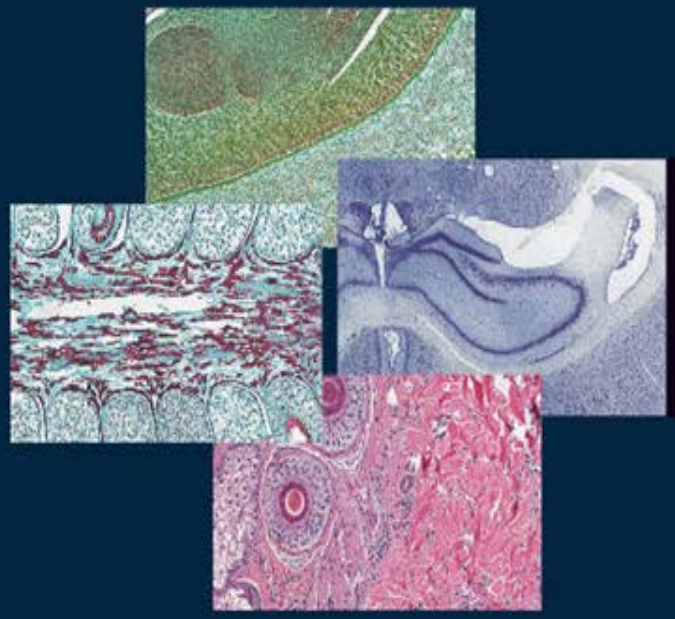


APERIO UNIVERSITY

Image Viewing

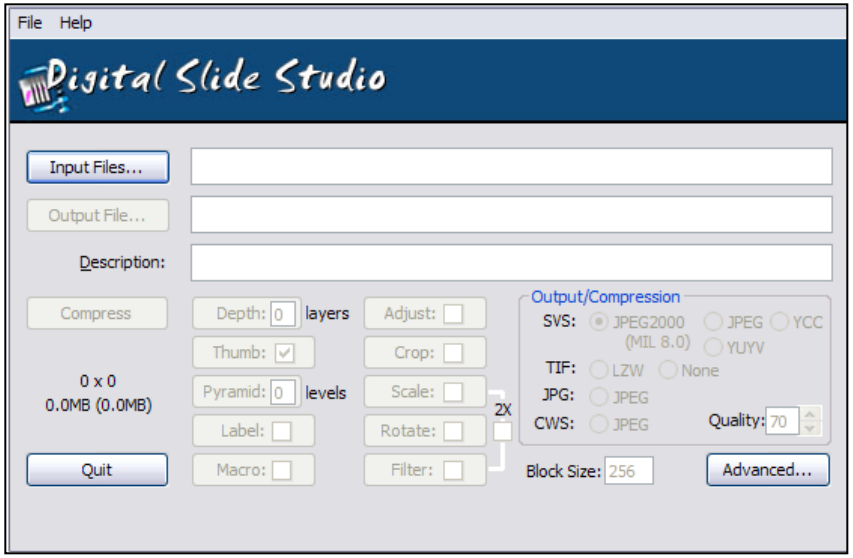
with ImageScope

ImageScope Components

Use ImageScope to View These File Types:

- **ScanScope Virtual Slides** – .SVS files created when the ScanScope scanner scans glass microscope slides.
- **JPEG** files – Both .JPG and .JP2 files.
- **TIFF** and **TIF** files.
- **CWS** files – Composite WebSlides.
- **ScanScope image set**, .sis file – The ImageScope image view is what you see when one or more digital slides are being viewed in the ImageScope window.

Digital Slide Studio can be used to convert a file to .svs



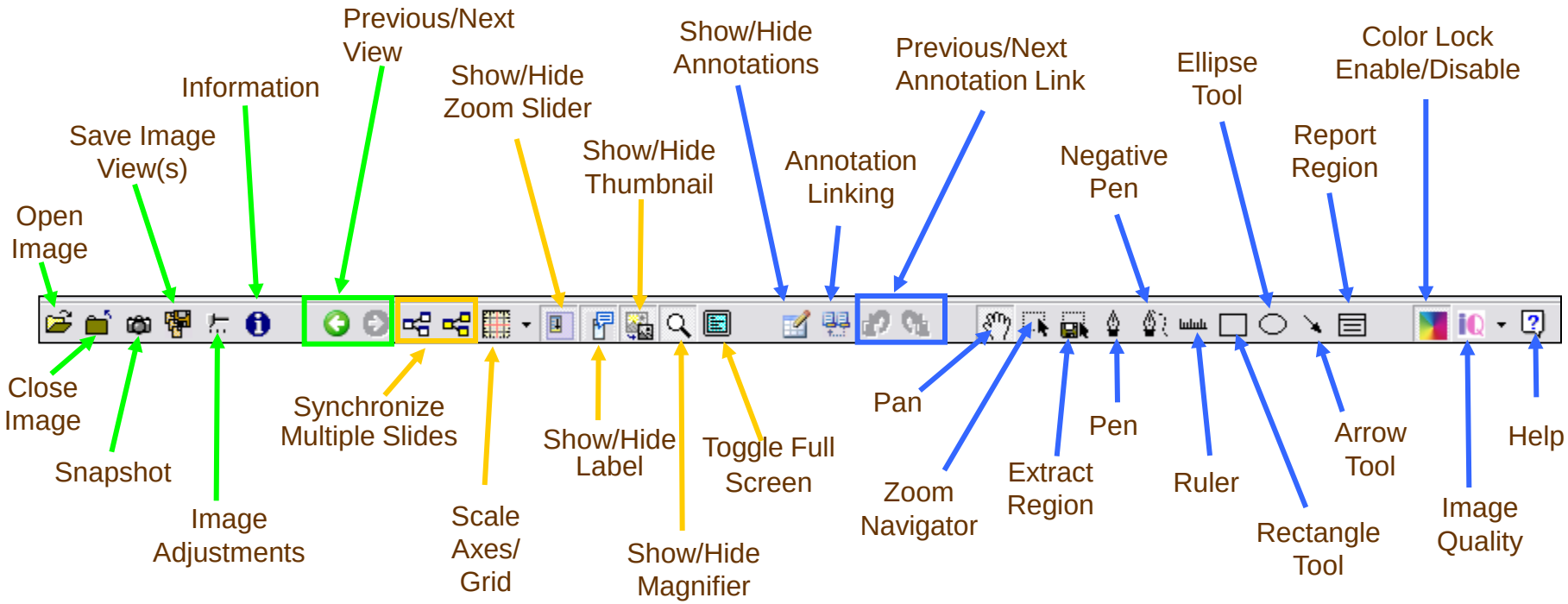
ImageScope Components

ImageScope Main Menu

- You can access various ImageScope features from the following:
  - **File:** Open/Close Images, Save Images & Snapshot and Access Remote Servers.
  - **Edit:** Copy.
  - **Image:** Adjust Image Parameters, Rotate, View Image Info, Resolution, False Color, Quality, Keep Open, Go to specific image X,Y coordinates.
  - **View:** Scale Axes/Grid, Viewing Tools (Magnifier, Thumbnail etc.) Status Bar, Annotations and Annotations Links, Analysis tool, Tracking tool, Digital Slide Conferencing and TelePath Live (remote live viewing of a slide).
  - **Tools:** Options (allows user to customize ImageScope features), Advanced (adjust Image Cache parameters), Logging (turns on/off logging of ImageScope actions).
  - **Windows:** Changes view of images to tile horizontal/vertical or cascade.
  - **Help:** ImageScope Help, Send Feedback (to Aperio), ImageScope Version Info.

ImageScope Components

ImageScope Tool Bar Summary



ImageScope Basic Features

ImageScope Tools/Menus

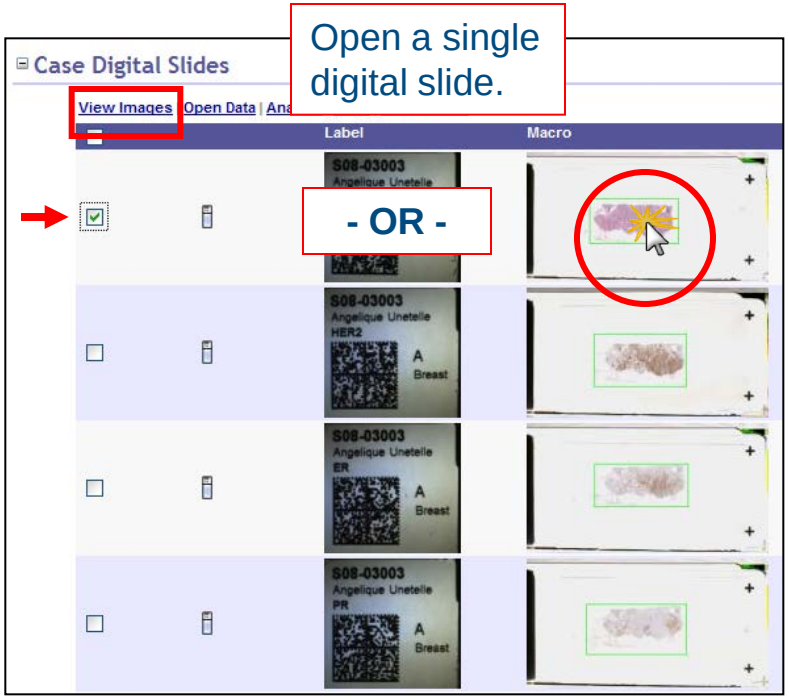
- The Slide barcode or Spectrum slide ID can be seen in the **Title Bar**.
- The **Main menu** is at the top of the window below the title bar.
- The **Main Toolbar** is below the main menu.

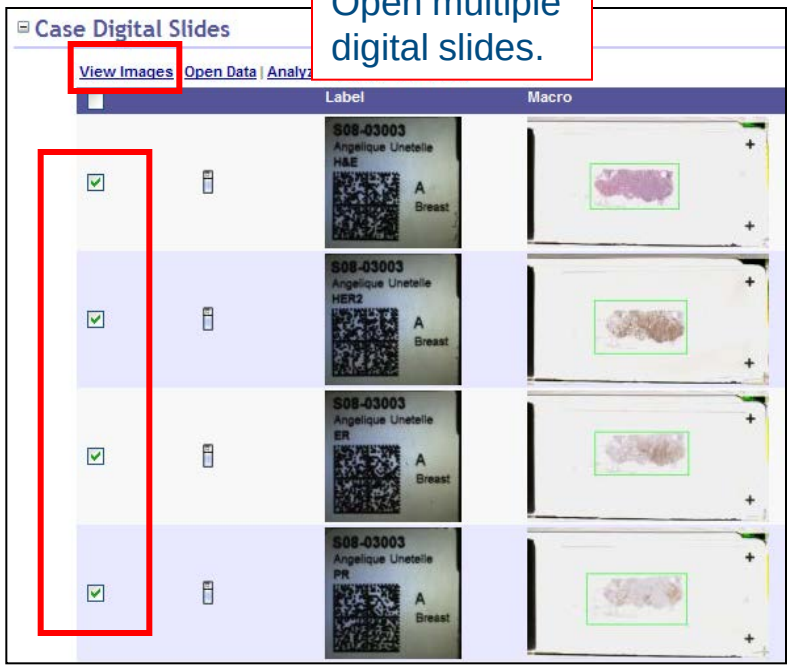
Keyboard Shortcuts

- Keyboard shortcuts can be used with ImageScope.
  - Help – F1
  - Pen drawing tool – F2
  - Negative pen drawing tool – F3
  - Ruler – F4
  - Rectangle drawing tool – F5
  - Ellipsis drawing tool – F6
  - Arrow drawing tool – F7
  - View full screen – F11
  - Open image rotation toolbar – Ctrl E
  - View/hide Analysis – Ctrl G
  - Keep Open – Ctrl K
  - View/hide Annotations – Ctrl N
  - Display IQ toolbar – Ctrl Q
  - View/hide thumbnail – Ctrl T

Open Digital Slides

- Open a single digital slide or multiple slides from the Spectrum web interface.

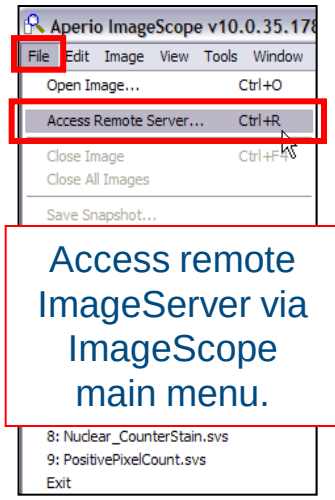




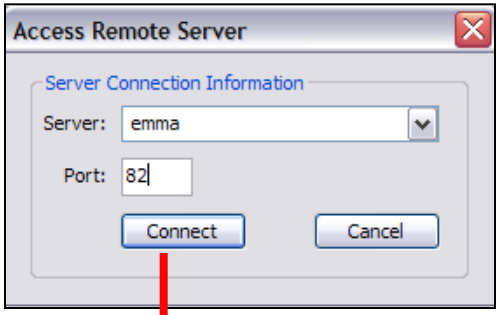
ImageScope Basic Features

Open Digital Slides.

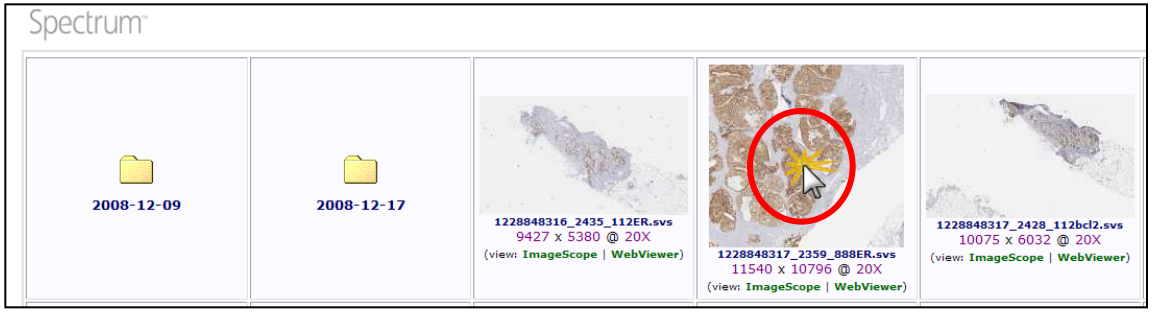
- Open a Spectrum digital slide directly in ImageScope by accessing the remote ImageServer.



Access remote ImageServer via ImageScope main menu.

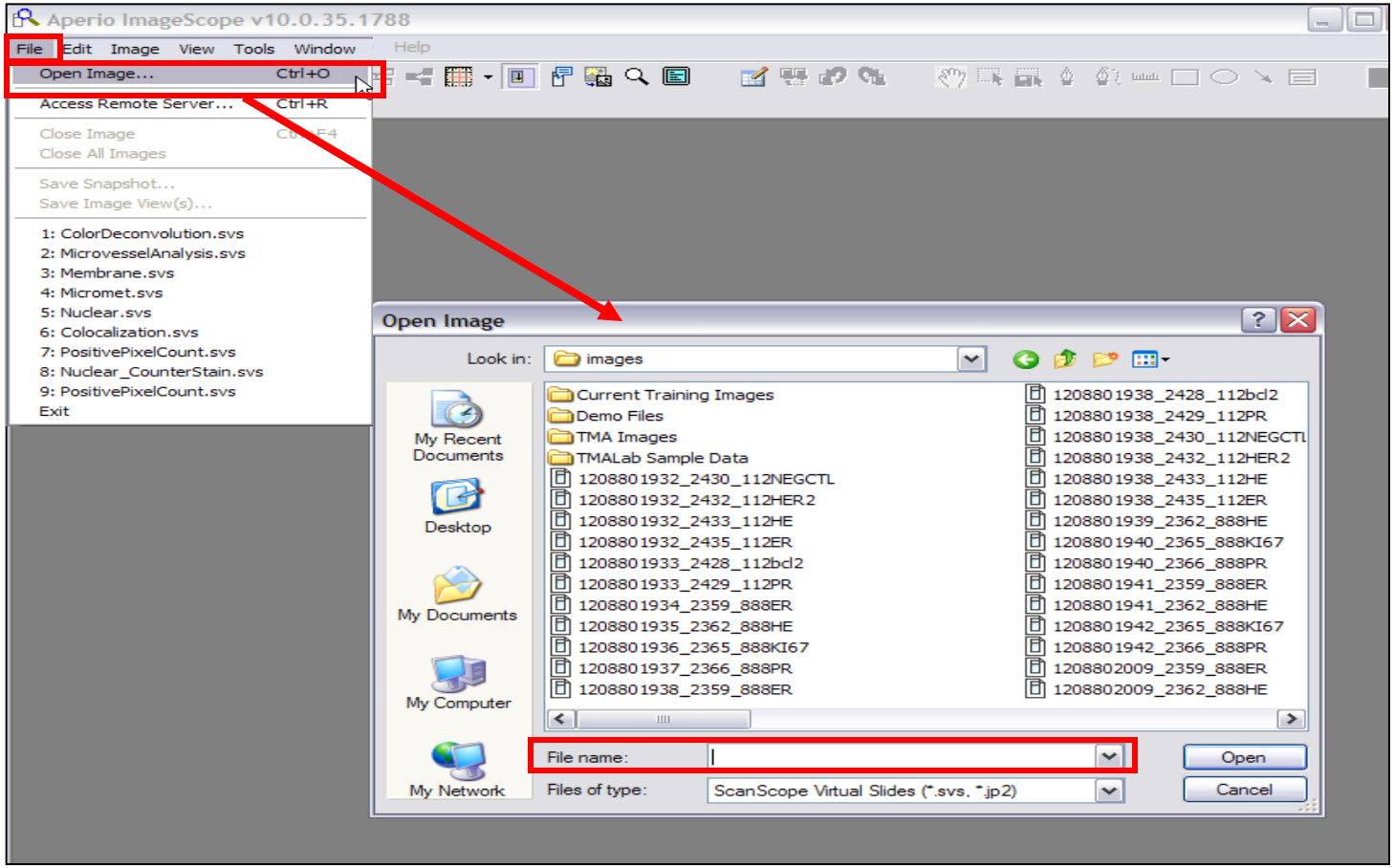


When opening an image via the remote ImageServer, you will need to log in using your Spectrum username and password to validate that you have the proper user permissions.



Open Digital Slides

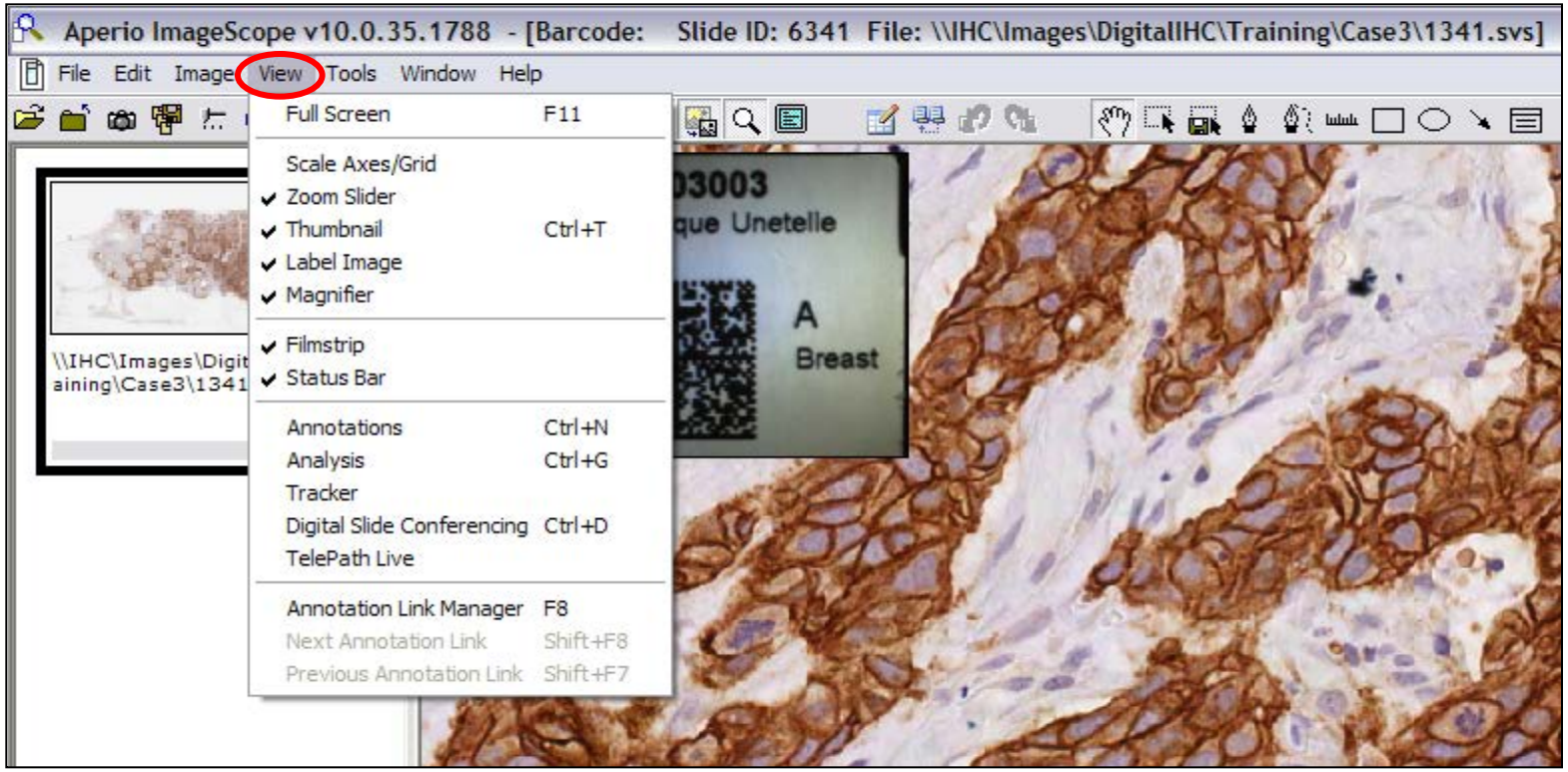
- Open local digital slides; that is, images that reside on your workstation.



ImageScope Basic Features

ImageScope Hide/View

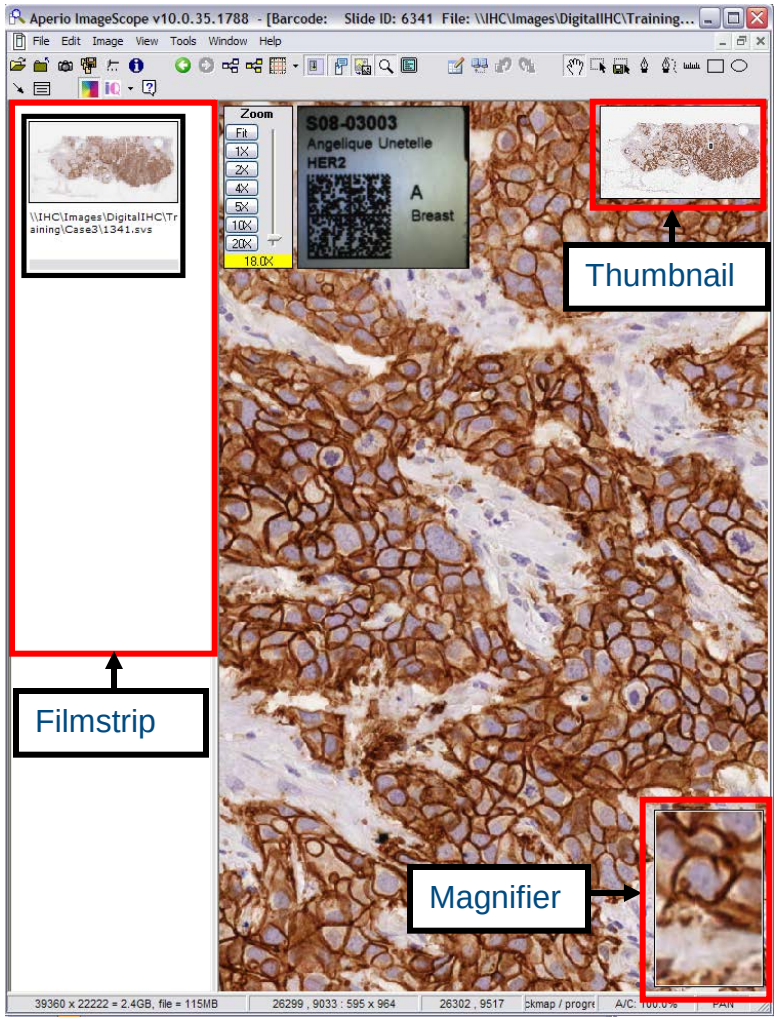
- View/hide various ImageScope features from the **View Menu.**
  - Items checked = Display
  - Unchecked = Hidden



ImageScope Basic Features

ImageScope Viewing Options

- **The thumbnail** displays where you are in the image at a higher power (represented by rectangle). Click in thumbnail to navigate anywhere in slide.
- **The filmstrip** will display multiple selected images. The current slide has a bold border.
- **Magnifier:** Left click and drag in the magnified area to move the magnifier to any location.



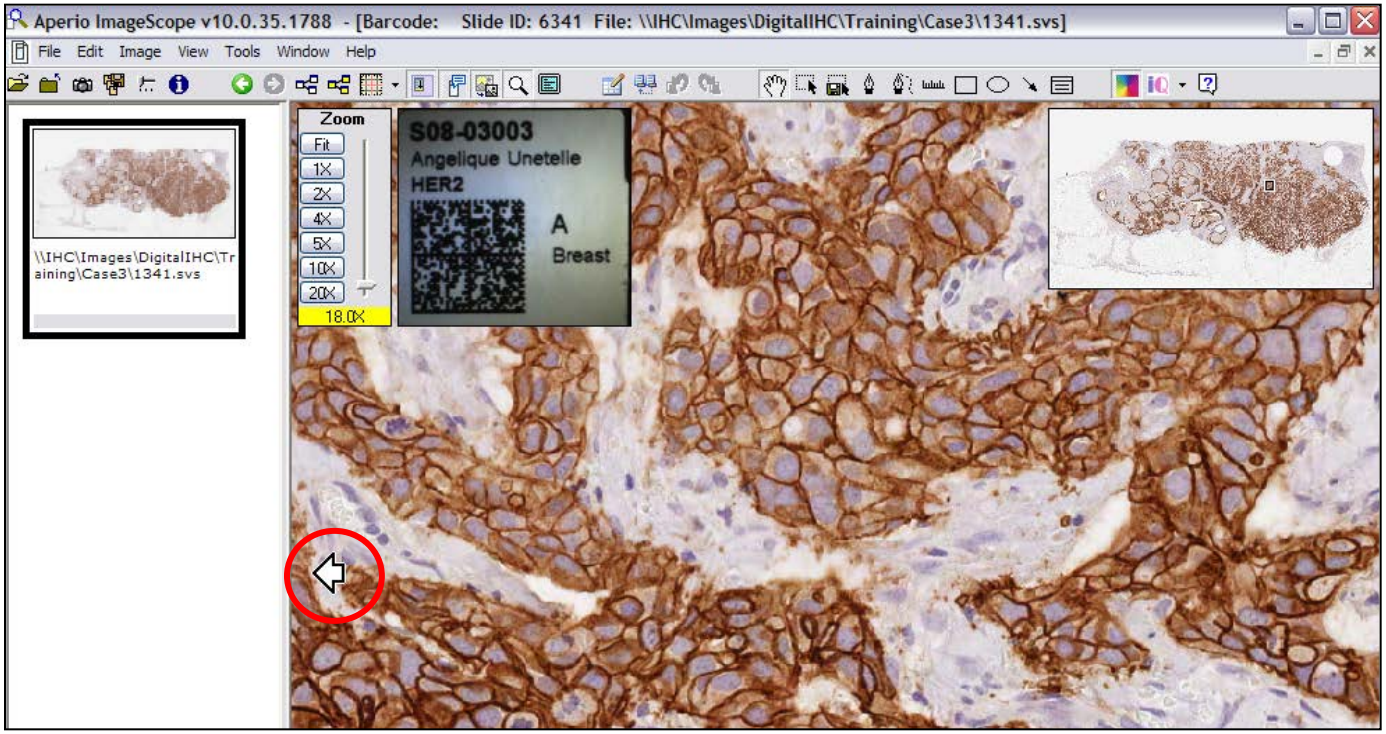
ImageScope Basic Features

ImageScope Pan

Click & Drag

- **Pan** using hand.
- **Auto Pan** using arrow (hand changes to an arrow when close to image edge).

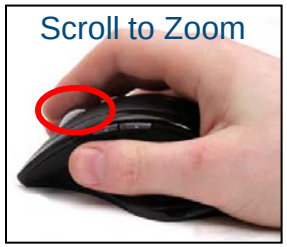
Left Click

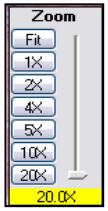


ImageScope Basic Features

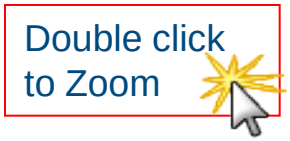
ImageScope Zoom

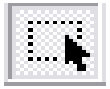
- **Mouse scroll wheel** will zoom in and out.
- **Zoom tool** changes the zoom on the image.
- **Double clicking** anywhere in the image or thumbnail takes you to the highest zoom of that area.
- **Zoom Navigation** allows user to define the zoom in window exactly.



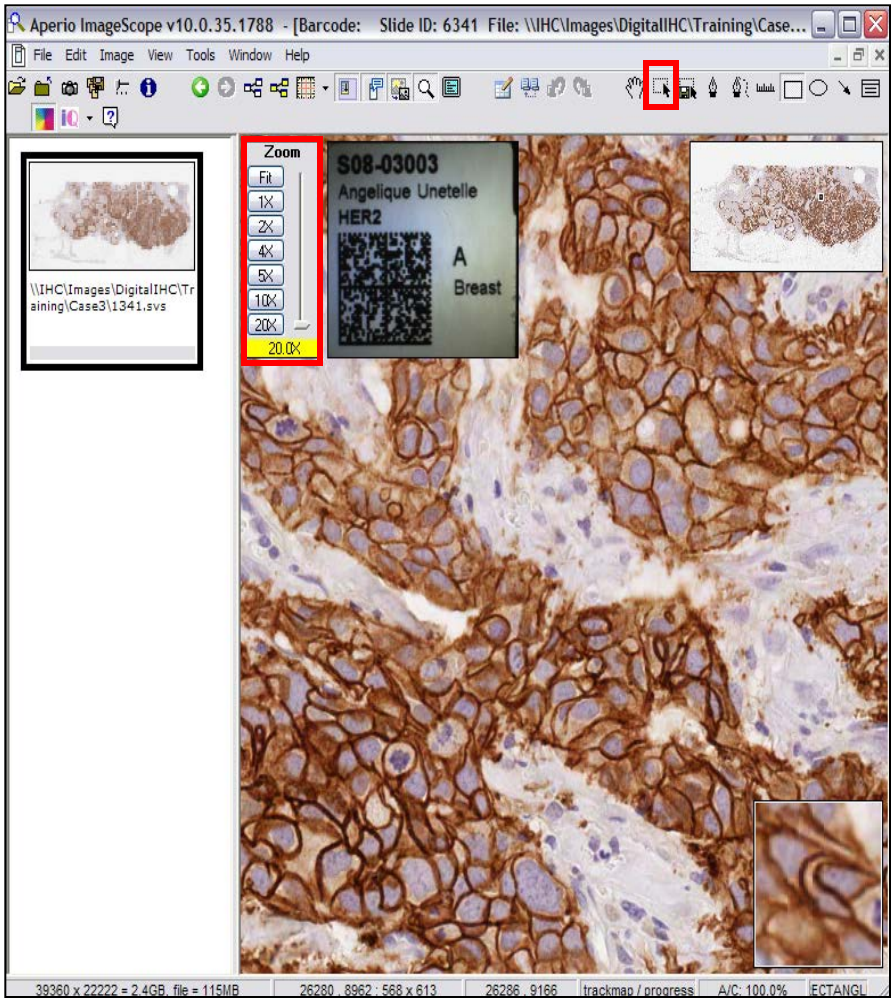


Select to Zoom





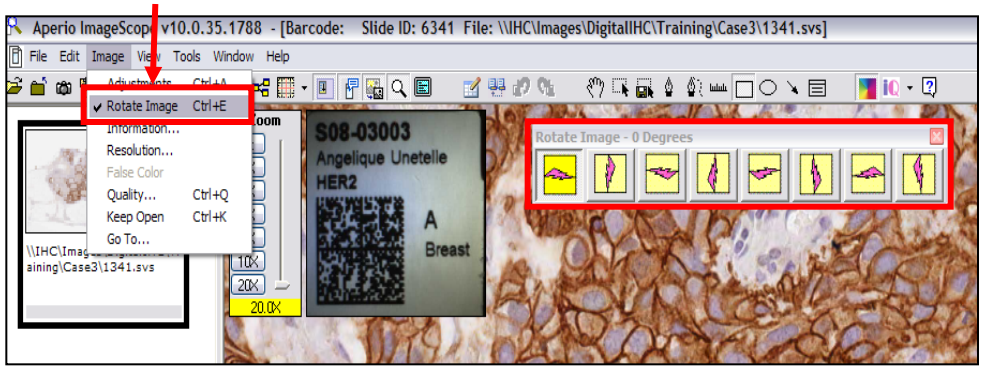
Define Zoom

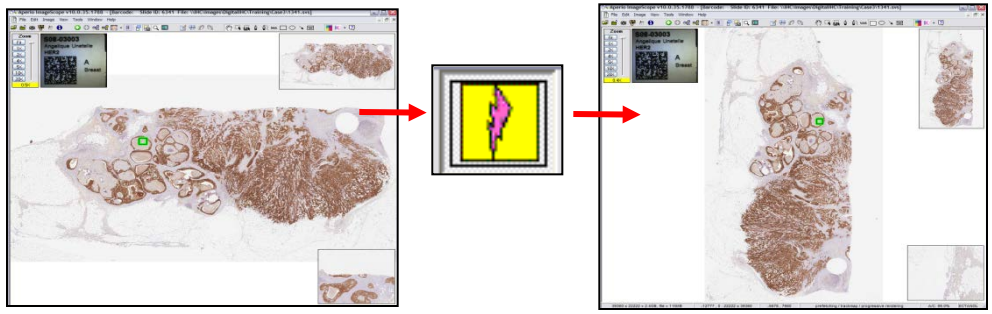


ImageScope Basic Features

ImageScope Rotation

- Rotate an image for display.
- Rotation setting is not saved with the image when the image is closed.
  - Create/save a new rotated image using the Snapshot or Extract Region tools.

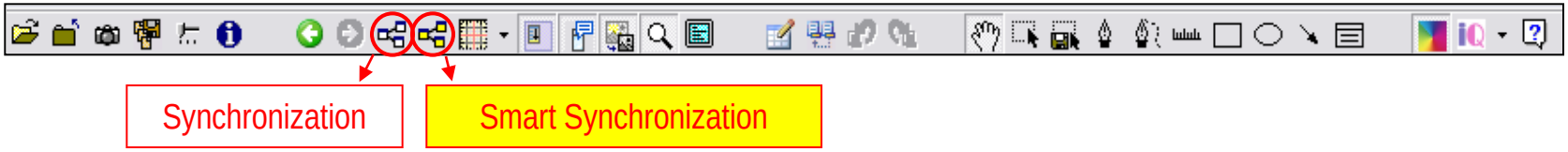




Rotate Tool	Description
	Rotate zero degrees
	Rotate 90 degrees right
	Rotate 180 degrees
	Rotate 90 degrees left
	Flip vertically
	Rotate 90 degrees right and flip vertically
	Flip horizontally
	Rotate 90 degrees left and flip vertically

ImageScope Sync Viewing

Synchronized Navigation of Multiple Digital Slides



Synchronization

- Manually align multiple slides to view common regions, then click the synchronization icon to lock them in for synchronized viewing (i.e., if you pan right in one slide, the other digital slides also pan right).

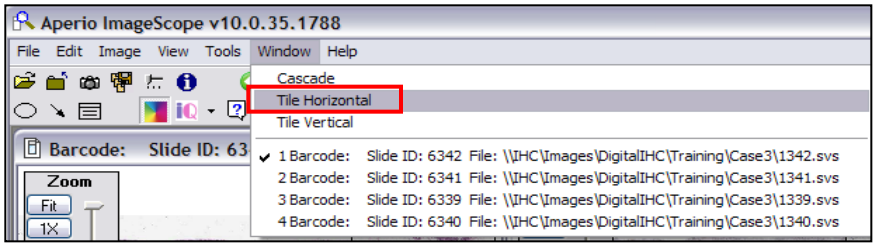
Smart Synchronization

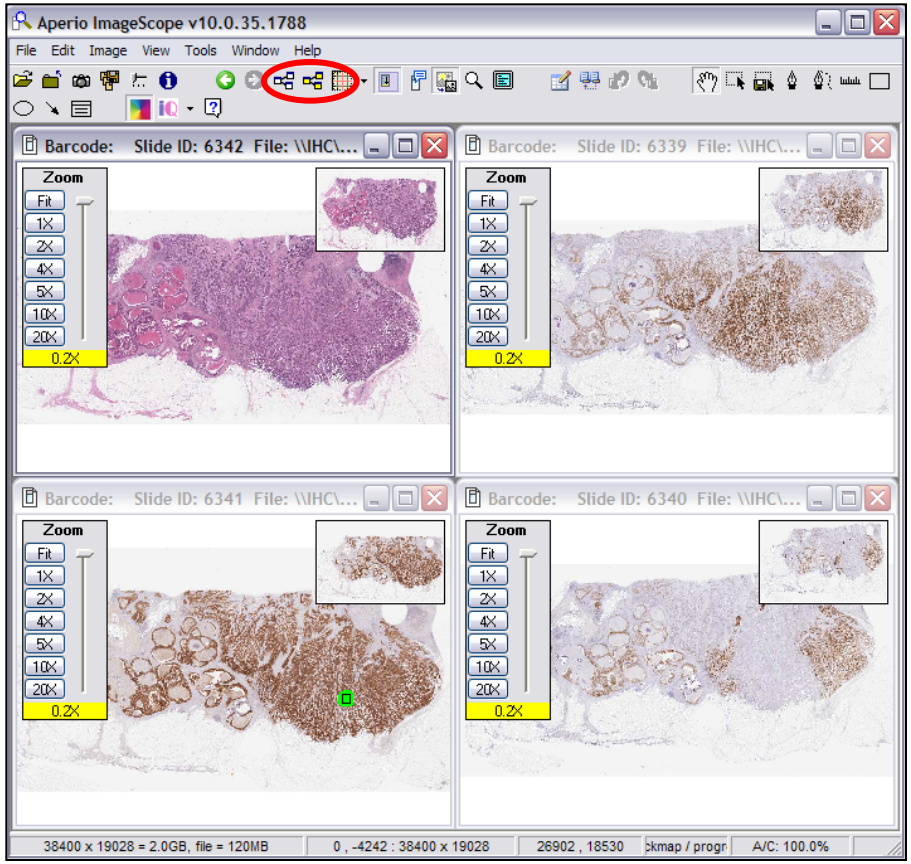
- Smart synchronization is an extension of the synchronization feature. It automatically aligns multiple slides to a common region and locks them in for synchronized viewing.
  - Smart synchronization is able to compensate for rotation (non-flipped) but not for other factors such as stretched or missing tissue. In those cases, ImageScope will do its best to display the same tissue feature in all tiled images, but not necessarily in exactly the same location.

ImageScope Sync Viewing

Viewing Multiple Slides Simultaneously

- Click Window Menu and select Tile Horizontal.
- Click Sync  .
  - Smart Sync
    - Slides should synchronize automatically to the same region within in the digital images.
    - Smart sync is dependant upon slide to slide similarity in shape, size and form.
  - Manual Sync
    - Manually orient slides to desired location prior to synchronizing.





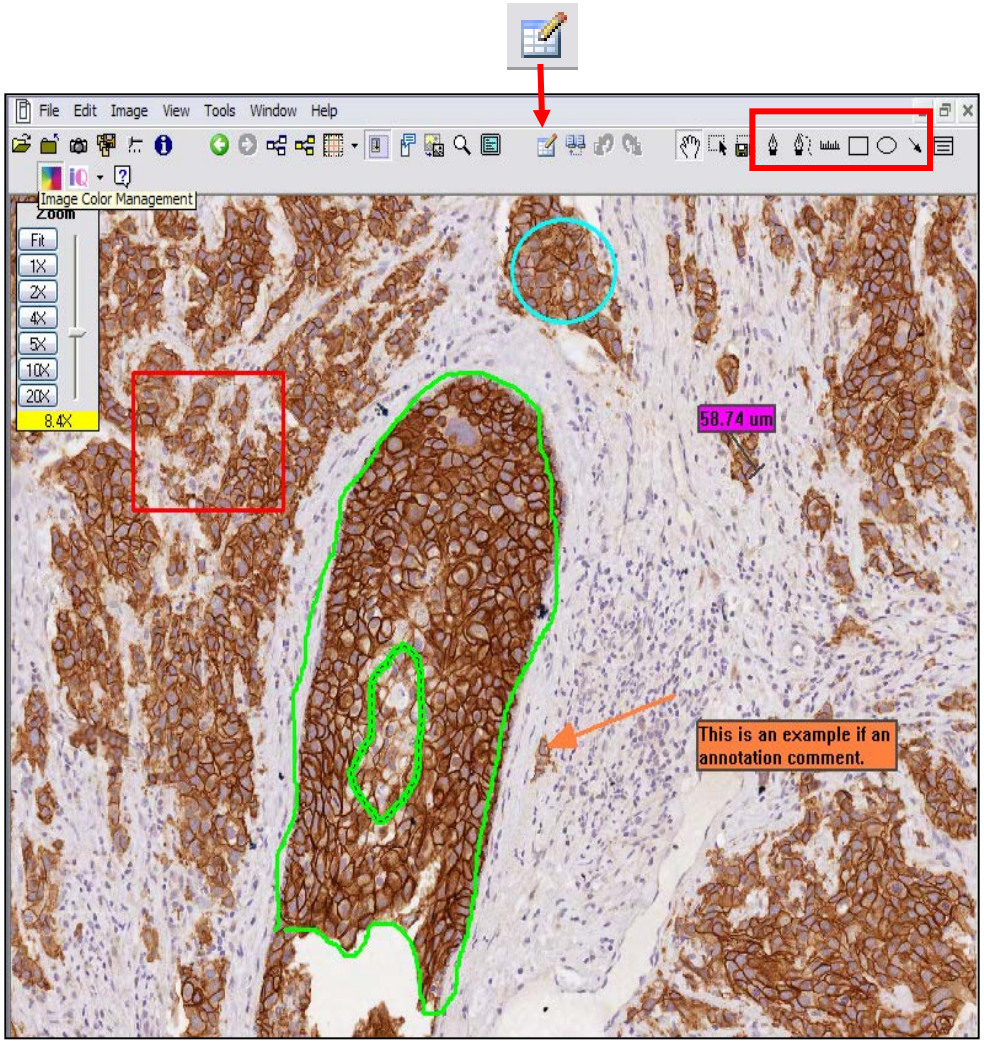
ImageScope Annotations

Annotation Tools

- Point to, highlight, measure, outline or exclude areas with annotation tools.

Pen *
Negative Pen*(excludes area)
Ruler (measures in microns)
Rectangle*
Ellipse
Arrow

*These annotation tools can be used to define regions to perform or exclude Image Analysis.

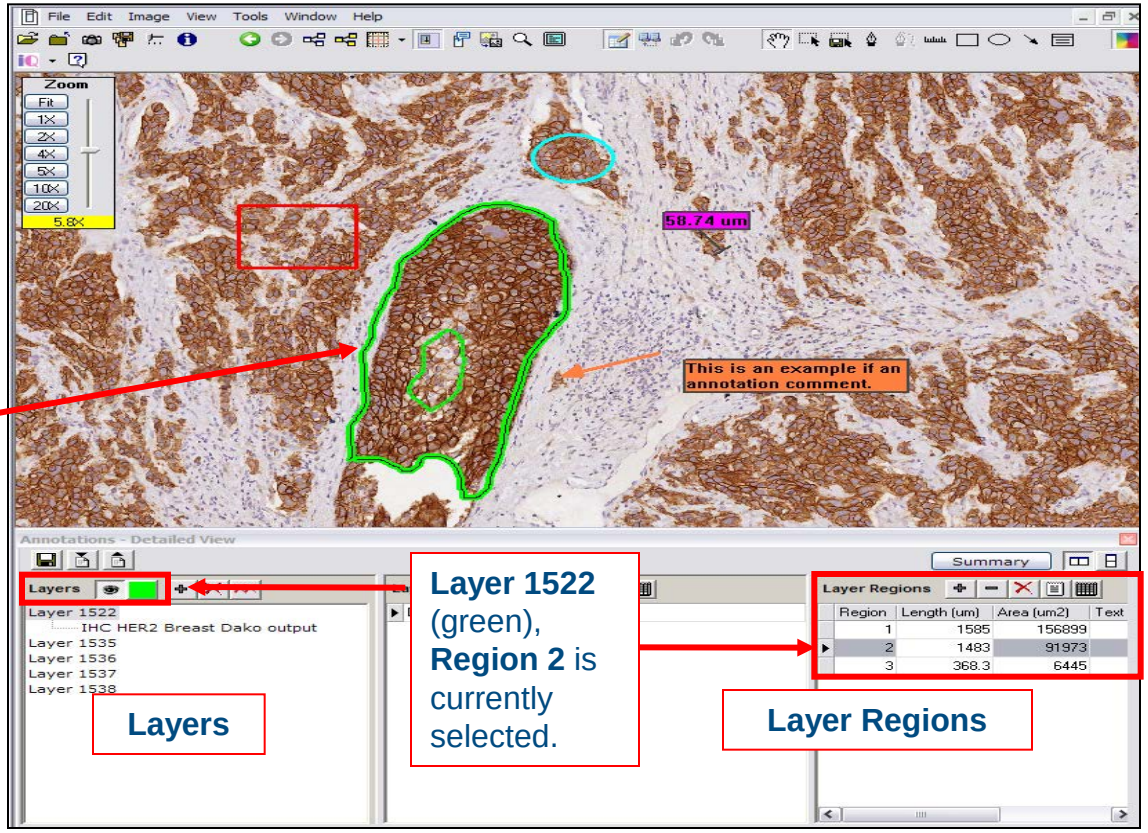


ImageScope Annotations

Annotation Layers and Regions

- **Layers:** Annotations that are grouped and color coded in the annotations window.
- **Layer Regions:** Each object within a layer (i.e.: a pen outline and comments).

Current selected region (annotation) will have a bolded black centerline to distinguish it from another annotations.



ImageScope Annotations

Annotation Layer and Region Toolbars

- Save, view/hide, change color, add new, export, delete or delete all Layers/Regions.


Save Annotations


View/Hide


Color


Add Layer/Region/Attribute

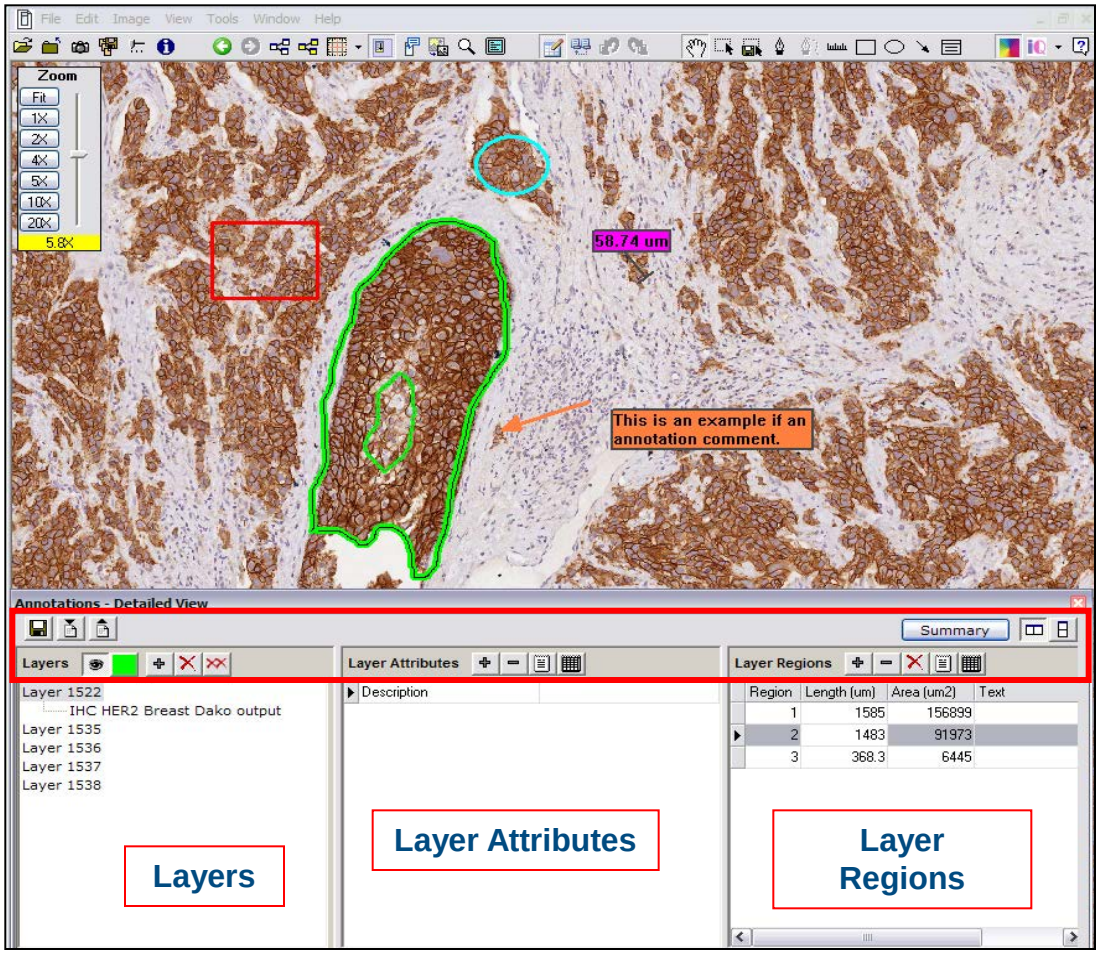

Delete Attribute


Delete Layer/Region


Delete All Layers


Export Grid to Text File


Export Grid to Excel File



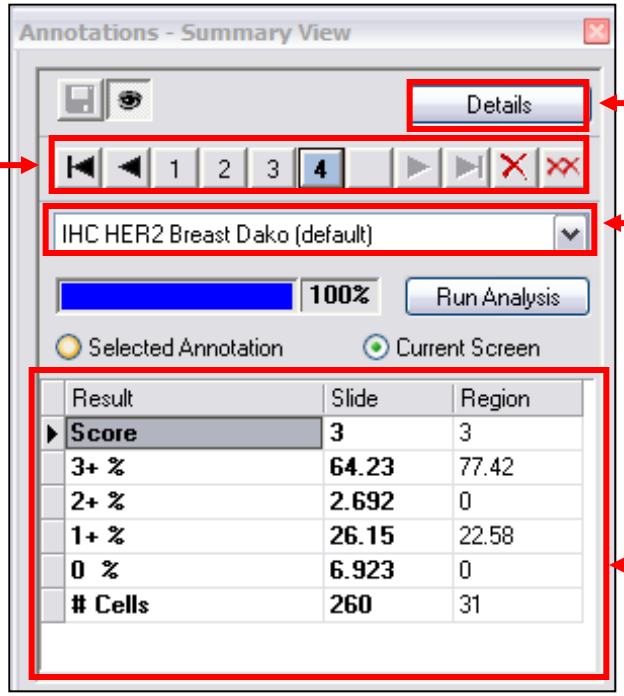
ImageScope Annotations

Annotations Summary View

- Provides a streamed line view of the annotations window.
  - Developed for analyzing DIHC slides.
  - Makes the process quicker and simpler by fitting into a normal workflow.

Navigate to annotations that have been drawn.

The summary view is the default view for the clinical DIHC workflow.



Click to return to detailed annotations window.

If slide specific processing is enabled and set to use a specific IA macro, the tool will populate here.

Analysis outputs.

Define Image Analysis Area

- Image Analysis can be performed on an entire image or on user defined regions.

Pen

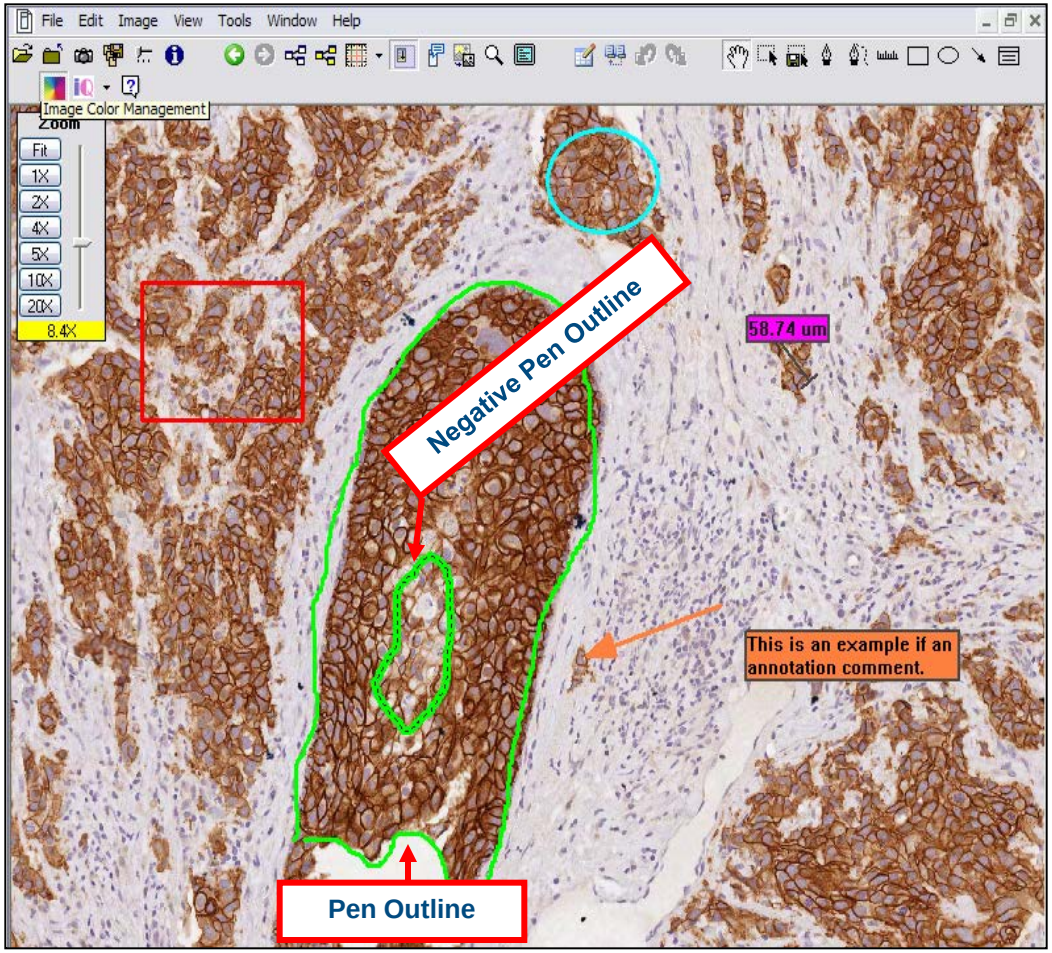
Negative Pen

Rectangle

Use either the Pen or Rectangle to annotate a region of analysis (if not doing whole slide analysis). Use the Negative Pen to exclude areas from being analyzed.

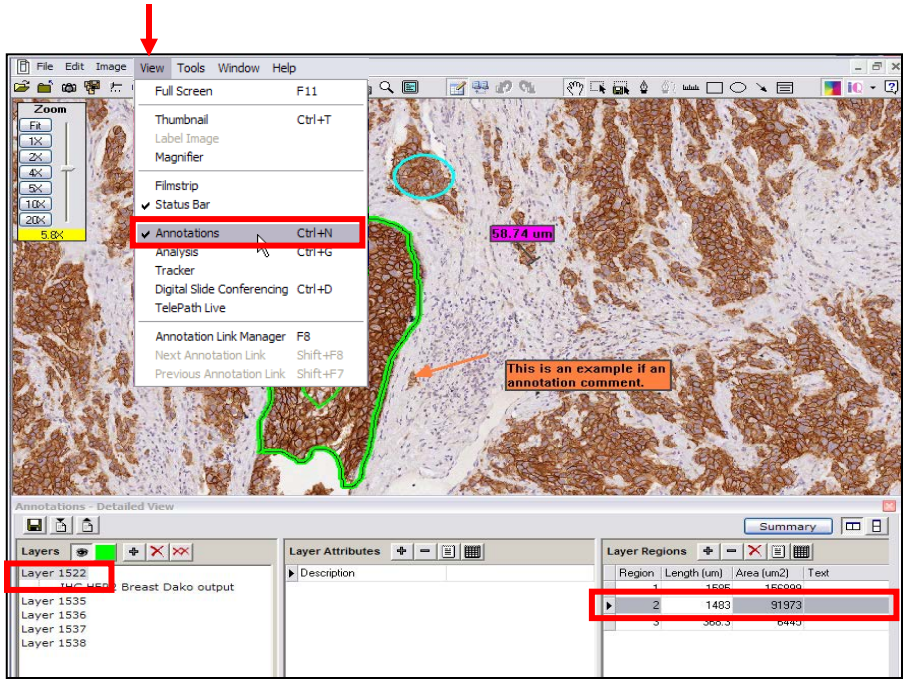
Pen = Solid Line

Negative Pen = Dashed Line



Select Area to Analyze

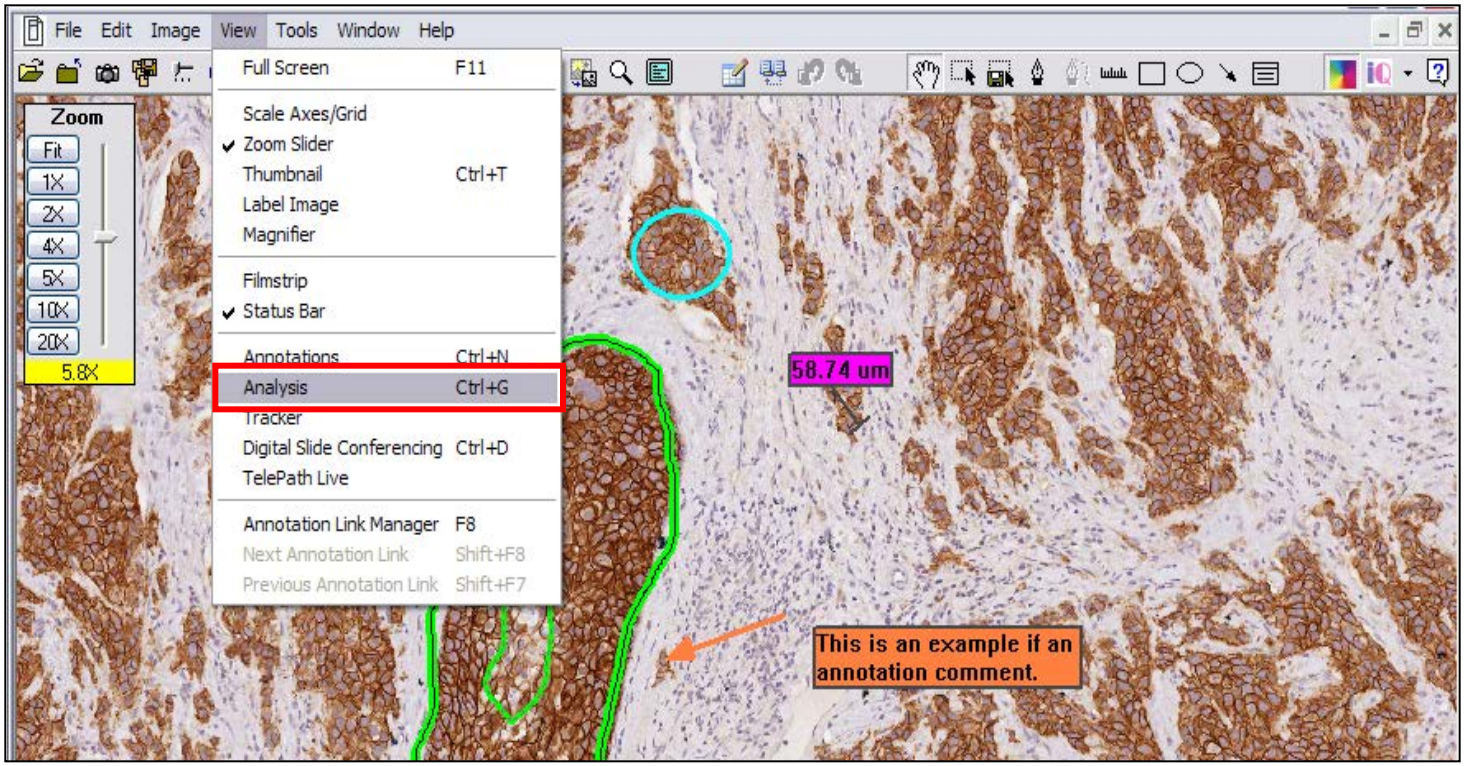
- Analyze an entire digital slide image or use the annotation tools to pick just an area to analyze.
- Open the **Annotations** window from the view menu**.**
- Select **Annotation Layer and Region** to analyze (skip this step if doing whole slide analysis).



ImageScope Image Analysis

Perform Analysis

- Select analysis tool to use with a slide through the Analysis window.
  - Macros are sets of Image Analysis parameters defined to meet a specific research or clinical application.
  - Macros are categorized by type (Positive Pixel Count etc.).

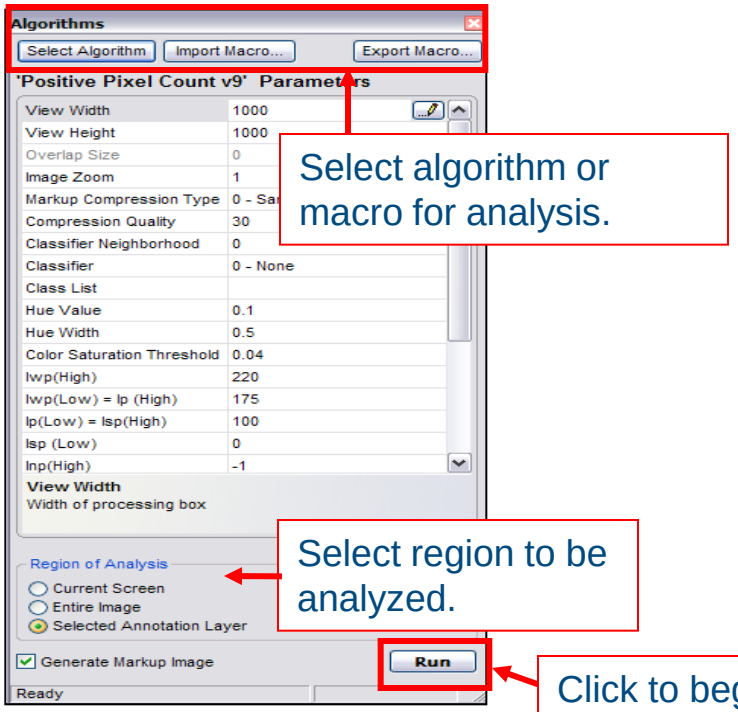


ImageScope Image Analysis

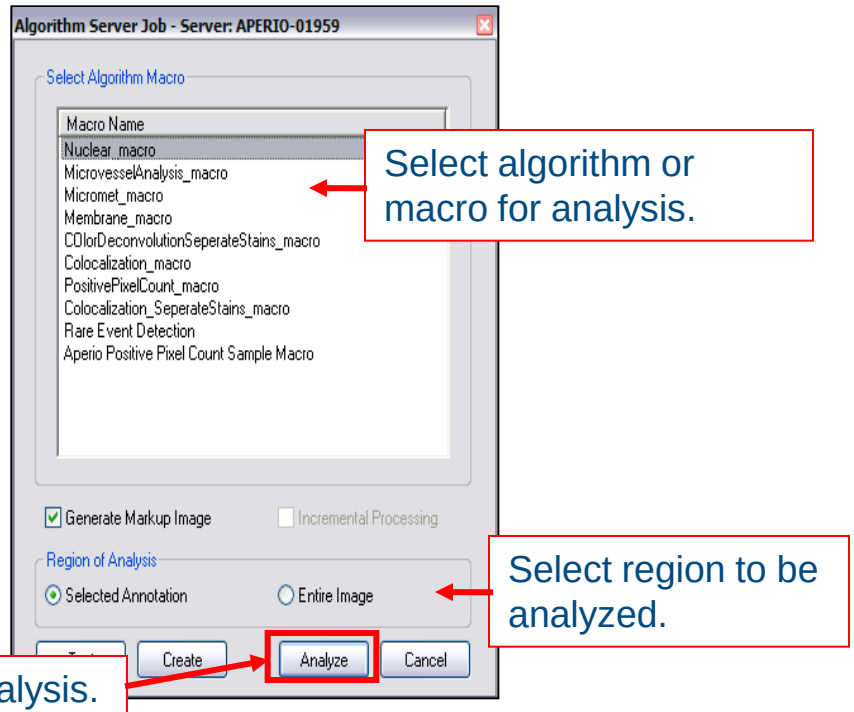
Analysis Window

- ImageScope user interface is somewhat different depending on whether you are analyzing a local or a remote image (client side analysis vs. server side analysis).

Window from ImageScope

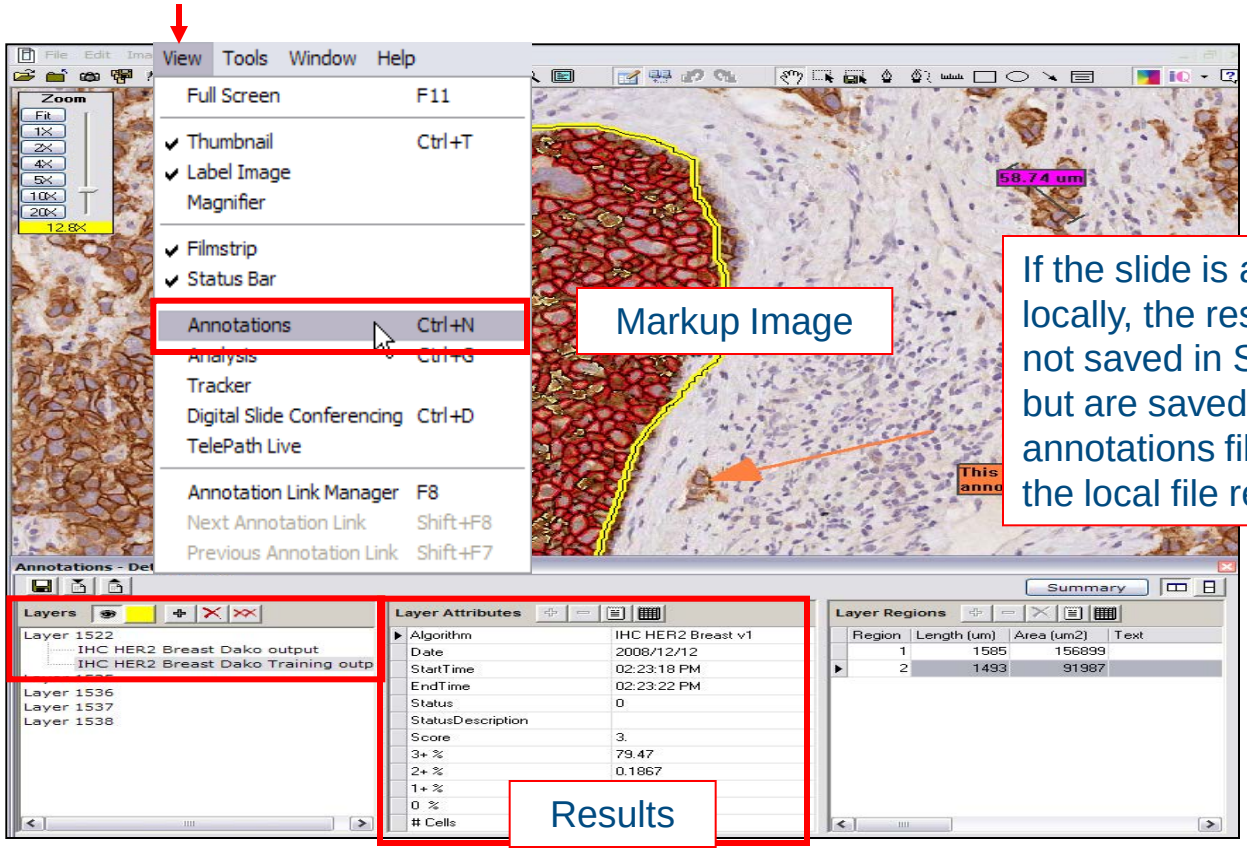


Window from Spectrum



Analysis Results

- When the analysis is done, the Algorithms window displays “Analysis complete.”
- If generated, the markup image is displayed.
  - View results in the Annotations window.

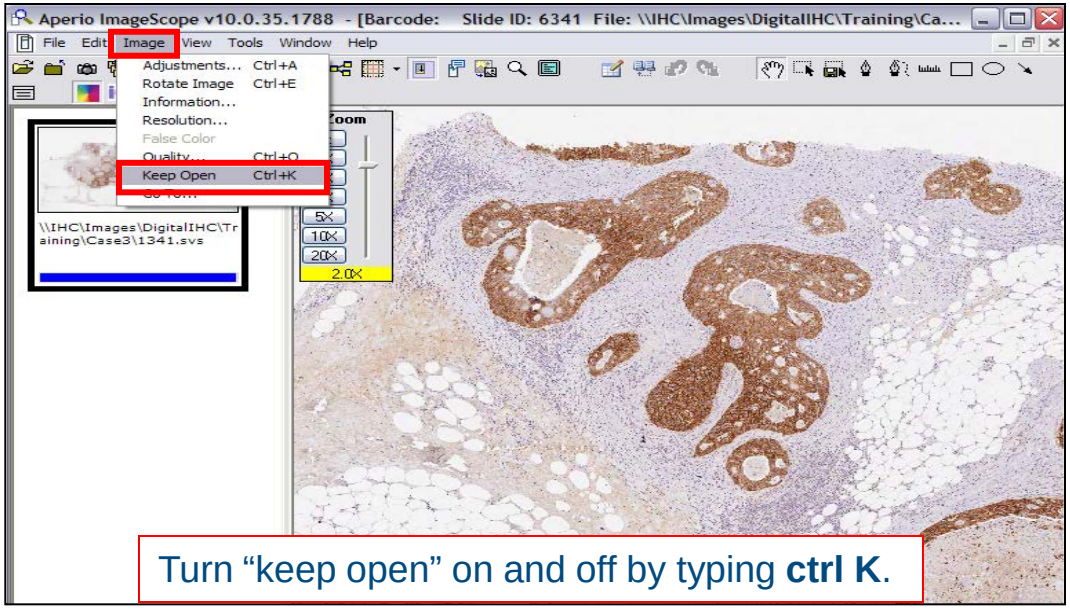


If the slide is analyzed locally, the results are not saved in Spectrum, but are saved in an annotations file where the local file resides.

ImageScope Additional Tasks

Keep Open Option

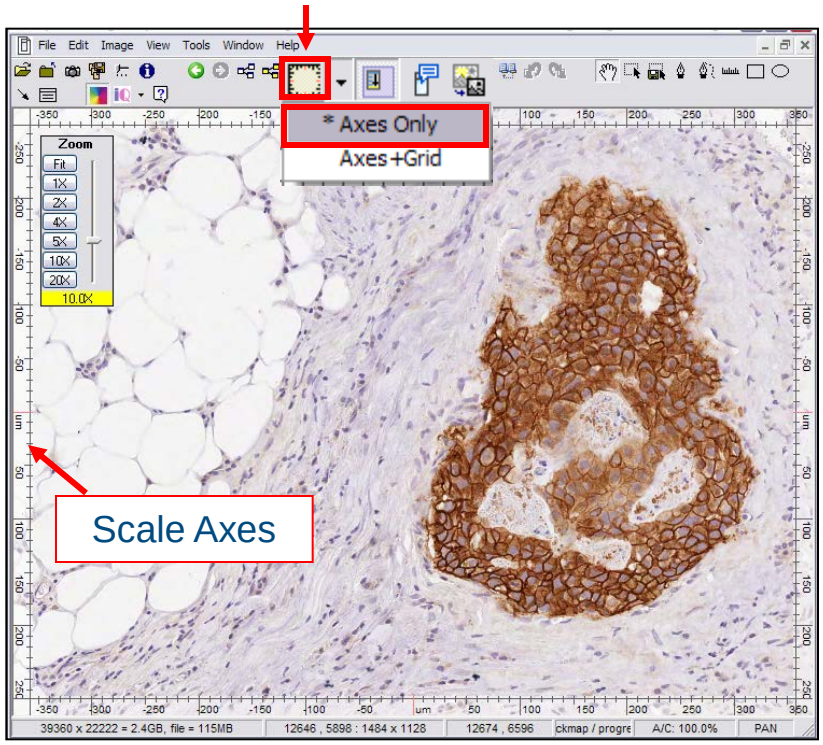
- When you select one or more multiple images in Spectrum (by clicking the thumbnail or selecting multiple images and using the **View Images** command), any images already open in ImageScope are closed before displaying the new ones.
- Use the Keep Open option to keep a specific image in ImageScope open when you select and view new images in Spectrum.

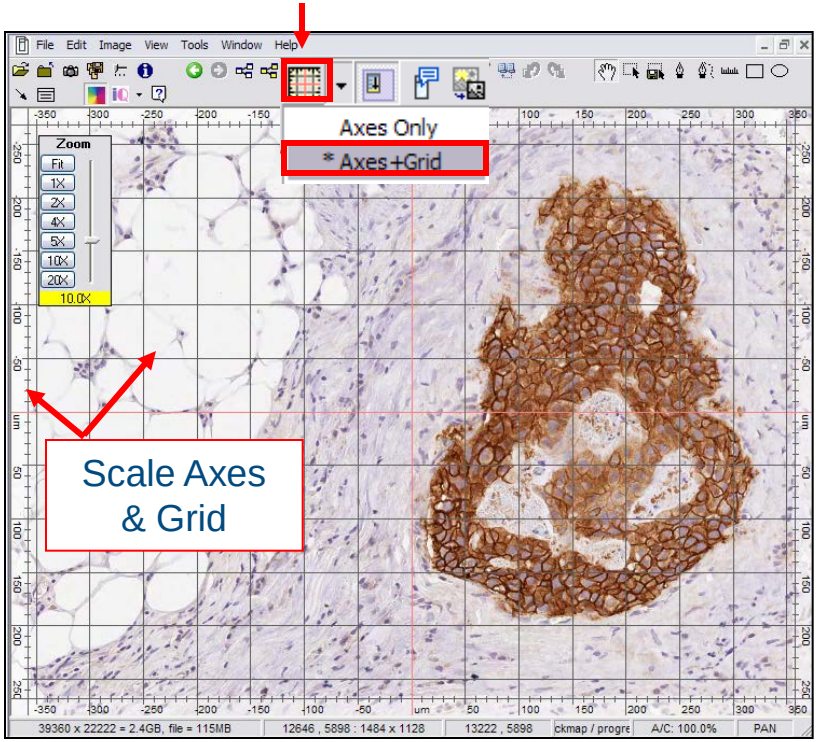


ImageScope Additional Tasks

Scale Axes & Grid

- View scale axes and a grid on an image in ImageScope.
- The units and spacing are adjusted to correspond to the resolution of the image and the current zoom level.

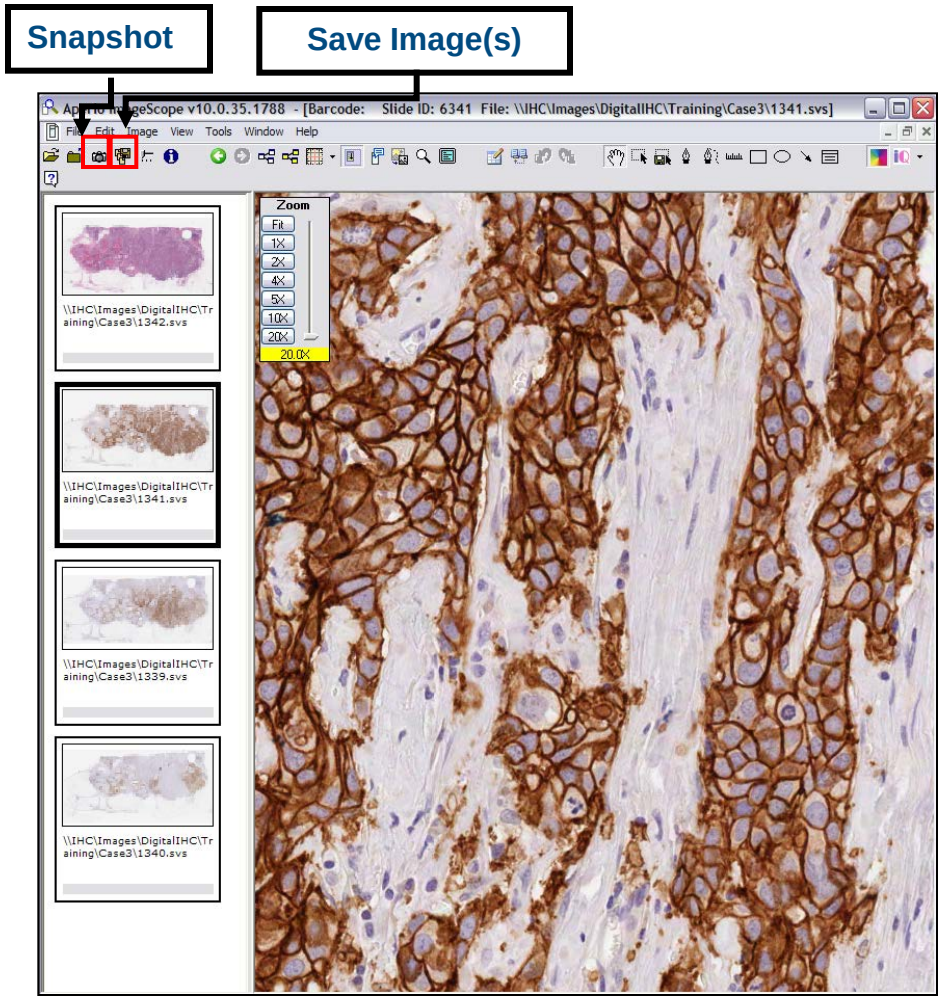




ImageScope Additional Tasks

SnapShot/Save Images

- The Snapshot icon grabs a screen shot of the image as it appears in your screen.
- The Save Image(s) icon saves a link to all images in the filmstrip to a file.



ImageScope Additional Tasks

Extract Region

- Extract Region icon  will capture a high resolution portion of the image defined by the user dragging a box around the area of interest.
  - Various image formats are available upon saving the image.

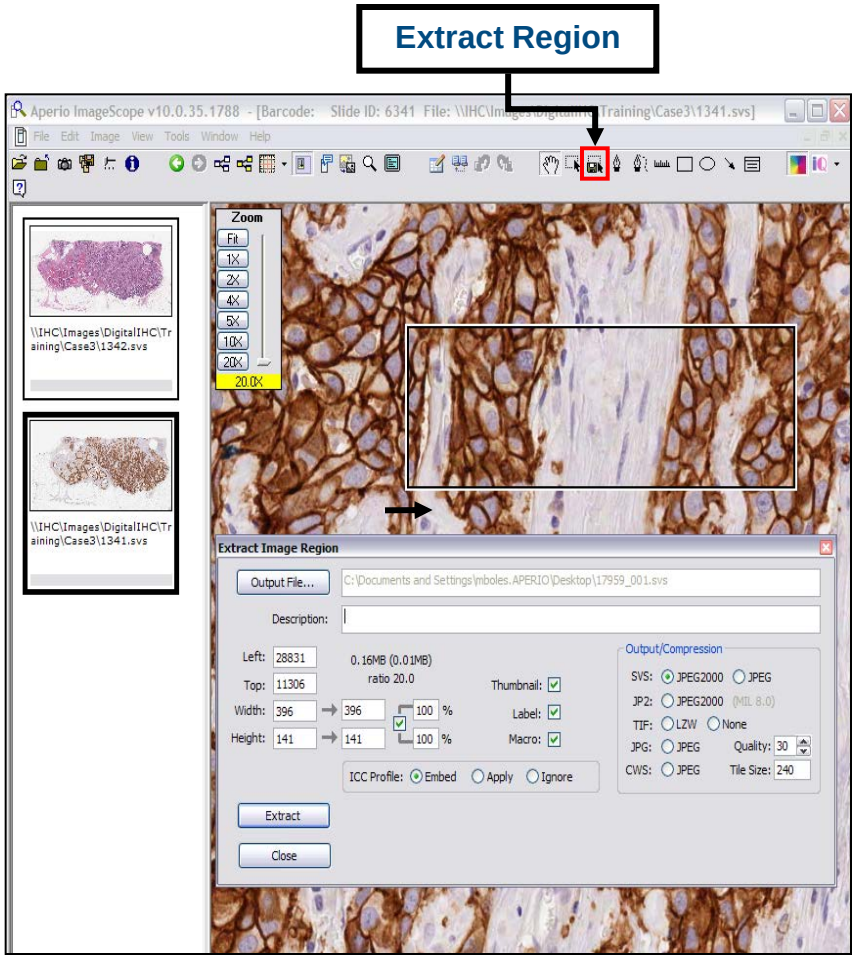
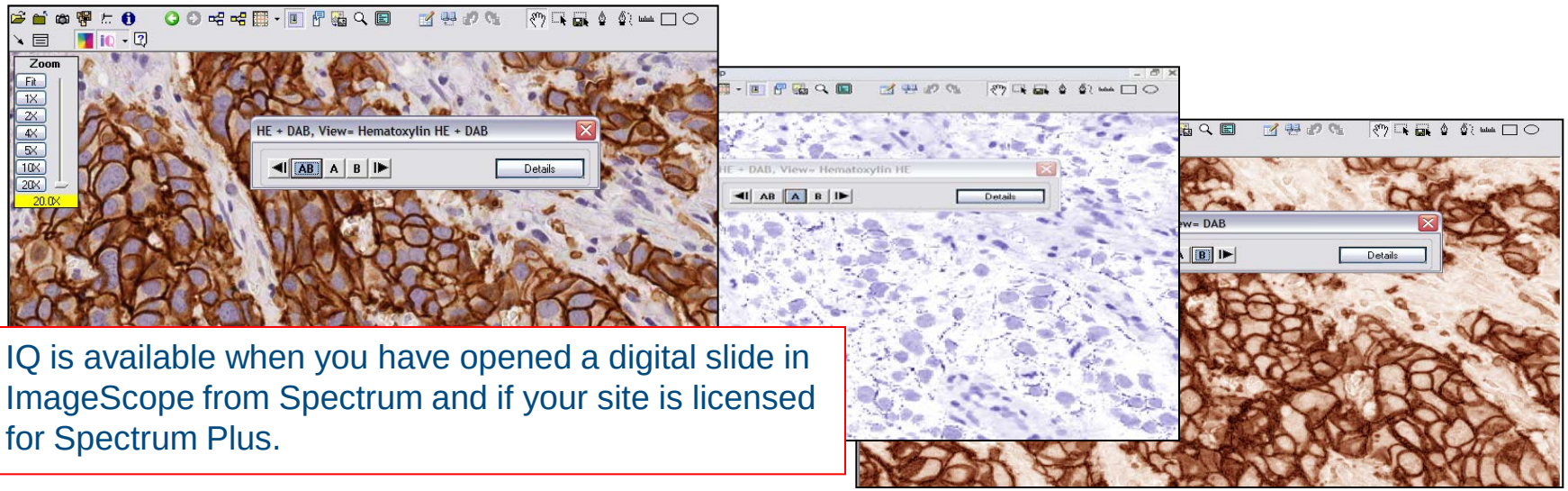


Image Quality

Image Quality Module (IQ)

- Provides advanced view options based on the digital slide's stains.
- Users can customize the view of slides visual clarity by:
  - Digitally adjusting the stain colors.
  - Viewing the individual stain images.
  - Re-mixing the stains on the fly while navigating the image.
- IQ uses color processing, analyzing each pixel of the digital slide image, to identify stains and modify their appearance on the digital slide.



IQ is available when you have opened a digital slide in ImageScope from Spectrum and if your site is licensed for Spectrum Plus.

Image Quality Features

IQ Features

- View a selected stain while navigating the slide.
  - IQ uses color deconvolution to separate stains and present them as you pan or scroll about the image.
- Boost or dilute the displayed concentration.
  - Useful for over or under stained slides.
- Enhance cellular detail such as nuclei.
- Digitally adjust individual stain color for visual clarity and personal preferences.
- Visual enhancements are only applied for the current ImageScope session and does not change the actual digital slide.

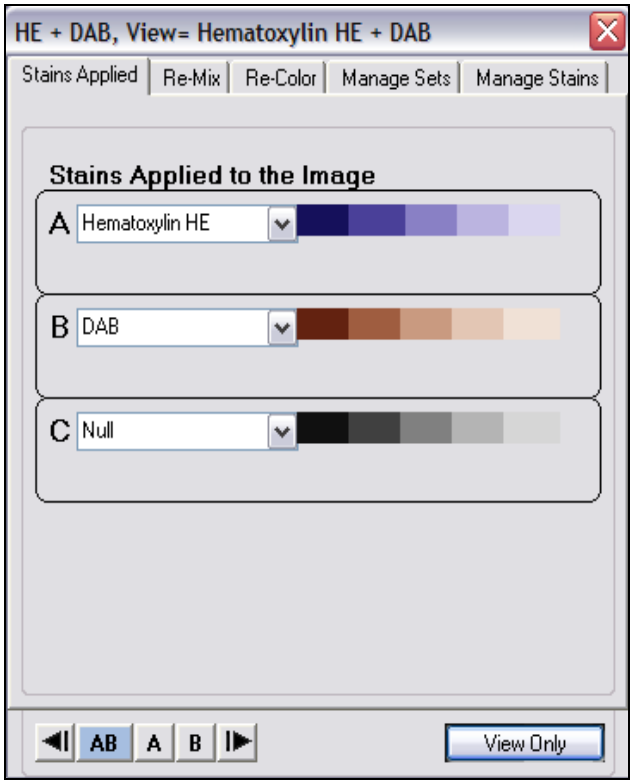


Image Quality Stain Sets

IQ – Use With Any Stain Set

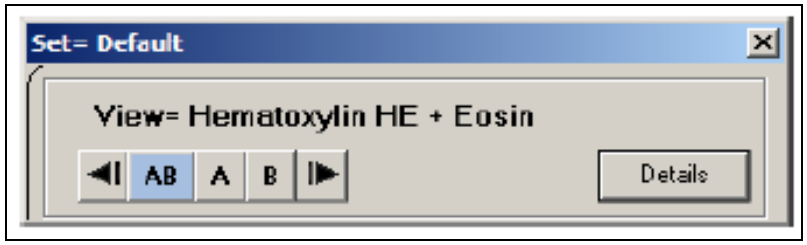
- To use IQ user must open an image in ImageScope through Spectrum Plus.
- With a digital slide open in ImageScope, clicking the **IQ** button displays the **stain set** menu.
  - The Default stain set is H&E and is just a place holder. Users need to replace the stain set with their personal settings for H&E.

Pink box indicates stain set applied

Image Quality Viewing Stains

Viewing Individual Stains

- From the Image menu, clicking **Quality** displays the **Image Viewing** toolbar.
- AB displays the image with both stains.
- A displays the image with only stain A (Hematoxylin for default set).
- B displays the image with only stain B (Eosin for the default set).
- Details displays the entire IQ window.



The options in this window will reflect the stain set chosen. For example, if the stain set included H&E and DAB the **Quality** menu options will reflect accordingly.

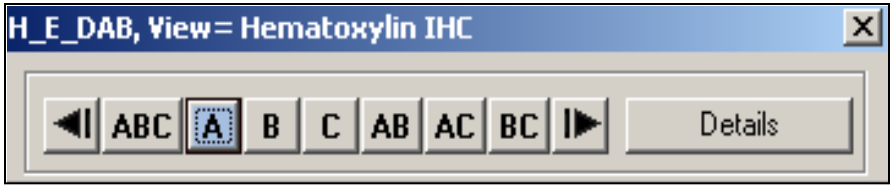
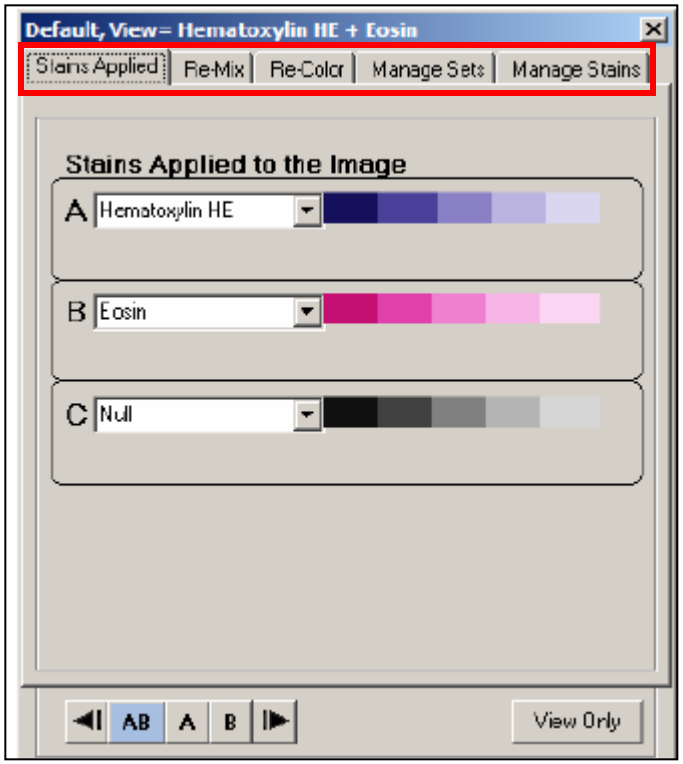


Image Quality Functions

Several IQ functions allow the user to:

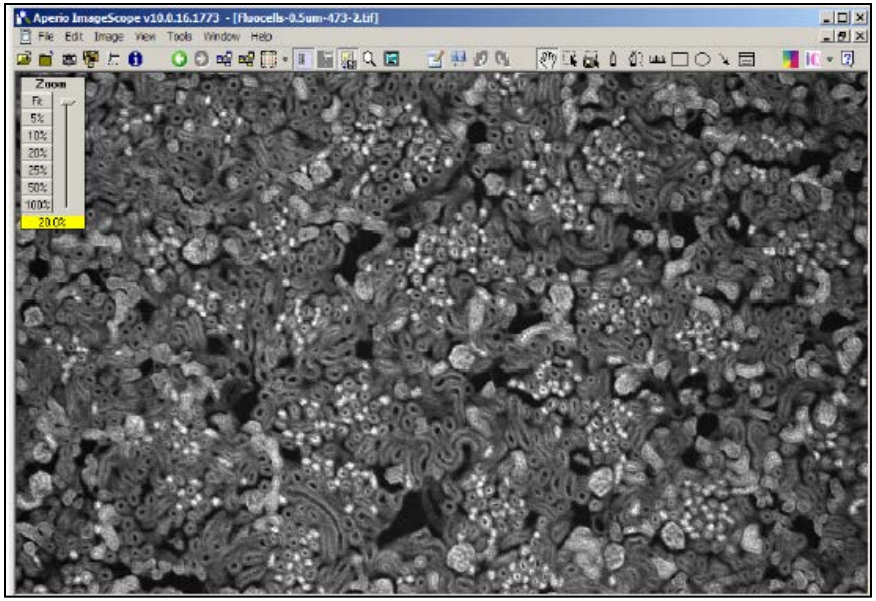
- Define and save stains sets.
- Change concentration.
- Change intensity and color settings.
- Measure color of stains used in the lab.
- Use the tabs to navigate through IQ features.



Fluorescence Grayscale Support

Grayscale Image can be viewed in ImageScope

- A grayscale image is one in which each pixel contains no color component, but has only a value that define its intensity from black at the weakest intensity to white at the strongest.
- Often produced by measuring the intensity of light at each pixel in a single band of the electromagnetic Spectrum, such as fluorescence.



Fluorescence Grayscale Support

False Color

- Users can set a grayscale image to a false color to highlight details by increasing the distance in color space between successive gray levels.
  - This does not increase the information contents of the original image.
- To assign false color:
  - From the **Image menu**, click **False Color**, the dialog box displays.
  - Select the color using the slider bar or click a specific color.
  - Click **Enable** to see the image in false color.