

Training the Next-Gen Scientist

8:30 AM, 17 May, 2022

Mondal Lab, IAP, Indian Institute of Science, Bangalore 560012, India

Workshop on

Light Sheet Microscopy and Imaging



Light Sheet Technology: The Next-Gen Technology

Partha Pratim Mondal | ASIA

**Bio:** Partha Pratim Mondal is a professor in the Department of Instrumentation and Applied Physics, Indian Institute of Science (IISc), Bangalore, India. He obtained his Ph.D. from IISc, was a postdoctoral research fellow at Massachusetts Institute of Technology, Cambridge, USA, International Centre for Theoretical Sciences, Trieste, Italy, and the University of Genova, Italy. Dr. Mondal's research interests include super-resolution microscopy, nanofluidics, imaging cytometry, nanolithography, light-sheet techniques, fluorescence imaging, optical traps, single molecule imaging and nanobiophysics. He has served as the editorial board member of Microscopy Res. Tech., Wiley and Scientific Reports (Nature Publishing). He has also served as associate editor of Frontiers in Nanobiotechnology, and AIP Advances, American Institute of Physics.

Full CV link at: <http://iap.iisc.ac.in/~partha/>

**Abstract:** Once in a century, a field of research comes across a technological breakthrough that takes it to the next level. This is something that seems apparent with the advent of light sheet technology. The very fact that, all of the science investigation, scientific instruments and engineering devices predominantly use point-illumination as a fundamental tool, makes light sheet so fundamental and desirable. Over a span of a few years, this technology has brought in sheet-selective interrogation and revolutionized the field of biology (developmental biology, organology), applied physics (imaging, microscopy, optical tweezers), medical science (clinical biology, medicine) and engineering (biomedical, nanofabrication). The technology has progressed further by its integration with existing engineering modules and sophisticated techniques (super-resolution, multiphoton imaging etc.) techniques. Unlike existing techniques that are predominantly point-illumination-based, light sheet technology offers selectivity, single-shot interrogation, a large field-of-view, and high-speed data acquisition. Qualitatively, this enables high quality investigation in terms of improved signal-to-background ratio, reduced scattering, improved contrast, and large-scale interrogation of specimens (from cells to mammals). The growth of this technique is well received by the research community, and it is expected to eventually dominate major fields of science and technology.

Talk Date & Time | 8:30 AM, 17 May, 2022 (Indian Time)

**Zoom Link:**  
<https://us06web.zoom.us/j/9093331111?pwd=bHdQSVh1J1RUR2ozZjdRZ1cvQT09>  
**Zoom Meeting Id :** 909 333 1111  
**Passcode :** LSMI2022



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7 PM, 17 May, 2022

Mondal Lab, IAP, Indian Institute of Science, Bangalore 560012, India

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The intelligent microscope project: towards new landscapes with MOMIX

Alberto Diaspro | EUROPE

**Bio:** Alberto Diaspro is Full Professor of Applied Physics at Department of Physics of Genoa University (UNIGE), Director of the Department of Nanophysics at the Istituto Italiano di Tecnologia (IIT), Academic of the Ligurian Academy of Sciences and Humanities, affiliated at Institute of Biophysics of the National Research Council (IBF, CNR). AD is Director of the Nikon Imaging Center at IIT. He was President of OWLS, EBSA. AD main research experience is related to the design, realization and utilization of optical instrumentation in molecular and cellular biophysics. AD published more than 400 papers, 16000 citations, H-60/source Google Scholar). He is Editor in Chief of Microscopy Research and Technique. AD is SPIE fellow, IEEE and OSA senior member. AD received the Emily M.Gray Award for mentoring in Biophysics in 2014 and the Award for Scientific Communication by the Italian Physical Society in 2019. AD is President of the Italian Biophysical Society (SIBPA) and of the Scientific Council of "Festival of Science". AD received the Gregorio Weber Award for excellence in microscopy in 2022.

Full CV link at <https://peerj.com/Diaspro/>.

Talk Date and Time: 7 PM, 17 May, 2022 (Indian Time)  
4 PM, 17 May, 2022 (Italian Time)

**Zoom Link:**  
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Selective Plane Illumination Microscopy (SPIM): Imaging Fast and Gentle

Abhishek Kumar | USA

**Bio:** Abhishek is an MBL Investigator and Chan-Zuckerberg Initiative (CZI) Imaging Scientist at the Marine Biological Laboratory (MBL). He is a physicist by training and his research interests are developing novel optical microscope systems and complimentary image analysis methods. Abhishek is leading the effort to establish MBL's Imaging Initiative. Currently, his lab's focus is to harness computer vision with home built multi-view optical microscopes for live imaging.

Full CV link at <https://www.mbl.edu/research/faculty-and-whitman-scientists/Abhishek%20Kumar>

Talk Date & Time | 8:30 AM, 18 May, 2022 (Indian Time)  
11:00 PM, 17 May, 2022 (USA Time)

**Zoom Link:**  
<https://us06web.zoom.us/j/9093331111?pwd=bHdQSVh1J1RUR2ozZjdRZ1cvQT09>  
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Training the Next-Gen Scientist

8:30 AM, 19 May, 2022

Mondal Lab, IAP, Indian Institute of Science, Bangalore 560012, India

Workshop on

Light Sheet Microscopy and Imaging



Selective How Developmental Biology paradigms can be addressed by live-cell imaging technologies in Model organisms

Upendra Nongthomba | ASIA

**Abstract:** Development of an organism is a highly complexed process, dictated by underlying genetic set up, their interactions with each other and with the environment. Many of the events are also controlled by mechanical forces produced by cell-cell, cell-tissue, and organ to organ interactions. Most of the developmental paradigms have been resolved with the development of high imaging tools, particularly the live-cell imaging techniques. In this talk, I will highlight few ground breaking developmental paradigms and how imaging tools have helped in understanding and dissecting the mechanisms involved.

Talk Date & Time | 8:30 AM, 19 May, 2022 (Indian Time)

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Full CV link at <https://dubl.wordpress.com/people/the-boss/>

Training the Next-Gen Scientist

4 PM, 20 May, 2022

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Light Sheet Microscopy and Imaging



Light-sheet super-resolution microscopy

Francesca Cella | EUROPE

**Bio:** Francesca C. Zanacchi works in the Physics Department at University of Pisa in the field of biophysics. Her research is mainly focused on the design and application of optical imaging techniques to study intracellular biological processes. In particular, the research activity involves advanced fluorescence imaging techniques, super-resolution microscopy and computational approaches oriented to single molecule studies of cells, tissues and organoids. Previously she worked as a researcher at the Italian Institute of Technology (IIT) and as a Postdoc at the Institut de Ciències Fotòniques (ICFO) in Spain. She graduated in Physics at the University of Genoa (Italy) in 2006 and in 2010 she accomplished her PhD studies in Physics (University of Genoa). She was a visitor scientist at the European Molecular Biology Lab (EMBL, Heidelberg) in 2008, at University of Maine (USA) in 2009 and at the University of Frankfurt in 2013.

Full CV link at: <https://orcid.org/0000-0002-2427-3009>

**Abstract:** The advent of light sheet based techniques (LSFM) represents a breakthrough in biological processes imaging. We will focus on the main challenges, in terms of imaging depth and resolution improvement of LSFM. Within this context, recently, the coupling of localization based techniques and selective plane illumination microscopy allowed to extend the application range to thicker tissues (up to 150µm). However, imaging in depth is still limited since it suffers from a decreasing in the image quality due to scattering effects. Here we also focus on the advantages provided by non linear excitation in individual molecule localization-selective plane illumination (IML-SPIM) when imaging scattering samples. In particular, two photon photo-activation can be exploited to improve performances in terms of imaging depth capabilities and image contrast, reducing light-sample interactions and sample photo-damage.

Talk Date & Time | 4:00 PM, 20 May, 2022 (Indian Time)  
12:30 PM, 20 May, 2022 (Italian Time)

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