MARIANAS LIGHTSHEET

Versatile live cell light sheet microscope

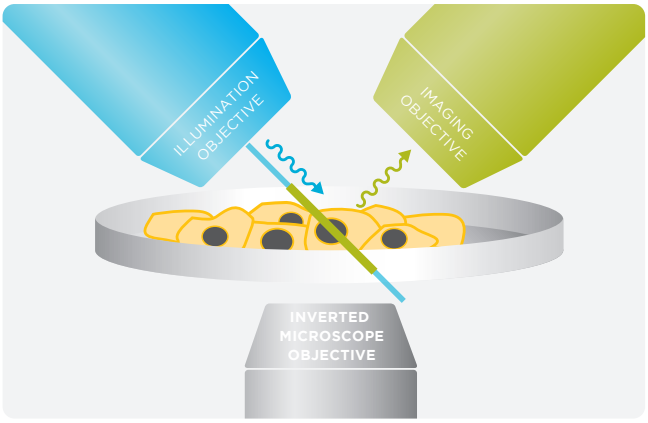
Marianas LightSheet™ merges the low phototoxicity and large specimen handling of dual inverted selective plane illumination (diSPIM) with the power and flexibility of a live-cell microscope system. diSPIM technology enables rapid 3D imaging of samples ranging from single cells to small organisms over the course of hours to days. Unlike capillary-based light sheet methods, diSPIM allows for standard specimen preparation in standard dishes in standard media. Combined with spinning disk confocal, TIRF, FLIM and photomanipulation, Marianas LightSheet is a powerful live-cell imaging workstation. SlideBook™ hardware and software integration seamlessly manages acquisition, alignment, deconvolution and rendering.

Rapid 3D imaging with isotropic resolution

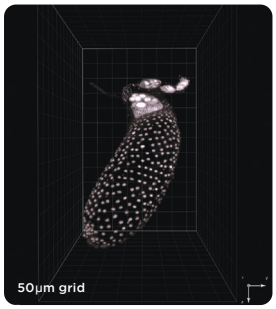
Selective plane illumination (SPIM) uses a thin sheet of light to illuminate only the plane of interest, reducing phototoxicity by drastically cutting total light dose and allowing for prolonged specimen imaging.

diSPIM employs two orthogonal objectives positioned at 45° above the specimen plane. By alternating between the objectives for imaging and excitation, diSPIM captures two volumes that are fused and deconvolved to achieve isotropic resolution.

The sheet is swept through the sample at high speed while a piezo moves the imaging objective to capture data up to 600 images per second.



The most flexible sample accommodation of any light sheet

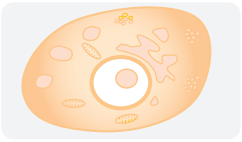


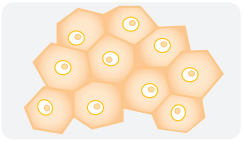
Drosophila embryo with DAPI staining of DNA

Horizontal specimen mounting supports conventional preparations such as coverslips and Petri dishes and provides a platform for custom-designed chambers.

Open sample chamber allows specimens of various sizes, ranging from cells to whole organisms.

Inverted microscope enables long term live cell experiments with available perfusion and incubator for full environmental control.



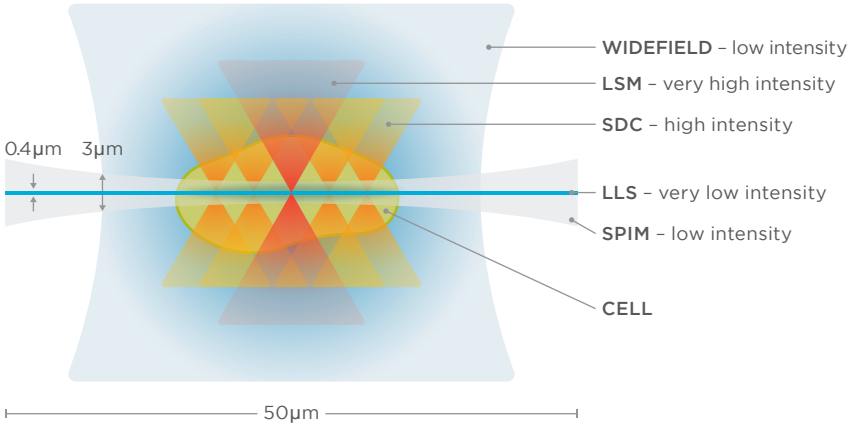


The ideal solution for cell viability

CELL VIABILITY

Peak light intensity is greatest in point-to-point scanning methods. Total light dose increases in methods that illuminate the entirety of the cell.

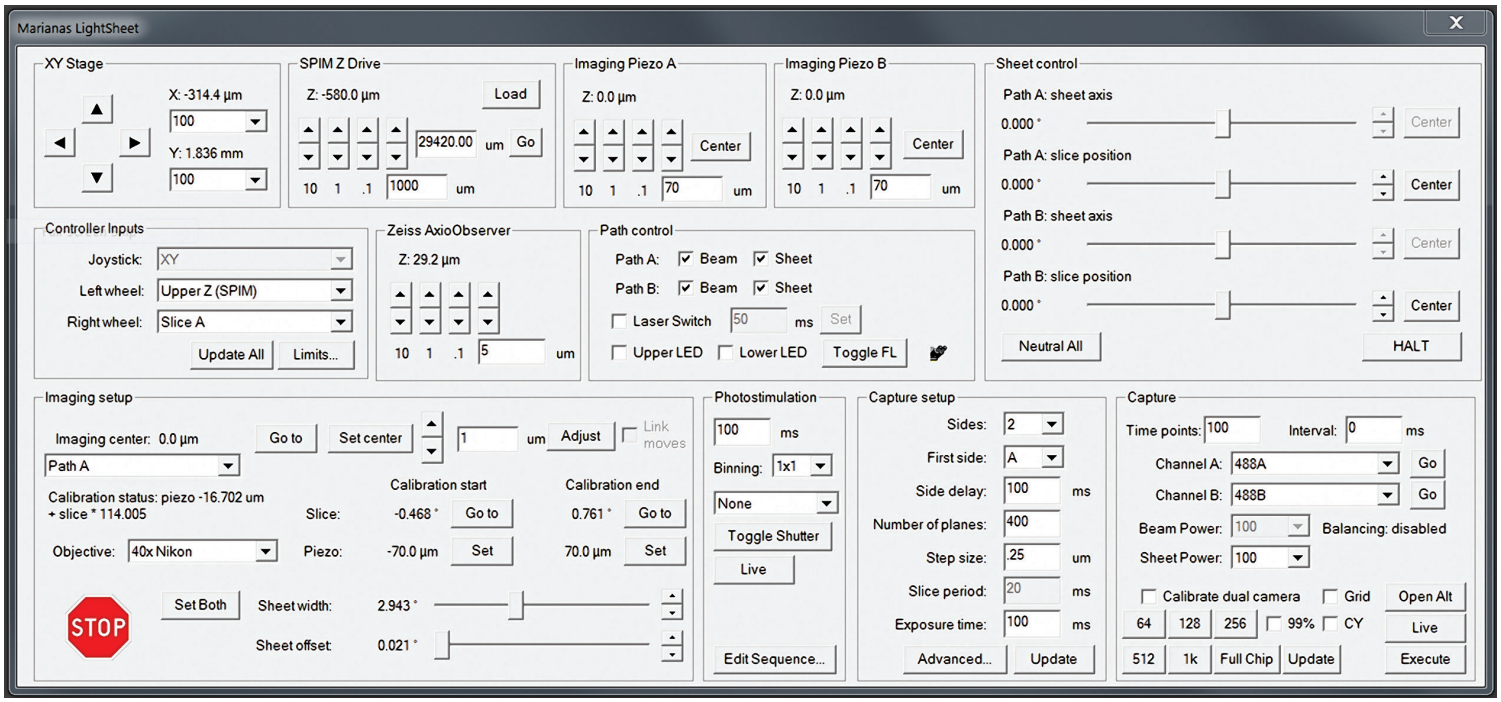
LIGHT DOSE / PHOTOTOXICITY

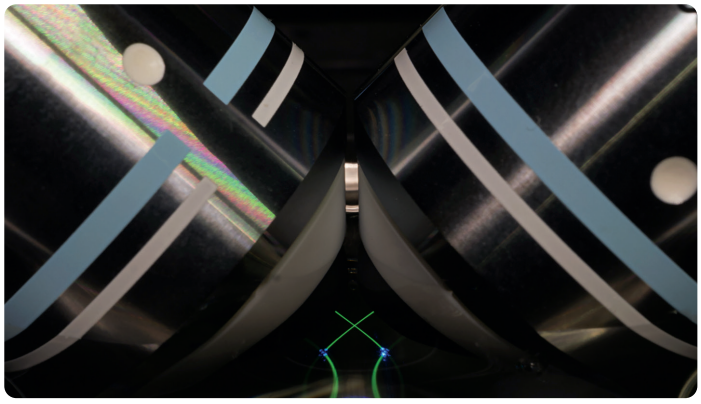


SPIM is ideal for long-term live cell imaging due to the low light intensity compared to confocal and laser scanning systems.

Fully integrated software solution

SlideBook 6





CAPTURE → FUSE → DECONVOLVE → ANALYZE

Integrated hardware and software control creates a seamless user experience with comprehensive control of acquisition and rendering.

- Software assisted camera and laser alignment
- High-speed deconvolution, fusion and 3D reconstruction
- Custom scripting and MATLAB® integration

Upgrades

CSU-X1 and CSU-W1
Spinning Disk Confocal

mSwitcher
Galvo-mirror 1ms optical path switching

Ablate!
Pulsed 355nm or 532nm laser for rapid, precise tissue injury

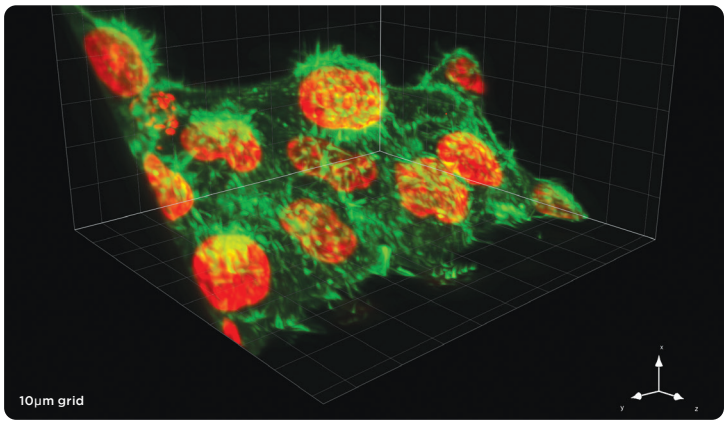
Vector
Scanner for FRAP, photoactivation, photoablation and uncaging

Phasor
Computer Generated Holography System

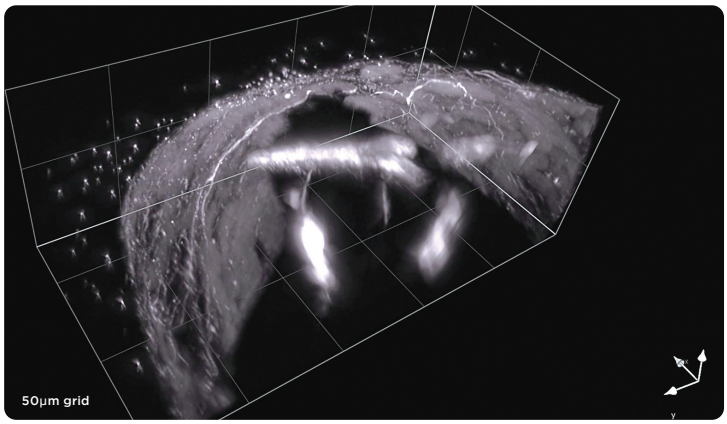
VectorTIRF
Motorized Spinning X,Y TIRF Illumination

Specifications

OBJECTIVES	10X water immersion, 0.3 NA, 3.5mm WD 20X water immersion, 0.5 NA, 3.5mm WD 40X water immersion, 0.8 NA, 3.5mm WD 16X multi-immersion RI 1.33-1.56, 0.4 NA, 12mm WD, CLARITY (coming soon)
OBJECTIVE TRAVEL	150µm or 300µm piezo translators
SPECIMEN MOUNTING	Horizontal stainless steel chamber 50mm x 24mm coverglass standard 95mm Petri dish Custom chambers available upon request
CAMERA	2048x2048 16-bit sCMOS 100fps Liquid cooling
LASER LINES	405nm, 445nm, 488nm, 515nm, 561nm, 594nm, 640nm
ENVIRONMENTAL CONTROL	Available perfusion system and full chamber incubator
COMPUTER	Dual 12-Core Xeon 2.3GHz CPUs 128GB RAM, 4GB GPU, 512GB solid state drive 2TB SSD RAID-10 drive array for data acquisition 10Gb Ethernet with optional multi-mode and single-mode fiberoptic connectivity



HeLa cells with fluorescently labeled Actin and DNA



4 day old live zebra fish larva expressing GFP

3i Intelligent Imaging Innovations

BUILT BY SCIENTISTS FOR SCIENTISTS. Intelligent Imaging Innovations (3i) designs and manufactures cutting edge live cell and intravital microscopy imaging platforms driven by 64-bit SlideBook software. 3i was established in 1995 by a group of scientists whose wide range of research activities includes cell biology, immunology, neuroscience and computer science. Our collective aim is to provide advanced multi-dimensional microscopy platforms that are intuitive to use, modular in design, and meet the evolving needs of investigators in the biological research community.

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