Light Sheet Technology: The

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

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

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, 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

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

Institute of Physics.

Zoom Link:

Mondal Lab

https://us06web.zoom.us/j/9093331111?pwd=bHdQSVhLb1J1RUprR2ozZjdRZ1cvQT0

Zoom Meeting Id: 909 333 1111 Passcode : LSMI2022





fields of science and technology.

Training the Next-Gen Scientist

7 PM, 17 May, 2022

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

Workshop on

Light Sheet Microscopy and Imaging







The intelligent microscope project: landscapes with new **MOMIX**

Alberto Diaspro | EUROPE

Abstract: Advanced optical microscopes have been implemented in the last decades, shining a new light on the cellular and molecular biology questions. Multimodal optical microscopy image correlation sensing (MOMIX) is a growing attitude boosted by artificial intelligence that makes intelligent the microscope. In the era of superresolved fluorescence microscopy, fluorescence plays a significant role, including its photochemical parameters, from brightness to lifetime, and non-linear approaches, like those associated with multi-photon excitation, also able to exploit intrinsic fluorescence and SHG/THG. In this framework, polarization methods, like Mueller matrix microscopy, expand contrast mechanisms available for imaging toward label-free. The intelligent MOMIX is AIguided through a computational core based on independent component analysis (ICA) un-supervised machine learning towards supervised deep learning. The ambitious target is to create a robust virtual environment "to see "what we could not perceive before. An interesting case study is related to understanding the role of chromatin remodelling in physiological/pathological processes.

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

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.

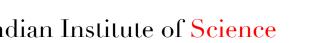
Talk Date and Time: 7 PM, 17 May, 2022 (Indian Time) 4 PM, 17 May, 2022 (Italian Time)

Zoom Link: https://us06web.zoom.us/j/9093331111?pwd=bHdQSVhLb1J1RUprR2ozZjdRZ1cvQT09

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Training the Next-Gen Scientist

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

https://www.mbl.edu/research/faculty-and

whitman-scientists/Abhishek%20Kumar

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Full CV link at

Workshop on

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

Light Sheet Microscopy and Imaging

(SPIM): Imaging Fast and Gentle

Abstract: Selective Plane Illumination Microscopy

(SPIM) or Light Sheet Fluorescence Microscopy

(LSFM) has emerged as a powerful fluorescence

microscopy tool for bioimaging. LSFM is very well

suited for long term imaging as it offers optical

sectioning, high-speed imaging, and low

photobleaching and phototoxicity. I will give a brief

overview of this field and then discuss building

blocks of SPIM systems. I will also discuss various

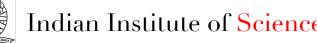
implementations and SPIM's applicability. Finally, I

will conclude by discussing data handling and image

Talk Date & Time | 8:30 AM, 18 May, 2022 (Indian Time)

11:00 PM, 17 May, 2022 (USA Time)

fusion aspects associated with SPIM imaging.



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Training the Next-Gen Scientist

8:30 AM, 19 May, 2022

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Light Sheet Microscopy and Imaging



8:30 AM, 18 May, 2022



professor of Molecular Reproduction, Development and Genetics Department at the Indian Institute of Science. Prof. Nongthomba is currently working on mechanisms of muscle and neuronal development and their diseases; aging and longevity; epigenetic nheritance; freshwater ecology, drug screening, and understanding the science behind Ayurveda formulations, using small model organisms. The main focus of his group is to understand the molecular and cellular basis of myopathies and neurodegenerative disorders. His team use two genetically tractable model organisms, Drosophila melanogaster (fruit fly) and Danio rerio (zebrafish) to trace the etiology of these diseases, and dissect the associated mechanisms. He is also interested in identifying host factors responsible for host pathogen interactions. He uses genetic tools and transgenic approaches to identify novel factors, and decipher pathways underlying normal development and those which lead to the manifestation of diseased conditions. Experimental approaches include genetic, molecular, biochemical, and biophysical assays, electron and confocal microscopy, and behavioral tests. To this end, he has published near about 60 high-impact research articles. He is a member of many societies, associate editor of Frontiers in Cell and Developmental https://us06web.zoom.us/j/9093331111?pwd=bHdQSVhLb1J1RUprR2 Biology, Journal of Genetics. For his scientific contribution, he was given Sir C. V. Raman young Scientist's award by the Government of Karnataka

Full CV link at https://dbgl.wordpress.com/people/the-boss/ Selective How Developmental Biology addressed by live-cell imaging technologies organisms

Upendra Nongthomba | ASIA

Abstract: Development of an organism is a highly complexed process, dictated by underlying genetic t up, their interactions with each other and with environment. Many of the events are also ontrolled by mechanical forces produced by cellcell, 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

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

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microscopy



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

techniques, super-resolution microscopy and

computational approaches oriented to single

Previously she worked as a researcher at the

Italian Institute of Technology (IIT) and as a

Postdoc at the Institute 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.

molecule studies of cells, tissues and organoids

advanced fluorescence imaging



Francesca Cella | EUROPE

Light-sheet super-resolution

Abstract: The advent of light sheet based

4 PM, 20 May, 2022

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

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

Zoom Link:

Full CV link at.

https://us06web.zoom.us/j/9093331111?pwd=bHdQSVhLb1J1RUprR2ozZjdRZ1cvQT09

Zoom Meeting Id: 909 333 1111 Passcode: LSMI2022

https://orcid.org/0000-0002-2427-3009





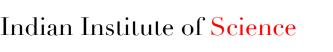


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