

# STRATAQUEST

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Features Overview  
V6.0 - V7.1

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V6.0

➔ New Startup Screen

- On the *left* side of the screen: Open existing analysis project or import a scan. You can browse for the desired project or select one from the Last Opened Projects list. You can empty this list by pressing Clear all or only delete a selected item by pressing Clear selected. Once you select a project, you can go to Preview section to select sample, see the description and a preview image. Press Hide Preview to hide Preview section.
- On the *right* side of the screen you can import your selection with SQ APPS. The Apps are organized within groups.



➔ Reading on the fly

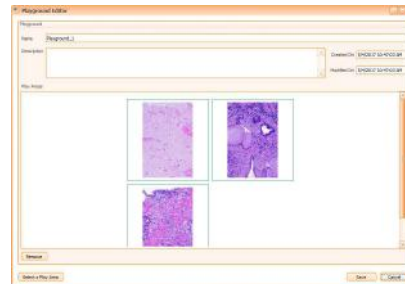
- When importing *Zeiss, Aperio, PerkinElmer* and *bigtiff* files, the images will be **read on the fly** during the import, which means they will not be extracted or saved on your computer. The import process will be faster and memory saving.

➔ Panoramic/Mirax Batch BF and FL

- StrataQuest 6.0 includes as *batch import* options Panoramic/ Mirax for fluorescence and brightfield. For batch import, please check Import multiple projects for selection and then choose FL or BF.

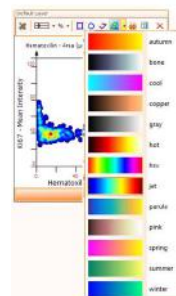
➔ Playground

- StrataQuest *playground* is a sample-like project item composed of areas of predefined size from existing samples. It works like a virtual sample and it brings better management of sample's heterogeneity. By selecting various sample pieces, you can determine optimal settings that will eventually be applied to the desired sample.



➔ Heatmap diagrams

- StrataQuest includes a *heat map* feature for a better understanding of processed data. The graphical representation specific to a heat map shows up data where the individual values contained in a matrix are represented as colors.



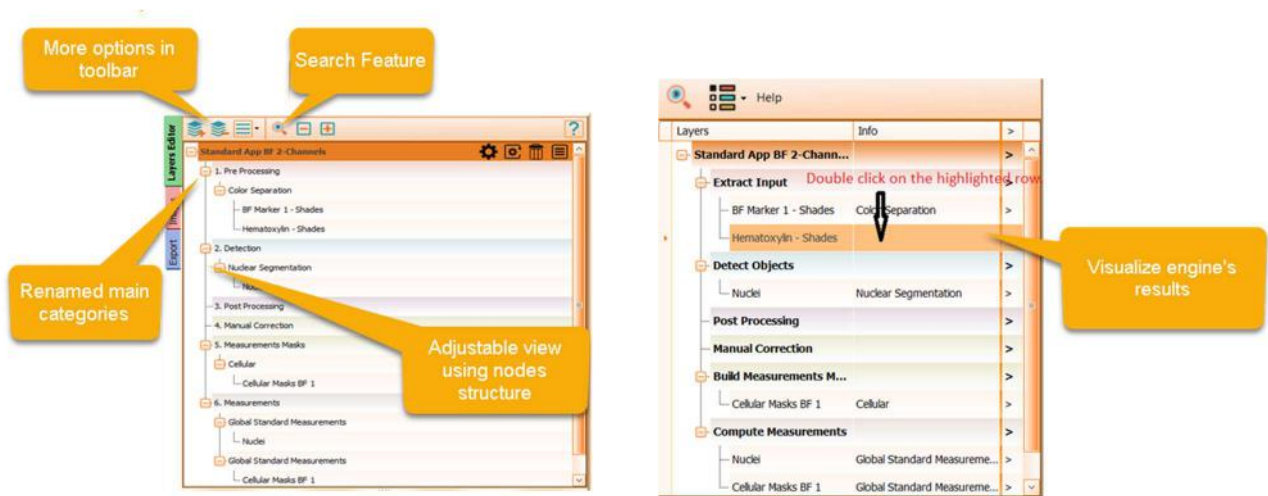
## StrataQuest Features Overview

- Rename axis: the name of a diagram axis can now be edited
- 16bit support
- Installer (Setup Wizard)

V7.0

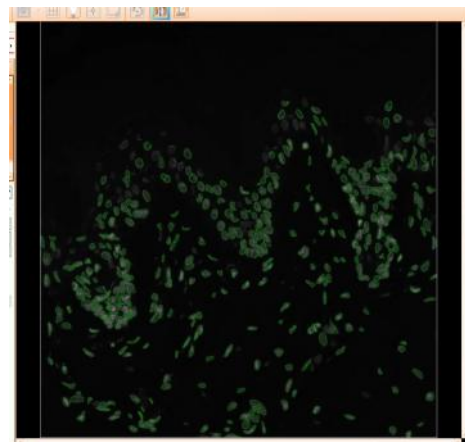
## Engines

- Layers and engines redesign

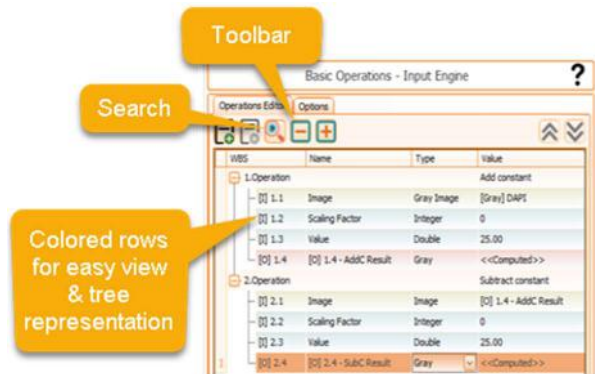


- Nuclear Segmentation Engine

- Allows previewing results on an area as you change parameter values.

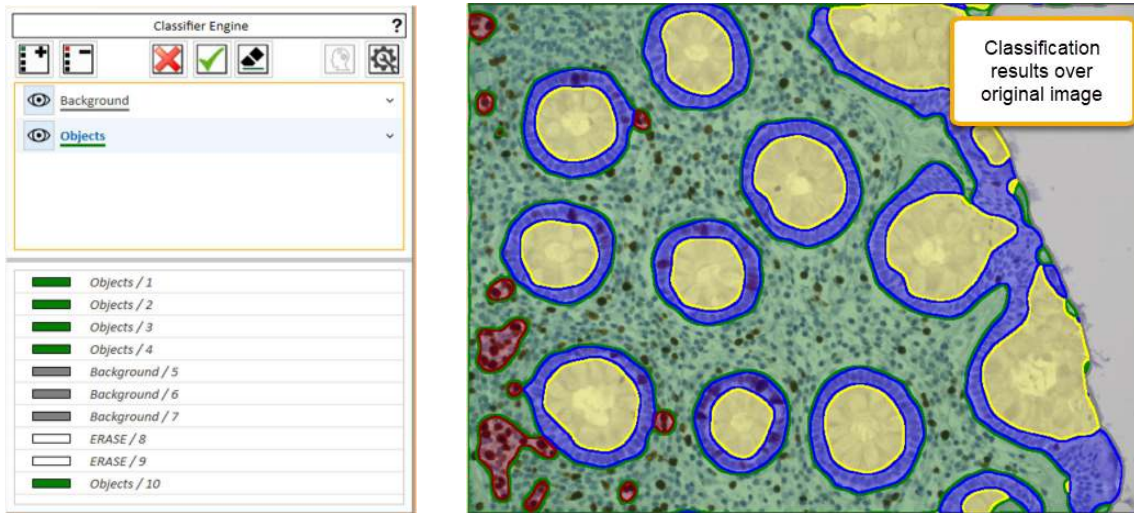


➔ Basic Operation Engine has been redesigned



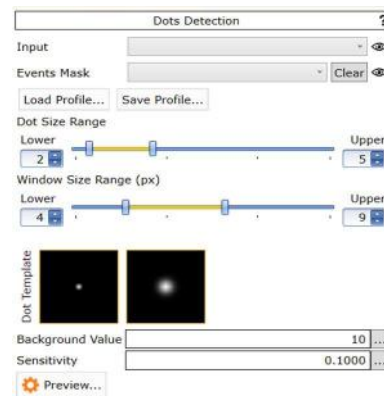
➔ Classifier Engine

- Determines to which user defined class a pixel belongs, on the basis of a training set of data containing relevant measurements for each class.

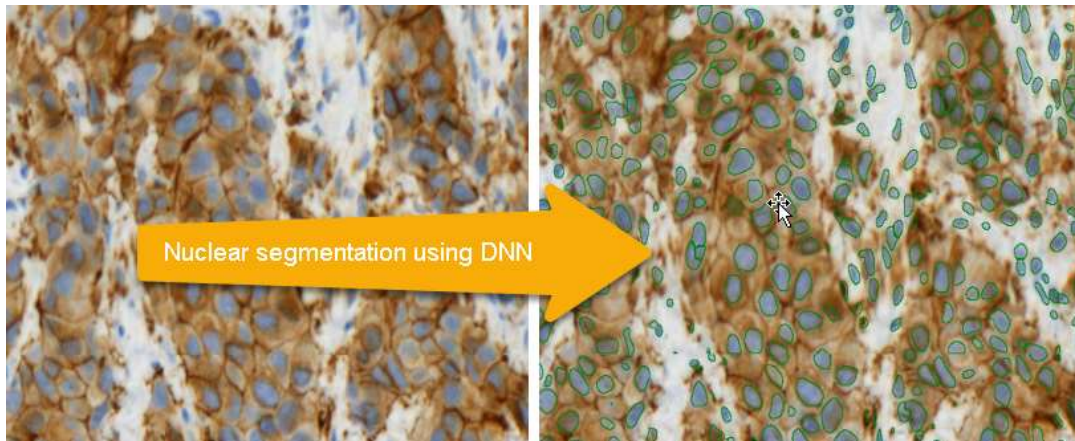


➔ Dots Detection Engine has been redesigned

- Parameters have been renamed and an Advanced parameters section is available
- Dot templates available
- Create profiles
- Changing parameters will show results as you change them



➤ Nuclear Segmentation – DNN: can work on gray and color images

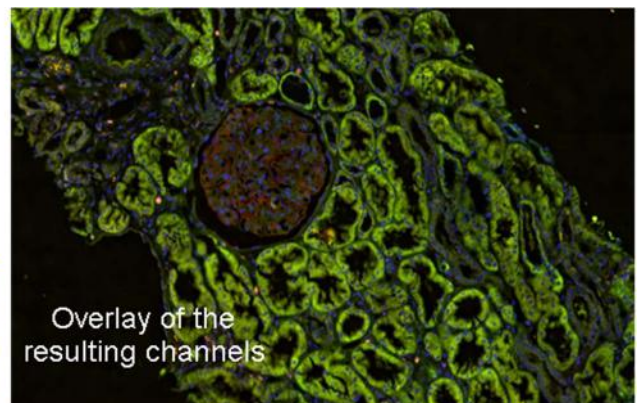
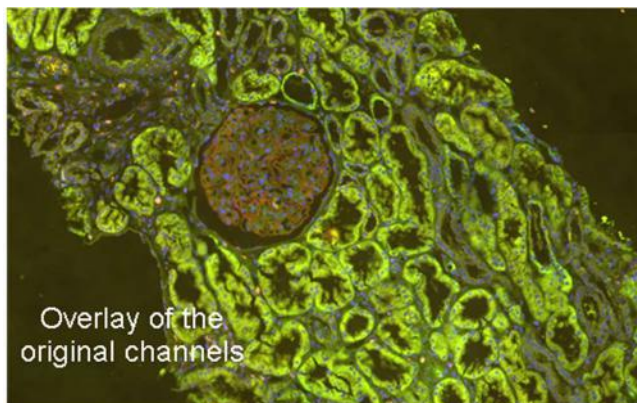


➤ Tissue Detection engine

- The existing Tissue Detection algorithm has been packed into a new engine and can be used in the layer processing workflow generating masks for the detected regions that can be used further in processing.



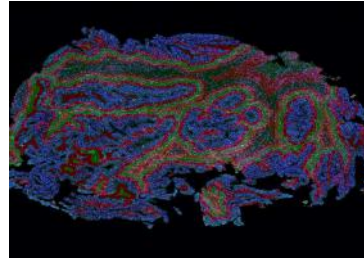
➤ Background Removal engine: helps removing the background in certain situations



## StrataQuest Features Overview

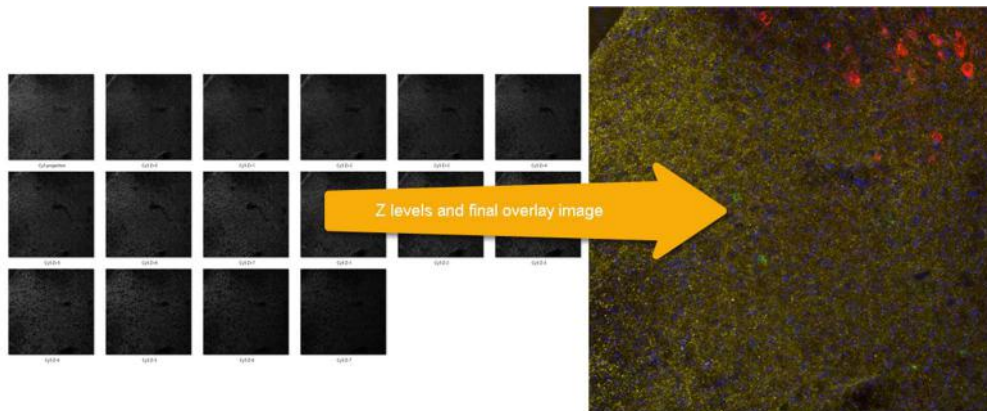
### ➤ Proximity Area engine: adjusts the proximity areas around the events

- Adjusts the proximity areas around the events.



### ➤ Projection engine

- Useful especially for Z-stacks, allowing to combine multiple Z-stacks into a single image through different functions (SUM, MAX, Fuse method from TFAXS). It works on BF and FL (8bit or 16bit) images

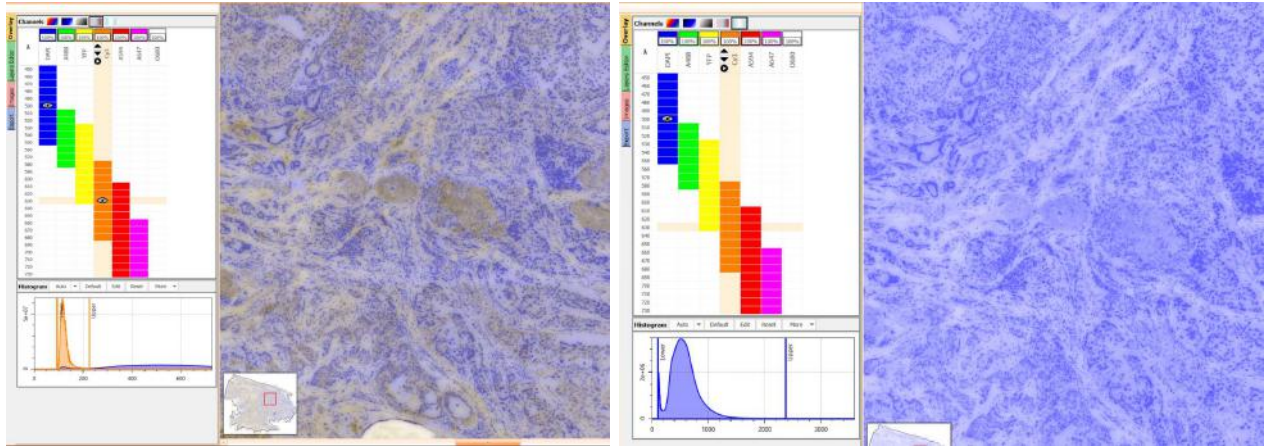


## User Interface and Visualization

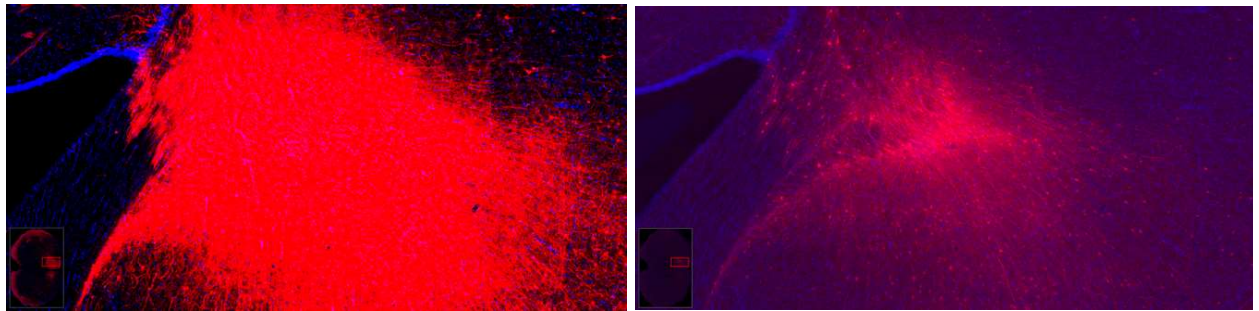
### ➤ New Startup Screen



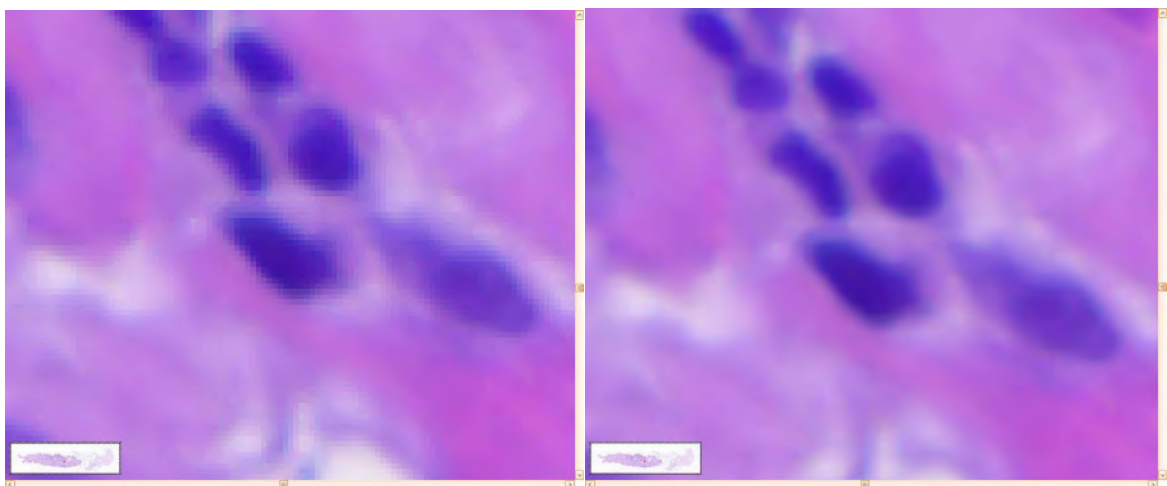
- Pseudo IHC View: visualize individual channel fluorescent images as converted in brightfield images



- HDR-like visualization for 16bit images



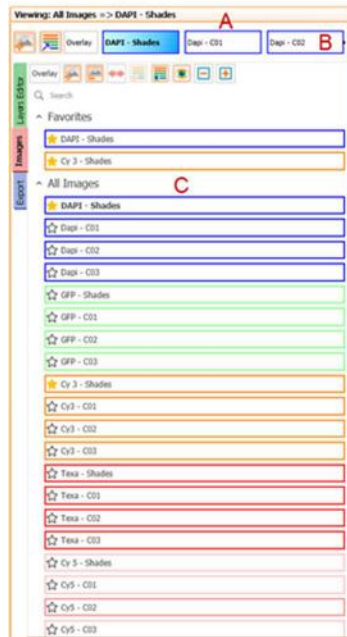
- Smoothened display of images



- Illumination Correction button
  - Enables/disables the illumination correction on the sample.
- Image Types redesign

## StrataQuest Features Overview

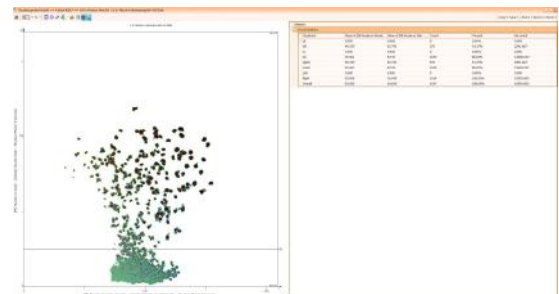
- Image types can now be seen in a new tab similar to “Layers Editor”.
- The new design allows for better organization into categories, search function, drag and drop operations and a Favorites category.



- In the (A) area there is always displayed the current shown image.
- The quick access toolbar (B) shows images from one category. The toolbar is visible all the time, even if Layers Editor is active.
- Clicking on an image selects it. Clicking again will switch to the previously displayed image. (both in B and C).
- Images are grouped in categories (C). User defined categories can be shown or not.

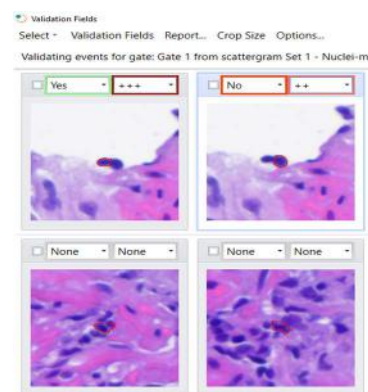
### Image Diagrams

- Double click on a scattergram to open scattergram detail window.
- Press Image Diagram button to visualize the objects directly on the diagram.



### Redesigned validation workflow

- The Validation workflow has a separate window.
- Users can define their own fields and set colors for values to be easier to identify.
- The defined fields are stored in the project but also in the SQ installation folder so they can easily be reused in other projects once defined.
- Right clicking on an object will open a popup with a bigger image of the object that can be zoomed in for more details.

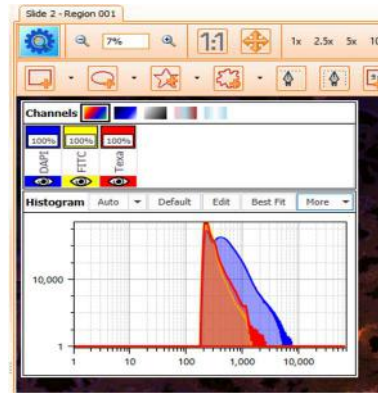




## Usability and Features

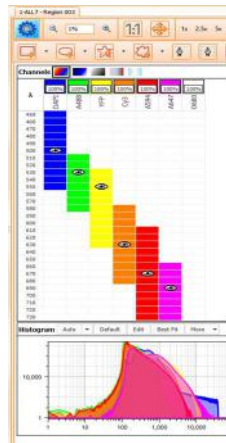
### ➔ Region Overlay with Histogram

- View mode: Overlay, Single Channel Color, Single Channel Gray, Pseudo-IHC Overlay, Single Pseudo-IHC.
- Clicking on the “View” button will toggle the channel visibility.
- Changes are visible as you do them, no need to apply.
- Histogram is visible in FL projects.
- Histogram can be zoomed with scroll mouse wheel and panned with left mouse button.
- Double click on the histogram will reset the zoom range to the entire range.
- Auto and Default deal with the 16bit range. They operate on the current visible channels.
- Controls for grid visibility and logarithmic scales.
- Right click and move the mouse to define a zoom rectangle.



### ➔ Lambda Stack navigation

- The display of the wavelengths for TissueFAXS has been improved to have a better overview and an improved user experience.

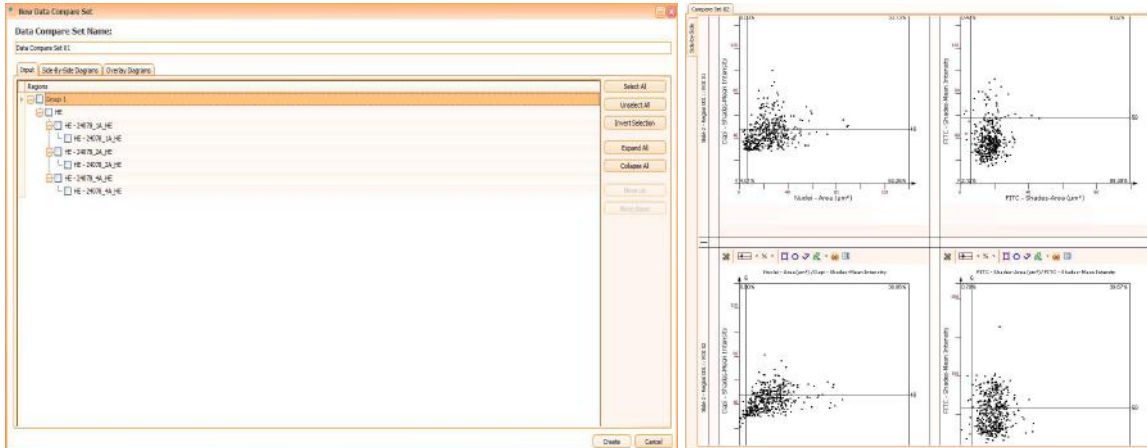


### ➔ Show Grid button: shows/hides gridlines between FOVs

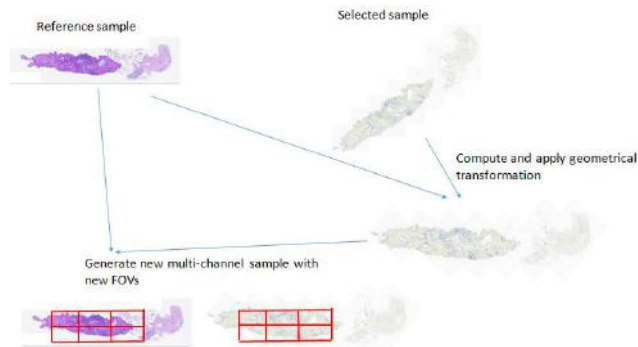
### ➔ Improved Diagrams handling

- View/Hide Global Measurements and Scoring results in more space for the diagrams.
- New layouts for Manage Diagrams and Manage Gates.
- Arrange diagrams with drag and drop.
- Print Preview for the diagrams container.

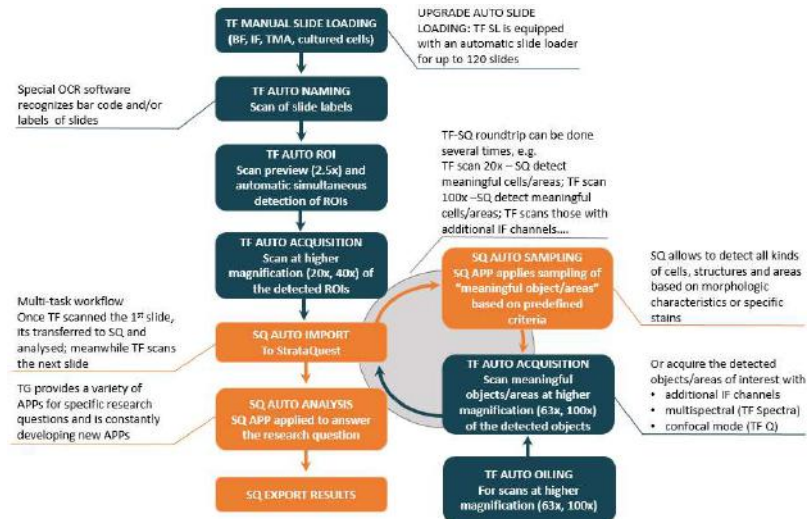
➤ Data Compare Sets



➤ Sample Registration



➤ Dual TissueFAXS-StrataQuest multi-task workflow



➤ Existing Scoring can be edited

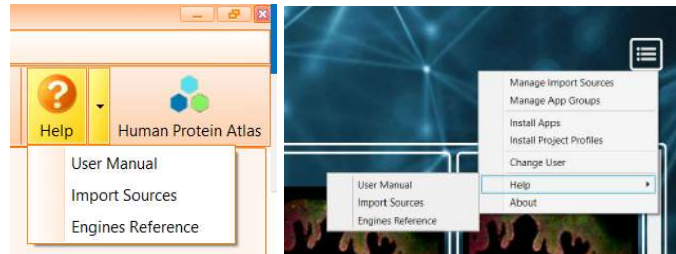
➤ Fast switching of image types

➤ Auto-range for 16bit images: computes 16bit range for 16bit outputs of engines

➤ DPI Awareness: display for high resolution monitors (4K) with increased DPI

- ➔ Auto-saving: StrataQuest automatically makes backups for each experiment once in a while, and stores these backups in the project's folder.

- ➔ Help



- ➔ Human Protein Atlas

- There has been added a quick link in the main toolbar to the “Human Protein Atlas”. This is a small web browser and requires internet connection.

## Import

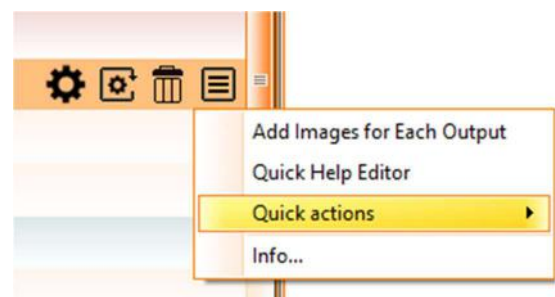
- ➔ Import Olympus VSI
- ➔ Import StrataFAXS II
- ➔ Import OME-TIFF
- ➔ Import PreciPoint
- ➔ Support for Z-Stacks from TFAXS: TissueFAXS **Z-stacks** are now visible and available for analysis in **StrataQuest**.
- ➔ Support for Time-lapse from TFAXS: TissueFAXS time lapses are now visible and available for analysis in **StrataQuest** as individual time frames.

V7.1

## Engines

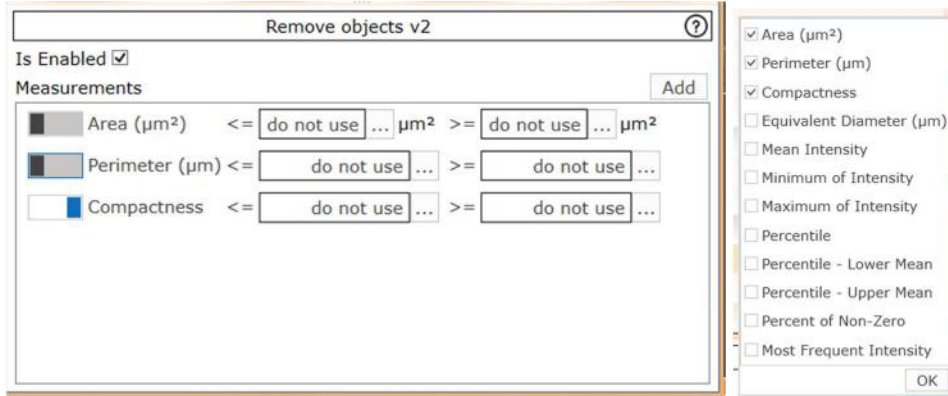
- ➔ Quick Actions

- This is a new StrataQuest feature used to combine frequent operations in a single action.
  - There are multiple Quick Actions types based on the context from which they are triggered:
    - Layer
    - Engine
    - Engine Output
    - Diagram (quadrants and gates)



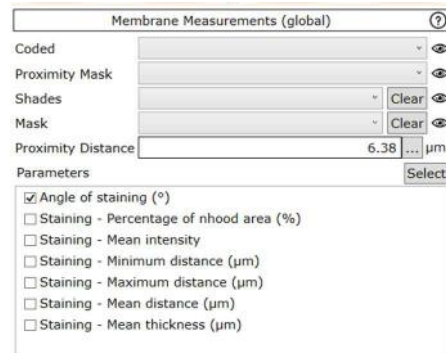
➔ “Remove objects v2” engine

- It extends the existing engine by allowing more parameters to be used (see image below) and it also saves “Post Processing input” so the user can see the original objects before post processing (incl. stitching). The control can be used in Easy Mode as it is (no individual measurements).



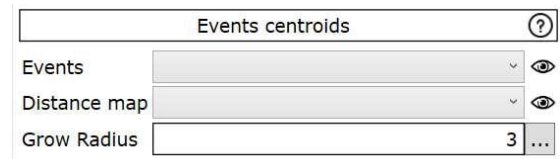
➔ “Membrane Measurements (global)” engine

- Generates measurements for membrane around objects: Angle of staining (how much of the nuclei is surrounded by the membrane), distance (min, max, mean) membrane, thickness of membrane, percentage of positive area/membrane surrounding the nuclei, intensity on membrane. Any wire-like pattern can be used as membrane.



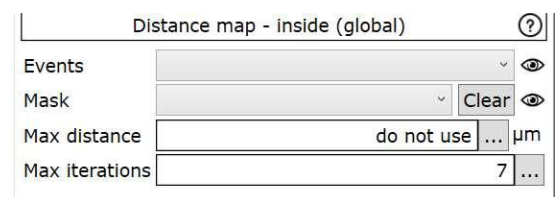
➔ “Events centroids” engine

- Finds the center of objects. This engine has 2 modes.
- The first mode works based on an intensity image such as the one generated by the “Distance Map – inside (global)” engine.
- The second mode finds the closest point to the average (x, y) position of the label.



➔ “Distance Map – inside (global)” engine

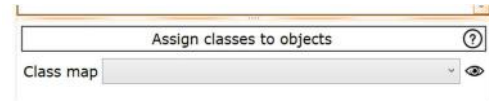
- Generates a distance transformation image on a Stitched/Global object. This engine can handle even large macrostructures that span on multiple FOVs.



## StrataQuest Features Overview

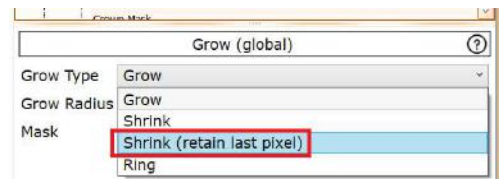
### ➔ “Assign classes to objects” engine

- This is a simple measurements engine that aids in using Classifier of Proximity Areas outputs. It will assign to each object the index of the class/area it is located in. Using a histogram with this measurement eases the visualization of objects in a certain class/area.

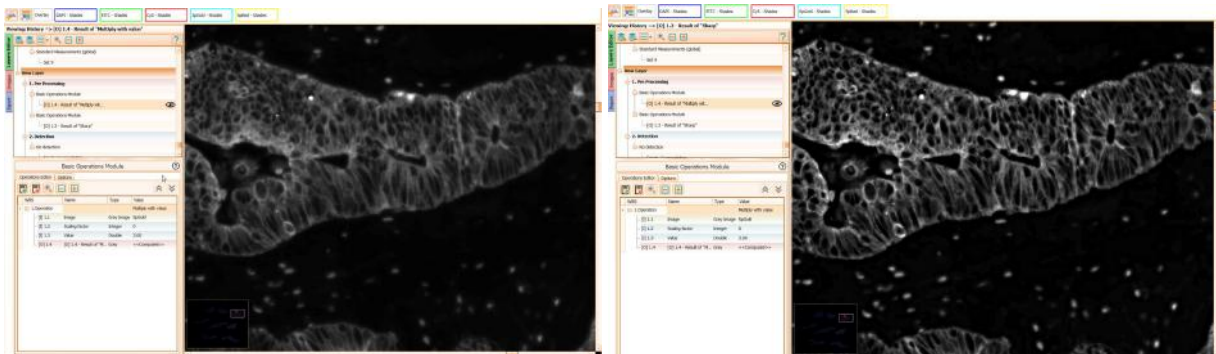


### ➔ “Global Growing” – “Shrink (retain last pixel)” option

- There is a new option for shrinking: when performing a shrink, you have an option to retain the last pixel, instead of completely removing all the pixels in the label.



### ➔ BOM engine – Sharp filter



### ➔ “Coded image” stitch objects behaviour

- The “Coded image” engine can now import stitch for objects even when using gates. The imported stitch data will be transferred to “Existing Coded” engine.

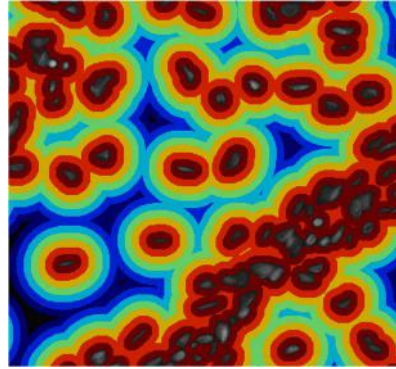
### ➔ Classifier engine improvements

- The Classifier “Visualization Coded Map” carry now “stitch” information so the classes can be treated as single events.
- Using the “Existing Coded” detection engine with “Visualization Coded Map” will reuse the stitch information.
- The default view type for “Visualization Coded Map” (directly from Classifier or from Existing Coded) is set to labeled objects. Also, the labels colors are synchronized with Classifier’s class colors.

### ➔ Proximity areas engine improvements

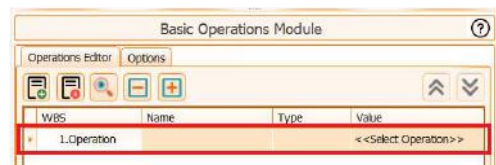
## StrataQuest Features Overview

- The Proximity Areas “Coded Map” carry now “stitch” information so the areas can be treated as single events.
- Using the “Existing Coded” detection engine with “Coded Map” will reuse the stitch information.
- The default view type for “Coded Map” (directly from Proximity Areas or from Existing Coded) is set to labelled objects. The colors used for the areas are heat map like.



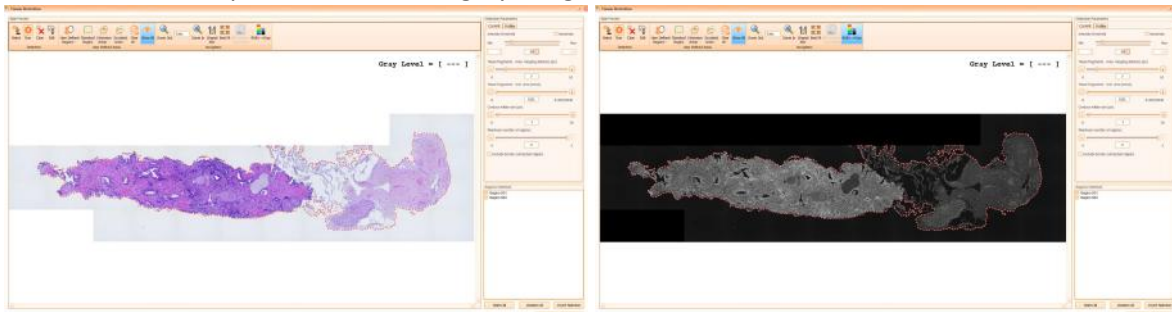
### ➤ BOM default operation

- Because you cannot use BOM without an operation, now this operation comes added by default when you add the engine so it saves some extra clicks.

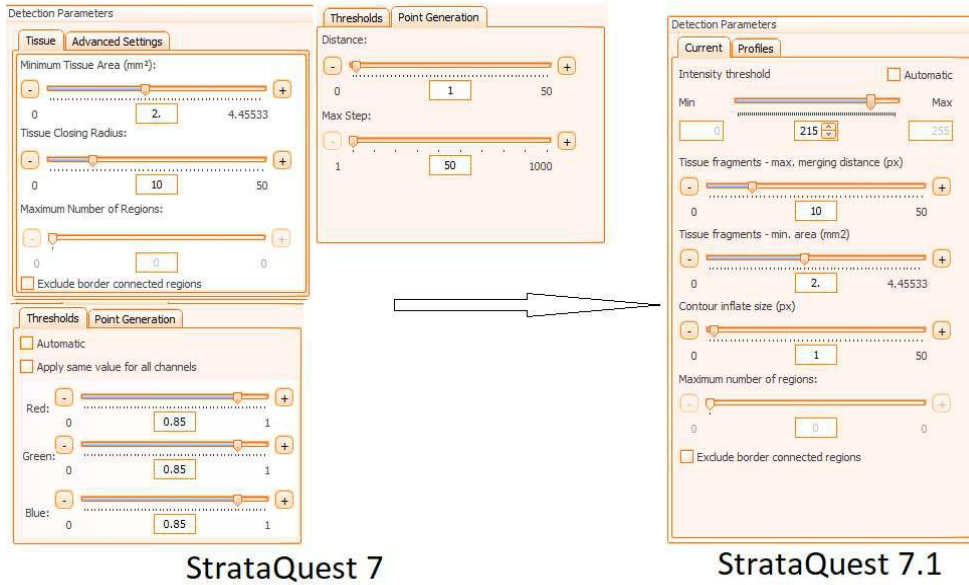


### ➤ Detection improvements

- As tissue detection runs internally on a gray image, in order to facilitate the proper selection of the threshold, it's also possible to see the gray image.



- Tissue Detection parameters have been simplified – now there is a single Intensity threshold and Max Step parameter from Point Generation has been removed.
- The layout of the parameters has been reworked so the user can see all of them at once and match the order in which they are considered by the algorithm. Profiles have been moved to another tab.



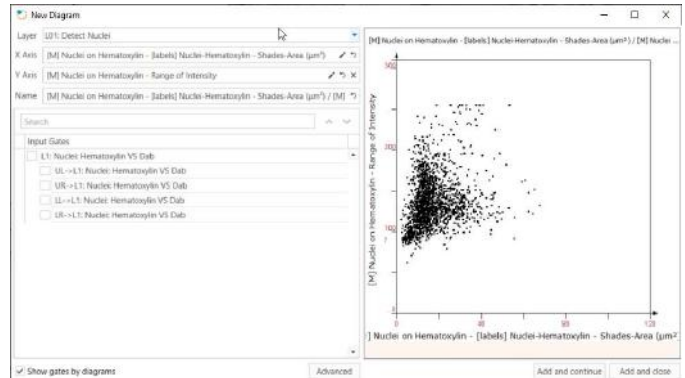
StrataQuest 7

StrataQuest 7.1

## Usability and Features

➤ **New diagram window:** There is a new “New Diagram” window that replaces the individual Scattergram and Histogram

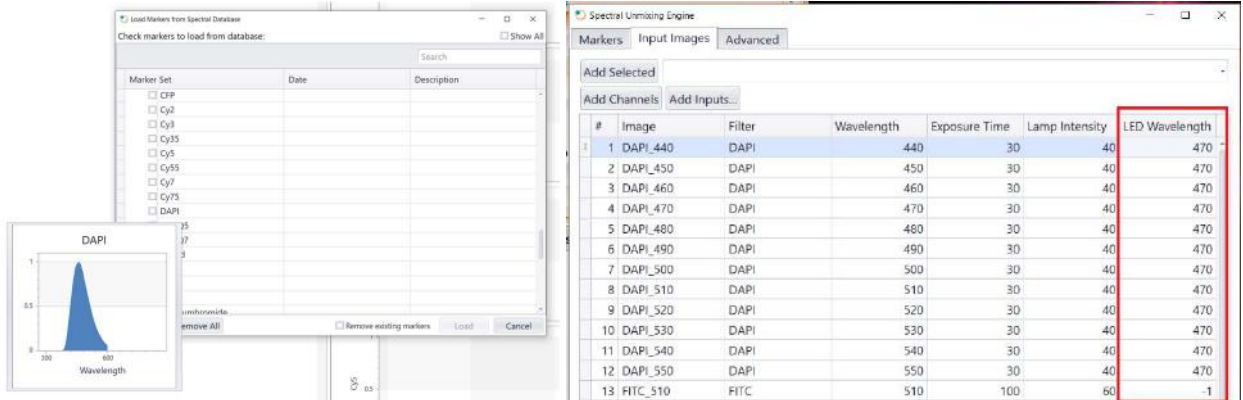
- Preview of the diagram is shown;
- If you select X Axis only - you define a histogram; and if you select both X and Y - you define a scattergram;
- You can rename axis upon diagram definition;
- You can change the axis of a diagram upon editing;
- You can change the type of diagram upon editing;
- The input gates can be grouped by diagram (default, configurable) and you also have option to search for a diagram;
- Some rarely used options are shown only when “Advanced” is clicked.



➤ **Predefined markers for spectral imaging**

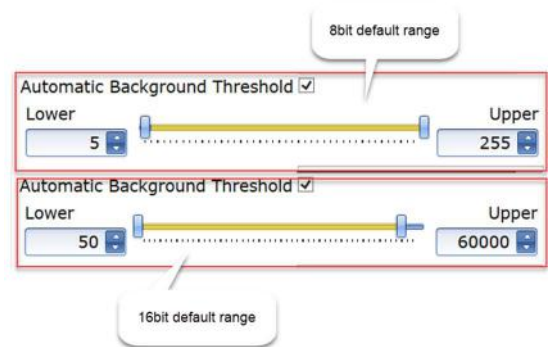
- For using the predefined markers, the software needs to know the excitation wavelength of the light source which is normally read from TissueFAXS project file, but for older projects or when it is unavailable it can also be manually input.

## StrataQuest Features Overview



### 16bit range adjustment

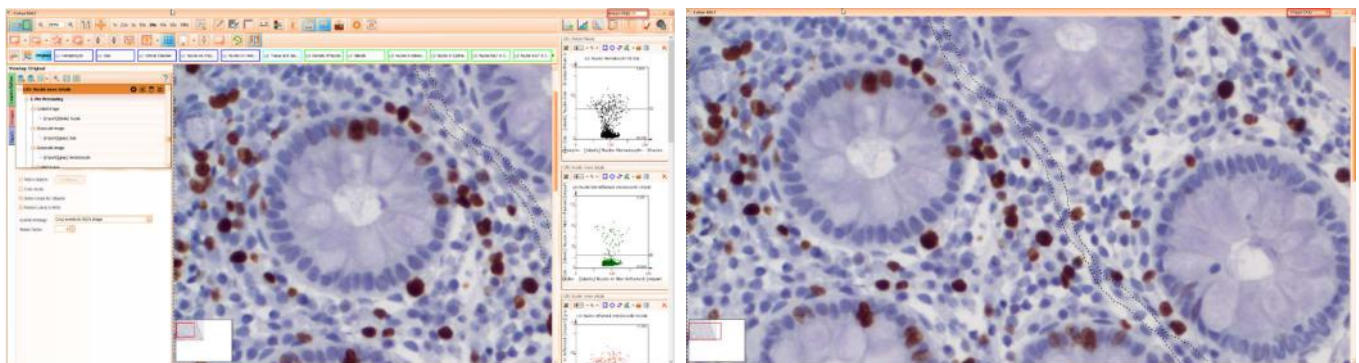
- When changing input from 8bit to 16bit the thresholds are now automatically adjusted when needed to a 16bit relevant value. This should avoid strange results when user forgets to adjust the values. This works for Nuclei, Area, Dots, Membrane and BOM.



## User Interface and Visualization

### Image-only view

- Allows visualizing only the image within the viewer in a full screen. This is useful when you want to focus on image results, presentations or when using a tablet input device for manual drawing.

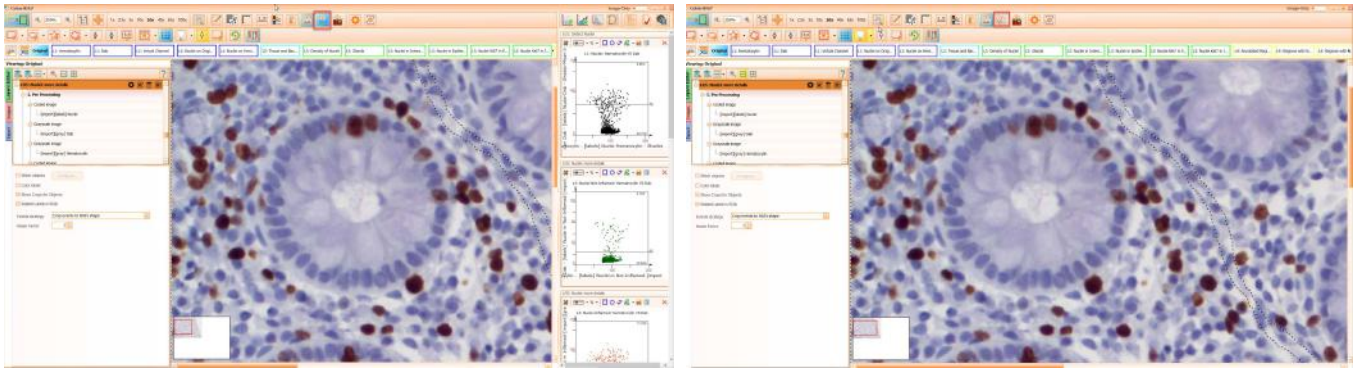


### Show diagrams button

- Allows showing/hiding **Diagrams** section

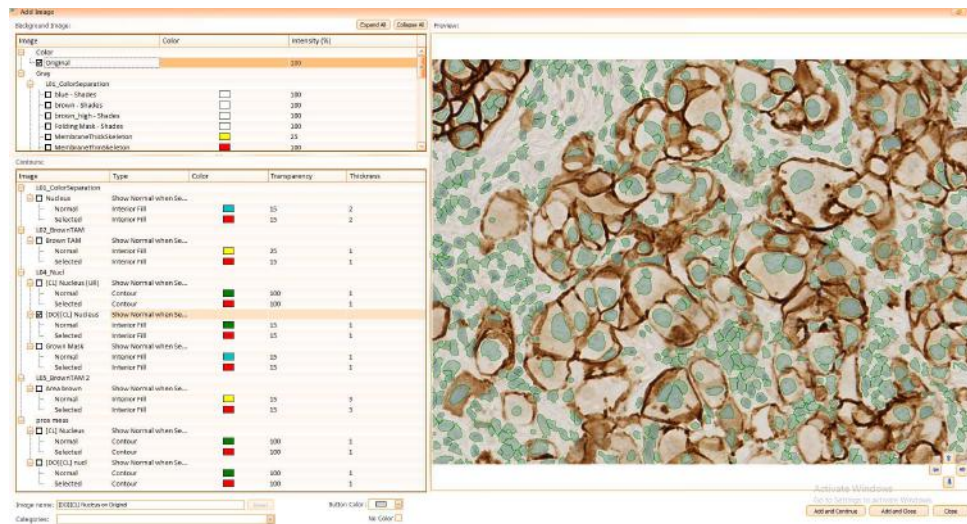


## StrataQuest Features Overview



### ➤ Show diagrams button

- Allows showing/hiding **Diagrams** section: This window is now resizable and it can also be maximized to take entire screen size. The three main areas can be resized by using the resize grippers between them.



## Import

### ➤ Import BigTIFF multi-page

- This is a new Import Source available only in FL, single imports (no batch). It will read sample channels from the selected TIFF pages (directories). All selected pages must have the same size in pixels and the user has to enter the name of the channels. This is different from standard BigTIFF import (where the channel is taken from the file name) or OME-TIFF (where the channel name is read from the OME Metadata).