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3D Imaging Specialist,
Carl Zeiss Microscopy GmbH

"Light Sheet Microscopy – Next Generation Live Imaging"

28 May 2013, 11:00 (*s.t.*)

Venue: IMB Seminar Room 2nd floor

Institute of Molecular Biology (IMB)

Johannes Gutenberg University Campus Mainz

All are welcome to attend

IMB TechTalk

Abstract

Light Sheet Microscopy – Next Generation Live Imaging

Dr. Sören Alsheimer, 3D Imaging Specialist, Carl Zeiss Microscopy GmbH

Light sheet microscopy is a revolutionary imaging technology originally developed by Ernst Stelzer and Jan Huisken at EMBL. Core of this approach is the orthogonal arrangement of illumination and detection optics, which was already implemented in the "Ultramikroskop" from Carl Zeiss at the beginning of the century, and the shaping of the laser beam into a sheet of light. As a result of this implementation light sheet microscopes create optical sections by focal illumination and allow camera-based widefield detection. Compared to other imaging approaches light sheet microscopy features a number of advantages: (1) No pinhole is needed to create the optical section. (2) No out-of-focus illumination means strongly reduced laser load (up to a 1000x less compared to regular confocal). (3) No stray light from out of focus planes. (4) Cover glass-free mounting enables multiview acquisition with homogeneous illumination and up to isotropic z-resolution. (5) High-speed 3D imaging of very large samples is possible.

With the Lightsheet.Z1 Carl Zeiss is now offering the first commercial implementation of this technology as a fully intregrated imaging system. Due to its optics design Lightsheet.Z1 allows you to perform high-speed imaging of samples in the submillimeter range, such as entire embryos, organoids, explants, spheroids, and 3D cell culture with homogeneous illumination, strongly improved z-resolution and tremendeously improved sample viability.

The talk will provide an introduction into the topic, feature interesting application examples, and close with a brief presentation of Lightsheet.Z1.