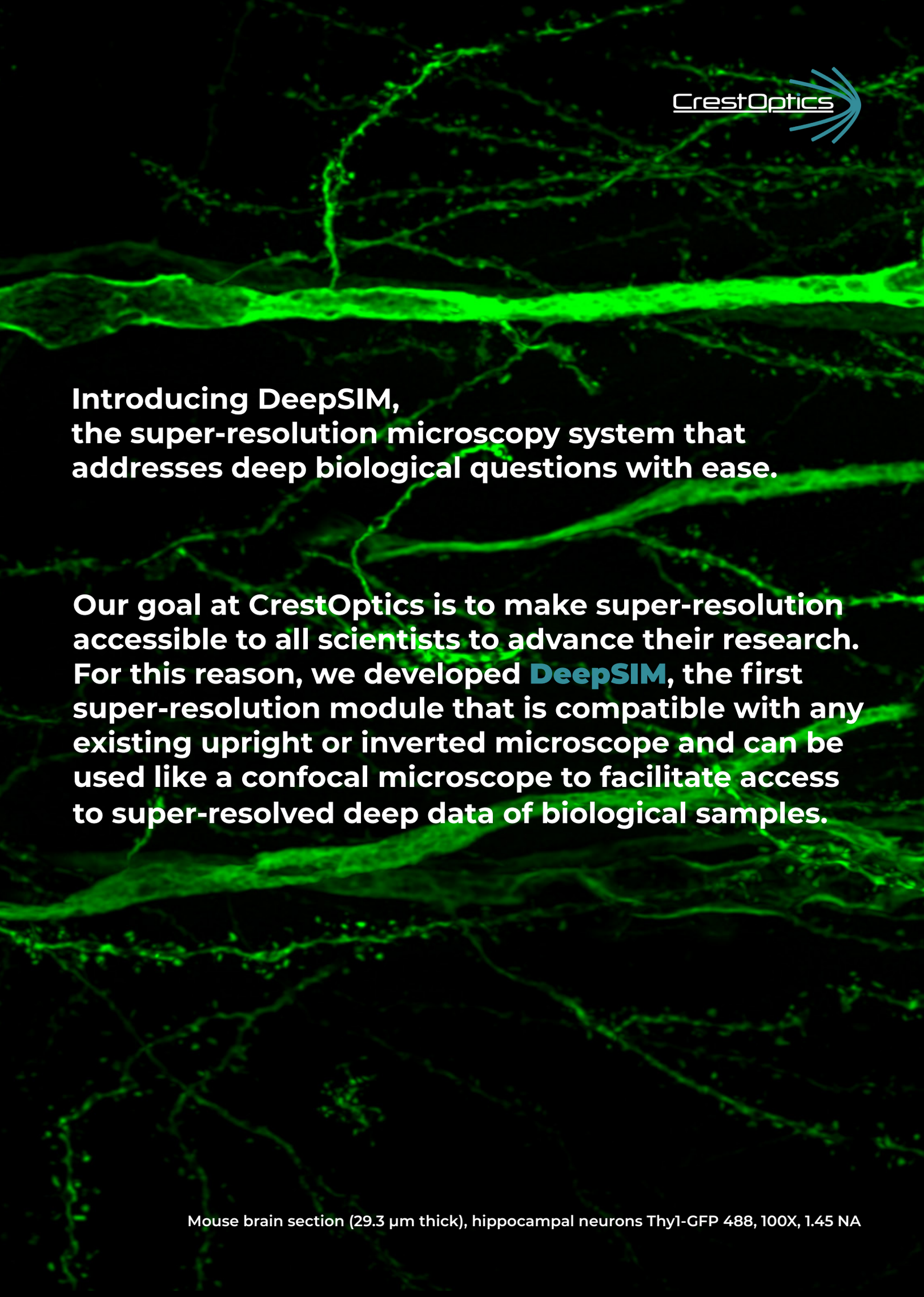
CrestOptics

DeepSIM

Seamless Evolution of Your Microscopy

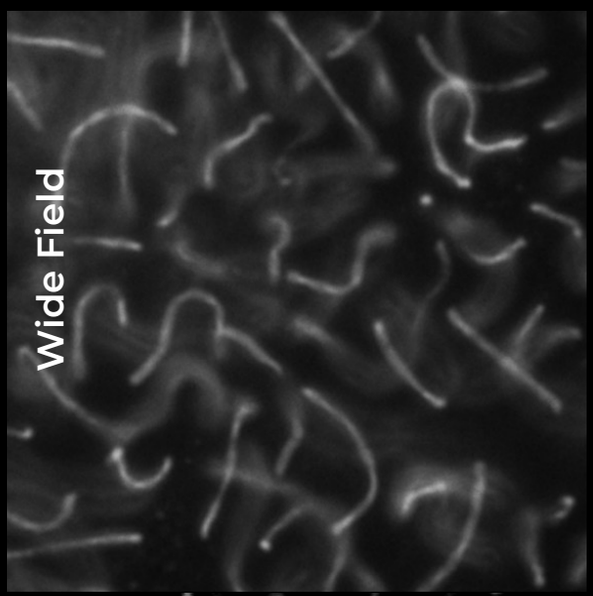


Introducing DeepSIM,
the super-resolution microscopy system that addresses deep biological questions with ease.

Our goal at CrestOptics is to make super-resolution accessible to all scientists to advance their research. For this reason, we developed DeepSIM, the first super-resolution module that is compatible with any existing upright or inverted microscope and can be used like a confocal microscope to facilitate access to super-resolved deep data of biological samples.

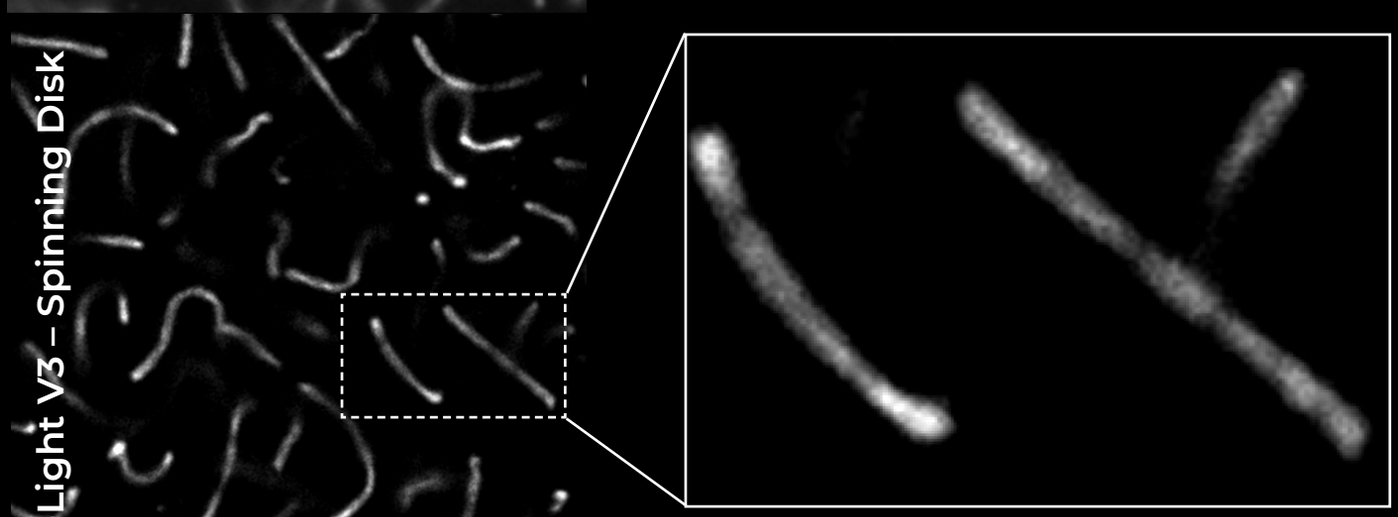
Mouse brain section (29.3 µm thick), hippocampal neurons Thy1-GFP 488, 100X, 1.45 NA

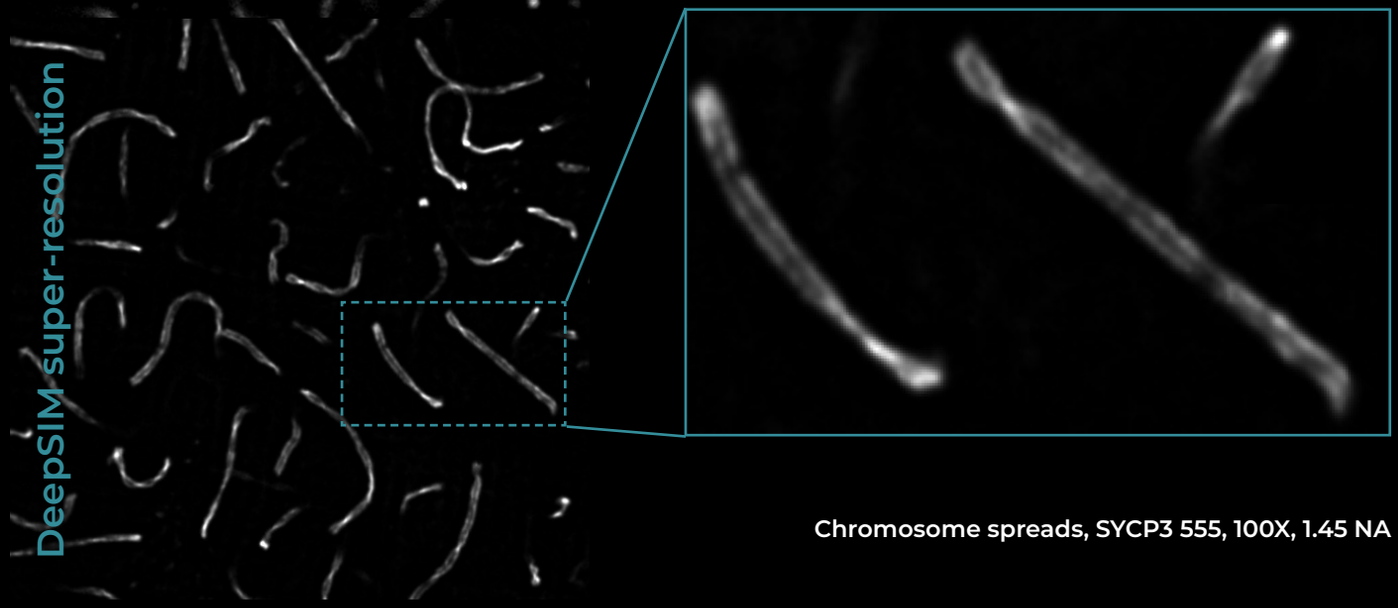
Three imaging modalities in one setup



By choosing **DeepSIM technology**, you will be able to create a modular, expandable, and highly performant system, resulting in the creation of a truly enabling technology.

The DeepSIM can be used both with CrestOptics' X-Light V3 confocal system as well as independently as a Stand-Alone system for any microscope that has a camera port.

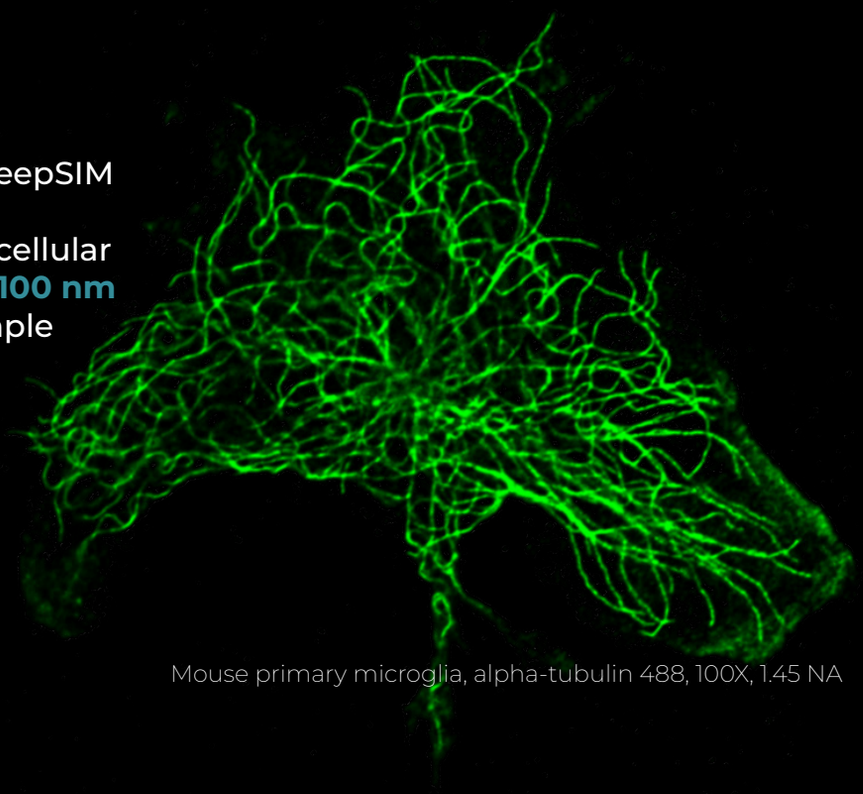




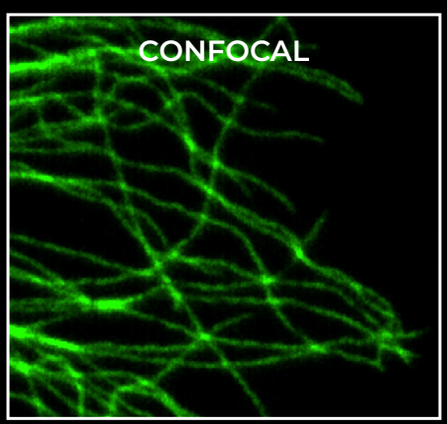
Chromosome spreads, SYCP3 555, 100X, 1.45 NA

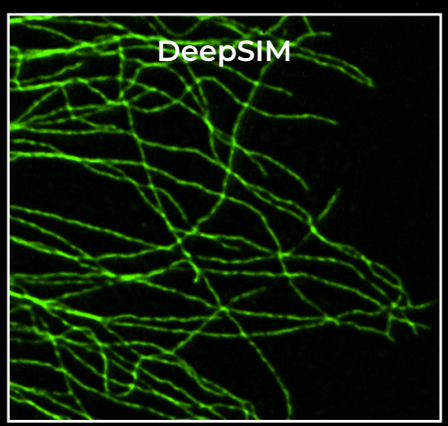
A single click to double confocal resolution

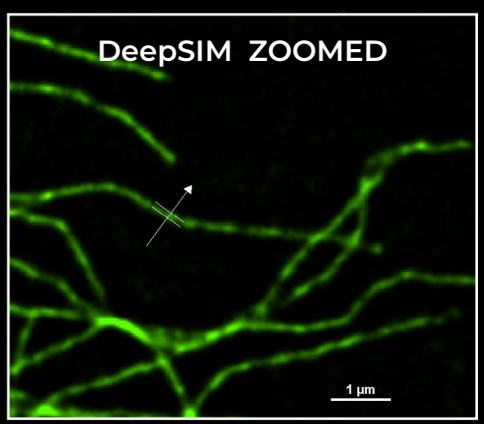
Through the use of a multi-spot structured illumination system, DeepSIM provides reliable, easy-to-use and affordable solutions to study sub-cellular structures with a XY resolution of **100 nm** without requiring any special sample preparation protocol.

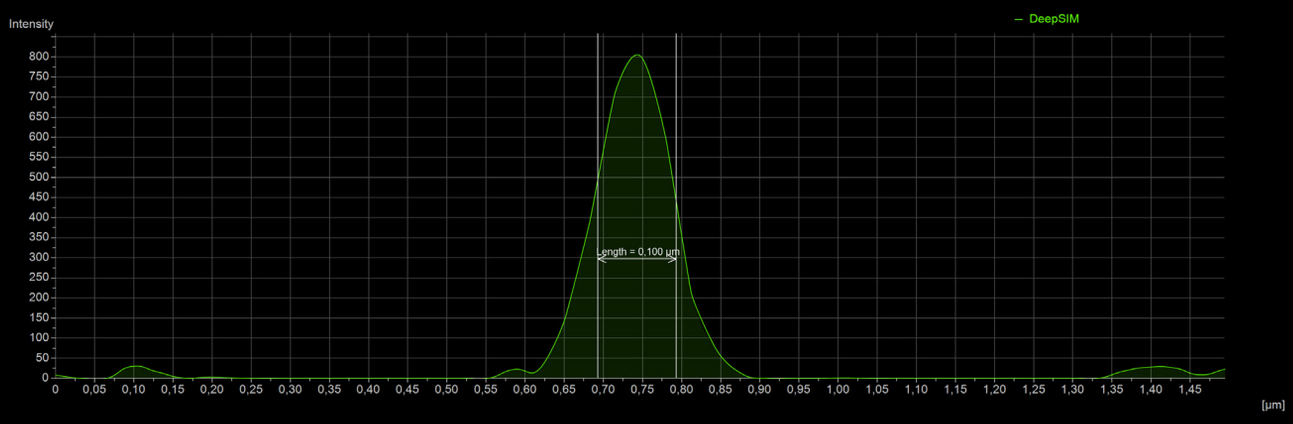


Mouse primary microglia, alpha-tubulin 488, 100X, 1.45 NA





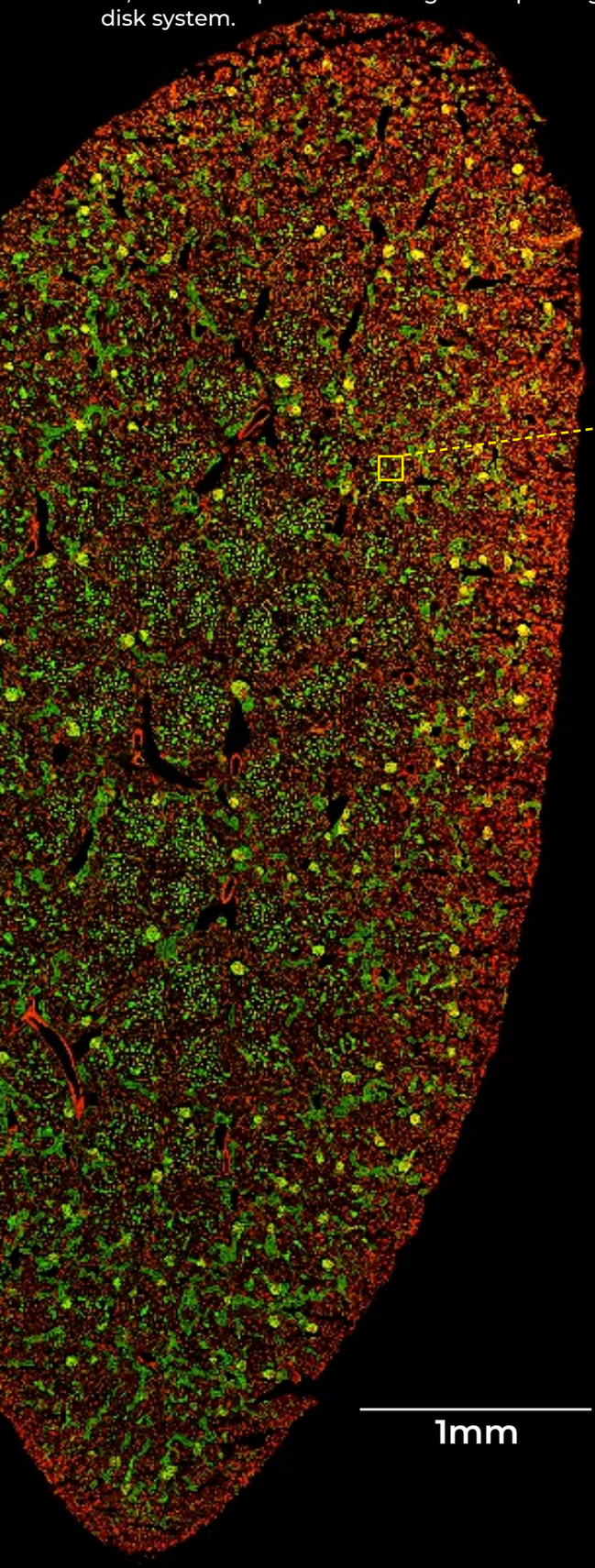




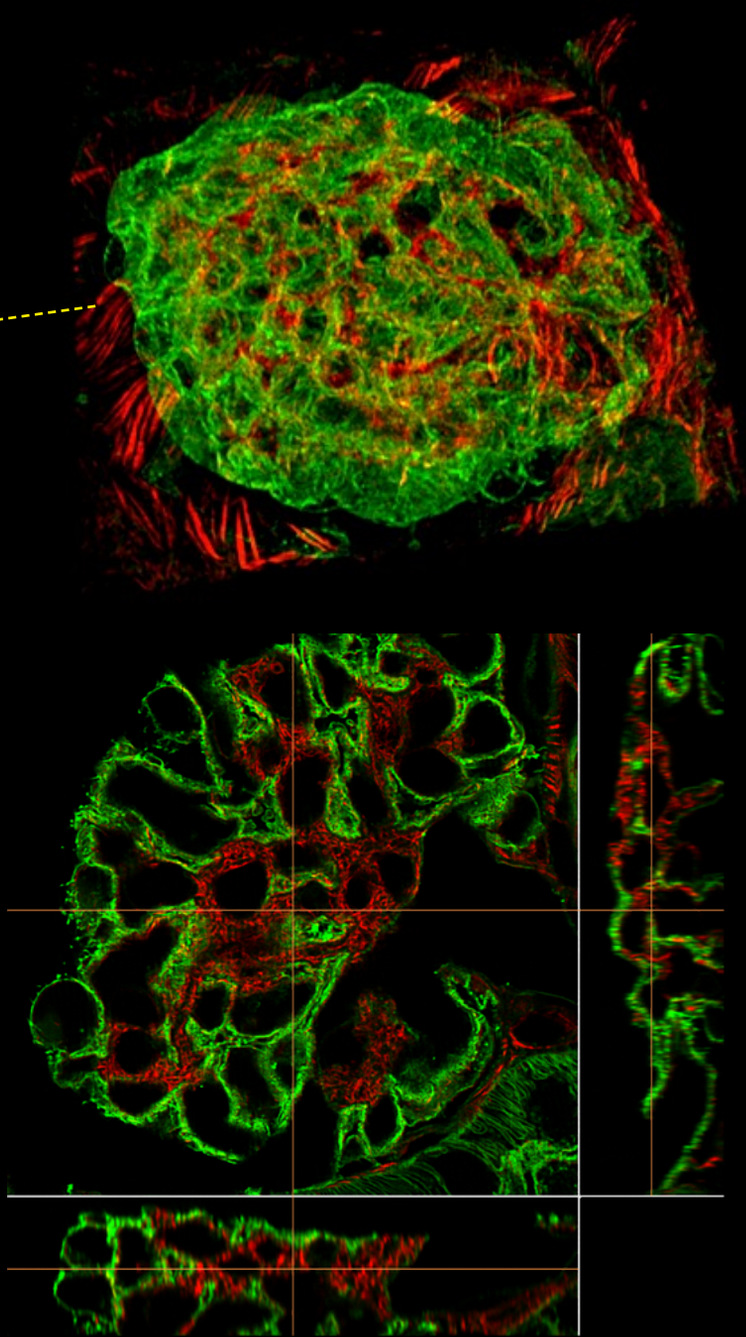
Mouse primary microglia, alpha-tubulin 488, 100X, 1.45 NA, 100 nm resolution

Three methods are available for obtaining deep data...

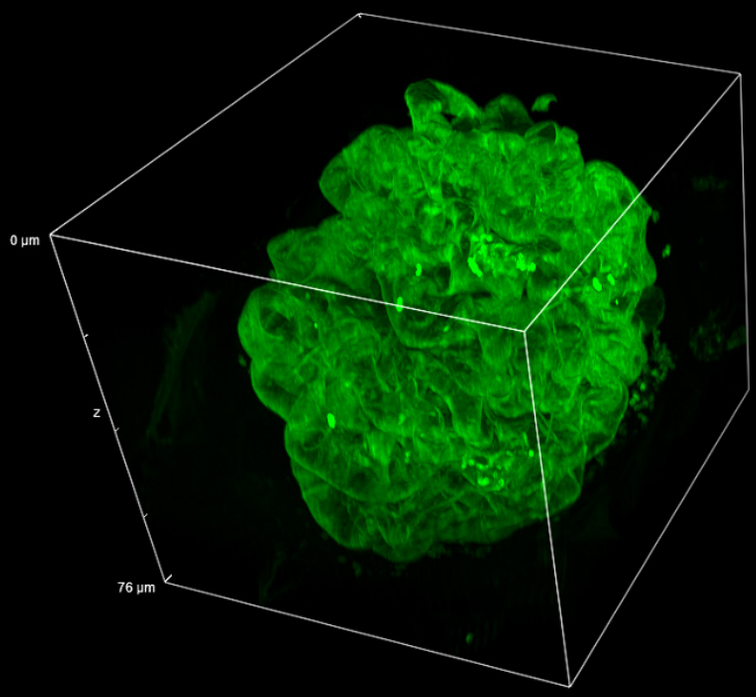
Mouse kidney section. Wheat Germ Agglutinin (WGA; green) and phalloidin (red) markers. 25X Sil, 1.05 NA acquired with X-Light V3 Spinning disk system.



With DeepSIM, large confocal acquisitions can be enhanced by adding a deeper level of detail thanks to **super-resolved optical sectioning with Z resolution of up to 300 nm.**



3D volume views of super-resolved glomeruli, 60X, 1.45 NA. Axial resolution is appreciable through orthogonal views.

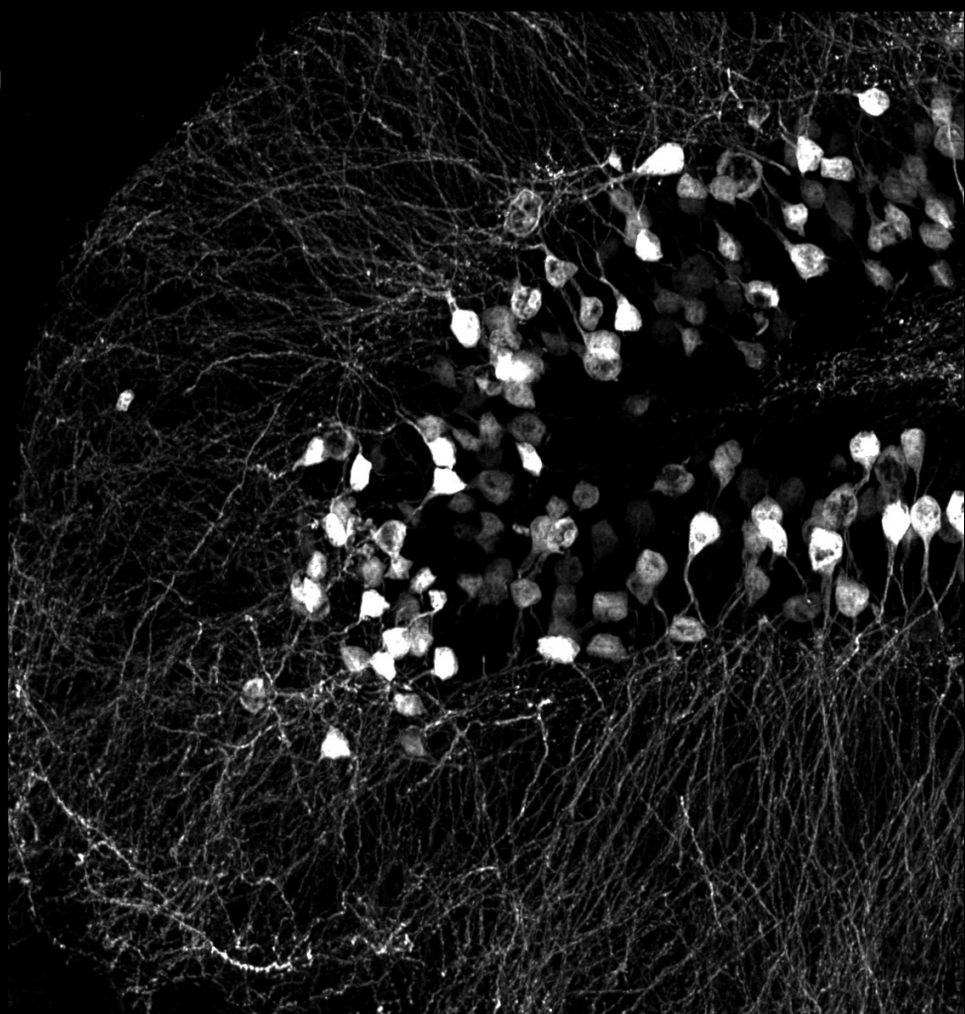


Cleared mouse kidney section stained with Alexa Fluor 488 labeling blood vessels.
Z stack 76µm and 3D rendering.

It can be used with samples with thicknesses comparable to those used in confocal microscopy, giving super-resolved data over a **depth of 50 µm**.

In this way, native heterogeneous complex samples can be investigated more thoroughly using routine preparation protocols.

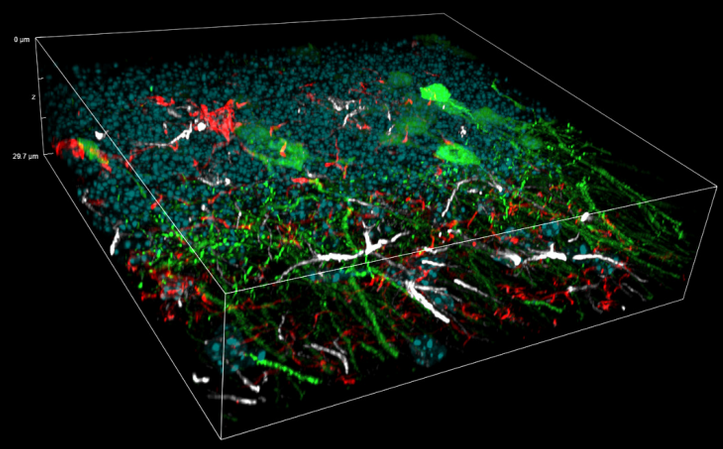
A two-fold increase in spatial resolution can be obtained using both **high magnification (60X, 100X) and low magnification (20X, 40X) objectives**, thereby enabling the study of complex 3D models such as tissues, spheroids, organoids, and small organisms.



Hippocampal coronal slice from Thy1-GFP mouse brain;
20X dry 0.75 NA.

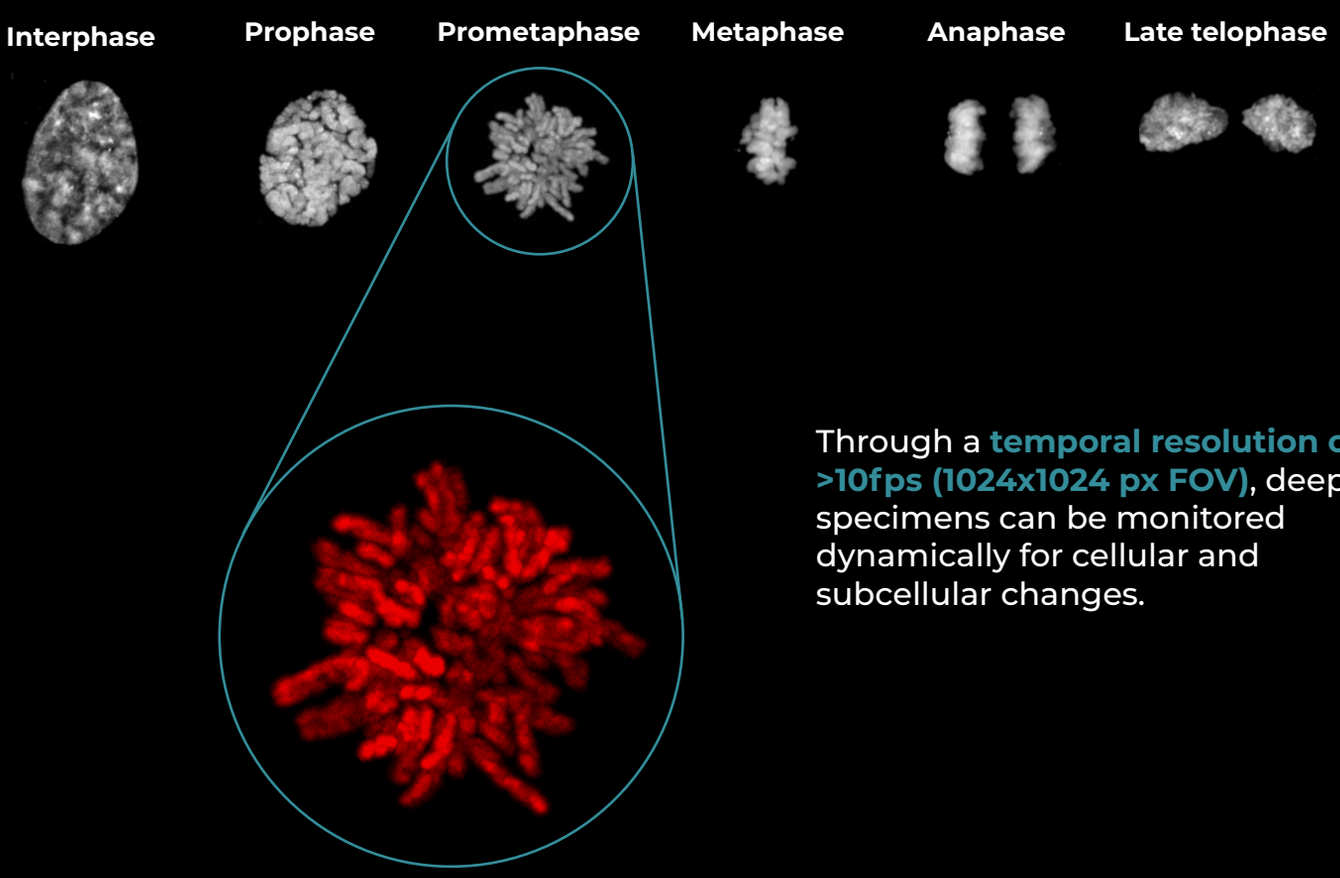
At any moment, you can find out more

In order to provide maximum flexibility in fluorophore choice and optimal multichannel imaging without spectral overlap, we have designed the instrument to operate across the **entire wavelength spectrum from 400 to 750 nm.**
By utilizing the dual camera function of the X-Light V3 spinning disk system, the DeepSIM can simultaneously acquire multiple channels, resulting in **faster acquisition times.**



3D volume view of a mouse brain tissue section showing neurons with dendritic spines (green), microglia (red), astrocytes (white) and DNA (cyan).
Total volume acquired: 30 µm. 60X, oil 1.4 NA

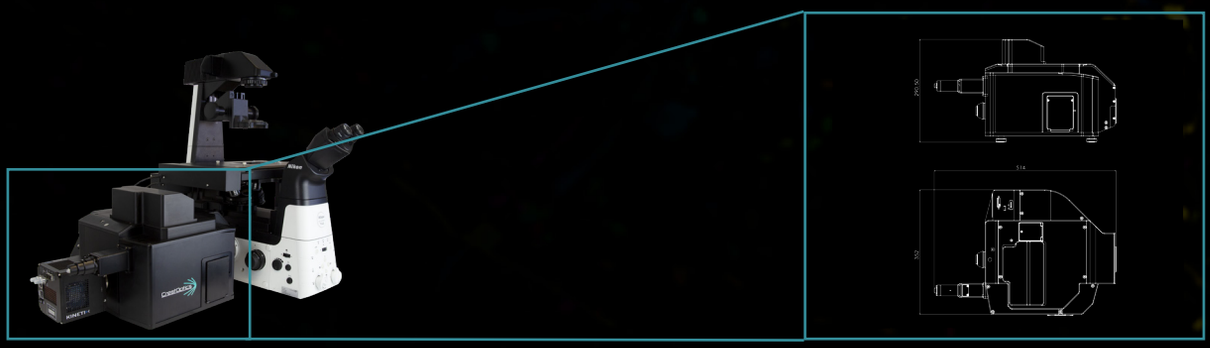
The DeepSIM high-speed acquisition modality allows for the capture of meaningful data at high resolution while **minimizing light exposure** and therefore the risk of photo-toxicity. A delicate specimen can be explored using this functionality.



Through a **temporal resolution of >10fps (1024x1024 px FOV)**, deep specimens can be monitored dynamically for cellular and subcellular changes.

hTERT RPE-1 prometaphase cell undergoing mitotic division, MIP 100X, 1.45 NA

Stand-alone



Combination with X-Light V3

Specifications

	DeepSIM stand-alone	DeepSIM X-Light
FOV	1024x1024 pixel (66x66 µm 100X | 333x333 µm 20X)	1024x1024 pixel (66x66 µm 100X | 333x333 µm 20X)
Resolution	Lateral Resolution (FWHM): ~100 nm (100X NA 1.45) Axial Resolution (FWHM): ~300 nm (100X NA 1.45)	Lateral Resolution (FWHM): ~100 nm (100X NA 1.45) Axial Resolution (FWHM): ~300 nm (100X NA 1.45)
DeepSIM acquisition speed	14.7 fps (1024x1024px) - with DeepSIM rolling reconstruction 249.9 fps	14.7 fps (1024x1024px) - with DeepSIM rolling reconstruction 249.9 fps
Laser spectral range	Excitation: 400-750 nm; emission: 400-850 nm	Excitation: 400-750 nm; emission: 400-850 nm
Objective specifications	-from 20X to 100X magnification range -high numerical aperture (NA) -plan apochromat correction	-from 20X to 100X magnification range -high numerical aperture (NA) -plan apochromat correction
Camera compatibility	Any triggerable camera having 6.5 µm pixel size	Any triggerable camera having 6.5 µm pixel size
Spinning disk upgrade	Stand-alone solution	Add-on compatible with Crestoptics X-Light V3
Imaging modalities	Super-resolution DeepSIM | Widefield	Super-resolution DeepSIM | Confocal spinning disk X-Light V3 | Widefield
Upgradable microscope configuration	Upright and inverted configurations	Inverted configurations
Software	µManager/ VisiView®/ NIS Elements	µManager/ VisiView®/ NIS Elements
Installation conditions	Temperature 23± 5°C, Humidity 70% RH or less	Temperature 23± 5°C, Humidity 70% RH or less
Weight	50.7 lbs | 23Kg	44 lbs | 20Kg
Dimensions	13.8 (w) x 20.2 (L) x 11.4(h) inches 352.0 (w) 514.0 (L) x 290.5 (h) mm	14.0 (w) x 17.1 (L) x 11.4(h) inches 356.0 (w) 435.0 (L) x 290.5 (h) mm

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Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. The product is in compliance with the CE Mark and laser-safety test. To ensure correct usage, read the corresponding manuals carefully before using your equipment

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