#### cellSens functions

		Dimension	Standard	Entry
Layout	User experience customization	1	1	✓ <u> </u>
	Overlay multiple images	√	1	
	Document groups for side-by-side image comparison	1	1	1
View	Movie playback	1	1	✓
view	Tile view (multiple images in a single data set shown side by side)	1	1	✓
	Slice view for orthogonal plane viewing of 3D or time-lapse data sets	1		
	Voxel view for isosurface and volumetric rendering of 3D and 4D data sets	1		
	Snap/movie acquisition	√	1	✓
	Time-lapse at specified interval	1	1	
	Automated multi-wavelength	1	Multichannel Acquisition	
	Z-Stack	1		
	Multi-dimensional (xyzt and wavelength)	1		
	Graphical Experiment Manager	√		
	Manual assisted panoramic imaging (manual MIA)	1	Manual Process	
Image Acquisition	Multiposition acquisition and stage navigator	Multiposition		
0	Automated panoramic imaging (auto MIA, requires motorized stage)	Multiposition		
	Instant EFI image (manual or motorized Z)	/	Manual Process	
	Simultaneous multi-color imaging (Image splitter needs)	Ratio/High End Device		
	Live deblurring	/		
	High Dynamic Range Imaging (HDRI)	1		
	Multi-well Plate Acquisition	Well Plate Navigator Multiposition		
	Geometry/combine/filter processing	/	1	
	Fluorescence unmixing	1	-	
	Brightfield unmixing	1		
Image Processing	Deblurring (No/Nearest Neighbor, Wiener Filter)	1		
	Kymograph	1		
	2D deconvolution (constrained iterative deconvolution)	1		
	3D deconvolution (constrained iterative deconvolution)	CI Deconvolution		
	Begion and line measurements	/	1	
	Phase analysis	1		
	Object analysis and classification	Count & Measure		
Image Analysis	Interactive measurement	/	1	J*
	Intensity plot over time/z		•	•
	Colocalization	/		
	Object Counting (Manual)	/	1	
	Online Batio and Kinetics	Batio	•	
	Batio analysis (off-line)	1		
	Automatically compose Word reports	/		
Documentation and	Database image and data management solution for microscopy	Database Core	Database Core	
Collaboration	Save and load image/documents from Database	Database Client	Database Client	Database Client
Remoting	Remote Live Image Viewing	Database Ollenit	NetCam	Database Glient
nemoting	nomoto Eivo imdye viewiliy	* Three points apple four points apple arbitrary line	alaged polygop, polyling	and name and is yet line and
		i niee points angle, tour points angle, arbitrary line,	ciosed polygon, polyline a	and perpendicular line on

## Products with confirmed functionality

			Dimension	Standard	Entry
-	Camera	DP20*1, DP21, DP22, DP25*2, DP26, DP27, DP70*1, DP71*2, DP72*2, DP73*3, DP80*3	~	1	1
Olympus	Missossa	BX43, BX53, BX63, BX61, BX61WI, IX83, IX73, IX81, SZX16A	✓	1	
	Micoscope	IX81-ZDC, IX81-ZDC2, IX3-ZDC	$\checkmark$		
	Peripherals	BX-DSU, IX3-DSU, IX2-DSU, U-CBF	1		
	Motorized XY stage	BX3-SSU, IX3-SSU	Multiposition		
Olympus Soft Imaging Solutions	Camera	CC12, F-View II, Colorview I, Colorview II, Colorview III, Colorview IIIu, XM10, XC10, XC30, XC50, UC30, UC50, SC20, SC30, SC100	1	✓	1
	Peripherals	cell^TIRF (multi-line, single line), MT20, USB-ODB converter, Real Time Controller (U-RTC and U-RTCE), U-FCB	1		
Hamamatsu	Camera	Orca R2 (C10600-10B), Orca 03 (C8484-03G), Orca 05 (C8484-05G), Orca ER (C4742-95-12ER), Orca Flash 2.8	1		
		ImagEM C9100-13, ImagEMX2(C9100-23B), ORCA-Flash 4.0 V2(C11440-22CU), ORCA-Flash 4.0 LT	High-End Camera		
Q-Imaging		MicroPublisher 3.3 RTV, MicroPublisher 5 RTV	~	1	
	Camera	Monochrome: Exi Blue/Aqua, RETIGA (Exi, SRV, 2000R, 2000RV, 4000R, 4000RV, 6000_mono) QIClick plus RGB slider	1		
		Color : EXI Aqua	Llich End Comore		
			Tign-End Gamera		
Photomotrico	Camera	CUUISINAP HQ2	High End Comora		
FIIOtometrics	Image Splitter	Dual View DV2 /OuadView OV2	Ratio/High End Davica		
Andor	Camera	iXon X3 807 iXon Liltra 807 7/la/ 2 (Camera-link) 7/la5 5/LISB3 0)	High-End Camera		
lenontik	Camera	ProgRes C3. ProgRes C5		1	
Vincent Associates	Shutter	Uniblitz shutter (VCM-D1_VMM-D1_VMM-D3)			
Cooll ED	Light Source	precisExcite (nE-1 nE-2)	1	·	
Lumen Dynamics	Light Source	X-Cite 120 PC, X-Cite exacte, X-Cite XI ED1	1		
	Light Source	Lambda DG4	1		
Sutter	Shutter, FW	Lambda 10-3/10-B	1		
	Motorized XY stage	Proscan (I, II, III), Optiscan	Multiposition		
Prior	Shutter, FW, Z-drive	Proscan (I, II, III), Optiscan II	1		
	Piezo Z (control via Real Time Controller)	NanoScanZ NZ100	High-End Device		
	Motorized XY stage	Mac 6000	Multiposition		
Ludi	Shutter, FW, Z-drive	Mac 6000	1		
	Motorized XY stage controller	Oasis 4i	Multiposition		
Objective Imaging	Z-drive controller	Oasis 4i			
	Motorized XY stage	Tango	Multiposition		
Marzhäuser	Z-drive controller	Tango	1		
Physik Instrumente	Piezo Z (control via Real Time Controller)	PIFÖC P-721	High-End Device		
Yokogawa	CSU	CSU-X1	High-End Device		
Compatible imag	*1 DP20/70 does not support W je formats	indows7 64bit, Windows 8/8.1 32bit/64bit. *2 DP25/DP71/DP72 does not suppo	ort Windows8/8.1 32bit/6	64bit. *3DP73/80 support only	Windows7/8/8.1 64bit
Read and write	JPEG, JPEG2000, TIFF, BMP, AVI, PNG	G, VSI (Virtual slide image),			
Read only	GIF, PSD (Adobe Photoshop), TIFF (DP-BSW, FSX100, MetalMorph), OIF/OIB (Fluoview format), Cell, STK (MetaMorph), MRC (Medical Research Council)				
Recommended s	system requirements				

05	Microsoft Windows 8.1 Pro (32-bit/64-bit), Microsoft Windows 8 (32-bit/64-bit) Pro, Microsoft Windows 7 (32-bit/64-bit) Ultimate with SP1, Microsoft Windows 7 (32-bit/64-bit) Professional with SP1
OS Language	English, Simplified Chinese, Japanese, German, Russian (only for Entry and Standard) and all others with English like alphabet
CPU	Intel Core i5, Intel Core i7, Intel Xeon Recommended for high speed image acquisition: QuadCore
RAM	4 GB Recommended for high speed image acquisition: 8GB or more only on Windows7 64-bit operating system
Graphic card	1280x1024 (min. 1024 x768) monitor resolution with 32-bit-video card with separate graphics memory (no integrated graphics processor with shared memory)
Port	USB 2.0 port to connect devices to the system Fire Wire A to connect devices to the system (BX61, IX81, SZX2-MDCU, IX3-DSU etc) Serial (RS232) to connect devices to the system (BX61, IX81, SZX2-MDCU etc) Additional PCI/PCIe slots as necessary to connect third party peripherals (principally third party cameras) with proprietary interface cards
HDD	1 GB for installation Performance of hard disk is a limiting factor for image acquisition speed Recommended for high speed image acquisition: Solid State Drive (SSD)
Drive	DVD drive (Read: DVD-R DL)
Web Browser	Recommended for Windows 7: Microsoft Internet Explorer 8.0, 9.0, Recommended for Windows 8: Microsoft Internet Explorer 10, Recommended for Windows 8.1: Microsoft Internet Explorer 11

#### Image data courtesy of:

Hiroo Ueno, Ph.D. Department of Stem Cell Pathology, Kansai Medical University (cover page)

• OLYMPUS CORPORATION is ISO14001 certified. • OLYMPUS CORPORATION is FM553994/ISO9001 certified.

All company and product names are registered trademarks and/or trademarks of their respective owners.
Images on the PC monitors are simulated.
Specifications and appearances are subject to change without any notice or obligation on the part of the manufacturer.



OLYMPUS CORPORATION -ku, Tokyo, 163-0914, Japan OLYMPUS EUROPA SE & CO. KG OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS CORP. 48 Woerd Avenue Waltham, MA, U2453, USA. OLYMPUS SINGAPORE PTE LTD. er, Singapore 248373 OLYMPUS AUSTRALIA PTY. LTD.

### OLYMPUS LATIN AMERICA, INC. 5301 Blue Lacoon Drive. Suite 290 Miami, FL 33126, U.S.A. OLYMPUS (CHINA) CO., LTD.

-3, Xinyuan South Road, Chaoyang District, Beijing, 100027 P.R.C. OLYMPUS KOREA CO., LTD. -gu, Seoul, 135-509 Korea



## Seamless Workflow. Intuitive Operation.



Imaging Software



Not for clinical diagnostic use.

## **ADD SIMPLICITY TO EXPERIMENT DESIGN...** LEAVE MORE TIME FOR RESEARCH

Olympus cellSens gives you a simpler way to work.

Enjoy full control over the user interface, with functions that are where you want them, when you need them.

Seamless operation, from image capture to report creation means more results with less effort.

Spend less time with your software. Have more time for research.



Imaging



## Capture multi-color, time lapse, and z-stack appropriate capture button, add relevant parameters, and click "Start". The Process Manager or Experiment Manager make it easy to capture multidimensional image.

and the second

Mar Martina



Processing

Viewing and Processing Automatically view your data in the colors and layout you choose. Take advantage of an array of advanced image processing functions, such as stitching, extended focus, deconvolution, and unmixing.



**Measurement and Analysis** Make measurements using an intuitive interface. cellSens offers region of interest, phase analysis, and cell count capability. Export raw measurement data to MS Excel or a cellSens workbook with a single click.

## Microscopy Research With a Personal Touch

With microscope optics pushing the boundaries of resolution and size at all magnifications and microscope design enabling new techniques, it is important to be able to efficiently capture and process the images produced. In addition, an increasing number of researchers are imaging using a microscope and it is therefore essential that imaging and analysis are both flexible and user-centric. The Olympus cellSens software family fulfils all these requirements with its unique personalisation concept.

## Analyzing

## Reporting



**Collaboration and Communication** Actively collaborate with colleagues and coworkers with special tools including Database and Reporting functions. These functions make it simple to manage, share, and distribute your own image and data reports.

# REDUCE CLUTTER AND CONFUSION BY DISPLAYING ONLY THE TOOLS AND WINDOWS YOU NEED

#### It's Time to Get Personal

Olympus has been at the forefront of microscopy for over 90 years and has developed microscopes and systems for a broad spectrum of applications. As a result, we know that each researcher has individual requirements that can't all be met by fixed solutions. The cellSens software family consists of three packages, all featuring a peerless user-definable interface. As a result, each user can define what they want cellSens to show them within the defined work areas.

#### Dynamic Interface

Creating an efficient workflow requires careful definition of the tasks and tools at each stage. With the cellSens platform's dynamic GUI, the same is true—the tools you need for each stage are clearly available, without clutter or the need to search. Olympus has created a number of interface layouts, which are developed with capabilities appropriate to the users needs.

• Acquisition Layout—for selecting between different acquisition processes and adjusting the camera settings

• **Processing Layout**—for post-acquisition functions such as image processing, execution of measurements, collection of data, presentation of resulting statistics

• Count & Measure Layout—for manual and automated measurement and object counting

• **Reporting Layout**—for generating reports to document and share results.

• Create Layout—a user can define his or her own layout in various arrangements



#### **Camera Control Panel**

The most important microscope component that requires software control when imaging is the digital camera. Modern cameras feature a number of functions that can be changed to enhance or perfect an image; for example, exposure time and pixel binning. The cellSens Entry and Standard packages control such features on all Olympus digital microscopes and cameras.

The Dimension package, in addition, controls such features on high-end research cameras as well. As a result, scientists can maximize the quality of their images.





#### **Dark Application Skin**

The Dark Application Skin reduces computer monitor-generated ambient light and allows cellSens users to adapt to darkened environments; icon contrast remains high for easy recognition and quick selection.



Dark skin

#### Arrange Windows as You Like

Organize the tools and windows for the job at hand to create a functional layout that works best for you.





Full screen

Floating panels



Docked panels

## **EMPOWERED TO DO WHAT YOU WANT**















## **AN ARRAY OF EASY-TO-USE FUNCTIONS** TO TURN RESEARCH FINDING INTO COMPELLING PRESENTATIONS

### Image Capture

#### **Graphical Experiment Manager (GEM)**

#### Dimension

Achieve a high flexibility in the design of experiments, with capabilities such as changing imaging conditions. Furthermore, using the High-end Device Solution provides compatibility with image splitting and piezo devices helps simultaneous two-color imaging and high-speed z-stack image acquisition.

#### 🔌 - 🛞 😂 ⊘ 😥 🦅 🏅



#### Well Plate Navigator

Dimension	+	Multiposition	+	Well Plate N

The Well Plate Navigator Solution allows you to automatically scan and acquire images from different plate formats, either standard or customized. All acquired images can be saved into a structured database for easy access, together with their well position and user



comments. Settings for imaging conditions can also be varied for individual wells, by column, by row or arbitrarily.

#### **Extended Focus Imaging**



By recording image data while the user gradually focuses through its sample the EFI function automatically creates a single all-in-focus image. The EFI process can be fully automated when cellSens Dimension is integrated into a motorized microscope. Such EFI composites can also be created by combining collections of previously captured images.

#### **Capture Multidimensional Images**



In combination with a motorized microscope, the Process Manager makes it easy to capture multi-color and multidimensional images. With the optional Multiposition Solution you can automatically capture multi-point and large area images.



#### **Panoramic Imaging**

Dimension	+ Multiposition
Or	
Standard	+ Manual Process

The manual multiple image alignment function creates a single montage image as you scan the specimen. Multiple saved images with adjoining edges can also be combined into a single montaged image. Wide area imaging can be completely automated when cellSens Dimension and its optional Multiposition Solution are combined with a motorized microscope. This function can also be used in combination with a motorized z-focus to enable the capture of images auto-corrected for sample distortion and tilting. With the release of cellSens v.1.11, a multi-point focus map is now available to enable automated focusing across wide image areas.



#### 

### Viewing and Processing

#### Unmixing



With the linear unmixing algorithm in cellSens Dimension, you can readily separate fluorochromes which overlap in their emission spectra—such as GFP and YFP—to produce crosstalk-free fluorescent images. This linear unmixing tool can also separate autofluorescence-related background. Brightfield image unmixing is also available as part of cellSens Dimension.





After unmixing

#### **Best Focus Extraction**

Extract the best focus from images, including z-stack, time-lapse images. This function is effective in creating T-series images with the best focus possible, even when working with defocused time-lapse images.



8

#### Deconvolution

#### Dimension

+ CI Deconvolution





#### High Dynamic Range Imaging (HDRI)

By automatically capturing many images at different exposures the HDRI function creates a final image with a much greater dynamic range, where low intensity signals are clearly visible without overexposing the bright areas of the sample.

## **AN ARRAY OF EASY-TO-USE FUNCTIONS** TO TURN RESEARCH FINDING INTO COMPELLING PRESENTATIONS

### **Measurement and Analysis**





Depending on the cellSens package different measurements are easily accessible, including distance between points, areas, intensity measurements and morphological parameters. Measurement data is saved as an image layer that can be exported to MS Excel and cellSens workbook formats, or viewed using OlyVia the free image viewer software.



## Measurement and ROI - x 😤 🦫 📴 🕇 🔹 /1- ×20AA $\Box \diamond O O O Z Ø \diamond$ 🗋 🖻 💏 👚

Automatic Object Measurement and Classification



cellSens Dimension has an extensive set of manual measurements that can be further expanded with the Count & Measure Solution. Easily perform automatic object measurement and classification in an interactive interface where recognized objects are always linked with their measurements.



image



Measurement and classification results

## **Collaboration and Communication**

#### Reporting



A convenient Reporting tool combines images with image property data, measurement data and your own customized fields into a report template with easy drag-and-drop operation. These Microsoft Word\* reports will let you guickly and easily collaborate with colleagues and communicate your results.

\*Requires Microsoft Word version 2003 or later



#### **Intensity Analysis**

#### Dimension

Graphically depict intensity and channel ratios, and export values to Excel or WorkBook by simply setting the region of interest (ROI) on multi-color images captured via FRET or Ca2<sup>+</sup> imaging. Finer details of cell structures can also be brought into clear view through the use of ratio display, thanks to the intensity modulated display (IMD) that displays ratios and intensity in terms of hues and brightness. Furthermore, the ROI can be moved to capture measurements in line with cell movements, and online analysis is made possible through selection of the ratio option.





#### **Manual Count**

Dimension

### Standard

Perform manual counts with self-set classes. Counts and proportions can then be undertaken for each class through simple mouse operation



#### **Remote Live Image**



The cellSens NetCam Solution lets any authorized network user see your live image in real time via a web browser



#### Database Database Core or Datab<u>ase Client</u> Database Core or Database Client Entry Database Client

The Database Core Solution allows the creation of user-defined databases, with full access control, which can be shared across a network. The database not only collects images but also all associated image properties, user comments and any kind of related file, like spreadsheets for other documents. An interactive query tool makes it easy to find the desired data, with automatic preview of the found images. With the Database Client Solution you can then conveniently deploy the capability to read and write to the shared database across many different stations.



#### Solution

Each cellSens Package can be expanded towards a specific application by using optional "Solutions"

