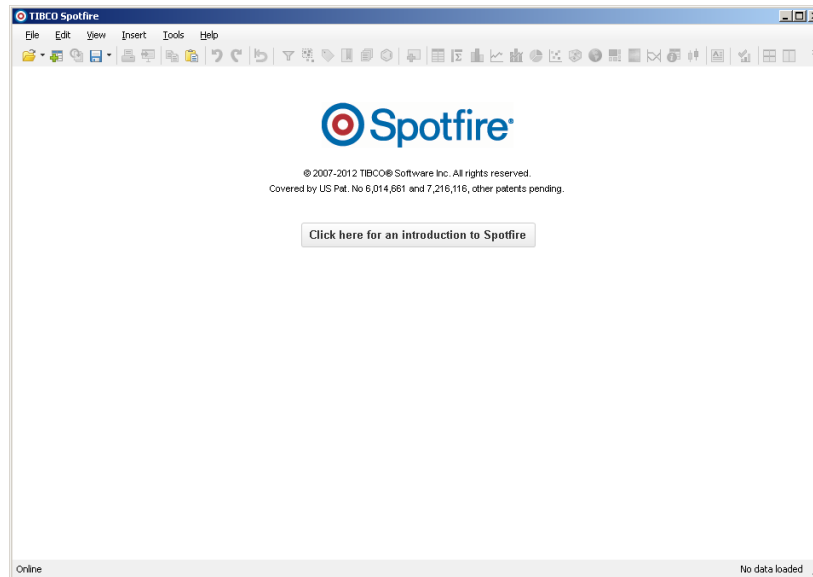


CellProfiler-Spotfire Integration

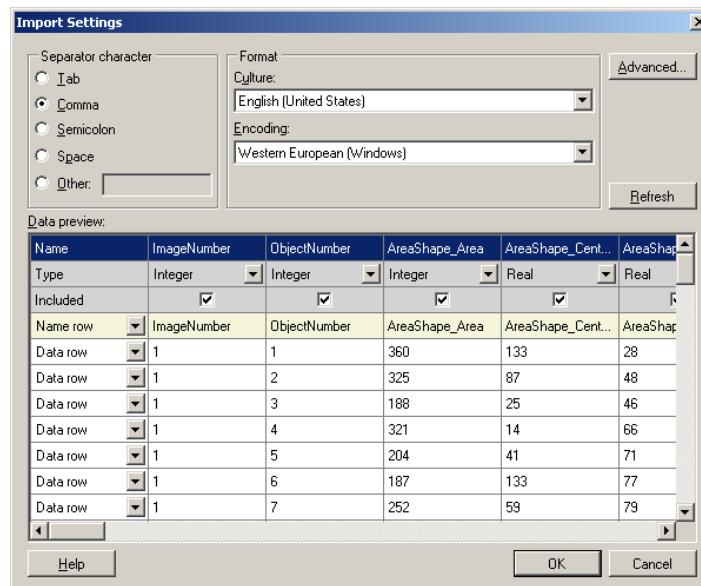
TIBCO Spotfire (<http://spotfire.tibco.com/>) is an analytics and business intelligence platform for analysis of data by predictive and complex statistics.

How to use CellProfiler 2.1 output in Spotfire DecisionSite

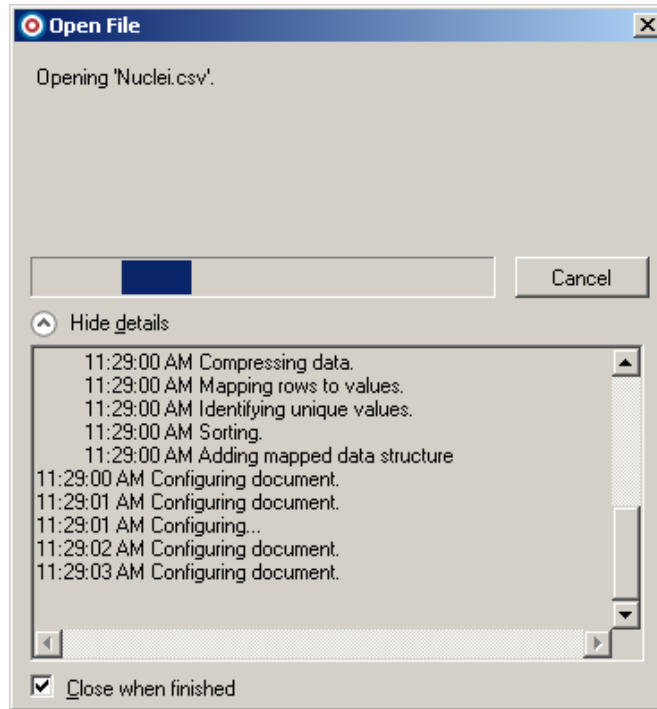
1. Run your CellProfiler pipeline or project and save the per-image or per-image measurement output as a comma-delimited text file (CSV) using the **ExportToSpreadsheet** module. For this example, we will be using the demonstration pipeline accessible from the Welcome screen in CellProfiler.
2. Start the Spotfire application.



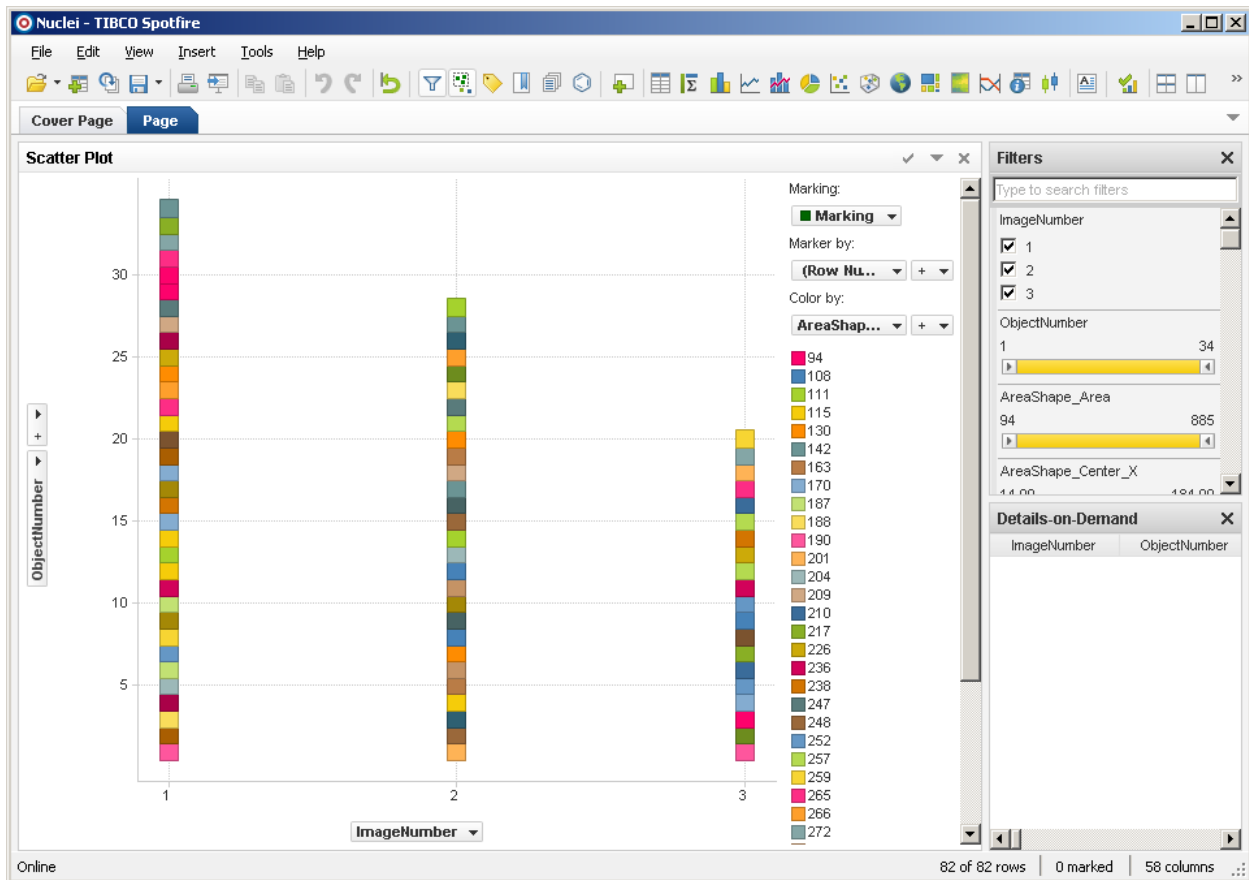
3. Go to **File > Open...** and pick the CellProfiler CSV you would like to view. In this case, we are importing the per-object measurement file "Nuclei.csv".
4. Confirm the data import settings (column data formats, etc) and click "OK".



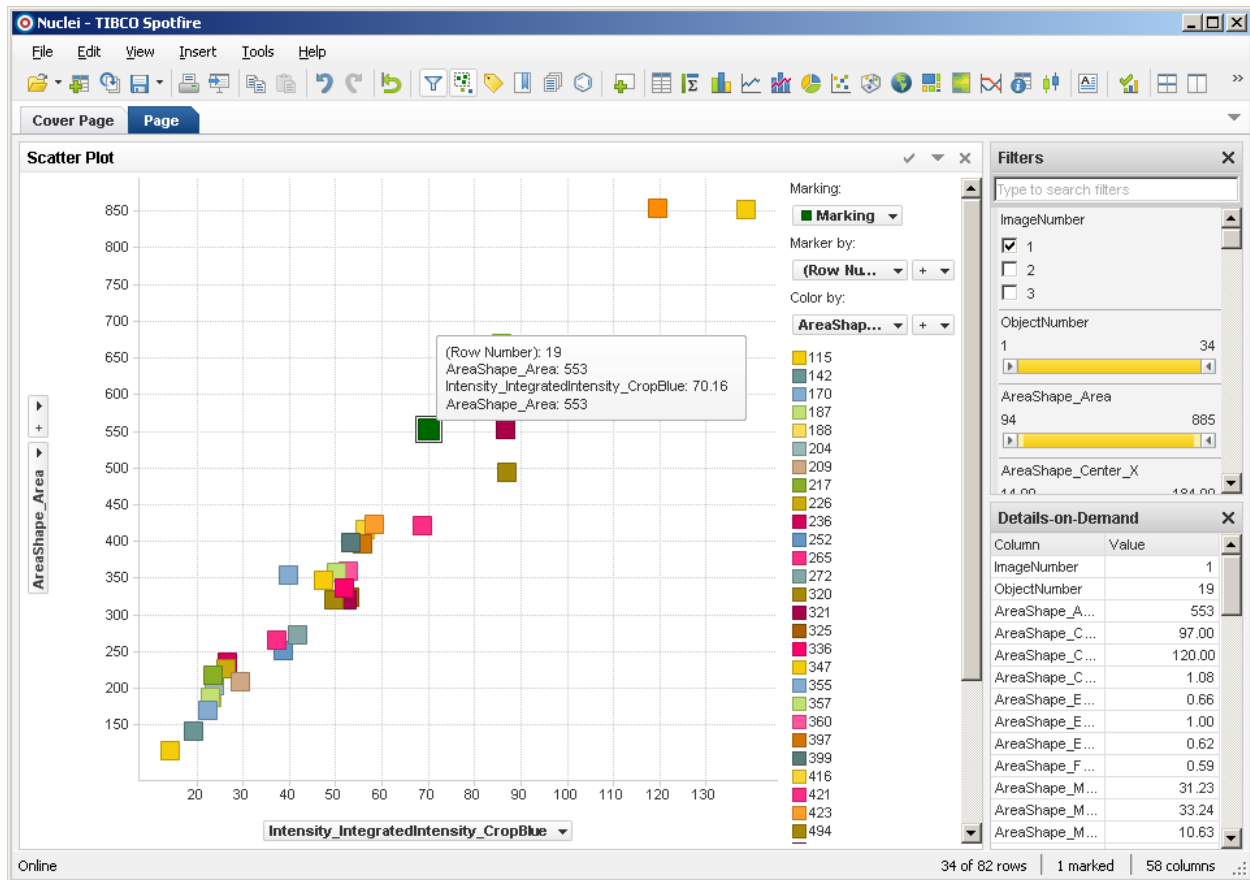
The program will spend a few moments importing the data.



5. The initial display in Spotfire will look like this, with ImageNumber and ObjectNumber indices plotted against each other as a scatter plot (which is not terribly informative):



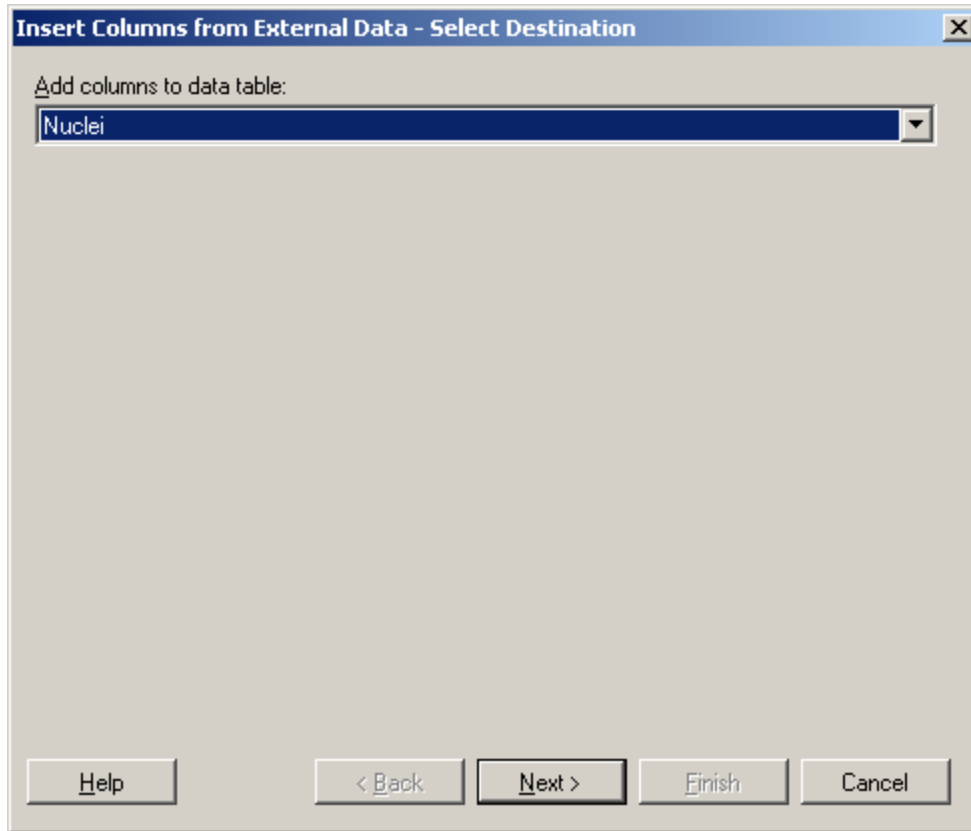
6. At this point, you are free to select any of the various data columns, e.g., nuclei area vs. integrated intensity of the DNA channel. You can hover over or click on any data point to see more information about the measurements associated with that object (shown in the “Details-on-Demand” panel).



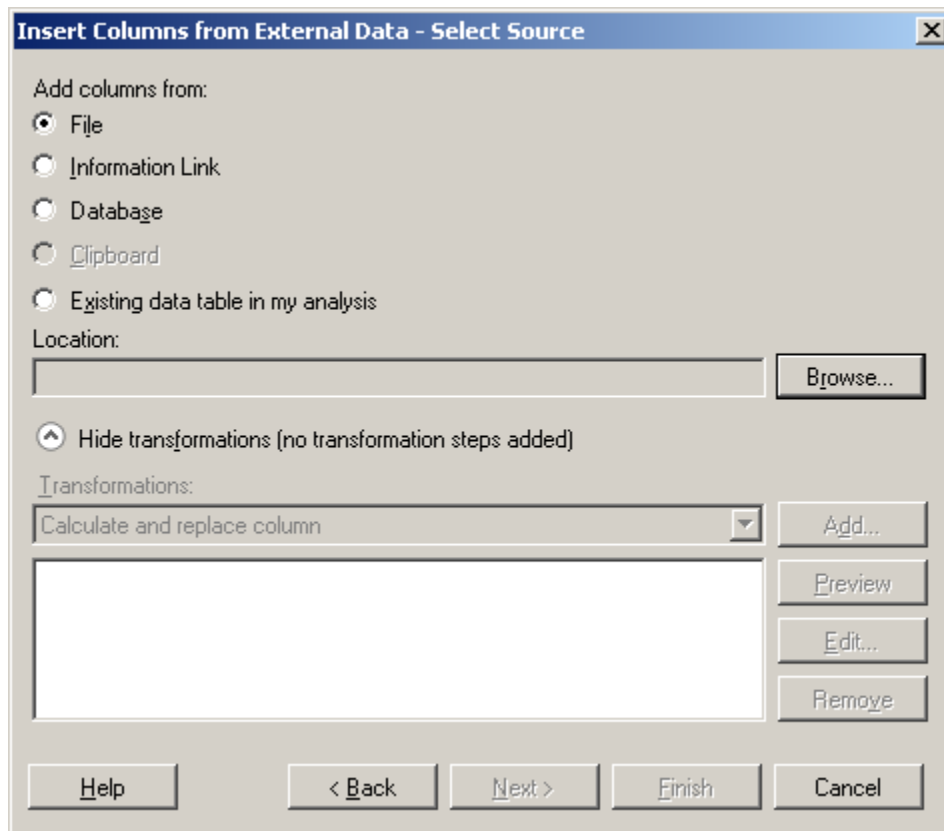
Linking images to CellProfiler 2.1 data in Spotfire DecisionSite

1. Run your CellProfiler pipeline/project as before to output a spreadsheet of data. However, in this case, you must make sure to also output the per-image spreadsheet if not already doing so). See the module for ExportToSpreasheet for additional help in doing so.
2. Load your CellProfiler per-object data into Spotfire following the directions in “How to use CellProfiler output in Spotfire” above.

- Go to *Insert > Columns from External Data* to obtain the dialog box below. From this box, click 'Next >'.



- In the "Select Source" dialog box, select "File" for "Add columns from:". Click the "Browse" button to select the location of the per-image CSV (in this case, named "Image.csv").



5. Selecting a CSV file will prompt you to confirm the column settings. Click “OK” when done.

Import Settings

Separator character:

- Tab
- Comma
- Semicolon
- Space
- Other:

Format:

Culture: English (United States)

Encoding: Western European (Windows)

Advanced... Refresh

Data preview:

Name	Count_Cells	Count_Cytoplasm	Count_Nuclei	Crop_AreaRetain...	Crop_AreaRe
Type	Real	Real	Real	Integer	Integer
Included	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Name row	Count_Cells	Count_Cytoplasm	Count_Nuclei	Crop_AreaRetain...	Crop_AreaRe
Data row	34	34	34	39601	39601
Data row	28	28	28	39601	39601
Data row	20	20	20	39601	39601

Help OK Cancel

6. With the per-image data specified, click “Next >” to proceed.

Insert Columns from External Data - Select Source

Add columns from:

- File
- Information Link
- Database
- Clipboard
- Existing data table in my analysis

Location: \\iodine\imaging_docs\EducationalMaterials\WrittenTutorials\SpotfireIntegr... Browse...

Hide transformations (no transformation steps added)

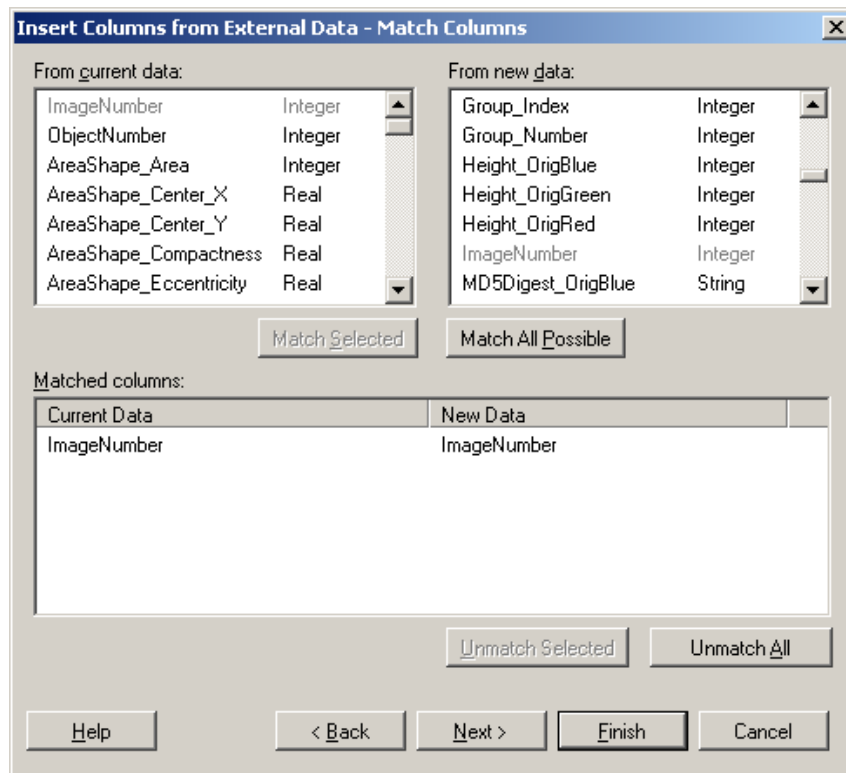
Transformations:

Calculate and replace column Add... Preview Edit... Remove

Help < Back Next > Finish Cancel

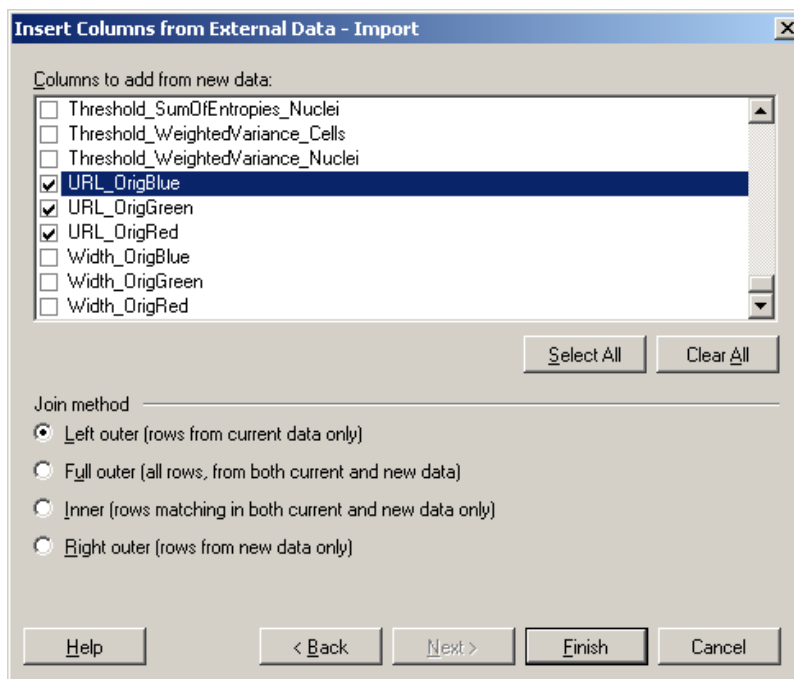
7. In the “Match Columns” dialog box, you must link the indexing column from the already-loaded per-object spreadsheet with the corresponding index from the per-image spreadsheet to be loaded.

Select “ImageNumber” from the “From current data” column and “ImageNumber” from the “From new data” column. Click the “Match Selected” button to pair these columns and then click “Next >”.

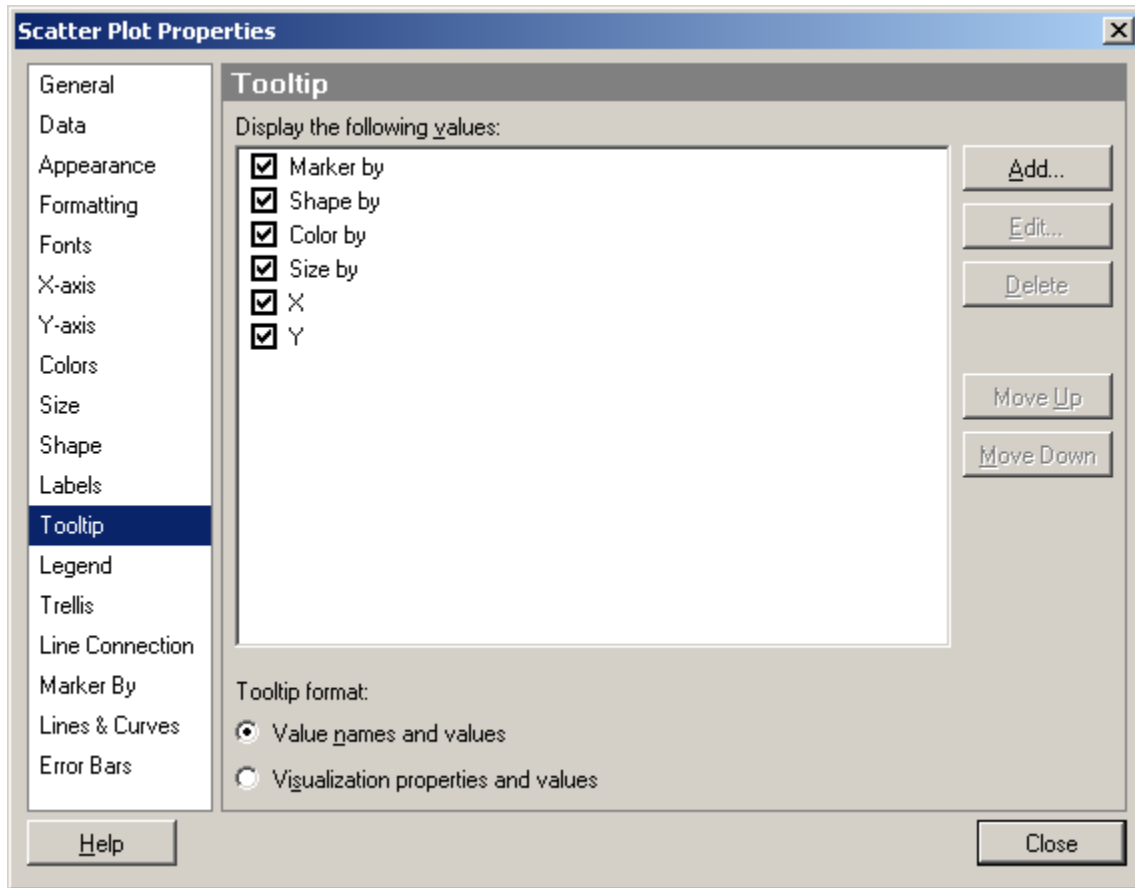


8. In the “Import” dialog box, select the columns prefixed with “URL” from the listing in “Columns to add”. Each URL entry corresponds to a URL of the channels loaded in the CellProfiler pipeline. You are free to select as many of the channels to show as you wish. In this case, all three channels (OrigBlue, OrigGreen, and OrigRed) are selected.

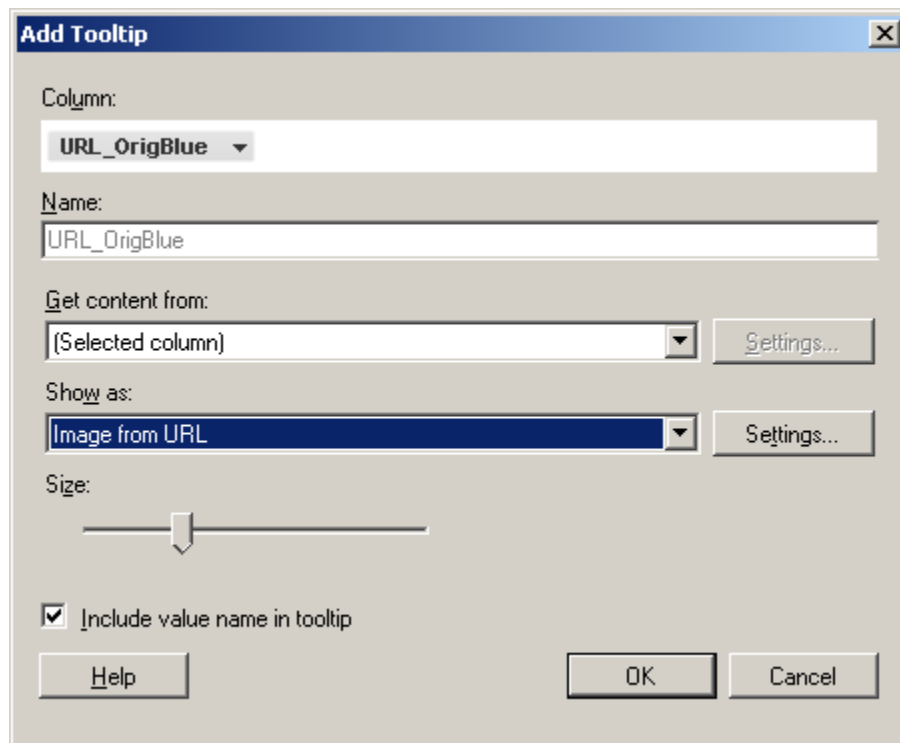
Leave the join method at the default of “Left outer” and then click the “Finish” button.



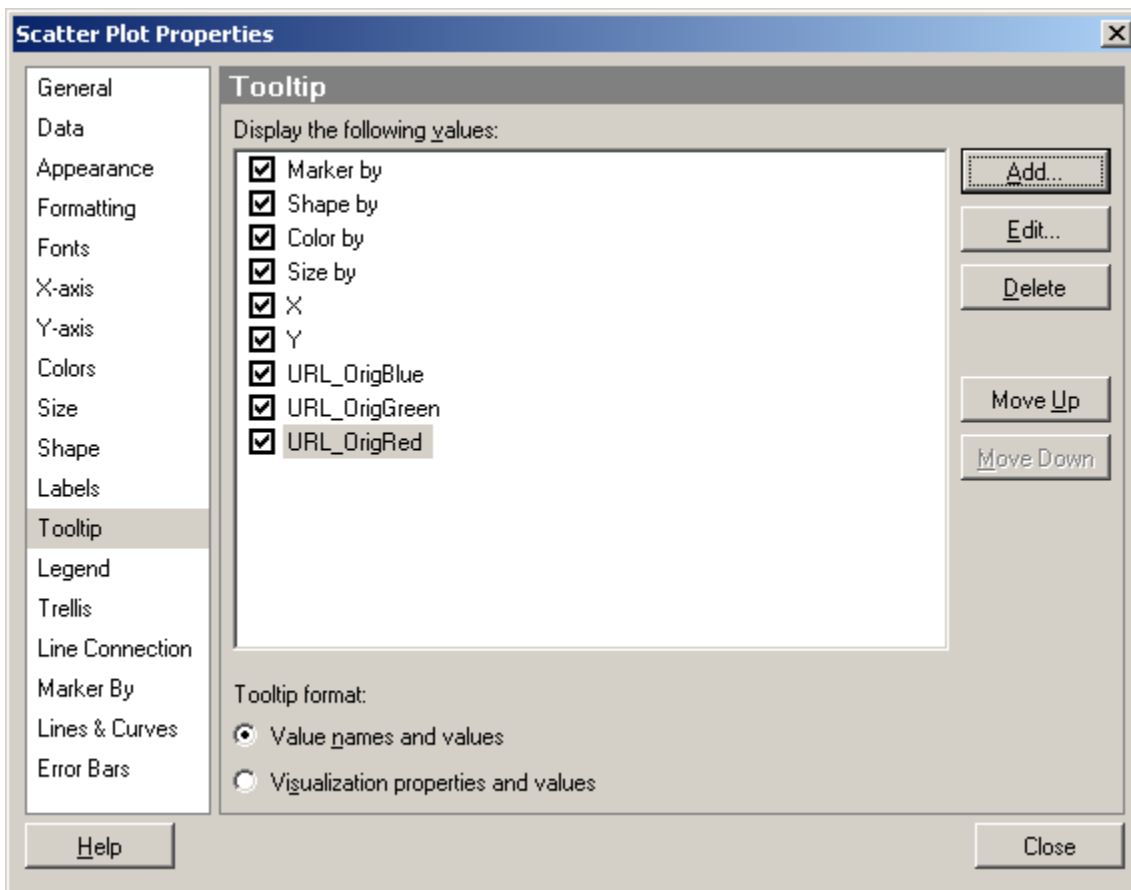
9. From the main Spotfire interface, select *Edit > Visualization Properties*. Select “Tooltip” for the properties and then click the “Add...” button.



10. For the “Add Tooltip” dialog, select the desired channel to show (in this case, “URL_OrigBlue”) for “Column” and “Image from URL” under “Show as:”. Click “OK” when done.



11. The link to the image channels(s) are now added to the list of tooltips. Click "Close".



12. Hovering over a data point will now show a tooltip complete with a thumbnail of the originating channels.

