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. Samarendra Pratap Singh
Department of Physics
Shiv Nadar Institution of Eminence
Gautam Buddha Nagar

on
"From Laboratory to Application: Expanding Syringe Printing for Organic Electronic Devices"

Date: 12th August 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 Dhirendra Kumar Chaudhary
Veer Bahadur Singh Purvanchal University, Jaunpur

Abstract of the Webinar

Additive manufacturing is revolutionizing organic electronics and energy storage by enabling cost-effective, scalable production with minimal waste. Unlike conventional fabrication methods, printing technologies allow seamless laboratory-to-manufacturing transitions while reducing material usage. In this context, this talk will discuss potential of an in-house developed, custom-built, cost-effective syringe-based printer. By controlling the extrusion amount and feed rate, thin films are optimized to achieve the desired thickness and morphology, which are crucial for high-performance, Organic Solar Cells (OSCs) and low-voltage operating Organic Field-Effect Transistors (OFETs). The printed OSC, with a device architecture of ITO/ZnO/PTB7-Th:PC71BM/MoOx/Ag, has achieved a Power Conversion Efficiency (PCE) of up to 6.65%, comparable to spin-coated devices of the same architecture, processed and characterized in ambient. To further demonstrate the micron-level capability of the printer, a fully printed, eco-friendly, solid-state flexible supercapacitor is successfully fabricated. The supercapacitor exhibited impressive electrochemical performance. These results indicate that the low-cost syringe-based printer is a viable and superior technological alternative in the realm of flexible and printed electronics.

Information about the speaker

Dr. Samarendra Pratap Singh earned his doctoral degree in Physics from the prestigious Indian Institute of Technology (IIT) Kanpur, India. Subsequently, he served as a Research Scientist at the Institute of Materials Research and Engineering (IMRE), A*STAR Singapore. Currently, he is a Professor in the Department of Physics at Shiv Nadar Institution of Eminence, Gautam Buddha Nagar, India.

His research focuses on advancing the understanding of charge transport mechanisms and photophysical properties in carbon-based molecular semiconductor systems. His work centers around the development and characterization of innovative materials, particularly organic semiconductors and organic-inorganic hybrid structures, with applications spanning multiple technological domains. His interdisciplinary approach bridges fundamental physics with practical device engineering, targeting applications in field-effect transistors, photovoltaic cells, biosensing platforms, and next-generation flexible and wearable electronic systems. Through this research, he contributes to the growing field of molecular electronics and sustainable energy technologies, positioning novel materials at the forefront of emerging electronic applications.

Samtel Centre for Display Technologies (SCDT) and the National Centre for Flexible Electronics (FlexE Centre) of IIT Kanpur are dedicated to flexible electronics research and commercial deployment respectively

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