



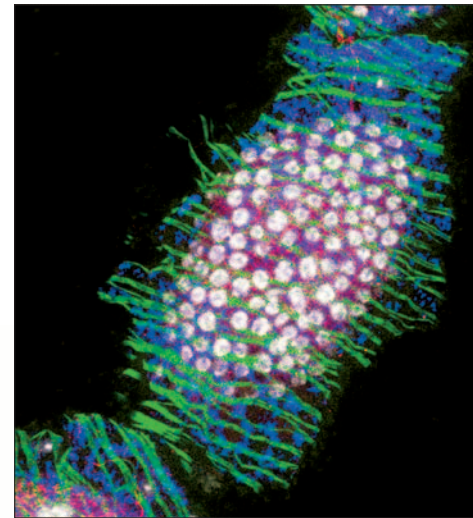
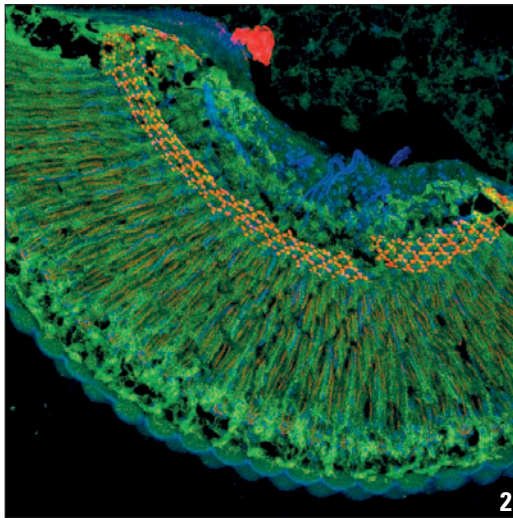
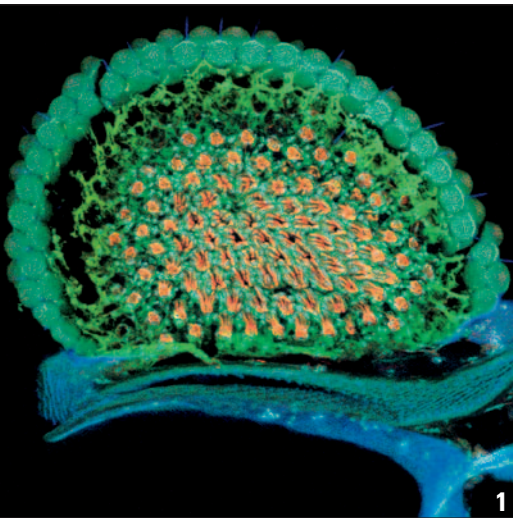
Reach High!

The New Leica TCS SP5 II – The Only Broadband Confocal

Living up to Life

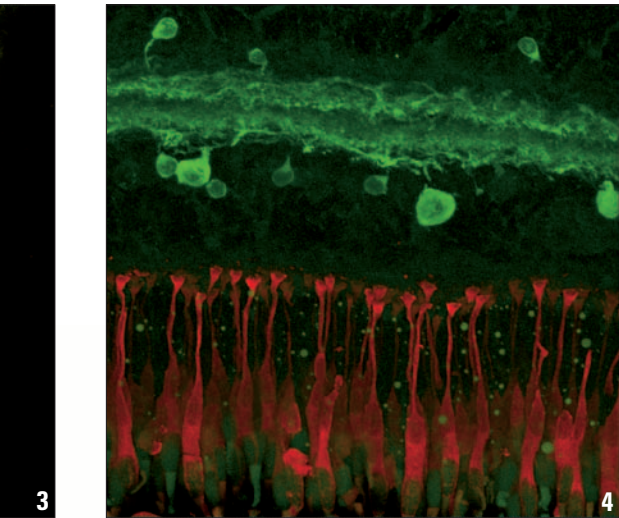
Leica

MICROSYSTEMS



- High-speed Live Cell Imaging a
- The Fastest True Confocal Sys
- Leading in Multispectral Imag
- Intelligent and Intuitive Interfa



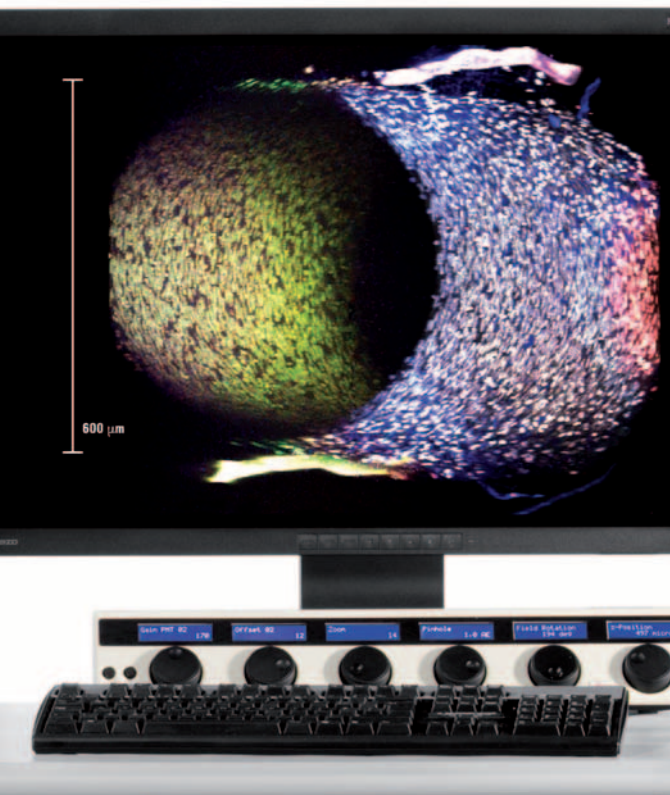


and High Resolution Morphology – All in One

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Today, biological and medical research in advanced fluorescence has evolved into two different directions: on one hand scientists want to record brilliant, high-resolution images to illustrate morphological features of fixed or slowly moving live samples. On the other hand, high-speed dynamic processes in live cells are monitored by fast time-course studies, from which significant quantitative data are extracted.

Reach High!

The Only Broadband Confocal: Uniting Two Worlds

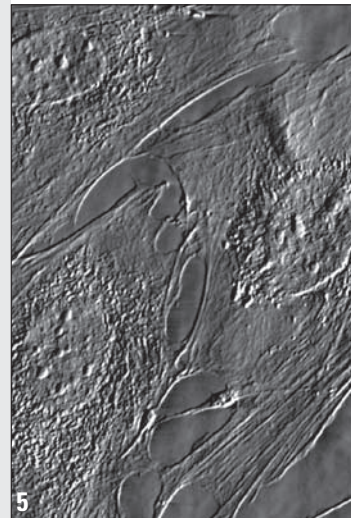
In Confocal Microscopy, these apparently opposing worlds have led to the development of two classes of systems: Those which are optimized for morphological image acquisition or those designed for high-speed live cell imaging and data generation.

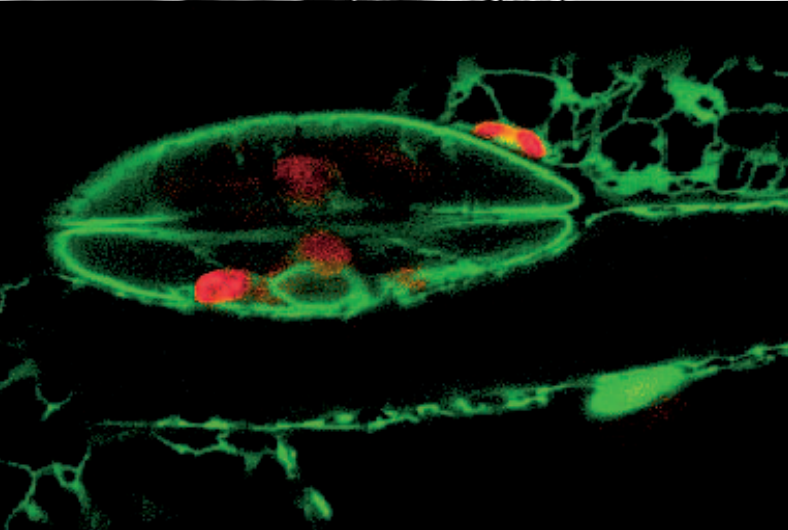
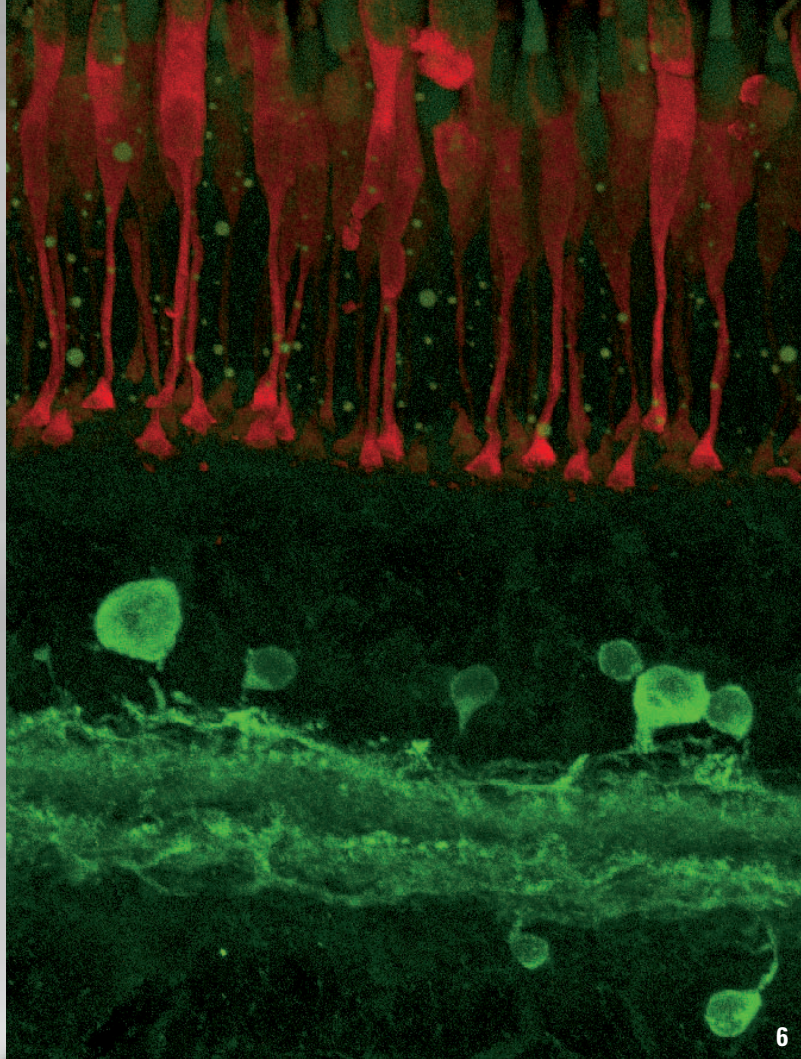
Until now, research in a multi-user laboratory, where both aspects are equally important, requires investment in two dedicated systems.

The broadest band of Imaging Speeds with the new Leica TCS SP5 II

In close cooperation with leading scientists, we have developed the new system Leica TCS SP5 II which covers the wide range of imaging speeds from spot recording to real-time imaging in a single truly confocal platform. This new broadband confocal microscope system perfectly merges two worlds in one.

And broadband means more than only speed: The system accomplishes the most demanding requirements in recent multi-fluorescence research by groundbreaking new technologies to maximize spectral and multichannel performance. The Leica TCS SP5 II is made to meet your needs as a scientist who wants to reach higher.





High Speed and High Resolution – All in One

Profit From the Full Range of Scan Speeds in One Single System

Why choose between a hi-resolution morphology system and a real-time live cell imaging system when you can have it all in one? As fast as you need it, as hi-res as your work demands – the new Leica TCS SP5 II is a true broadband confocal and finally covers the full range of scan speeds in one single system.

Switch speed in an instant

The new Leica TCS SP5 II comes with a tandem-scanning system mounted on a sliding device. This set-up enables you to easily switch between conventional and resonant scanner. Whereas the conventional scanner serves for all morphology and classical speed live cell applications, as well as beam-parking for fast intensity monitoring and FRAP (Fluorescence Recovery After Photo-bleaching) experiments, the resonant scanner provides you with a whole range of high speed options. This flexible combination makes the Leica TCS SP5 II an ideal device for multi-user facilities.

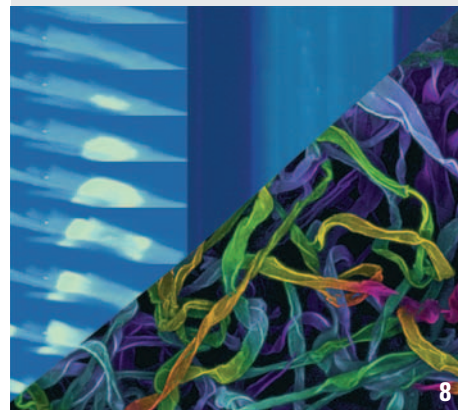
The Fastest True Confocal

Full field high speed imaging

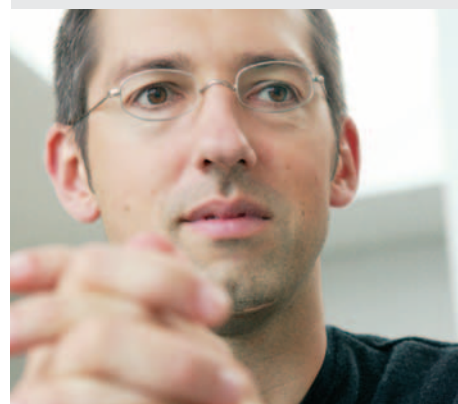
The resonant scanner of the Leica TCS SP5 II enables you to acquire high speed images at large formats (full field high speed imaging). A scanning frequency of 8 kHz allows for line-frequencies up to 16 kHz and corresponding data acquisition at a time resolution of better than 65 μ s. Unlike any other high-speed concept, the Leica TCS SP5 II will allow you to cover a field of view of 15 mm diagonal even at high speed. Also, the full spectral tunability of SP-detection and AOBs[®] is maintained for resonant scanning. Any laser combination and any emission band can be employed – full field rotation and even panning in x and y is available.

True Confocal for highest resolution, low bleaching

Using a resonant scanner for high speed scanning offers further advantages: the true confocal scanning system does not reduce optical sectioning performance, as do slit-scanners or spinning disc-systems. Plus, due to short illumination times, bleaching is reduced significantly as compared to parallel scanning.



- True single point Confocal Tandem Scanner (conventional and resonant)
- Frame rates up to 290 frames/s
- Line frequencies from 1Hz to 16 KHz
- Spot recording (beam park)
- Field rotation at all speeds
- Triggers and synchronization signals for integration in experiments



“Science is all about wanting to know. It’s never about wanting to wait, is it?”

Dr. Jan Ellenberg

Group Leader, Ellenberg Group
Functional Dynamics of Nuclear Structure
during the Cell Cycle
EMBL
Heidelberg, Germany

Imagine a confocal that makes your work much more flexible. A device that supports quick decisions in the lab as well as simultaneous data acquisition while at the same time providing the highest efficiency through better transmission of emitted light. Can't think of any? Well, Leica can. The new Leica TCS SP5 II. For those who want to reach higher.

Better images in less time

The new Leica TCS SP5 II is composed of up to five true spectral channels, allowing simultaneous data acquisition at five individually tunable spectral bands. Spectral separation is performed by the patented Leica SP detection concept, employing a prism and mirror-sliders. This ensures maximal transmission of the detection module which in turn guarantees high efficiency. What does this mean for your work? Less photobleaching. And better images in less time.

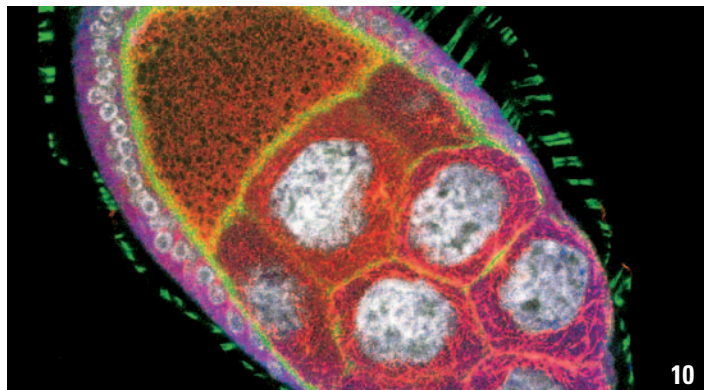
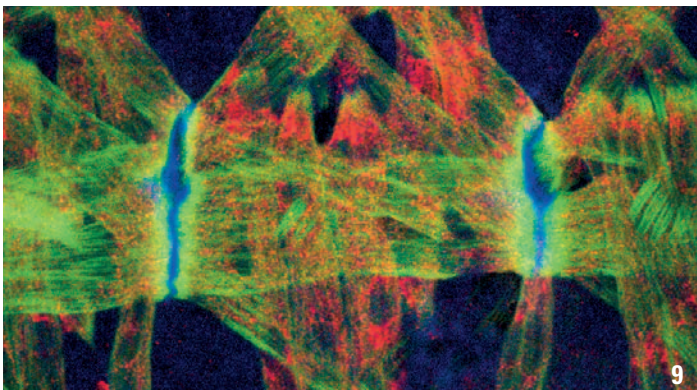


Leading in Multispectra

The Leica TCS SP5 II. Highest Sensitivity. Broadband

Ready when you are

Much better transmission for emitted light than with e.g. dichroic mirrors is provided by the acousto-optical beam splitter AOB^S. In addition to this higher quality standard, the system offers the option of switching quickly between sequential scans and region-of-interest scans with entirely individual excitation schemes. And whenever you need to employ new dyes or laser lines, the AOB^S, being a single optical tunable element, is immediately applicable. Or, as we say: it is ready when you are.



A tool that tunes in on your quality needs

The Leica TCS SP5 II provides you with unique sensitivity in confocal microscopy by combining three quickly tunable devices – AOTF (Acousto-Optical Tunable Filter), AOBS® and SP-Detector (Spectrophotometer Detector).

Need more options? Here you go

Perform FLIM (Fluorescence Lifetime Imaging) data acquisition with the spectral detector and tune continuously the emission bands. This option enormously widens the application range of FLIM. Plus it permits the investigation of wavelength dependencies of fluorescence lifetime.

This high flexibility for multi-parameter fluorescence is also applied to a non-descanning detection module for four channels reflected light, and four channels transmitted light is available. It supplies

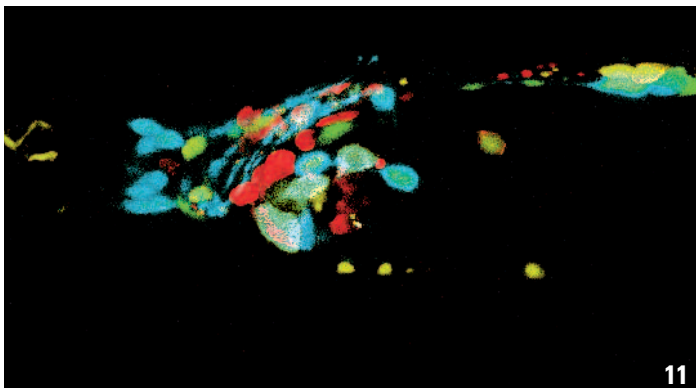
- Maximum transmission with prism-based Leica SP detector
- 5 spectral confocal channels (max)
- Extreme sensitivity with Leica AOBS®
- 8 non-descanned channels (max) *
- Online ROI-spectrometer *
- APD (Avalanche Photo Diode) detection for ultimate sensitivity *
- Spectral FLIM, 2 channels
- Dual channel FCS *
- Auxiliary emission port *
- Very fast beam path configuration
- Most effective channel separation

* optional

Imaging

and Spectral Performance

wavelength separation by secondary beam splitters and barrier filters on motorized and computer controlled wheels. An emission port for individual purposes is used for fluorescence cross correlation spectroscopy, 2-channel FCS (Fluorescence Correlation Spectroscopy), or serves as an online ROI (Region Of Interest) spectrometer, enabling you to record and display emission spectra online. The combination of FCS via the emission port and spectral FLIM by internal SP detectors makes the instrument ready for both FCS and FLIM.

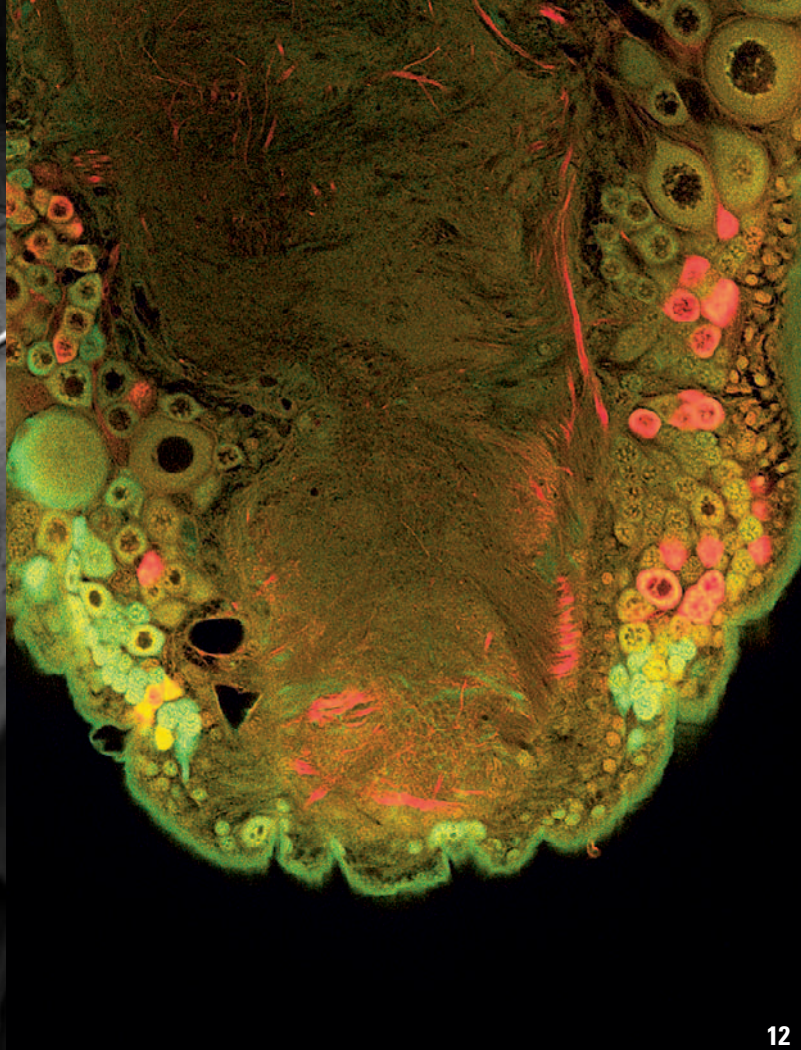


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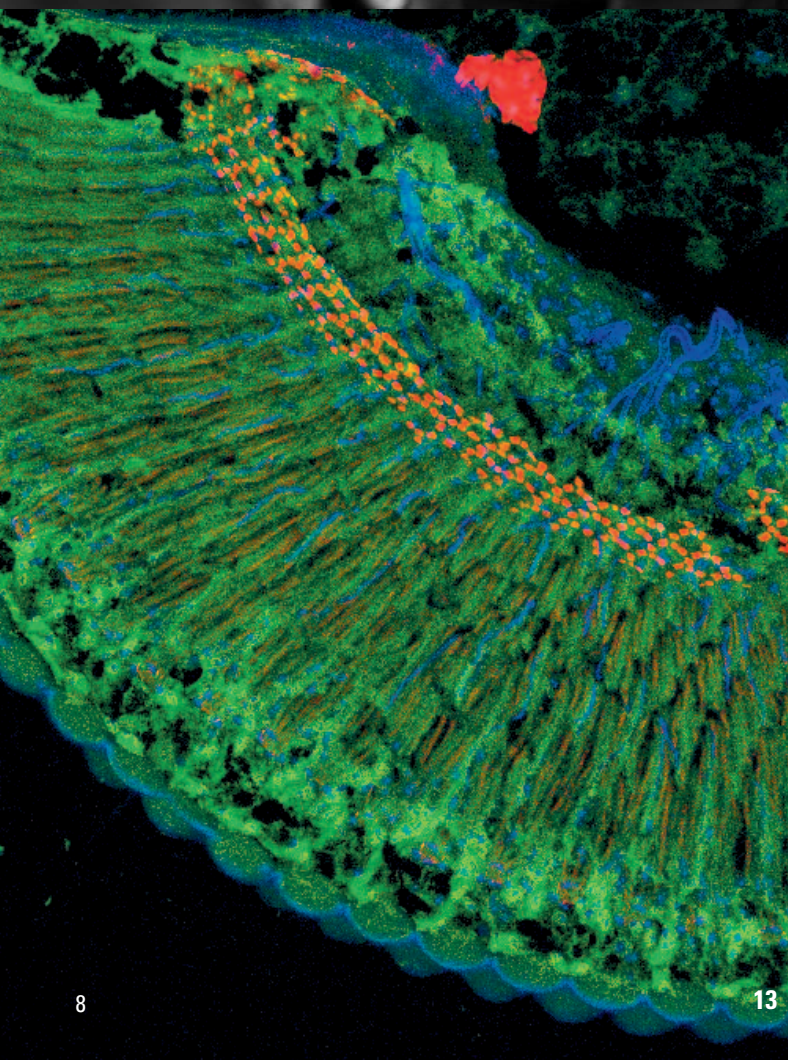


“The Acousto Optical Beam Splitter has revolutionized confocal fluorescence microscopy. Maximum sensitivity and applicability of multiple light sources gives real advantages for our scientific work.”

Prof. Alberto Diaspro
Department of Physics
University of Genoa
Genoa, Italy

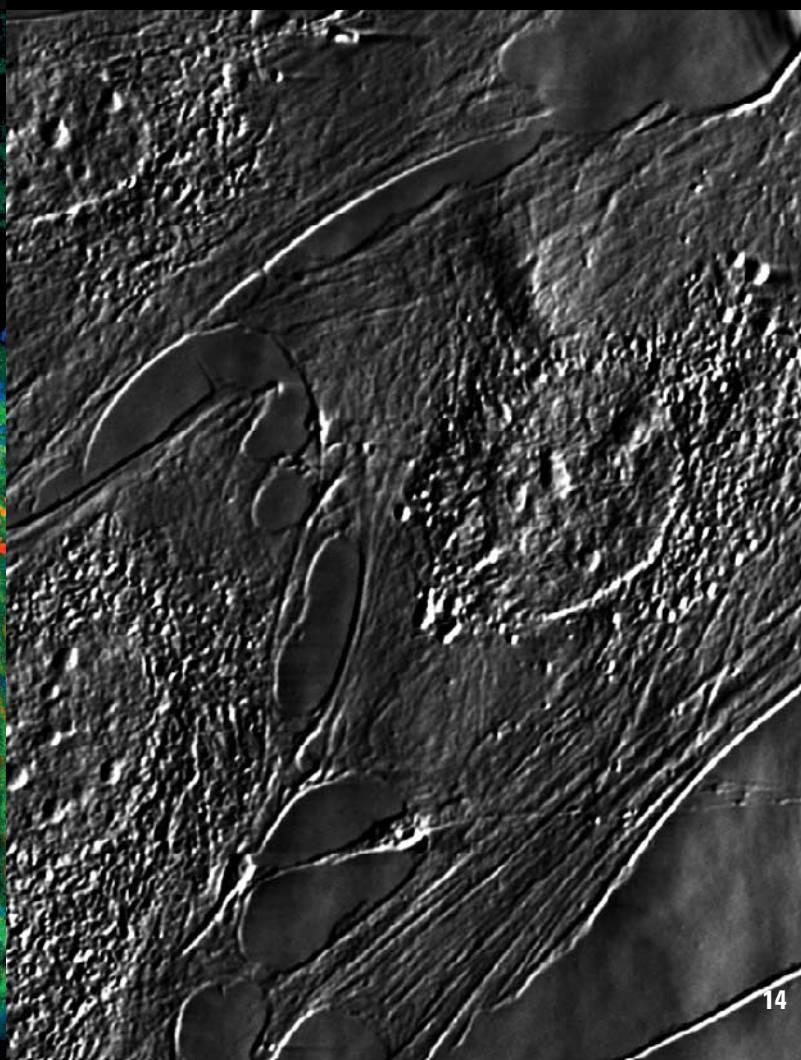


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Think of the things you could do, if you had access to all the good tools out there. The new Leica TCS SP5 II unites the most advanced technical concepts currently available in one single system and brings you closer to this dream.

SuperZ stage

Distortion-free recording of large 3D stacks and live vertical sectioning of the specimen is enabled by the new galvanometer-driven backlash-free focusing stage, moving parallel over a large 1.5 mm range – a precondition for perfect imaging results.

Switchable beam expander

The optics of the Leica TCS SP5 II is optimized for imaging and manipulation. The beam expander allows for switching between outstanding precision and high bleach power. This means that there is no impairment of optical properties when bleaching or imaging.

UV and IR in one system – deep imaging a video rates

The concept of three different laser ports in one system provides excitation from UV to IR. You can simultaneously work with UV lasers, visible lasers, femtosecond¹ and picoseconds pulsed IR lasers while covering excitation from 350 nm to 1040 nm for deep imaging. The range of spectral detection reaches from 400 nm to 800 nm.

The big picture: a larger image field at your disposal

The Leica TCS SP5 II offers an entirely new scanner concept for working with high frame rates, up to 290 fps, with full performance over the whole field of view (15 mm resonant, 22 mm conventional). Frame sizes up to 8192 x 8192 pixels (64 Mpix), easily transport optical resolution – without losing time.

Unique Options for High-Quality Results

Combining the Best Hardware in One System.

The intelligent base

Designed around our high specification automated Leica DM/DMI Digital Research Microscopes, performance and flexibility enable outstanding results. The unique range of CS objectives, tested and selected for confocal applications, turns the Leica TCS SP5 II into a powerful solution – tailored to your research needs.

- Precise optical sectioning with SuperZ Galvo stage
- Switchable beam expander
- UV, VIS and IR in one system
- Excitation range 350–1040 nm
- 405 nm imaging
- D-FLIM 405 nm
- Femtosecond and picosecond IR lasers
- Up to 64 Megapixels/image, field rotation 200°, also for resonant scan



Leica TCS SP5 II – Detection module

Proven SP-detection by Leica for both standard imaging and 2-channel FLIM – that is what lies at the heart of our new confocal microscope. This innovative combination allows for true spectral FLIM data acquisition, taking you to an entirely new dimension of fluorescence imaging.

Additionally, fluorescence cross correlation spectroscopy (FCCS) can be performed with the same instrument: Leica TCS SP5 II.



Time is precious. Of course you want to have answers to your scientific questions as quickly as possible. The new Leica TCS SP5 II system comes with a user-friendly workflow based software package that lets you concentrate on what is worth your attention: research with high-quality results.

We are used to setting standards

Leica pioneered user-guiding software in 1995 by introducing workflow arrows to guide the user step by step through the process of sensible data recording. Ever since, this concept has been refined and improved to constitute the main base for our new user interface: Leica LAS AF (Leica Application Suite Advanced Fluorescence).

Standardized software for easy use and compatibility

Leica LAS AF is the platform for all software in Leica Microsystems. This ensures compatibility of different applications with different hardware, covering the whole range of microscopy and imaging equipment from Leica Microsystems.

Since all Leica software is identically structured, once you are trained to use one of our applications, you will easily learn to operate completely unrelated applications – saving time and training effort.

Intelligent and Intuitive Interface

High Usability for High Ambitions.

The clearly structured user interface is designed for easy, ergonomic use. It takes you through all necessary steps, always showing current options while hiding currently irrelevant ones. You do not have to be an IT expert to configure your own tools. After all, we know that you need to concentrate on what is really important – your research results.

Software that really works for you

In addition to the basic applications, Leica offers you a whole range of extended applications. Software wizards for FRAP, FLIP (Fluorescence Loss In Photobleaching) and FRET (Fluorescence Resonance Energy Transfer) are designed to support your workflow and efficiency. The benefits are obvious: no need for configuring tools. You can fully concentrate on your work.

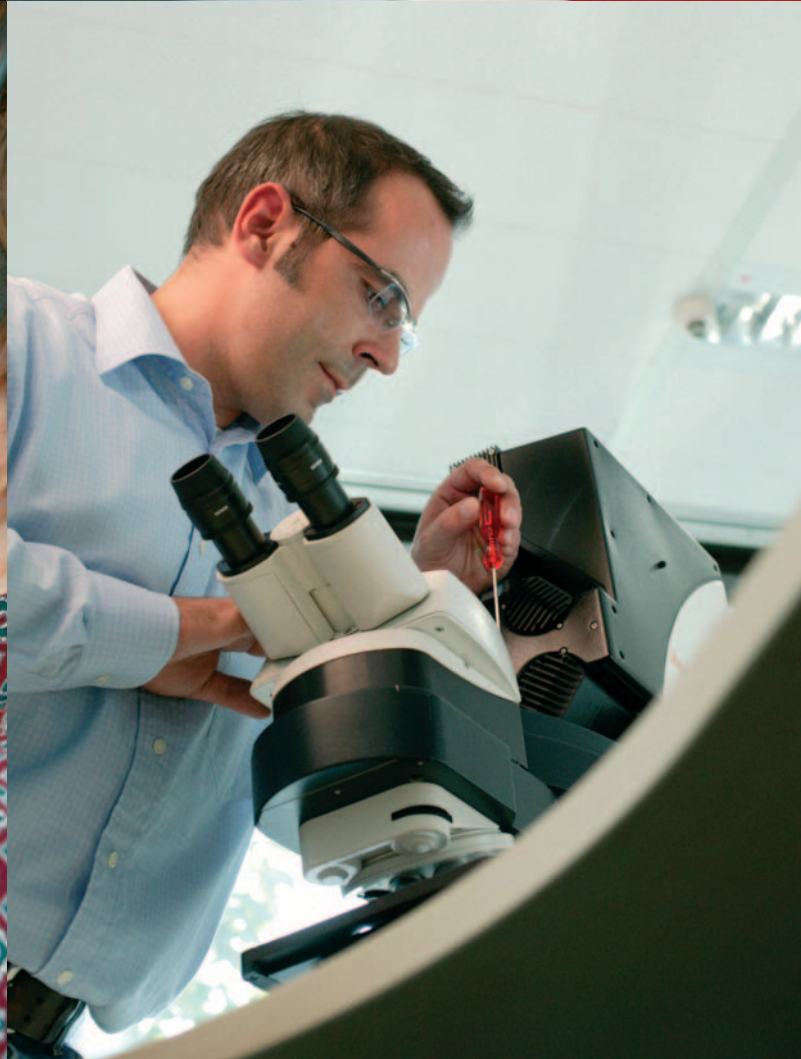
- Clear and non-distracting
- Guided workflow
- Interactive, fast set-up by programmable control panel
- Ergo-check of settings
- Advanced Time Lapse
- Live Data mode
- 3D reconstruction
- Colocalization analysis
- Dye Finder: linear unmixing
- FRAP wizard
- FRAP XT and FlyMode FRAP
- FRET Wizards
- FCS and FLIM applications
- Electrophysiology wizard



“Enormous flexibility and significantly improved transparency are the benefits which we gain from the Leica SP detection module.”

Prof. Fujio Murakami

Neuroscience Laboratories
Developmental and Functional
Neuroscience Group
Graduate School of Frontier Bioscience
Osaka University
Osaka, Japan



Some of our most exciting innovations have been inspired by what our customers have to say. Listening closely to their wants and needs has helped improve our work far beyond technical research and development. It has also helped us increase the efficiency of our service and support. So if there is anything we can do for you, let us know. We're here to listen – and to help. After all, we want to continue raising our standards.

The range of services available at Leica Microsystems is wide, and we are constantly working to expand it. From technical support to training services, you will find everything you need to get the most out of your Leica products.

Leica customer service

We're just a call away – wherever you are. Simply give your national Leica call line a ring to get superior engineering and applications support or to contact our sales and applications specialists.

Operation and application training

We also provide in-depth training for getting the most out of your system and applications.

Taking Service to a Higher Level

Maintenance contracts

Various levels of maintenance are available – from once-a-year minimum maintenance to our all-inclusive contract. Talk to your local service manager about which contract will be best for you.

Other services:

- Spare parts
- Upgrade kits
- Documentation



“Technical service, application support and an open ear for any question is an attitude we appreciate from a supplier. Leica has matched our expectations.”

Dr. Norbert Perrimon
HHMI
Harvard Medical School
Department of Genetics
Boston, MA
USA



Acknowledgements:

We gratefully acknowledge the following scientists for providing images:

- 1 *Drosophila melanogaster* (eye section)
Red: F-Actin, Cy3; Blue: Nuclei, DAPI; Green: pigmented cells, GFP
Courtesy of Anne Galy, IGBMC, Strasbourg-Illkirch, France
- 2 (13) *Drosophila melanogaster* (eye section)
Green, Retina cells, GFP; Red: F-Actin, Cy3; Blue: Nuclei, DAPI,
Courtesy of Anne Galy, IGBMC, Strasbourg-Illkirch, France
- 3, 10 *Drosophila melanogaster* (egg chamber)
Green: Actin, Alexa 488-Phalloidin; Red: Cortex, Egalitarian Red
Blue: hnRNP, Cy5; Grey: Nuclei, DAPI
Courtesy Sonja Lopez de Quinto, Florence Besse & Oliver Hachet,
EMBL, Heidelberg, Germany
- 4 (6) *Cyprinus carpio* (retina)
Green: Amacrincells, FITC; Red: red and green cones, Cy3
Courtesy of Dr. Konrad Schultz, Carl-von-Ossietzky University
Oldenburg, Neurobiology, Oldenburg, Germany
- 5 (14) Human fibroblasts
Transmitted light
Courtesy of Dr. Günter Giese,
Max Planck Institute for Medical Research, Heidelberg, Germany
- 7 *Arabidopsis thaliana* (leave)
Green: Endoplasmatic Reticulum, GFP; Red: Plastides, auto-
fluorescence; Grey: DIC (Differential Interference Contrast)
Courtesy of Prof. Dr. Diedrik Menzel, Institute for Cellular and
Molecular Botany (IZMB), Rheinische Friedrich-Wilhelms-
University, Bonn, Germany
- 8 Upper left: Ca²⁺ waves in muscle cells, time lapse recording.
Courtesy of D. Eisner, University of Manchester, UK
Lower right: Hairs on spring leaves, color-coded height projection
Courtesy of R. Borlinghaus, Leica Microsystems
- 9 *Drosophila melanogaster* (state16 embryo)
Green: F-Actin, TRITC-Phalloidin; Red: muscles, Myosin, Cy3
Blue: Tigrin (Extracellular matrix protein), Cy5
Courtesy of Dr. Laurent Soustelle and Dr. Angela Giangrande,
IGBMC, Strasbourg-Illkirch, France
- 11 *Caenorhabditis elegans* (neurons)
Green: GABAergic neurons, GFP; Red: glutamatergic interneurons,
DsRed; Cyan: sensory and interneurons, CFP; Yellow: excitatory
motoneurons, sensory neurons, YFP; Grey: sensory neurons, DiD
Courtesy of Dr. Harald Hutter, Max Planck Institute for Medical
Research, Heidelberg, Germany
- 12 *Schistocera gregaria* (nervous system)
Green: cell bodies and GABA containing axons, Cy2
Red: cell bodies and cns axons, Cy3
Leica Microsystems CMS, Mannheim, Germany

¹ As the use of lasers with sub-picoseconds-impulses for two-photon laser microscopy is protected by several patents (US 5 034 613, JP 284 89 52, EP 500 717 and EP 807 814) we have licensed these patents from the Cornell Research Foundation Inc. and the Carl Zeiss MicroImaging GmbH and therefore, we can now offer this technology to our customers.“

“With the user, for the user”

Leica Microsystems

Leica Microsystems operates globally in four divisions, where we rank with the market leaders.

● Life Science Division

The Leica Microsystems Life Science Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems' customers at the leading edge of science.

● Industry Division

The Leica Microsystems Industry Division's focus is to support customers' pursuit of the highest quality end result. Leica Microsystems provide the best and most innovative imaging systems to see, measure, and analyze the microstructures in routine and research industrial applications, materials science, quality control, forensic science investigation, and educational applications.

● Biosystems Division

The Leica Microsystems Biosystems Division brings histopathology labs and researchers the highest-quality, most comprehensive product range. From patient to pathologist, the range includes the ideal product for each histology step and high-productivity workflow solutions for the entire lab. With complete histology systems featuring innovative automation and Novocastra™ reagents, Leica Microsystems creates better patient care through rapid turnaround, diagnostic confidence, and close customer collaboration.

● Medical Division

The Leica Microsystems Medical Division's focus is to partner with and support surgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the future.

The statement by Ernst Leitz in 1907, “with the user, for the user,” describes the fruitful collaboration with end users and driving force of innovation at Leica Microsystems. We have developed five brand values to live up to this tradition: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement. For us, living up to these values means: **Living up to Life.**

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and representatives in more than 100 countries