

# mScope Universal Viewer

## *version 3.9*

## User Guide

August 2012

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# 1. Introduction

This guide describes mScope Universal Viewer functionalities, accessible from the mScope Clinical, Education or Research portals. The viewer enables a user to display, navigate and enrich media available in the portal.

## 1.1. What is Media

Media is defined as any file containing visual information. mScope supports many media formats. Examples include:

- 2D images (e.g. .jpg, .gif, etc.)
- video (e.g. .mpeg)
- whole-slide images produced by slide scanners (e.g. Aperio, Hamamatsu, Zeiss, etc.)
- DICOM Series

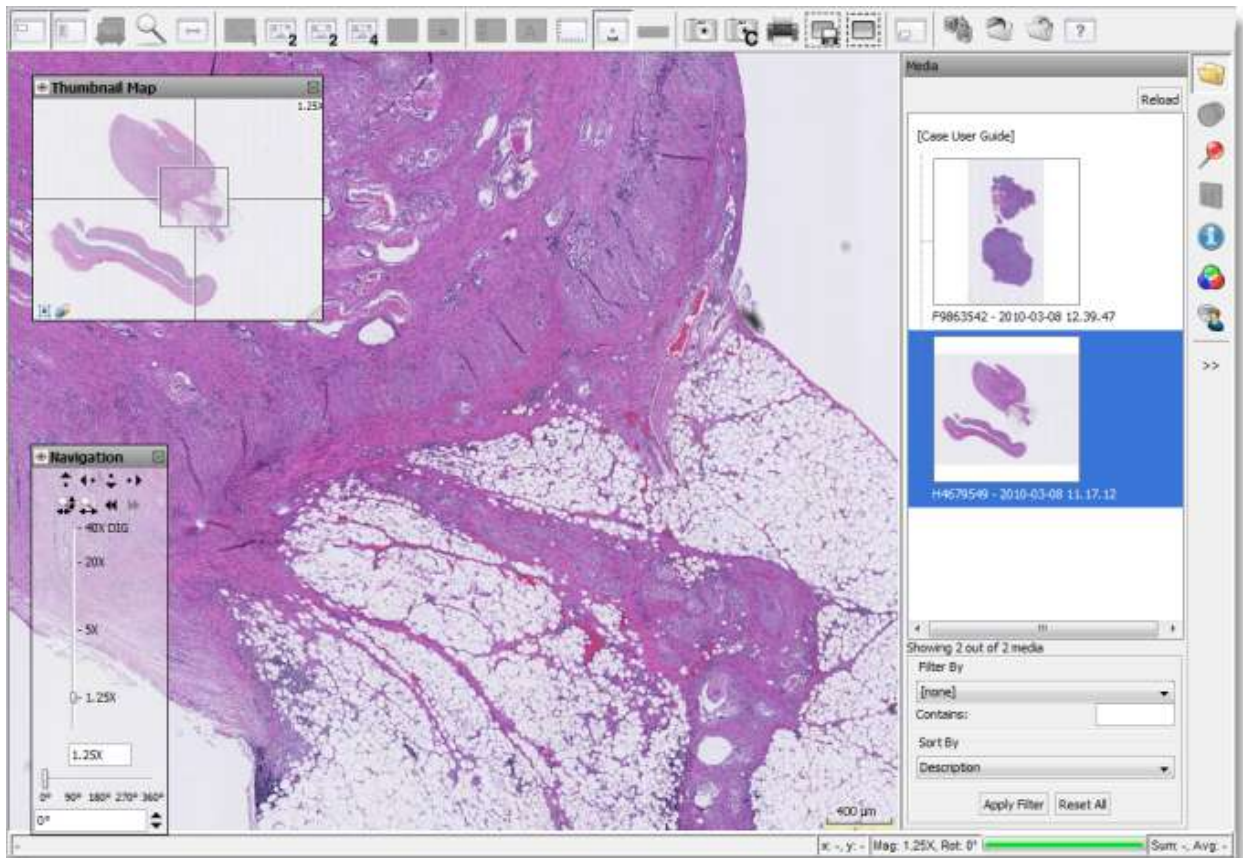
Media is displayed in the mScope Portal using thumbnails



## 1.2 mScope Viewer Overview

The mScope Viewer is a Java application that is launched when a user clicks on a media thumbnail in the Portal.

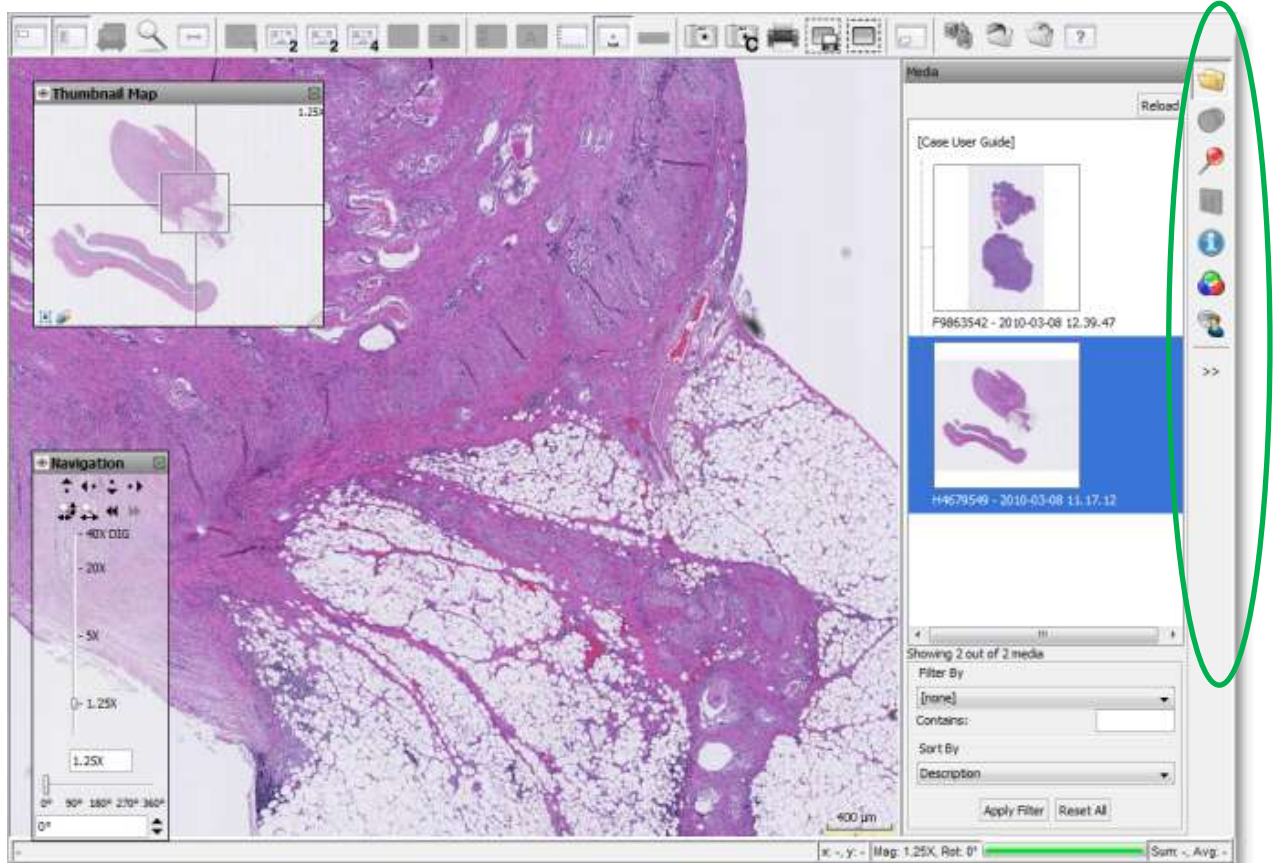
In order to eliminate the requirement to download the entire media file (which in some cases is several GBs in size), it selectively and intelligently loads the data corresponding to the region within the viewing area. The mScope Viewer includes tools to allow users to navigate, zoom, annotate, and export media as well as to collaborate.



## 1.2 mScope Viewer tabs

Here are the different tabs available in the viewer:

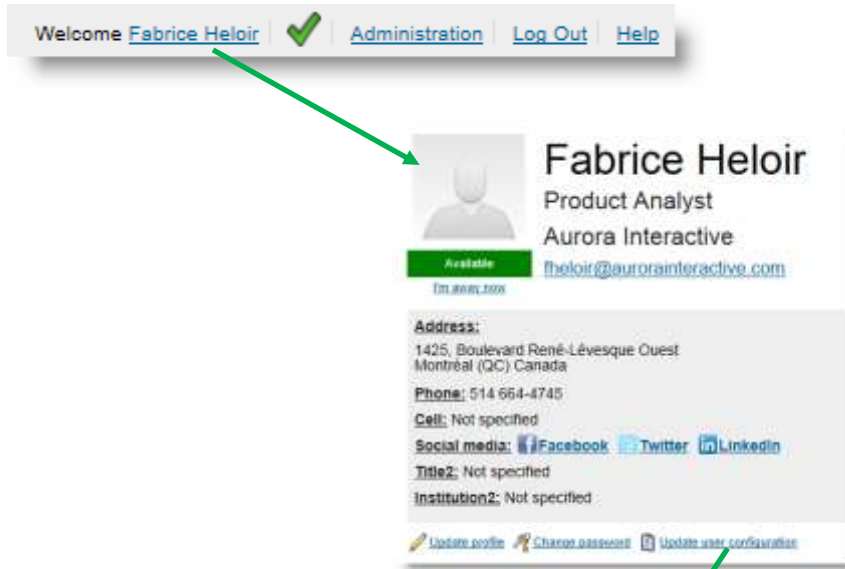
- Media: Lists all media associated to a case. Click on a media's thumbnail to view it.
- Annotations: Lists all annotations. Click on the checkbox left of an annotation's title to display the annotation in the main window or use the editor to update an annotation's information (according to granted rights.)
- Analysis: Integration with external quantitative analysis tools
- Attributes: Detailed media information, including custom mScope attributes
- Collaboration: Work directly with other mScope users. Allows real time media and annotation sharing.
- Color: Non-permanent adjustments to media contrast, gamma, brightness and red, green and blue gains.





## 2. mScope User configurations

Once logged in the mScope portal, click on your username in the upper right corner of your screen to access your mScope profile.



Select "Update user configuration" to update your preferences, including Viewer configurations.



**New settings available in 3.9.0 :**

- Hide other annotations when creating or editing a new annotation.
- Hide the title of newly created annotations
- Show media viewing history by default
- Set measurement units

## 2.1 Performance

In order to increase the viewer's performance and better leverage your computer's power, memory allocated to mScope may be increased.

The following table displays recommended memory settings based on RAM memory:

User computer's RAM memory	mScope recommended setting
Less than 1 Go	128 Mo
Between 1Go and 3Go	256 Mo
More than 3 Go	512 Mo

Warning: Increasing the mScope viewer's memory could slow down concurrent applications on your computer. If this occurs, decrease the selected value of this parameter.

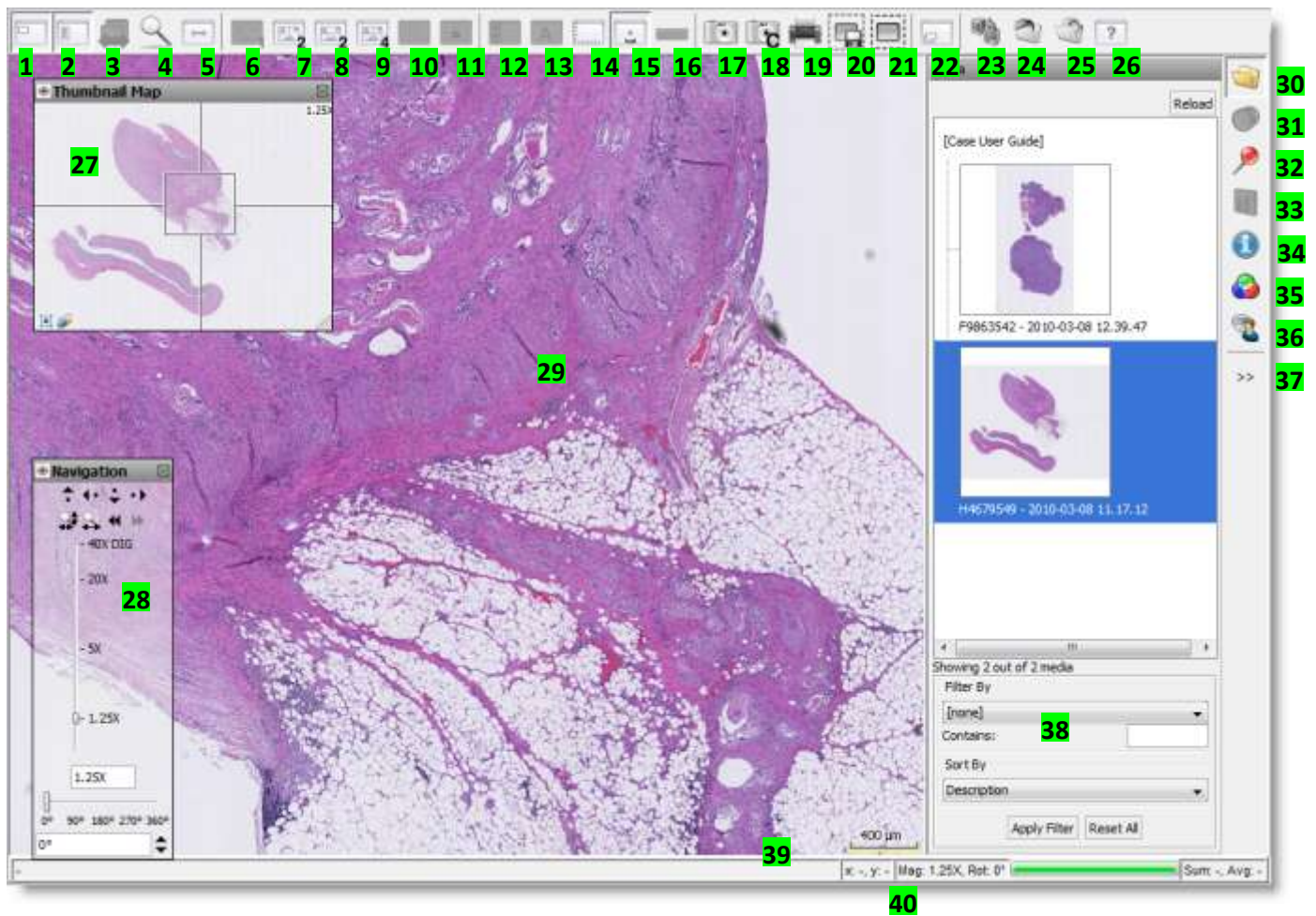


### 3. mScope Viewer

This section describes all the main components of the mScope viewer, how they interact and their primary functions.

#### 3.1. Viewer Basics

The features of the viewer are identified on the image below and described in the table on the following page:



ACTIONS	OBJECTS AND WORK ZONES
<ol style="list-style-type: none"> <li>1. Show/Hide Thumbnail Map (24)</li> <li>2. Show/Hide Navigation window (26)</li> <li>3. Show/Hide DICOM series scroller</li> <li>4. Magnifier</li> <li>5. Mode: switch navigation mode between Default (drag left to move media left) and Microscope (drag left to move media right)</li> <li>6. Return to single image viewing mode</li> <li>7. Enable dual image viewing mode: allows you to display two images simultaneously side-by-side</li> <li>8. Enable dual image viewing mode: allows you to display two images simultaneously top-to-bottom</li> <li>9. Enable four image viewing mode</li> <li>10. Synchronize navigation of multiple images</li> <li>11. Align all secondary images with active image</li> <li>12. Show left sidebar</li> <li>13. Show/Hide attribute overlay</li> <li>14. Grid/Ruler: cycles through available grid and ruler types</li> <li>15. Show/Hide scale (37)</li> <li>16. Clear Measurements: Removes temporary measurements (created by holding the Shift key while dragging the mouse) from the image (only available if the original media includes metric information)</li> <li>17. Snapshot: captures the selected field of view as a .jpg to your computer</li> <li>18. Save snapshot to clipboard: copies the selected field of view to the clipboard.</li> <li>19. Print: sends the current view to a printer</li> <li>20. Native ROI Export tool: exports native image data for the selected region to a .tiff file</li> <li>21. Create derived image tool: defines a new mScope image based on the selected region</li> <li>22. Cycles through additional images provided by the acquisition device (e.g. barcode image, whole slide macro image, etc.)</li> <li>23. Save viewer state to server</li> <li>24. Open viewer state from file</li> <li>25. Save viewer state to file</li> <li>26. Help</li> </ol>	<ol style="list-style-type: none"> <li><b>27. Thumbnail Map:</b> provides an overall view of the media, shows what area you are looking at</li> <li><b>28. Main Image Window:</b> current view area of the image</li> <li><b>29. Navigation Window:</b> allows control of magnification and provides tools for navigating and rotating the image</li> <li><b>30. Media:</b> all media associated with a case, jump to any media by clicking on it</li> <li><b>31. Multi-channel media:</b> View different channels such as in a fluorescence image</li> <li><b>32. Annotations:</b> allows for creation, organization and viewing of annotations depending on your permissions</li> <li><b>33. Analysis:</b> Launch analysis algorithms</li> <li><b>34. Attributes:</b> detailed information about the media including any assigned mScope attributes</li> <li><b>35. Color:</b> non-persisted adjustments for brightness, contrast, gamma, red, green, and blue</li> <li><b>36. Collaboration:</b> work with others viewing and annotating the image at the same time as if through the same eyepiece</li> <li><b>37. Hide/Show the current tab</b></li> <li><b>38. Filter/Sort the current media list</b></li> <li><b>39. Legend:</b> Image scale (if available)</li> <li><b>40. Status Bar:</b> Display current navigation info (coordinates, magnification, rotation, etc.)</li> </ol>

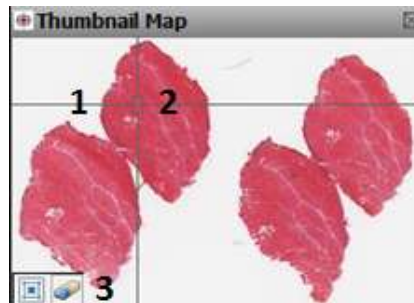
## 4. Navigating the image

Image navigation may be accomplished both by interacting directly with the image or using the navigation and magnification windows. The basic navigation controls are as follows:

Action	In the main viewing area	From navigation tools
Zoom in (center)	Left mouse click	Select the desired value on the slider in the navigation window
Zoom in (mouse cursor position)	Left mouse click with ALT-key pressed	N/A
Zoom to region	With ALT-key pressed, hold left mouse button and drag	N/A
Zoom out	Right mouse click	Select the desired value on the slider in the navigation window
Pan	Hold left mouse button and drag	Click on the arrows in the navigation window
Navigate to a precise point in the image	N/A	Click on a specific point in the thumbnail map
Show/Hide help window	F1-key	N/A
Show/Hide top toolbar	F2-key	N/A
Show/Hide bottom status bar	F3-key	N/A
Show/Hide magnifier window	F10-key	Click the corresponding button in the top tool bar
Show/Hide thumbnail map	F11-key	Click the corresponding button in the top tool bar
Show/Hide navigation window	F12-key	Click the corresponding button in the top tool bar

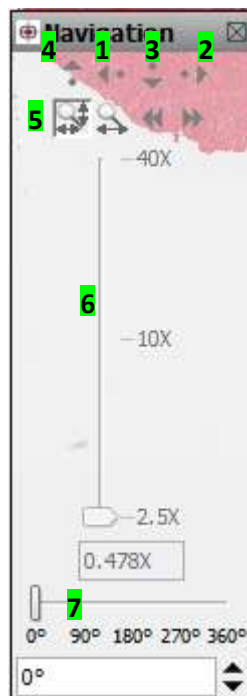
## 5. Navigation Window

1. **Image:** Thumbnail view of complete image
2. **ROI:** Region of interest identifying the current view area
  - you can drag the ROI to move the image in the main viewer
  - left clicking anywhere in the thumbnail will move the ROI to that location
3. **Show/Hide View History:** Highlights the areas viewed by the user (selecting the eraser clears the history)



## 6. Magnification Window

- **Jump Left:** Bring what is left of the current display into view
- **Jump Right:** Bring what is right of the current display into view
- **Jump Down:** Bring what is below the current display into view
- **Jump Up:** Bring what is above of the current display into view
- **Zoom to Fit:** Fits the complete image into the main view area
- **Magnification Slider:** Select the magnification desired
- **Rotate:** adjust image orientation by one or ninety degree increments



Please note that for functions 1 to 4 a 10% overlap is set to avoid missing important image features found at the border of the viewing area.

## 7. Navigation type

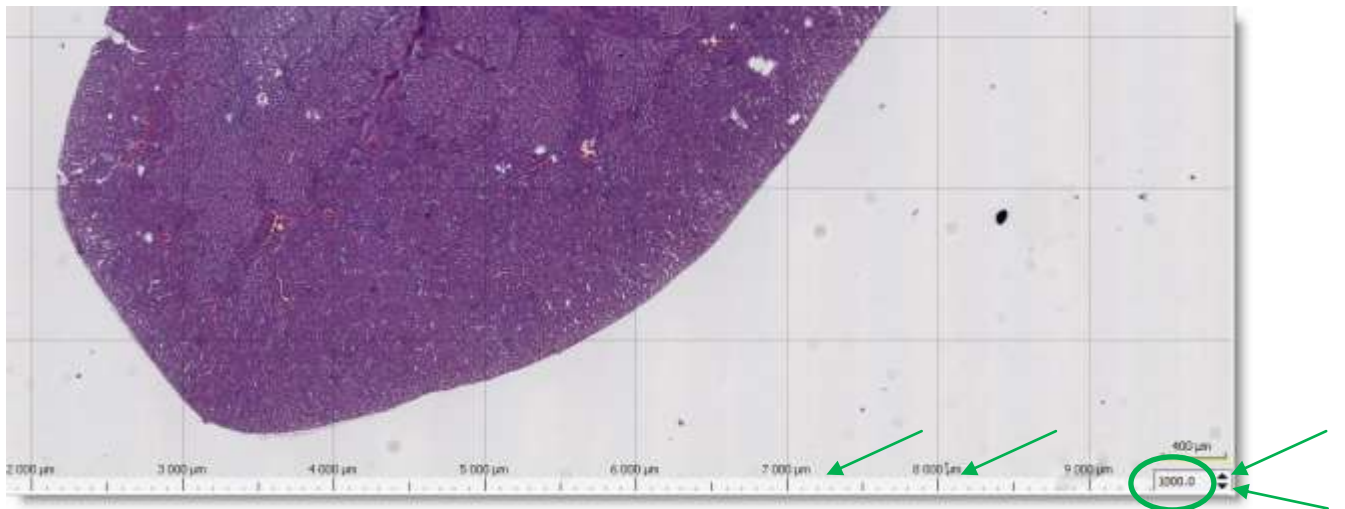
mScope allows two different types of navigation:

- “Standard” navigation: Click and drag the image, the movement corresponds to the drag
- “Microscopic” navigation: Click and drag the image, the movement corresponds to the opposite of the drag



## 8. Grid/Ruler

The grid/ruler tool displays distance values based on the user preference setting for measurement units.



You can also modify grid cell size by typing in a value and hitting “Enter” or using the arrows at the bottom right.



## 9. Temporary Measurements

With SHIFT-key pressed, hold left mouse button and drag to create temporary measurements.

Click on the ruler in the tool bar to erase all temporary measures.

**Note:** This tool is only available if the image includes dimension information.

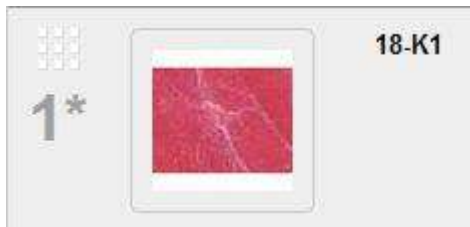


## 10. Extracted Image

New mScope images may be extracted from existing ones by selecting a region using this tool.



Once the tool is selected, drag your mouse over the desired area holding a left click on your mouse. Extracted images are identified with a "\*" in the portal media list.

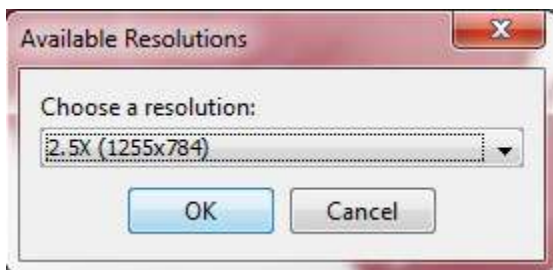


## 11. Snapshots

This tool allows a user to create a JPEG images to be saved to their computer.



Once the tool is selected (file or clipboard), drag your mouse over the desired area holding a left click on your mouse. The desired resolution and the directory in which to save the image (file or clipboard) can then be created.

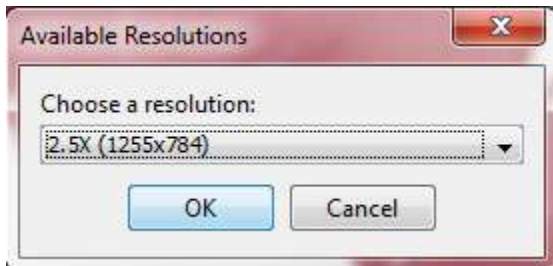


## 12. Native ROI Export Tool

mScope allows the export of native regions of interest. The selected area will be exported in a pyramidal TIFF format that can then be used in other applications such as Photoshop.



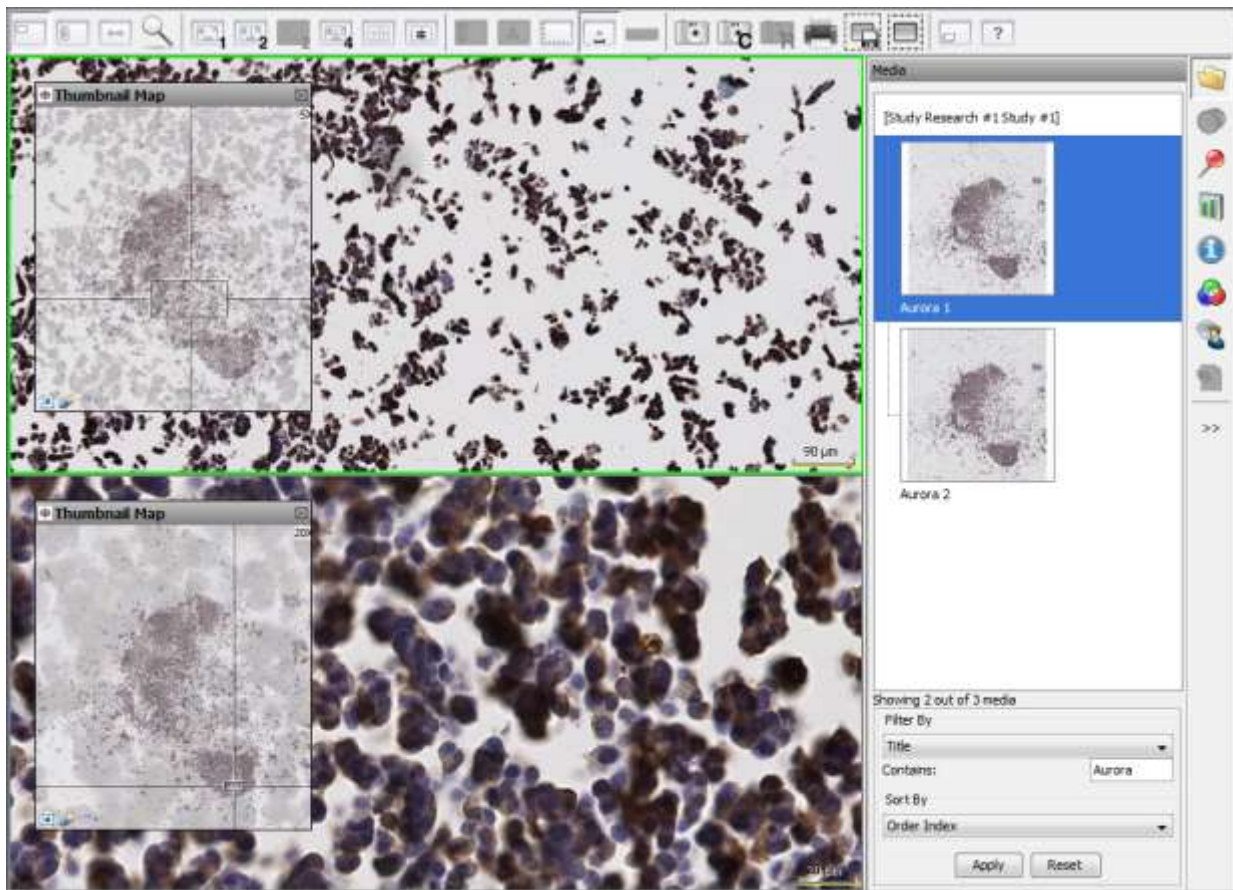
Once the tool is selected, drag your mouse over the desired area holding a left click on your mouse. The desired resolution and the directory in which to save the image can then be created.



### 13. Multi-image Viewing

The main viewing area may be separated into multiple sections to enable dual (or 4-) image viewing (with independent navigation and zoom).

#### Vertical split



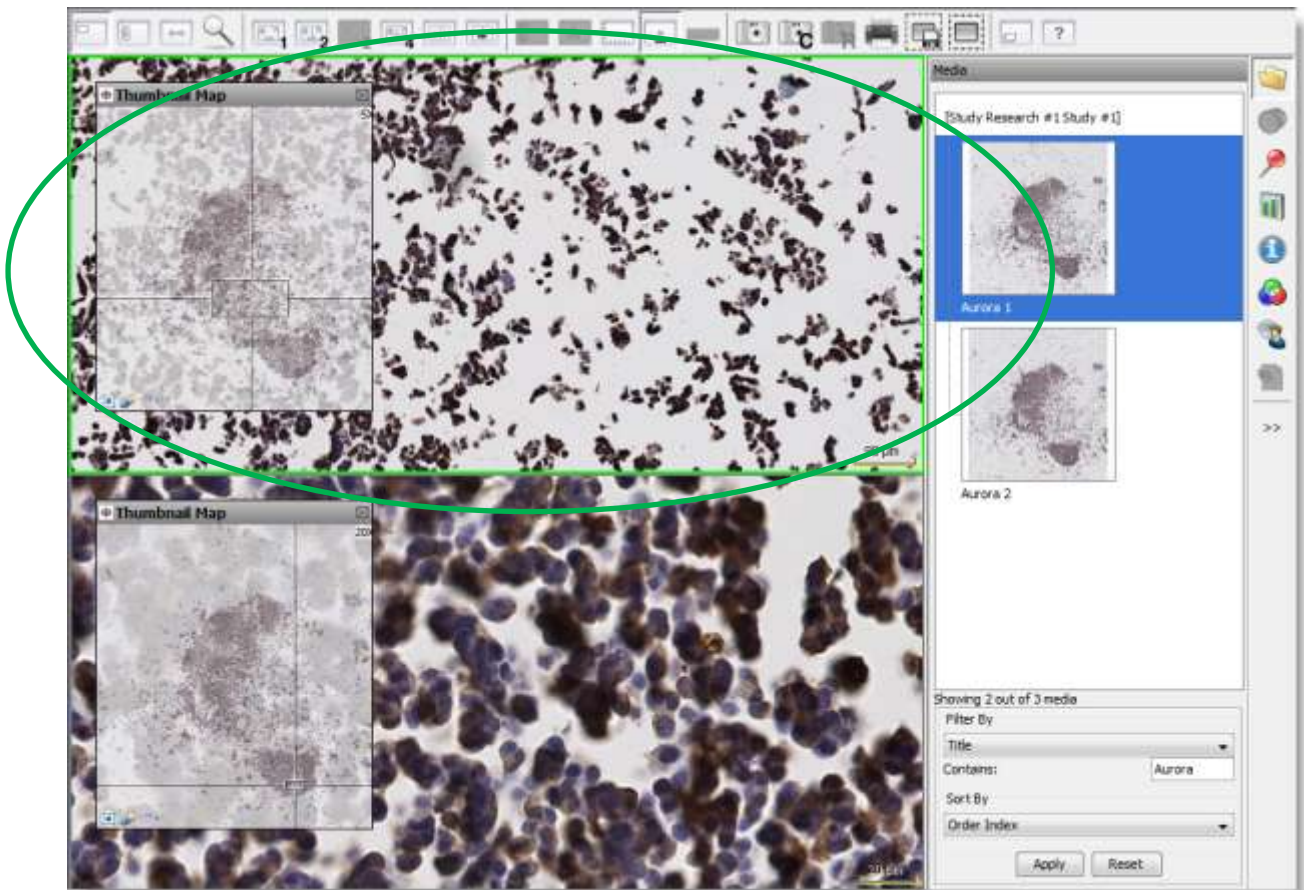
#### Horizontal split

Images are displayed side-by-side or overlaid. Click on the icon to return to single image viewing mode.

When multi-image viewing mode is enabled, users may choose between loading the same image or loading different images.

To determine which image to view in which panel:

- a. Click on a panel (a blue frame will identify the active selection)
- b. Click on the desired media from the media tab





## 14. Synchronizing Image Navigation in Multi-image Viewing Mode

To synchronize image navigation in multiple panels, click on the “Toggle synchronized navigation” icon. Click again to interrupt synchronized navigation.



## 15. Align Images

Clicking this icon roughly aligns all images open in split screen mode with the active image.



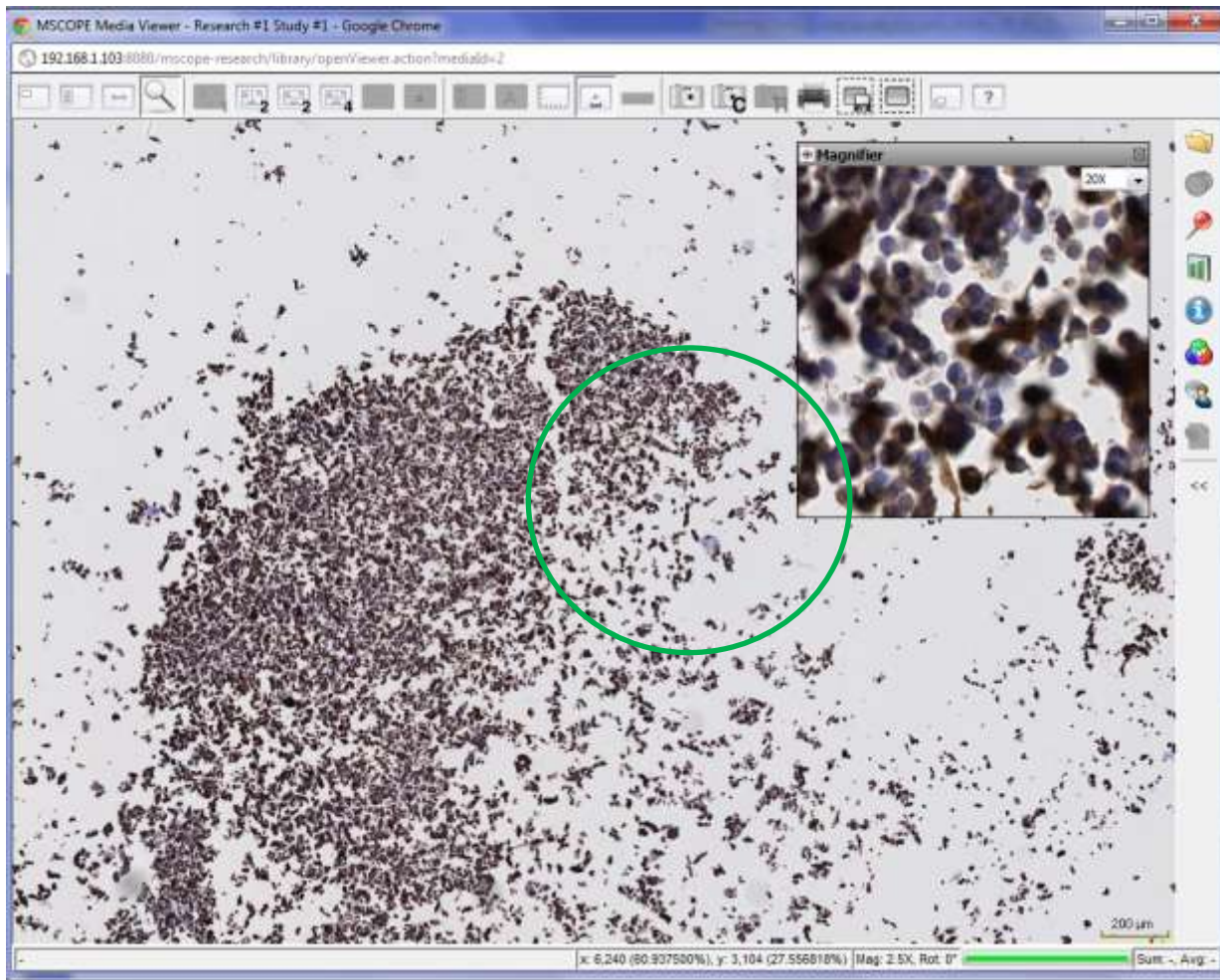
## 16. Show/Hide Scale

To hide the scale displayed at the bottom right corner of the screen, click on the “Show/Hide scale” icon. Click again to show the scale.



## 17. Magnifier

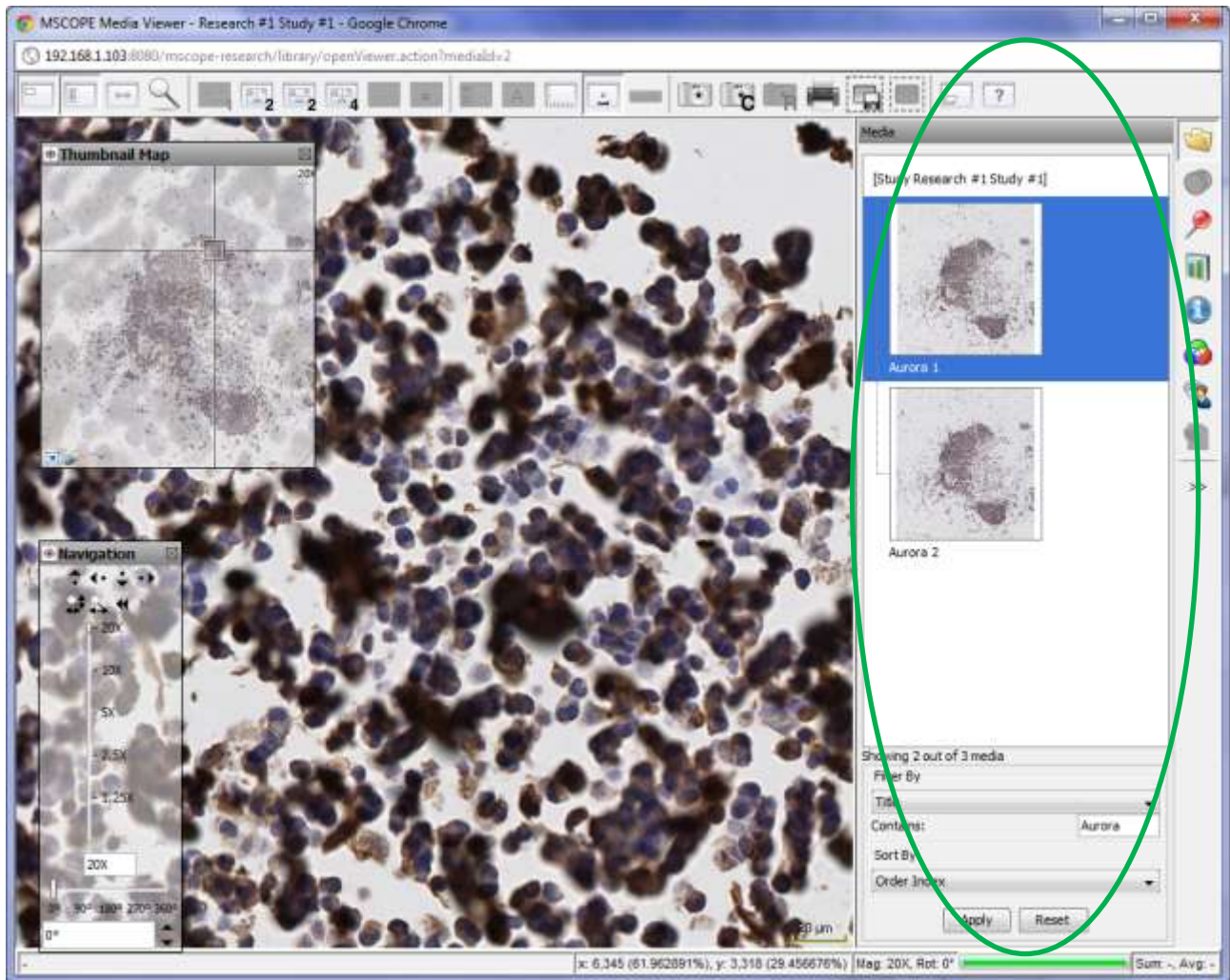
Click on the magnifier icon to display the magnifier window at the bottom right of your screen. This windows shows a magnified version of whatever falls under your mouse cursor. The desired magnification level can be selected from the menu.





## 18. Media

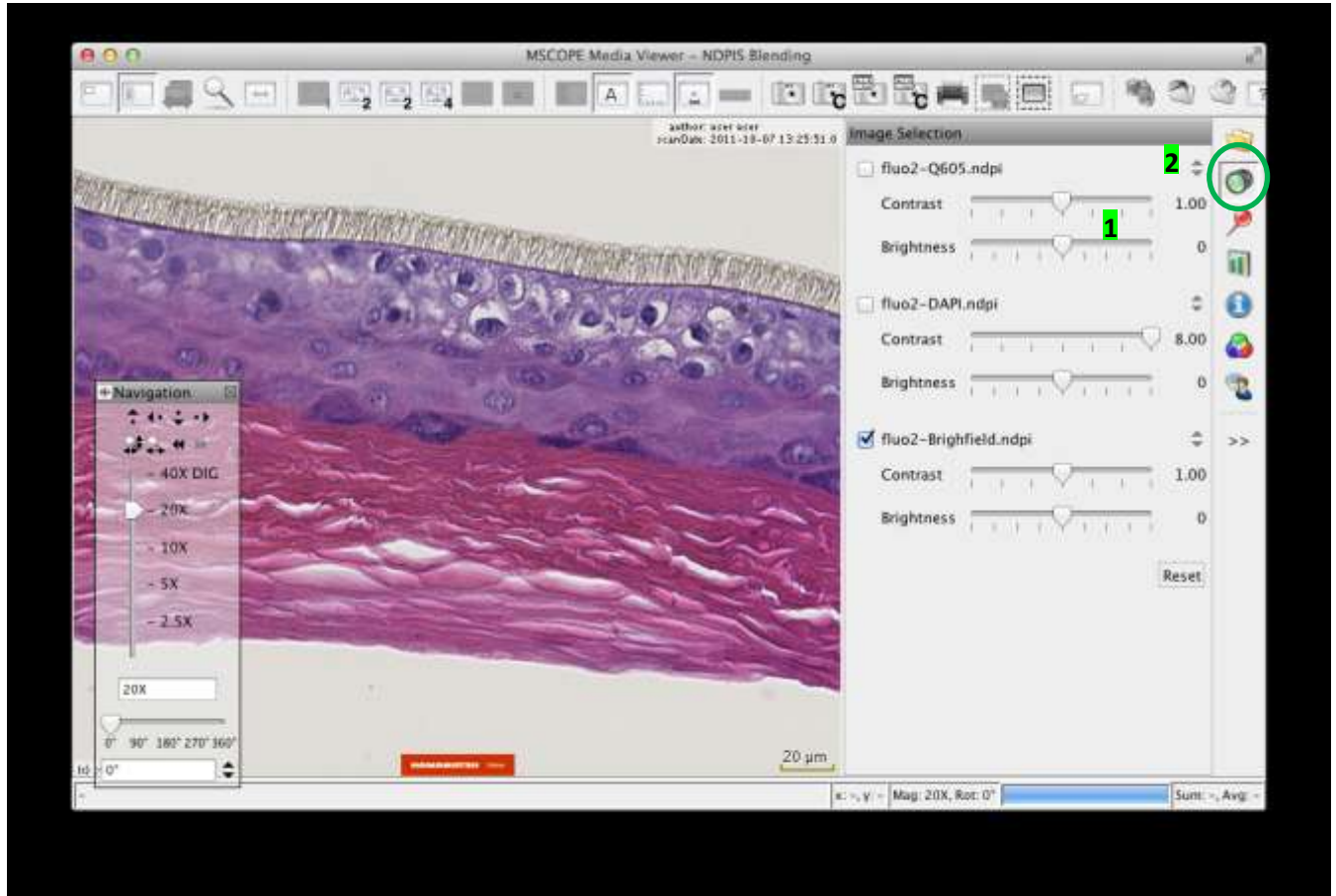
Thumbnails of all media attached to a case are available in the media tab. Users may quickly switch between them by clicking on the appropriate thumbnail without the need to close the browser or navigate back to the portal.

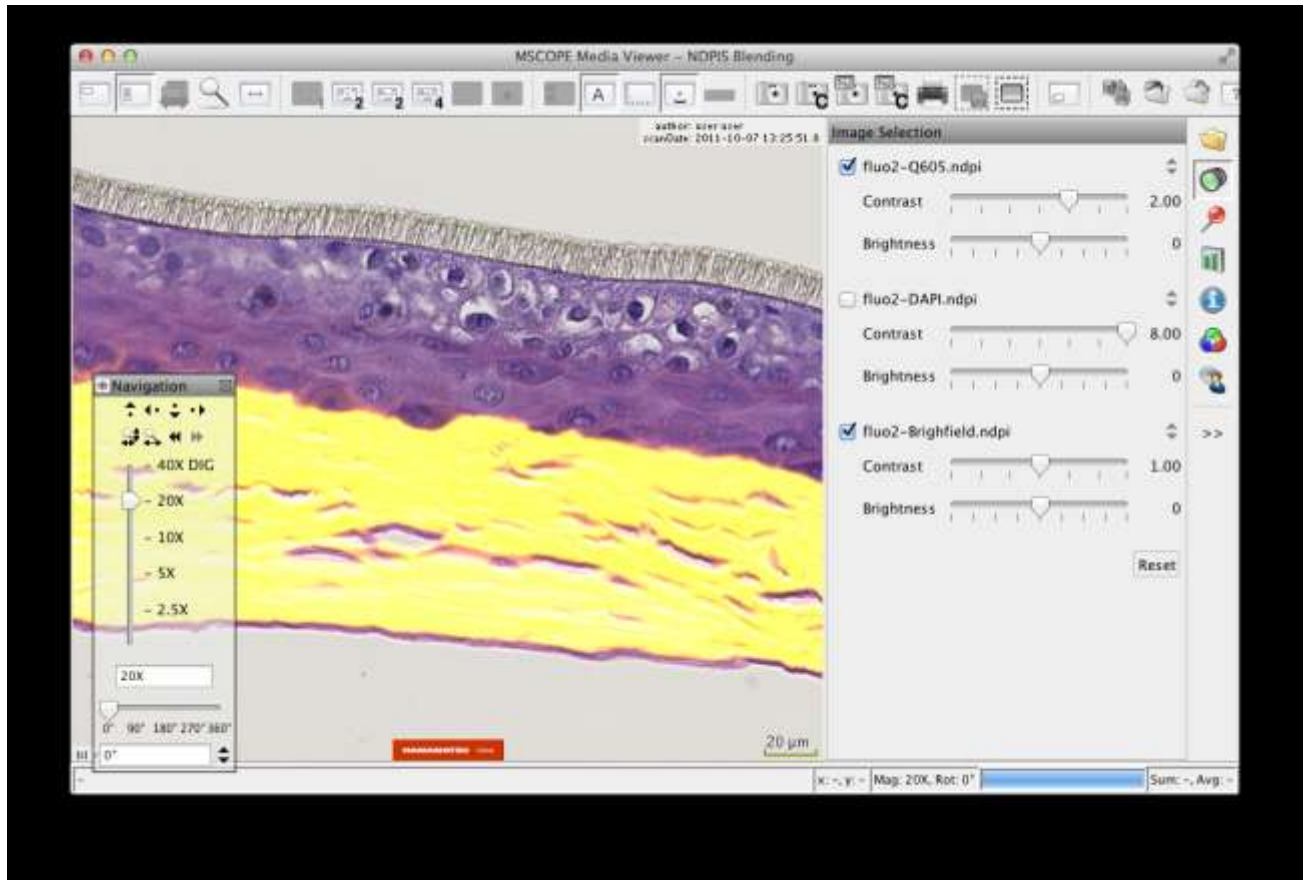


## 20. Multi-channel Image Formats

mScope supports the viewing of multi-channel image formats such as Hamamatsu NDPIS, Leica SCNv2, etc.

When viewing such an image, use the appropriate tab to toggle and adjust the contrast & brightness (1) and order (2) of each channel to create a custom “blended” image.





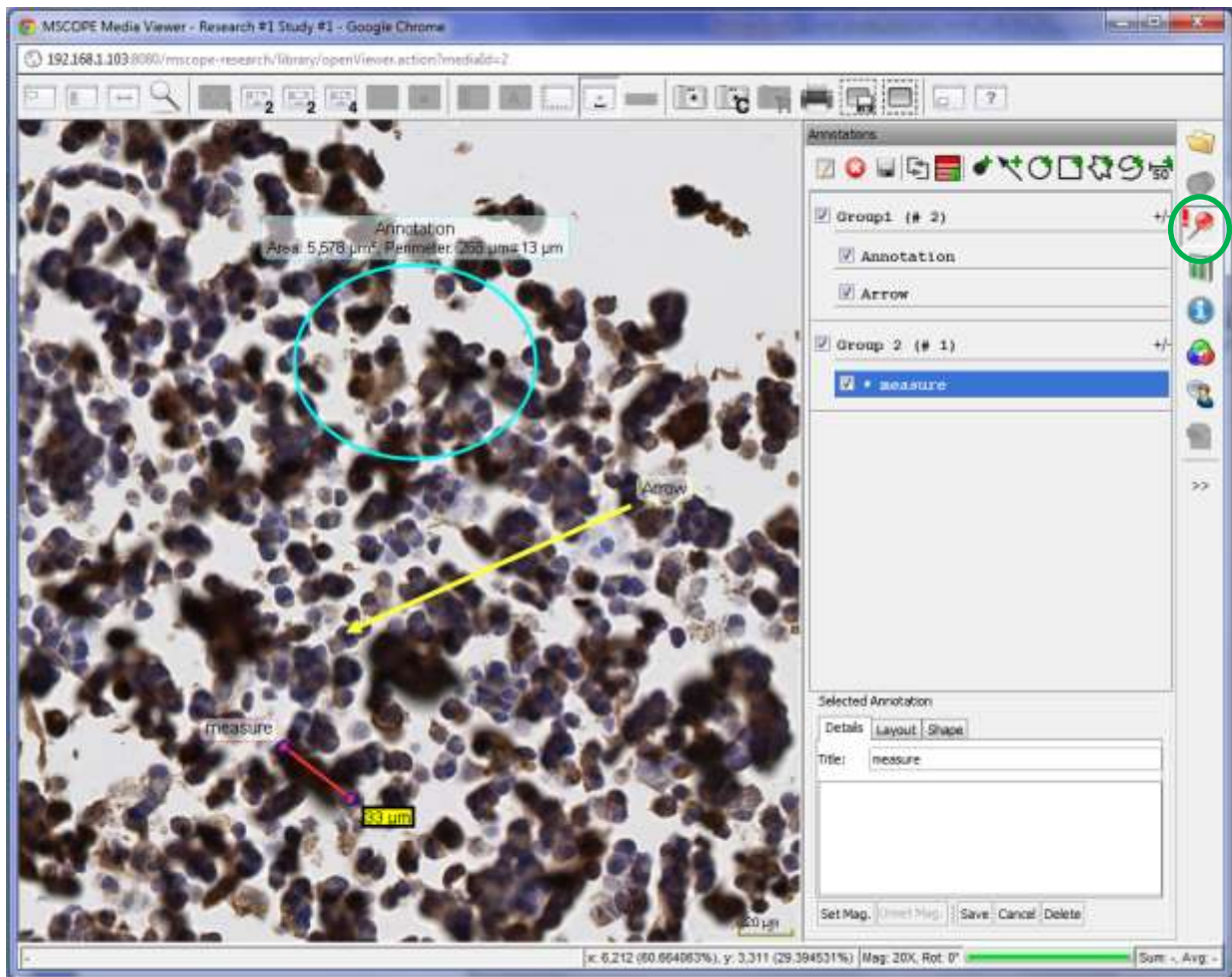


## 19. Annotations

The annotation tab holds the list of all annotations created and saved for a media and allows you to create new ones.

By clicking on the annotation name, the viewer navigates directly to the annotation's location.

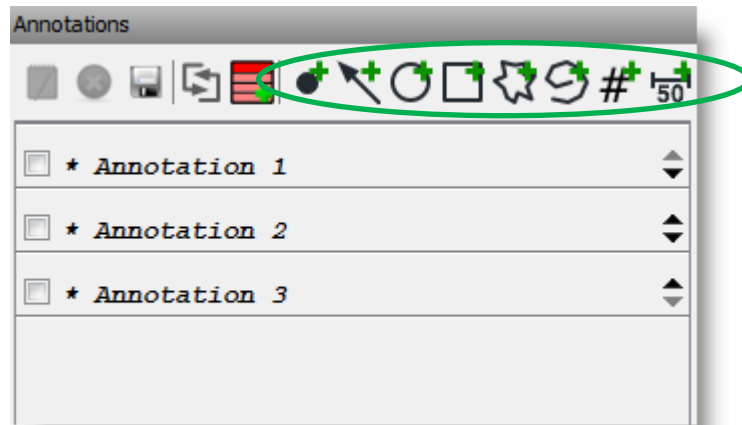
Based on permissions, users may add and/or modify annotations.



### 19.1 Create an annotation

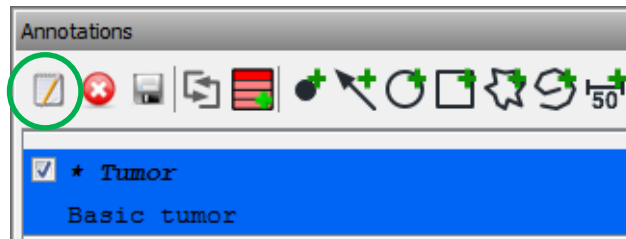
Several annotations are available:

- Dot
- Arrow
- Ellipse (circle)
- Rectangle (square)
- Open polygon
- Closed polygon (freehand)
- Counting (“#”)
- Measurement



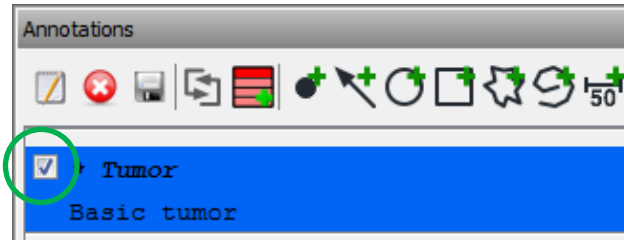
### 19.2 Modify an annotation

Click on an annotation’s title before clicking on the “edit” icon to display the annotation’s modification’s window at the bottom of the tab.



### 19.3 Show/Hide annotations

Check an annotation to show/hide it. When showing multiple or groups of annotations, the viewer will automatically choose a resolution allowing the display of all annotations.

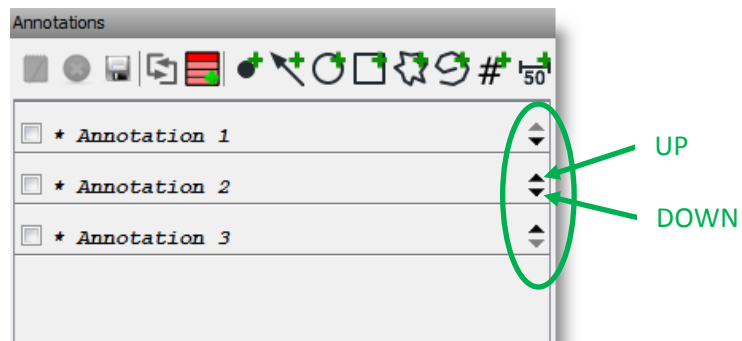


Note : You can set a user preference to show or hide existing annotations when you create a new one.

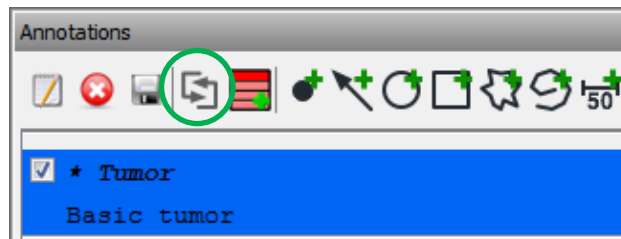
### 19.4 Order annotations

There are two ways to order annotations:

- Clicking the up and down arrows displayed for each annotations



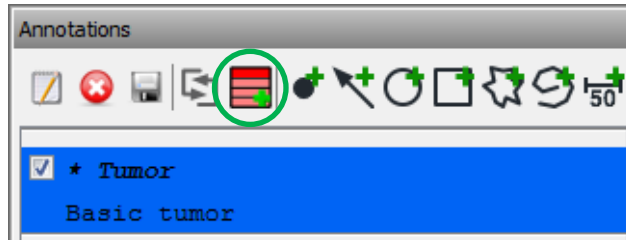
- Click on the “double-arrow” icon to order annotations by dragging and dropping them. Don’t forget to turn off this functionality before creating new annotations.





## 19.5 Create groups of annotations

Click on the “Add a new group” icon to organize annotations in groups.



## 19.6 Annotation Properties

Selected Annotation

Details Layout Shape

Title: New Annotation **1**

Description **2**

Set Mag. Unset Mag. Save Cancel Delete

Selected Annotation

Details Layout Shape

Text Position: North **3**

Text Color: **4**

Font: SansSerif **5**

Style:  Bold **6**  *Italic*

Size: Normal (15) **7**

Set Mag. Unset Mag. Save Cancel Delete

Selected Annotation

Details Layout Shape **8**

Line Color: **8**

Filter Color: **9** Reset

Filter Opacity: **10**

Fill Color: **11** Reset

Fill Opacity: **12**

Set Mag. **13** Unset Mag. Save Cancel Delete

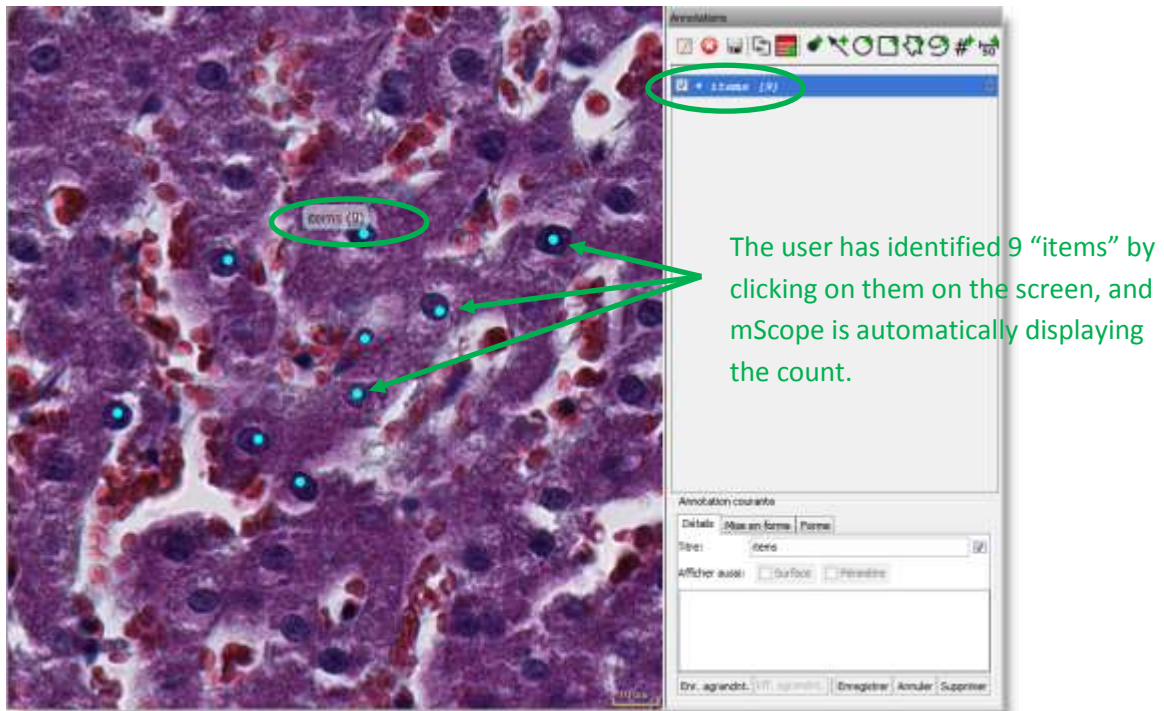
1. **Title:** the text that appears in the viewer to identify the annotation
2. **Description:** detailed information about the annotation that will appear when a user's cursor hovers over the annotation in the viewer
3. **Text Position:** controls the position of the Title (1)
4. **Text Color:** controls color of the Title (1)
5. **Font:** controls the font of the Title (1)
6. **Style:** controls the style of the Title (1)
7. **Size:** controls the display size of the Title (1)
8. **Line Color:** controls the line color of the arrow, circle, and square annotations
9. **Filter Color:** controls the color that is applied to everything outside the annotation
10. **Filter Opacity:** the intensity of the filter
11. **Fill Color:** controls the color that is applied to everything inside the annotation
12. **Filter Opacity:** the intensity of the
13. **Set Magnification:** click to set the default magnification level used to display the annotation.  
(Click Unset Mag. To unset the currently saved magnification)

### 19.7 Counting Annotation Properties

Use the counting annotation to have mScope help you save time counting items (e.g. cells, etc.).

Aim and tag each item with a dot while mScope does the counting for you.

The total count is display beside the name for the annotation.

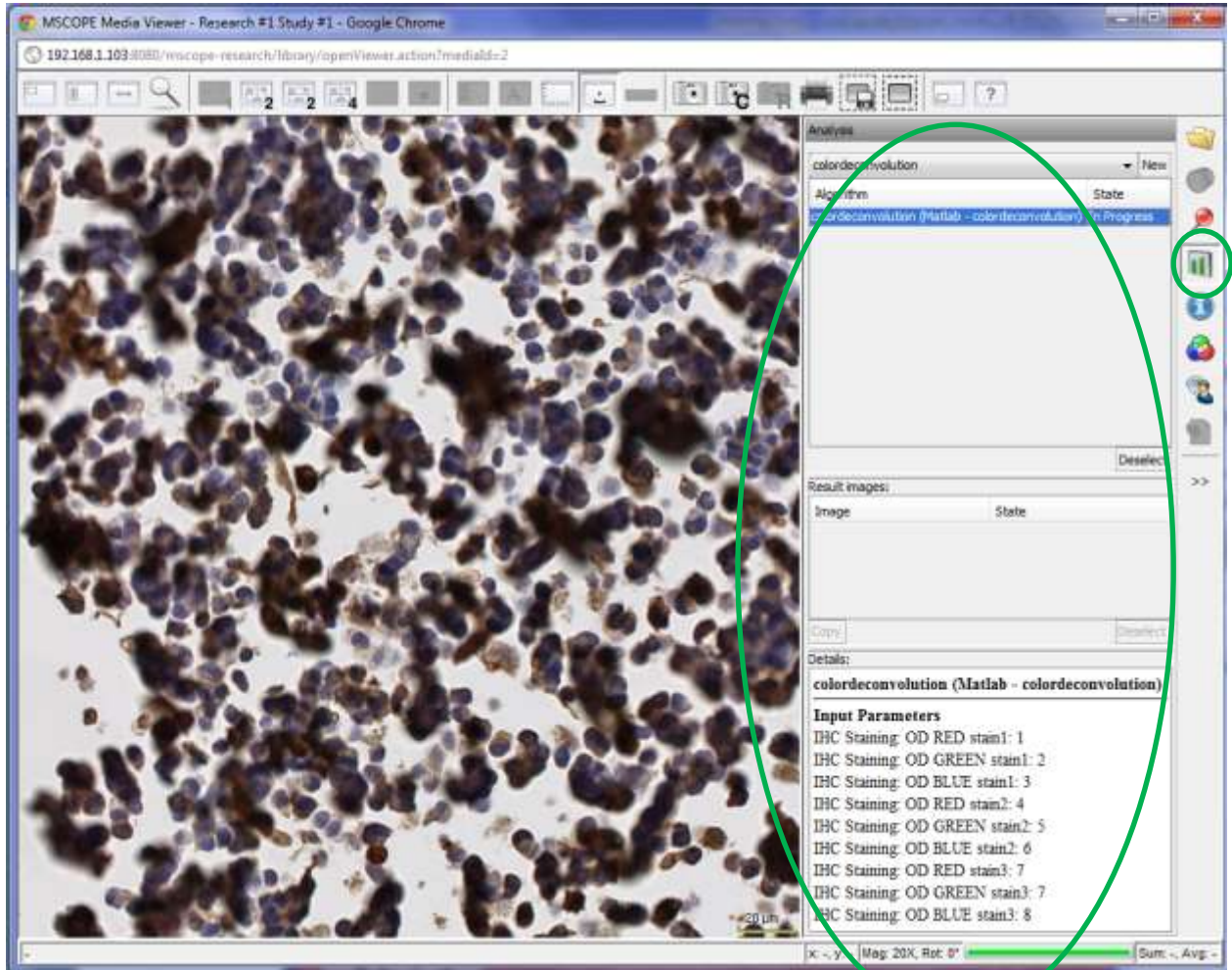


Each point can be moved (mouse drag) or removed (alt-click), when the annotation is in edit mode. To add more points, simply click on the image (when the annotation is in edit mode).

## 19. Analysis

The analysis tab allows you to launch image analysis algorithms from the viewer and to display their results.

To activate this functionality, please contact the Aurora Interactive support team. Custom and 3<sup>rd</sup> party algorithms may be integrated with mScope.

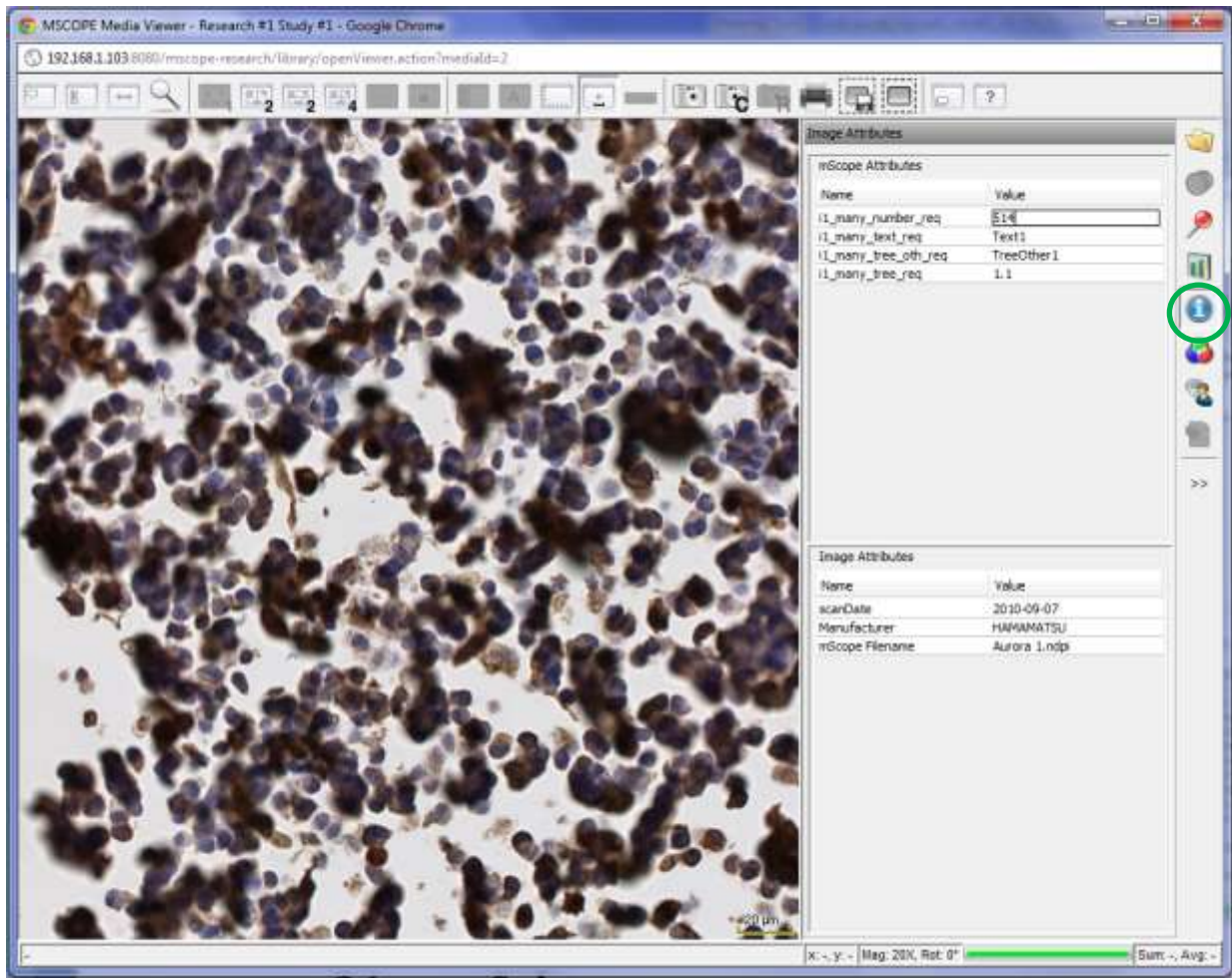




## 21. Attributes

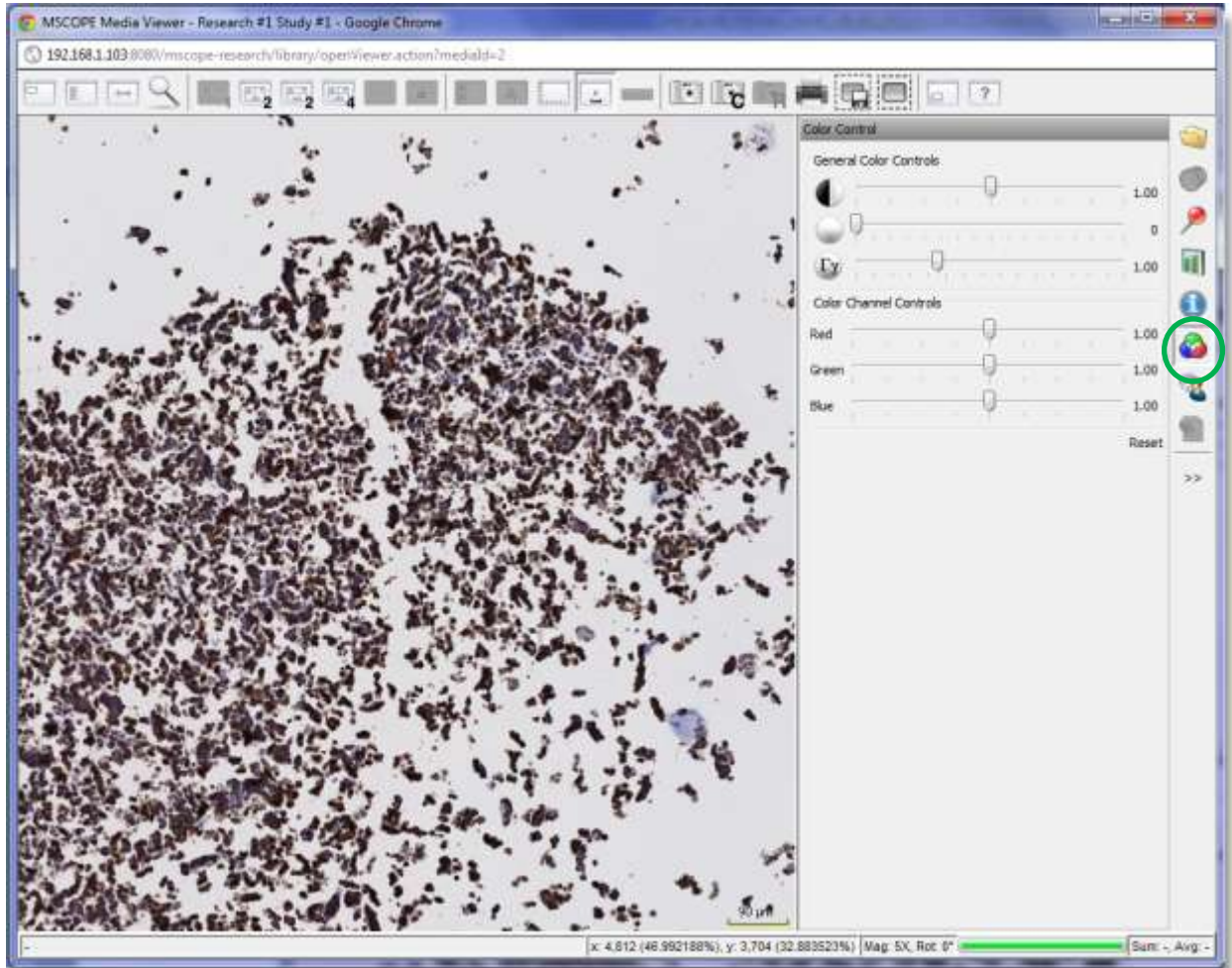
The Attributes tab provides detailed information about the media:

1. Image attributes: provided from the acquisition device
2. mScope attributes : custom attributes defined in the mScope portal. Their values may be edited directly in the viewer. (left mouse click to edit, hit enter key to save )



## 22. Color

The Color tab provides non-persisted adjustments for brightness, contrast and gamma as well Red, Green, and Blue.



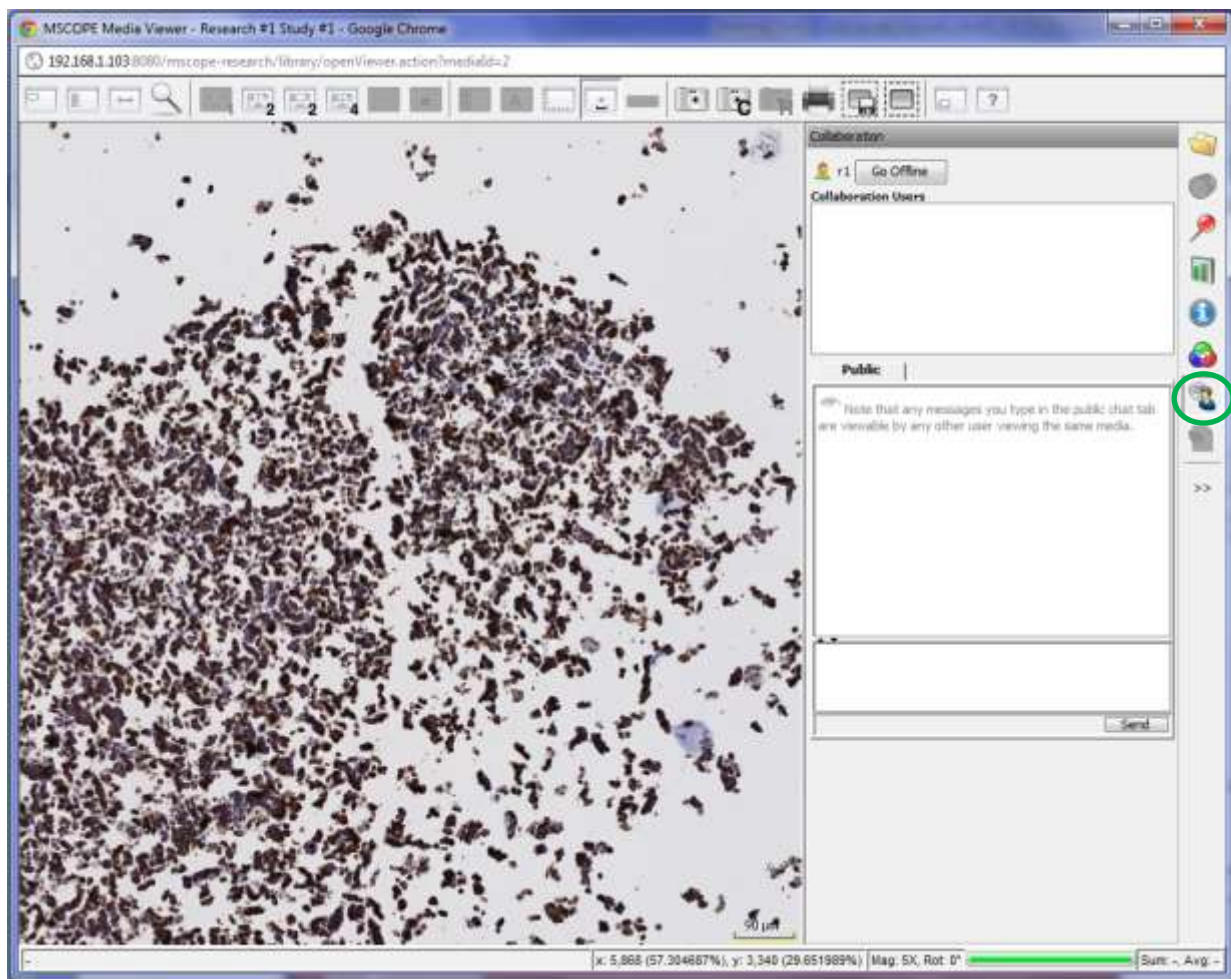


## 23. Collaboration

Collaboration enables multiple remote users to synchronize the viewing of an image.

A collaboration session is led by a host. All actions taken by the host such as navigating the image and adding annotations are visible to the participants in real time. Participants may be located anywhere provided they have web access.

By selecting the collaboration tab near the bottom of the right module toolbar you will see a list of users currently viewing the same image.



**NOTE:** An image may reside in multiple locations. For example, if two users have included the same image in different cases they will not see each other when looking at them in the two different contexts.

## 23.1 Initiating a Collaboration

To start a collaboration open the collaboration tab (explained above) and invite the users you want to join by double clicking on their names.

You will be asked to name the session and to select a flexible or fixed hosting style. If the flexible hosting style is selected users will have the option to assume control of the session as opposed to fixed which locks the initiator as the host.



## 23.2 Accept a collaboration invitation

The Collaboration tab of the guest's viewer will change color indicating the request. Opening the tab they will see the invitation in the list. To join the collaboration they simply double click on the invitation.



## 23.3 Passing Control and Exiting

Once the session has begun, it is possible for users to assume control of the presentation in order to become the host.

This is done by selecting the button "Take Control". Leaving the collaboration is done by selecting the "Disconnect" button or closing the viewer.

mScope provides a chat window so you can communicate with other collaborators if you do not have a phone or VOIP connection.





## 24. Saved Viewer States

“Viewer State” functionality is built around four actions :

1. Save current viewer state to server
2. Load current viewer state from a file
3. Save current viewer state to a local file
4. Load viewer state from server/portal

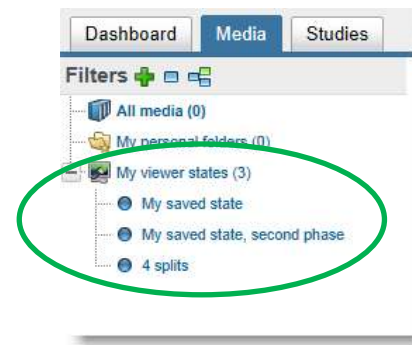
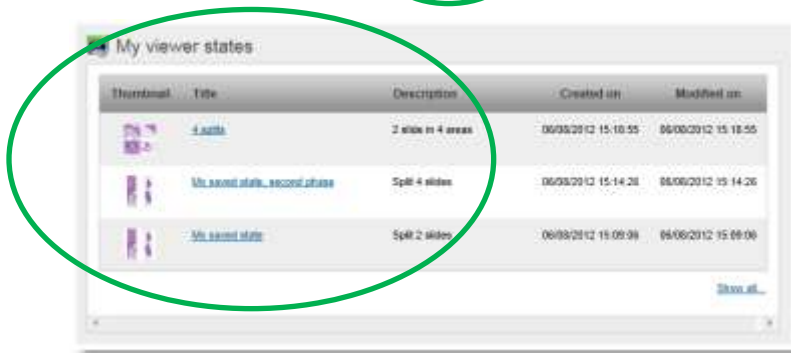


Action 1 to 3 available in the viewer



To load the viewer state from the server/portal go:

- to your user profile
- to your dashboard (mScope Education & Research only)
- to the media library (mScope Research only)



All three links lead to the Viewer state management page:

## Viewer states

Results 1 to 3 of 3  
Results per page: 20

Thumbnail	Title	Description	Created on	Modified on	Actions
	<a href="#">4 slide</a>	2 slide in 4 areas	06/08/2012 15:18:55	06/08/2012 15:18:55	
	<a href="#">My saved state</a>	Split 2 slides	06/08/2012 15:09:06	06/08/2012 15:09:06	
	<a href="#">My saved state, second phase</a>	Split 4 slides	06/08/2012 15:14:26	06/08/2012 15:14:26	

In this management page, you can update the title & description of each viewer state, or delete it completely if no longer useful.

### 1. Saving to the server/portal

The screenshot displays the mScope viewer interface. A central histology slide is shown with a 'Thumbnail Map' in the top-left corner and a 'Navigation' panel in the bottom-left. A 'Viewer State Information' dialog box is open in the center, highlighted with a green circle. The dialog box contains the following text:

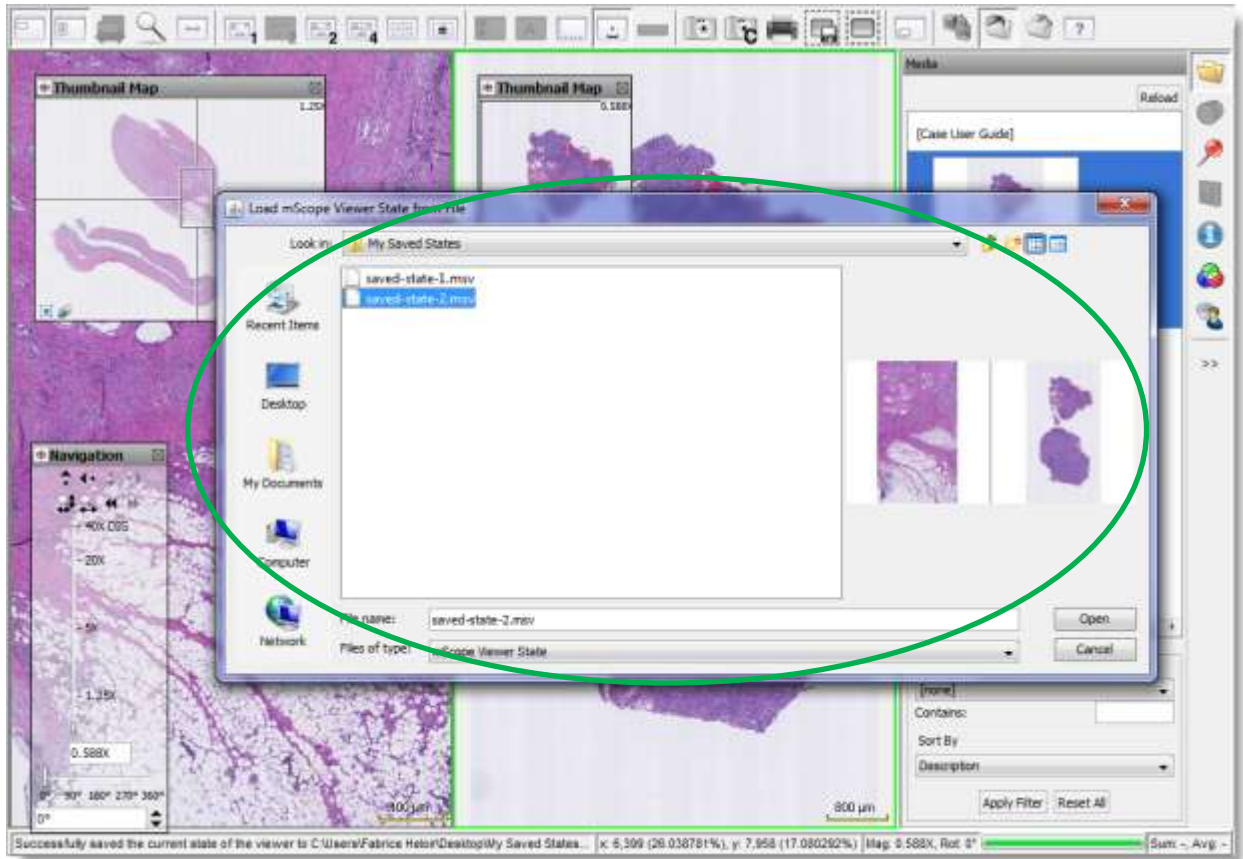
Title: My saved state  
Description: Split 2 slides

Buttons: Save, Cancel

To the right of the main viewer is a 'Media' panel showing a list of saved states. The first entry is highlighted and shows a thumbnail, the title 'F8863542 - 2010-03-08 12:30:47', and a date. Below the list, there are filter and sort options.

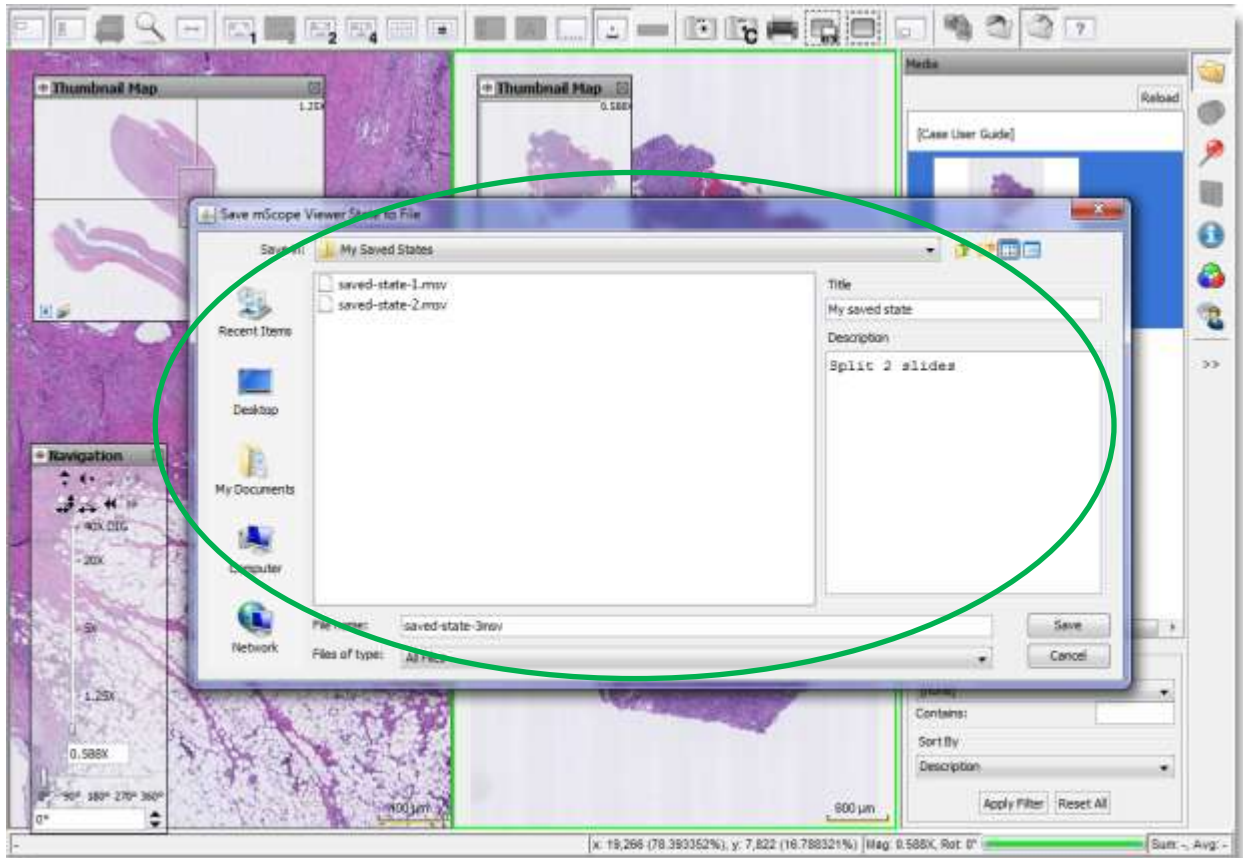
If the current state has already been saved, you will be given an option to overwrite it.

2. Load current viewer state from a file



The files with the extension .MSV are the ones you're looking for.

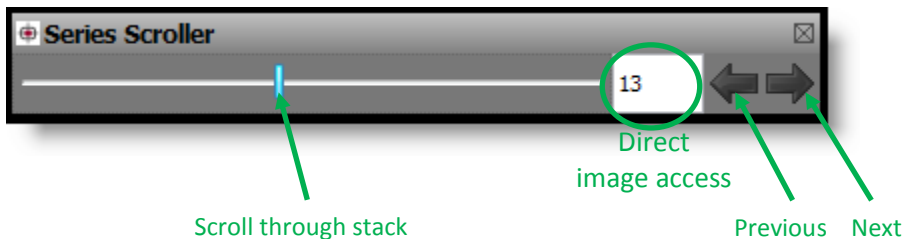
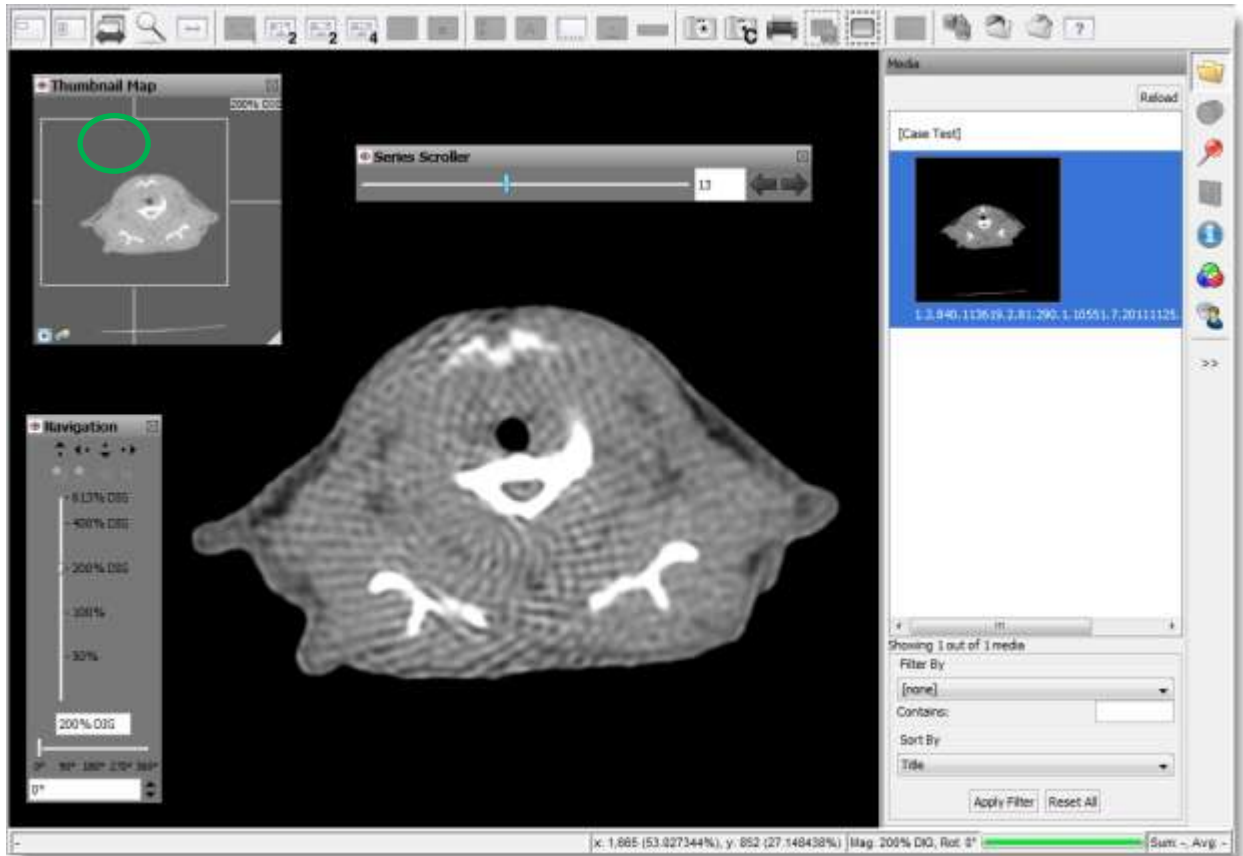
3. Save current viewer state to a file



The file will be generated with the extension .MSV.

## 25. DICOM Series Scroller

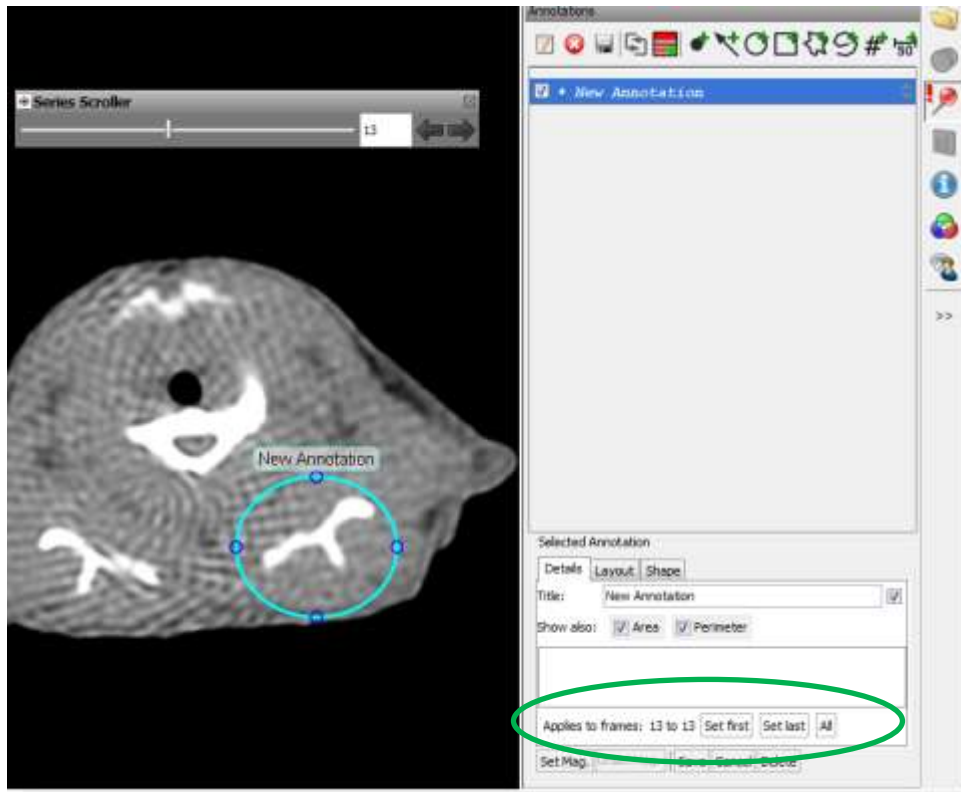
This feature allows the user to scroll through a DICOM series as one image: One DICOM series composed of many images is displayed as one “stack”.





## DICOM Series Annotations

When you create an annotation on a DICOM Series, one new property applies: the applicable frame(s).



By default, the new annotation only applies to (and is displayed on) the frame on which you created it.

You can, however, set the first and last frames for an annotation:

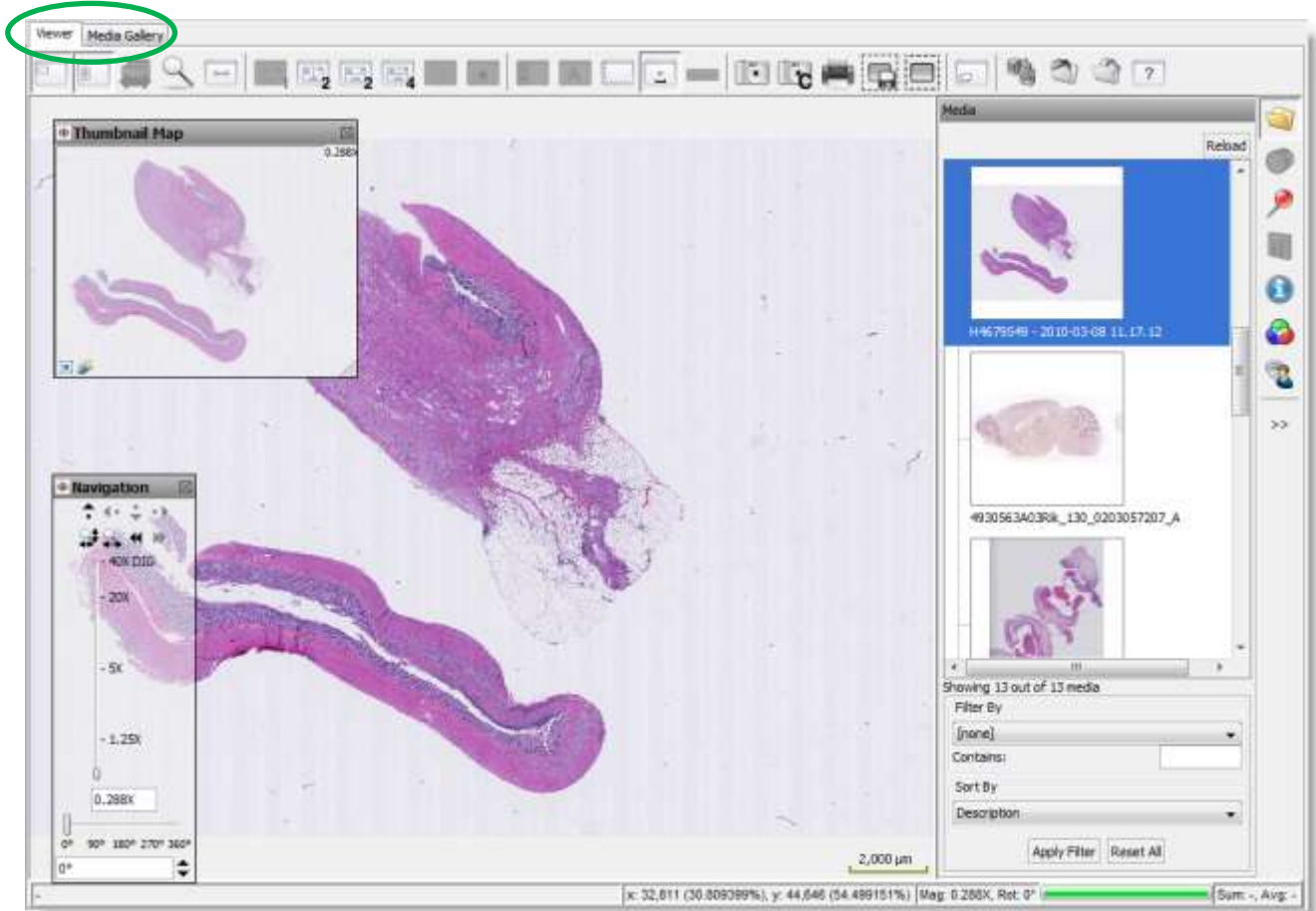
1. Edit the annotation
2. Go to the first frame of your choice and hit the button "Set First"
3. Go to the last frame of your choice and hit the button "Set last"

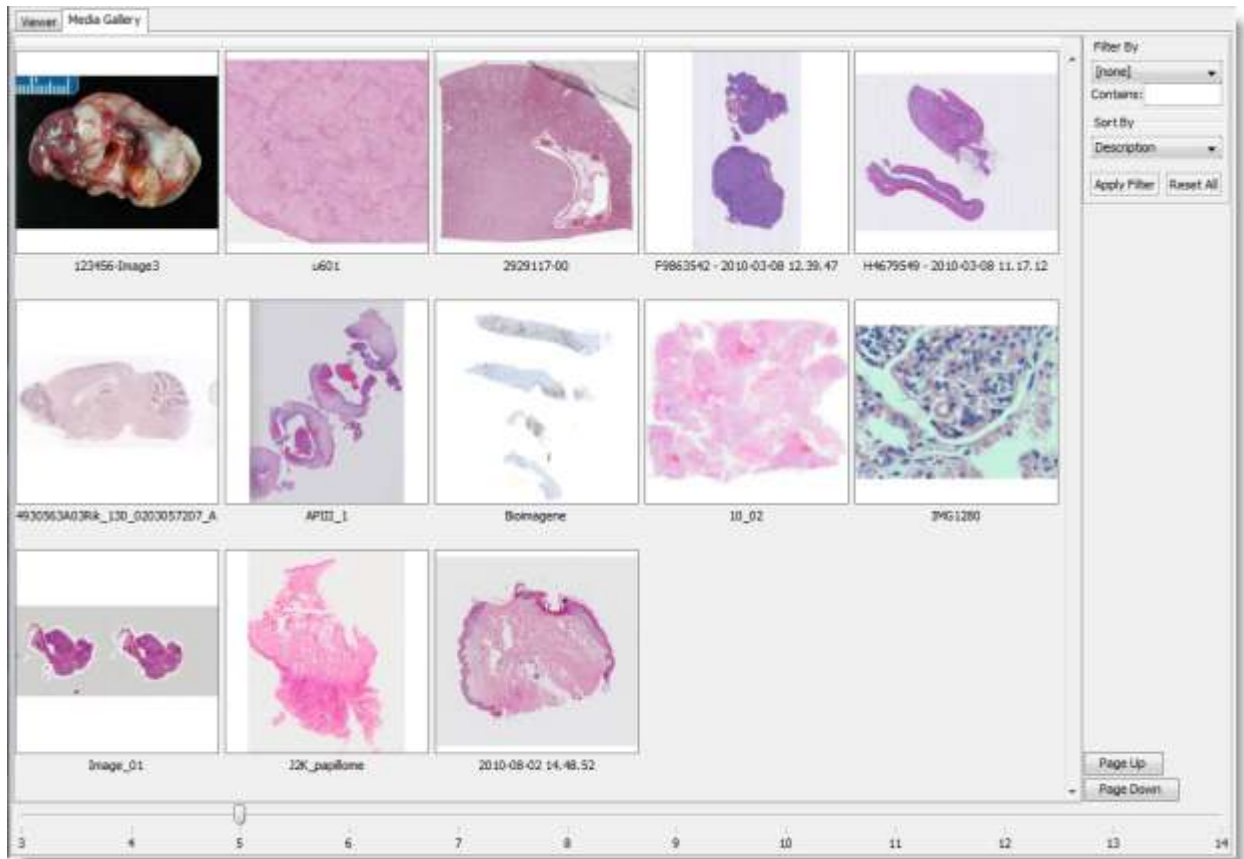
The button "All" makes the annotation visible across the whole stack of frames in one click.

## 26. Gallery View

The Media Gallery provides a new way to display the media list in the mScope viewer.

When you open the viewer, click on the tab “Media Gallery”.





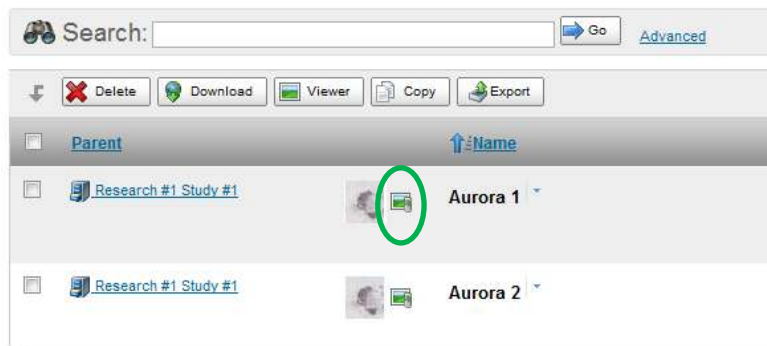
The gallery view allows you to see many images in one screen simultaneously. You can choose the number of images per row using the bottom slider; the size of the images will adjust automatically.

Double-click on an image to view it in the standard mScope viewer.

## 27. Light viewer

mScope proposes two viewing modes: either a full version or a “mobile” version, allowing, amongst others, to view an image on a mobile device, tablet or computer without the Java plug-in installed.

### Media



When viewing a mobile version, image navigation must be performed using the controls displayed in the navigation box located in the lower left corner of the screen.

