

Light sheet fluorescence microscopy for Multiview imaging of living and cleared specimens.



ZEISS Lightsheet 7



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Seeing beyond

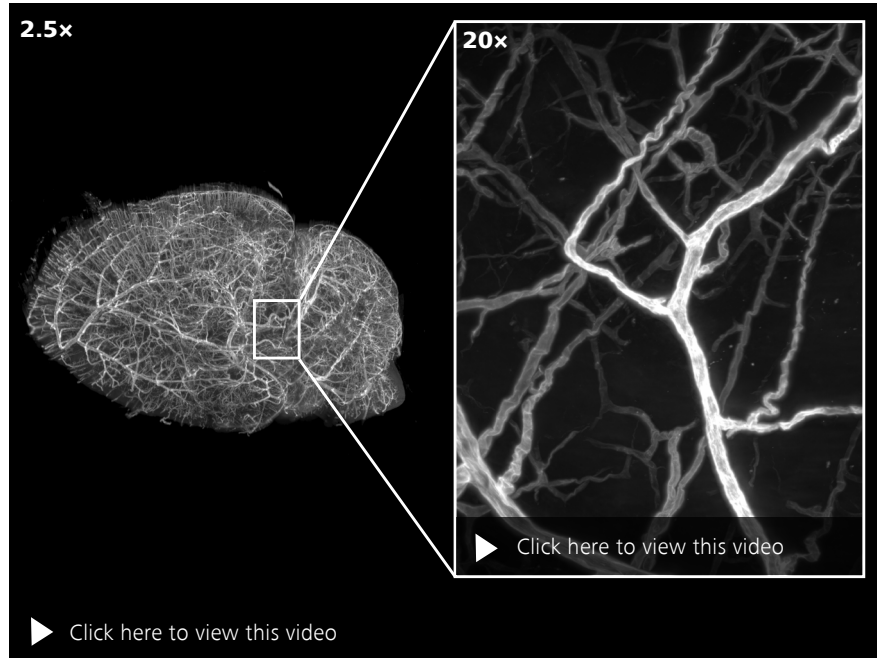
ZEISS Lightsheet 7

Light sheet fluorescence microscopy for Multiview imaging of living and cleared specimens.

Flexible. Robust. Easy to Use.

Life sciences research can put big demands on your imaging capability, sometimes requiring you to image whole living model organisms, tissues and cells as they develop. Light sheet fluorescence microscopy (LSFM) with its unique illumination principle is ideal for fast and gentle imaging of such specimens. The exceptional stability of Lightsheet 7 lets you observe living samples over extended periods of time — even days — with less phototoxicity than ever before.

What's more, you can employ this technique to image very large optically cleared specimens in toto, and with subcellular resolution. Enhance your Lightsheet 7 with dedicated optics, sample chambers and sample holders to accurately adjust to the refractive index of your chosen clearing method, and then image your large samples, even whole mouse brains. All of this flexibility comes in the proven and stable boxed light-sheet design from ZEISS.



Vasculature mapping of whole mouse brain, cleared using iDISCO+ protocol, equilibrated in ethyl cinnamate. Image volume is 13.1 × 13.1 × 6 mm at a pixel resolution of 1.83 × 1.83 × 6.77 μm. Acquired in 40 minutes in 4x4 tiles, 866 z-sections. Sample courtesy of E. Diel, D. Richardson. Harvard University, Cambridge, USA.

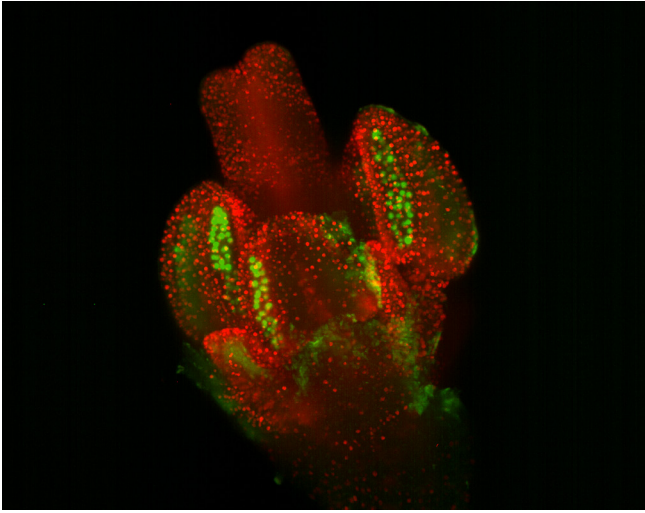
Image Optically Cleared Specimens

Which optical clearing method you choose will depend on the type of tissue you are imaging, your fluorescent labels and the size of the sample itself: Lightsheet 7 is designed to match all of these different conditions.

You can now image specimens at up to 2 cm in size at any refractive index between 1.33 and 1.58, and in almost all clearing solutions. Just one stable turn-key system lets you acquire overview images and data with subcellular resolution. Whether you work with optically cleared organoids, spheroids, organs, brains or other specimens, Lightsheet 7 is your microscope of choice for fast, gentle LSFM imaging.

Get Best Image Quality and Stability

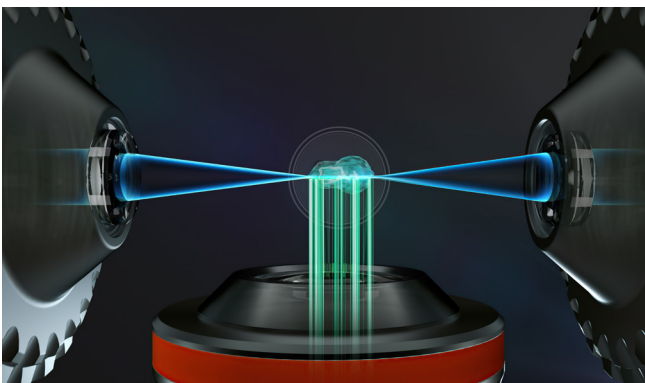
Take your LSFM imaging a step further to tackle a broad range of applications and achieve best image quality with your easy-to-use Lightsheet 7. Newly designed optics and sample chambers let you adjust to the perfect refractive index. The new sample holder makes mounting larger specimens simple. Smart software tools help you adjust imaging parameters, such as light sheet and sample positions, the right zoom settings, tiles and positions as well as data processing parameters. All of these new features go hand in hand with the reliable ZEISS combination of cylindrical lens optics and laser scanning to generate the illumination light sheet. Add the patented Pivot Scan technology and get artifact-free optical sections with best image quality.



Development of Arabidopsis. Red: H2B, mRuby for somatic nuclei. Green: ASY1, eYFP for meiocytes. Courtesy of S. Valuchova, P. Mikulkova and K. Riha, Central European Institute of Technology (CEITEC), Masaryk University, Brno, Czech Republic.



ZEISS Lightsheet 7: Schematic drawing of functional principle



Schematic drawing of light sheet fluorescence microscopy (LSFM)

Observe Real Life – Fast and Sensitive

Lightsheet 7 now features the high quantum efficiency of pco.edge sCMOS detectors to enable observations of the fastest processes at the lowest illumination light levels. You'll get a real life view of your samples without the adverse effects of excitation light on their biology.

For vertically oriented specimens and highest frame rates, opt for the CMOS detector AxioCam 702: a special sample chamber provides heating, cooling and CO₂ to maintain the perfect environment for your experiments. Add Multiview and triggering options to control external devices – Lightsheet 7 is your ideal system to observe live processes in an almost unlimited range of organisms.

Maximum Photon Efficiency. Maximum Speed. Maximum Sample Size.

Light sheet fluorescence microscopy (LSFM) splits fluorescence excitation and detection into two separate light paths, with the axis of illumination perpendicular to the detection axis. That means you can illuminate a single thin section of the sample at one time, generating an inherent optical section by exciting only fluorescence from the in-focus plane. No pinhole or image processing is required. Light from the in-focus plane is collected on the pixels of a camera, rather than pixel by pixel as, for example, in confocal or other laser scanning microscopes.

Parallelization of the image collection on a camera-based detector lets you collect images faster and with less excitation light than you would with many other microscope techniques. In summary, LSFM combines the optical sectioning effect with parallel image acquisition from the complete focal plane. This makes 3D imaging extremely fast and very light efficient. The de-coupling of the detection optics from the illumination optics enables fluorescence excitation with dedicated lenses at low numerical aperture, without sacrificing detection resolution and sensitivity. This makes LSFM ideal for imaging of samples at the millimeter scale, such as developing organisms or large cleared tissue samples.

Your Flexible Choice of Components



1 Microscope

- Standalone sealed box system: laser safe, no eyepieces, sample chamber, sample holder
- Incubation and temperature control options (cooling and heating)
- CO₂-Module

2 Objectives

- Lightsheet 7 detection optics 5×/0.16 foc (water, clearing n=1.33–1.58)
- Lightsheet 7 detection optics 10×/0.5 (water immersion)
- Lightsheet 7 detection optics 20×/1.0 (water immersion)
- Clr Plan-Apochromat 20×/1.0 Corr nd=1.38
- Clr Plan-Neofluar 20×/1.0 Corr nd=1.45
- Clr Plan-Neofluar 20×/1.0 Corr nd=1.53
- Lightsheet 7 detection optics 40×/1.0 (water immersion)

3 Illumination

- Lightsheet 7 illumination optics 5×/0.1 foc
- Lightsheet 7 illumination optics 10×/0.2 foc
- Flexible choice of laser lines: 405 nm, 445 nm, 488 nm, 515 nm, 561 nm, 638 nm
- Transmission LED for sample positioning and overview

4 Cameras

- Lightsheet 7 detection module "Axiocam"
- Lightsheet 7 detection module "pco.edge"
- Selected emission filters and beam splitters

5 Software

- ZEN 3.1 LS (black edition) for image acquisition
- ZEN 3.1 (blue edition) for image processing and analysis
- Lightsheet 7 Multiview Processing
- 3DXL
- Deconvolution
- arivis Vision4D®

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