



## 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. Monojit Bag

Department of Physics  
Indian Institute of Technology Roorkee

on  
“Polymer Nanoparticle Solar Cells:  
Challenges in morphology control and  
the perspective for indoor light  
harvesting”

Date: 12<sup>th</sup> May 2026

Time: 7:30 PM to 8:30 PM

Visit [www.iitk.ac.in/scdt/webinars.html](http://www.iitk.ac.in/scdt/webinars.html)  
to access the zoom link to join the  
webinar.

The event will be chaired by  
**Dr. Mayuribala Mangrulkar**  
Ahmedabad University

### Abstract of the Webinar

Organic solar cells have gained popularity in renewable energy sectors due to their light weight and solution processability on flexible substrates. However, most high-performance organic solar cells require solvent engineering, additive engineering, or specialized techniques to optimize thin-film morphology for improved charge generation and transport. Polymer/organic nanoparticles bridge the gap between molecular-scale assembly and meso-scale phase segregation by providing controlled size and shape. These nanoparticles are generally synthesized in aqueous media with a surfactant coating, which improves long-term stability under environmental conditions. Yet, fabricating efficient organic solar cells from these surfactant-stabilized nanoparticles remains a major challenge. Excess surfactant impedes charge transport, while a low surfactant concentration causes particles to aggregate, forming microcracks. In this talk, I will discuss general strategies for preparing thin films from aqueous dispersions without compromising film quality. In the end, I will demonstrate how efficient bulk-heterojunction polymer solar cells based on aqueous nanoparticles can be fabricated.

### Information about the speaker

Dr. Monojit Bag is currently an associate professor in the Department of Physics and an adjunct faculty member of the Centre for Nanotechnology at the Indian Institute of Technology Roorkee, India. He earned his master's degree in physics from the University of Pune in 2006 and his Ph.D. in Materials Science from JNCASR, India, in 2011. He has been working in the field of organic electronics for the last 20 years and in hybrid perovskite-based materials for energy harvesting and storage for the last 12 years. He has published over 90 research articles and holds several Indian and US patents. His current research focuses on energy-harvesting and storage devices, integrated photo-rechargeable supercapacitors, thin-film-based electrochemical FETs, and other optoelectronic devices, as well as next-generation memory devices for neuromorphic applications.