



SCDT – FlexE Centre Webinar Series

The webinars aim to bring together researchers in Flexible Electronics and allied areas from across India (and other countries) on a single platform to promote professional interaction.

Webinar by



Dr. Suraj Soman

Senior Scientist
Centre for Sustainable Energy Technologies (C-SET), CSIR-National Institute For Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram
on
“Fascinating Lab to Land Journey of Versatile Nanostructured Indoor Solar Cells”

Date: 15th April, 2025

Time: 7:30 PM to 8:30 PM

Visit www.iitk.ac.in/scdt/webinars.html to access the zoom link to join the webinar.

The event will be chaired by

Dr. L. Giribabu

CSIR-Indian Institute of Chemical Technology, Hyderabad

Abstract of the Webinar

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. Recent innovations, such as co-sensitization approach, introduction of dual-species copper-based electrolytes replacing traditional iodide systems, use of bilayer TiO_2 -ZnO nanostructured electrodes, have addressed recombination issues, enhancing performance of these innovative nano-photovoltaic devices under indoor and ambient lighting conditions. 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'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 innovative self-powered products in my research lab at NIIST over the past decade. 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 efficiencies of 40% and above. By nurturing capabilities, CSIR strives to establish a formidable position in the global indoor photovoltaic landscape, and propelling India towards self-sufficiency in emerging photovoltaic sectors.

Information about the speaker

Dr. Suraj received his Ph.D. from Dublin City University, Ireland, and pursued postdoctoral research at Caltech and Michigan State University, USA. He joined CSIR-NIIST in 2014 and currently serves as a Senior Scientist at the Centre for Sustainable Energy Technologies (C-SET). His research focuses on the indigenous development of indoor solar cells using third-generation molecular light-harvesting technologies such as dye-sensitized and perovskite solar cells, aiming to replace one-time use primary batteries realizing self-powered gadgets. He established a state-of-the-art molecular photovoltaics lab at CSIR-NIIST and has authored over 50 publications as corresponding author in this area. Dr. Suraj is a recipient of several prestigious awards, including the Solar Challenge Award (2023), CSIR Young Scientist Award (2020), INSA Medal for Young Scientist (2020) and Kerala State Young Scientist Award (2018).