‘Still Life’ of Flexible Surfaces

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Abstract

Natural or artificial ‘flexible’ surfaces such as paper or PDMS have been extensively used in the modern devices. In this talk, we explore the usage of such surfaces in developing low-cost sensors, which are eventually translated into an array of frugal diagnostic devices such as enzyme detectors, immunosensors, breath sensors, tremor detectors, among others. In the process, the real-life examples of product design are brought in to show the utility of the understanding of such paradigms in the realm of point-of-care (POC) frugal diagnostics. Importantly, the vision of improving quality of global health requires a large number of POC facilities with decision making capabilities, accessible even for the ‘last mile’ population. In this direction, there is an urgent need to develop such POC devices specific to many biomarkers in various body fluids such as serum, sebum, urine, saliva, or tear. In addition to this, a complete healthcare solution can be thought of through the integration of such POC technologies with the IoT enabled software for analysis, trained manpower for the usage of such IoT enable devices at the level of primary care, and a health management system. In bits and pieces, we are able to join many of these dots, which will also make their appearance at the various places of this talk to highlight the necessity of art, science, and technology for the improvement of the quality of human ‘still life’.
Bio-Sketch

Dr. Dipankar Bandyopadhyay is a Professor in the Department of Chemical Engineering at IIT Guwahati and serves as the Head at the Centre for Nanotechnology and at the School of Health Sciences & Technology.

He obtained his B.Sc degree in Chemistry and B.Tech in Chemical Engineering from Calcutta University. After completion of M.Tech from the Department of Chemical Engineering at IIT Kanpur, he served ANSYS - Fluent India Private Limited for more than 3 years as a CFD Engineer before completing PhD from IIT Kanpur. He has also served as visiting faculty at Yeungnam University at South Korea under the WCU Program, and KTH Sweden under the Erasmus Mundus program.

Dr. Bandyopadhyay’s research areas encompass Thin Film Dynamics, Soft-matter Physics, Liquid Crystals and Smart Materials, Droplet and Digital Microfluidics, Health Care Point-of-Cater-Testing Devices, MEMS Theranostics, Microrheology, Clean energy, Harvesting, Computational Fluid Dynamics, Stability and Instability of Fluidic systems, Complex Fluids, Microrheology, among others.

He has authored ~130 research publications in the international journals and has filed 21 Indian and 9 international patents so far. He is also one of the PIs of “Centre for Excellence on the Research and Development of Nanoelectronic Theranostic Devices”, “Centre for Excellence in Disruptive Innovations & Product Development for Affordable Rural Healthcare”, and BioNEST at IIT Guwahati. He delivered Prof. C. V. Seshadri Memorial Distinguished Lecture 2020, IIT Kanpur. He is the recipient of NCL’s Prof. K Venkataraman CHEMCON Award in CHEMCON 2016. He and his group at the Indian Institute of Technology Guwahati is the recipients of Gandhian Young Technology award 2016 and 2019, BIRAC-SRISTI Appreciation Award 2017 and 2021. He is a nominated member of American Chemical Society, Royal Society of Chemistry, and Indian Institute of Chemical Engineers.