SIMTRUM

Laser Scanning Confocal Microscope

2022 V3

For customized projects please Contact us:

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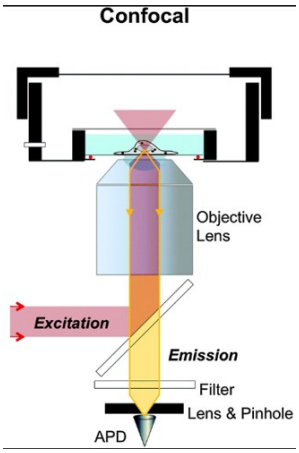
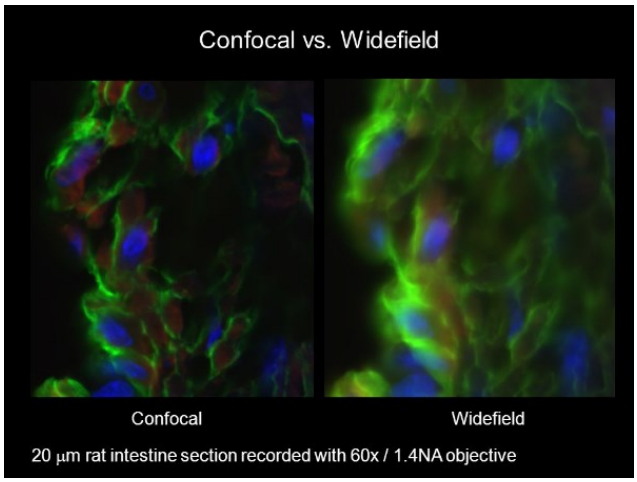
Principle of Laser Scanning Confocal Microscope

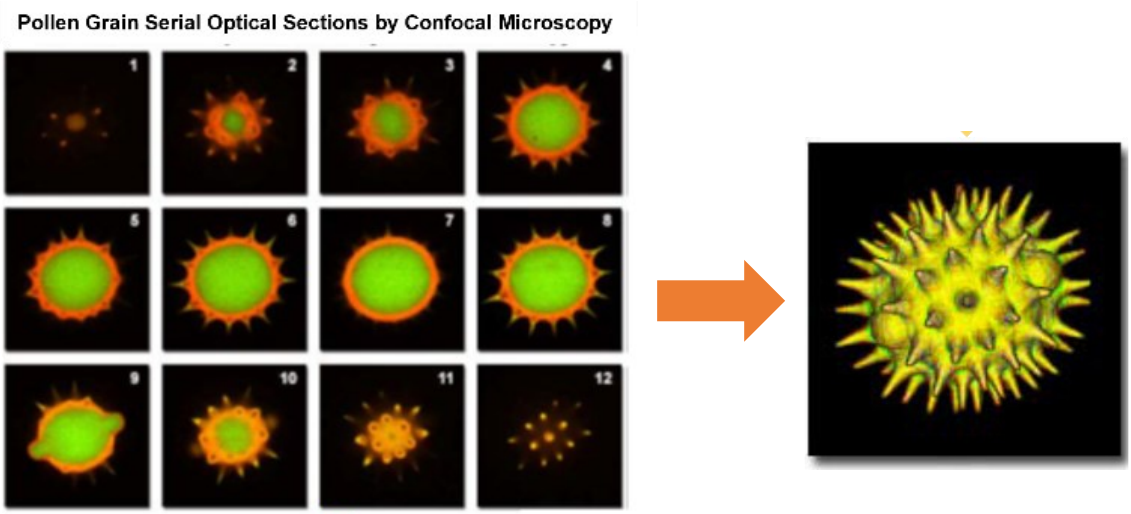
- The specimen is imaged one pixel at a time
- Excitation light is focused into a PSF-sized spot in the sample
- This is then scanned across the sample by a galvo scan mirror
- A pinhole at the focal point rejects out-of-focus emission light





Confocal Microscopy offers several advantages over conventional Widefield Optical Microscopy

- Control the depth of focus to reduce background information from the focal plane
- Imaging the depth of the thick specimen
- Spatial filtering techniques to eliminate out-of-focus light or glare in specimens
- …



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SIMSCOP Series Laser Scanning Confocal Microscope

Confocal Microscopy is an optical imaging technique for increasing the Optical Resolution and Contrast of a Micrograph by using a Spatial Pinhole to block out-of-focus light in image formation. Capturing multiple two-dimensional images at different depths in a specimen enables the reconstruction of three-dimensional imaging.

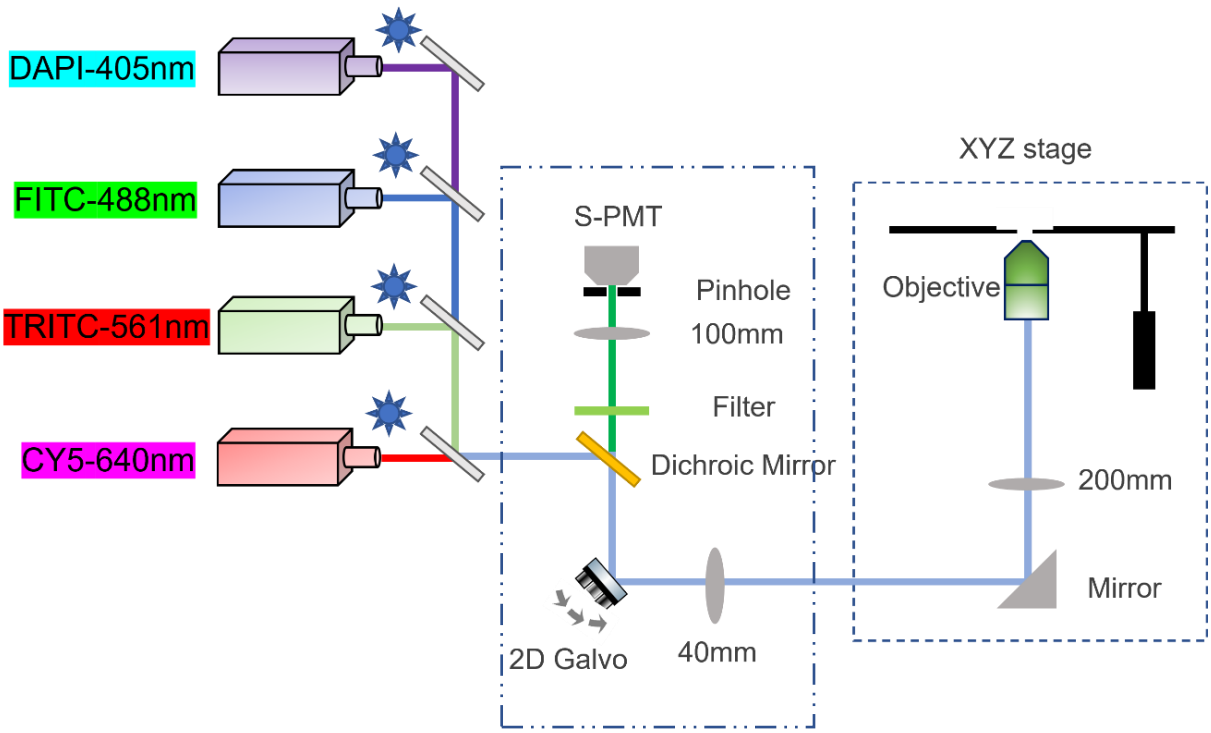
This technology is widely adopted in scientific and industrial, for life science, material, or semiconductor inspection. However, the cost of the mature commercialized system is usually very high.

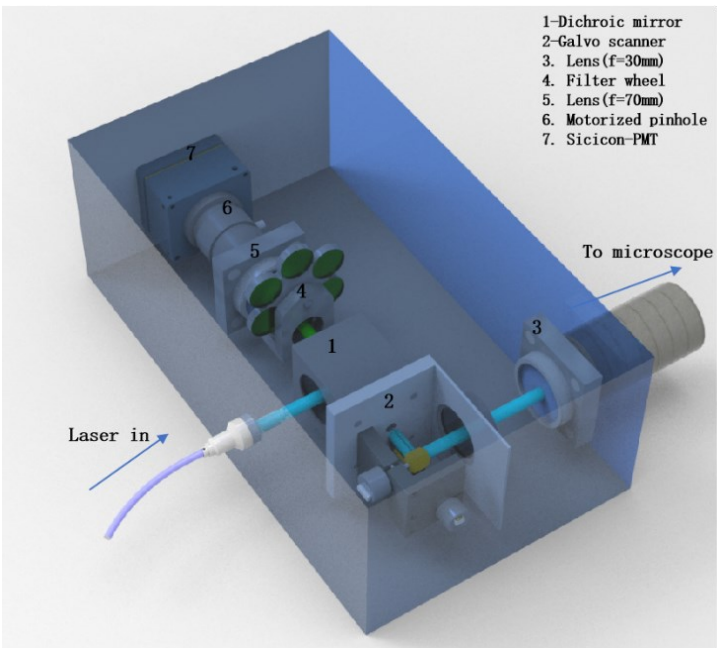
SIMTRUM sees the needs of the customer to have a robust confocal microscope system with reasonable cost, Our SIMSCOP Series offers a great balance between functionality, cost, and flexibility.

Key Advantage

- Professional software UI with great features for imaging analysis
- Single or Multi laser Channel, laser power control accuracy up to 0.01%,
- Silicon PMT detector enabling higher photon dynamic range and less noise.
- Support high-speed scanning: 30fps@512x512 Pixels(Resonant scanner)
- Compact Modular design, able to adapt to most microscope system
- Multiple upgrade options for future capability expansion with low cost

Confocal Optical Layout





Confocal Unit Optical Layout

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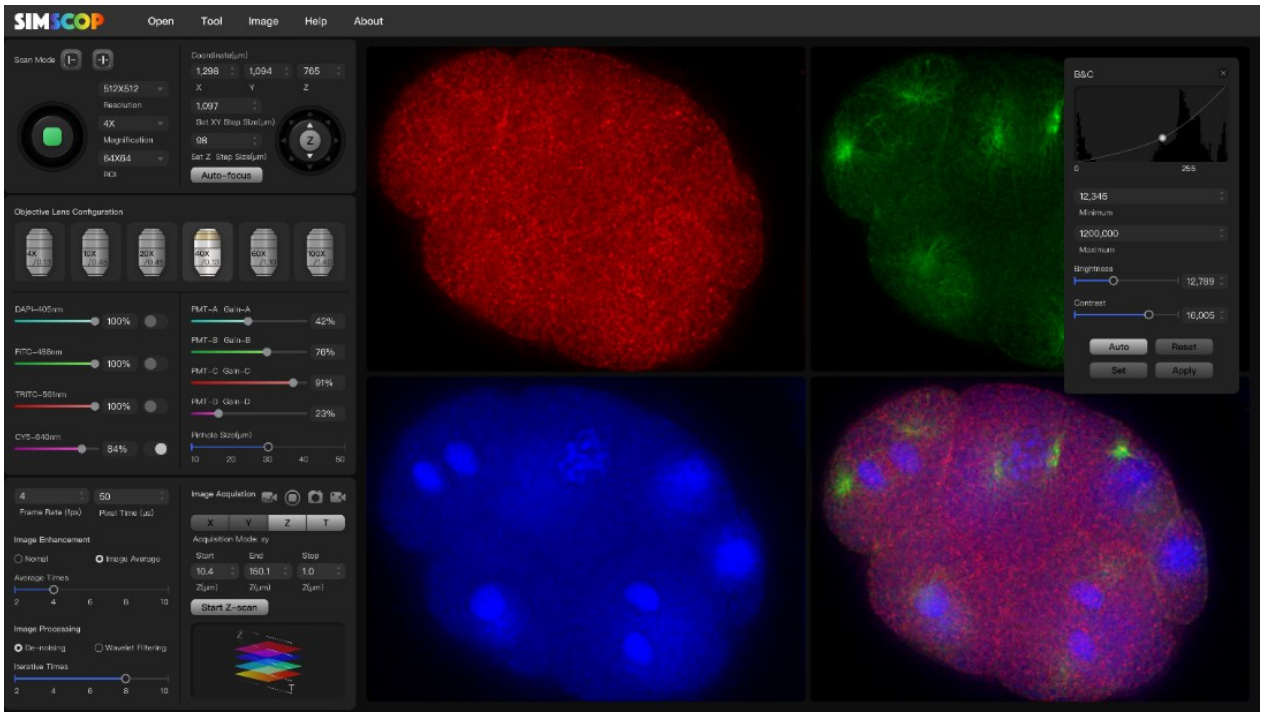
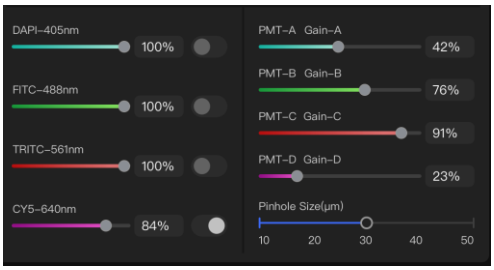
Professional Software UI Design

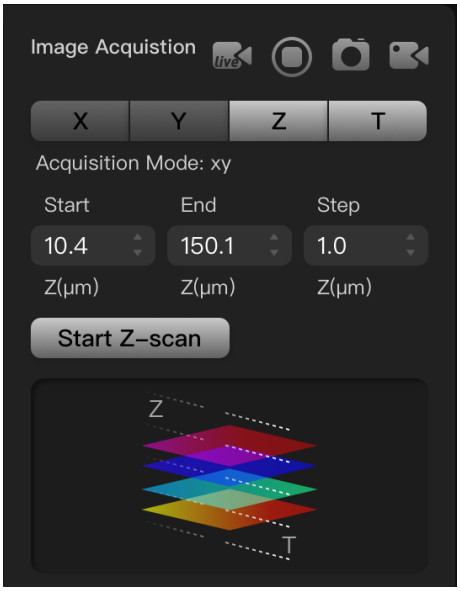
SIMSCOP CM Series Confocal Microscope Software Key Features



Functional GUI Panel



Easy-to-recognize display for setting lasers, detectors, etc.



Scanning parameter settings

Image processing & deconvolution

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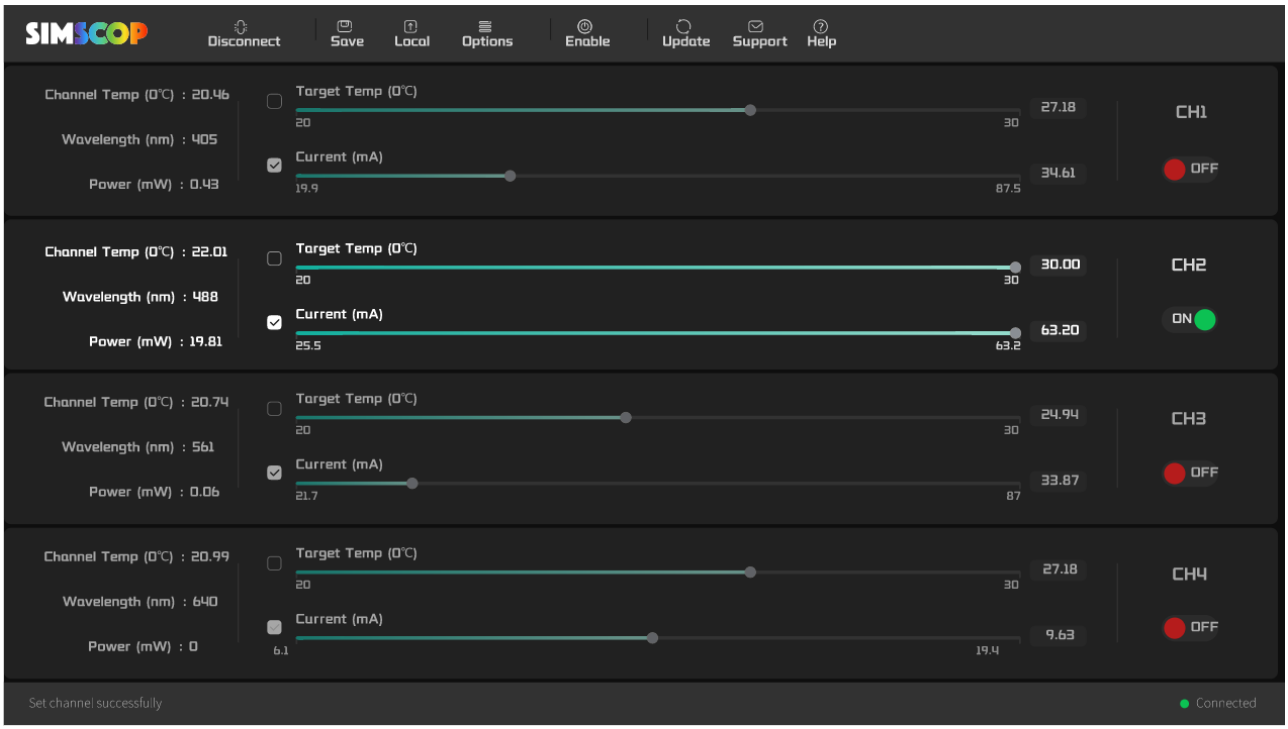
Professional Software UI Design



Laser Control Panel

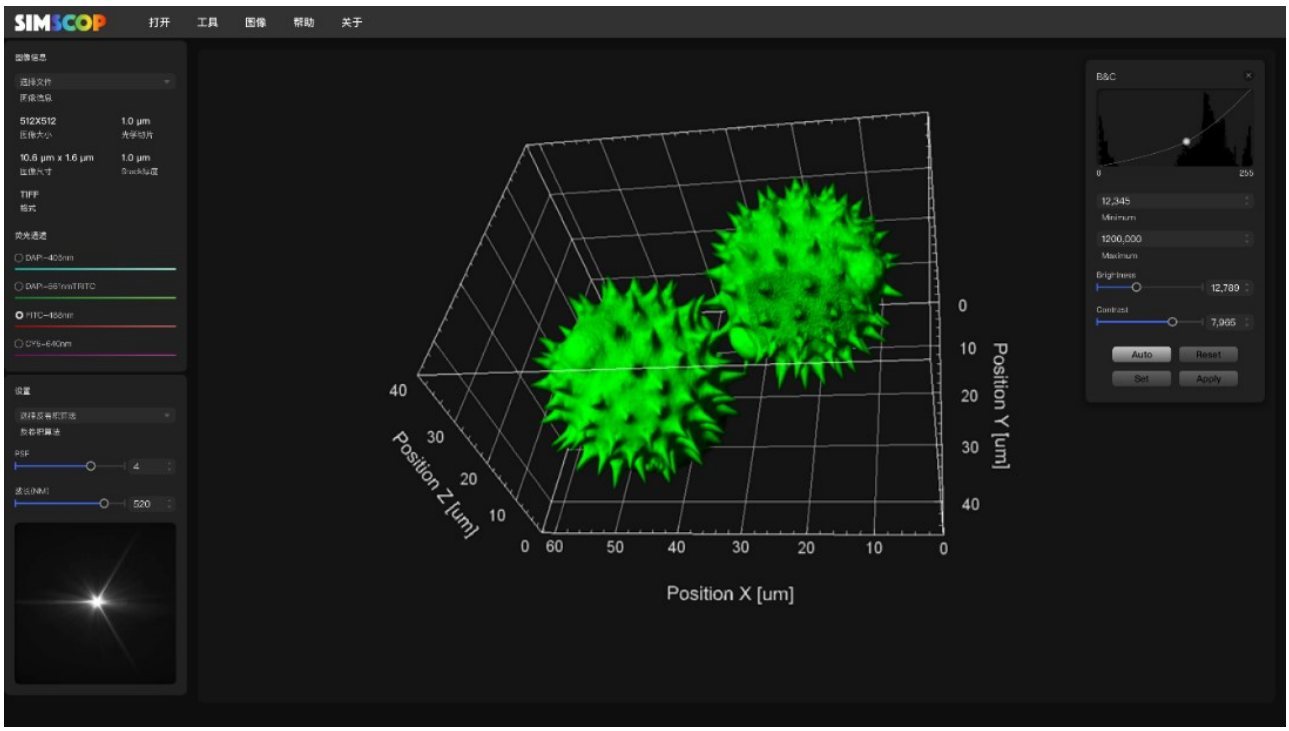
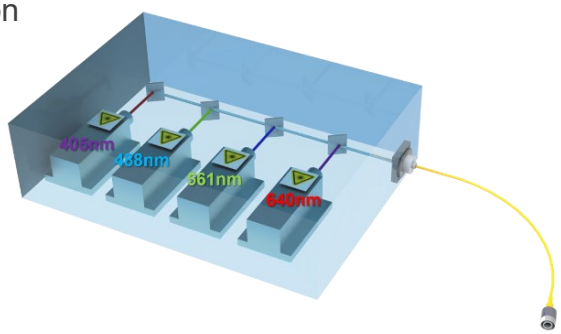
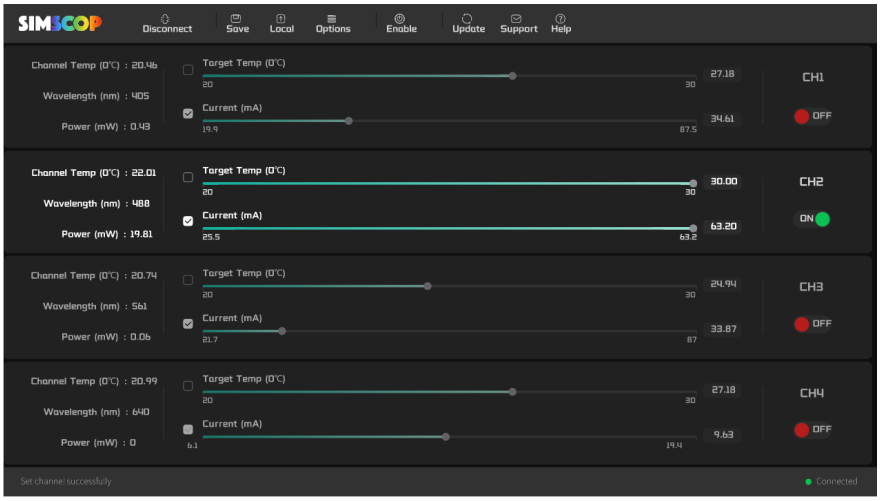


Image Processing & Deconvolution

High Sensitivity Four Channel Laser + Control System

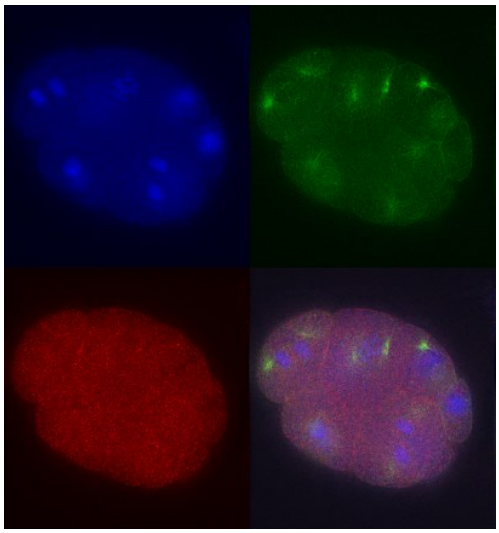
- Equipped with a 4-Channel diode laser and control PCB board to realize the **High-speed Low-cost** independent adjustment of each laser channel,
- Laser intensity adjustment accuracy of 0.01%.
- TTL / Analog modulation





High-Speed Imaging

- Simultaneous preview of multiple fluorescent channels



C. Elegans embryo images with three channels
(DAPI: 477nm; FITC: 542nm, CY3: 654nm)

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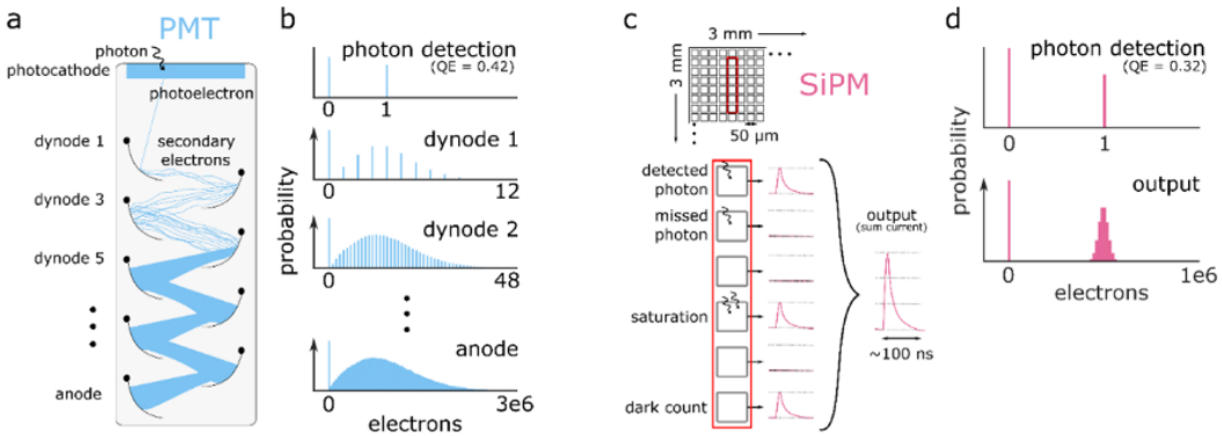
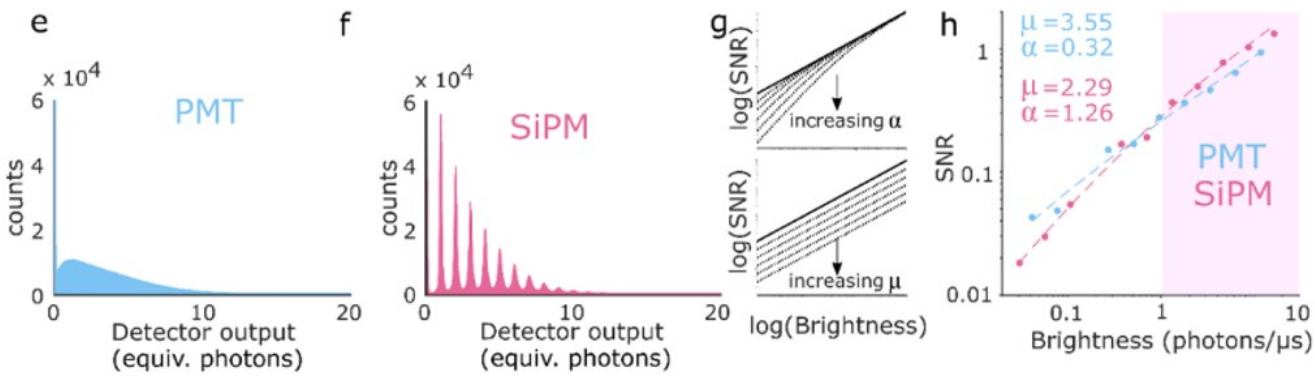
Silicon PMT Detector Enabling Higher QE and Less Noise

SIMSCOP CM Series confocal microscope equipment with SiPM Detector

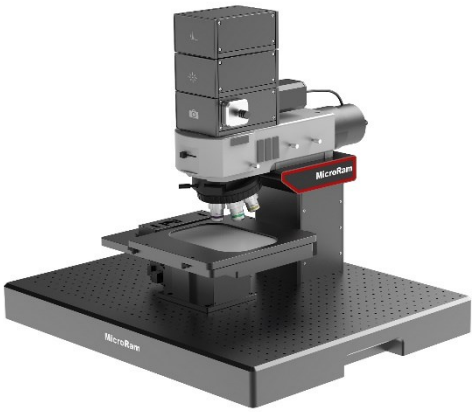
- Low-voltage operation
- Long operating life,
- Wider dynamic range
- Insensitivity to magnetic field
- Suitable for High-speed and High-SNR imaging

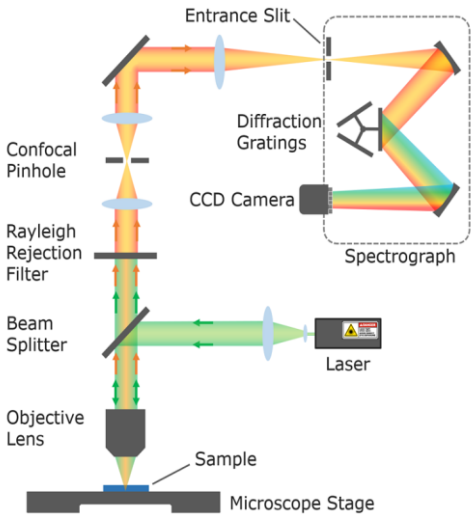


Silicon photomultipliers (SiPMs) consist of an array of SPADs fabricated on a shared substrate, with outputs into a shared readout channel (c). Each element acts as an all-or-none photon detector that produces a pulse of stereotypic height with low variability (d). Pulses from all elements sum to form the SiPM output. A large number of elements in the array (>1000) allows many photons to be detected simultaneously without saturation and enable large active areas compatible with large-etendue objectives.



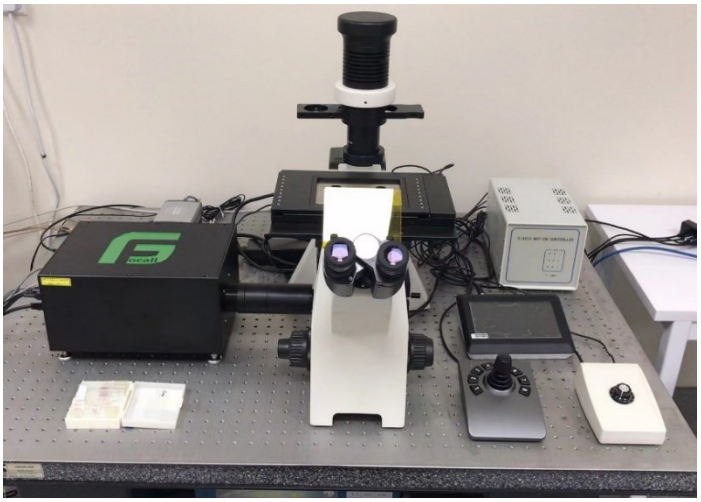
System Upgrade Options





Upgrade to Confocal Raman Microscope

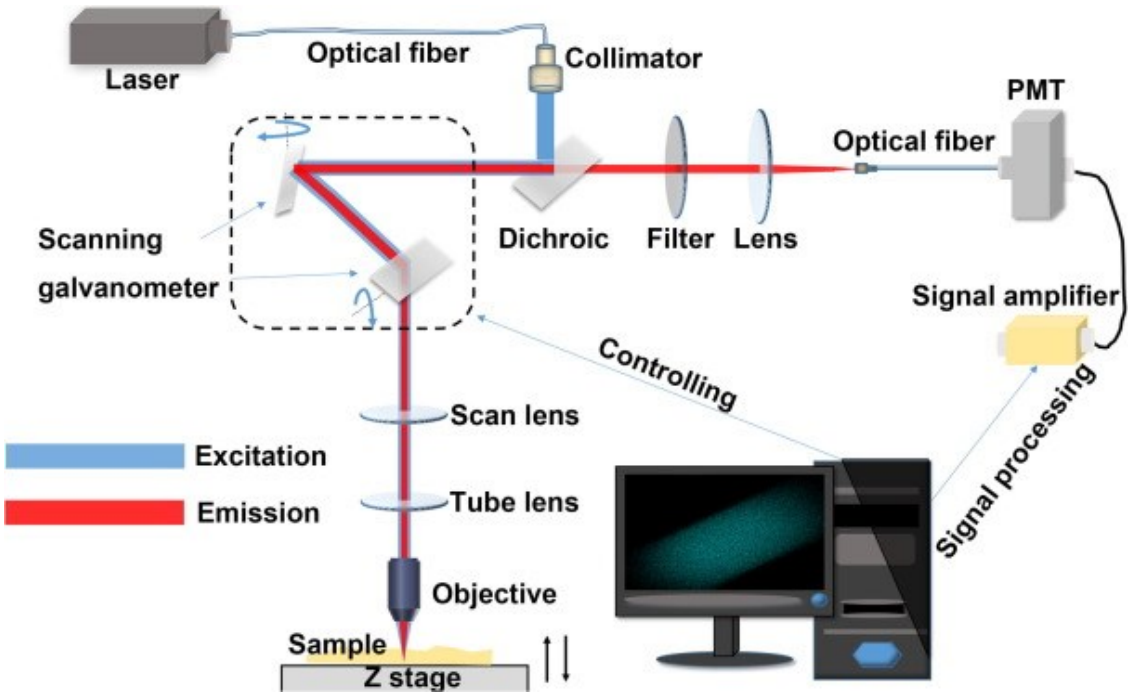
- 532,785,1064 Raman
- Upright Microscope setup
- High Resolution with Raman image mapping



Upgrade to Lines Scan Confocal Microscope

- Frame Rate 210fps
- Resolution: 150 nm over the optical diffraction limit
- Imaging Depth of 500 to 1000 microns
- Image Contract enhancement 20-30 dB

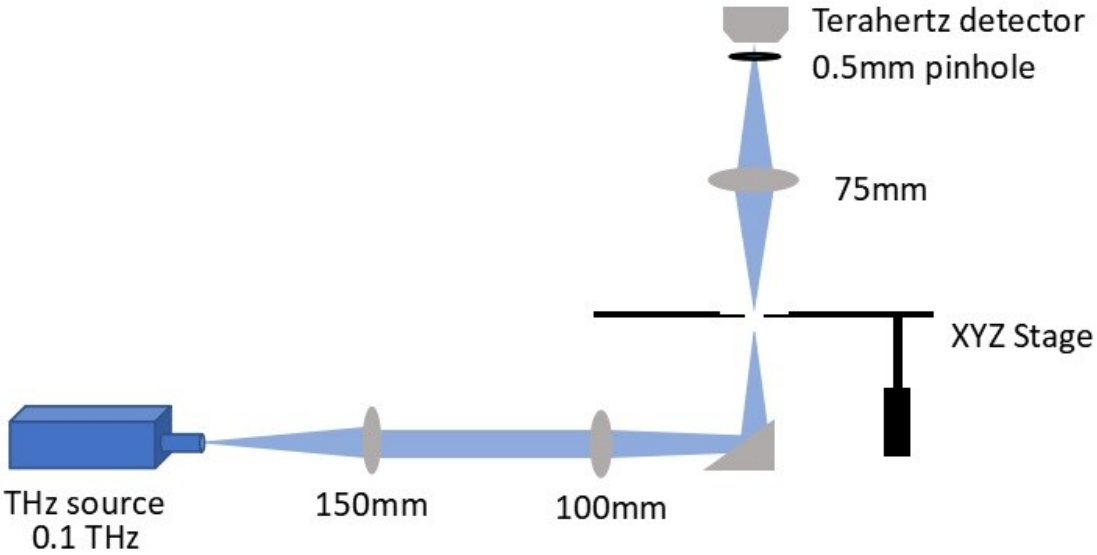
System Upgrade Options



Upgrade to Confocal Spectral Microscope (NIR I/II confocal)

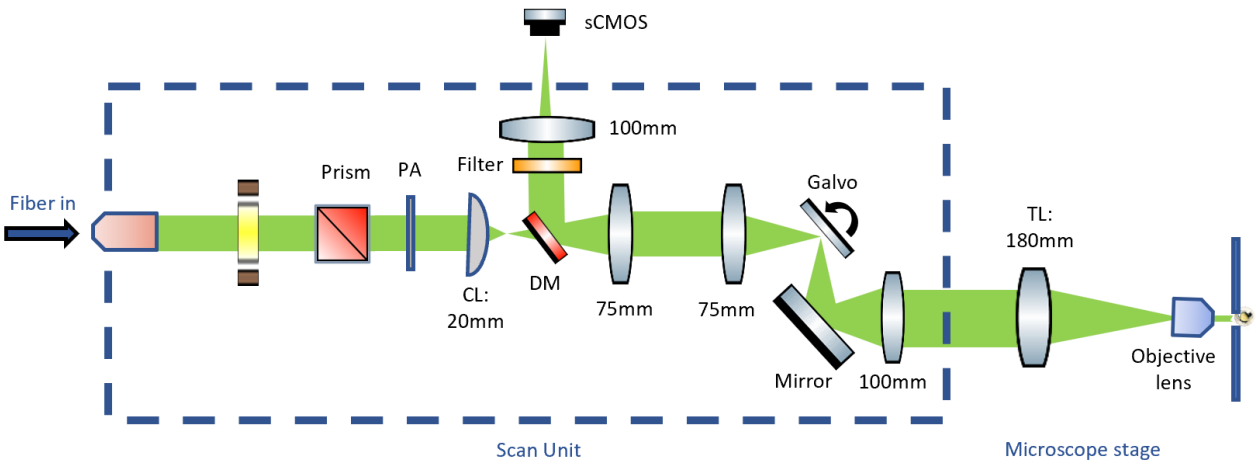
- Wavelength Range UV to NIR (200nm-2.5nm)
- Spectral resolution up to 0.2nm
- Large NA setup for high-sensitivity application

System Upgrade Options



Upgrade to Terahertz Confocal Microscope System

- 100GHz, output power: 80mW
- Spatial resolution 150-200um



Upgrade to Super Resolution Re-scan Confocal Microscope (RCM)

Product Specifications

Confocal Microscope Specification	
Laser Light Source	405 nm (20 mW); 488 nm (20 mW); 561 nm (20 mW); 640 nm (20 mW); Analog /TTL level modulation , intensity adjustable (0-100%); Single-mode fiber , FC/APC connector.
Scan Module	Dual-axis XY high-speed optical scanning galvanometer Field of view 15mm X 15mm , scanning pixels 512 x 512 ~ 4096 x 4096 Pixel time 0.5 μs -100 μs , standard scan speed: up to 4fps (512 x 512)
Scan Mode	XY, XYT, XYZ, XYZT
Pinhole Choice	Diameter: 10/20/30/40/50 μm
Detector	SiPMT , QE>25%@500nm, GaAsP PMT, QE>45%@500nm
Filter Unit	DAPI(445nm/40); FITC(530nm/43); TRITC(605nm/60); CY5(695nm/40)
XYZ Translation Stage	Minimum step size 50 nm; repeatability +/- 0.1 μm Maximum speed 100 mm/s Stroke : X : 110mm , Y : 75mm , Z : 9mm
Software Feature	Multicolor fluorescence colocalization processing, Z - stack processing analysis, large image stitching, Filtering processing, Imaging parameter management, etc.

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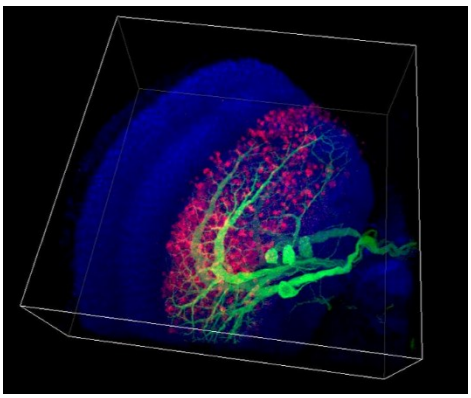
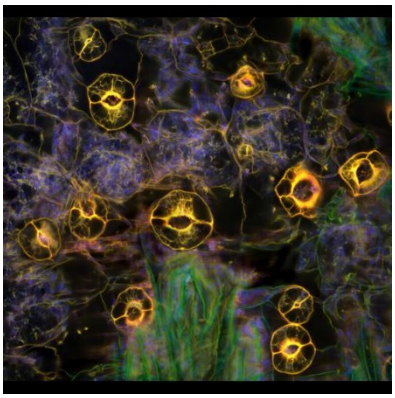
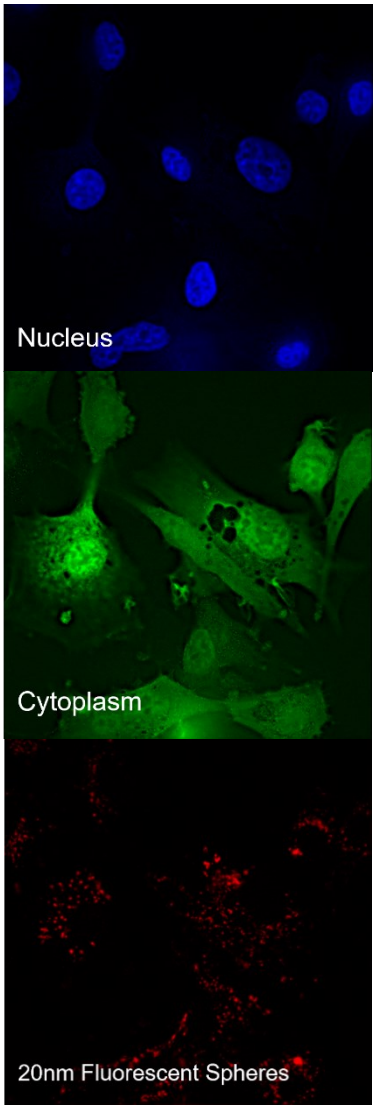
Confocal Imaging Applications

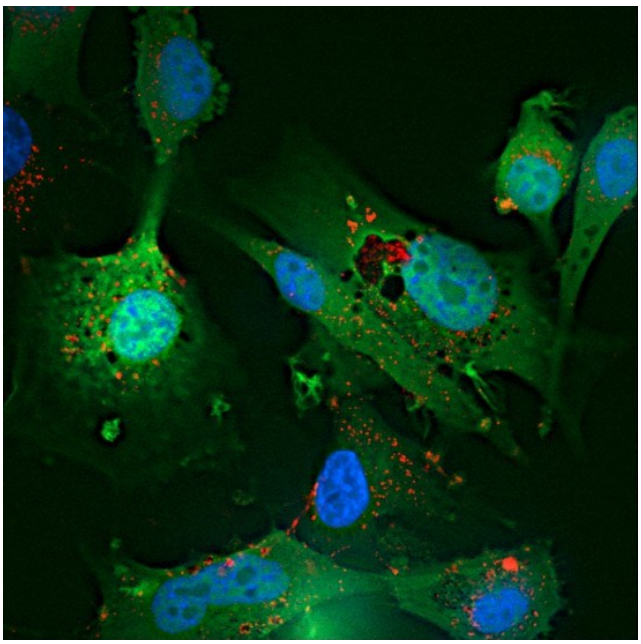


Drosophila brain; triple antibody staining:
Alexa 488, Alexa 568 and Alexa 633



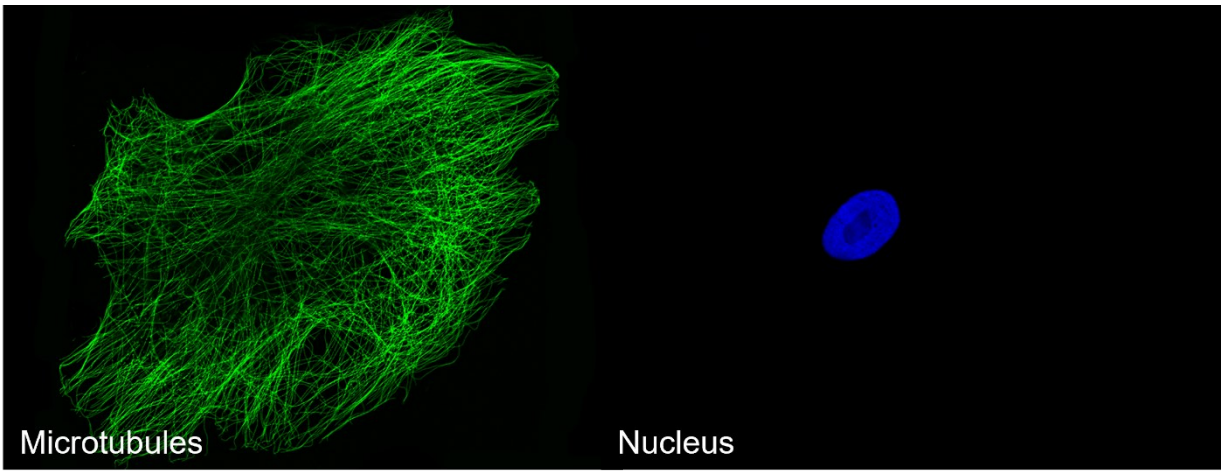
Confocal micrograph of Arabidopsis thaliana (thale cress)
Seeding leaf with stomata(yellow moth-like structures)
And parenchyma cells.

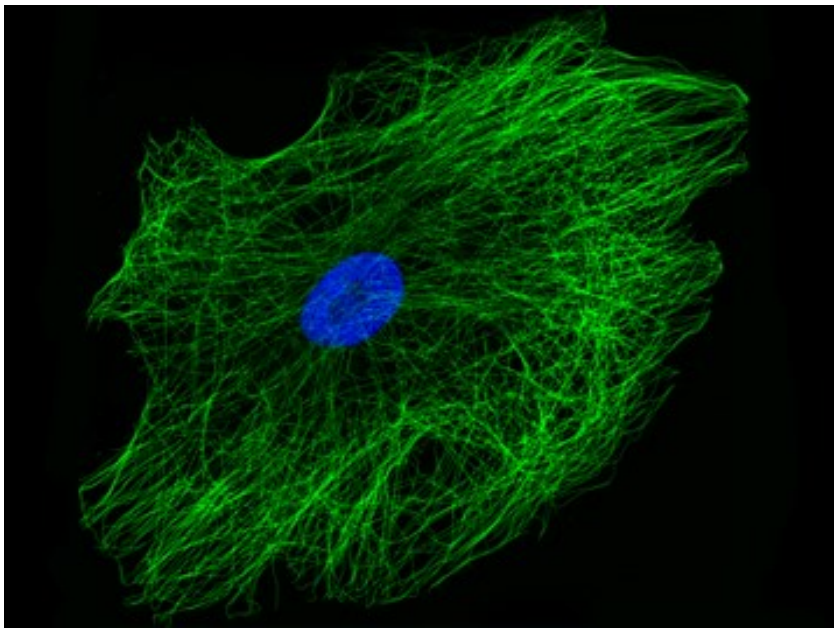




Glioblastoma cells in culture transfected with a green fluorescent protein. The nuclei are stained blue with DAPI. The red spots are 0.02-micron fluorescent spheres that have been taken up into the cells by endocytosis. These cells have no endogenous P10 protein; P10 is a tumor suppressor gene that is mutated in many different types of cancer. The absence of the P10 protein is thought to increase cell mobility and possibly contribute to metastasis.

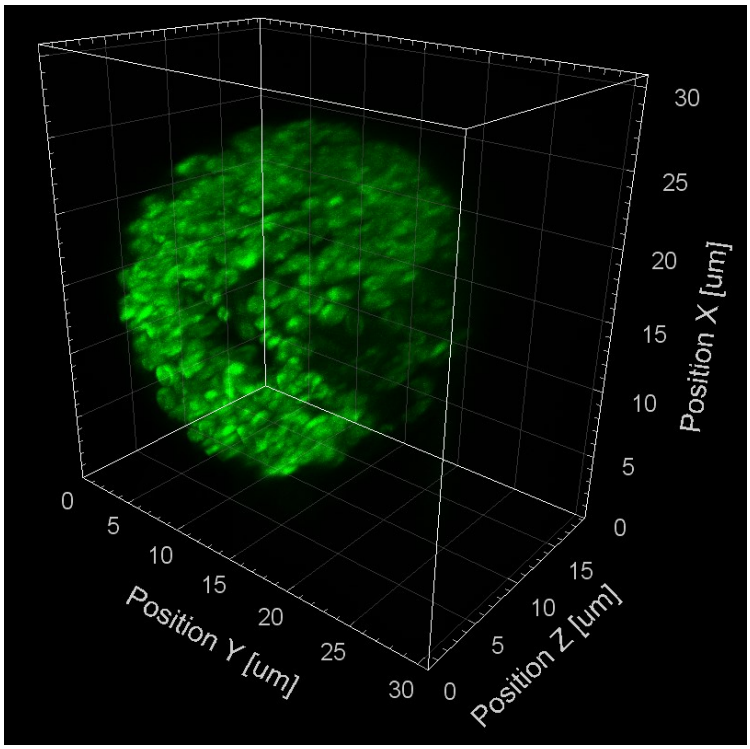
Confocal Imaging Applications



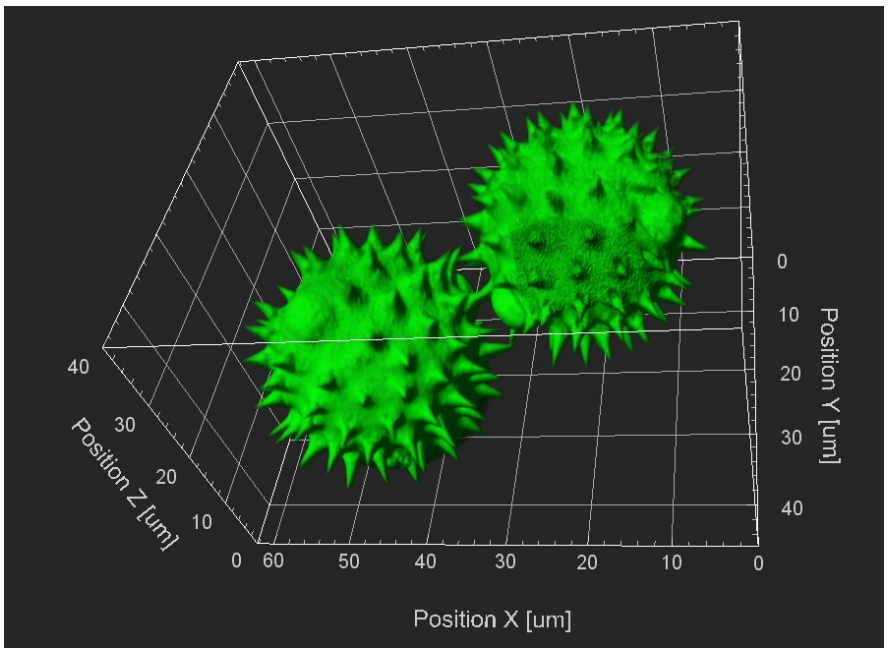


Shown is a confocal microscope image of a human gingival fibroblast in culture. Interphase microtubules (green) are labeled with alpha/beta-tubulin primary antibodies. FITC conjugated secondary antibody was applied afterward. Nuclear DNA (blue) was stained with Hoechst33242.

Confocal Imaging Applications



Live mitotic HeLa cell treated with epsin1 siRNA, DiOC6(3)to label mitotic membranes (green). Confocal images were taken at 0.118 μm steps along the Z-axis.



Pollen grain-3D

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