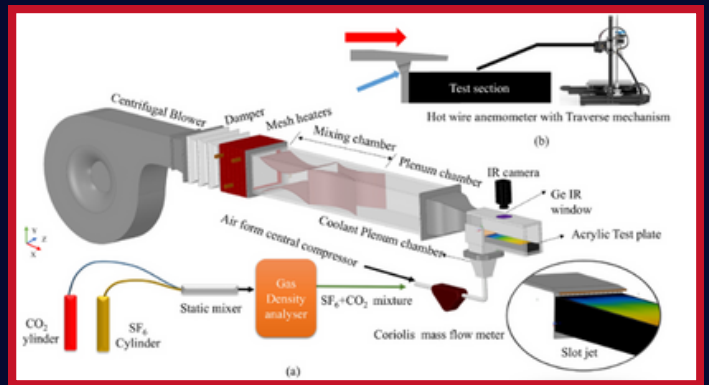




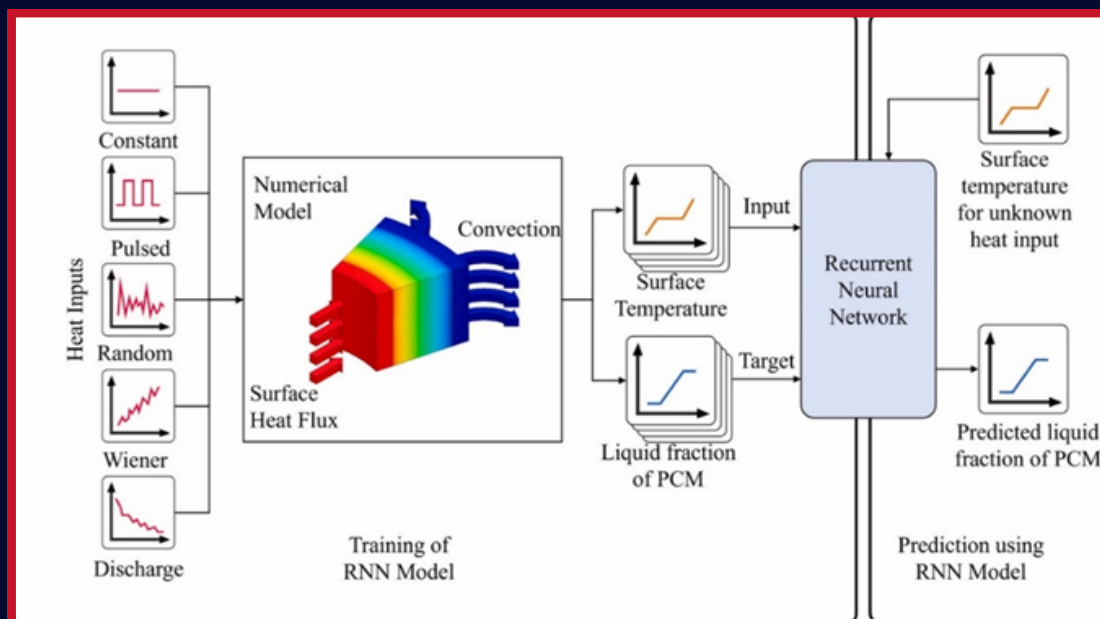
HEAT TRANSFER STUDIES FROM A PCM BASED HEAT SINK WITH BAFFLES



PREDICTION OF THERMAL CONDUCTIVITY OF AN ORTHOTROPIC MATERIAL USING INVERSE METHDODOLOGY



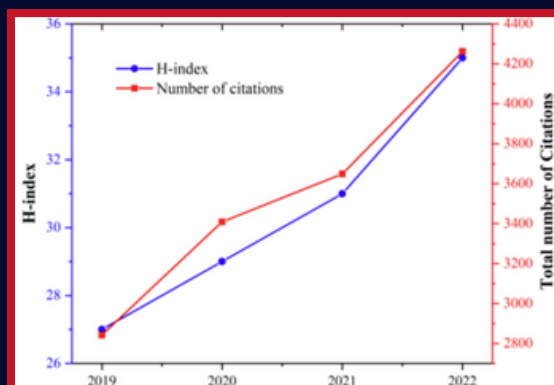
3D SLOT FILM COOLING IN AN ANNUALR COMBUSTOR



## About the various activities pertaining to the research conducted

Prof. C. Balaji has taken several initiatives to bring several activities on board. Some of them are listed below:

1. Prof. C. Balaji has been consistently ranked among the top 2% of researchers in the field of Mechanical Engineering over the last five years (Source Stanford University and Elsevier).



2. Prof. C. Balaji has been retained as the Editor-in-Chief of the International Journal of Thermal Sciences (IJTS), a Q1 journal with an impressive impact factor of 4.5, for a term extending from January 2023 to December 2025.

3. Prof. C. Balaji designed and developed a full suite of 45 lectures each of 50 minutes duration for the course on Heat Transfer which is freely available on NPTEL and YouTube.

4. Prof. C. Balaji is the principal investigator of the funded project (8.86 crores) titled “Climate change impacts on coastal infrastructure and the adaptation strategies” sponsored by Department of Science and Technology, Government of India (2018-2023).

5. Prof. C. Balaji is the Co-Principal investigator for “Laboratory for Atmospheric and Climatic Sciences” (5 crores) sponsored by Ministry of Education, Government of India (2021-2026).

6. Prof. C. Balaji was the moderator for the panel discussion on the topic “Battery Thermal Management – Recent Trends and Future Challenges” for the 17th International Heat Transfer Conference (IHTC17) held at Cape Town, South Africa (2023).

7. Prof. C. Balaji delivered a keynote lecture on the topic “Thermal Energy Storage - Pathway to Energy-Efficient Electronics and Battery Systems” for the 17th International Heat Transfer Conference (IHTC17) held at Cape Town, South Africa (2023).

8. Prof. C. Balaji delivered a lecture on the topic “Thermal Science and Engineering: Quo Vadis” as part of the distinguished Arcot Ramachandran Lecture, which was organized by The Academy of Sciences, Chennai, in collaboration with IIT Madras.

9. Mallikarjuna Rao P, U. Parthasarathy, and Marri Girish Kumar obtained their Ph.D. degree in 2021. Ram Prabhu, Baki Harish, Rajesh Akula, and Suraj Kumar obtained their Ph.D. degree in 2022. Siddharth Kumar obtained his Ph.D. degree in 2023. Buchi Raju obtained his M.S degree in 2022. In his career, so far he has guided 38 students towards the completion of Ph.D degree.

10. Completed more than 5 M.Tech projects and multiple B.Tech projects in the last 2 years.

## BOOKS PUBLISHED (2021-2023)

1. C. Balaji. Essentials of Radiation Heat Transfer, 2021 Springer.
2. C. Balaji. Thermal System Design and Optimization, 2021 Springer.
3. Rahul Yadav, C. Balaji, and S. P. Venkateshan. Radiative Heat Transfer in Participating Media with MATLAB Codes, 2023 Springer.

## HIS OTHER PUBLICATIONS



*Joy of Teaching (Tamil)*



*Joy of Research (Tamil)*



## JOURNAL PAPERS (2022-2023)

Number of Research Articles Published – 25 (2022-2023)

SI.No	Name of authors	Title of the Paper	Name of the Journal
1.	Ananda Prasanna, Rampada Rana, Batchu Suresh, C Balaji, and Arvind Pattamatta	A multiobjective optimization of 3D-slot jet configuration for enhancement of film cooling in an annular combustor liner	International Journal of Heat and Mass Transfer
2.	Ananda Prasanna, Arvind Pattamatta and C Balaji	Fluid Flow and Heat Transfer Characteristics of Three-Dimensional Slot Film Cooling in an Annular Combustor	International Journal of Heat and Mass Transfer
3.	P. Yaswanth, B. Arul Malar Kannan, V. M. Bindhu, Balaji Narasimhan, C Balaji	Evaluation of Remote Sensing Rainfall Products, Bias Correction and Temporal Disaggregation Approaches, for Improved Accuracy in Hydrologic Simulations	Water Resources Management
4.	Alankrita Singh, C Balaji	Heat Transfer Optimization Studies of Semi-Spherical Protrusions on a Concave Surface during Jet Impingement	Heat Transfer Engineering
5.	Sandeep Chinta, V S Prasad, C Balaji	Hybrid assimilation on a parameter-calibrated model to improve the prediction of heavy rainfall events during the Indian Summer Monsoon	Current Science
6.	Girish Kumar Marri, C Balaji	A machine learning methodology for the diagnosis of phase change material-based thermal management systems	Applied Thermal Engineering
7.	Suraj Kumar, C Balaji	Prediction of orthotropic thermal conductivities using Bayesian-inference from experiments under vacuum conditions	Heat Transfer Engineering
8.	Rajesh Akula, C Balaji	Thermal management of 18650 Li-ion battery using novel fins-PCM-EG composite heat sinks	Applied Energy
9.	R Chandrasekar, Reetik Kumar Sahu, C Balaji	Assimilation of multi-channel radiances in mesoscale models with an ensemble technique to improve track forecasts of Tropical cyclones	Journal of Earth System Science
10.	Girish Kumar Marri, C Balaji	Effect of phase change temperatures and orientation on the thermal performance of a miniaturized PCM heat sink coupled heat pipe	Experimental Heat Transfer

11.	Harish Baki, Sandeep Chinta, C Balaji, Balaji Srinivasan	Parameter Calibration to Improve the Prediction of Tropical Cyclones over the Bay of Bengal Using Machine Learning–Based Multiobjective Optimization	Journal of Applied Meteorology and Climatology
12.	Suraj Kumar, C Balaji	Systematic approach to estimate non-uniform heat generation rate in heat transfer problems using liquid crystal thermography and inverse methodology	Experimental Heat Transfer
13.	Baki Harish, Sandeep Chinta, C Balaji, and Balaji Srinivasan	Determining the sensitive parameters of WRF model for the prediction of tropical cyclones in the Bay of Bengal using Global Sensitivity Analysis and Machine Learning	Geoscientific Model Development Discussions
14.	Baki Harish, C Balaji, and Balaji Srinivasan	Impact of data assimilation on a calibrated WRF model for the prediction of tropical cyclones over the Bay of Bengal	Current Science
15.	Baki Harish, Sandeep Chinta, C Balaji, and Balaji Srinivasan	A sensitivity study of WRF model microphysics and cumulus parameterization schemes for the simulation of tropical cyclones using GPM radar data	Journal of Earth System Science
16.	Rajesh Akula and C. Balaji	Effect of PCM fill ratio and heat sink orientation on the thermal management of transient power spikes in electronics	Journal of physics: Conference Series
17.	Girish Kumar Marri and C Balaji	Liquid crystal thermography based study on melting dynamics and the effect of mushy zone constant in numerical modeling of melting of a phase change material	International Journal of Thermal Sciences
18.	M Ram Prabhu, C Balaji, T Sundararajan, M J Chacko	Estimation of Aerodynamic Heating on Scramjet Inlets and Validation with Measurements	Journal of Thermal Science and Engineering Applications
19.	P Jyoteeshkumar Reddy, Dommeti Sriram, S S Gunthe, C Balaji	Impact of climate change on intense Bay of Bengal tropical cyclones of the post-monsoon season: a pseudo global warming approach	Climate Dynamics
20.	S M Kirthiga, B Narasimhan and C Balaji	A multi-physics ensemble approach for short-term precipitation forecasts at convective permitting scales based on sensitivity experiments over southern parts of Peninsular India	Journal of Earth System Science
21.	Siddharth Kumar, R. Phani, P. Mukhopadhyay and C. Balaji	An assessment of radiative flux biases in the climate forecast system model CFSv2	Climate Dynamics

22.	Girish Kumar Marri and C Balaji	Experimental and numerical investigations on the effect of porosity and PPI gradients of metal foams on the thermal performance of a composite phase change material heat sink	International Journal of Heat and Mass Transfer
23.	Rajesh Akula and C. Balaji	Thermal performance of a phase change material based heat sink subject to constant and power surge heat loads: A numerical study	ASME-Thermal Science and Engineering Applications
24.	Rajesh Akula, Athul gopinath, R. Srikanth and C. Balaji	Experimental and numerical studies on heat transfer from a PCM based heat sink with baffles	International Journal of Thermal Sciences
25.	Sandeep Chinta and C Balaji	Calibration of WRF model parameters using multi-objective adaptive surrogate model-based optimization to improve the prediction of the Indian summer monsoon.	Climate Dynamics

## CONFERENCE PAPERS

01

Pratheek Suresh and Chakravarthy Balaji, Thermal prediction for two-phase immersion cooled data centres based on CNN-LSTM encoder-decoder networks, 17th International Heat Transfer Conference (IHTC17-2023), Cape Town, South Africa.

02

Sayan Majumder, Rajesh Akula, and Balaji Chakravarthy, Thermal management of electronics working on cyclic heat loads: An experimental study, 17th International Heat Transfer Conference (IHTC17-2023), Cape Town, South Africa.

03

Kasavajhula Naga Vasista, Rajesh Akula, and C. Balaji, Thermal management of electronic chips using minichannel based hybrid cooling system for power surge heat loads, 17th International Heat Transfer Conference (IHTC17-2023), Cape Town, South Africa.

04

Ananda Prasanna Revulagadda, C. Balaji, and Arvind Pattamatta, Effects of gas radiation and thermal barrier coating on the film cooling performance of an annular combustor, 17th International Heat Transfer Conference (IHTC17-2023), Cape Town, South Africa.

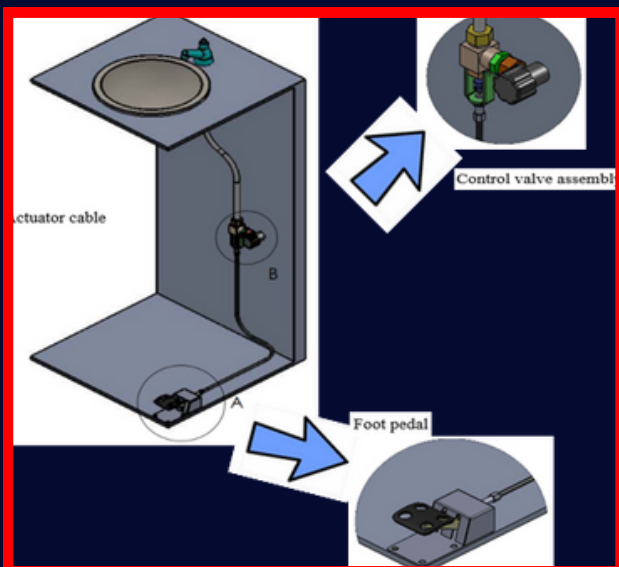


## PATENTS GRANTED

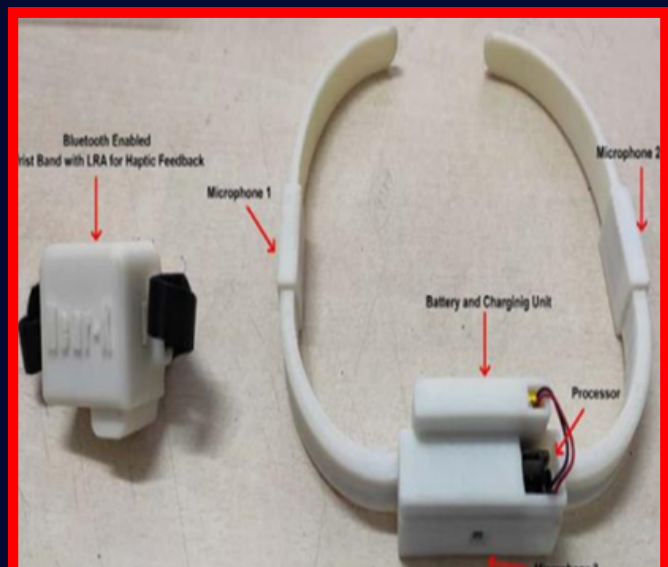
Foot Operated Revamped Tap (FORT) Assembly to avoid the use of hands in existing washbasins and urinals to stop the spreading of contagious infections.

A mechanical based, cam actuated automatic equipment that dispenses hand sanitizer in metered quantities.

Wearable Assistive Device for Hearing-Impaired people to convert Audio into Visual and Haptic Feedback (Approval Pending).



FORT



WEARABLE ASSISTIVE DEVICE

To know more about Prof. C. Balaji

[CLICK HERE](#)



# Prof. M. S. Ananth Endowment Fund



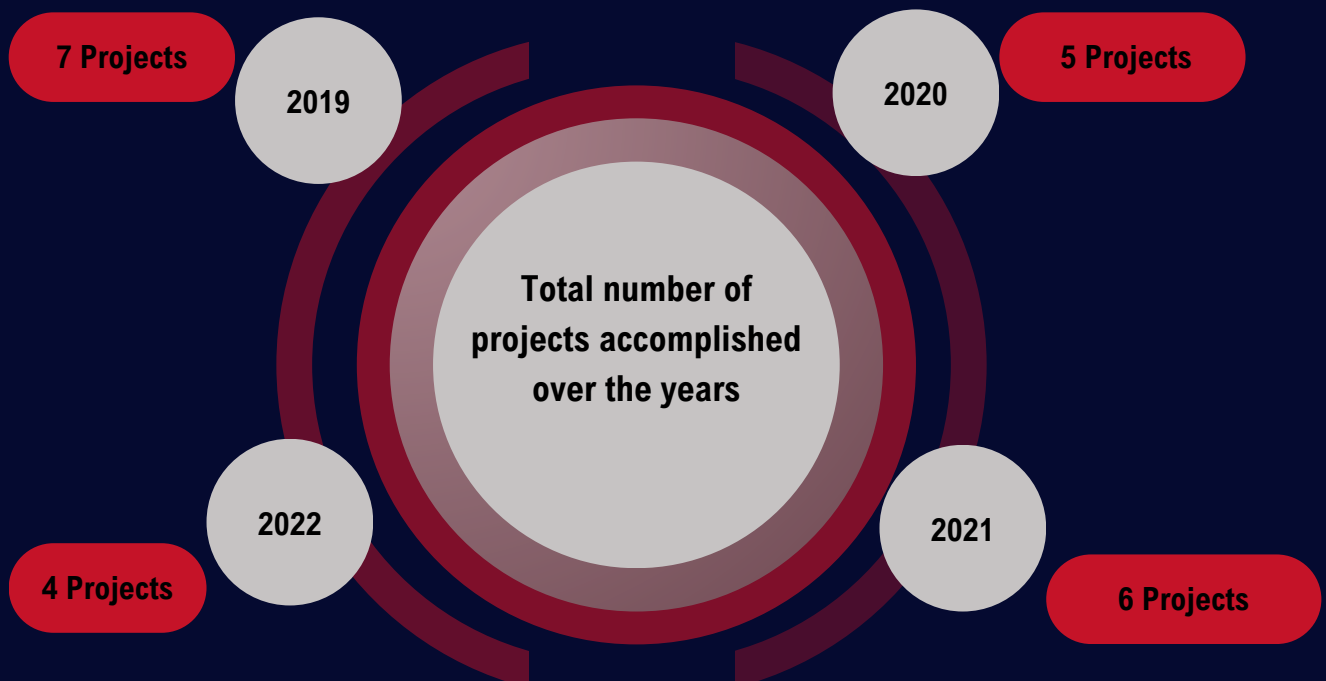
**Prof. M. S. Ananth**

This Endowment Fund was established to honor Prof. M. S. Ananth, who served as the Director of IIT Madras from 2001 to 2011. He is well-known for his contributions to science and teaching, as well as his tireless efforts to develop higher education and research in India.

The following activities are supported through this endowment fund:

- ✓ To support socially relevant projects.
- ✓ To support the educational needs of the children of staff members of self-help organizations who work in IITM campus.

## SOCIALLY RELEVANT PROJECTS:



In 2022 alone, the institute successfully executed four impactful projects.



**Prof. Nikhil Bugalia**  
Department of Civil Engineering

**Project Name:**

Construction and Demolition (C&D) Waste Management and the Role of the Informal Unorganized Sector in India: Case of New Delhi

**Objective of the project:**

Identifying early-stage demolition projects in different parts of the City and various stakeholders involved in the identified projects to understand their roles in an informal/formal C&D waste management system through interviews. Results indicate significant environmental and economic benefits the informal sectors contribute as they engage in deconstruction, salvaging several materials otherwise considered waste and adding value to the formal recycling process through their selective demolition practices.



**Prof. Madhu Mutyam**  
Department of Computer Science and Engineering

**Project Name:**

Tracking Beehive Health Using IoT Technology

**Objective of the project:**

The work aims to build an IoT-based tracking system to monitor the health of a beehive. It helps minimize manual inspection of the beehives so that beekeepers can handle a more significant number of beehives simultaneously, improving their income level.



**Prof. Sreeram K. Kalpathy**

Department of Metallurgical and Materials Engineering

**Project Name:**

Farmer-friendly, point-of-use, portable heavy metal sensors with cell phone interface: A new technical aid for the agricultural sector

**Objective of the project:**

Analyzing water quality and heavy metal presence in water samples collected from several temple tanks in Rameswaram, Tamil Nadu using the ICP-OES facility at SAIF-IIT Madras. The project is aimed at helping farmers and agricultural cooperatives to decide on soil quality by measuring soil salinity and heavy metal presence detection so that they can sow crops in the right location and maximize crop yields.



**Prof. Suresh Kumar Rayala**

Department of Biotechnology

**Project Name:**

Community Screening of “Kasimedu fisherwomen” for cervical cancer using a self-sampling kit and an indigenous innovative detection device.

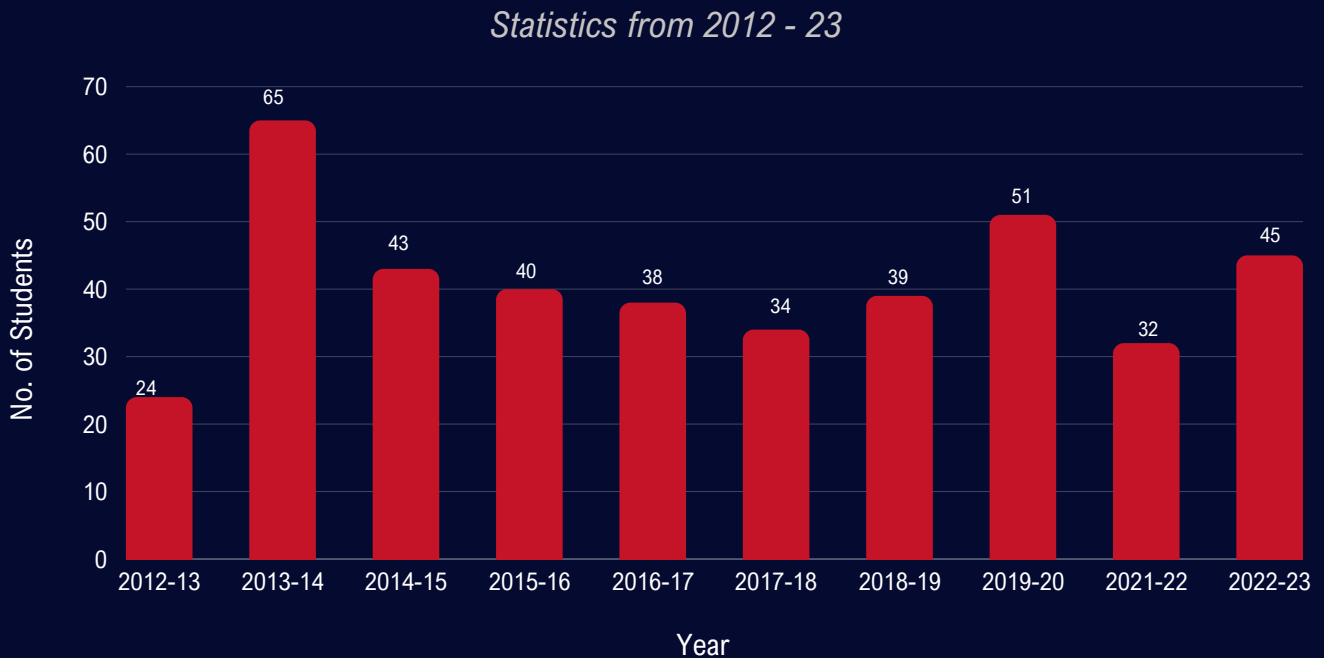
**Objective of the project:**

This project is aimed at a community screening of cervical cancer in Kasimedu fisherwomen and detecting an HR-HPV in these women using an indigenous detection device (developed at IITM). Fabrication of point of care device for detection of HR-HPV and continuous field work – community screening by enrolling more women into the cervical cancer screening.



# SUPPORT TO CHILDREN OF STAFF MEMBERS OF THE SELF-HELP ORGANIZATION WHO WORK IN IITM:

The below graph depicts the number of students who have reaped the benefits over the years.

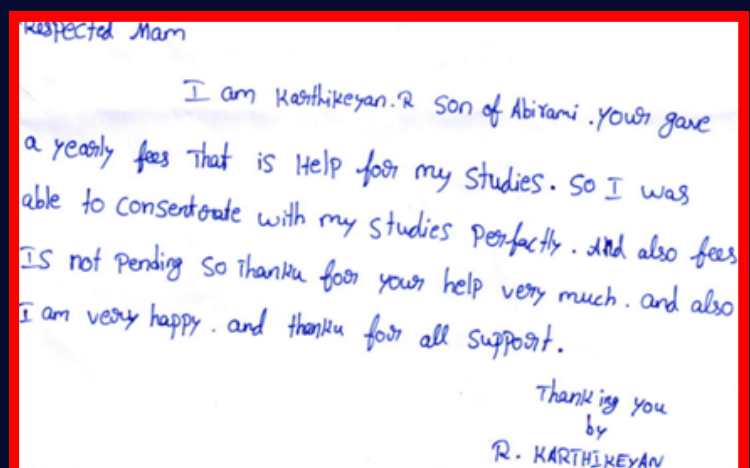


In 2022, 45 children of the IIT Madras campus Self-Help group staff have been given support to their tuition fee through this scheme.

## Gratitude Note from some of the beneficiaries:



R Karthikeyan



மாமி :

சூர்யா சாமிநி உதவிவிப்பது சாமினாவும்தான் சாமினாவுடைய மகன்  
Y. நித்திஷ் VII படித்து உருகிறார். சாமினாவுடைய மகன்  
அர்மிலா V படித்து உருகிறார் தாய்கள் கஷ்டப்பட்டு  
படிக்க வைத்தின்தொடும். அதுதான் சாமினாவுக்கு  
மனித படிப்பதற்கு சீவ் கொடுக்கதற்கு மிக்க நன்றியை

கிப்படித்து  
Y. Sathya



Nitish and Sharmila



K. Dhanush Kumar

Good morning maam .

I am K.channamma's son .

Thank you so much maam for giving us money .  
It has helped us .

We will be always thankful to you maam  
We will never forget this .

Respected madam

My self K.vinushya iam studying 10th standard  
My mother name K.Shanthi .I wish to thank you for  
the support and help my education .I wish to express  
my heartfelt gratitude for your help in  
financing my studies.



K. Vinushiya



*We are grateful to you & your family*

## Mr. Swaroop Kittu Kolluri

*Thank you for your sustained generosity to IIT Madras over the years. Contributors such as yourself enable our students and Professors to dream big and work towards a better and brighter future. We hope you are proud of your alma mater and how it has remained steadfastly committed to academic and research excellence since your time here. You and your family have been instrumental in facilitating this significant growth. Our efforts to nurture the culture of academic excellence that is the hallmark of IIT Madras - quality education, cutting-edge research, and unfettered creativity shall continue. We are privileged and humbled to have you and your family walking with us along this trail. We wish you and your family the best always in all walks of life!*



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For more information, please contact:  
Office of Alumni and Corporate Relations  
T: +91-44-2257 8390 | [acr.iitm.ac.in](mailto:acr.iitm.ac.in)



November 2023