

## ImageFocus 4.0

### USER GUIDE

Version 329271

#### System requirement

- OS: Windows XP / Vista/ 7 / 8 (32 & 64bit)
- CPU: Intel processor (Core2 Duo or higher is recommended)
- Memory: 2GB or More is recommended
- USB ports: USB2.0 Hi-Speed port

#### Getting started - Mount the camera on a microscope

All Euromex CMEX-1 (article dc.1300c), CMEX-3 (article dc.3000c), CMEX-5 (article dc.5000c), CMEX-10 (article dc.10c), sCMOS-1, sCMOS-3 and 5 Mpix cooled CCD cameras (dc.5000i) are delivered with a C-mount projection objective except the 5 Mpix cooled CCD cameras that comes without a projection objective

*When the 5 mm ring is screwed to the camera, the camera has a C-mount. Without this 5 mm ring, the camera is a CS-mount camera*



Cameras without mounted projection objective can be directly screwed to a C-mount (with 5 mm ring attached) adapter or CS mount (without 5 mm ring attached)

e.g.

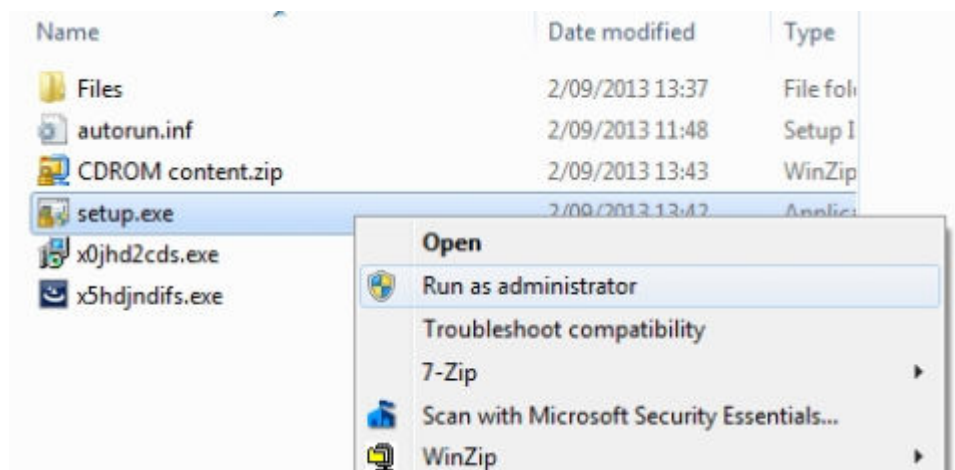


C-mount photo adapter

### Getting started - Install the software

In order to use the Euromex CMEX-1, CMEX-3, CMEX-5, CMEX-10, sCMOS-1, sCMOS-3 and 5 Mpix cooled CCD cameras, you need to install the camera drivers and the application software ImageFocus 4.0

Therefore, select setup.exe, right mouse click and run setup.exe with “Run as administrator”



*After finishing the installation, you can go to the Device Manager of your computer to check if the driver was installed properly*

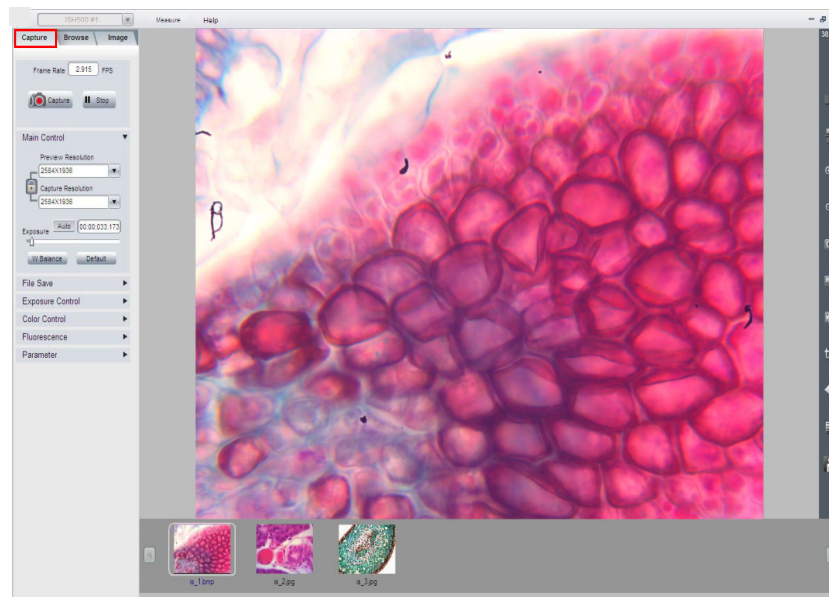
## Starting up ImageFocus 4.0

Double-click on one of the shortcuts to start ImageFocus 4.0

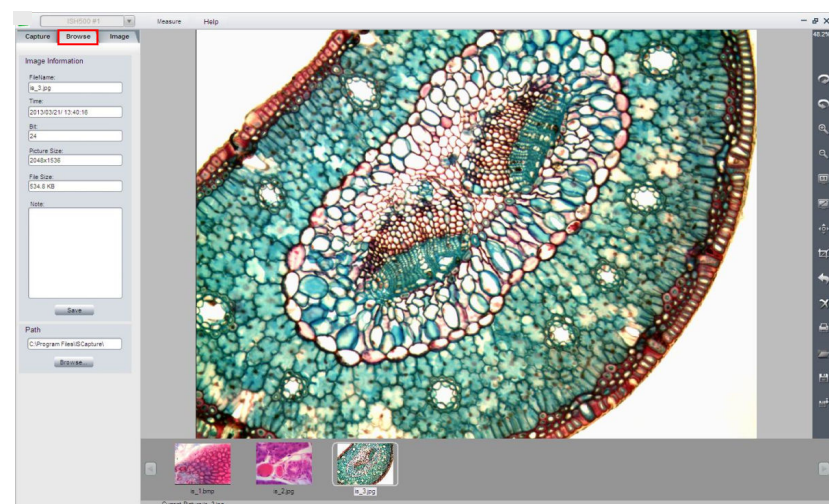
*If you need the software in one language only, you can delete the other shortcuts*

When IMAGEFOCUS 4.0 starts up, the live image window appears. You can set the parameters to get correct images, save still pictures or videos. The [Capture] window provides image acquisition settings. The [Browse] window allows you to manage all your images. The [Image] window offers advanced image processing functions

### [Capture] window



### [Browse] window



[Image] window

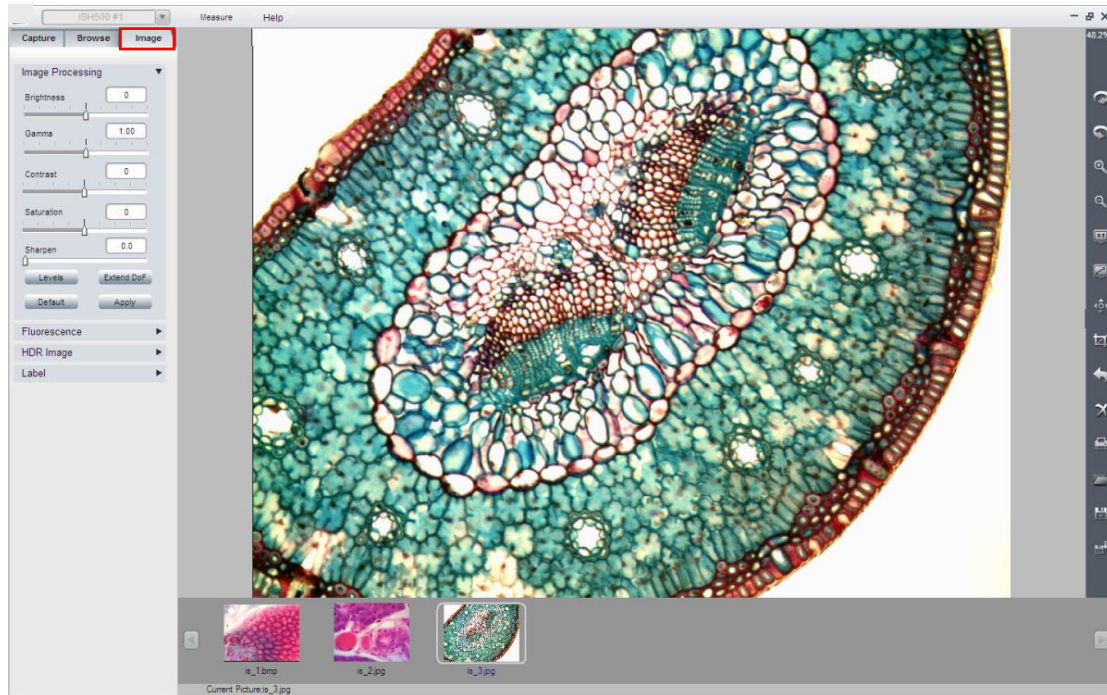
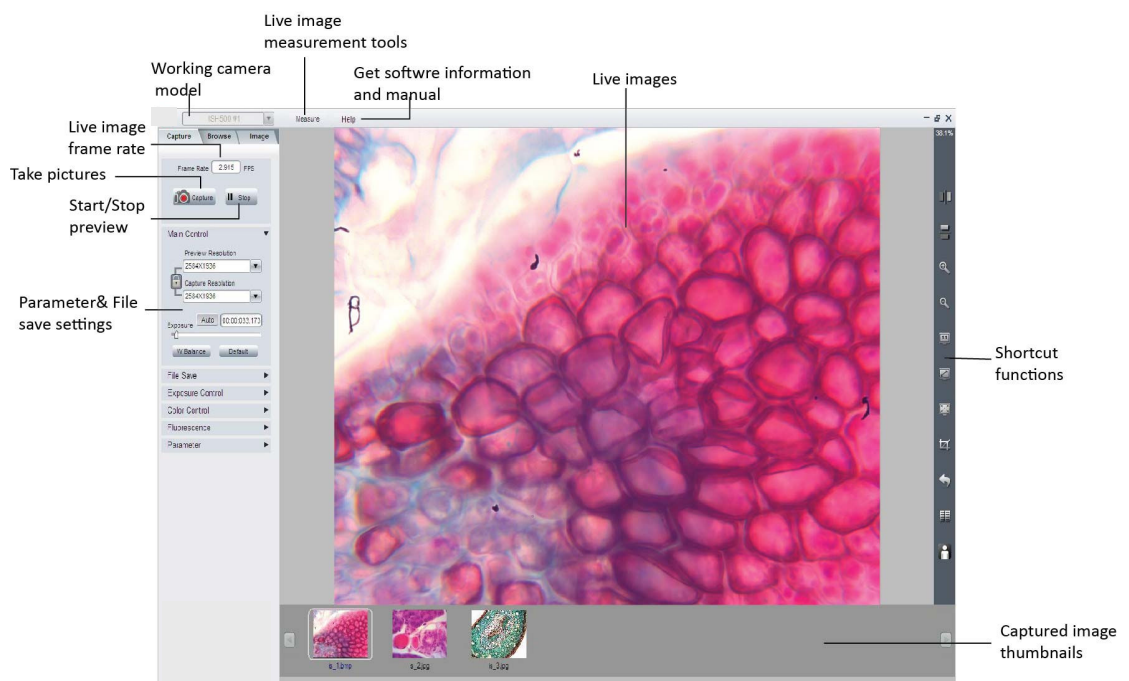
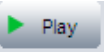


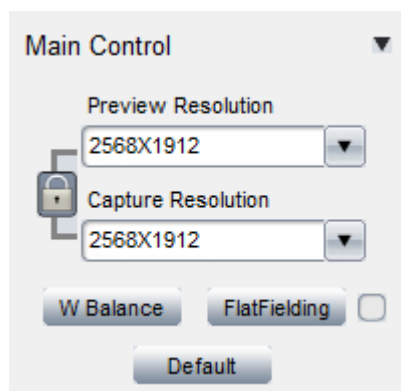
Image acquisition

Adjust the camera settings to get correct live images, do live image measurements and save still pictures and videos

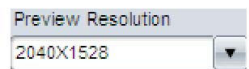
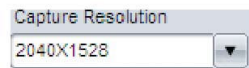

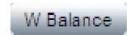


Start IMAGEFOCUS 4.0 with a camera attached to a free USB 2.0 port of the computer. The live image will be displayed automatically. If IMAGEFOCUS 4.0 was already running, connect camera, click  to start a preview session

## Basic controls



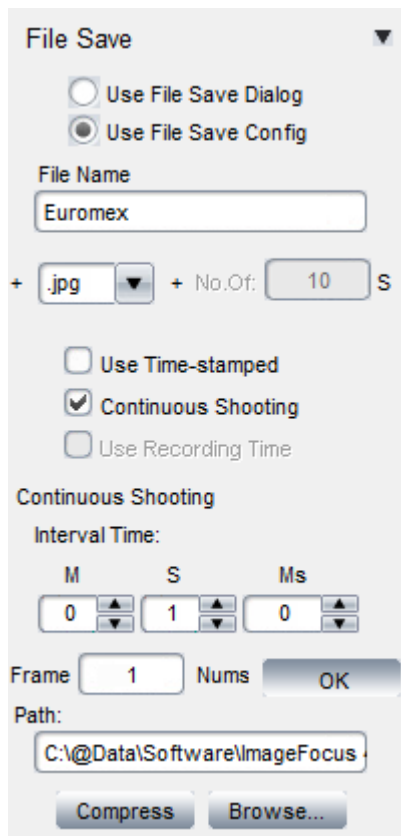
Provide basic camera settings:

	Live image resolution	Select resolution for live image
	Captured image resolution	Select resolution for capturing
	Lock	<p><b>Lock:</b> Set <b>same</b> preview and capture resolution;</p> <p><b>Unlock:</b> Allow to set <b>different</b> preview and capture resolutions.</p>
	White Balance	Correct live image color

To perform a correct white balance, please follow below steps:

1. Move the sample out of the field of view
2. Unselect [Color Enhancement]  
(It is unselected by default in [Color Control] panel)
3. Don't use too much brightness to do the white balance
4. Click the [W Balance] button
5. Move back the sample
6. Check the color rendering of the sample

### Take still images and videos



Under the File Save section, select if a File Save dialog must be used or a specific configuration must be executed

Enter a default file name

Select which format must be used:  
.bmp, .jpg, .tif, .raw ou .avi (video)

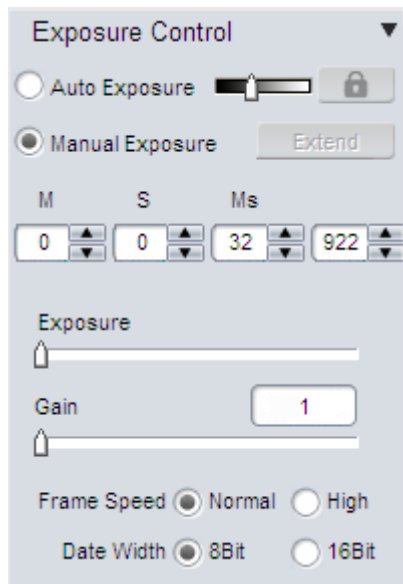
If one select "Continuous shooting", click "Change" in order to set the interval time of the continuous shooting and the number of frames to capture. Click OK to confirm the settings

For video recording (.avi) one can set recording time or the number of frames to record

Enter the path to save the pictures / video

If a compression has to be applied to the file, select it from "Compress" and select one of the available compression modes (codec) on your computer

## Exposure Control

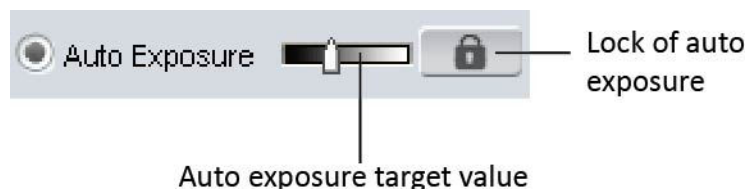



Here the user can change the Exposure time and the Gain of the internal operational amplifiers to adjust the image brightness

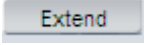
You can also select the frame speed mode 'High' to get higher live image frame rate

You can also set a 8-bit or 16-bit data format for the captured images (only available for CCD and sCMEX camera's)

## Auto Exposure



- Check the [Auto Exposure] checkbox if you want the software to adjust the exposure time automatically to get correct – not overexposed - brightness of live images. This can be useful when used with stereo microscopes as brightness change continuously with magnification
- **Auto exposure target value:** You can pre-set a specific reference exposure time for the auto exposure adjustment. It helps the auto exposure function to find more rapidly a correct exposure time. If the imaging target is quite bright, set a lower value to tell the software that it not necessary to set long exposure times
- **Lock:** This will freeze the auto exposure calculation. While auto exposure is working, it will keep on calculation of the image brightness in order to get correct exposure time. If you got good live images, you can click  to lock it

[Extend]  is used to enable longer exposure times. This function is **ONLY** available for **CCD** cameras.

A [Update]  button appears after you selected [Extend]

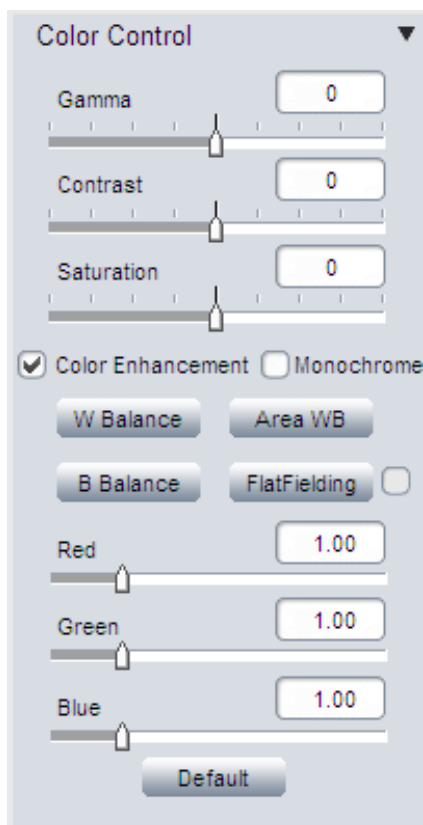
Click on it to stop the current exposure time and **start with the new specified exposure time immediately**. With long time exposure applications, we strongly recommend to click [Update] to start the new setting. It will generate faster the new image. If the exposure time is less than 2-3 seconds, it is not necessary

## Gain, Frame Speed & Data Width

Gain		Increase the power of the image data. <b>Higher gain gives brighter images, but also makes the noise signal more obvious.</b>
Frame Speed	High Speed	Corresponding to high pixel clock. Gives faster frame rate.
	Normal Speed	Offer lower frame rate than High Speed, but gives <b>longer maximum exposure time.</b>
Data Width	8-bit	8-bit images use $2^8 = 256$ gray levels to represent image details.
	16bit	16-bit images uses $2^{16} = 65.536$ gray levels to represent image details. <b>ONLY</b> available for <b>CCD &amp; sCMEX eries</b> camera in .tiff and .Raw formats

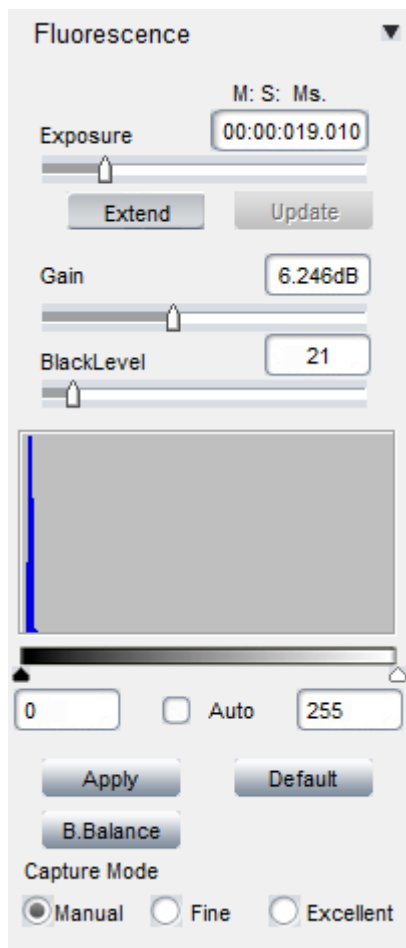


## Color Control - Adjust image color, gamma, contrast and saturations



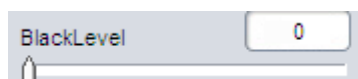
Gamma	Gamma is used to obtain correct reproduction of intensity. Default value (Gamma = 0) is recommended in most of cases.
Contrast	Contrast is the difference between the brightness brights and the darkest darks in an image. Higher contrast will make the shadows become darker and the highlights brighter. High contrast will lost more image details. Default value (Contrast = 0) is recommended.
Saturation	Adjust image saturation. Saturation is the intensity of color in the image.
Color Enhancement	Used to make the image color more vivid. Before doing White Balance, it recommends to uncheck this function, then apply WB
Monochrome	Check the checkbox to get a grayscale image
W Balance	White balance. Give reference to true white for the cameras. Correct image color
Area WB	Manually select the white color area in the image as the white balance reference
B Balance	Black Balance. Correct black color. Usually use in fluorescence application.
FlatFielding	Correct image uneven brightness. Uncheck the check box: cancel background brightness correction.
Red	Adjust the intensity of red in the image. [Red] = 1 means the original intensity of red in the image.
Green	Adjust the intensity of green in the image. [Green] = 1 means the original intensity of green in the image.
Blue	Adjust the intensity of Blue in the image. [Blue] = 1 means the original intensity of red in the image.
Default	Restore the parameter settings to the initial value and apply white balance.

## Fluorescence Settings



Integrate parameter settings for fluorescence or low light imaging conditions

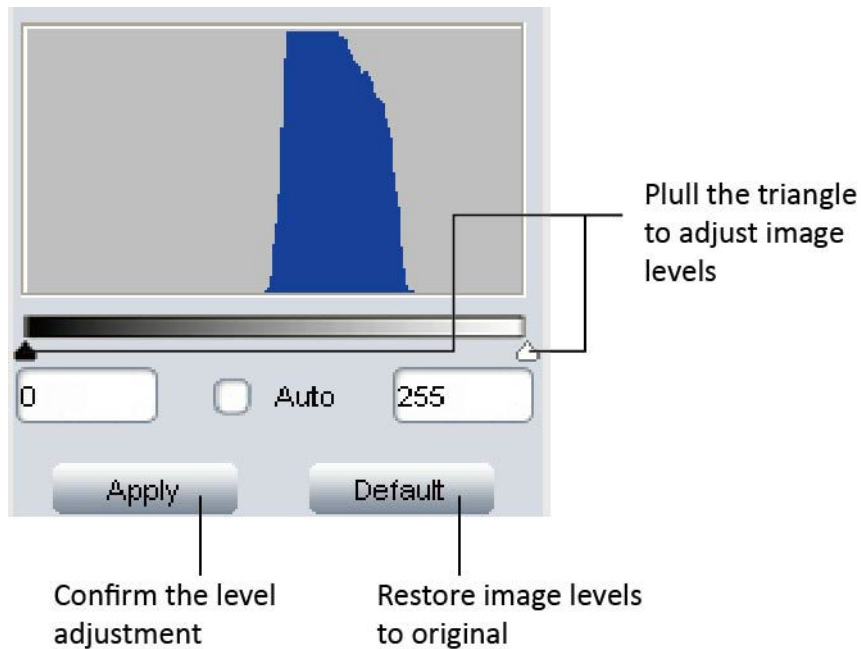
### Black level



The Black level function defines the brightness level for the darkest part of the image. In low light imaging, it can help to see more details in the darker areas

*In low light application, one can use long exposure times to get a correct image. However, when you start setting the camera parameters, we recommend to set **short exposure times, use larger Gain levels and set the Black level first**. After you find a first image you reduce the Gain and Black level, increase the exposure time*

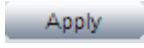
## Adjust levels of histogram

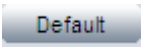


Check the [Auto] check box to adjust **automatically** the levels of the image histogram

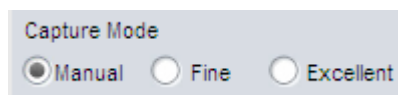
Adjust manually image histogram levels:

Pull the triangles to adjust the levels. Move the **white triangle to the left**, it can reveal some details in darker areas. Move the **black triangle to the right**, it can reveal some details in very bright areas

Click  to **apply** the setting. If you need reset to the original levels,

click  to **restore** the values

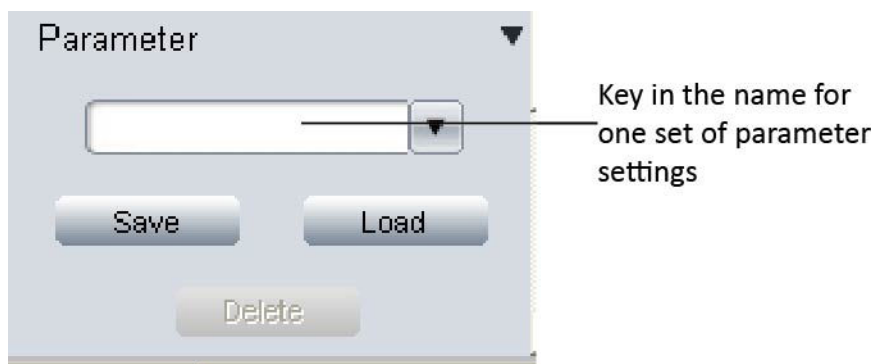
## Capture Mode



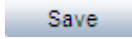

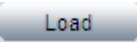
Three capture modes are specially developed for fluorescence imaging.

<input checked="" type="radio"/> Manual	Capture the image with current parameter settings
<input type="radio"/> Fine	Automatically <b>reduce the gain</b> and <b>extend the exposure</b> to get the same brightness image. ( <b>Lower gain will give lower noise level images</b> )
<input type="radio"/> Excellent	Automatically save 10 images with current settings and then get an average image. ( <b>It needs to take a while to capture an image in this mode.</b> )

## Parameter

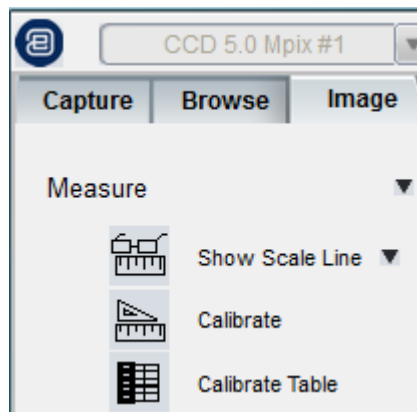



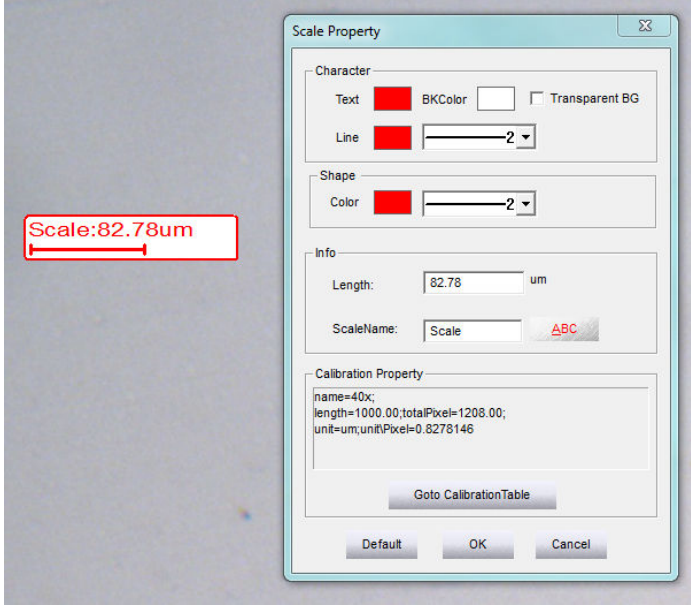


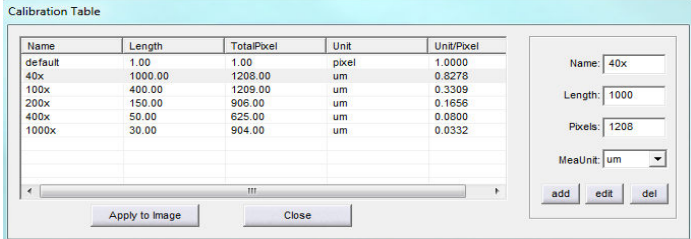


Save parameter sets for different applications. The saved parameters include exposure time, gain, frame speed, data width, gamma, contrast, saturation, color enhancement status, monochrome, RGB gain and black level





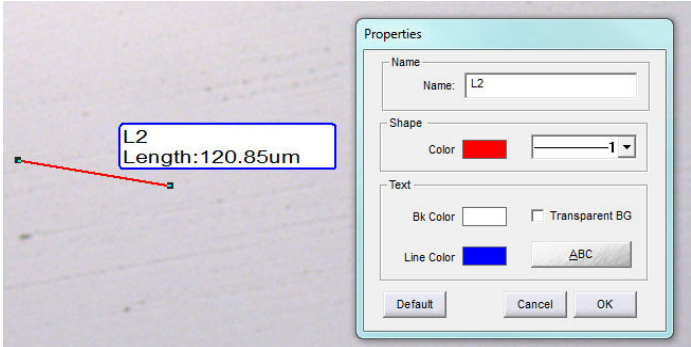

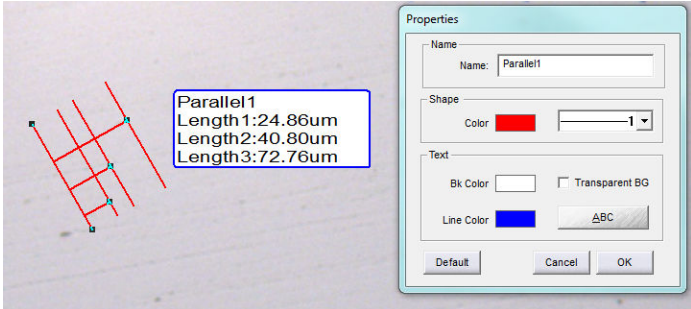
- Save parameter: Enter a name for parameter set, click  to save it
- Load parameter: Click  to open a drop-down menu and select a set with parameter and click  to load the parameters into the software



## Measurements


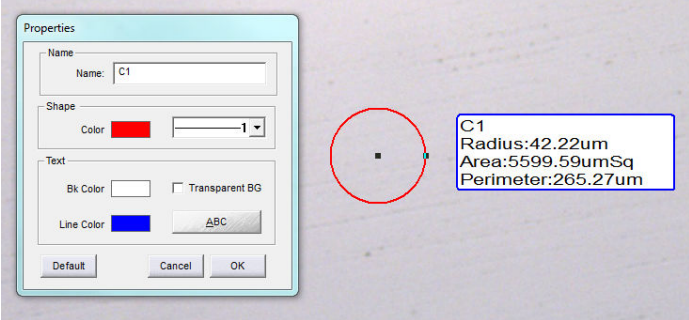

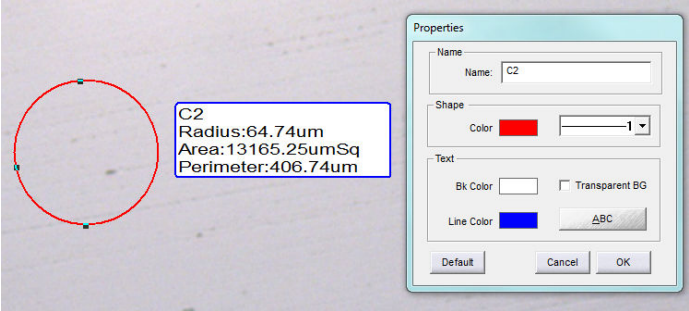

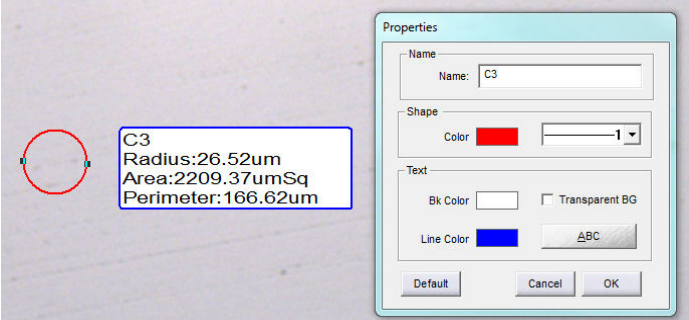
Click on the Image TAB and on [Measure] to get the measurement icons




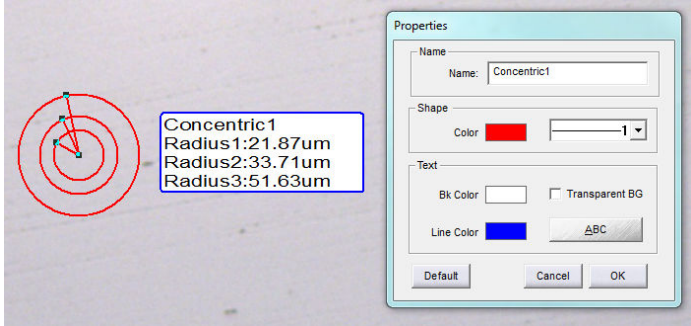

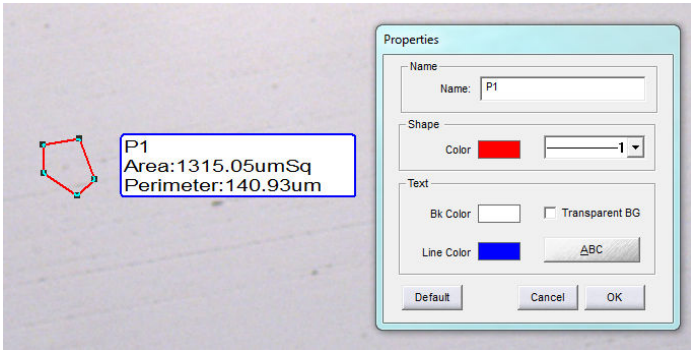

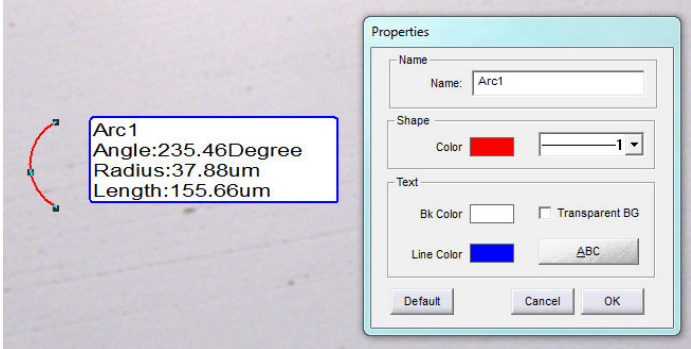
	<p>Show Scale Line</p>	<p>Enable/Disable the scale line on image</p> 
	<p>Calibrate</p>	<p>Perform a calibration on an image</p>
	<p>Calibrate table</p>	<p>Open/Edit the calibration table</p> 
	<p>Decimal</p>	<p>Set number of decimals to be shown on image  (valid values are 0 to 7)</p>
	<p>Measurement List</p>	<p>List with all measurements</p>


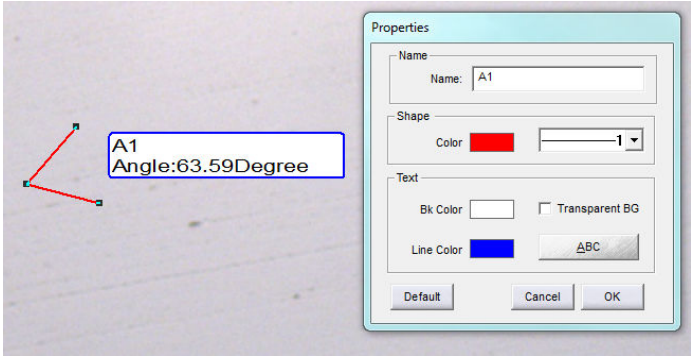

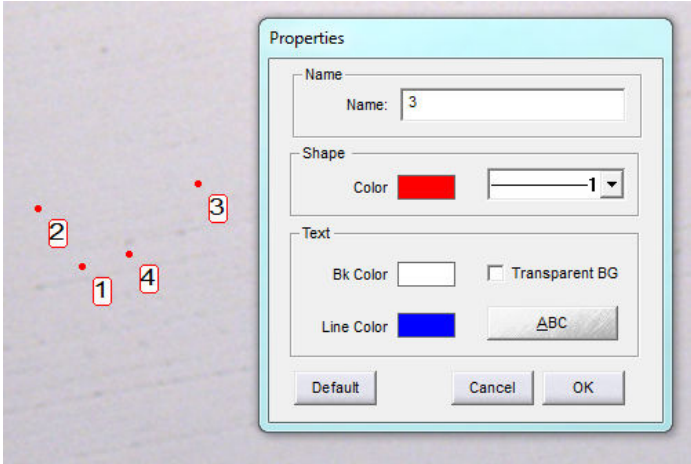
	Lock	Lock and unlock
	Delete	Click on icon to enable the delete function Select the item to delete
	Select	Select tool
	Line	<p>Perform a line measurement</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	Parallel	<p>Measure the distances of parallel lines</p> <ul style="list-style-type: none"> <li>- click a first time to start tracing the baseline</li> <li>- click at the end of the baseline to terminate the tracing of the base line</li> <li>- move the cursor to trace a second line, click on at the end of this new line to terminate the tracing of the second parallel line</li> <li>- double-click to terminate the function (see example below)</li> </ul>  <p><i>Double click on text area to show and edit the properties</i></p>

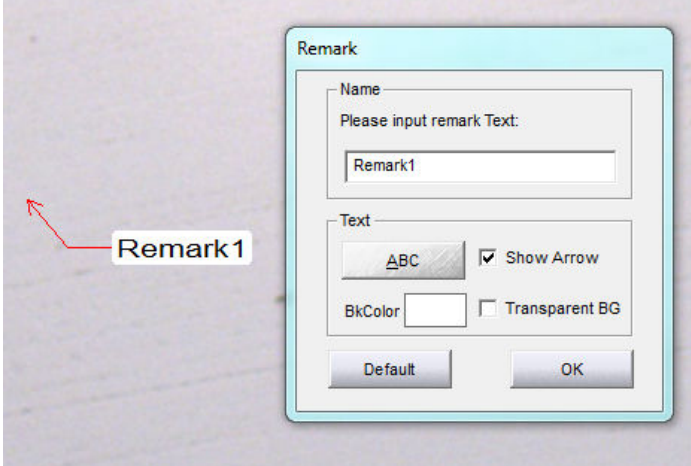
	<p>Perpendicular</p>	<p>Measure the distances of perpendicular lines</p> <ul style="list-style-type: none"> <li>- click a first time to start tracing the baseline</li> <li>- click at the end of the baseline to terminate the tracing of the base line</li> <li>- move the cursor to trace a second line, click on at the end of this new line to terminate the tracing of the second perpendicular line</li> <li>- double-click to terminate the function (see example below)</li> </ul> <div data-bbox="644 831 1339 1171" data-label="Image"> </div> <p><i>Double click on text area to show and edit the properties</i></p>
	<p>Rectangle</p>	<p>Measure de height, width, surface and perimeter of a rectangle</p> <div data-bbox="644 1541 1339 1881" data-label="Image"> </div> <p><i>Double click on text area to show and edit the properties</i></p>

	<p>2-points circle</p>	<p>Click the center of the circle to trace and move the cursor to the 2<sup>nd</sup> point of the circle Click a second time to terminate the operation</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	<p>3-points circle</p>	<p>Click 3 times to define the 3 points of the circle to trace</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	<p>Diameter circle</p>	<p>Click 2 times to define the diameter of the circle to trace</p>  <p><i>Double click on text area to show and edit the properties</i></p>



	<p>Concentric circles</p>	<p>Click once to define the center of the centers of the concentric circles. Click to trace a first circle, etc ... Double-click to terminate the operation</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	<p>Polygon</p>	<p>Measure the surface and perimeter of a polygon</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	<p>Arc</p>	<p>Arc measurement by 3 points</p>  <p><i>Double click on text area to show and edit the properties</i></p>

	<p>Angle</p>	<p>Angle measurement</p> <p>Click once, move the cursor and click at the intersection point of the 2 lines of the angle.</p> <p>Move the cursor again and click a third time to terminate the operation</p>  <p><i>Double click on text area to show and edit the properties</i></p>
	<p>Point</p>	<p>Set a point to mark something or perform a count on an image</p>  <p><i>Double click on text area to show and edit the properties</i></p>

<b>A</b>	Remark	<p style="text-align: center;">Click on the location where you want to add a remark</p> 
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## Calibration procedure and Calibration table

Before you can perform measurements on an image, the calibration table must be updated with correct calibration values for each available magnification and camera of the microscope. This table contains a calibration value (usually  $\mu\text{m}/\text{pixel}$ ) for each magnification of your microscope(s)

When you enter a name for a calibration value, we recommend to use the total magnification (see table below, 40x for a 4x objective together with a 10x eyepiece; if you use more than one microscope, you can use prefixes to distinguish them, e.g. M40x and S40x)

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309
200x	150.00	906.00	um	0.1656
400x	50.00	625.00	um	0.0800
1000x	30.00	904.00	um	0.0332

Name: <input type="text" value="1000x"/>
Length: <input type="text" value="30"/>
Pixels: <input type="text" value="904"/>
MeaUnit: <input type="text" value="um"/>
<input type="button" value="add"/> <input type="button" value="edit"/> <input type="button" value="del"/>

*Remark: there is always a default entry that cannot be deleted*

### Procedure

1. Take as many pictures of a suitable calibration slide (\*) as there are magnifications available on your microscope !

**Save each image with a comprehensive filename!**

*We recommend to use the total magnification as filename, e.g. for an image taken with a 4x objective and 10x eyepiece: '40x'*


(\*) Euromex cameras are delivered with 76 x 26 mm calibration slides with a 1 mm / 100 micrometer reticle, 10  $\mu\text{m}$  intervals (Order reference AE.1110)

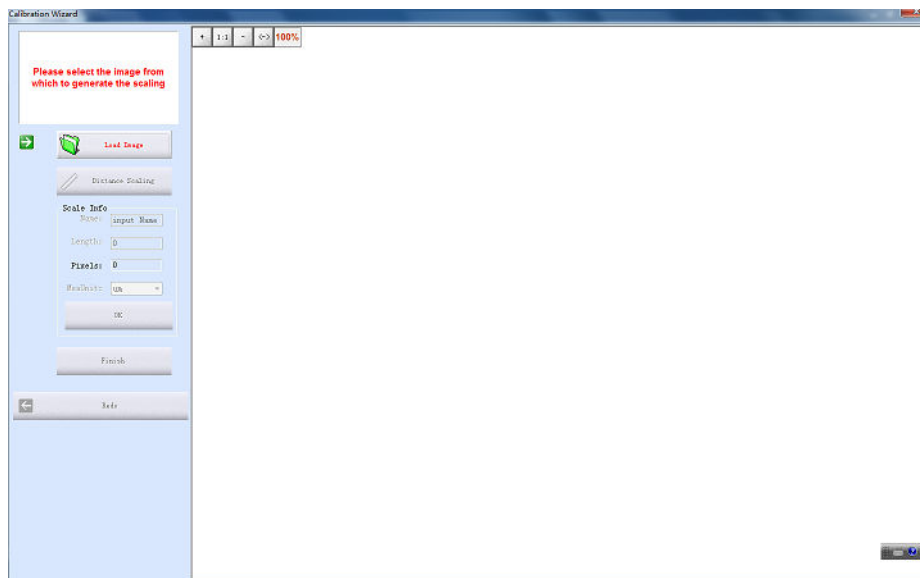


*For stereo microscopes, we recommend to purchase an optional calibration slide with*

100  $\mu\text{m}$  intervals like a 50 mm / 500 micrometer slide (Order reference AE.1112)

For zoom stereo microscopes, one can use the click-stops on the microscope in order to set the magnifications. If there are no such click-stops available, one must put some mark(s) on the microscope in order to know with which magnification a picture is taken !

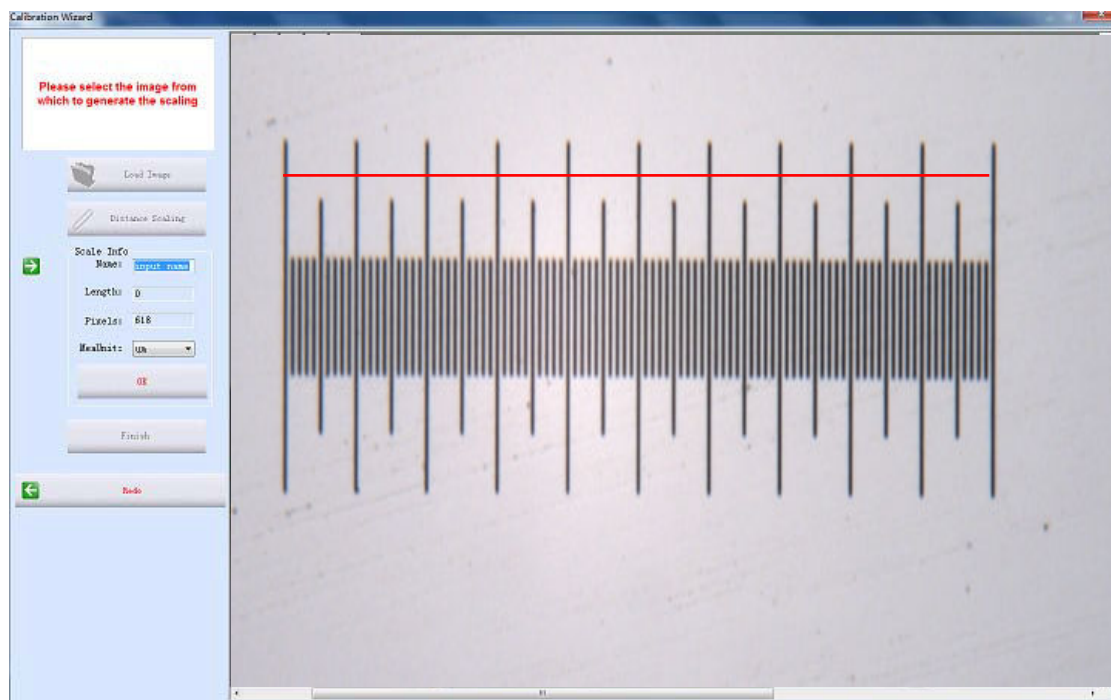
2. Click  to start to perform a calibration



3. Click the [Load Image] button to load the first picture of the calibration slide taken in step 1

4. Click the [Distance scaling] button and move the cursor over the image; click on mouse button to start drawing a line along the micrometer; start at the beginning of a vertical line; click the mouse button again at the end of the line; stop at the end of a vertical line

*Draw a line as long as possible, as longer lines will have better precision and thus more accurate measurement results*

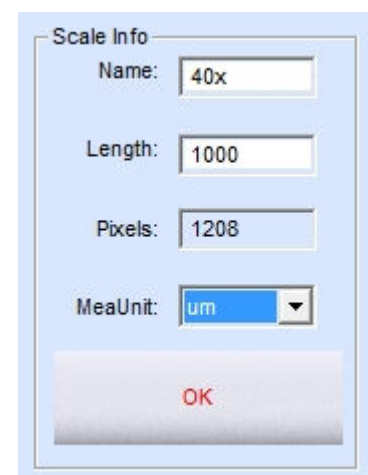


*In this picture the line represents – with a 1mm/100 micrometer calibration slide with 10  $\mu\text{m}$  divisions – in reality 100 divisions  $\times$  10  $\mu\text{m}$  = 1000  $\mu\text{m}$  long*

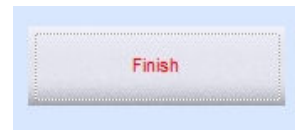
5. Select the measurement unit for the value “Length”.  
*In microscopy we usually use ‘ $\mu\text{m}$ ’ to specify distances*

Enter in the field with the label ‘Name’, the total magnification e.g. ‘40x’ (or alternatively the magnification of the objective e.g. ‘4x’) at which the picture has been taken

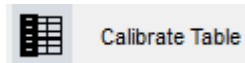
Enter the real distance representing the line (in our example = 1000



6. Click [OK] to confirm the calibration and click “Finish”.



The new calibration value for “40x” will be created in the [Calibrate Table]



Calibration Table

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278

Name:   
 Length:   
 Pixels:   
 MeaUnit:

add edit del

Apply to Image Close

As you can see in table above, the calibration value is equal to 0.8278  $\mu\text{m}/\text{pixel}$

**7 Repeat steps 2 to 7 as many times as there are pictures that you took during step 1**

*Example: with 10 objective and 10x eyepiece = 100x total magnification*

Calibration Table

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309

Name:   
 Length:   
 Pixels:   
 MeaUnit:

add edit del

Apply to Image Close

*Example: with 20x objective and 10x eyepiece = 100x total magnification*

Calibration Table

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309
200x	150.00	906.00	um	0.1656

Name:   
 Length:   
 Pixels:   
 MeaUnit:

add edit del

Apply to Image Close

*Example: with 40x objective and 10x eyepiece = 400x total magnification*

Calibration Table

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309
200x	150.00	906.00	um	0.1656
400x	50.00	625.00	um	0.0800

Name:   
 Length:   
 Pixels:   
 MeaUnit:

add edit del

Apply to Image Close

*Example: with 100x objective and 10x eyepiece = 1000x total magnification*

Calibration Table

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309
200x	150.00	906.00	um	0.1656
400x	50.00	625.00	um	0.0800
1000x	30.00	904.00	um	0.0332

Name:   
 Length:   
 Pixels:   
 MeaUnit:

add edit del


Apply to Image Close



## Perform a measurement on an image

- 1 In the [Image] tab, select an image on which you want to realize a measurement

*Example: image taken with the 20x objective and 10x eyepiece of the microscope*

- 2 Click  [Calibrate Table] to open the calibration table

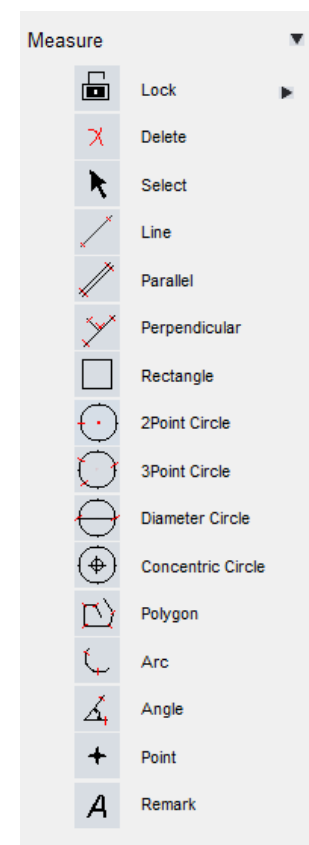
- 3 Select the magnification that corresponds for the selected image

Name	Length	TotalPixel	Unit	Unit/Pixel
default	1.00	1.00	pixel	1.0000
40x	1000.00	1208.00	um	0.8278
100x	400.00	1209.00	um	0.3309
200x	150.00	906.00	um	0.1656
400x	50.00	625.00	um	0.0800
1000x	30.00	904.00	um	0.0332

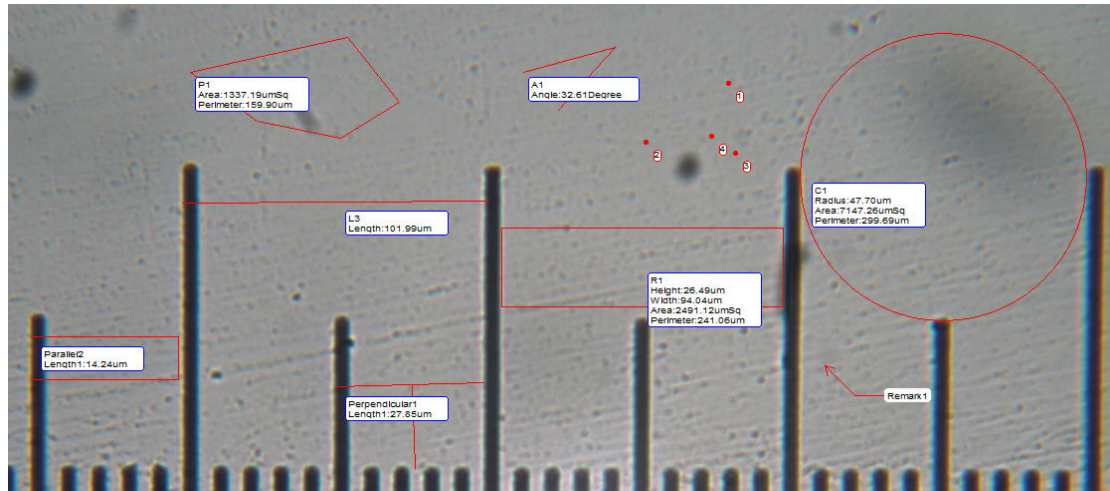
Apply to Image      Close

- 4 Click on “Apply to image” and “Close”
- 5 Choose one of the available measurements

Line  
 Parallel line  
 Perpendicular lines  
 Rectangle  
 2point Circle  
 3Point Circle  
 Diameter Circle  
 Concentric Circle  
 Polygon  
 Arc  
 Angle  
 Point  
 Remark (for adding a label with remarks)



## 6 Perform your measurement on the image



## Measurement List -



Name	Length_um	Width_um	Height_um	Area_umsq	Perimeter_um	Radius_um	Angle
L1	612.73						
Parallel1	734.60						
Perpendicular1	462.92						
R1		449.58	359.67	161700.66	1618.50		
C1				420057.97	2297.52	365.66	
P1				225746.95	2283.12		
Arc1					440.31	175.46	143.79
A1							28.92
Remark1							

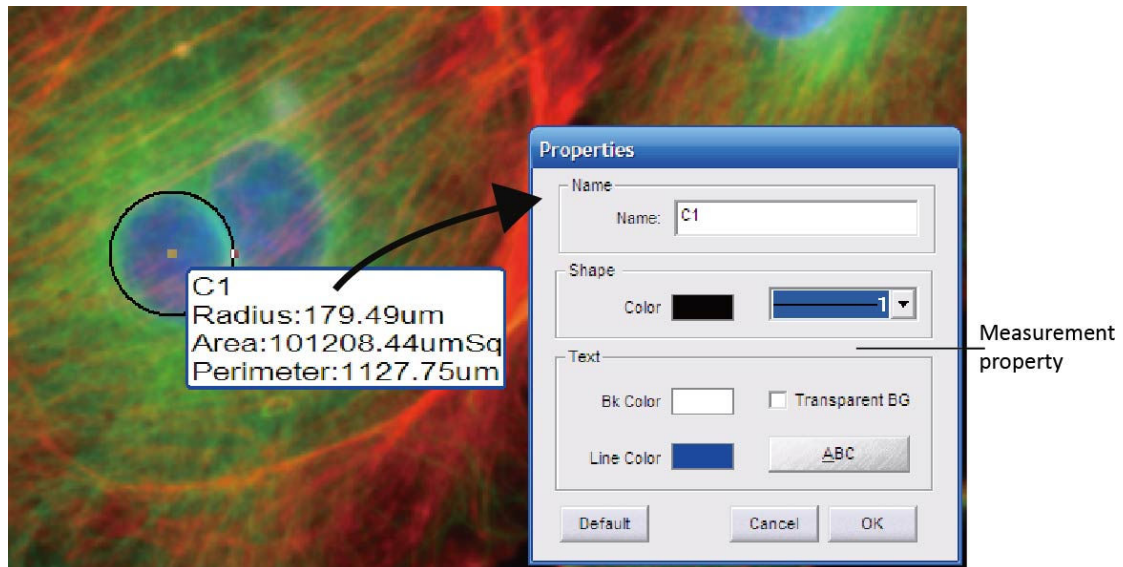
Save to TXT  
Export the measurement data to .txt file

Save to Excel  
Export the measurement data to Excel file

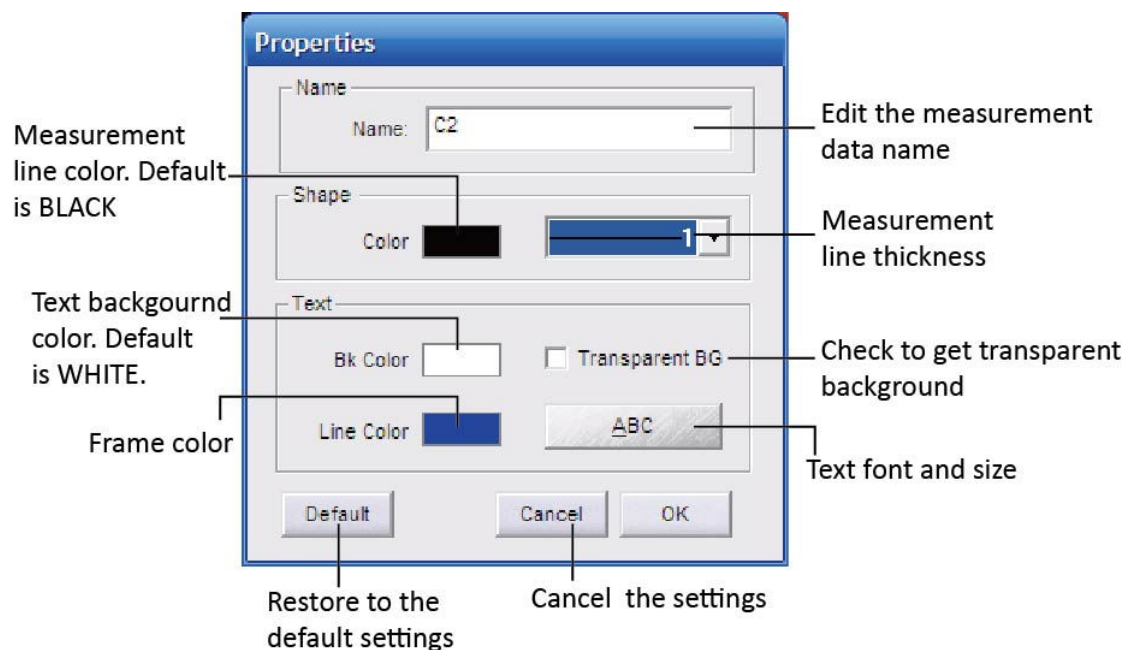
Copy  
Copy all the measurement data to a file: txt, word or excel.

All measurements done on the image is kept in this table. You can export all the measurement data to the [TXT](#) or [Excel](#) file

## Measurement properties

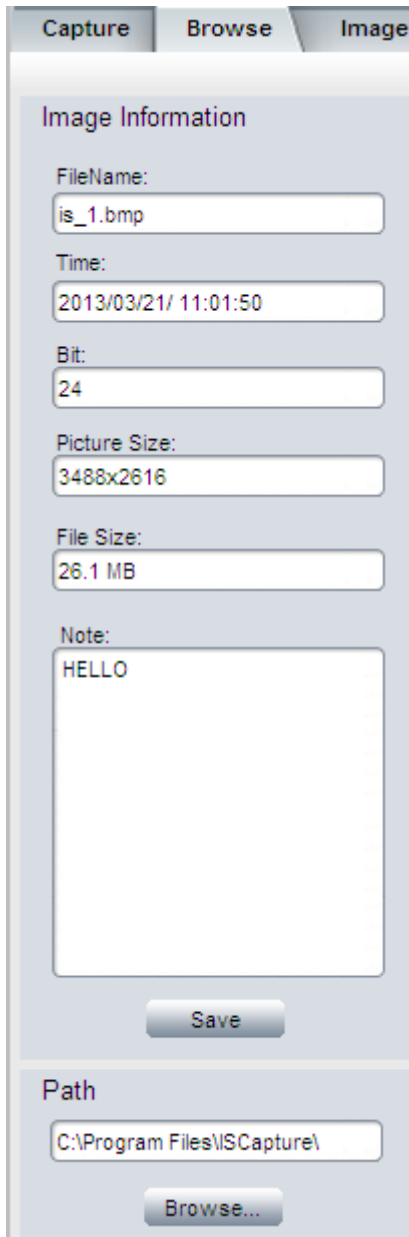


Double click on the measure to edit the properties of a measurement. You can change the measure properties like name, color, thickness, background color and the character font, etc ...



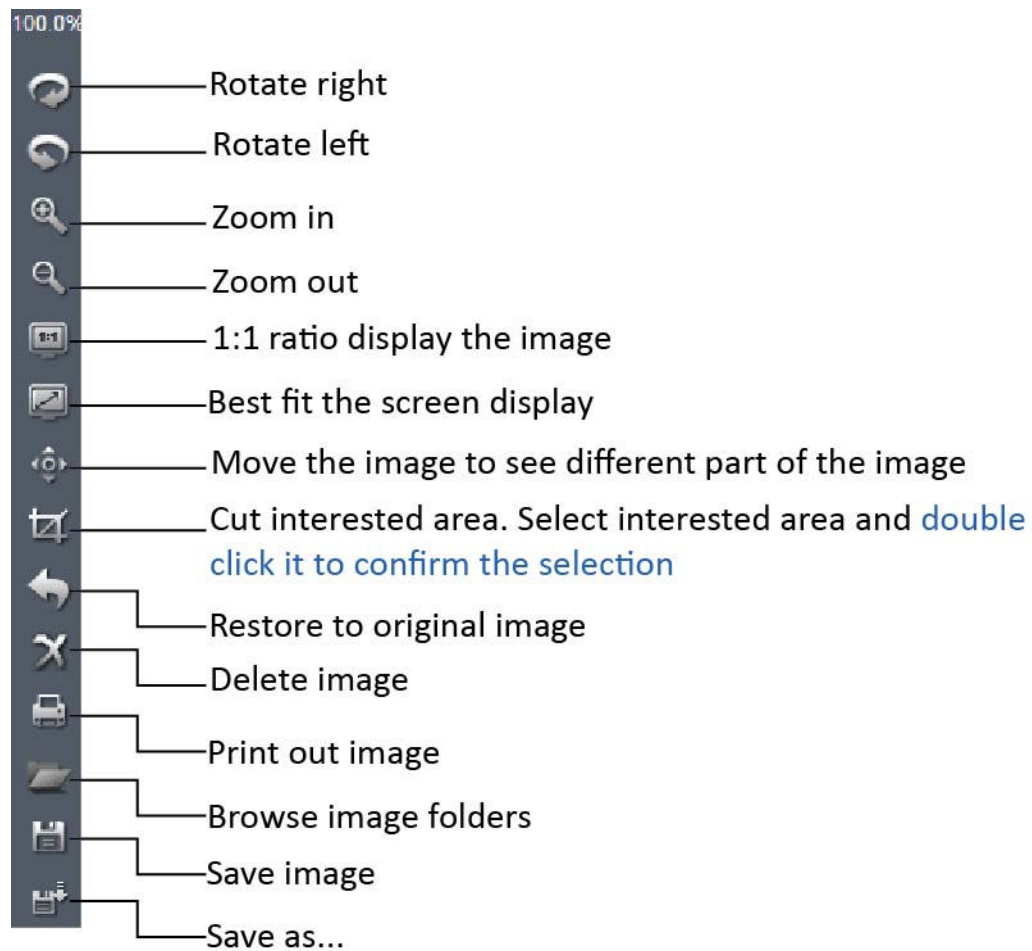
## Browse tab

Under the [Browse] tab, you can see the image File name, capturing time, data depth (bit), picture resolution and image size. It also allows to [add comment to any individual image](#)

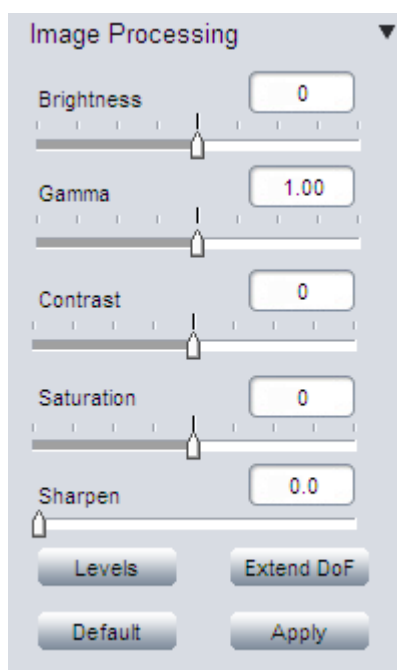


The screenshot shows a software interface with three tabs: 'Capture', 'Browse', and 'Image'. The 'Browse' tab is active. Below the tabs is a section titled 'Image Information' containing several input fields: 'FileName:' with the value 'is\_1.bmp', 'Time:' with '2013/03/21/ 11:01:50', 'Bit:' with '24', 'Picture Size:' with '3488x2616', and 'File Size:' with '26.1 MB'. Below these fields is a 'Note:' section with a text area containing 'HELLO'. A 'Save' button is located below the note. At the bottom of the form is a 'Path' section with a text field containing 'C:\Program Files\ISCapture\' and a 'Browse...' button.

**Under the Image Tab** there are some quick functions on the right hand side of the software



## Image Processing



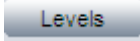
### CAUTION

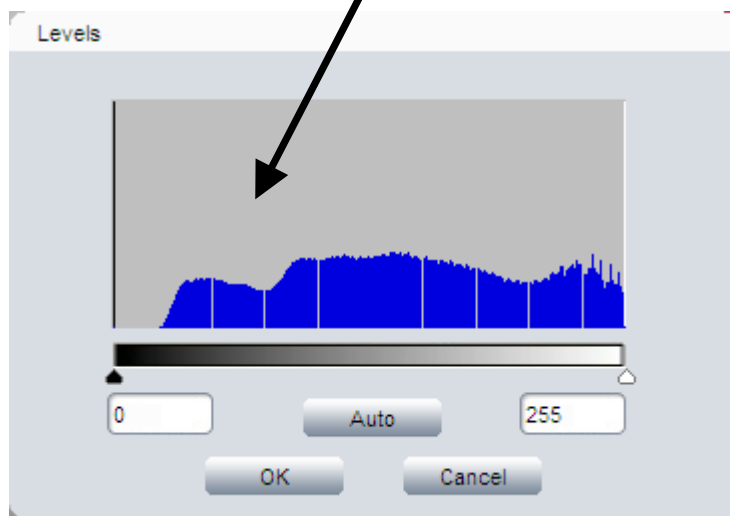
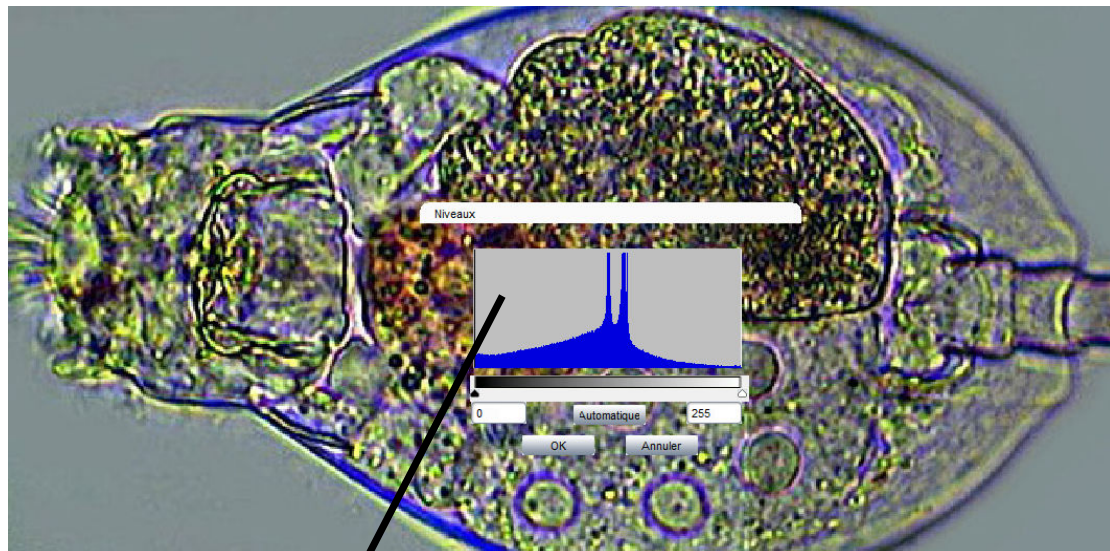
When you click [Apply], all the changes are applied to the image ! These changes **CAN NOT BE RECOVERED**

Provide some basic stilled image processing functions and allows to [extend the Depth of Focus](#).

Brightness	Adjust captured image brightness. Default brightness = 0
Gamma	Adjust captured image gamma. Default gamma = 1.00
Contrast	Adjust contrast. Increase the contrast, the shadows become darker and the highlights brighter. Decrease the contrast, the highlights grow dim and the dark areas lighten up
Saturation	Adjust the color saturation. Fully-saturated colors are very bright, while low saturation are grayish.
Sharpen	Adjust the image sharpness. Sharpness is the contrast on the edges. Sharpening increases the bright and dark lines on edges.
Levels	Adjust image levels. Get more details in [Fluorescence]>>[Levels]
Extend DoF	Extend the <a href="#">Depth of Focus (DoF)</a>
Default	Restore Brightness, Gamma, Saturation, Sharpen and levels back to the default value
Apply	Confirm to apply all the settings to the image.

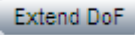
## Histogram correction

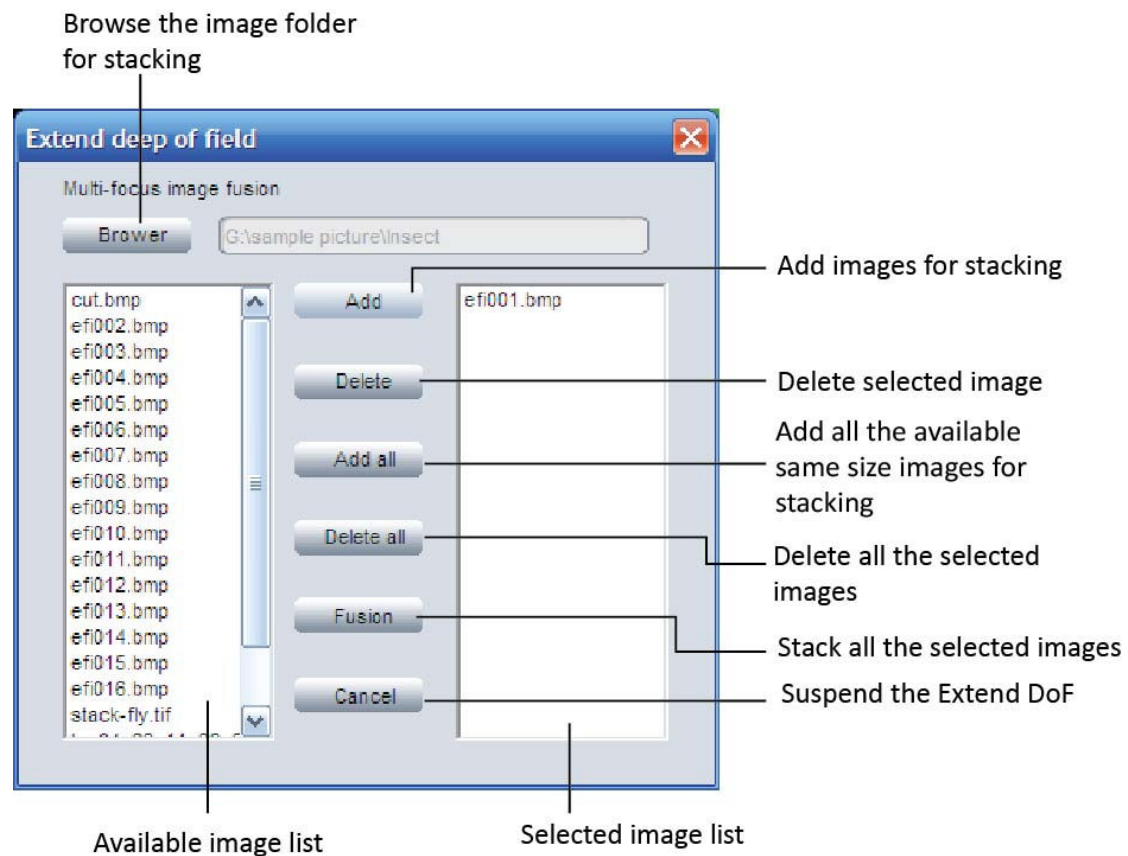
Click on [Levels]  to get the image histogram of the image. This represent the intensity distribution of all the pixels of the image



You can move the back cursor to the right and move the white cursor to the left in order to correct the contrast by applying a mathematical transformation on each pixel of the image

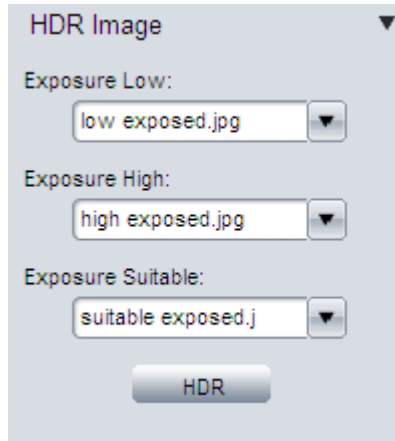
## Extend depth of focus or stacking of images

Click [Extend DoF]  to get the dialog for stacking images. Select the images to stack and apply the function.





## HDR High Dynamic Range imaging



High Dynamic Range (HDR) image function is used to get higher dynamic image

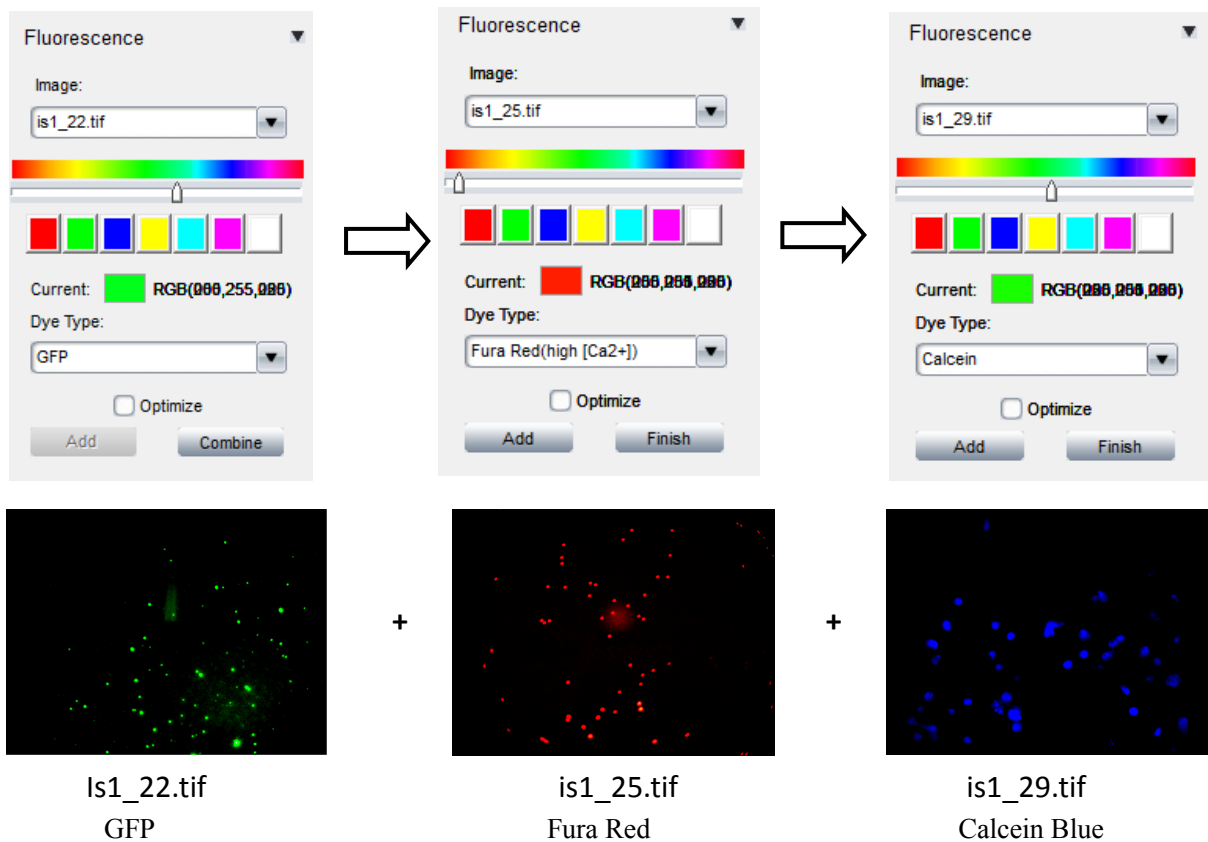
- Take pictures of the **same scene** with different exposure times and load them in ImageFocus 4.0
- In the drop-down menu, select the images for [Exposure Low], [Exposure High] and [Exposure Suitable]
- Click [HDR] button to combine different exposed images into one. The generated HDR image will be named as “hdr\_image”

## Image - Fluorescence

This function is used to assign an image taken with fluorescence with a fluorophore and to combine different images into one combined image

**Note that all images MUST have the same size in order to be combined !**

- Select the first image (example below: is2\_22.tif)
- Select from the list a fluorophore that have been used for this image  
*You can also select a color instead of the name of the fluorophore*
- Click 'Combine'



The first screenshot shows the 'Fluorescence' panel with 'Image: is1\_22.tif', 'Current: RGB(000,255,000)', and 'Dye Type: GFP'. The 'Combine' button is visible.

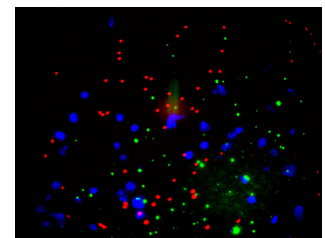
The second screenshot shows 'Image: is1\_25.tif', 'Current: RGB(200,000,000)', and 'Dye Type: Fura Red(high [Ca2+])'. The 'Finish' button is visible.

The third screenshot shows 'Image: is1\_29.tif', 'Current: RGB(200,000,000)', and 'Dye Type: Calcein'. The 'Finish' button is visible.

Below the screenshots are three fluorescence images:

- is1\_22.tif  
GFP
- is1\_25.tif  
Fura Red
- is1\_29.tif  
Calcein Blue

- Select the next image (example is2\_25.tif) =
  - Choose from list a fluorophore or a color
  - Click 'Add'
  - Repeat steps d to f for each image to combine
  - To end the operation, click 'Finish'
- The resulting image is called 'combine'**



**combine.tif**

**Optimize** The optimize checkbox can be also selected during the combination