Leica Microsystems

ABOUT

Leica Microsystems develops and manufactures microscopes and scientific instruments for the analysis of microstructures and nanostructures. Widely recognized for optical precision and innovative technology, the company is one of the market leaders in compound and stereo microscopy, digital microscopy, confocal laser scanning and super-resolution microscopy with related imaging systems, electron microscopy sample preparation, and surgical microscopy. Leica Microsystems is part of Danaher.

Users of Leica Microsystems' instruments and services can be found in both clinical and life science research, several surgical specializations, disciplines associated with material sciences, the manufacturing industry, and forensics services as well as in classrooms around the world. Instruments and workflow solutions for electron microscopy sample preparation for life sciences and industrial applications alike complete the company's product portfolio.

Leica Microsystems' Life Science area supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems' customers at the leading edge of science. Our portfolio for life science research includes the STELLARIS confocal platform with modalities ranging from FALCON for lifetime-based measurements, STED, Digital Light Sheet to multiphoton microscopy and CRS. THUNDER Imagers with computational clearing offer solutions for high-speed, high-quality imaging. Live Cell and Cryo CLEM workflow solutions provide tools for live cell imaging, vitrification and transfer to EM. Furthermore, our Aivia AI image analysis software complements the imaging portfolio. Cell DIVE for multiplexed imaging addresses spatial biology and function within the tumor microenvironment.

If you are interested in experiencing our advanced sample preparation and imaging solutions for life science research yourself, please come to our booth to schedule a personal appointment at the EMBL Imaging Centre.

INDUSTRY TALK

Judith Reddington – Leica Microsystems CMS GmbH

Petr Strnad – Viventis Microscopy Sàrl (part of Leica Microsystems), Lausanne, Switzerland

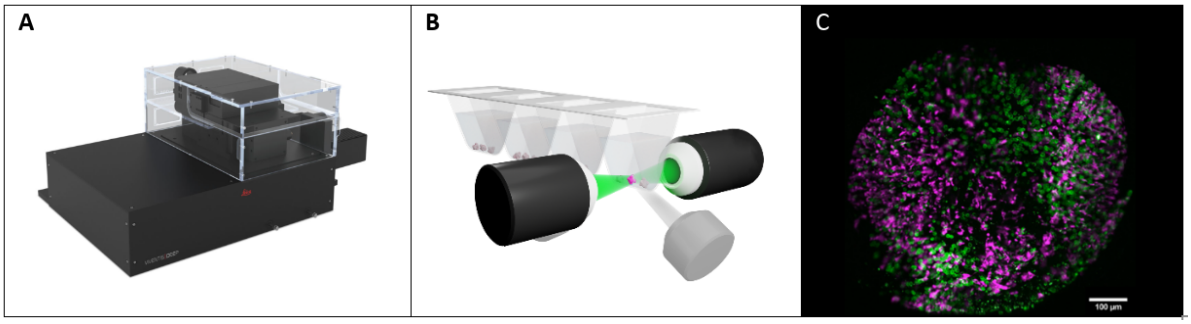
Open top multi sample dual view light sheet microscope for live imaging of large multicellular systems

Visualizing the dynamics of individual cells to understand the underlying mechanisms shaping complex tissues is an overarching goal in cell and developmental biology.

However, visualizing single cells in the innermost layers of large 3D multicellular systems like developing model organisms or 3D cell culture systems including spheroids or organoids is challenging, mainly due to light scattering causing poor penetration. In addition, understanding complex processes in these samples often requires crossing large spatiotemporal biological scales. Due to its high spatiotemporal resolution and low phototoxicity light sheet microscopy should be the method of choice for imaging of large living samples [1].

Here we present Viventis Deep: an open-top dual-view and dual-illumination light-sheet microscope purposefully designed for live imaging of large specimens at single-cell resolution. The configuration of objectives together with a customizable multiwell mounting system combines for the first-time dual view light sheet imaging with multiposition imaging [2].

In brief: Viventis Deep offers a unique combination of open top configuration, penetration depth into the sample easy sample mounting, throughput and long-term live imaging and enables the gain of quantitative single-cell information in large specimens even over extended periods of time.



(A) Viventis Deep Imaging System.

(B) Viventis Deep combines open top multi-position and 2 illumination and 2 detection objective imaging.

(C) 38 hour imaging of brain organoid.

[1] J. Huisken, J. Swoger, F. Del Bene, J. Wittbrodt, and E. H. K. Stelzer, "Optical Sectioning Deep Inside Live Embryos by Selective Plane Illumination Microscopy," Science, vol. 305, no. 5686, Art. no. 5686, Aug. 2004, doi: 10.1126/science.1100035.

[2] Moos, F., Suppinger, S., de Medeiros, G. et al. Open-top multisample dual-view light-sheet microscope for live imaging of large multicellular systems. Nat Methods 21, 798–803 (2024). https://doi.org/10.1038/s41592-024-02213-w