From Eye to Insight

Leica
MICROSYSTEMS

Intuitive
Innovative
Indispensable

Leica Application Suite X

Imaging and Analysis Software for
Life Science Research

Powerful Performance Made Simple

The Leica Application Suite X (LAS X) focuses on user-friendliness. The workflow-oriented design makes it an **Intuitive** imaging platform which can be personalized to your needs. Researchers can plan and execute even the most complicated experiments easily. Elevate the impact of your work with **Innovative** and powerful features.

INTUITIVE

EASE OF USE

The LAS X workflow guides you intuitively through acquisition, processing and analysis. Save and recall customized system settings for maximum reproducibility. Use the Easy Operation Mode on widefield systems to design your own user interface with the functions you need. Just enter the dyes of your sample in the Dye Assistant and start your multicolor confocal image acquisition. The LAS X application wizards go beyond the pure application by additionally providing sophisticated analysis options.

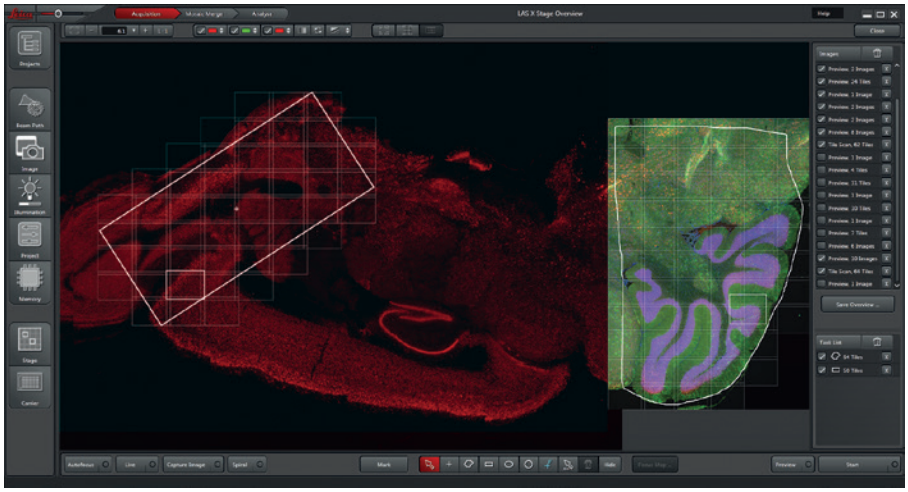
APPLICATION WIZARDS

Intuitive wizards guide you through various applications like FRET, FRAP, or FALCON (FAst Lifetime CONtrast) the future of functional imaging, thus reducing potential mistakes and minimizing time for setup. Redefine the detection limit of confocal imaging with the LIGHTNING Detection Package which extracts the maximum information from each specimen down to 120nm.

INNOVATIVE

LIVE CELL IMAGING

Keep cells in focus. With a click of a button, the hardware based Adaptive Focus Control (AFC) makes refocusing obsolete. Whether you search for the most interesting cells in your dish or you perform a fast multi-position time-lapse experiment, your sample stays reliably in focus, in real time. Experimental conditions can be documented and controlled with the Environmental Control module. You never have to question the validity of your results again, just analyze the environmental conditions together with your image data. The software-controlled water immersion micro dispenser and the motorized correction collar facilitate long-term time-lapse, deep-tissue and screening experiments at best possible image quality. The Mobile Connection module offers you the possibility to increase your working efficiency by controlling your imaging experiments from anywhere and anytime.



LAS X Navigator

NAVIGATION

Switch from searching image by image to seeing the full overview of your samples. Like a GPS for your cells, LAS X Navigator ensures that you always have a clear roadmap to brilliant data.

Create fast overviews of your samples and identify the important details instantly. Then set up high resolution image acquisition automatically using templates for slides, dishes and multiwell plates.

LAS X is the **Indispensable** software solution for all Life Science Imaging Systems from widefield to confocal and super-resolution microscopy. What could be easier than using just one software for all types of microscopes and applications?

INDISPENSABLE

VISUALIZATION

LAS X includes powerful visualization tools. Display images live during acquisition with the Image Viewer. Review data, write annotations, create image overlays or compare different experiments with each other. The Image Gallery offers a thumb nail view with various display and filter options available such as selecting the image with the best focus at each time point automatically. The 3D viewer provides smooth and fast motion of 3D volumes in real time. Use the movie maker to create astonishing 4D animated movie sequences.

ANALYSIS AND MEASUREMENTS

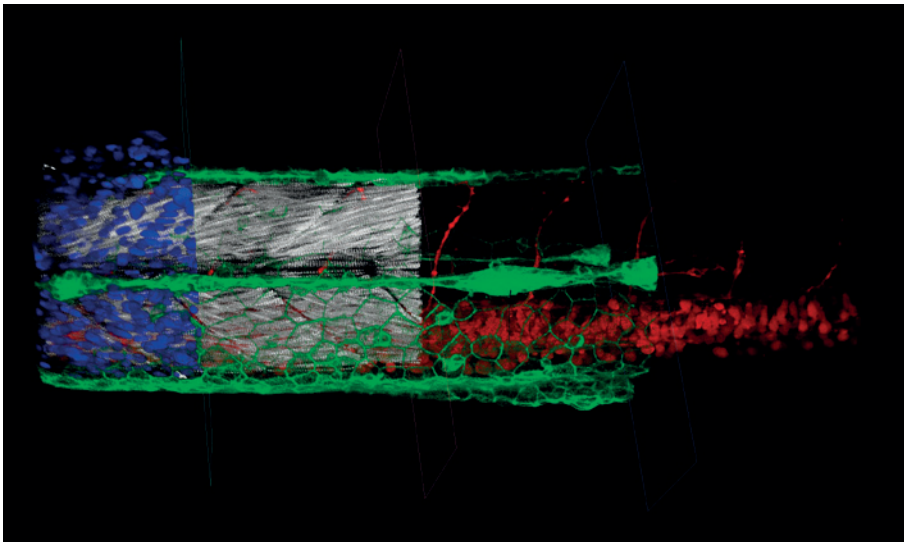
Obtain reproducible analysis results rapidly with the 2D and the 3D image analysis wizards. Go step by step through the workflow from applying filters, thresholding, binary image processing through measurements and classification. In addition, you can perform object tracking or call ImageJ macros within the 2D analysis wizard. Distances, areas, volumes, angles, and much more can be determined with the measurement tools.

POWERFUL LAS X CORE MODULE

The LAS X Core module provides full image viewing capabilities, including annotations, image overlay and image comparison. Create Maximum Intensity Projections, quantify your images and export image series as a movie. You can also apply processing tools such as noise reduction filters, parallax correction and shading correction. To experience the full capabilities of the LAS X software, the LAS X Core module comes with a 30 day trial version of all optional modules (see back page).

HARDWARE INTEGRATION

LAS X is one common software platform for widefield, confocal and super-resolution systems supporting upright, inverted, fixed stage and stereo microscopes from Leica Microsystems. Configure your widefield system with a rich choice of LED light sources, microscope stages and environmental equipment. LAS X supports not only a wide variety of added components, but also CCD, EM CCD and sCMOS cameras from all major suppliers. With LAS X you decide which technology best fits your research. There is no need to learn multiple operating concepts for different applications.



Zebrafish Embryo · Courtesy of Lionel Newton, EMBL Heidelberg · Green: Lateral line primordium (GFP), Red: Neuronal marker (DsRed); Blue: Nucleus marker (BFP), Gray: Muscles (SHG)

Leica
MICROSYSTEMS

LAS X MODULES AND FUNCTIONS

	Short Description	Widefield	Confocal
LAS X Core	Basic building block for all LAS X systems. Operates without the need for a dongle.	●	●[1]
Multi Channel Acquisition	Allows the definition of up to 8 sequential camera channels per experiment. Confocal Scanning allows acqusition of a multitude of channels simultaneously or sequentially.	○	●
Time-Lapse	Define the duration and frequency of image capture for time-lapse experiments.	○	●
Z-Control and Software Autofocus	Position focus or capture 3 dimensional data. Includes software autofocus.	○	●
Mark and Find	Define multiple stage locations and revisit them as part of a time-lapse or Z stacking experiment.	○	●
Stitching	Create overview images of large fields of view.	○	●
Assay Editor	Perform multi well and multi chamber experiments. Automatically distribute regions and positions to each well/chamber.	○	–
Extended Depth of Field	Sums up only the in focus area of each image in a three dimensional image stack and creates a single EDOF image.	○	–
Trigger to Peripherals	Send and receive trigger signals from peripherals within the standard LAS X user interface.	○	–
Live Image Builder	Detects manual sample movement automatically and smoothly extends the image.	○	–
Live Stream Movie Recording			
User Management	Allows system administrators to give different access levels to different LAS X user groups.	○	●
Reticules	Digital overlays displayed on top of the camera image emulating fixed eyepiece graticules.	○	–
Measurements	Simplify the manual tasks involved in generating measurement parameters.	○	–
Extended 2D Annotations	Additional functions such as magnifying a rectangular region on the image or superimposing an imported image.	○	–
Lambda Scan	Imaging method that acquires the emission spectrum in each image pixel using spectral detectors.	–	●
Lambda-lambda scan	Imaging method that acquires the full excitation-emission spectrum in each image pixel using a tunable laser and spectral detectors. Allows Lambda square fluorescence mapping.	–	○
Dye Finder	Multi-color restoration, channel unmixing (online/offline).	○	○
Dye Assistant	Confocal users can select different dyes and LAS X sets up all hardware components accordingly.	–	●
LightGate	Restriction of detection to a certain time window removes unwanted signal from autofluorescene or backscattering with HyD detectors.	–	○
Z intensitiy compensation	Tool to compensate within a z-stack drop of fluorescence intensity that occurs deeper inside your sample with laser power and/or detector gain.	–	●
Live Data Mode	Define acquisition macros. Allows interactive data recording, logging of comments, job-sequencing, and online evaluation.	○	○
HCS A	Versatile tool set for high content screening and automated microscopy.	○	○
3D Visualization	Graphic card based processing for smooth and fast motion of 3D volumes in real time.	○	○
3D Analysis	Easy and Versatile Wizard for 3D multi channel analysis and classification. Includes measurements in 3D and 3D process tools.	○	○
2D Analysis	Easy and Versatile Wizard for 2D multi channel analysis and classification.	○	○
Measurements	Module for 2D measurements such as distances, areas, angles. Count objects and classify objects manually. Create reports.	○	○
Calcium Imaging	Module for online ratio measurement, online display of ratio graphs and ratio image.	○	●
Colocalization	Histogram based colocalization and area measurements.	○	○
LIGHTNING	Fully automated real-time image information extraction based on adaptive deconvolution.	–	○
FRET SE	Powerful wizard for FRET acquisition and analysis (sensitized emission FRET).	○	○
FRET AB	Powerful wizard for FRET acquisition and analysis (acceptor bleaching FRET).	–	○
FRAP	Wizard for user friendly setup and analysis of FRAP and FLIP experiments, optional fast zoom in during bleach with resonant scanner.	–	○
FALCON	Fully integrated FAst Lifetime CONtrast functional imaging for FLIM and FLIM-FRET data acquisition.	–	○
FCS	Wizard for fast and reliable setup of FCS and FLCS experiments and full control of F(L)CS data aquisition.	–	○
Electrophysiology	Package to guide you through E-Phys experiments, incl. Automated recordings, interactive data acquisition, trigger functions.	○	○
SmartSTED Wizard	Intuitive workflow to operate STED 3X with three simple sliders to define the general level of resolution increase and the amount of super-resolution in 3D. With a third slider to adjust between signal-to-noise and the number of achievable images.	–	○
CARS Calculator	Automatic calculation of specific Raman wavenumbers according to the pumplaser wavelength used for exaction and vice versa.	–	○
CARS Spectral Scan	Automatic spectral scan covering the Raman wavenumbers range 1200–3400 cm^{-1}.	–	○
Environmental Control	Have full control of your experimental conditions. Log the environmental data and monitor it during the experiment.	○	○
Mobile Connection	Connect to your acquisition station via web client or mobile device and see the course of your experiment, review the whole experiment or open any image series available in the project tree.	○	–

● = included ○ = optional – = not available

[1] LAS X Core is not sufficient to drive a confocal system, but the offline version can be used to review the acquired data.

Leica Microsystems CMS GmbH | Ernst-Leitz-Strasse 17–37 | D-35578 Wetzlar (Germany)
Tel. +49 (0) 6441 29-0 | F +49 (0) 6441 29-2599

www.leica-microsystems.com

Download a free LAS X Core Offline Version from:
www.leica-microsystems.com/LAS-X