TISSUEQUEST

Features Overview V6.0 - V7.1

V6.0

➢ x64 support and Intel IPP upgrade

- HistoQuest 6.0 comes with new features which improve handling of large samples/number of samples in one project as well as increase the software's speed:
- Full 64 bit support will greatly increase the number of samples which can be analyzed in one project.
- By implementing x64 support, the user will no longer receive "not enough memory" kind of messages from the application.
- The processing libraries have been updated in order to take advantage of the latest processors.
- The effective speed increase is up to 40%.
- Examples:

Project and number of FOVs	***TissueQuest 4.0***	***TissueQuest 6.0 – 64 bit***
630 FOVs	774 seconds No. of events after analysis: 513259	533 seconds
117 FOVs	143 seconds No. of events: 65278	92 seconds
2160 FOVs	1671 seconds No. of events: 649731	1152 seconds

➢ Cache updates

- TissueQuest 6.0 will use the cache directly from TissueFAXS. The cache is not copied anymore, so no more extra time or space is required. Also, this eliminates waiting time while the project is loaded into the viewer.
- TissueQuest 6.0 will build a faster and smaller cache by combining 4x4 images instead of 2x2 images.
- New cache technology that improves building time up to 100% and reduces space on hard disk even up to 400%.

➢ Reading on the fly for Zeiss and Perkin Elmer

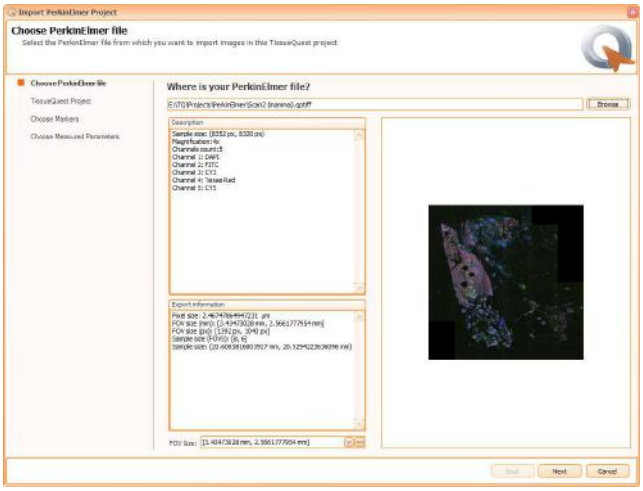
- When importing images from a **Zeiss/Perkin Elmer** file, the images will be read on the fly during the import, which means they will not be extracted or saved on your computer. The import process will be faster and memory saving.

➢ Batch Zeiss

- It is possible to import multiple Zeiss files to create a HistoQuest project.
- To choose desired project, find it and select in the left panel, then press **Add** button to bring it in the Selected projects panel in the right.

➢ Import FL Perkin Elmer

- Importing **Perkin Elmer** files is now available in TissueQuest.

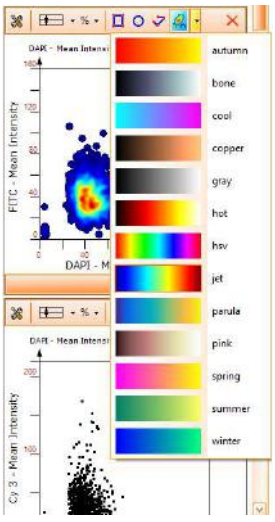


➢ Fluorescence Illumination Correction

- Occasionally, on the acquired images, some shades may appear. They can be caused by imperfections of any component of the lightpath (FL Lamp, filters etc.), specks/impurities on the camera/objective.
- **TissueQuest** allows you fixing such shading problems in fluorescence experiments by using the **FL Shading Correction** function. To apply shading correction, a *correction image* is required (mandatory).
- The **correction image** is an image computed in order to store information about the shades in the light path. By applying this image to a certain region, the shades will be eliminated and the images will be uniformly illuminated.
- The shading reference image can be applied to z-stacks as well.
- The shading reference is specific for each channel, including confocal channels.

➢ Heatmap diagrams

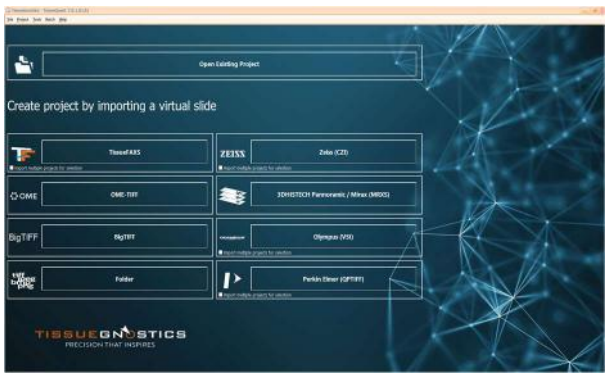
- **HistoQuest** includes a *heat map* feature for a better understanding of processed data. The graphical representation specific to a heat map shows up data where the individual values contained in a matrix are represented as colors.
- To use heat map feature, press **Draw Heat Map** button from the scattergram toolbar ( ) and the dots of the scattergram will be automatically converted into a heat map image. You can also choose the graphical appearance of the heat map.



V7.0

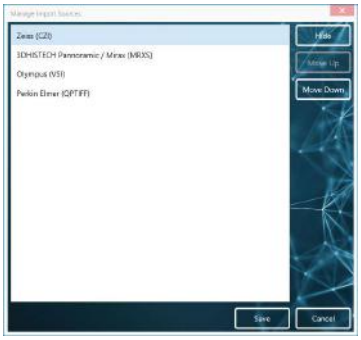
➢ New Startup Screen

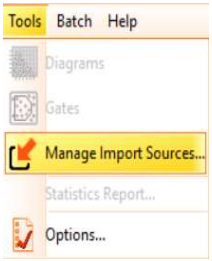
- **TissueQuest 7.0** comes with a new graphic interface for the startup screen.



➢ Manage Import Sources

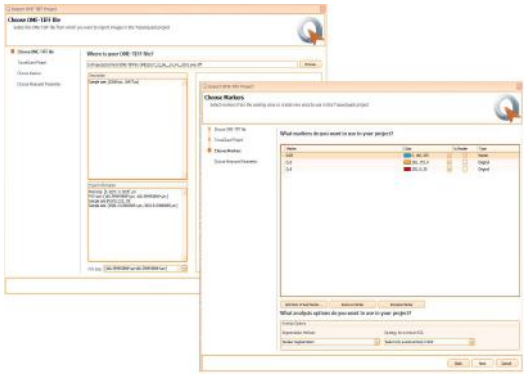
- From the Manage Import Sources, the user can modify the order of the import sources or can hide some of them.
- The new configuration will be saved in a config file that will be used afterwards.





➢ Import OME-TIFF images

- TissueQuest now allows importing OME-TIFF images. The wizard will guide the user to create the new project.
- This import is available with reading on the fly and it is possible to import 16bit projects as well.



➢ Import BigTIFF

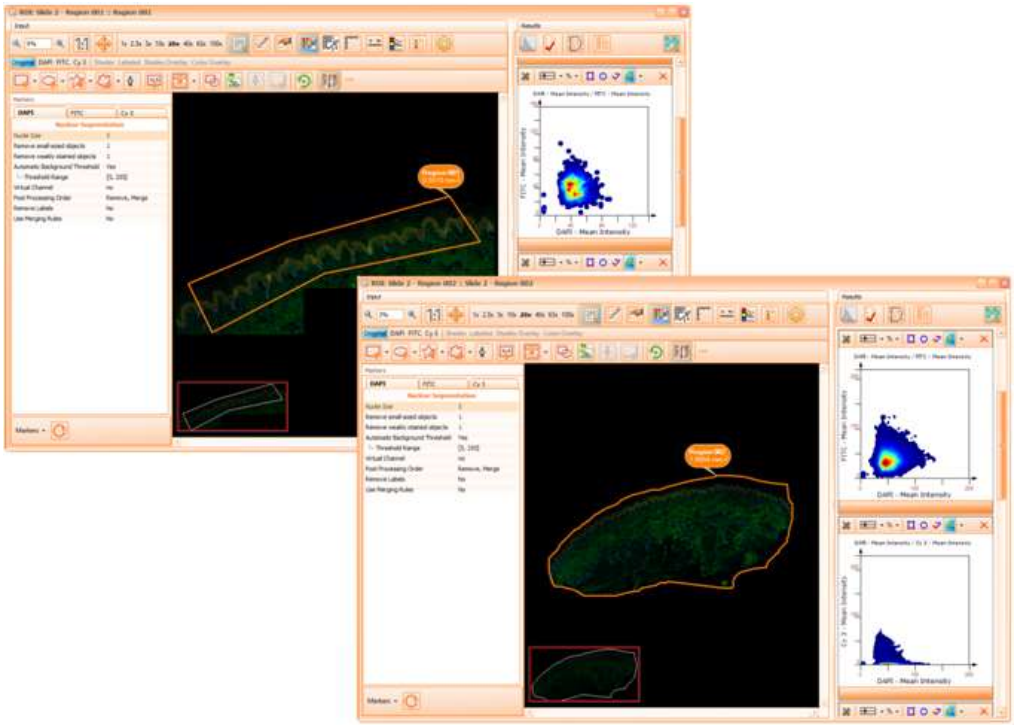
- **TissueQuest** now allows importing BigTIFF images. The wizard will guide the user to create the new project, as shown below.

➢ Import Olympus

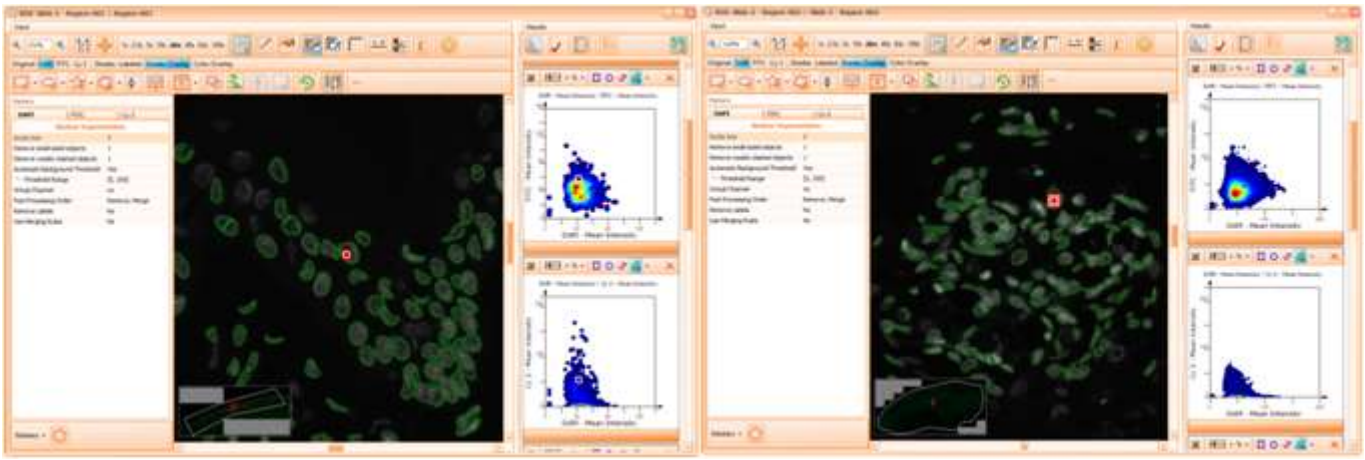
- **TissueQuest** can import **Olympus** files. Batch import is supported and reading on the fly feature is available as well.

➢ Support for Multiple Detail Windows

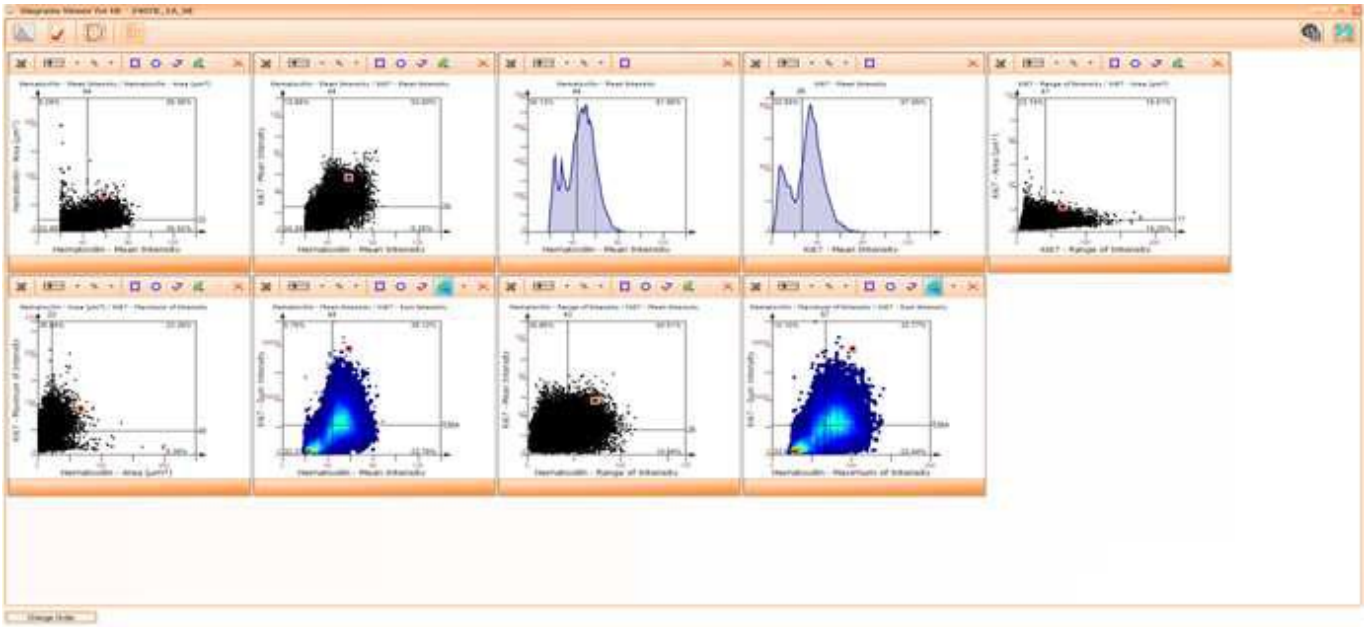
- It is now possible to simultaneously open multiple samples in the **Detail Window**.



- **Support for multiple raw data**: for each detail window you can open a raw data window.
- **Support for backward/forward connection**: for each detail window you can start a backward/forward connection window.

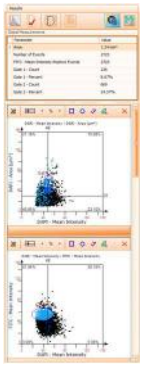


- **Support for scattergram detail window**: for each detail window you can open a scattergram detail. **Detail Manager window**: this feature helps when having many detail windows opened. Show All Diagrams in Detail Window
- You can visualize the diagrams for a processed region in a detail window, by choosing **View/Hide Diagrams from Detail Window** button (). All the diagrams will open in a dedicated detail window.



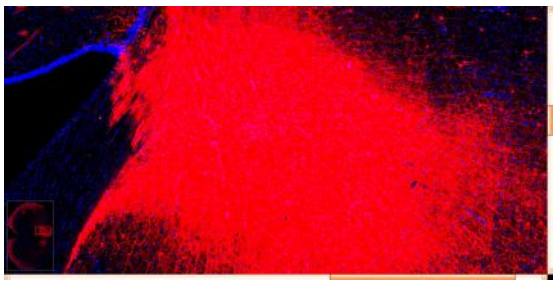
➢ Global Measurements

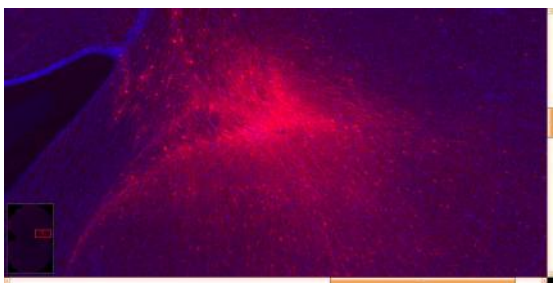
- The global measurements is a new control in **TissueQuest 7**, where the application displays the information about the area of samples/regions, number of events, number of positive events and information about the gates.
- This control is also available in the **Diagrams Viewer.**



➢ Show HDR Image

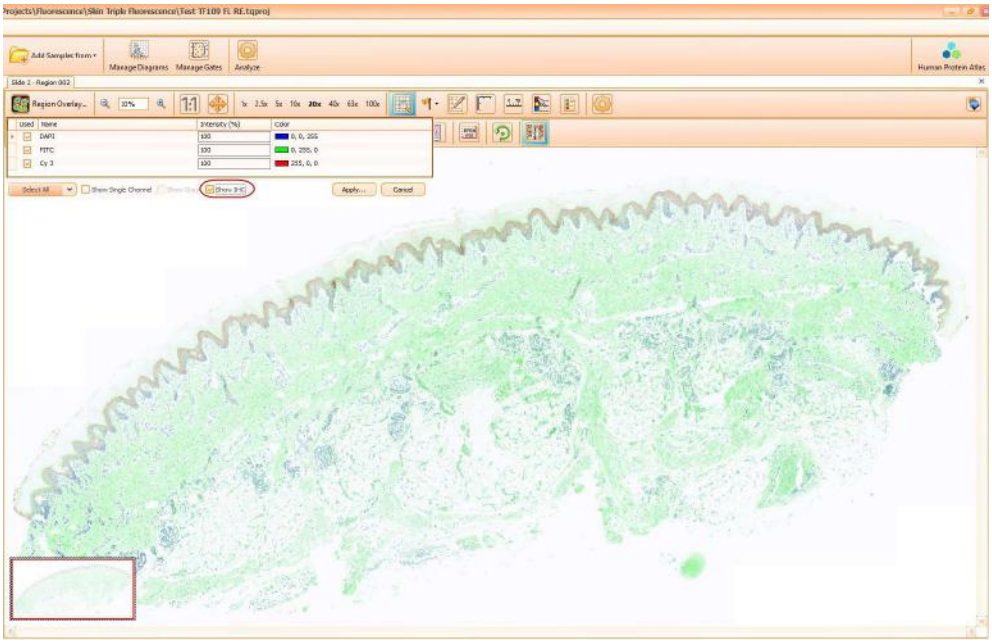
- **TissueQuest** now gives you the possibility to visualize samples as **HDR** images. Use the **HDR** button from the sample viewer toolbar to activate **HDR** visualization mode.





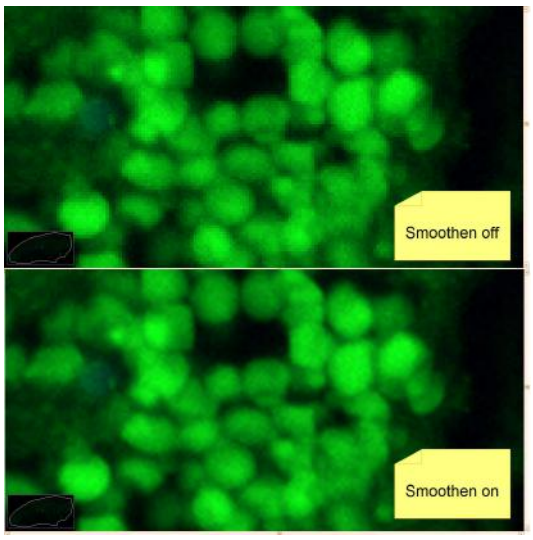
➢ Pseudo-IHC View

- **Pseudo IHC** view mode takes a monochrome image and converts it to a 24bpp color IHC-like image. In other words, a user can visualize individual channel fluorescent images as converted in brightfield images.
- This function it is available for any fluorescent project including 8 or 16 bit.



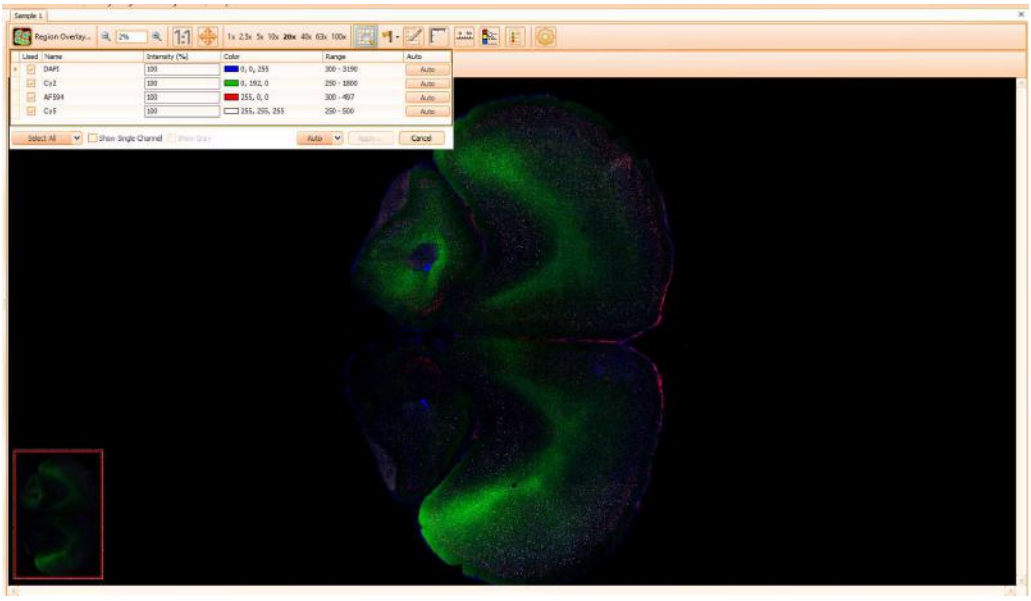
➢ Show Smoothen Image

- **Smoothen Image** button (), found in the main viewer toolbar, is enabled by default in **TissueQuest**.



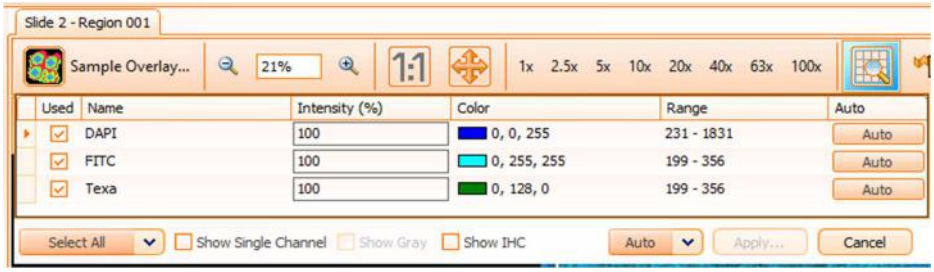
➢ Support for 16bit projects

- **TissueQuest** now supports creating and reading projects with 16bit images. This implies certain changes on the graphical user interface.



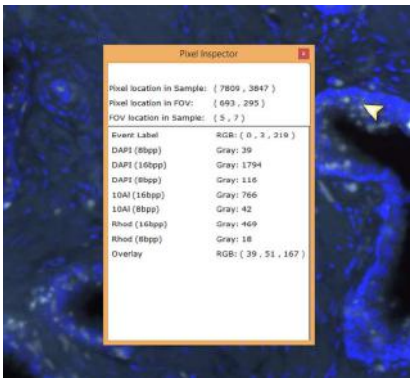
➢ Redesigned region overlay

- To modify settings related to **Region Overlay**, press corresponding button ().
- This window allows you to choose which channels to view in your acquired image. Here, you can adjust the color, light intensity, dynamic range (only for channels acquired with 16bit) for each channel. If more than one channel is selected, clicking **Apply** will yield an overlay image, which is composed of the selected channels according to the set algorithms.



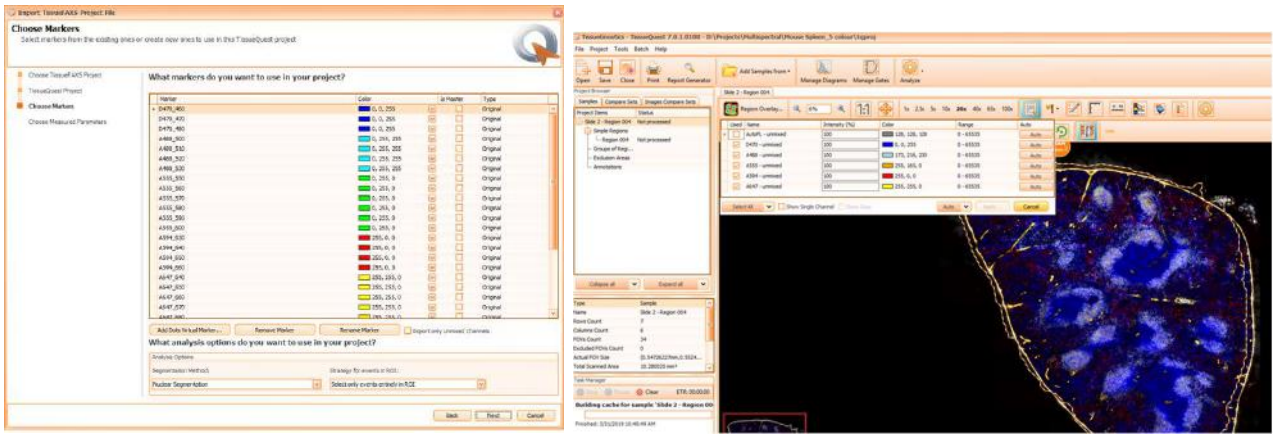
➢ Pixel Inspector

- Pixel Inspector is a tool that allows you visualize information about a pixel selected within the tissue.



➢ Import only unmixed channels from TissueFAXS projects

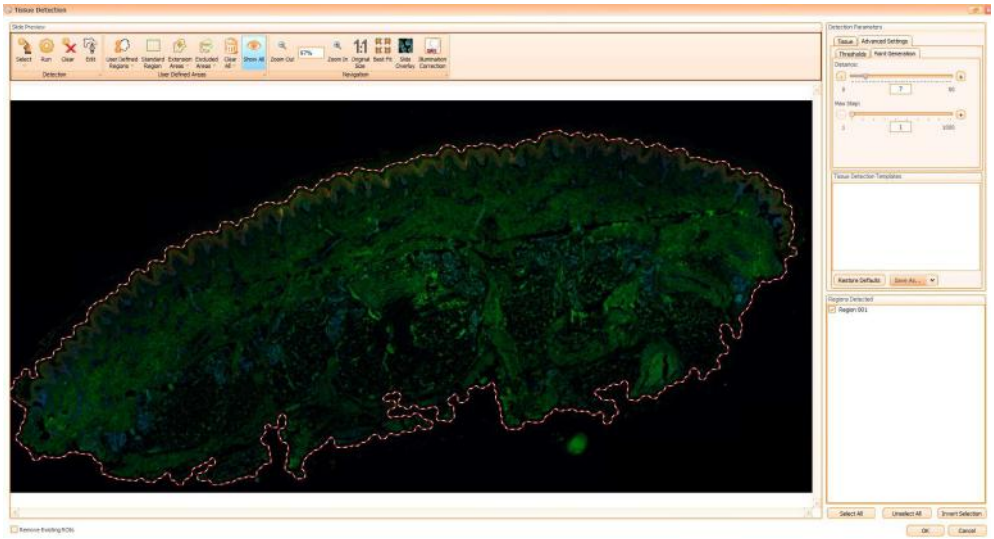
- It is now possible to import from **TissueFAXS** projects only **unmixed channels**.



➢ Tissue Detection feature

- **Tissue detection** feature is now available in **TissueQuest** like it is currently in **StrataQuest** and **TissueFAXS**.
- This tool will perform an automatic detection for the entire sample or from a selected area.
- It brings:

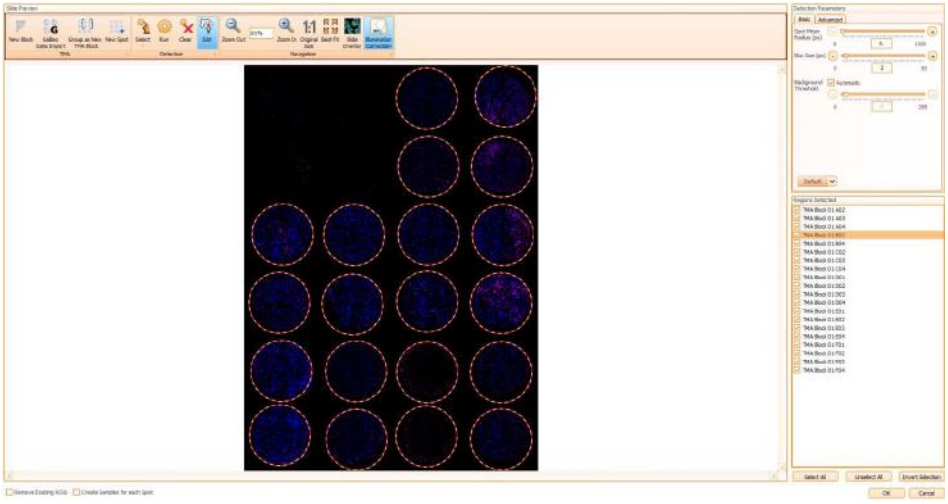
- Interactive Sample Viewer
- Possibility to define Excluded Areas from detection
- Possibility to define Extension Areas included in detection
- Edit detected regions
- Manual definition of regions
- Run detection on a selected area



➢ TMA Detection feature

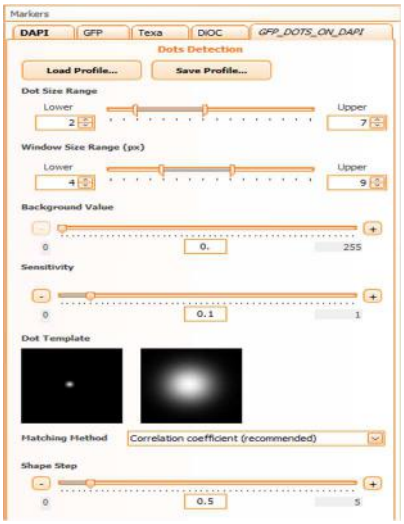
- TMA detection feature is now available in **TissueQuest** like it is currently in StrataQuest, HistoQuest and TissueFAXS. This tool will perform an automatic detection for the entire sample
- It brings:

- Interactive Sample Viewer
- Possibility to define new TMA block
- Possibility to group TMA spots as new TMA block
- Possibility to manually define new TMA spot
- Edit detected TMAs
- Run detection on a selected area



➢ Add DOTS Detection parameters in user interface

- It is now easier to adjust the parameters for DOTS detection, as the user can manually modify the values depending on each staining.



➢ Human Protein Atlas

- **Human Protein Atlas** can be accessed in **TissueQuest** from the main toolbar button (

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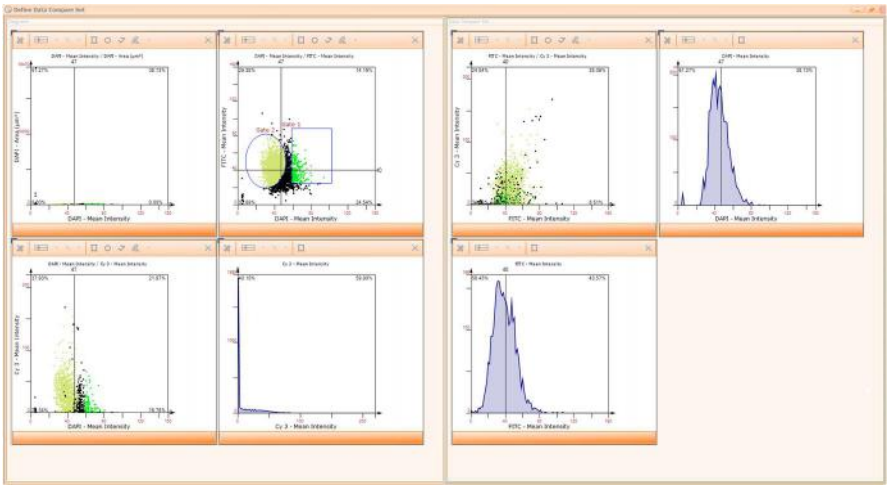
➢ Compare sets: update with Define by Drag and Drop

The **Compare Sets** feature includes now the possibility to define by drag and drop.

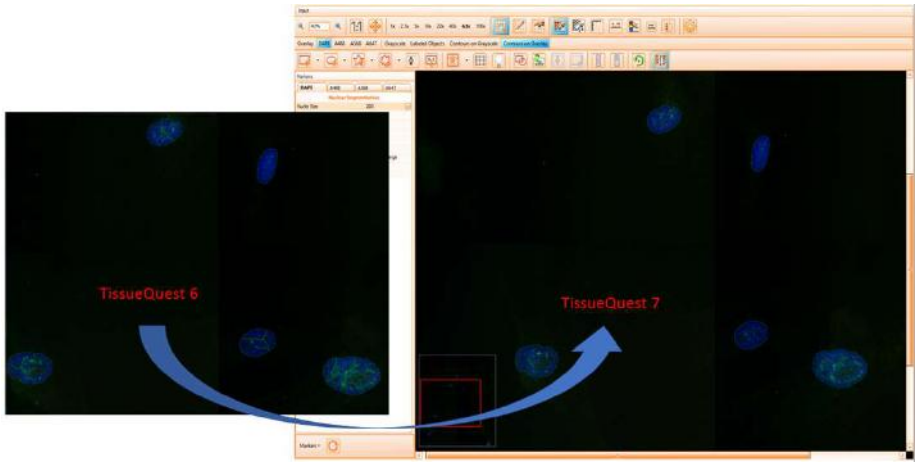


➢ Automatic Backup for Experiment Versions

- TissueQuest automatically makes backups for each experiment once in a while, and stores these backups in a database.
- Autosaving is done once in every 5 minutes.

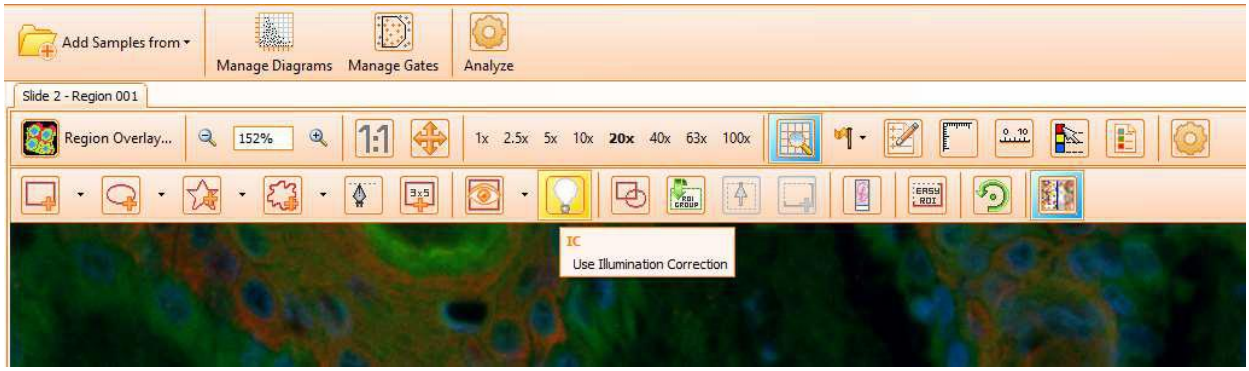
➢ Large nuclei detection in nuclear segmentation

- Nuclear segmentation now allows detecting large nuclei by increasing **Nuclei Size** up to 200.



➢ Illumination Correction button added to main toolbar

- The **Illumination Correction** button ( ) can be opened from the main toolbar.



➢ Import Multiple Perkin Elmer Projects

- Import Multiple Perkin Elmer Projects is now possible in TissueQuest.

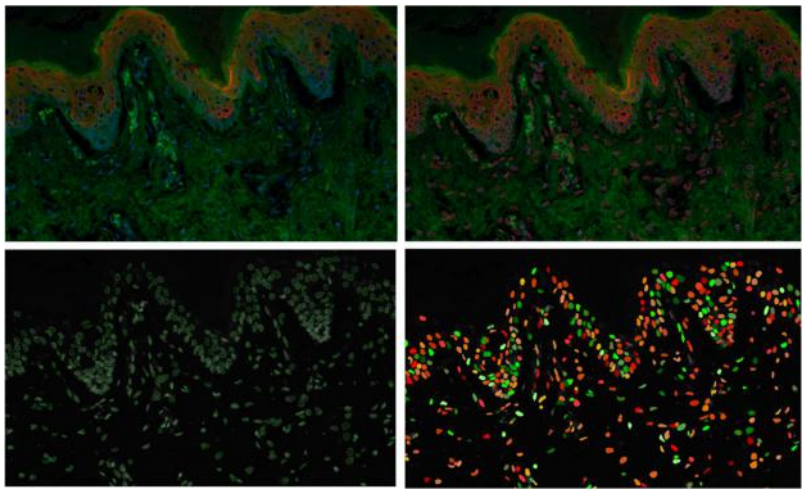
➢ Show Region Name on the viewer

- **Show Region Name** on the viewer button: this button shows/hides the region name on the sample.

V7.1

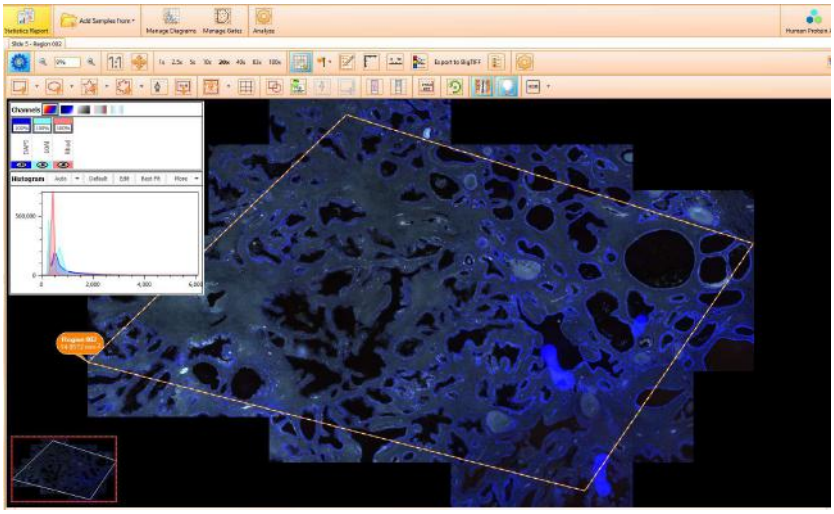
➢ Nuclear segmentation using DNN

- TissueQuest now has a new segmentation method for nuclei detection, called Nuclear segmentation – Deep Learning. It is a Nuclear segmentation that uses Deep Neural Networks. It can work on gray images (corresponding model must be selected).

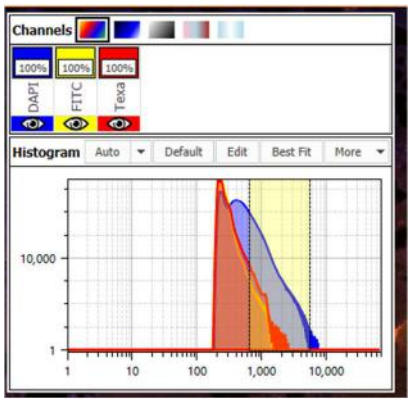


➢ New Region Overlay control

- The Region Overlay has been redesigned for improved user experience and faster feedback.

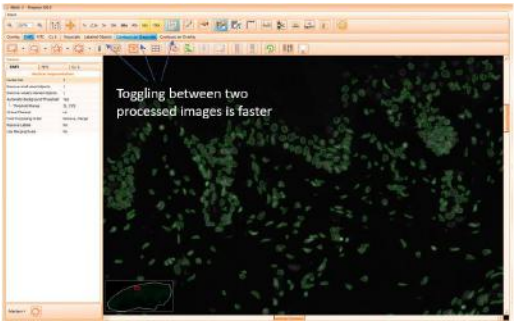


- View mode: Overlay, Single Channel Color, Single Channel Gray, Pseudo-IHC Overlay, Single Pseudo-IHC.
- Changes are visible as you do them, no need to apply.
- Histogram is visible in FL projects.
- Histogram can be zoomed with scroll mouse wheel and panned with left mouse button.
- Double click on 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.
- Grid visibility and logarithmic scales.



➢ New caching mechanism

- Fast image switching;
- Image cache which holds last used images;
- Default size is 2.5GB but can be configured;
- Works on any image (original or processed);
- Improves image switching in viewer – i.e. when toggling between two processed images



➢ Export as BigTIFF

- The results (masks) of an entire virtual slide can be now exported as BigTIFF.

➢ Reading on the fly for 3DHistech (Pannoramic, Mirax)

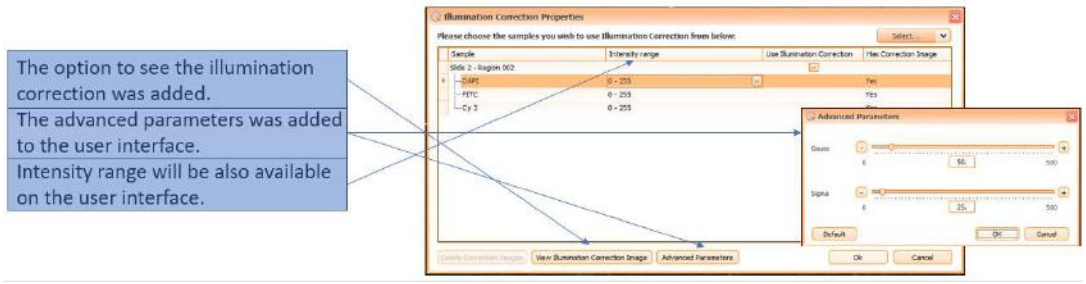
- Reading on the fly is available for 3DHistech (Pannoramic, Mirax), which means almost instantly created projects and no more images extracted on the hard disk.

➢ Batch import for 3DHistech (Pannoramic, Mirax)

- Batch import is available for 3DHistech (Pannoramic, Mirax).

➢ Shading correction improvements

The computation of shading correction has been modified to take advantage of multiple cores in the CPU. This means that for bigger projects there will be a noticeable speed improvement, depending on your configuration.

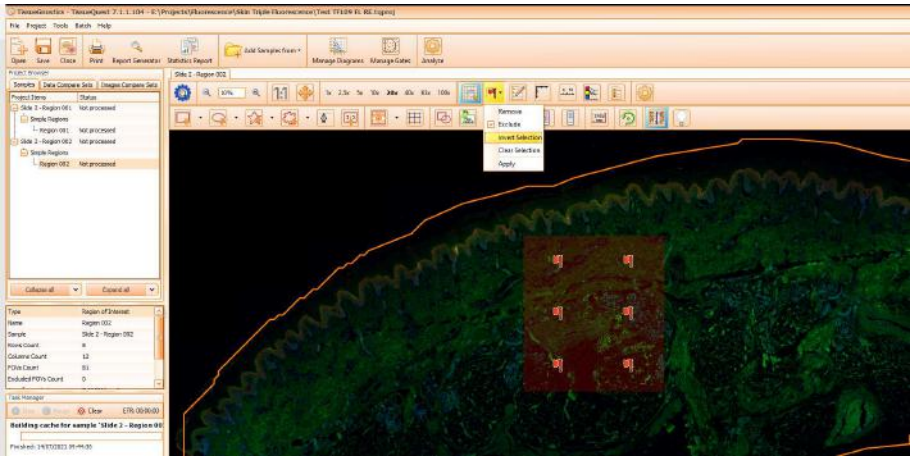


➢ Comments from TissueFAXS available in TissueQuest

- Comments from TissueFAXS (slides, regions), patient information and patient number are available in TissueQuest.

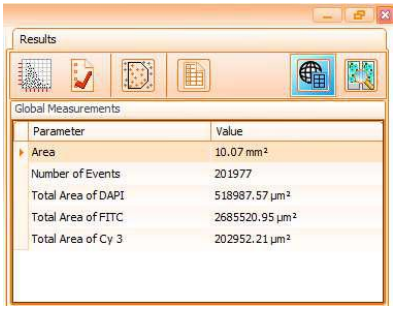
➢ Invert selection during excluding/removing FOVs

- Added flags selection can be inverted for an easier excluding/removing.



➢ Show Total Area in Global Measurements when Total Area Measurement is used

- When **Total Area Measurement** is used, TissueQuest will display in Global Measurements section from detail window the total area for every marker.



➢ Adjust number of cores

- Number of cores set in TissueQuest is automatically adjusted according to the number of cores present on any given machine (currently the default is 3 cores are used).

➢ Backward Connection icons

- In order to be more intuitive, Backward connection data viewing has now icons.