

MULTIPHOTON MICROSCOPY

## Ultima Investigator Plus

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Deep, High-Sensitivity Microscope  
for In Vivo Imaging

# Ultima Investigator Plus

## Larger field of view and deeper imaging

Ultima Investigator Plus™ features a base system specifically optimized for in vivo, deep tissue fluorescence imaging. With an expanded field of view, enhanced close-coupled detection path, and field-upgrade availability to the Ultima 2Pplus system, Investigator Plus is designed to grow with changing or increasing research demands. A host of add-ons integrate seamlessly for a comprehensive imaging experience. Additionally, new proprietary electronics and software allows for multi-region scanning for quick imaging between different targeted locations. Investigator Plus delivers the ultimate value for in vivo studies in individual labs and additional imaging bandwidth in imaging centers, enabling researchers to better explore neural connectivity, T-cell mechanisms, collagen alignment, and other tissue structures and functions.

### Investigator Plus features:

- Wide-angle collection for higher signal to noise deep within scattering samples
- Modular options for optogenetics, high-speed scanning, and fluorescence lifetime upgrades
- Real-time application interface for accessing data and configuring automated feedback experiments
- Field-upgradability to Ultima 2Pplus imaging workstation



“ We have been pleased with the Investigator multiphoton platform, which has allowed for cellular resolution neural imaging of calcium transients at video rates to visualize the formation of a memory trace in specific structures of the Drosophila brain. We are excited about the new developments in the field of view, multi-region scanning, and upgradeability as they will undoubtedly aid our work in unraveling the brain-wide processes that underlie cognitive behaviors. ”

– Dhruv Grover, Ph.D., Assistant Researcher at the Kavli Institute for Brain and Mind at the University of California, San Diego

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# A Modular System Optimized for In Vivo Tissue Imaging

The streamlined Investigator Plus microscope provides generous clearance for in vivo studies and off-axis imaging capabilities for tissue imaging applications. Modular add-ons—including three-photon imaging, multi-region scanning, and a motorized nosepiece—enable further interrogation of live tissues across diverse fields, including immuno-oncology and neuroscience.

## Intravital imaging for immuno-oncology experiments

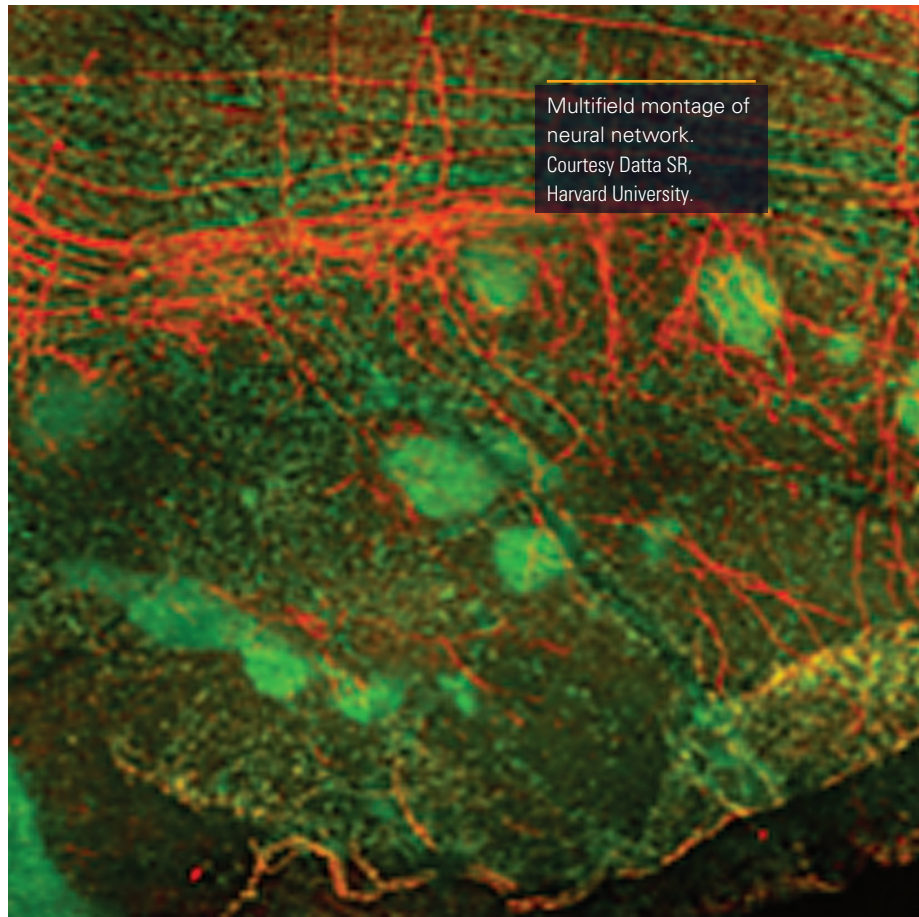
Multiphoton intravital imaging provides a high-resolution method for imaging tumor implants. Tumor progression, response to pharmaceuticals, and immune cell responses can all be measured via longitudinal imaging sessions.

## Superior imaging depth for brain tissue

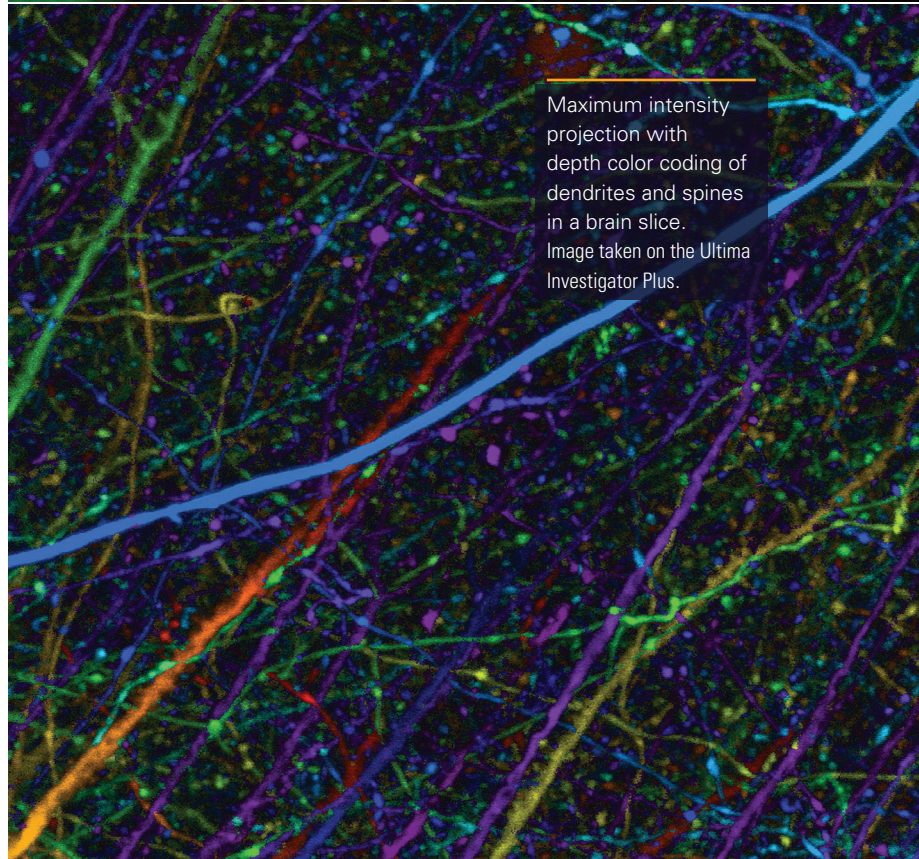
Investigator Plus is also ideal for probing neural connectivity in the brain. The imaging speed, depth, and resolution of the microscope supports in vivo imaging of neurons through thinned skulls and during behavioral experiments. Prairie View software enables seamless interaction with external devices for sensory stimulation, electrical recording, and other experimental paradigms in neuroscience.

## Intuitive software for improved results

Bruker's Prairie View software incorporates more than 20 years of life sciences application experience into a rich array of tools to give researchers the ability to easily design detailed and accurate protocols for improved experimental results. Full access controls enable users to optimize speed, resolution, and signal intensity. An intuitive user interface supports streamlined definitions for both simple and complex experiments in multiple dimensions. PrairieLink provides the capability to export data to—and receive script commands from—external programs during data acquisition, making complex closed-loop experiments easy to perform.



Multifield montage of neural network.  
Courtesy Datta SR, Harvard University.



Maximum intensity projection with depth color coding of dendrites and spines in a brain slice.  
Image taken on the Ultima Investigator Plus.

## Ultima Investigator Plus Specifications

Scanning Method	Matched pair of 6 mm galvanometers
Galvo Field of View	<b>Nikon 16x obj:</b> 1.4 mm x 1.4 mm; <b>40x obj:</b> 495 $\mu$ m x 495 $\mu$ m; <b>60x obj:</b> 160 $\mu$ m x 160 $\mu$ m
Resonant Field of View	<b>Nikon 16x obj:</b> 982 $\mu$ m x 982 $\mu$ m; <b>40x obj:</b> 353 $\mu$ m x 353 $\mu$ m
Scan Speeds (1x Zoom)	Raster Scan 2048 x 2048, 0.334 fps; 1024 x 1024, 0.787 fps; 512 x 512, 1.572 fps; 64 x 64, 12.329 fps
Scan Customization	User-definable pixel dwell time, minimum of 0.4 $\mu$ s (maximum 100 $\mu$ s) variable in 0.4 $\mu$ s steps; User-definable pixels per line and lines per scan from 1 to 2048; Scan zoom up to 128; 360 degree scan rotation; User-definable straight, freehand and circular line scans; Point scans
Resonant Scanner (optional)	8 kHz; 30 fps at 512 x 512; ROIs with pan and scroll
Detectors	Two performance-selected, multi-alkali PMTs; Optional upgrade to high-sensitivity Hamamatsu GaAsP detectors; Optional upgrade to four upper non-descanned detectors
Z-Motor Control	Standard focus motor assembly (minimum 0.025 $\mu$ m step size, 25 mm travel range); Z-Piezo with proprietary focus algorithms for high-speed Z-series (0.1 $\mu$ m step size, 400 or 1000 $\mu$ m range)
Motorized Microscope Base (optional)	X-Y motion control of microscope position, 0.3 $\mu$ m increments, 0.75 in. X and Y travel
Computer	Customized PC workstation
Imaging Software	Prairie View
I/O Hardware	High-performance Analog Input and Output; High-performance interface control box (GPIO)
I/O Software	Prairie View control of analog outputs and inputs and digital synchronization
Optical Inputs	Ultrafast pulse IR laser with low-dispersion optical path optimized for 2P or 3P laser input*; Optional epifluorescence illuminator and dichroic

\* Not included, please consult with Bruker representative

### Bruker Fluorescence Microscopy

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Multiphoton Microscopy | See Deeper into Brain Activity

[www.bruker.com/Investigator](http://www.bruker.com/Investigator)

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