ISS™
focus and discover

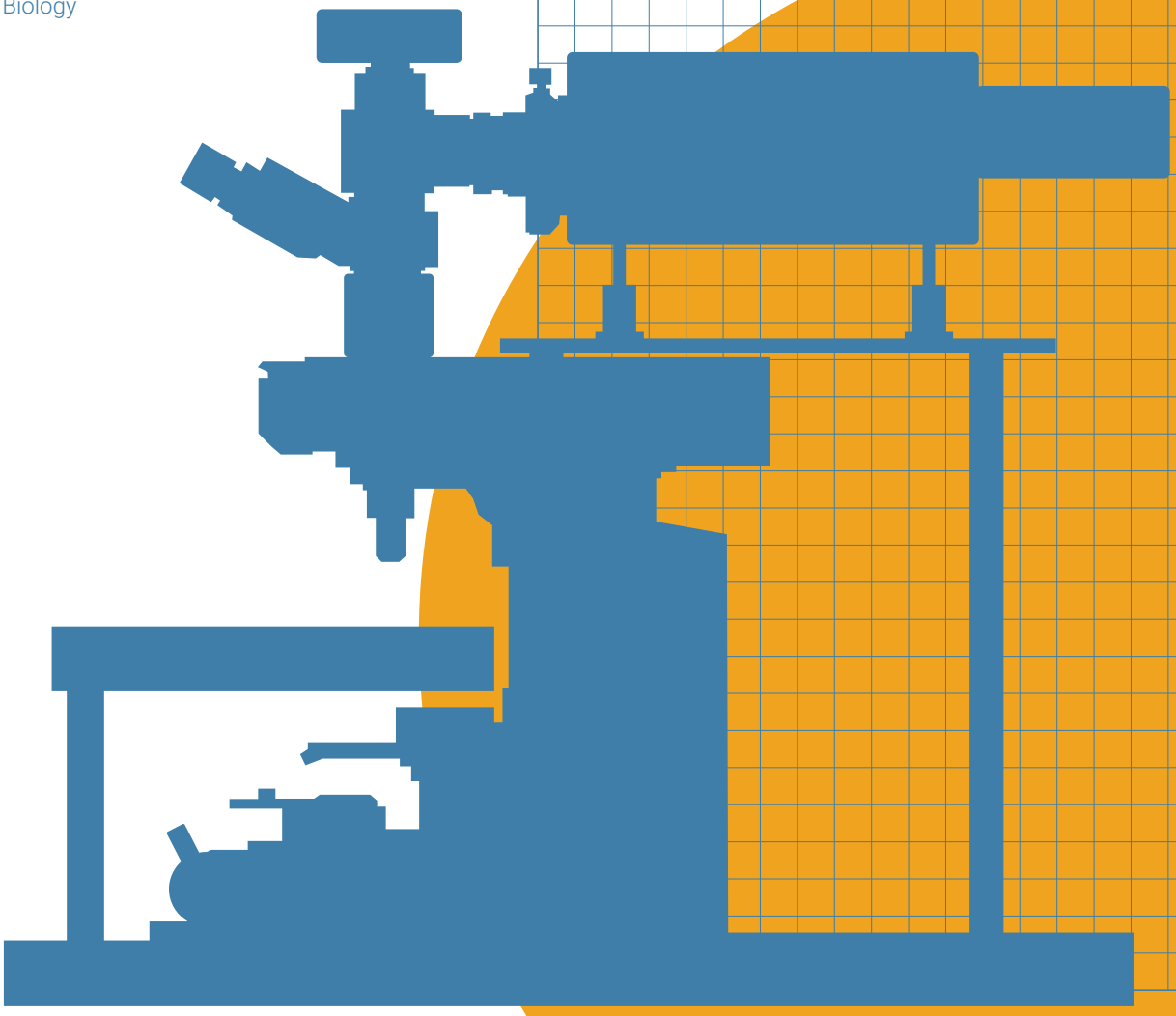
Innovation is What We Do at ISS

VIVIsight PRO

A Compact and Affordable Multiphoton Laser Scanning Microscope Specifically Engineered for In Vivo Imaging Applications

Ideal for:

- Neuroscience
- Cancer Biology
- Developmental Biology
- Vascular Biology



iss.com

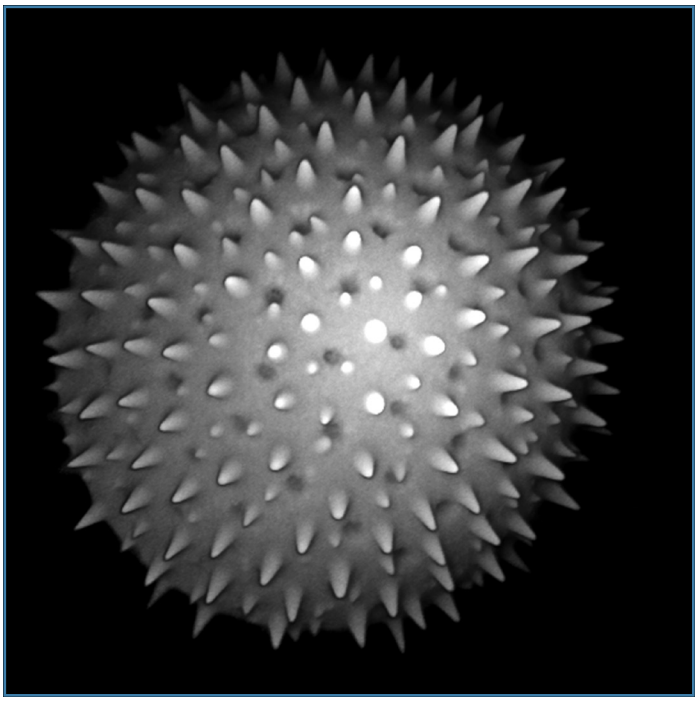
Introducing the VIVIsight PRO, a compact, affordable, and versatile multiphoton laser scanning microscope specifically engineered as an all-in-one solution for in vivo imaging applications. Harnessing super-fast photon counting techniques with hybrid photomultiplier tube (PMT) detectors, VIVIsight PRO excels in delivering exceptional sensitivity within an expansive dynamic range. VIVIsight PRO seamlessly integrates with a wide array of super-fast femtosecond lasers, ranging from single-wavelength fiber lasers to fully tunable Ti:Sapphire lasers, providing customized yet affordable solutions tailored to your unique requirements.

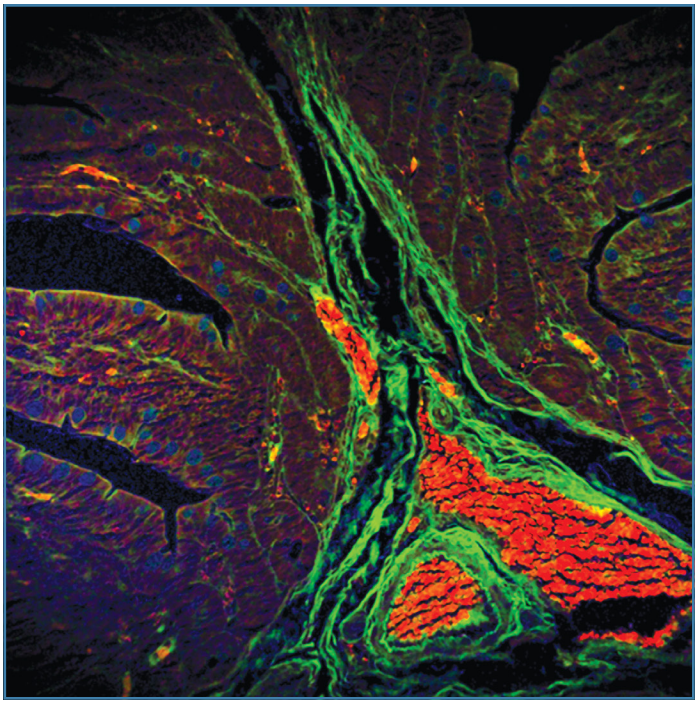
Multiphoton microscopy relies on the simultaneous absorption of two or more photons to excite fluorophores within the sample. This technique utilizes near-infrared (NIR) laser light, which has longer wavelengths compared to visible light, allowing for deeper tissue penetration. By focusing high-energy pulses of NIR light into a small volume of the sample, multiphoton microscopy selectively excites fluorophores within the focal plane, generating fluorescence signals only from the focal point. This confocal-like optical sectioning reduces out-of-focus background fluorescence and enables high-resolution imaging deep (from hundred micrometers to millimeters) within live tissues and animals. Another benefit of the system is its potential for integrating Fluorescence Lifetime Imaging (FLIM). FLIM can be seamlessly added to the VIVIsight Pro, significantly enhancing quantitative imaging and multiplexing capabilities. This technology has proven to be an excellent tool for metabolic imaging, making it valuable for studying cancer, neurodegenerative diseases, diabetes, cardiovascular diseases, and respiratory conditions.

Whether delving into neuronal dynamics or investigating tumor micro-environments, VIVIsight PRO effortlessly adapts to diverse research needs, ensuring unparalleled versatility in experimental design. Elevate your research endeavors with VIVIsight PRO, where cutting-edge technology meets customizable precision.

Applications:

- **Neuroscience:** Studying neuronal structure and function in brains, mapping neural circuits, and investigating neurodegenerative diseases.
- **Cancer Biology:** Visualizing tumor microenvironments, assessing tumor growth, and evaluating responses to therapeutic interventions.
- **Developmental Biology:** Observing embryonic development, organogenesis, and tissue morphogenesis in live embryos.
- **Vascular Biology:** Investigating blood flow dynamics, vascular permeability, and angiogenesis in vivo.



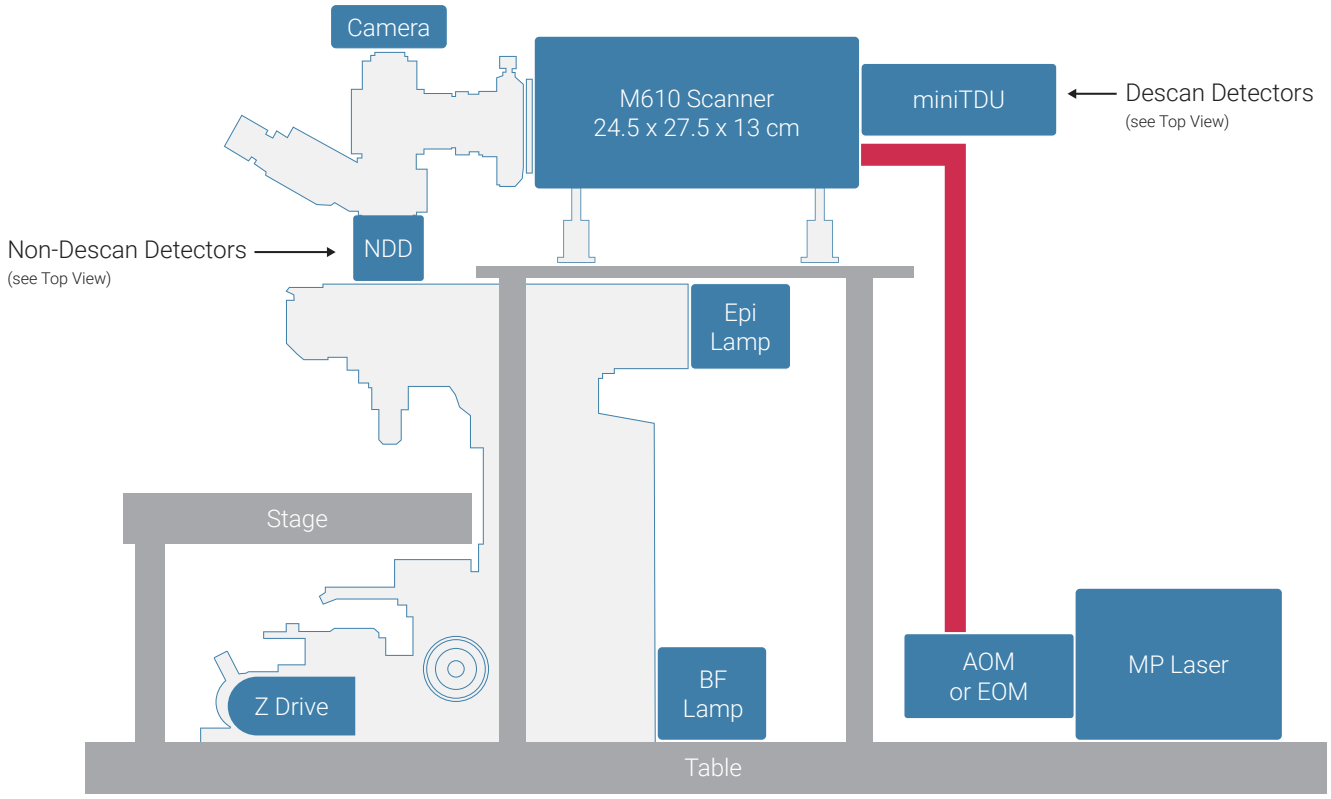


TOP RIGHT: An example of 3D volume rendering with VIVIsight PRO. A stack of z-sectioning images acquired from a pollen grain, using the two-photon laser excitation at the 780-nm wavelength.

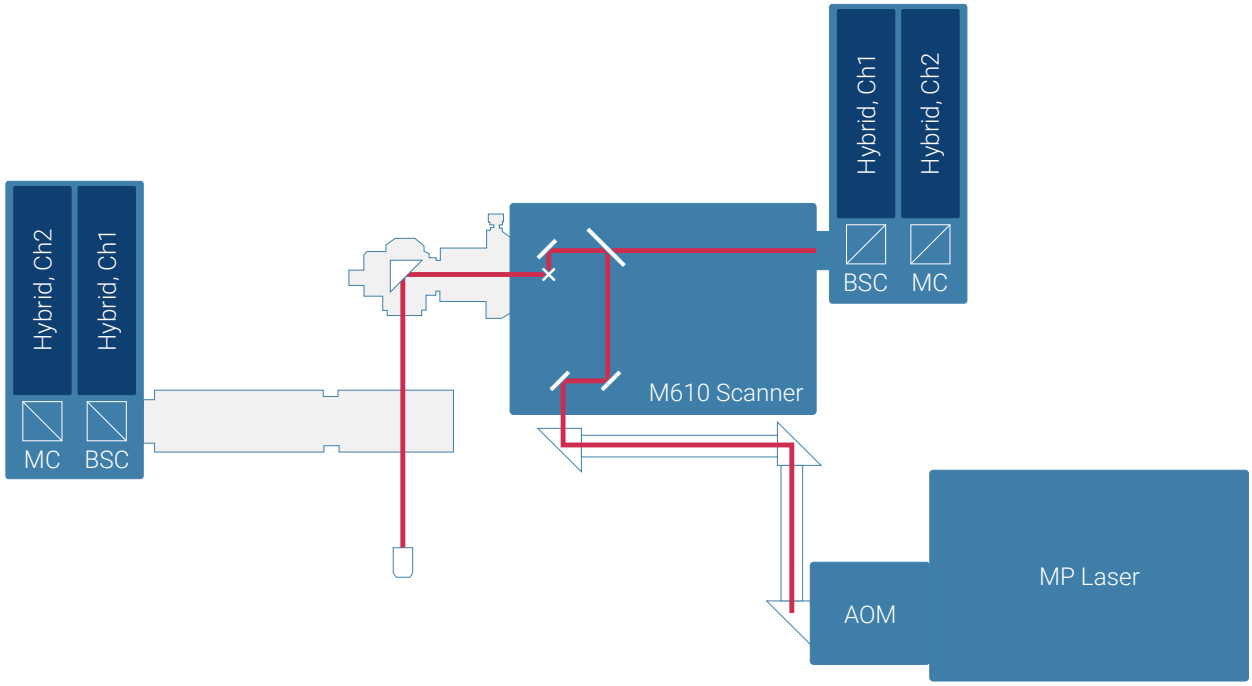
BOTTOM RIGHT: Image acquired from a hematoxylin and eosin-stained tissue, using the two-photon laser excitation at the 780-nm wavelength and a hybrid PMT photon counting detector. Both are capable of fluorescence lifetime imaging (FLIM). Together with ISS FastFLIM technology, it is straightforward to collect the fluorescent decay data at each image pixel. The time resolved data is quantitatively unmixed by the ISS VistaVision phasor plots module, producing three separate images which represent the fluorescence intensity contributed exclusively by distinct fluorescent species. The merged image is constructed utilizing false red, green and blue colors for shortest, intermediate and longest lifetime species, respectively.

VIVIsight PRO Configuration

Side View



Top View



Instrument Specifications

Software Overview

VistaVision – Laser Scanning Confocal Imaging & FLIM/PLIM Software. VIVIsight PRO features VistaVision, a comprehensive, user-friendly software package for the acquisition and analysis of multiphoton imaging, FLIM / PLIM & FLIM-FRET data in multiple dimensions (x, y, z, t, P – macro position for tiling , λ - emission spectrum, τ - lifetime).

Scan Modes

- Single spot
- 1D Line (X, Y or Z)
- 2D Image (XY, XZ, YZ)
- 3D Image Stack (XYZ)
- Each can be combined with time (t)

Scan Settings:

- Pixels Number: 1 x 1 to 4096 x 4096
- Dwell Time: 0.5 µs to infinity
- Optical Zoom: 1 to 40
- Field Diameter: 18 mm

Data Acquisition by Photon Counting:

- Photon Mode
- Time Tagged Mode
- Time Tagged Time Resolved Mode

Data Display and Analysis:

- Image enhancement by thresholding, contrast adjustment & smoothing
- Image false coloring with more than 50 LUTs & overlay of multiple channels
- Image quantification by advanced mathematical operations
- FLIM data analysis includes both fitting (up to 5 components) & phasor plots

Image Storage Formats:

- ISS proprietary formats with meta information
- Export to TIFF, GIF, JPEG, PNG, BMP, AVI, TXT
- Plots can be saved & exported to GIF, TIFF, JPEG, PNG, Bitmap & Metafile formats

2p Lasers:

- Single wavelength at 780 ± 3 nm, <110 fs, 0.25-1 W, Rep rate 50 / 80 MHz
- Single wavelength at 920 nm, <150fs, 1.2-2W, Rep rate 80MHz
- Dual wavelengths at 780 nm & 1550 nm, <90 fs, 0.25-1 W, Rep rate 50 / 80 MHz
- Tunable wavelengths from 690 ~ 1300 nm, <120 fs, >3 W at 900 nm, Rep rate 80 MHz

AOM (Acousto-Optic Modulator):

- Extinction ratio > 33 dB
- Spectral Resolution (FWHM) < 1.5 nm
- Rise/Fall time < 160 ns / mm
- RF Modulation TTL up to 1 MHz

Non-Descan Detectors:

- 1 ~ 4 channels
- GaAsP PMT, TE-cooled, QE>40% at 580 nm, detection range 300-720 nm
- Hybrid PMT, TE-cooled, QE=45% at 500 nm, detection range 250-720 nm
- MPPC SiPM, TE-cooled, PDE = 40% at 600 nm, detection range 350-1000 nm

Descan Detectors:

- 1 ~ 4 channels
- GaAsP PMT, TE-cooled, QE=40% at 580 nm, detection range 300-720 nm
- Hybrid PMT, TE-cooled, QE=45% at 500 nm, detection range 250-720 nm
- MPPC SiPM, TE-cooled, PDE=40% at 600 nm, detection range 350-1000 nm
- SPAD, Single Photon Avalanche Photodiode, Peltier cooled, low noise (<100 dark cps), QE > 70% at 700 nm, detection range 400-1060 nm

BX51WI Microscope:

- TR30 triocular with two WHN10X eyepieces
- 6-pos objective nosepiece with 10X, 20X / 25X and 60X objectives.
- Universal reflected illuminator with 6-pos epifluorescence cube turret & three fluorescent cubes (DAPI & FITC & TRITC)
- WI-NPA focusing arm with motorized Z drive (50 nm resolution)
- Open space manual stage or linear-encoded motorized stage

Optical Table:

For using a single or dual-wavelengths 2p laser:

Tuned damped, 2.5 x 5 feet, 8-in thick, 1/4-20 or M6 mounting holes in 1-in or 25-mm grid

For using a tunable 2p laser:

Tuned damped, 4 x 6 feet, 8-in thick, 1/4-20 or M6 mounting holes in 1-in or 25-mm grid

Computer Workstation:

- High performance computer loaded with OS Windows 11 64 bit, 64 GB RAM & 2 TB SSD
- 34", 3440 x 1440 resolution, flat color monitor

ISS™
focus and discover

1602 Newton Drive
Champaign, IL 61822 USA
Phone: 888-359-8681
iss@iss.com
www.iss.com