Software Manual

ZEISS Labscope v3.4

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Original Manual

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Content

1 Introduction to Labscope

Labscope is your easy-to-use imaging app for connected microscopes. Be it in the laboratory, university, school or even for your hobby – with Labscope you snap images, record videos and measure your microscopic samples, easier than ever. Transform your ZEISS network-compatible microscopes into Wi-Fi-enabled imaging systems. You can easily create digital classrooms or digital labs. Connect to microscopes at any point in time, from anywhere within your room. And then, share your images with the touch of your fingers.

Digital Classroom With the imaging app Labscope you can transform your student lab into a digital classroom via a WiFi-enabled network. Simply integrate your microscopes into the network - and you're ready to display all the live images at any time and from anywhere in the room in real-time. Project images onto the wall or a TV screen and foster teamwork among the students. With Labscope 'lecture & listen' becomes 'show & see'.

Routine Applications Labscope transforms your ZEISS network-compatible microscopes into a WiFi-enabled imaging system. You can easily create digital labs – just connect to any of the microscopes at any point in time and from anywhere in your room. Be it in your histology, cytology, hematology or pathology lab - Labscope snaps images and records videos of your microscopic samples. You even acquire multi-channel fluorescence images easier than ever.

Windows, iOS & Android Support Whether you're using a Windows PC with mouse and keyboard, a Windows tablet with touchscreen, an iPad, iPhone or Android devices – Labscope runs on all of these devices. Enjoy live images and view live thumbnails from your connected microscopes, and easily switch between all microscopes in the room. And snap images with scale bar and meta data. You can additionally perform annotation and measurement tasks. Record time-lapse or regular videos and save your images and videos to any shared network folder.

Service & Contact You can use the ZEISS Labscope Forum for submitting your service request of Labscope, it also includes the FAQs and latest release information. If you have any ideas for Labscope development, share with us in the ZEISS Portal My Voice.

Legal Notes Not all products are available in every country. Use of products for medical diagnostic, therapeutic or treatment purposes may be limited by local regulations.

Info

This manual is primarily based on Windows Labscope v3.4. And the latest iOS Labscope version is v3.3 and Android Labscope v4.0. Note there are certain functional differences between iOS, Android and Windows version of Labscope. For example, the Android and iPhone Labscope has less functions than iPad and Windows Labscope. You will find a detailed overview of the different functions in the product info under https://www.zeiss.com/labscope.

2 Installing Labscope

For Windows

1. Download the latest **Labscope v3.4** for Windows via the product website: https://www.zeiss.com/labscope
   → You will be directed to the ZEISS portal for downloading the installation files.
2. Double-click on **LabscopeSetup_vx.exe** to install the software.
3. Perform the required steps shown by the installation wizard. Please agree if you are asked to install additional drivers.
   → Some modules of Labscope require additional installation, e.g. **BioModuleSetup.exe**, which is for **AI Cell Counting and AI Cell Confluency** models, and you can find the installer in the same page of Labscope download in Zeiss Portal.

After the installation you see the **Labscope** program icon on your desktop.

For iOS

Download and install the latest Labscope v3.3 for iOS via the App store. And you could choose the corresponding app for iPhone and iPad ffrom there.

Please visit our product website to find the links to the downloads in the App Store:

https://www.zeiss.com/labscope

For Android

Download and install the latest Labscope v4.0 for Android via Google website to find the links to the downloads:

https://www.zeiss.com/labscope

3 First Start & Overview

Click on the app icon on your device to start the app.

Establish connection for the Labscope device with your microscope(s) and camera(s).

- For iPhone and Android devices, WiFi connection is supported.
- For iPad, WiFi or ethernet connection via lightning or USB-type-C adapters is supported.
- For Windows, WiFi, USB and ethernet connection is supported.

Note: Different microscopes and cameras support different connectivity as well.

After connection is established, the microscopes will be automatically shown up in Labscope. When there are no microscopes found in current connection, Labscope will show virtual microscopes. The below image is an example after connecting with several microscopes at same time.

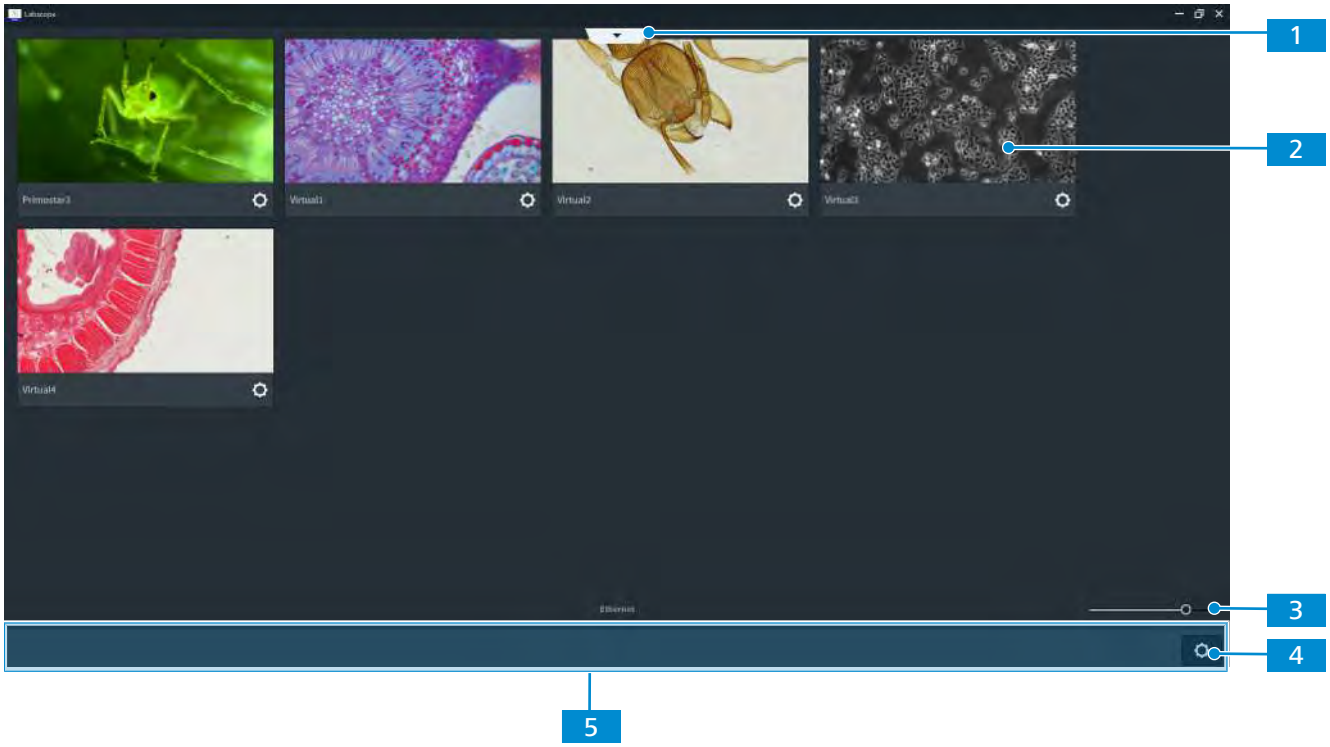


Fig. 1: Microscope View

1 Opens the **Multitask Bar**, see *Multitask Bar [▸ 10]*.

2 **Thumbnail View** of the connected microscopes

If you click on the individual **Gear** button, the **Microscope Configuration** is opened, see *Microscope Configuration [▸ 8]*

3 Changes the size of the thumbnail view.

4 Opens the **Global Settings**, see *Global Settings [▸ 40]*.

5 Main toolbar

Info

All the images of this manual are according to Labscope for Windows. The iOS and Android version can look slightly different in some interfaces.

4 Microscope Configuration

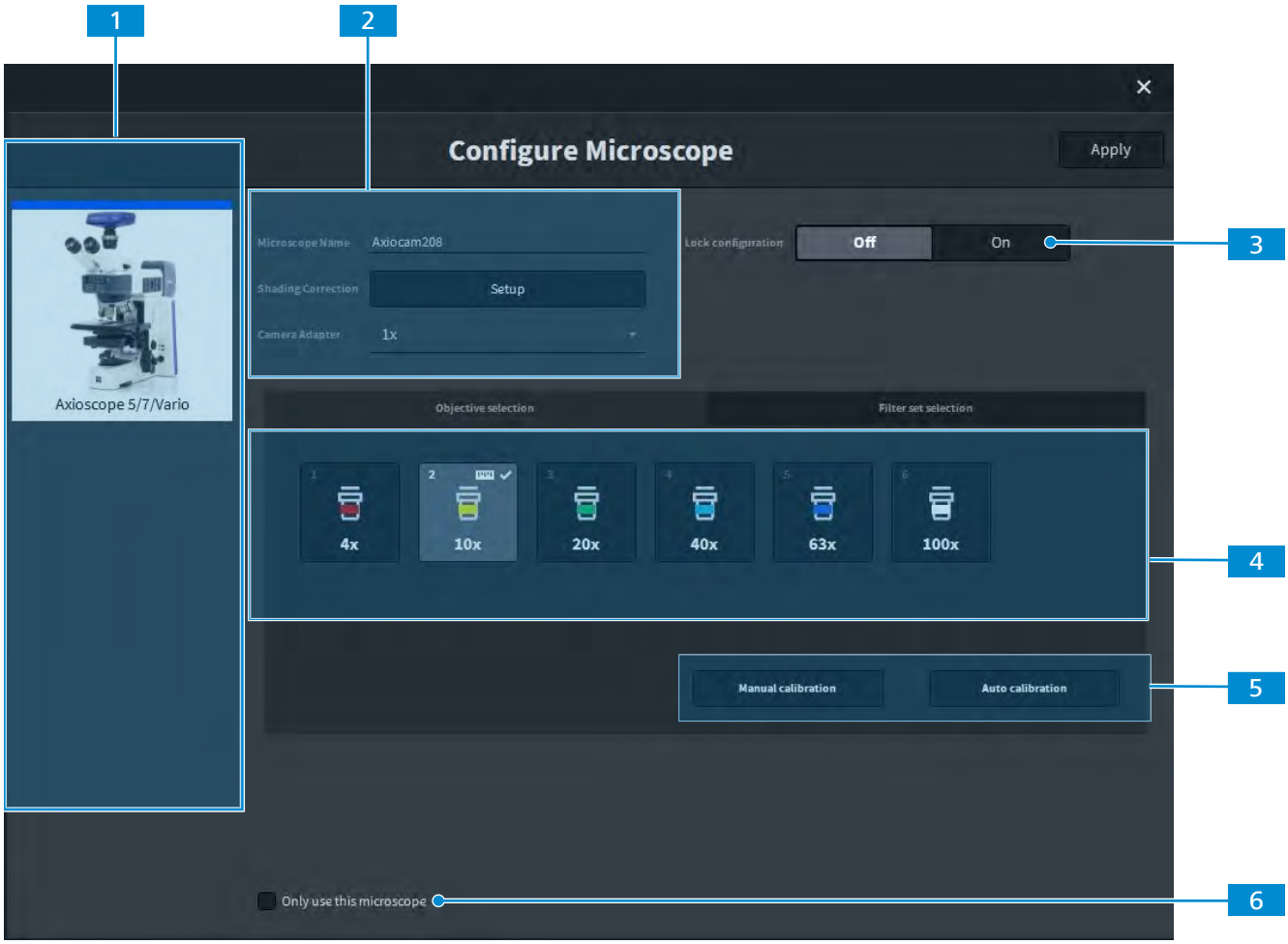


Fig. 2: Microscope Configuration

1 **Select Microscope/Camera**

Select the connected microscope or camera from the list. If the microscope is encoded, the microscope will be recognized automatically.

2 **Enter Parameters and Perform a Shading Correction**

This fields allow you to enter a name for the microscope and select the camera adapter.

Click **Setup** to open the **Shading Correction Setup**.

We recommend to perform a shading correction for each objective of any newly configured microscope before you start to work with the device.

Note: When working in the shading correction setup window, you need to remove the sample out of the live view for transmitted light or use a mirror for reflected light. Please read the on-screen hints in Labscope carefully. The shading correction is correlated to each objective, which means wrong selection of an objective in the setup window or live view can lead to a wrong live image effect.

3 **Lock Configuration**

If activated, you can enter a 4 digits PIN to lock the microscope configuration. If you forget the PIN code, the universal PIN code to unlock is: h!%jPYtt34

4 **Select Objective/Filter set**

Depending on the connected microscope the available positions (e.g. 1-6) will be displayed. If you click on a position you can select the attached component (e.g. 5 x objective) from the list.

5 **Scaling calibration**

In manual calibration mode drag the measurement line to a known size object from your sample. To finish the scaling calibration of the objective, input the correct length. If you have a ZEISS standard calibrator, you can also use Auto Calibration mode to easily calibrate.

Note: The calibration is correlated to each objective. There is an indicator on a calibrated objective in the Microscope Configuration window. A wrong selection or changing the camera adapter selection can lead to wrong scaling info.

6 **Only use this microscope**

If activated, only the current microscope is displayed in the microscope view.

5 Multitask Bar

The Multitask bar is the central element for navigating through the different views of the app. It can be accessed from the top toolbar on any screen of the app. It allows to easily switch between the different views by simply clicking on the desired thumbnail / preview window. The following views are available and will be explained in the next chapters:

- **Microscope View**, see *First Start & Overview [▸ 7]*.
- **Live View**, see *Live View [▸ 11]*.
- **Image View**, see *Image View [▸ 16]*.
- **File View**, see *Files View [▸ 38]*.

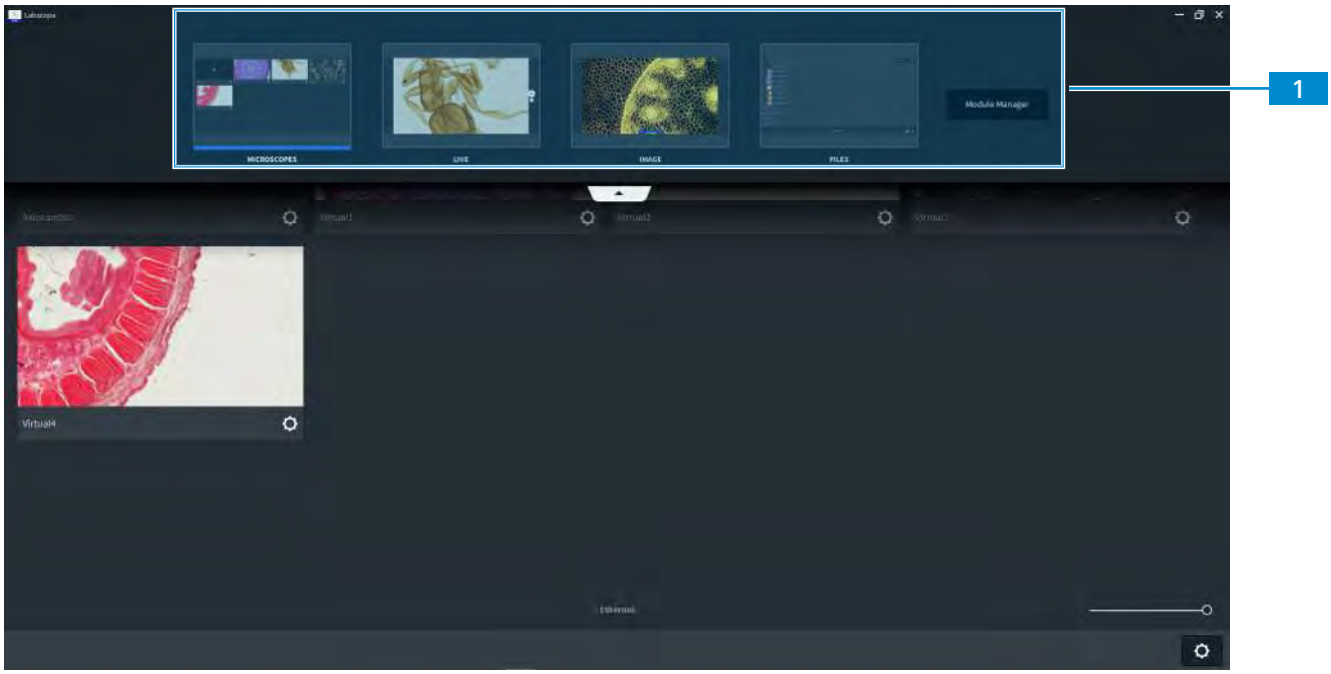


Fig. 3: Multitask bar

1 **Thumbnail View** of the available views

Click on the corresponding thumbnail to change to the desired view.

6 Live View

The Live view shows the live image from the connected camera on the selected microscope.

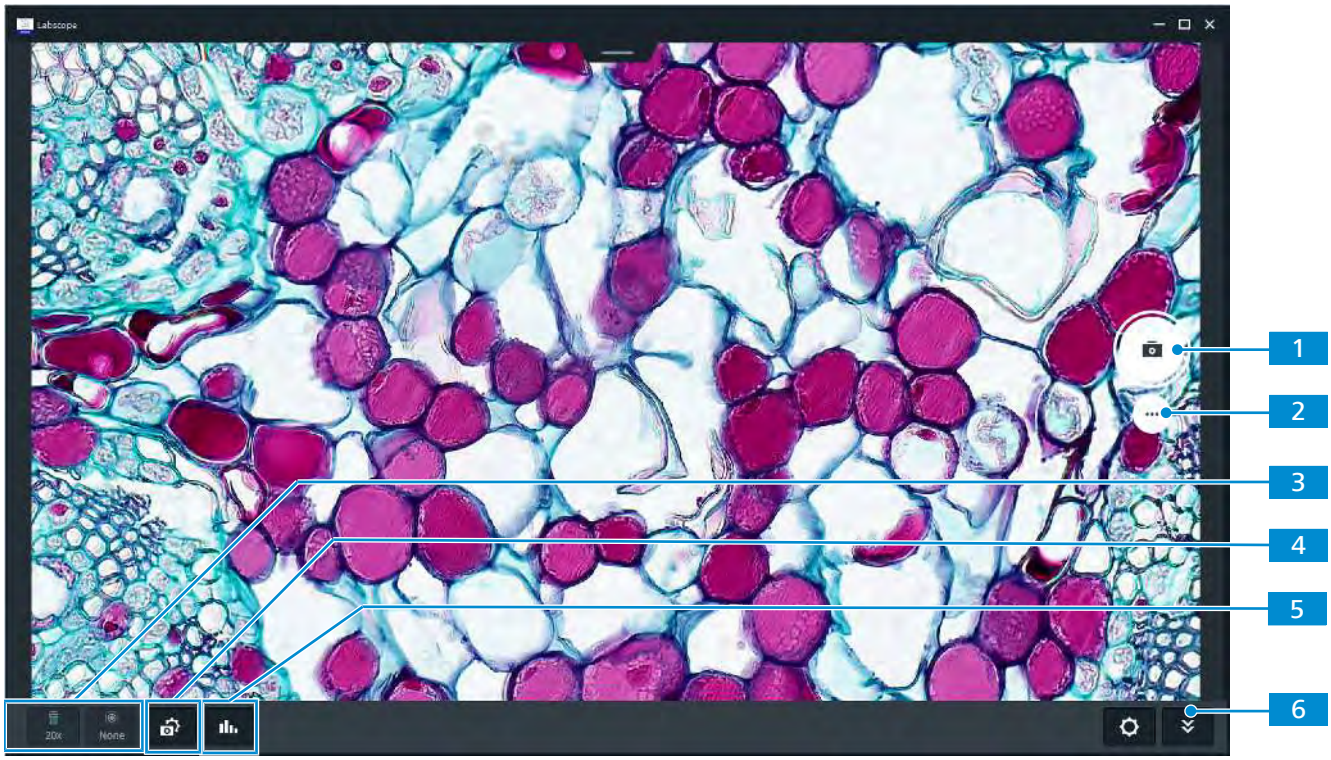


Fig. 4: Live View

1 Snap Button

Acquires an image (or short a "Snap"). Depending on the selected acquisition mode you can perform different types of acquisition.

2 Change Acquisition Mode

Select the desired acquisition mode, see ***Acquisition Modes*** *[▸ 20]*.

3 Display of Objective & Reflector

Shows the current objective and reflector. When working with non-encoded microscopes you can select the corresponding components manually. For encoded microscopes, the currently used objective and reflector will be displayed automatically.

4 Camera Acquisition Settings

Opens the camera acquisition settings, see ***Acquisition Settings*** *[▸ 30]*.

5 Histogram

Opens the histogram panel, see ***Histogram View*** *[▸ 19]*.

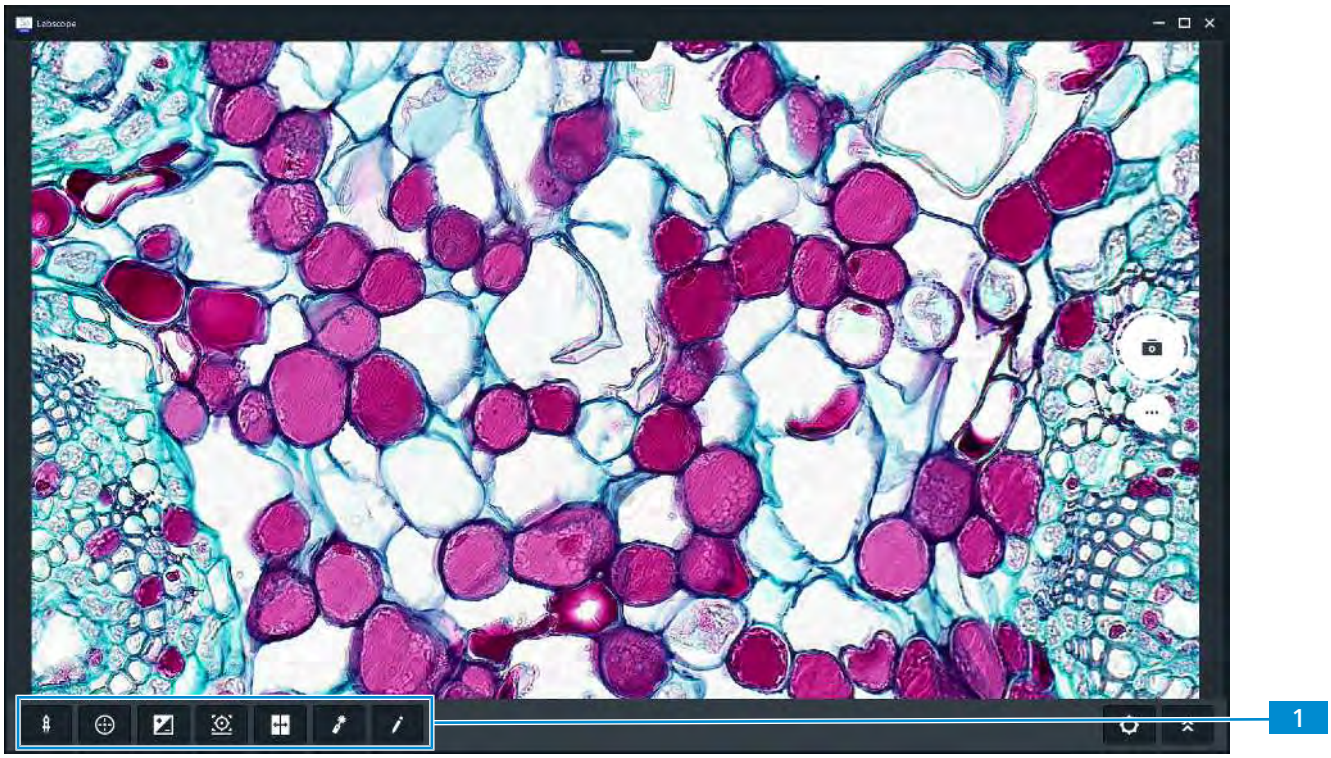
6 Show More Tools / Advanced Tools

Displays more tools (also called "advanced tools") in the toolbar, see ***Advanced Tools in Live View*** *[▸ 12]*.

For all available annotations and measurement tools, see ***Annotations and Measurement Tools*** *[▸ 32]*.

7 Advanced Tools in Live View

In **Live** view, click the **Show More Tools** button at the bottom right corner to see more tools. The additional tools / functions are displayed in the main toolbar 1.



The following functions are available:

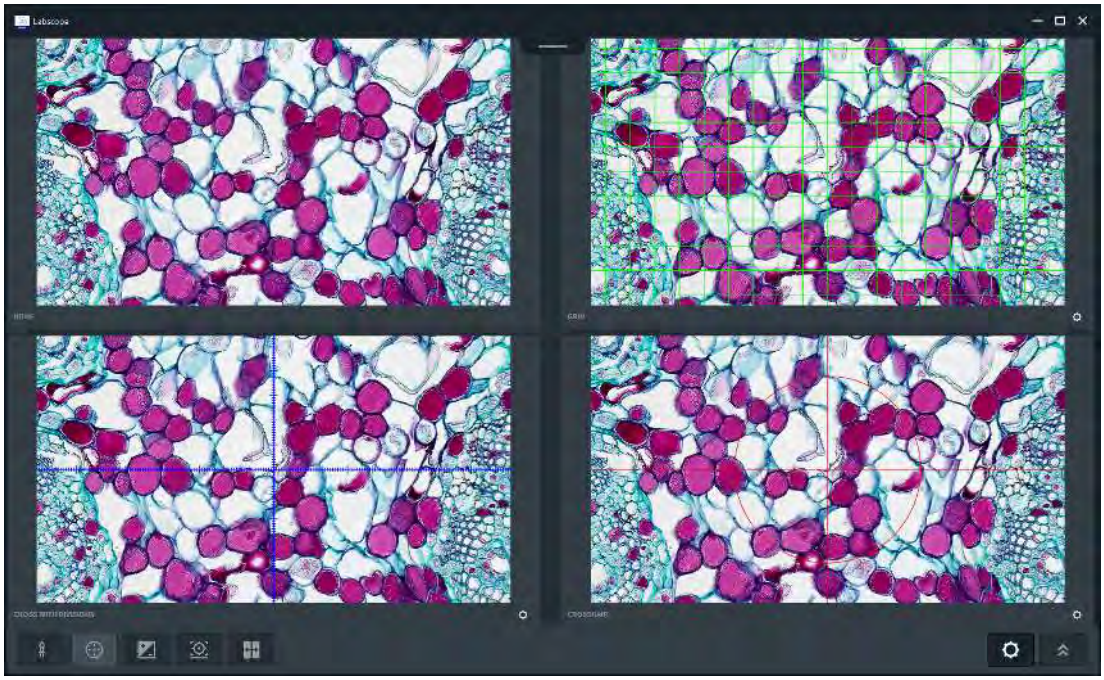
Icon	Function	Description
	Annotations and Measurement Tools	This function is available for both Live view and image view, see *Annotations and Measurement Tools [▸ 32]*.
	Graticule Overlay	Add various overlays to the image, see *Graticule Overlay [▸ 13]*.
	Over Exposure Indicator	Displays areas with over exposure, see *Over Exposure Indicator [▸ 13]*.
	Focus Indicator	Displays a focus indicator bar, see *Focus Indicator [▸ 14]*.
	Split View	Opens the **Split** (Comparison) view, see *Split View [▸ 14]*.
	Laser Pointer	This function is available for both Live view and image view. It will be shown when the **Education** module is activated. Displays a laser pointer/ red dot. It will follow the mouse or finger movement on the screen. This is useful for teaching or presentation purposes.

Icon	Function	Description
	**Drawing Mode**	This function is available for both Live view and image view. It will be shown when the **Education** module is activated. Displays a combined view of both microscopy view and camera view. This can be useful for drawing sketches from a sample image. We recommend to use a tablet holder (not included) for the drawing process.

7.1 Graticule Overlay

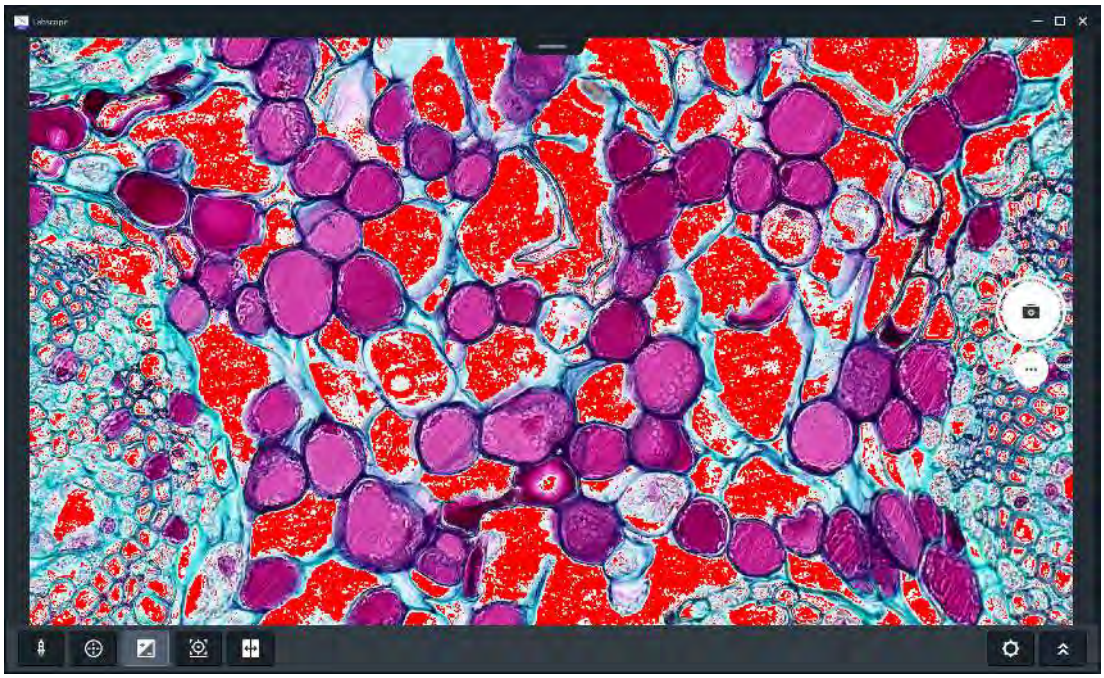
Graticule Overlay

You will see 4 windows where you can select the following overlays: no graticule, grid, cross with divisions and crosshair. Select the desired overlay by clicking on it.



7.2 Over Exposure Indicator

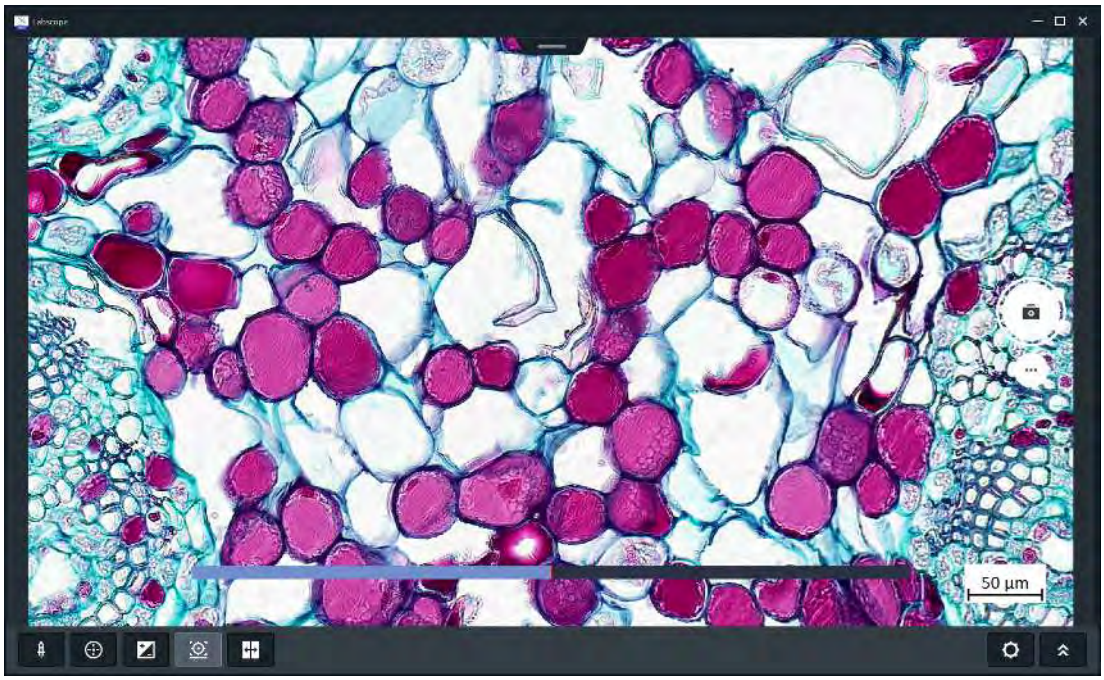
This function is available for both live view and image view. After clicking, the regions having over exposure will be shown with red color.



7.3 Focus Indicator

After clicking on the icon in the main toolbar, the focus indicator bar will show up at the central bottom of the **Live** view. When the focus changes, the indicator will also change dynamically.

You can even manually calibrate the default status of the focus indicator. Firstly adjust the fine focus of the microscope to make the image clear. Then click on the indicator bar and it will be calibrated.

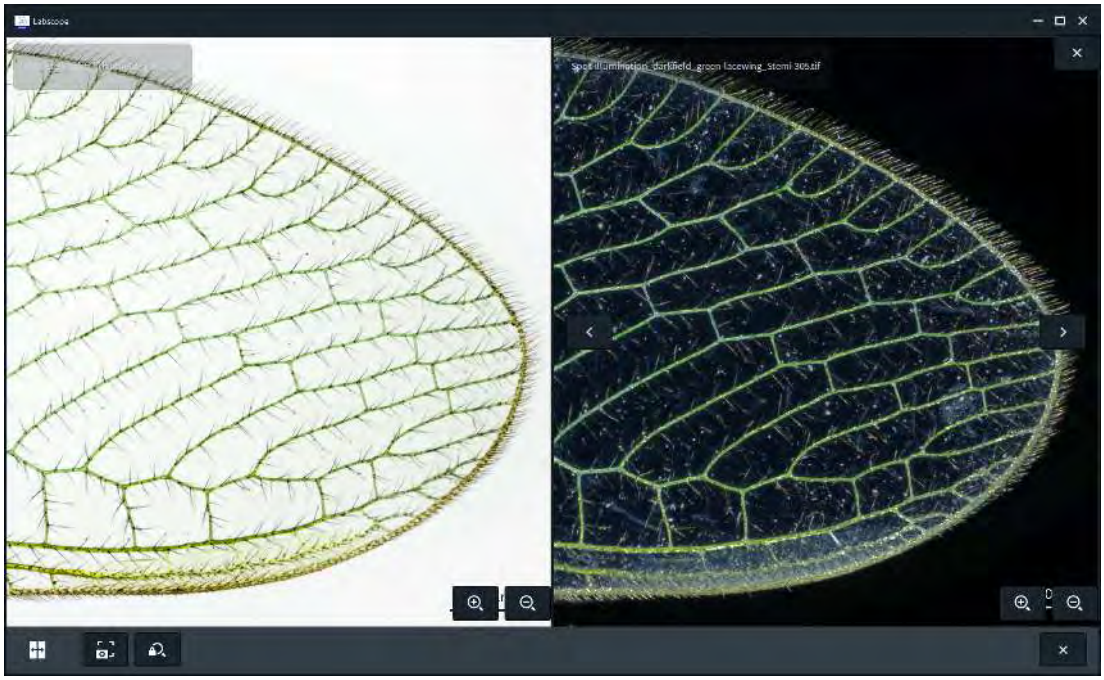


7.4 Split View

This view is available for **Live** and **Image** view.

After clicking on the Split view icon, two panels are displayed initially. The left side shows the current view (Live or Image view) and the right side shows the files of Labscope.

By selecting another file from the list it will be displayed in a comparison view together with the image on the left side:



8 Image View

After you have acquired an image you can quickly switch to the image view by clicking on the thumbnail / preview image of the snap in the lower right corner of the image area. The thumbnail / preview image will be available for a few seconds so that you can continue with the image acquisition of another image without interrupt. You can open an image from the **File view** as well.

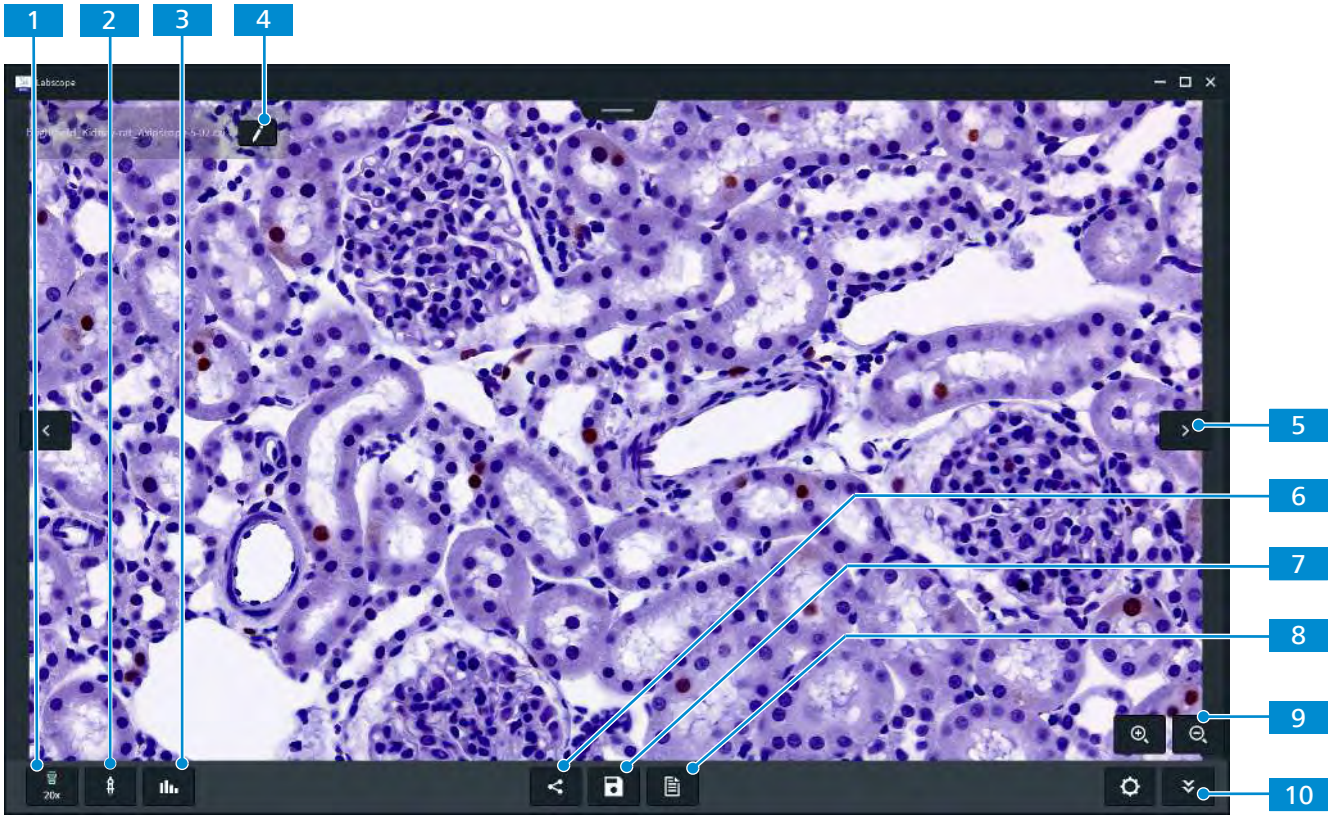


Fig. 5: Image View

1 Change Scaling

Shows the current image scaling. Click to change the scaling by selecting another image.

2 Annotations and Measurement Tools

Shows the available annotations and measurement tools which can be added to the image, see chapter *Annotations and Measurement Tools* [▸ *32*].

3 Histogram

Shows the histogram panel.

4 Edit File Name

Either change the file name or configure the file name template.

5 Previous/ Next Image

Click **<** to go to the previous image. Click **>** to go to the next image.

6 Share Image

Shares the image directly via email or other tools.

7 Save Image

Saves the image with different formats.

8 **Create Report**

Generates a report with the current image.

9 **Zoom In / Zoom Out**

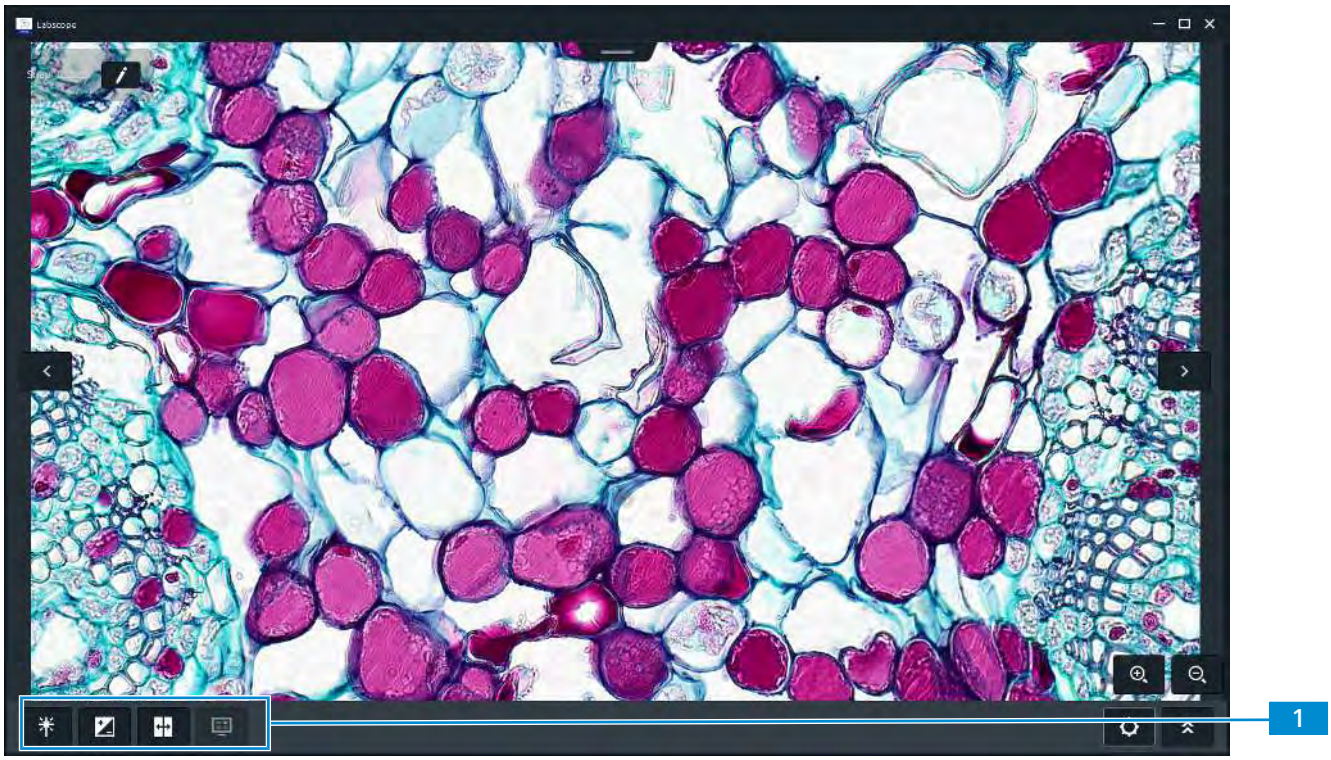
10 **Show More Tools / Advanced Tools**

Shows additional tools, e.g. image processing, over exposure indicator and Split view.

See also chapter *Image Processing [▸ 39]*.

9 Advanced Tools in Image View

In **Image** view, click the **Show More Tools** button at the bottom right corner to see more tools. The additional tools/functions are displayed in the main toolbar.



The following functions are available:

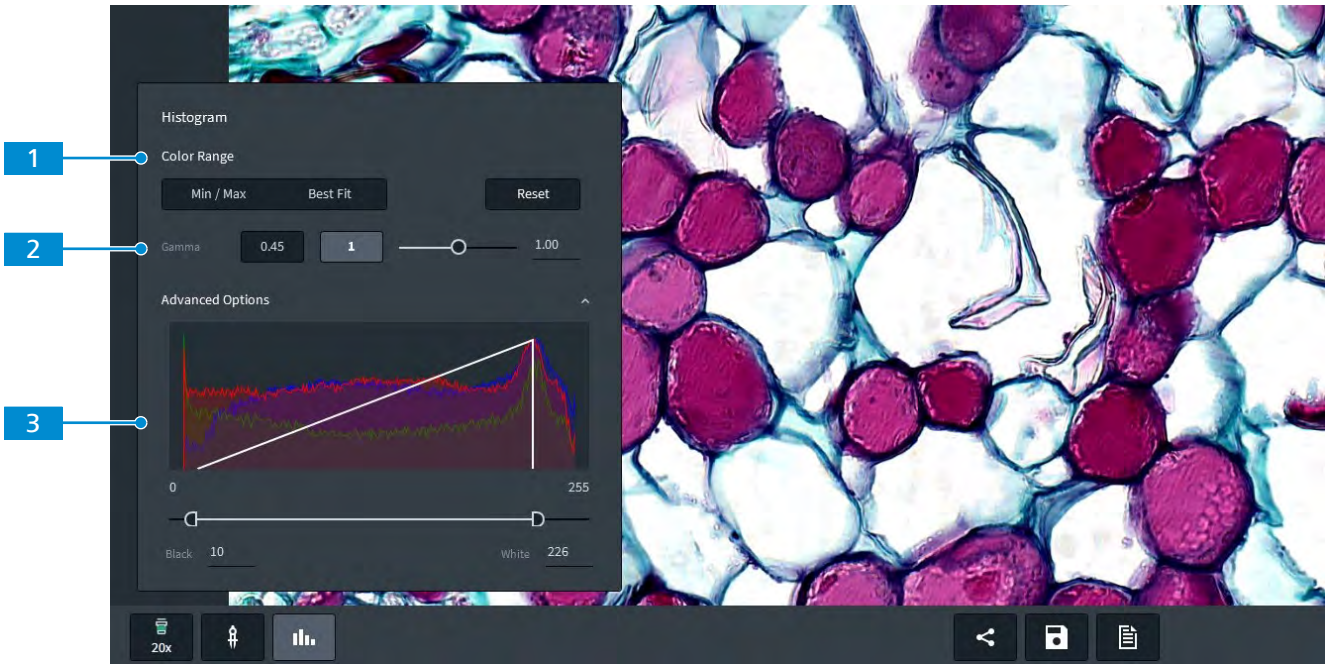
Icon	Function	Description
	Image Processing	Displays the image processing panel. You can edit the value of gamma, brightness, contrast, color intensity and sharpness, see *Image Processing [▸ 39]*.
	Over Exposure Indicator	Displays areas with over exposure, see *Over Exposure Indicator [▸ 13]*.
	Split View	Opens the **Split** (Comparison) view, see *Split View [▸ 14]*.
	Multi-channel Comparison	This function will be available and active only when the **Multi-Channel** module is activated and a multi-channel image was opened. Shows all individual channel images in separate windows. The last window displays the combined multi-channel image.

See also

- Annotations and Measurement Tools [▸ 32]

10 Histogram View

This function is available for both **Live** view and **Image** view. Click the button in main toolbar to open the histogram panel.



1 **Color Range**

Use the **Min/Max** and **Best Fit** buttons to achieve a proper display effect just by one click

2 **Gamma**

Adjust the gamma value by clicking, dragging or inputting.

3 **Advanced Options**

Adjust the histogram value of black and white by dragging the scroll bar or inputting in the dialog boxes

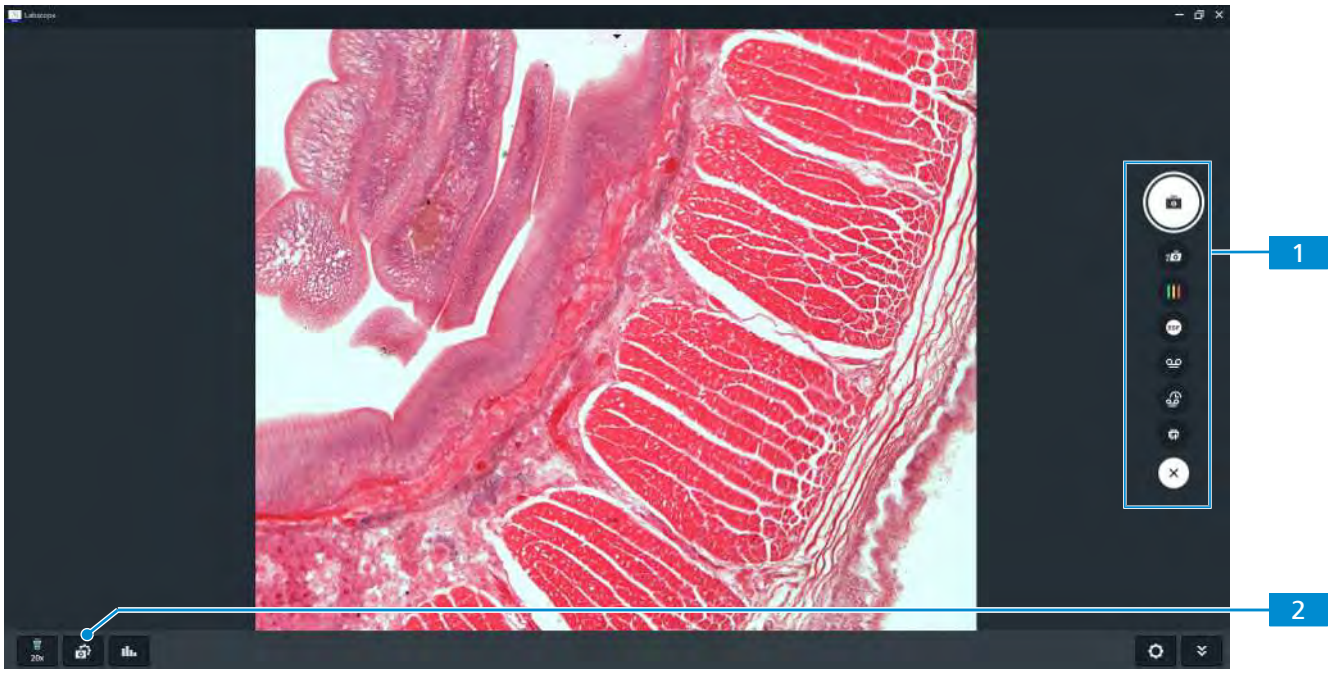
Info

For JPEG or TIFF format, the black and white value will be 0 and 255 (example for 8 Bit depth images) after the histogram is saved. Note that the "**Min/Max**" indicator in histogram panel for JPEG and TIFF is highlighted in most cases.

11 Image & Video Acquisition

Image acquisition is directly done in the **Live View**. First you have to select the desired acquisition mode. Per default, the single image acquisition mode is selected.

Note: Availability of each acquisition mode is depending on camera and microscope types and also licensed modules.



1 **Acquisition Mode Selection**

Select the desired acquisition mode, see *Acquisition Modes [▸ 20]*.

2 **Acquisition/ Camera Settings**

Opens the acquisition settings. See also chapter *Acquisition Settings [▸ 30]*.

See also

Acquiring Multi-Channel Images [▸ 23]

11.1 Acquisition Modes

The following acquisition modes are available and can be selected by tapping on the corresponding mode icon on the right side:

Icon	Mode	Description
	Single Image Acquisition (Snap)	Acquires a single image (also called a Single Snap).
	Fast Snap	Acquires an image from live view at high capture speed. In this mode, multiple users can acquire an image simultaneously.
	Multi Channel Acquisition	Only available if you have licensed the **Multi Channel** module.

Icon	Mode	Description
		Acquires fluorescence and transmitted light images in independent channels. The module supports adding false-color, comparing channels and creating reports with display of individual channels, see ***Acquiring Multi-Channel Images*** *[▸ 23]*.
	Extended Depth of Field (EDF) Acquisition	Acquires an EDF image, see ***Acquiring EDF Images*** *[▸ 25]*.
	Video Recording	Records a video. This functionality allows to record the current live image as a movie.
	Time Series Recording	Records a time series video, see ***Recording Time Series Videos*** *[▸ 26]*. This functionality allows to set up time intervals (e.g. each 5 seconds) where an image is taken. The images are then combined to a video.
	Fast Panorama	Only available if you have licensed the **Fast Panorama** module for Windows Labscope since v3.3. Acquire whole slide images with your manual microscope, see ***Acquiring Fast Panorama Images*** *[▸ 27]*.
	Bio Modules	Only available if you have licensed the **AI Cell Confluency** and/or **AI Cell Counting** modules for Windows Labscope since v3.4. Acquire images and get the confluency and/or counting result based on the live view, see ***Acquiring images with confluency and counting result*** *[▸ 28]*.

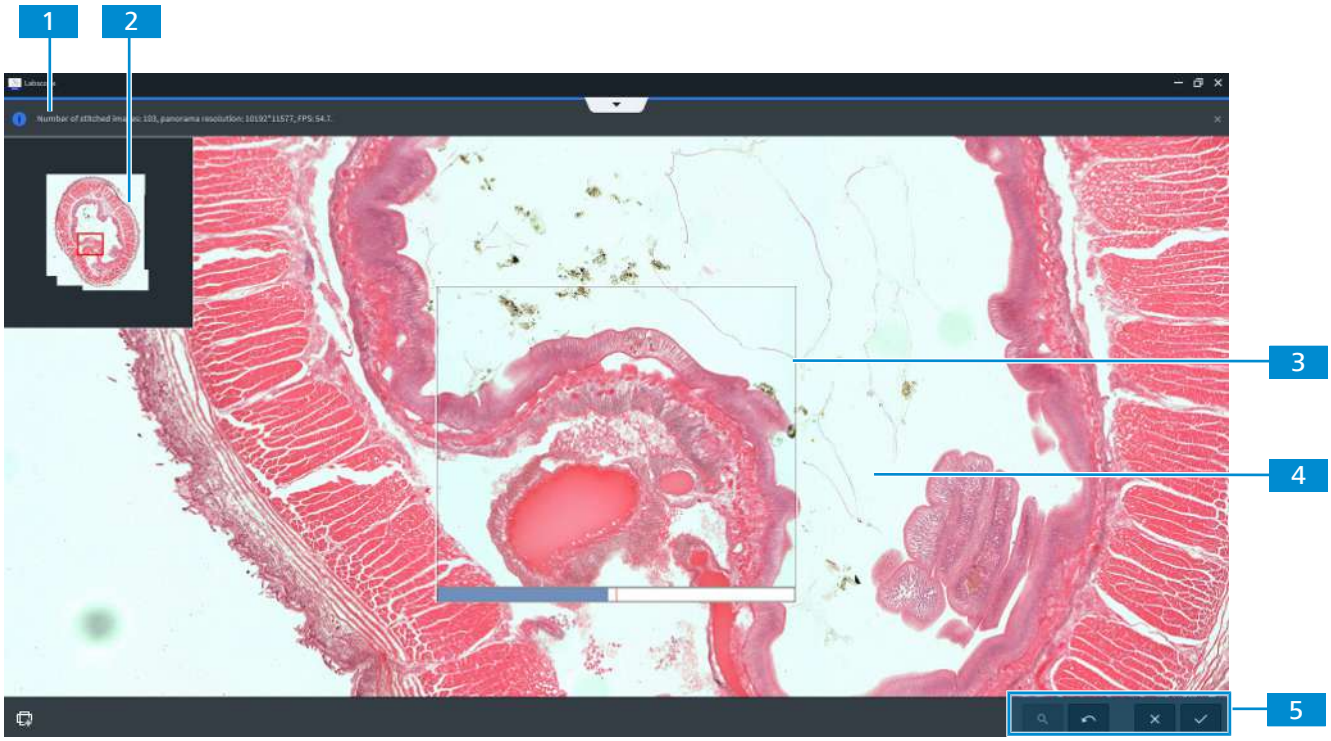
Note that there can be more types of snapping modes which are only available for certain types of cameras e.g.:

-  is for a denoised snap.

See also

- Acquisition Settings [▸ 30]

11.1.1 Fast Panorama Mode



1 **Hints**

Hints show up during Fast Panorama acquisition. They will show the information of how many images are stitched, the current whole image resolution and current FPS data.

2 **Preview of the stitched panorama image**

The red box shows the current position of live view.

3 **Live view window with focus indicator**

The outline color of the live view has two colors with different meanings. White is the normal status with successful stitching. Yellow means the confidence level of the current stitching attempt is low or the current image is unable to be stitched. This can be caused by no matching area, or the matching area is too small. Once it completely lost position or cannot stitch, a reminder occurs above the live view for reminding users to move it back slowly. The bar below the live window is the focus indicator which shows the calculated focus status. During the stage moving and stitching process, a blue outline always shows in the background which indicates the last successfully stitched position.

4 **Stitched images as background**

5

 **Position search** This button is enabled when the position is completely lost. After clicking on the button, the live view image will be searched from the whole stitched image background. If the correct position is found, Labscope will route to the correct position. If not, please try to move the live view to other areas where may be an overlap with the background, then try gain.

 **Undo** Click to delete the last stitched image. It supports continuous clicks, then multiple stitched images will be deleted.

 **Cancel** Click to stop the panorama acquisition.

 **Save** Click to save the panorama result.

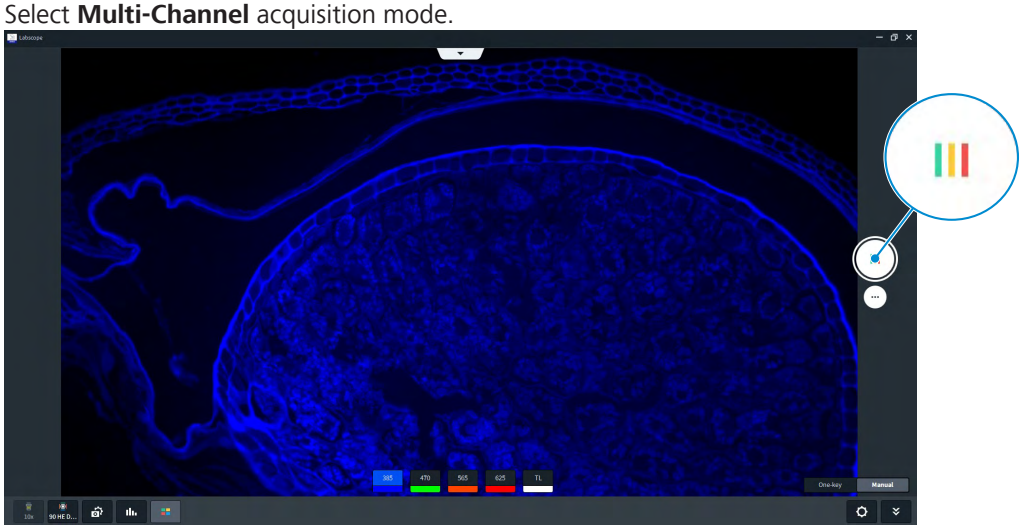
Note: For more information about the acquisition see *Acquiring Fast Panorama Images [▸ 27]*.

11.2 Acquiring Multi-Channel Images

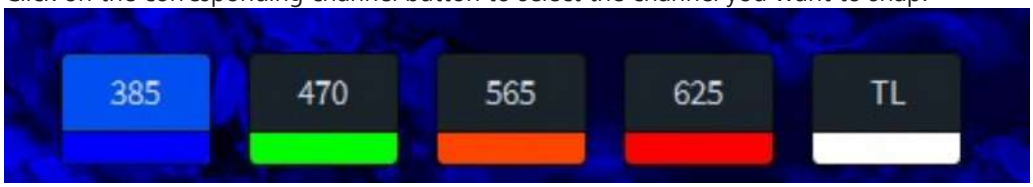
Labscope provides an easy solution for multi-channel acquisitions. Enhanced functions are available, like editing pseudo color, one-key multi-channel acquisition, comparison view, and report with displaying each channels, etc..

Note: Currently the multi channel module function is available for Labscope for iPad and Windows. The supported camera types are: Axiocam 202 mono, Axiocam 208 color, Axiocam 105 color (Windows only), Axiocam 305 mono/color (Windows only).

1. Select **Multi-Channel** acquisition mode.



2. Click on the corresponding channel button to select the channel you want to snap.



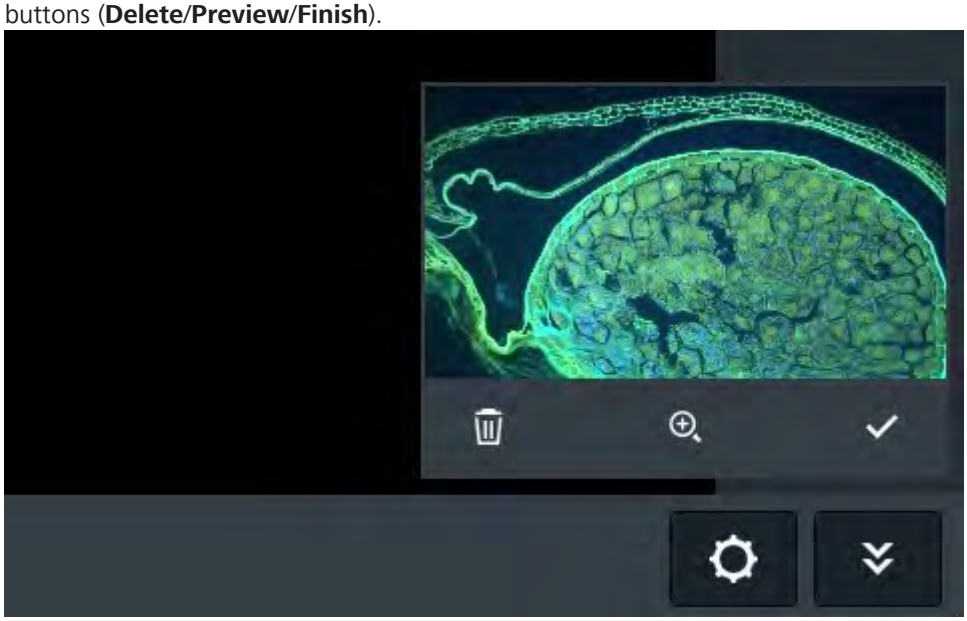
→ If it is an encoded **Axioscope 5** with **Colibri** light source, the light is turned on when the channel is activated.

→ If it is an encoded **Axiolab 5**, the activated channel is synchronized with the light source.

→ If it is a non-encoded microscope, the channel can only be activated manually on the microscope.
Note: The availability of channel buttons is dynamically changing according to the filter set. E.g. for a single DAPI bandpass filter, only the 385 LED channel will be displayed. The mapping logic is according to the excitation range of filter set and the LED's wavelength.

3. Activate the pseudo color panel of the current channel by long pressing on the individual channel button (for iPad). Or:
   Right click on the individual channel button (for Windows). Then select the pseudo color by clicking on it.
   Note: By clicking the button in the main toolbar you can switch the image view between false color and b/w mode.

4. Adjust the acquisition, histogram settings and channel name for the current channel. The acquisition settings and channel name will be stored in Labscope.
5. Click **Snap** to acquire the image for selected channel.
   → The preview of multi-channel image will be shown on the bottom right. It also contains 3 buttons (**Delete**/**Preview**/**Finish**).



6. Acquire the images for other channels.
7. After the acquisition for all needed channels is done, click **Finish**.
   → The multi-channel image will be saved.

One-key/Manual Mode

Once a multi-channel acquisition is finished in Labscope by using encoded Axiolab 5 or encoded Axioscope 5, the acquired channels and each channel's acquisition settings will be stored as a multi channel template in Labscope. Additionally the **One-key**/**Manual** buttons will show up in Live view/Multi-Channel mode.

- In **Manual** mode you can acquire multi-channel images step by step manually.
  Note: You can always go back to any channel and overwrite it with a new snap before you click on **Finish**. After each manual acquisition, the multi channel template will be overwritten by the new template.
- In **One-key** mode an automatic acquisition will be performed, which is just following the last stored steps and settings. The handling process of this function differs between different microscope types and the connection types.

Stored data for each enabled channel:

- Exposure mode and exposure time
- Gain value
- Light intensity

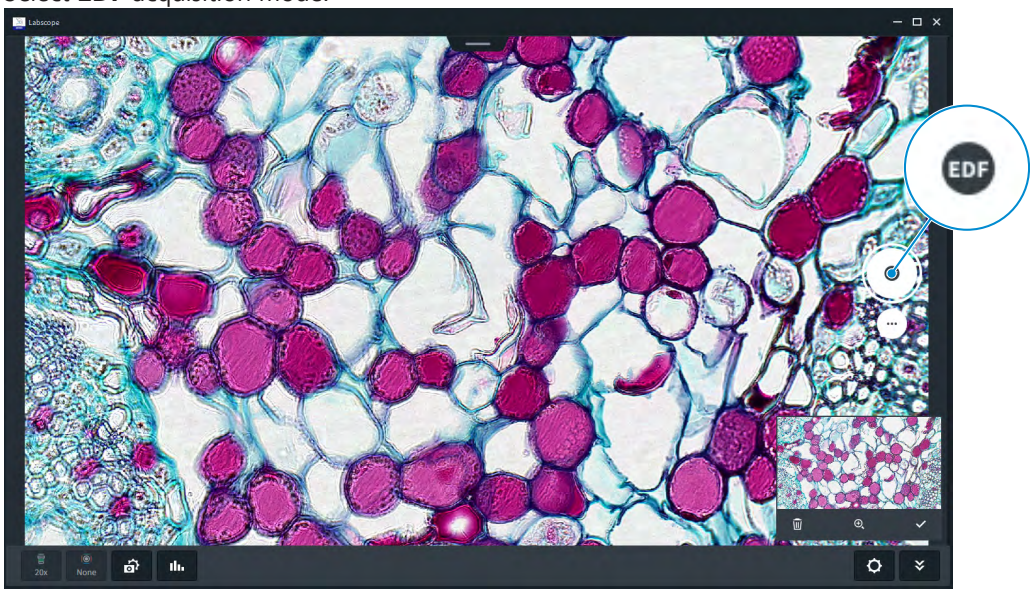
Note: To use the One-Key functionality for **Axiolab 5 FL**, you have to switch the channel manually on the microscope. A message will appear: "Please switch to channel... ".

11.3 Acquiring EDF Images

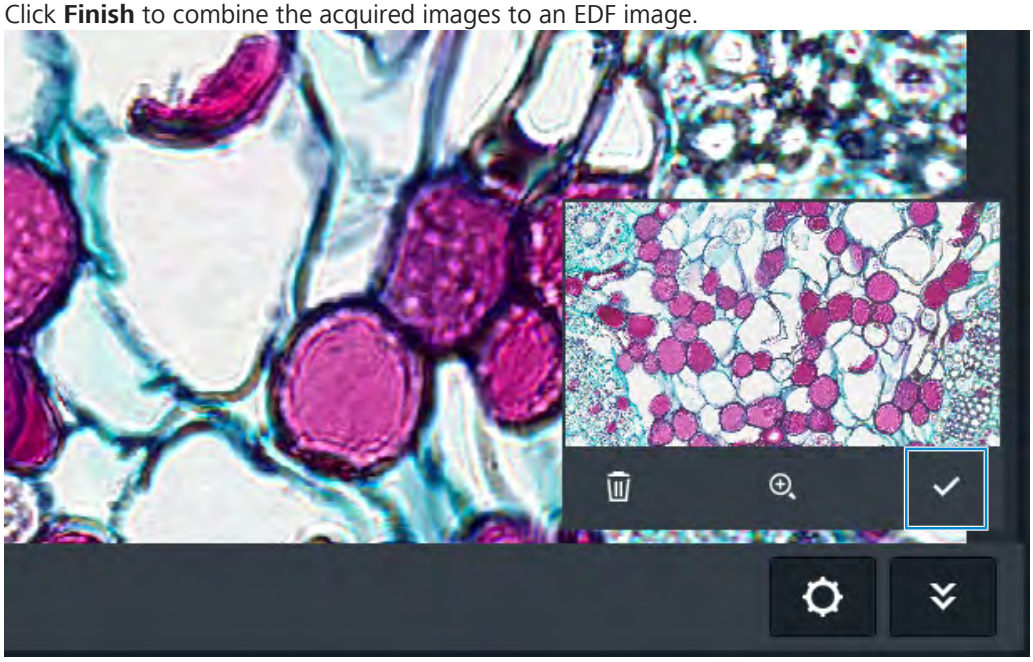
For samples with a different depth of field, it can be difficult to acquire a clear image for the whole area. In that case we recommend the EDF (Extended Depth of Field) acquisition mode to acquire combined in-focus images with different depths of field.

Note: The EDF acquisition only works with compound microscopes. It is not suitable for use with stereo microscopes.

1. Select **EDF** acquisition mode.



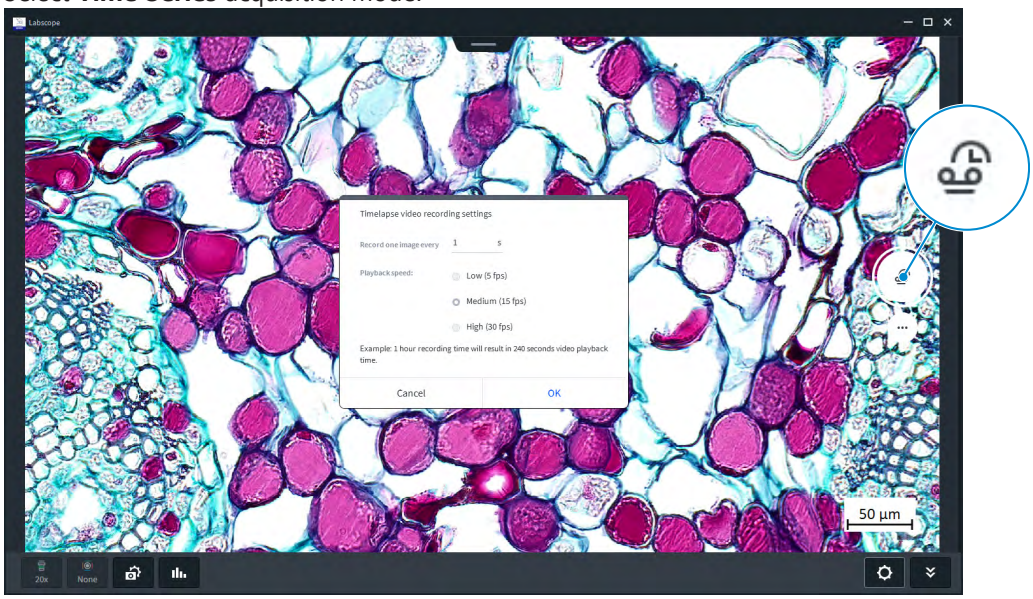
2. Adjust the focus for a certain area and click **Snap**.
   → A image is acquired and a preview window pops up.
3. Adjust the focus and acquire another image. You can repeat this procedure until all areas are acquired in focus.
4. Click **Finish** to combine the acquired images to an EDF image.



11.4 Recording Time Series Videos

For viewing a slow changing dynamic sample, e.g. to observe slow movement, gradual evolution or morphology changes in a certain period of time, the **Time Series** (or Time Lapse) is a good acquisition mode to use.

1. Select **Time Series** acquisition mode.



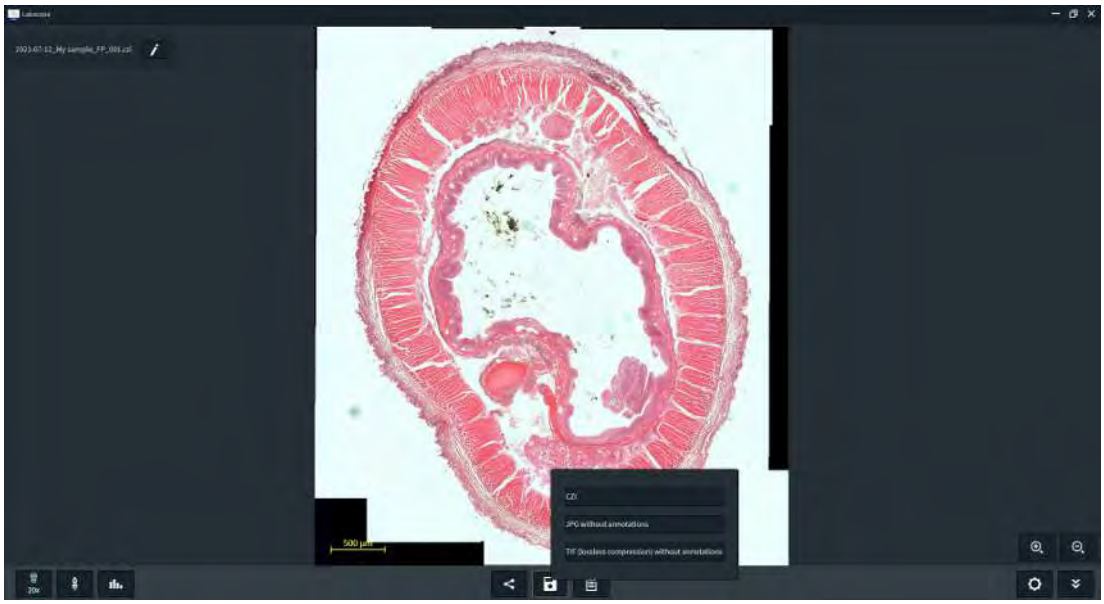
2. Click **Snap**.
   → The Time Series settings dialog will be displayed.
3. Select the preferred recording settings (see Time Series Recording Settings) and click **OK**.
4. Click **Snap** again to finish the recording.
   → The output time series video is generated and stored in the file system.

11.5 Acquiring Fast Panorama Images

The module **Fast Panorama** allows for easy acquisition of whole slide images (WSI) with manual microscopes. By manually moving the stage, images of the specimen will be stitched together automatically into a panoramic image. Please see the following steps for acquiring Fast Panorama images.

Note: Currently the module is only available for Windows since Labscope v3.3. The supported camera types are Axiocam 305 mono/color.

1. After putting your sample on the microscope, adjust the focus to see a clear view. Set the correct objective in microscope configuration and set the shading correction accordingly, see ***shading correction*** *[▸ 8]*.
2. In acquisition settings, choose manual exposure (the recommendation is below 2ms) and manual white balance. You may need to increase the light intensity and gain to a certain level to get a good brightness.
3. Select Fast Panorama mode  . Move the sample to the desired position, then click the button again to start Fast Panorama acquisition.
4. Move the stage, the live images will be stitched together to a panorama picture. There are some hints and tools to support your panorama acquisition process, see below.
5. After finishing the Fast Panorama acquisition, click  to finish and save your panorama picture. The image will be saved to your folder. You can adjust the histogram, do annotations and measurements, or save as JPG or TIF in the image view.



Important tips for getting a good panorama result:

- A good performance Laptop/PC is the basis for the performance of Fast Panorama process, see the required PC spec for Fast Panorama [*Application and System Requirements [▸ 43]*]
- Apply proper shading correction as preparation.
- Use manual exposure and manual white balance.
- Use low exposure time. Exposure time below 2ms is recommended, the lower the better performance.
- When moving the live view, having a certain overlap with the surrounding stitched images will improve the stitching quality.
- Try to use the tools Position search and Undo to support your process.
- For dense structure samples, e.g. tissue and blood, you could use a higher magnification objective for stitching once you meet the situation of frequent popup of the yellow box. Go from 10x to 20x, or from 20x to 40x, etc.

11.6 Acquiring images with confluency and counting result

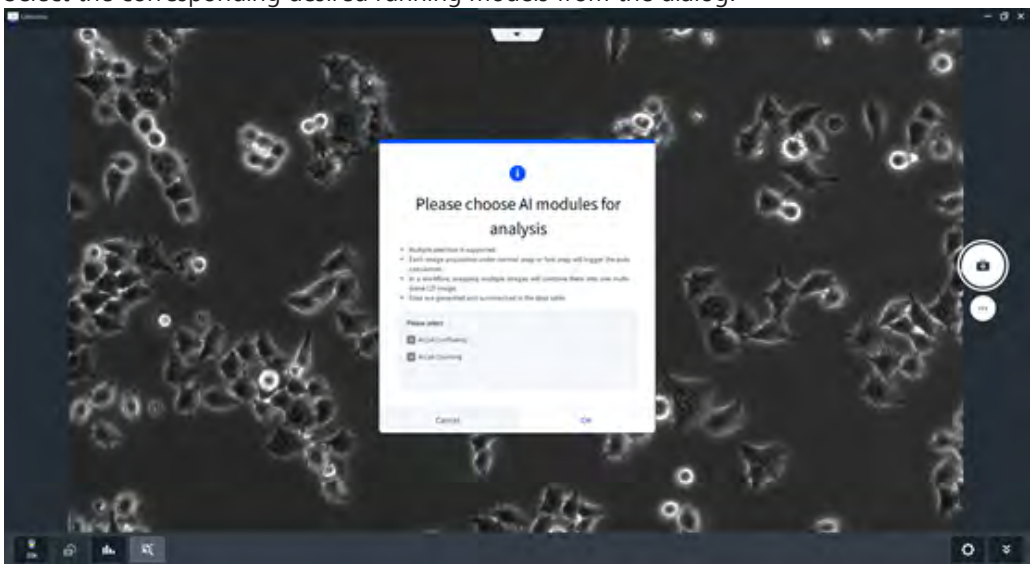
The two Labscope modules **AI Cell Confluency and AI Cell Counting** are AI based solutions that automatically determine the confluency level of the adherent cell culture, and the number of adherent cells in the field of view, respectively. They deliver repeatable, objective results and do not require manual parameter adjustments.

Info

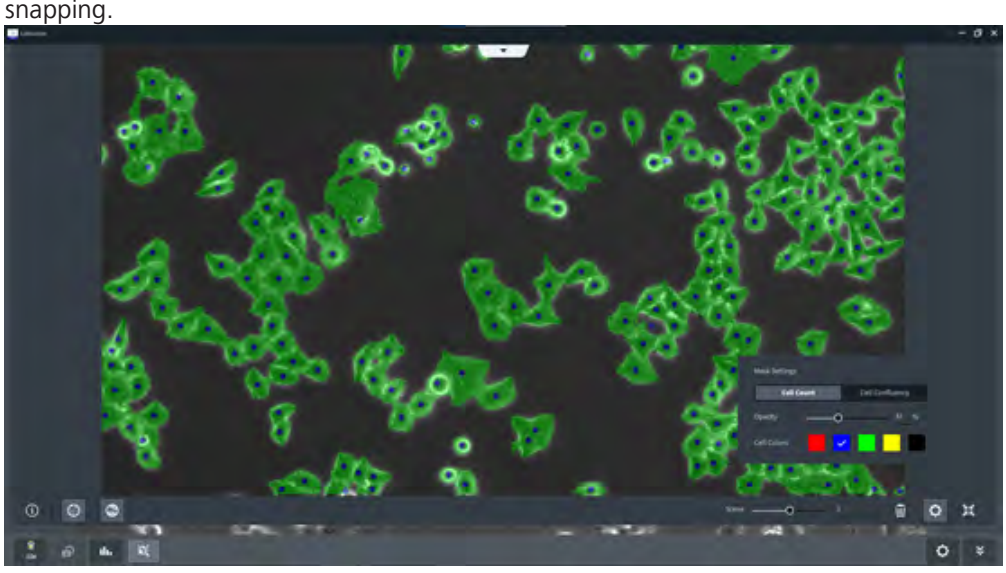
You need to install Labscope, then install **BioModules.exe**. Both are available to download from ZEISS Portal. Currently this function is only available for Windows Labscope with v3.4 or higher. The modules are primarily optimized for phase contrast images of adherent cell cultures.

1. In the live view, click **Bio Function**  .

2. Select the corresponding desired running models from the dialog.



3. Snap the desired view of your sample.
   → The confluency and/or counting result with the image will be simultaneously displayed.
4. Move the field of view to other areas of the sample and acquire multiple images if necessary.
   → There is always a preview window in the corner that immediately displays the results.
5. For enlarged preview, click **Zoom-In** 
   →  is for displaying the data table from the confluency and/or counting results.
   → In the larger preview, the colors and transparency of confluency and counting masks can be edited.
   → You can delete a particular selected scene and continue the workflow by going back to snapping.



6. To save your data, click **Checkmark**  in the small preview.
   → In Image View, you can check the confluency and/or counting masks and the data. You can also export the data table in csv format from the image.
   → The bio function also supports to trigger AI confluency/counting from an already acquired image.

11.7 Acquisition Settings

Based on the camera type and microscope system, the content of acquisition settings may vary. Using the **Reset all** button you can restore the default settings. When you enter the acquisition settings, the basic settings are displayed. When you click on **Advanced**, the advanced settings are displayed.

Basic Settings

Parameter	Description
Exposure	
– Auto / Manual	Switch between manual and automatic mode for exposure time. When switched to manual mode, you can adjust the exposure time settings like **Time** and **Gain** manually.
– Intensity	Adjust the auto exposure target intensity.
– Push	Use the current target intensity and applies auto exposure once.
White Balance	
– Push	Apply auto white balance adjustment once.
– Auto / Manual	Switch between manual and automatic mode for white balance. When switched to manual mode, you can adjust the white balance settings manually using the **Cold** / **Warm** slider.
Light Intensity	Only available for AxioLab 5 and Axioscope 5 + Axiocam 202 mono / 208 color.
– Slider	Adjust the intensity of the light source.
– RL / TL	Switch the light path between reflected light (RL) and transmitted light (TL).

Advanced Settings

Parameter	Description
Microscope Name	Shows the microscope name.
MAC Adress	Shows the MAC address of the connected microscope.
IP Adress	Shows the IP address of the connected microscope.
Firmware Version	Shows the version of the currently installed firmware of the camera.
Live Quality	Adjust the settings for the live image quality here.
Image Orientation	Adjust the image orientation.
Color	Switch between **Color** mode and **Grey** mode for the color camera.
Gamma	Adjust the gamma settings.
Denoise	If enabled, denoising is automatically applied on the image.
Sharpening	If enabled, sharpening is automatically applied on the image.
Pixel Correction	If enabled, pixel correction is automatically applied on the image.

Parameter	Description
HDR (High Dynamic Range)	If enabled, HDR is automatically applied on the image.

Note: The availability of these settings is according to the camera types.

11.8 File Name Template Configuration

Labscope provides the possibility to configure individual file names before and after acquisition. If you click on the **Pencil** button in the top left corner of an opened image you can access the Configuration menu for file names. Several Parameter will be available:

Parameter	Description
Configure File Name Template	Open the file name template configuration dialog. There you can select or add templates on the left side. The following 5 elements for configuring a file name template are available: **Text**, **Auto Numbe**r, **Date Time**, **Microscope Name** and **Objective Magnification**. If you activate **Ask on save**, every time when a snap is taken, a dialog will pop up and ask you whether you want to change the name for the snapped file. You can also scan a barcode of your sample to input the file name, either by using a barcode scanner (for Windows) or the iPad camera itself (for iOS). Therefore you need to activate the parameter **Camera-based barcode reader** in the **Global Settings** menu, see *Global Settings [▸ 40]*.
Auto Rename	Reset the file name according to the current file name template.

12 Annotations and Measurement Tools

You can add measurements, markers or text annotations either to the live image or an acquired image. The following list shows the available annotations and measurement tools:

Parameter	Description
Distance 	Draws a line and measures the length.
Rectangle 	Draws a rectangle and measures area and perimeter.
Circle 	Draws a circle and measures the area, perimeter and diameter.
Polygon 	Draws a polygon and measures the area and perimeter.
Arrow 	Draws an arrow.
Angle 	Allows to measure an angle.
Count 	Allows to draw in markers with ascending numbering.
Text 	Allows to enter text in a box.
Scale bar 	Allows to add a scale bar to the image.
Polyline 	Draws a polyline and measures the distance.
Spline Contour 	Draws a spline contour and measures the area and perimeter.
Spline 	Draws a spline and measures the distance.
Disconnected Angle 	Draws a disconnected angle and measure the angle.

Parameter	Description
Caliper 	Draws a single caliper and measures the distance.
Multi Calipers 	Draws a multi-caliper and measures the distances.

See also

Global Settings [▶ 40]

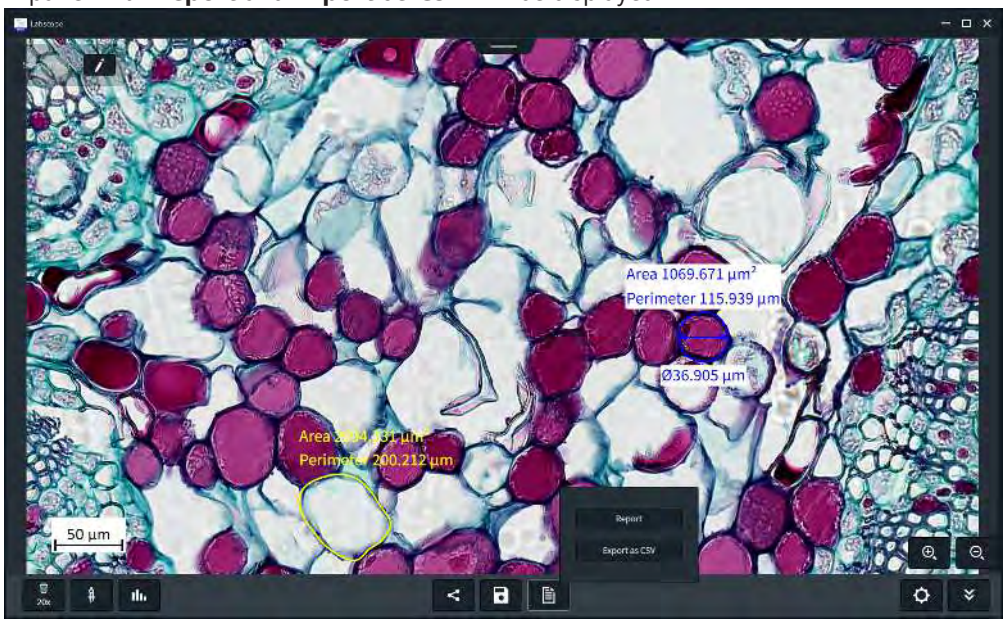
13 Reports

13.1 Generating Reports

There are two ways to generate a report.

Generating a Report from Image View

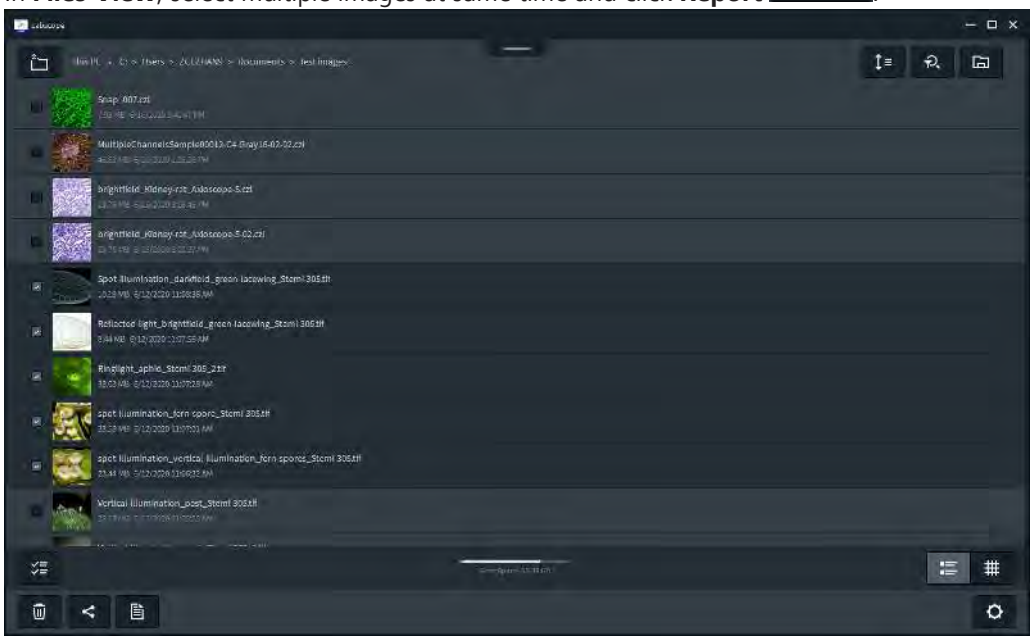
1. In **Image View**, click **Report**  .
   → A panel with **Report** and **Export as CSV** will be displayed.



2. Click **Report** to generate a PDF or RTF report based on selectable templates.
3. Click **Export as CSV** to export all measurements data from the image into a spreadsheet.

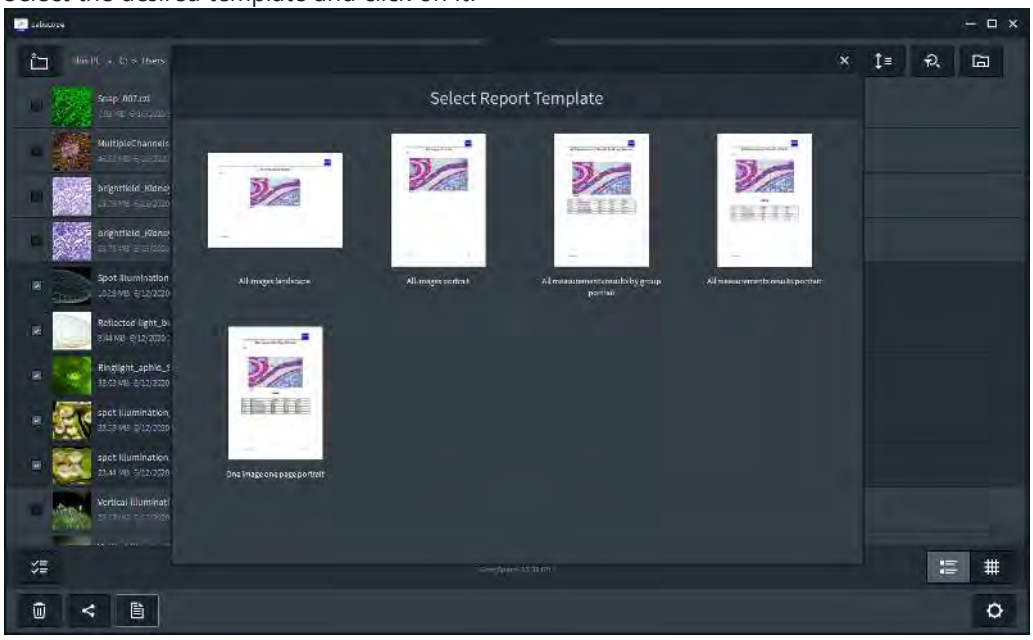
Generating a Report from Files View

1. In **Files View**, select multiple images at same time and click **Report**  .



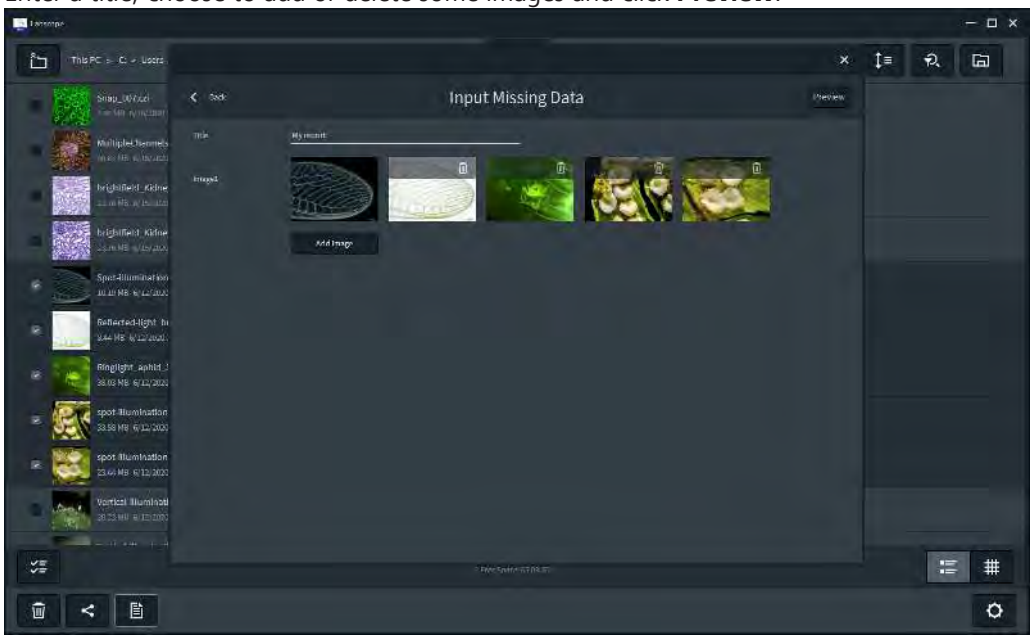
→ No matter which way you have chosen to create the report, the window **Select Report Template** will show up.

2. Select the desired template and click on it.

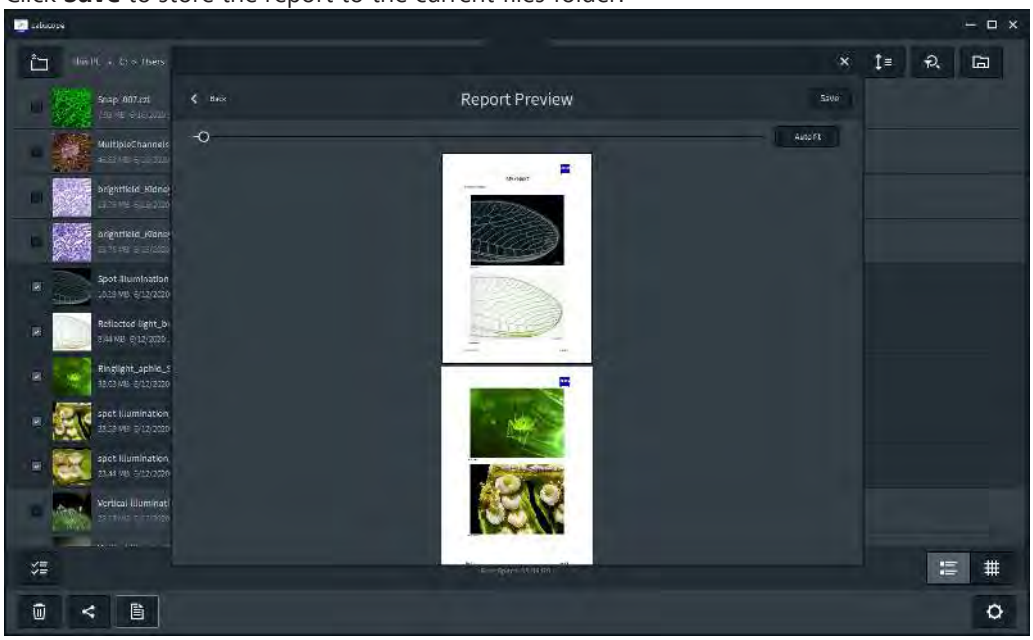


→ The window of **Input Missing Data** will be displayed.

3. Enter a title, choose to add or delete some images and click **Preview**.



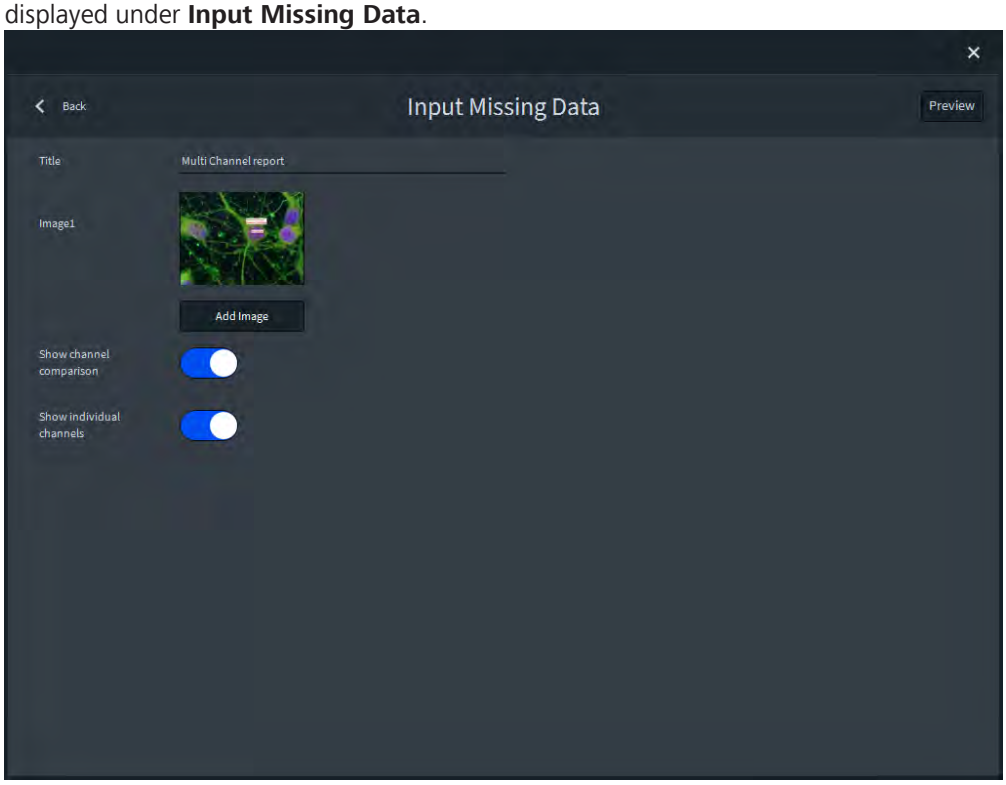
4. Click **Save** to store the report to the current files folder.



13.2 Generating Reports for Multi-Channel Images

1. Activate **Multi-Channel** module.
2. Create a report as explained in chapter *Generating Reports [▶ 34]*.

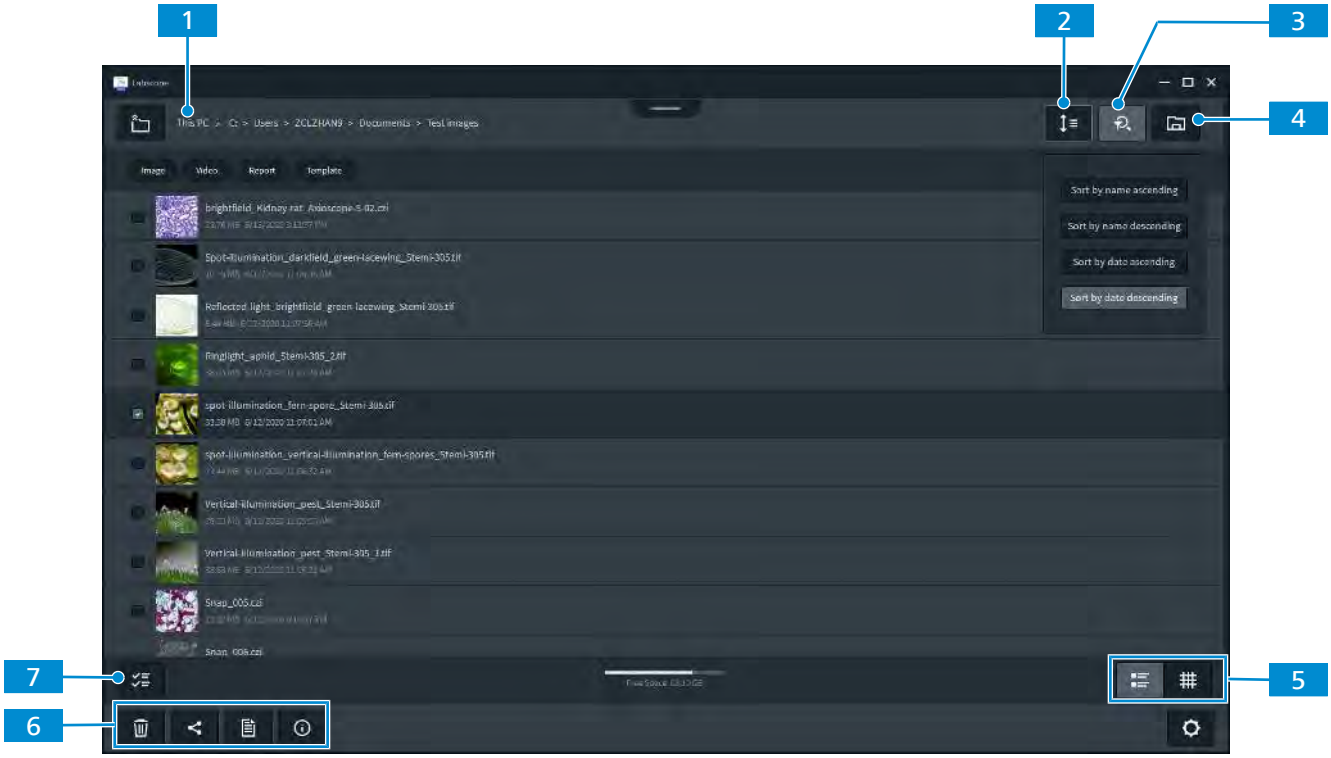
→ 2 additional toggles (**Show channel comparison** / **Show individual channels**) will be displayed under **Input Missing Data**.



3. Select **Show channel comparison** to display the image of all channels (like in **Comparison / Split View**) in the report.
4. Select **Show individual channels** to display each individual channel image in the report.

14 Files View

In this view you can manage relevant files on your device.



1 File Location

Click to choose the locations. Only available for Windows version. Files for iOS and Android are stored in a default location.

2 Sort Files

Sort files according to the desired options.

3 Search Files

4 Open Folder

Opens the folder of the current file location.

5 Switch File Views

6 Delete / Share / Report / Info

7 Select All Files

15 Image Processing

Image processing can only be performed on an acquired single channel image. You can use the image processing functions to improve the display of the image according to your needs. The image processing functions are accessible via the **Show more tools** icon in the **Image View**. Then tap on the magic wand icon to display the available image processing functions. Note that currently image processing is not supported on multichannel images (*.czi format).

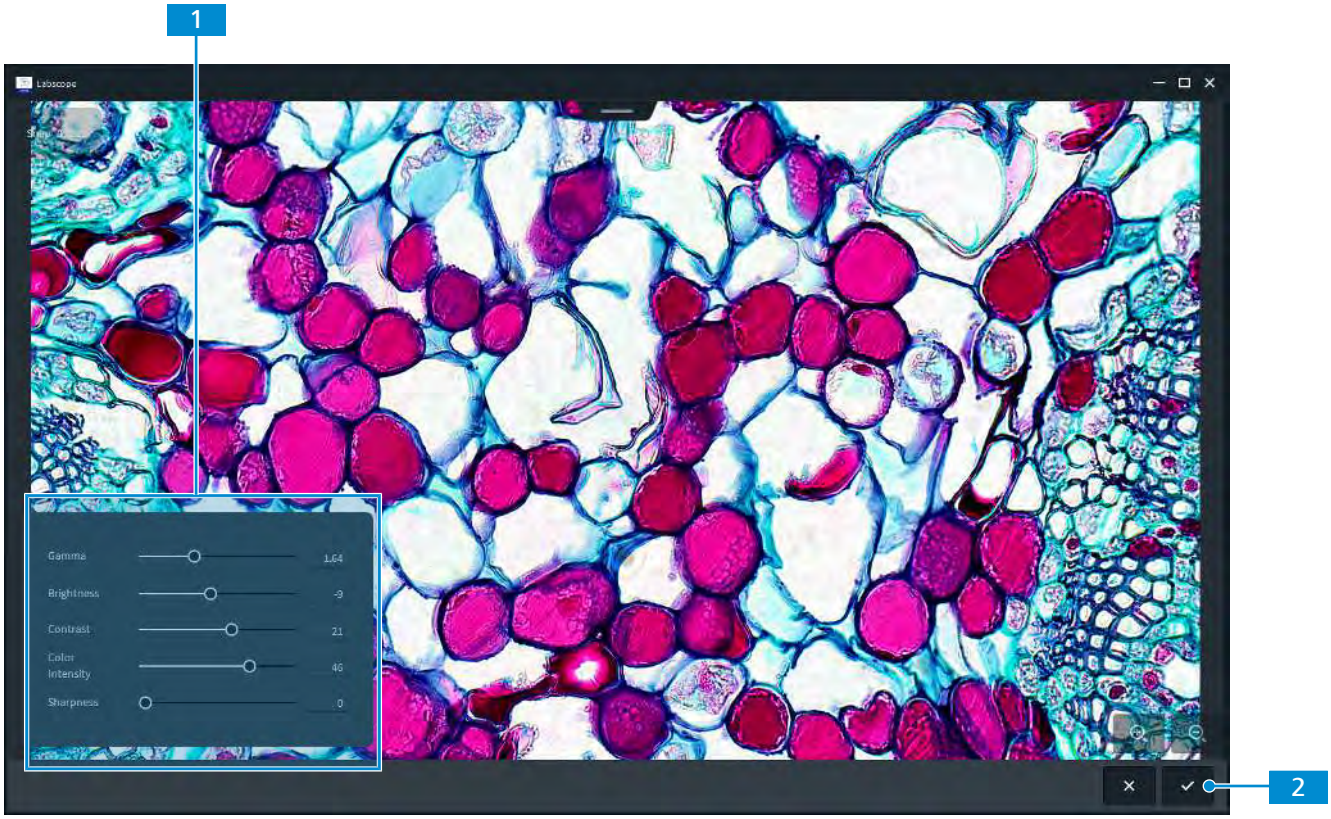


Fig. 6: Image Processing

1 **Adjust Settings**

Adjust the sliders of the individual functions to improve the image according to your needs.

2 **Apply Settings** or Cancel

16 Global Settings

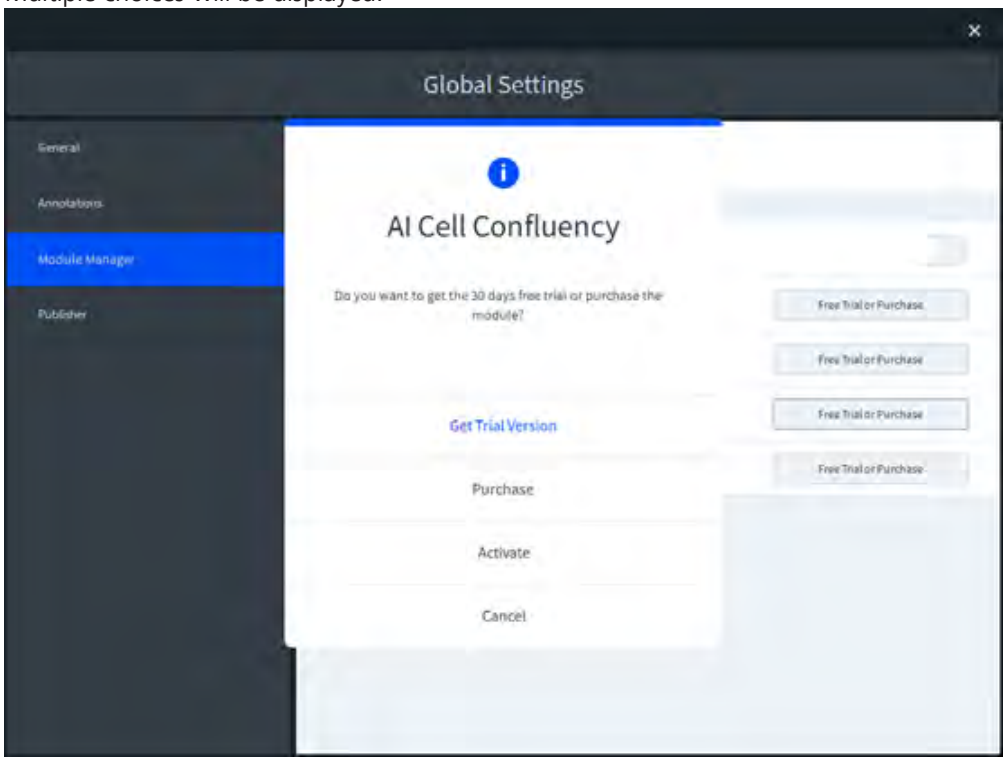
Parameter	Description
General	
– Language	Select the language of the application. **Note**: iOS and Android doesn't have this option here. The language will follow the system language settings.
– Show virtual microscopes	If activated, the virtual microscope will displayed on the Microscope view screen.
– Microscopes can be added manually	If activated, you can manually add a microscope by typing in the IP address. Use this when microscopes are in different VLANs or subnets with the Labscope devices.
– Default file format for snapped images	Choose the default image formats for image acquisition, e.g. CZI, JPG, TIF, CZI+JPG and CZI+TIF.
– Overwrite image on save	When saving an image, the previous image will be deleted.
– Theme	Select between dark and light theme.
– Camera-based barcode reader	Only available for iOS. Enables the scanning button to be shown in the file name window for **Ask on save** and searching text box.
– Hotkey for acquisition	Set the default acquisition hotkey for snapping and recording for the use of input devices like foot pedal or keyboard. If you use a foot pedal, you will need to set the hotkey of foot pedal in its driver to be same as the hotkey of Labscope. **Note**: iOS version doesn't have the option to set. The default acquisition hotkey is *Space*.
– Auto histogram acquisition	Set auto histogram (min/max or best fit) for each acquisition. The relevant histogram effect will be applied automatically for your acquisition each time.
Annotation	Different from the annotation adjustment in Live View or Image View, the settings here are for changing the default annotation properties.
– Measurement Unit	Change the unit of measurements here.
– Show measurements by default	If activated, measurements are displayed by default when you add them to an image.
– Default color	Set the default color for annotations here.
– Transparent	If activated, the annotations are displayed with a transparent background.
– Text background color	Set the background color for text annotations here.
– Default size	Set a default text size here.

Parameter	Description
– Disable measurement color coding	Only available on iOS. A default random color is set when adding a new annotation. Activate this option, if you want to have the same color for each newly added annotation.
– Decimal places	Set the default decimal places for the measurements.
Module Manager	Here you can enable/disable the corresponding modules. Note for some modules, there will be a hint showing that you have to restart the application to apply to the module changes. When you click **Info**, detailed module information will show up. Here you can also select **Free trial** or **Purchase** directly.
– **Education** module (included)	This module provides the functions of a **Laser Pointer** and **Drawing Tube** which are dedicated for the use of digital classrooms. In addition, the module is also an access to the **Labscope Teacher** interface once the Labscope Teacher server is running. **Note**: Labscope Teacher is a licensed software. Consult your sales representatives for an enquiry, demo and free trial.
– **Multi Channel** module	This module is enhanced with plentiful functions. It provides an easy solution for acquisition of fluorescence and transmitted light images in independent channels. It also supports adding false-color, comparing channels and reporting with displaying each channel. **Note:** The multi channel module function is available for Labscope for iPad and Windows. The supported camera types are: Axiocam 202 mono, Axiocam 208 color, Axiocam 105 color (Windows only) and Axiocam 305 mono/color (Windows only)..
– **Fast Panorama** module	This module allows for the easy acquisition of whole slide images (WSI) with manual microscopes. By manually moving the stage, images of the specimen will be stitched together automatically into a panoramic image. **Note:** The module is only available for Windows Labscope since v3.3. The supported camera types are: Axiocam 305 mono/color.
AI Cell Confluency module	AI based solution automatically determines the confluency level of the adherent cell culture. It delivers repeatable, objective results and does not require manual parameter adjustments. **Note:** The module is only available for Windows Labscope (v3.4 or higher).
AI Cell Counting module	AI based solution automatically determines the number of adherent cells in the field of view. It delivers repeatable, objective results and does not require manual parameter adjustments. **Note:** The module is only available for Windows Labscope (3.4 or higher).
Publisher	Displays legal information regarding the publisher as well as links to user support forum, data protection notice, and end user license agreement.

16.1 Licensing via Free Trial, purchase or activation

1. Under **Global Settings**, click **Module Manager**.
2. Click **Free Trial or Purchase**

→ Multiple choices will be displayed.



- **Trial Version:** It will route to ZEISS Portal where you can apply for a 30-day trial license.
- **Purchase:** It will route to ZEISS online shop where you can purchase a formal license.
- **Activate:** After getting your license, you can enter the license Key here to activate it. Please note, internet connection is required.

17 Application and System Requirements

Application

Category / Field of Application	Education, Documentation, Microphotography, Laboratory and Research
Compatible ZEISS microscopes	Primostar 3 HD, Primo Star HDcam, Primotech (Windows and iOS only), Primovert HDcam, Stemi 305 cam, Axioscope 5/7/ Vario and Axiolab 5
Compatible ZEISS cameras	Axiocam ERc 5s, Axiocam 202 mono, Axiocam 208 color, Axiocam 105 color (Windows only) and Axiocam 305 mono/ color (Windows only)
Languages	English, Czech, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian, Simplified Chinese, Spanish

System Requirements

	Labscope v4.0 for Android	**Labscope v3.3 for iPhone**	**Labscope v3.3 for iPad**	**Labscope v3.4 for Windows**
Operating System	Android 9.0 or later	iOS 13 or later	iOS 13 or later	Windows 10 (64-bit)
Minimum Hardware Requirements	RAM: 4GB	iPhone 6s/plus iPhone SE (2016)	iPad Air 2 iPad 5 iPad Mini 4	CPU: i3 (6th generation) dual-core @ 2.5GHz RAM: 4GB
Recommended Hardware Requirements	RAM: 6GB or above	iPhone 7 or later	iPad Air 3 or later iPad 6 or later iPad Mini 5 or later iPad Pro 1 or later	CPU: i5 (7th generation) quad-core @ 3.0GHz or above RAM: 8GB or above

System requirements ZEISS Labscope Module Fast Panoram

Operating system	Windows 10 (64-bit)
Minimum hardware	CPU: i5 (8th generation) quad-core @ 3.0 GHz RAM: 8 GB or above
Recommended hardware	CPU: i7 (9th generation) hexa-core @ 4.0 GHz or above RAM: 16 GB or above

Note:

Supported camera types for Multi Channel module: Axiocam 105 color, Axiocam 202 mono, Axiocam 208 color and Axiocam 305 mono/color. **Supported camera types for Fast Panorama module:** Axiocam 305 mono/color.

Not all performance specifications of the used cameras can be supplied in the Labscope environment due to application specific restrictions.

Software Manual ZEISS Labscope v3.4 | en-US | Rev.1

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