FACULTY PROFILE

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EDUCATION QUALIFICATION:

Degree	Specialization	University	Year
Ph.D.	Thermal	IIT Madras	2016
M.Tech.	Construction technology and management	IIT Delhi	2008
B.E.	Mechanical	Anna University	2006

EXPERIENCE:

Institute	Designation	Duration
IIT Madras	JRF	Feb.16 – Jun.16
NTU, Singapore	Research Fellow	Jul.16 – May.16
MNNIT Allahabad	Assistant Professor	May.16 – Present

AREAS OF INTEREST:

- Air-conditioning
- Passive cooling
- Heat transfer
- Modelling and Simulations

DOCTORAL RESEARCH:

- Title : Investigation on Cooling Tower Based Thermally Activated Building System for Human Comfort
- Visible Outcome : Journal papers – 6 (2 more papers planned); Conferences – 7

POSTDOCTORAL RESEARCH:

- Titles : 1. Atmospheric water generator – Design, development and optimization under tropical climate of Singapore
  2. Dehumidification Technologies for Applications in Buildings: Current Status and Future Trends
  3. Intelligent Building Automation and Analytics using Model-Predictive Control (MPC)
- Visible Outcome : Provisional patents – 2; Journal paper – 1 communicated

PROVISIONAL PATENTS:

1. Name/Title : Method and System for dynamically controlling central hybrid air-conditioner and water generator
   Reg./Ref. No. : US62/455, 177
2. Name/Title : Capillary Heat Exchanger
   Reg./Ref. No. : US 62/651, 642

JOURNALS:

Sl. No.	Authors	Paper Title	Journal (Impact factor)	Year	Vol.	Page No.
1	D.G. Leo Samuel, S.M.S. Nagendra, M.P. Maiya	Feasibility analysis of passive thermally activated building system for various climatic regions in India	Energy and Building (4.07)	2017	155	352-363
2		Passive alternatives to mechanical air conditioning of building: A review	Building and Environment (4.05)	2013	66	54-64
3		Parametric analysis on the thermal Comfort of a cooling tower based thermally activated building system in tropical climate – An experimental study	Applied Thermal Engineering (3.44)	2018	138	325-335
4		Simulation of Indoor Comfort Level in a Building Cooled by a Cooling Tower-Concrete Core Cooling System under Hot-Semiarid Climatic Conditions	Indoor and Built Environment (1.18)	2017	26 (5)	680-693
5		A study of pipe parameters on the performance of cooling tower-based thermally activated building system		2018	27 (2)	219-232
6		An analysis of operating parameters in the cooling tower based thermally activated building system (TABS)		First published online		
7		Cooling performance and indoor air quality characteristics of an earth air tunnel cooled building	Mapan (1.00)	First published online		
8	D.G. Leo Samuel, K. Dharmasastha, S.M.S. Nagendra, M.P. Maiya	Thermal comfort in traditional buildings composed of local and modern construction materials	International Journal of Sustainable Built Environment (-)	2017	6(2),	463-475
9	Adil Eshack, D.G. Leo Samuel, S.M.S. Nagendra, M.P. Maiya	Monitoring and simulation of mechanically ventilated underground car parks	Journal of Thermal Engineering (-)	2015	1	295-302

Title of papers planned to be published

1. A Sensitivity Analysis of the Design Parameters for thermal comfort of Cooling Tower Assisted Thermally Activated Building System (Submitted to Sadhana Journal)
2. An experimental investigation of operating parameters on the performance of cooling tower based thermally activated building system

INTERNATIONAL CONFERENCES:

1. D. G. Leo Samuel, S. M. Shiva Nagendra and M.P. Maiya. Investigation of cooling tower based thermally activated building system in tropical climate. International Conference on Polygeneration, Cuernavaca, Mexico, May, 2017.
2. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Impact of ceiling fan in passive concrete core cooled building. *International Conference on Polygeneration*, Chennai, February, 2015.
3. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Performance of concrete core cooling system coupled to cooling tower. *International Conference on Environment and Energy*, Hyderabad, December, 2014.
4. Adil Eshack, D.G. Leo Samue, S.M. Shiva Nagendra and M.P. Maiya. Monitoring and Simulation of Mechanically Ventilated Car Parks. *Energy Technologies Conference – ENTECH'14*, Istanbul, December, 2014.
5. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Feasibility of passive concrete core cooling at hot-semiarid climatic conditions. *VII Iberoamerican Congress of Refrigeration Science and Technology*, Tarragona, June, 2014.

NATIONAL CONFERENCES:

6. D. G. Leo Samuel and M.P. Maiya. Passive cooled thermally activated building system for human comfort. *National Conference on Advances in Refrigeration and Cryogenics*, Mumbai, June, 2016.
7. K. Dharmasastha, D. G. Leo Samuel, M.P. Maiya and S.M. Shiva Nagendra. Thermal performance of glass fiber reinforced gypsum roof with thermally activated building system – a pilot study. *National Conference on Advances in Refrigeration and Cryogenics*, Mumbai, June, 2016.
8. U. Gopinath, K. Dharmasastha, D. G. Leo Samuel, S. M. Shiva Nagendra and M. P. Maiya. Impact of cooling surface (area) on the performance of concrete core cooling system. *4th National Conference on Refrigeration and Air Conditioning*, Chennai, October, 2015.
9. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Nocturnal and evaporative cooling system for Indian climatic conditions. *3rd National Conference on Refrigeration and Air Conditioning*, Chennai, December, 2013.
10. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Numerical modeling of passive concrete core cooling system. *3rd National Conference on Refrigeration and Air Conditioning*, Chennai, December, 2013.
11. D.G. Leo Samuel, S.M. Shiva Nagendra and M.P. Maiya. Application of passive cooling system in tropical climate. 2nd *National Conference on Refrigeration and Air Conditioning*, Chennai, India, July, 2011.

A BRIEF DESCRIPTION OF MY PAPERS

1. **Feasibility analysis of passive thermally activated building system (TABS) for various climatic regions in India:** TABS are energy efficient and eco-friendly alternative to the conventional mechanical air-conditioning systems. It can be easily coupled with the passive cooling systems as it can operate at relatively higher temperature. However, the performance of the system greatly depends on the climatic conditions. This paper analyses the applicability of passive TABS for twelve Indian cities from five different climatic zones. It can provide confidence to stack-holders to employ the proposed passive cooling system, thus leading to sustainable development.

2. **A Study of Pipe Parameters on the Performance of Cooling Tower Based Thermally Activated Building System (TABS):** The performance of cooling tower based TABS greatly depends on the system design. However, studies on the influence of various design parameters of TABS on the indoor thermal comfort are scarce in the literature. This paper analyses the influence of three design parameters namely spacing between the pipes, distance of the pipes from the inner surface and pipe arrangement (serpentine and parallel). Thus, the paper aims not only to clear the knowledge gap but also to aid the HVAC designer to optimize the cooling system based on the requirements.

3. **An analysis of operating parameters in the cooling tower based thermally activated building system:** To achieve the best cooling experience and to run the system at optimal conditions, the maintenance engineer of the air conditioning system must know the influence of various operating parameters on the indoor thermal comfort indices. This paper investigates the impact of three operating parameters, namely supply temperature and flow rate of water and cooling area of a TABS on the indoor thermal comfort. The sequence in which various surfaces (roof, floor and walls) are cooled is found to have an appreciable influence on the cooling performance of the system.

4. **Simulation of indoor comfort level in a building cooled by a cooling tower–concrete core cooling system under hot–semiarid climatic conditions:** This paper provides the detailed account of the numerical model developed and the model validation of a passive cooled TABS. The feasibility of the system in hot semi-arid climatic conditions of New Delhi is investigated using thermal comfort indices namely predicted mean vote (PMV), predicted percentage of dissatisfied (PPD) and operative temperature. The influences of

internal load and ventilation on the diurnal fluctuation of indoor comfort indices and the time lag between the extrema of indoor and outdoor air temperatures are also presented.

5. **Parametric analysis on the thermal Comfort of a cooling tower based thermally activated building system in tropical climate – An experimental study:** The indoor thermal comfort achieved with a cooling tower based TABS depends on the various site conditions such as dry and wet bulb temperatures of ambient air, and solar radiation received by the building. To account for all these parameters, an experimental room of dimensions 3.5 m × 3.5 m × 3.15 m has been building in the natural environment. The experimental room has provisions to change various operating and design parameters. This paper discussed the influences of cooling surfaces (area), shading, natural ventilation and ceiling fan on the performance of cooling tower based TABS.

6. **Passive alternatives to mechanical air-conditioning of building: A review:** This review paper provides details on various passive cooling techniques in layman language (easily understandable). The paper presents the merits and demerits of the passive cooling systems and discusses the design and operating parameters that influence the performances of the systems. The paper discusses the feasibility of various passive cooling systems for different climatic conditions. It also highlights the advantages of coupling radiant cooling system with passive cooling sinks. This paper is cited by 42 and 56 literature as per Scopus and Google Scholar respectively.

7. **Thermal comfort in traditional buildings composed of local and modern construction materials:** Passive cooling features of ancient building architectures are cost-effective, eco-friendly and best suited to the local climate. On the other hand, the modern construction materials, such as cement and steel, are highly durable. Thermal comfort of eight vernacular buildings that use modern construction materials to improve the structural durability was monitored. The buildings have many passive cooling features that include air cavities in the structures to reduce heat transfer, high thermal mass to reduce temperature fluctuation and induced ventilation to remove heat from the indoor. All the passive cooling features investigated were found to have an appreciable influence on the thermal comfort of the indoor space.

8. **Cooling performance and indoor air quality characteristics of an earth tunnel cooled building:** Earth air tunnel system (EATS) is not only energy-efficient and eco-friendly but also provides a good IAQ because of the sufficient fresh air supply. This paper presents

the cooling performance and IAQ characteristics of a building supported by an EATS. The building was monitored for the concentration of fine and coarse particulate matter (PM), carbon dioxide (CO_2) and carbon monoxide (CO), temperature distribution and relative humidity (RH). Correlation analyses are carried out to understand the influences of thermal comfort parameters on IAQ parameters. The CO_2 and PM concentrations correlate well with indoor air temperature and RH respectively.