

Prof. Chellamma Mathew, fondly called by her colleagues and students as Chellamma Kochamma, after her Masters in Physics, joined the department in 1961, where she continued to serve as the Professor of Physics till her retirement in 1986.

Apart from the competency as a teacher, she was well known as a strict disciplinarian too; but she always showered unusual personal care and warmth not only to her students but to every individual of the wider fraternity of which she was very much part of.



PROF. CHELLAMMA MATHEW

She was a feminist in the true sense of the word and advocated for freedom of women from the inherent patriarchal leanings. She never compromised on values and principles. Through out her life she remained a spinster. Her home was wide opened for the cultural realm of the academic community, especially of girls and women. As a host she had been luxurious with hospitality and meticulousness. Further, she was exceptionally proficient in English and loved English literature. She died in 2017 leaving her deep footprints in all fields of her endeavours.



DEPARTMENT OF PHYSICS MAR THOMA COLLEGE, TIRUVALLA

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Seventh Prof. Chellamma Mathew Memorial Lecture

Title of the talk:

*Energy from the Lampshade:
Light That Works Overtime*

Speaker

Dr. Suraj Soman

*Principal Scientist
NIST Thiruvananthapuram*



10:00am



Thursday
19 February 2026



Seminar Hall, Dr. Alexander Mar Thoma
Memorial Golden Jubilee Block



SUSTAINABLE DEVELOPMENT GOALS

INVITATION

Dear Sir/Madam,
We, the staff, students and alumni of the Department of Physics, solicit your esteemed presence at the seventh Prof. Chellamma Mathew Memorial Lecture, scheduled to be held on Thursday, 19th February 2026 at 10:00am in the Seminar Hall, Dr. Alexander Mar Thoma Memorial Golden Jubilee Block.

Dr. Suraj Soman, Principal Scientist, CSIR-NIIST, Thiruvananthapuram will deliver the memorial lecture.

Dr. Mathew Varkey T. K.
Principal

Dr. Angel Susan Cherian
HoD & General Convenor

Dr. Noble P. Abraham
Coordinator

Organising Committee

Dr. I. John Berlin

Dr. Arun Vinod

Dr. Anju K. Nair

Dr. Navya Sara Kuriyan

Dr. Elizabeth Thomas

ABSTRACT

Energy from the Lampshade: Light That Works Overtime

Dr. Suraj Soman, Principal Scientist
Centre for Sustainable Energy Technologies (C-SET)
CSIR-National Institute for Interdisciplinary Science & Technology (NIIST)
Ministry of Science and Technology, Govt. of India,
Thiruvananthapuram

In the realm of third-generation molecular light-harvesting technologies, our focus is on efficiently capturing and recycling diverse light sources, including indoor, artificial, ambient and diffused sunlight using custom engineered dye-sensitized solar cells (DSCs). DSCs stand out for their high efficiency, exceeding 40%, and their suitability for indoor use due to their lower cost, stability and ease of production.¹⁻² Recent innovations, such as co-sensitization approach, introduction of dual-species copper-based electrolytes replacing traditional iodide systems, use of bilayer TiO₂-ZnO nanostructured electrodes, have addressed recombination issues, enhancing performance of these innovative nano-photovoltaic devices under indoor and ambient lighting conditions.¹⁻⁴ These advancements not only improve efficiency but also promote environmentally friendly practices, positioning DSCs as a viable option to replace conventional one-time-use primary batteries for powering electronic devices, facilitating self-powered applications thereby reducing the carbon footprint.

My presentation will highlight CSIR-NIIST's pursuit of self-reliance in indoor light-harvesting technologies underscored by advancements in the domain of DSCs and the fascinating lab to land transition being realized developing indigenous scale-up production equipment's, innovative self-powered products over the past decade in my research lab at CSIR-NIIST. At NIIST, our endeavors extend to the custom design and optimization of these indoor light harvesters, utilizing tailor-made molecules, materials, and device architectures realizing world record efficiencies of 40% and above. By nurturing capabilities, CSIR-NIIST strives to establish a formidable position in the global indoor photovoltaic landscape, and propelling India towards self-sufficiency in emerging photovoltaic sectors.

References:

[1] *Journal of Materials Chemistry A*, 2024, 12, 32721-32734

[2] *Journal of Materials Chemistry A*, 12, 2024, 1081-1093.

[3] *Journal of Materials Chemistry A*, 11, 2023, 14748-14759.

[4] *Journal of Materials Chemistry A*, 6, 2018, 22204.

PAST LECTURES

- **2020 Dr. T. N. Narayanan**, TIFR, Hyderabad “Molecular interfaces for Energy Devices”.
- **2021 Prof. John Philip**, IGCAR, Kalppakkam “How materials have been transforming our lives?”
- **2022 Dr. Jinesh K.B.**, IIST, Thiruvananthapuram “Artificial Brain for Artificial Intelligence”.
- **2023 Prof. Praveen C Ramamoorthy**, IISc, Bangalore “Molecules To Devices: Solid State Sensors for Environmental Monitoring”.
- **2024 Prof. (Dr.) Anand Narayanan**, IIST, Thiruvananthapuram “The Large Scale Structure of the Universe”
- **2025 Dr. K. Rajendran**, Institute for Climate Change Studies, Kottayam “Climate Change: Theory, Modelling and Future Directions”