Building publication ready scientific figure with ScientiFig

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01/09/15

Urfist de Bordeaux

Figures

Artistic Figures

(public domain from http://pixabay.com/)

Scientific Figures

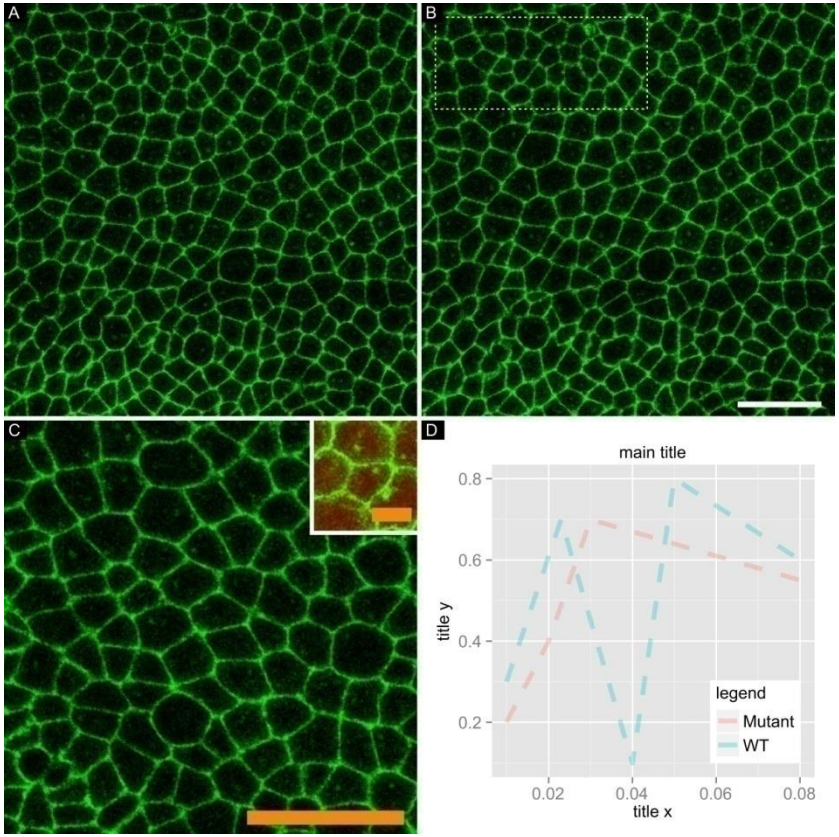


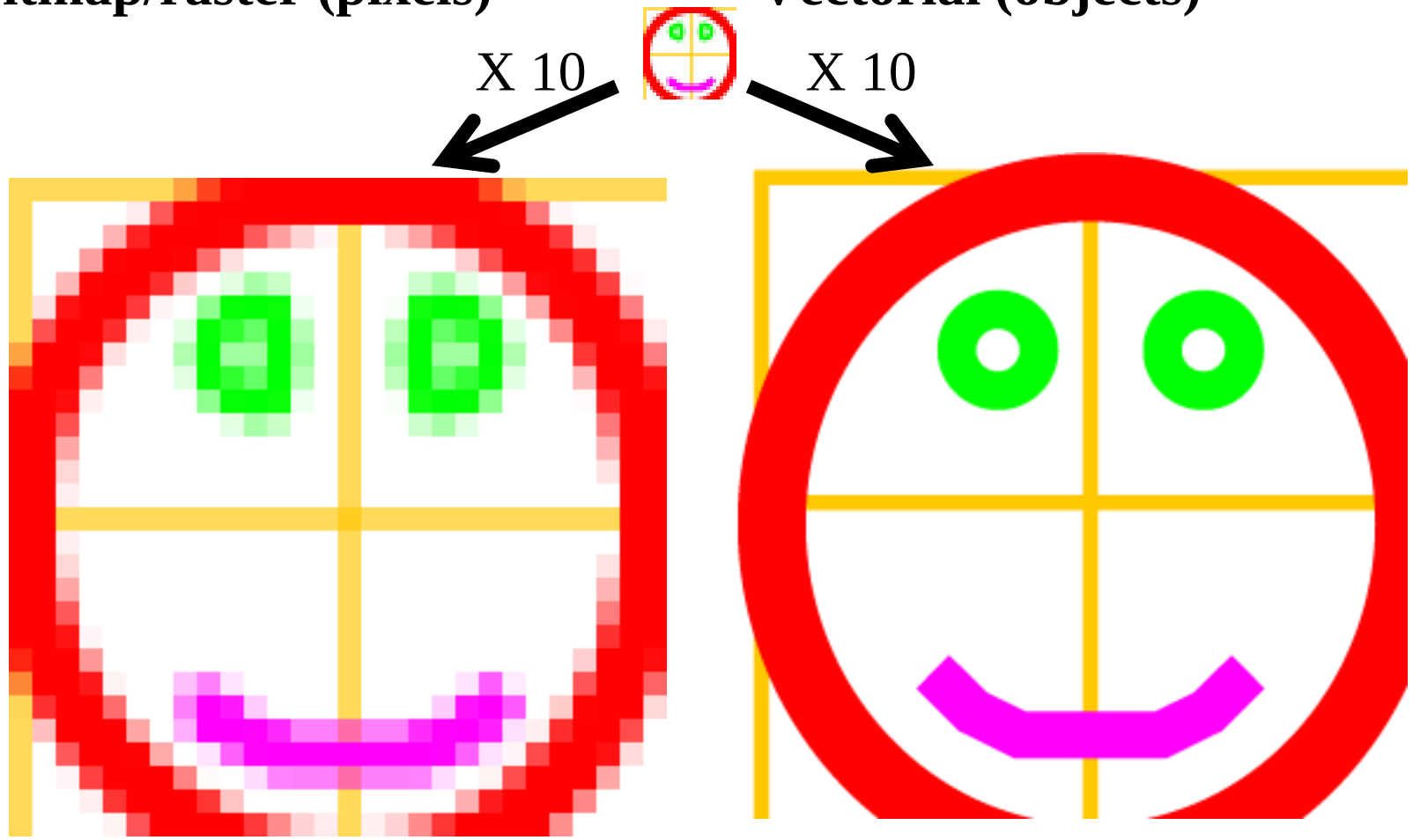
Image Types

Bitmap/raster (pixels)

Vectorial (objects)

X 10

X 10

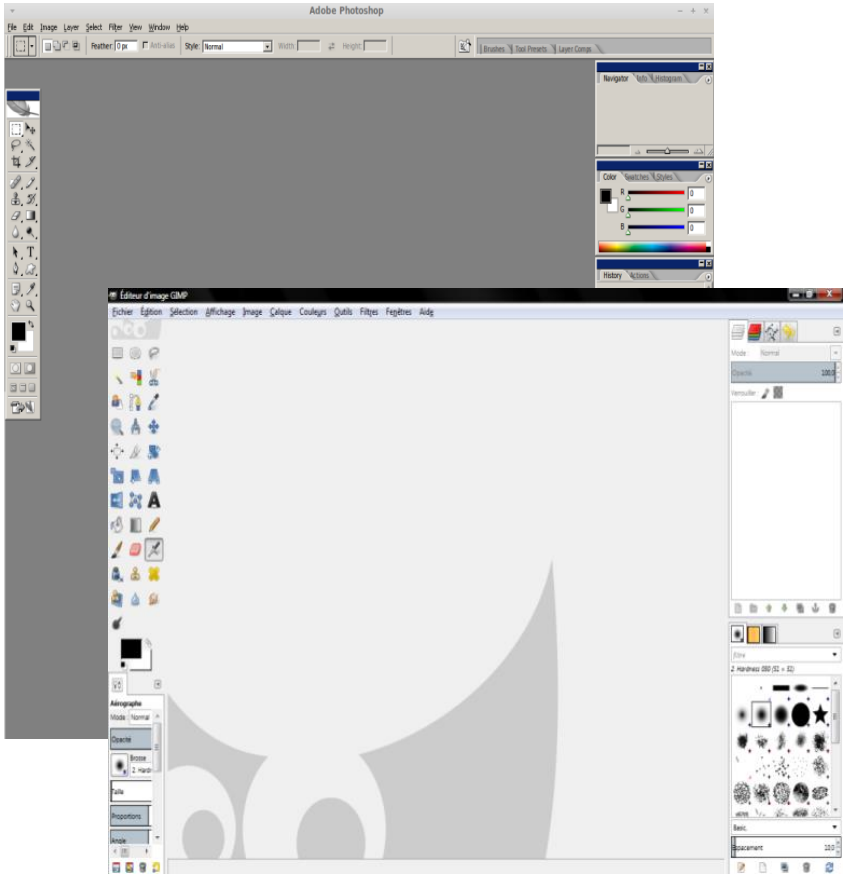


Exercise 0

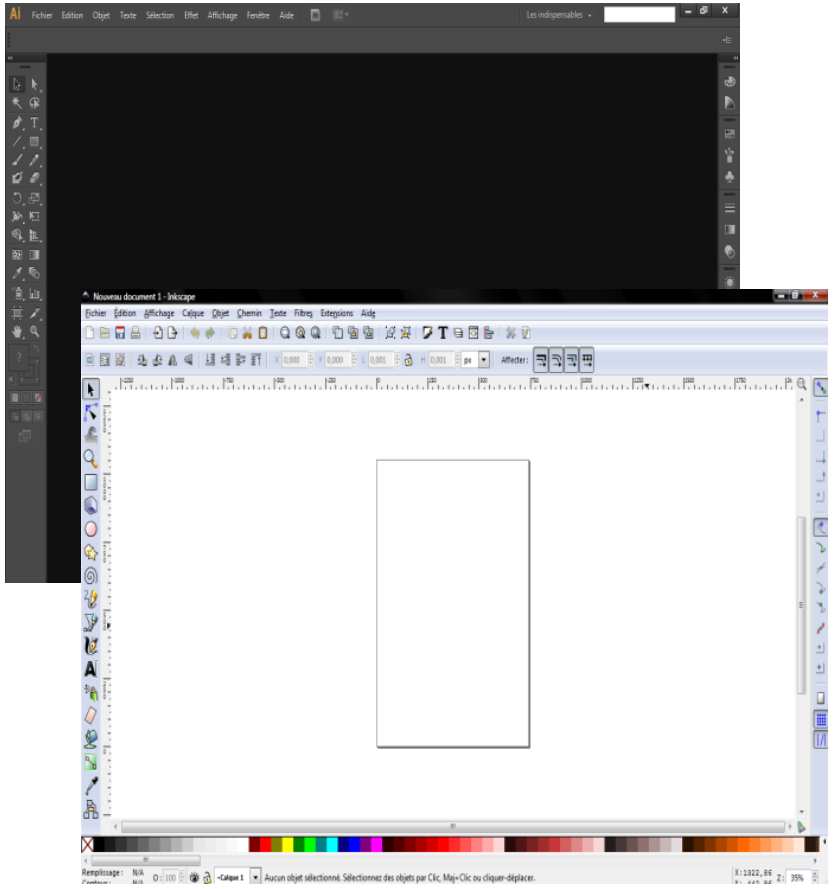
- Open the "Exercice_00" folder
- The raster image case:
  - Drag and drop the "raster.ppm" file over FIJI
  - Press the up arrow to zoom in
  - Right-click on the "raster.ppm" file, select "Open with ..." and select the notepad software
  - Change the value of the first pixel, save and reopen the image in FIJI
- The vector image case :
  - Open the "vectoriel.svg" file with Inkscape/Illustrator or a web browser
  - Open the same file with the notepad software
  - Double the size of the line and reopen the file

Figure mounting tools

Raster (Photoshop, Gimp, Paint, …) 74%



Vectorial (Illustrator, Inkscape, Powerpoint, …) 26%



Are these tools suitable to mount scientific figures ?

Toolbars

What they do

- Stain (brushes, pencils, sprays, gradients, ...)
- Distort, transform images
- Duplicate regions (Clone Stamp ...)
- Change Contrast
- …

What they don’t do

- Organize and maintain figure layout
- Preserve fonts when image is resized
- Manage scale bars
- Prepare figures for scientific journals
- …

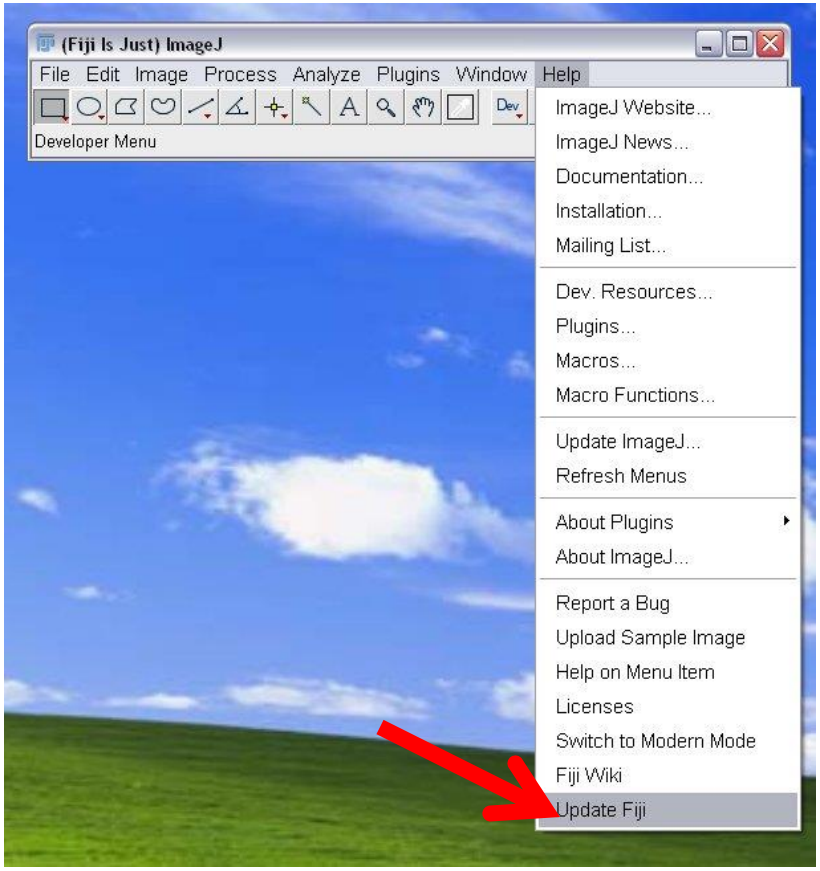
These tools have are designed to achieve artistic productions

The ScientiFig software

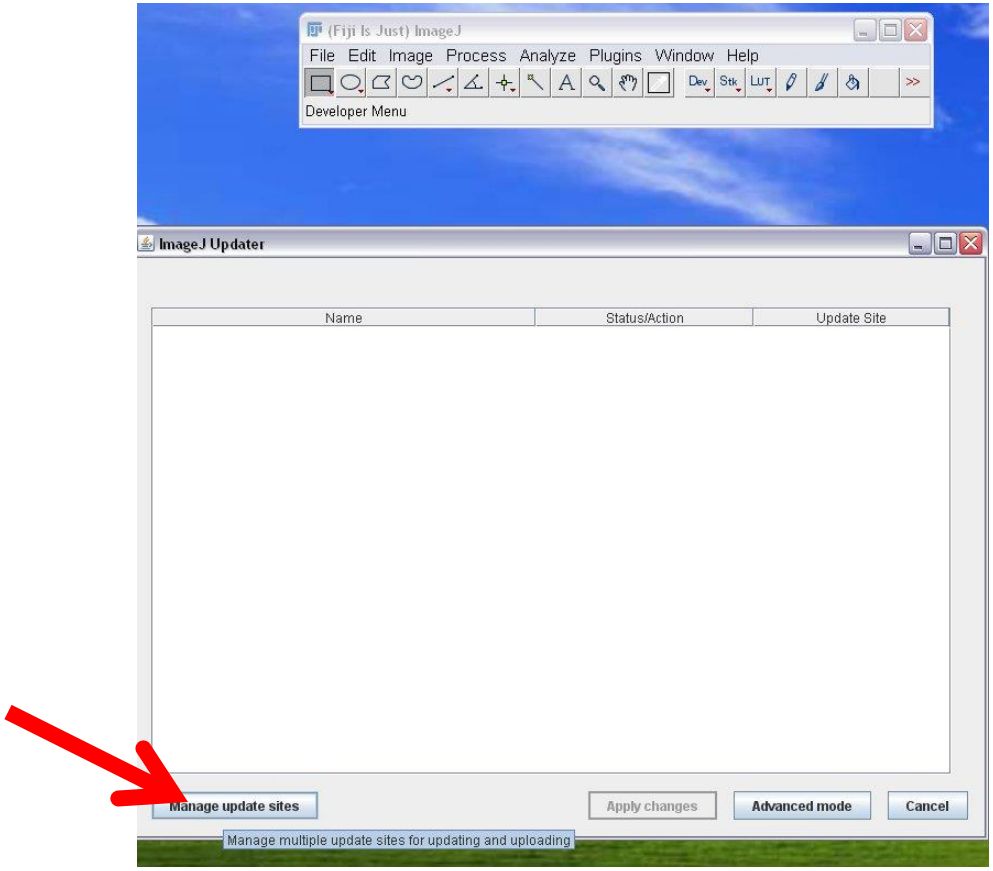
Install

- Standalone software
- Plugin for ImageJ
- Plugin for FIJI (automatic updates)

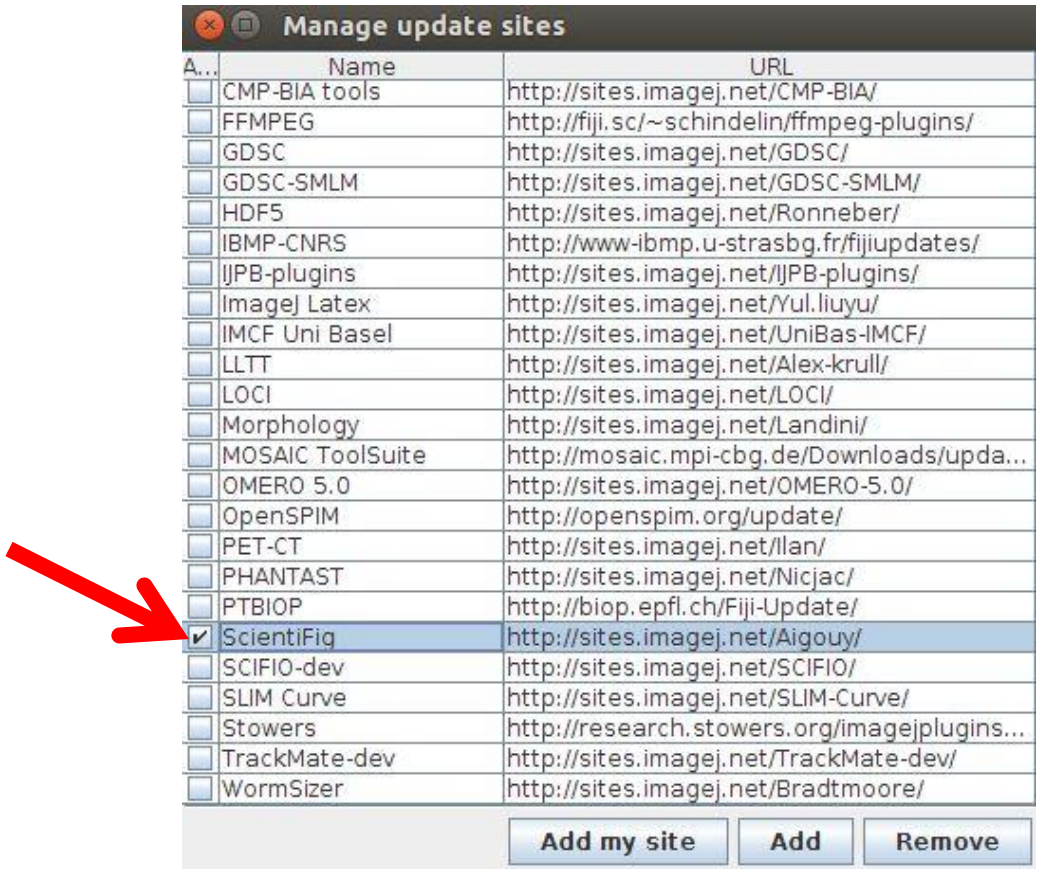
Install


(Fiji Is Just) ImageJ
File Edit Image Process Analyze Plugins Window Help
Developer Menu
ImageJ Website...
ImageJ News...
Documentation...
Installation...
Mailing List...
Dev. Resources...
Plugins...
Macros...
Macro Functions...
Update ImageJ...
Refresh Menus
About Plugins
About ImageJ...
Report a Bug
Upload Sample Image
Help on Menu Item
Licenses
Switch to Modern Mode
Fiji Wiki
Update Fiji

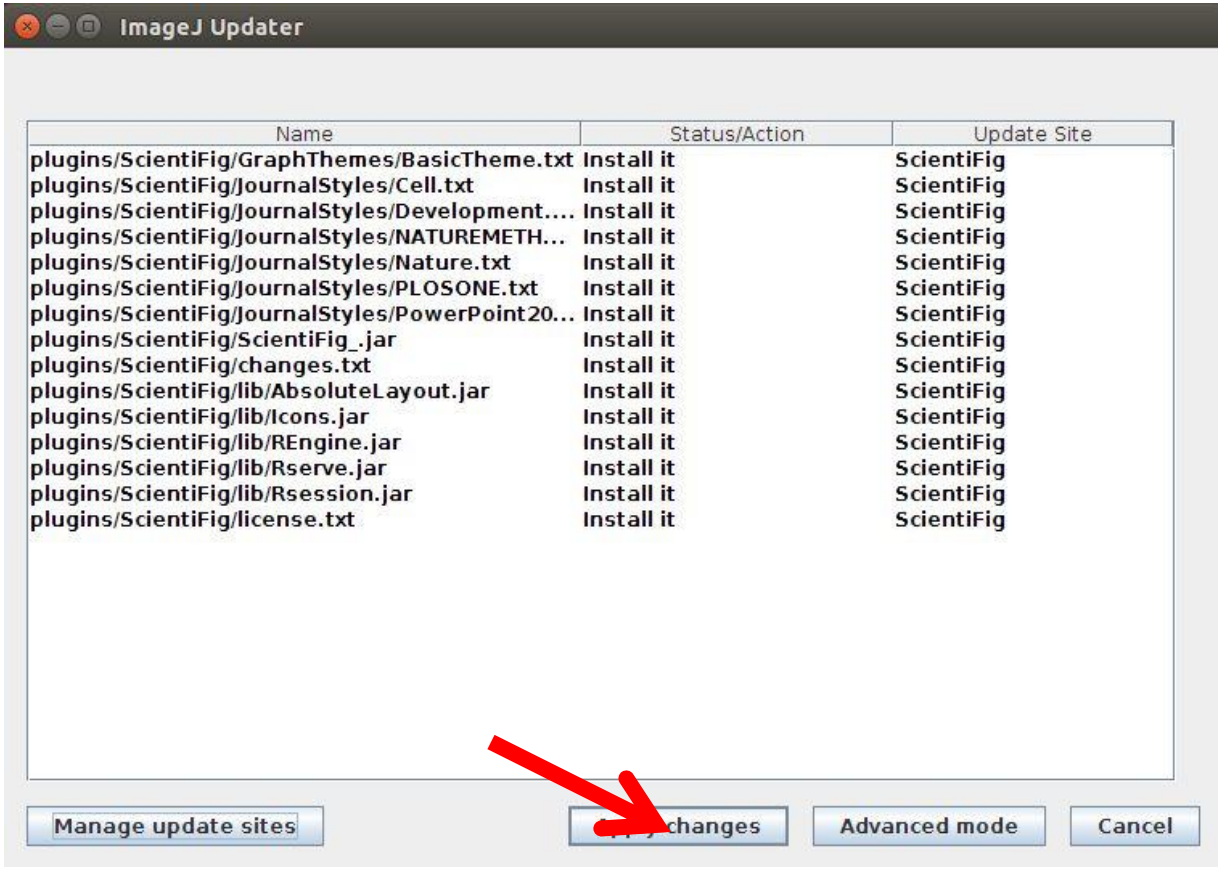
Install


(Fiji Is Just) ImageJ
File Edit Image Process Analyze Plugins Window Help
Developer Menu
ImageJ Updater
Name
Status/Action
Update Site
Manage update sites
Apply changes
Advanced mode
Cancel
Manage multiple update sites for updating and uploading

Install


Manage update sites
A...
Name
URL
CMP-BIA tools
http://sites.imagej.net/CMP-BIA/
FFMPEG
http://fiji.sc/~schindelin/ffmpeg-plugins/
GDSC
http://sites.imagej.net/GDSC/
GDSC-SMLM
http://sites.imagej.net/GDSC-SMLM/
HDF5
http://sites.imagej.net/Ronneber/
IBMP-CNRS
http://www-ibmp.u-strasbg.fr/fijiupdates/
IJPB-plugins
http://sites.imagej.net/IJPB-plugins/
ImageJ Latex
http://sites.imagej.net/Yul.liuyu/
IMCF Uni Basel
http://sites.imagej.net/UniBas-IMCF/
LLTT
http://sites.imagej.net/Alex-krull/
LOCI
http://sites.imagej.net/LOCI/
Morphology
http://sites.imagej.net/Landini/
MOSAIC ToolSuite
http://mosaic.mpi-cbg.de/Downloads/upda...
OMERO 5.0
http://sites.imagej.net/OMERO-5.0/
OpenSPIM
http://openspim.org/update/
PET-CT
http://sites.imagej.net/Ilan/
PHANTAST
http://sites.imagej.net/Nicjac/
PTBIOP
http://biop.epfl.ch/Fiji-Update/
ScientiFig
http://sites.imagej.net/Aigouy/
SCIFIO-dev
http://sites.imagej.net/SCIFIO/
SLIM Curve
http://sites.imagej.net/SLIM-Curve/
Stowers
http://research.stowers.org/imagejplugins...
TrackMate-dev
http://sites.imagej.net/TrackMate-dev/
WormSizer
http://sites.imagej.net/Bradtmoore/
Add my site
Add
Remove

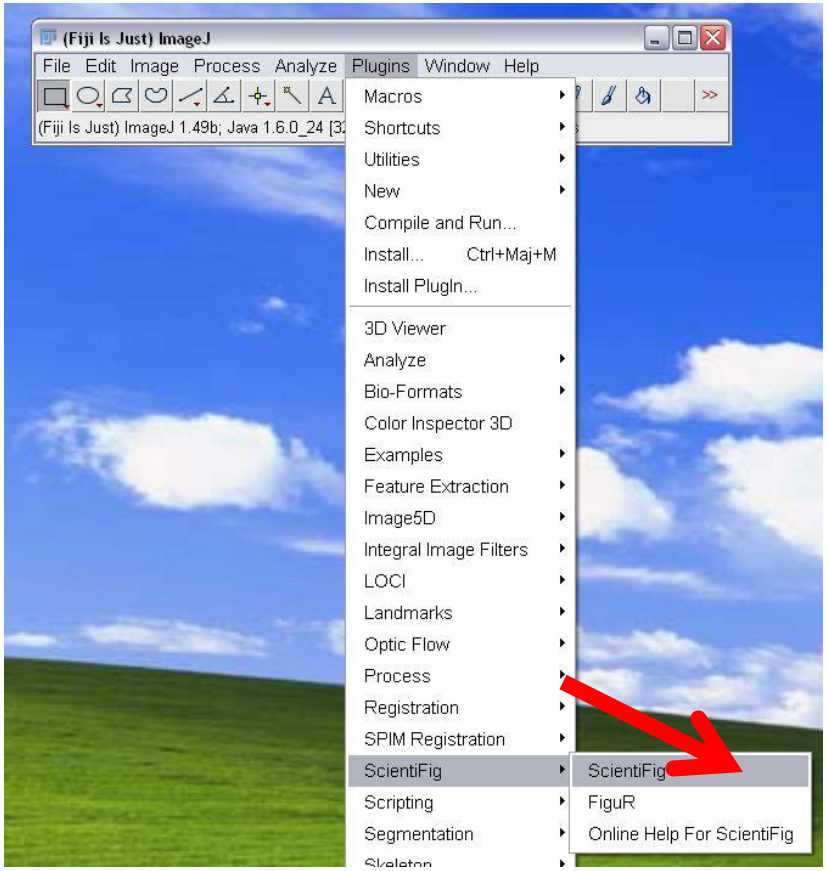
Install


ImageJ Updater
Name
Status/Action
Update Site
plugins/ScientiFig/GraphThemes/BasicTheme.txt Install it ScientiFig
plugins/ScientiFig/JournalStyles/Cell.txt Install it ScientiFig
plugins/ScientiFig/JournalStyles/Development.... Install it ScientiFig
plugins/ScientiFig/JournalStyles/NATUREMETH... Install it ScientiFig
plugins/ScientiFig/JournalStyles/Nature.txt Install it ScientiFig
plugins/ScientiFig/JournalStyles/PLOSONE.txt Install it ScientiFig
plugins/ScientiFig/JournalStyles/PowerPoint20... Install it ScientiFig
plugins/ScientiFig/ScientiFig_.jar Install it ScientiFig
plugins/ScientiFig/changes.txt Install it ScientiFig
plugins/ScientiFig/lib/AbsoluteLayout.jar Install it ScientiFig
plugins/ScientiFig/lib/Icons.jar Install it ScientiFig
plugins/ScientiFig/lib/REngine.jar Install it ScientiFig
plugins/ScientiFig/lib/Rserve.jar Install it ScientiFig
plugins/ScientiFig/lib/Rsession.jar Install it ScientiFig
plugins/ScientiFig/license.txt Install it ScientiFig
Manage update sites
changes
Advanced mode
Cancel

Install

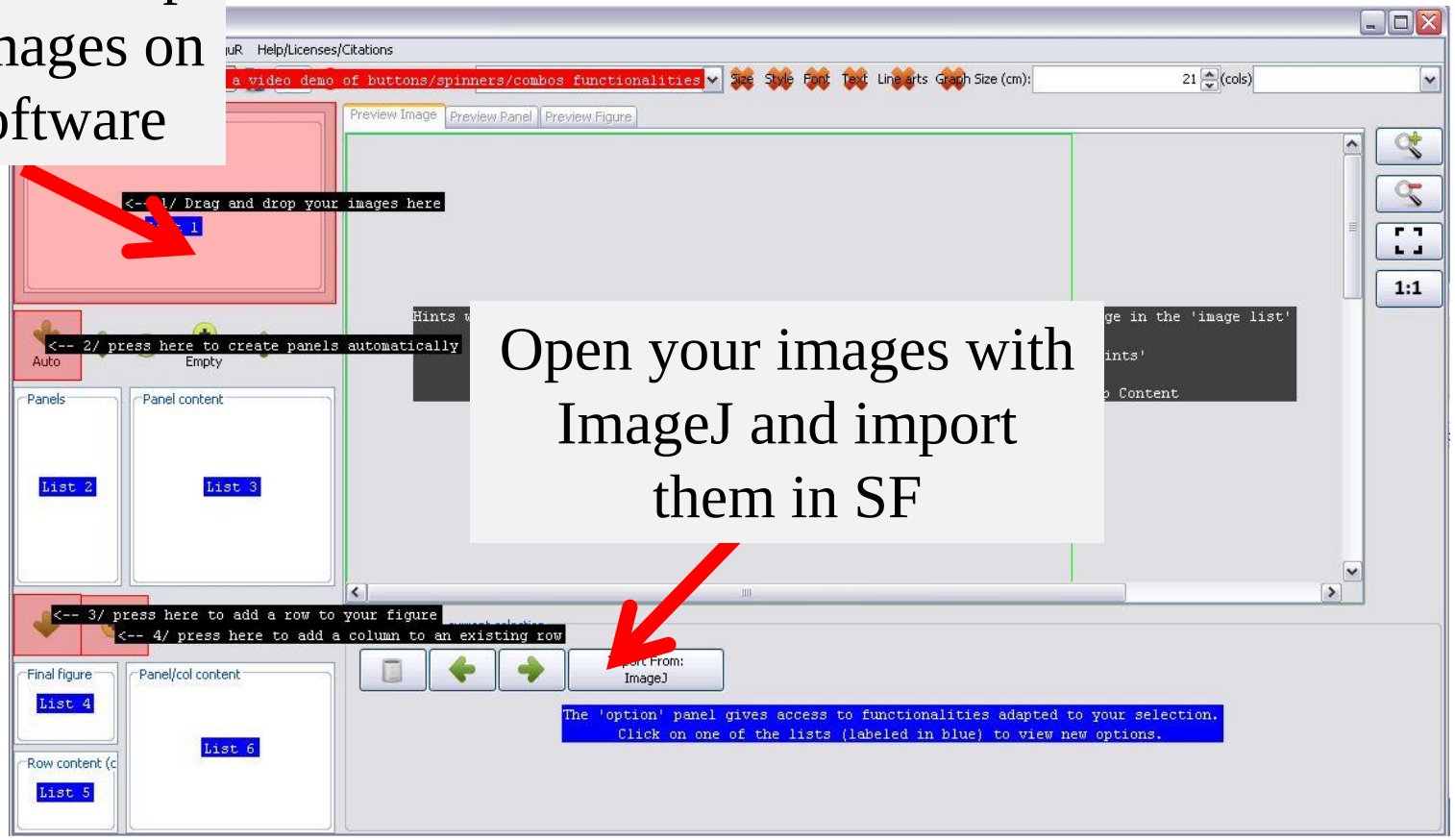
Restart FIJI

Installation



Load / import images into ScientiFig

Drag and drop your images on the software

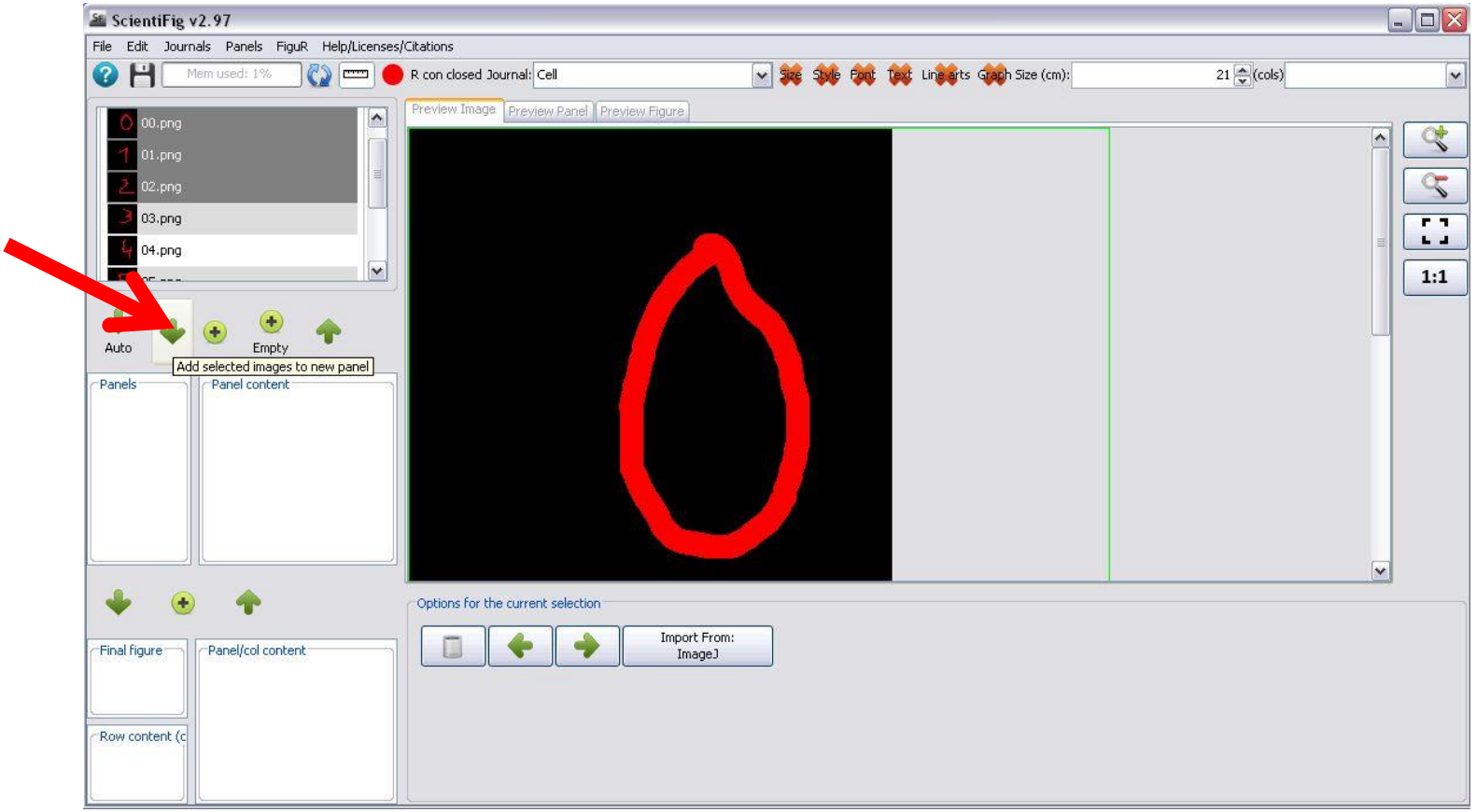


Open your images with ImageJ and import them in SF

Exercise 1

- Open the « Exercise_01 » folder
- Drag and drop DND_XX.png files on the ScientiFig software
- Open IJ_import.tif in ImageJ/FIJI
- Select a picture in the middle of the Z-stack and import it in SF

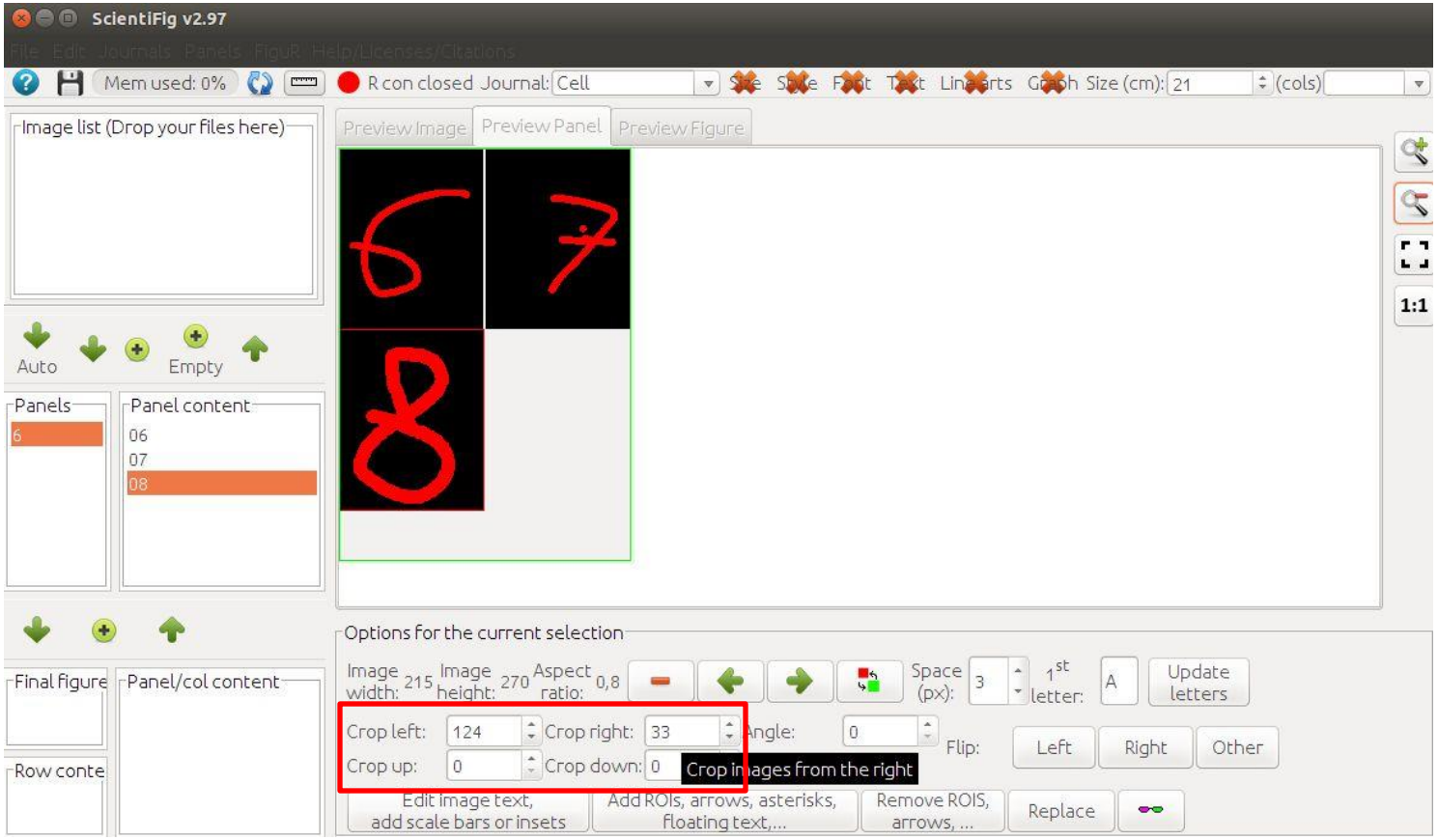
Organize panels (same size images)



Exercise 2

- Click « File>New »
- Open the "Exercice_02" folder
- Drag and drop images on the software interface
- Select all the images in the "image list"
- Create a 4X2 panel
- Create a 2X4 panel

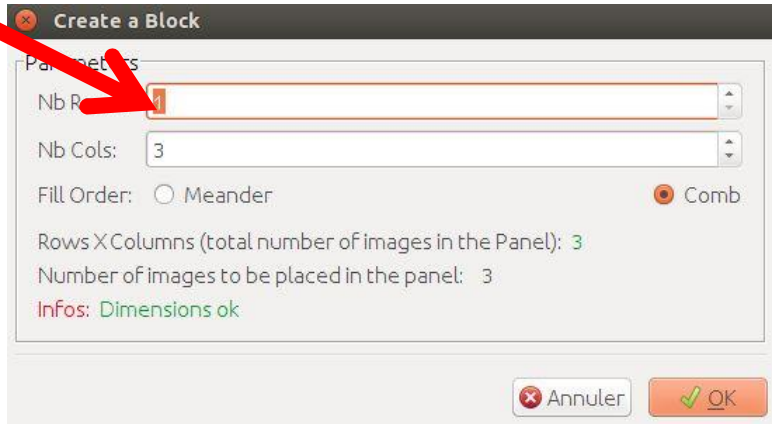
Assemble panels with images of variable size using a crop

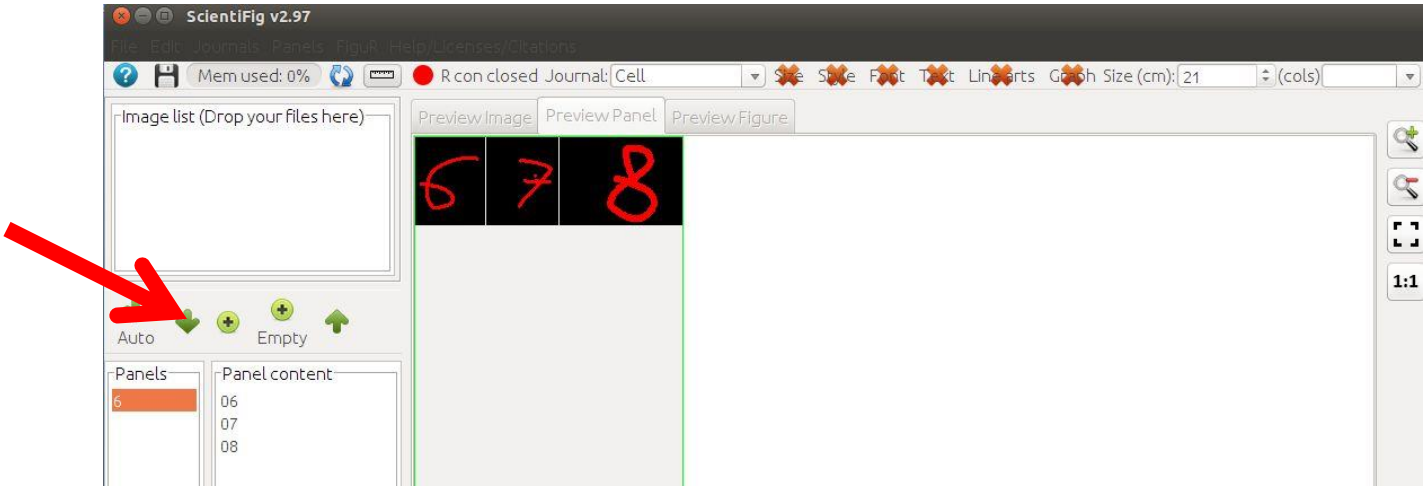


Exercise 3

- Click "File>New"
- Open the "Exercice_03" folder
- Drag and drop the images on the user interface
- Select all the images in the "image list"
- Create a 2X2 panel
- Crop the excessive image pixels, right and left to obtain an aspect ratio = 0.8:
  - crop left = 116 px
  - crop right= 40 px

Organize panels (variable images): the one row/col solution

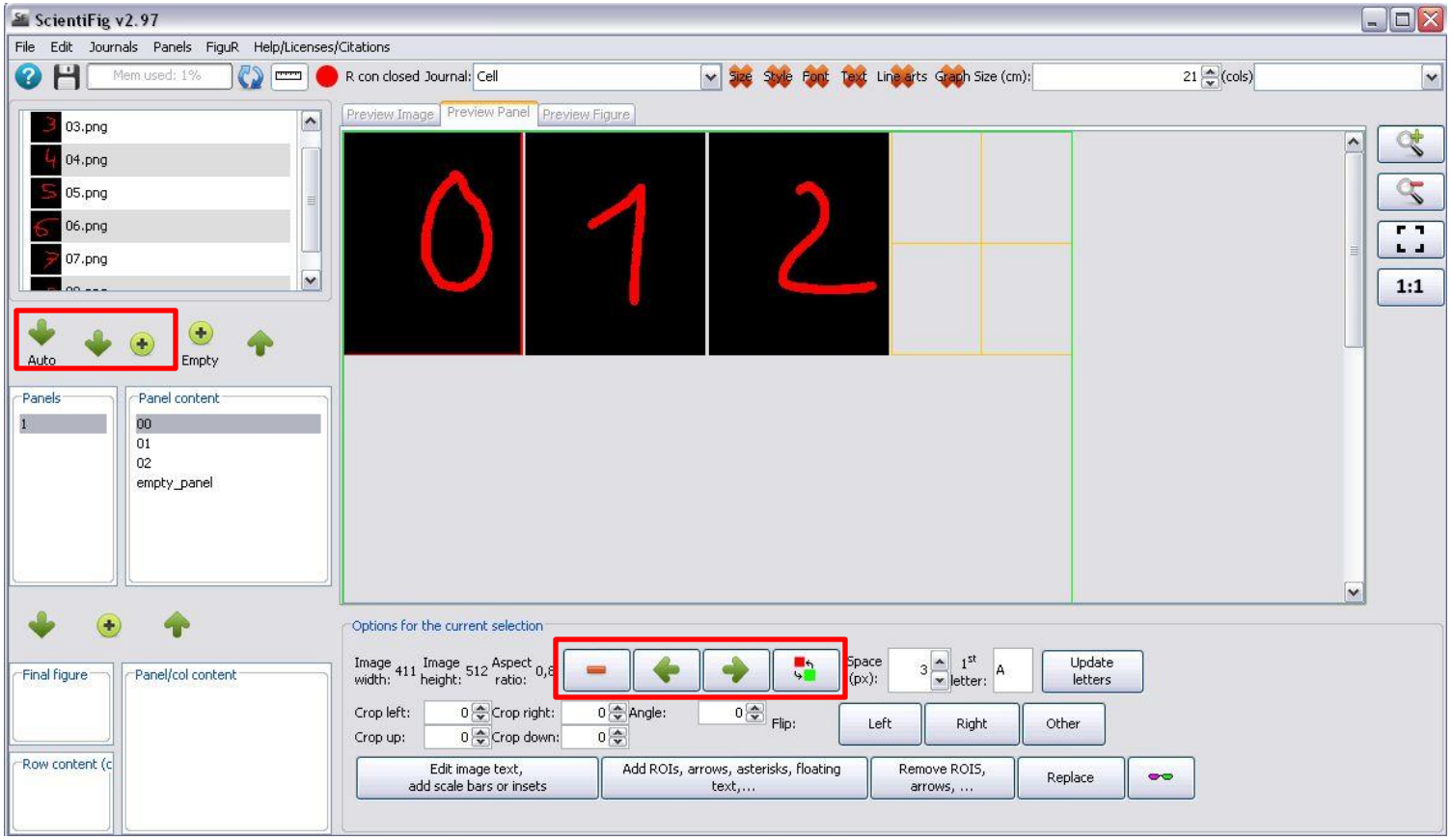




Exercise 3 bis

- Delete the panel you created by clicking the "up arrow" button
- Create a 3X1 panel
- Create a 1X3 panel

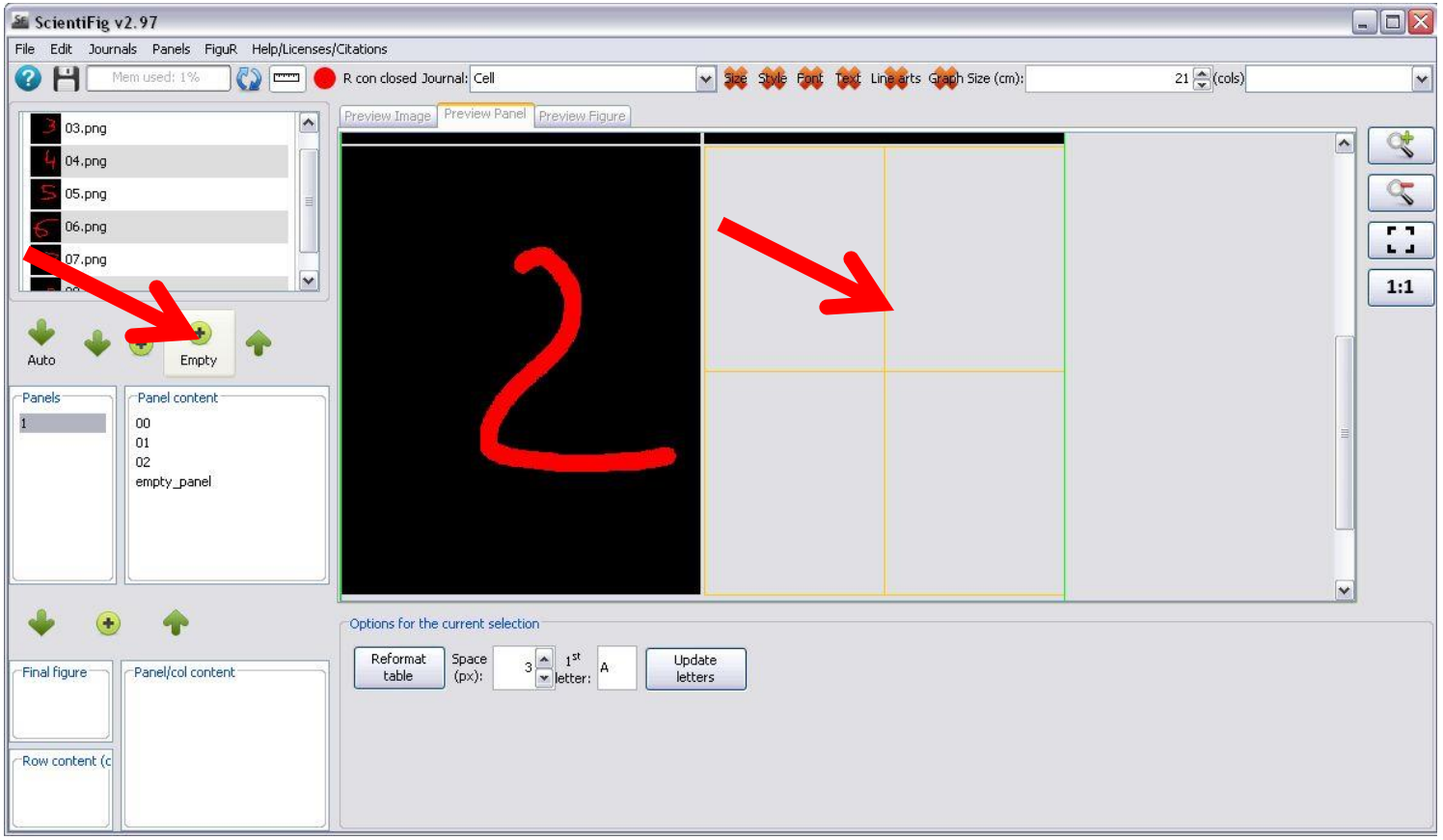
Add / delete pictures and reorganize panels



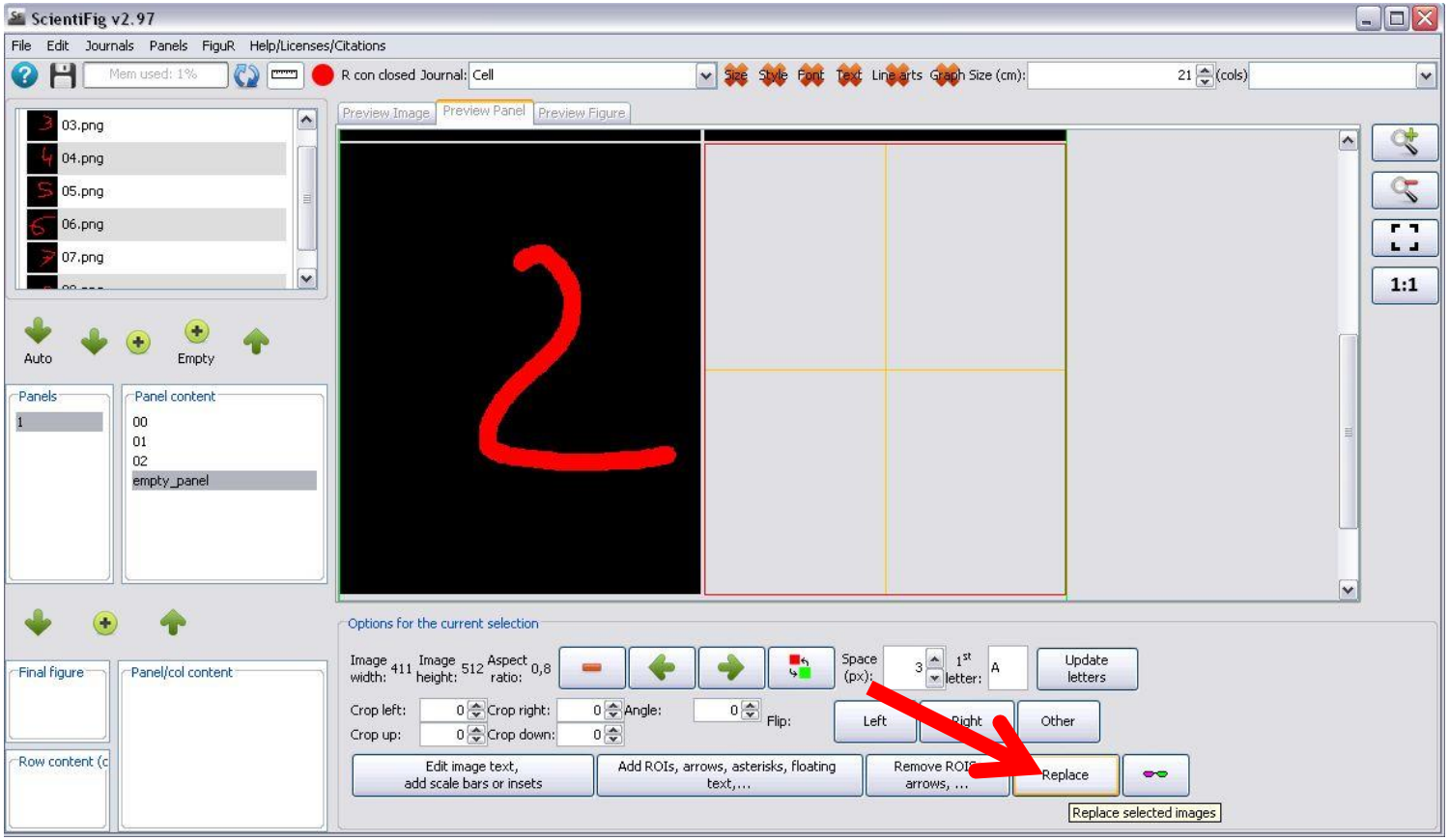
Exercise 4

- Click "File>New"
- Open the "Exercice_04" folder
- Create a panel ("auto" button)
- Delete one or more images from the panel
- Re-add (the) deleted image(s) to the panel ("+" button)
- Select two images (Ctrl or Cmd key on the keyboard) and exchange the position of these two images ("swap" button)
- Select an image and use the horizontal arrows to move it in the panel

Build panels even when images are missing



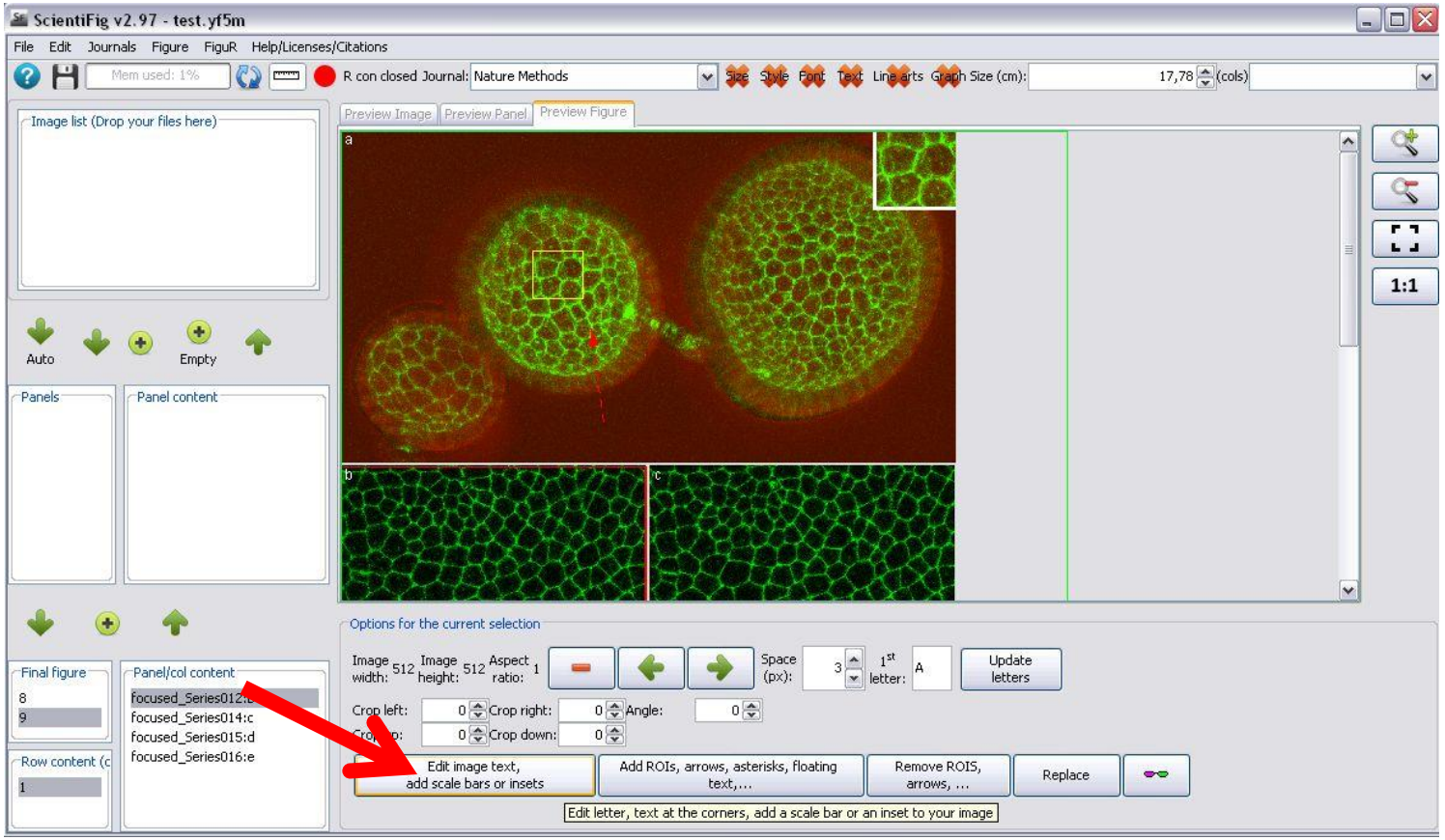
Build panels even when images are missing



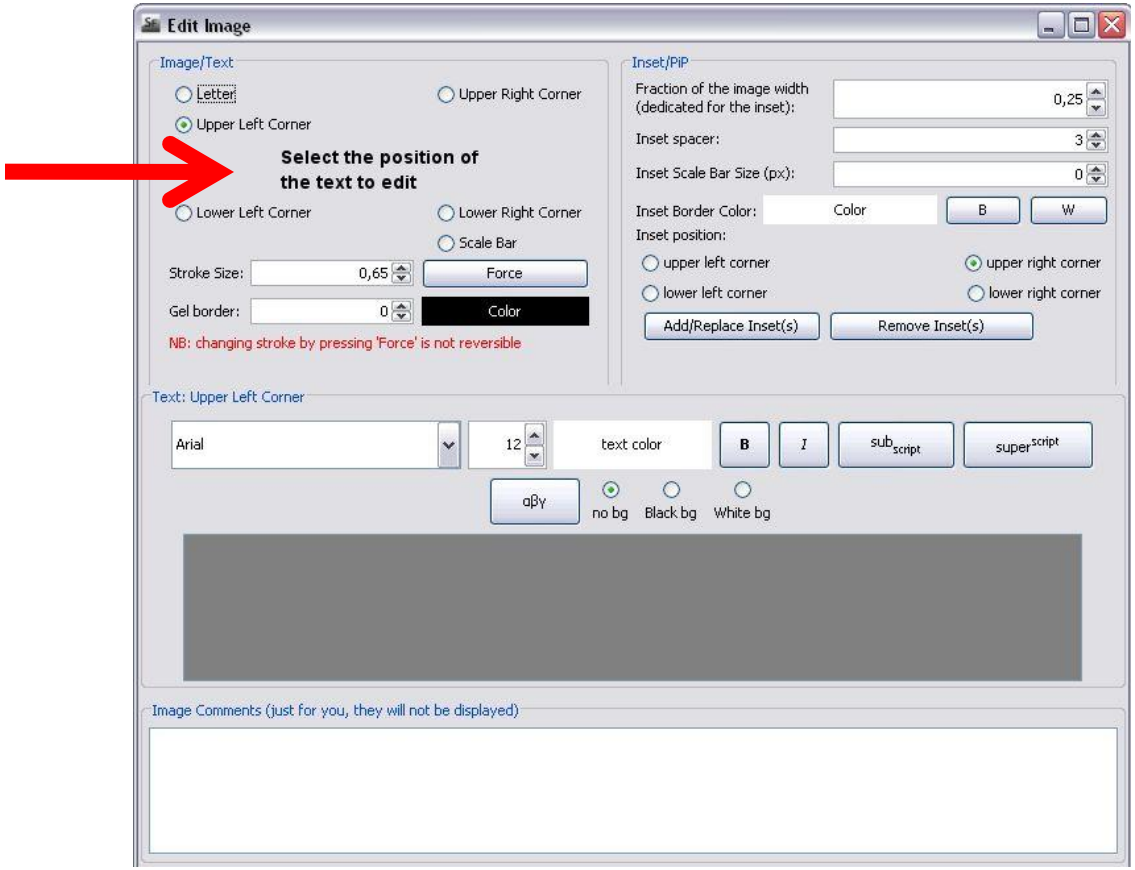
Exercise 5

- Click "File>New"
- Open the "Exercice_05" folder
- Load all images
- Select the three first pictures and create a panel
- Click the "+ Empty" button
- Set the width to 411px and height to 512px
- Select the empty image and click "replace" then select the image "03.png" in the "image list"

Annotate and add a scale bar



Annotate and add a scale bar

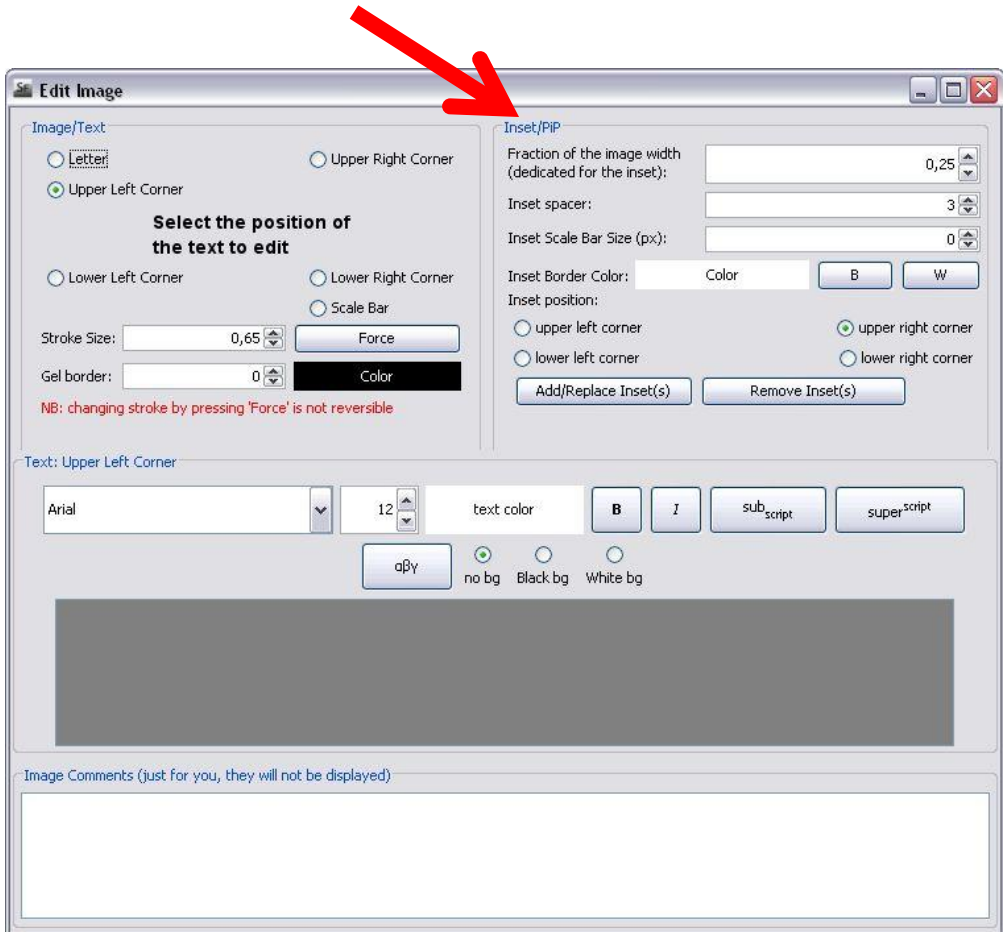


Note : the text can expand over several lines, be italicized, superscripted or subscripted.

Exercise 6

- Click "File>New"
- Open the "Exercice_06" folder
- Load the .yf5m file in ScientiFig
- Select the image
- Select "Upper Left Corner" and enter your text
- Select "Lower Right Corner" and enter your text
- Select "Scale Bar" set the bar size in pixels or in microns, adjust the height of the bar, write some text above the scale bar

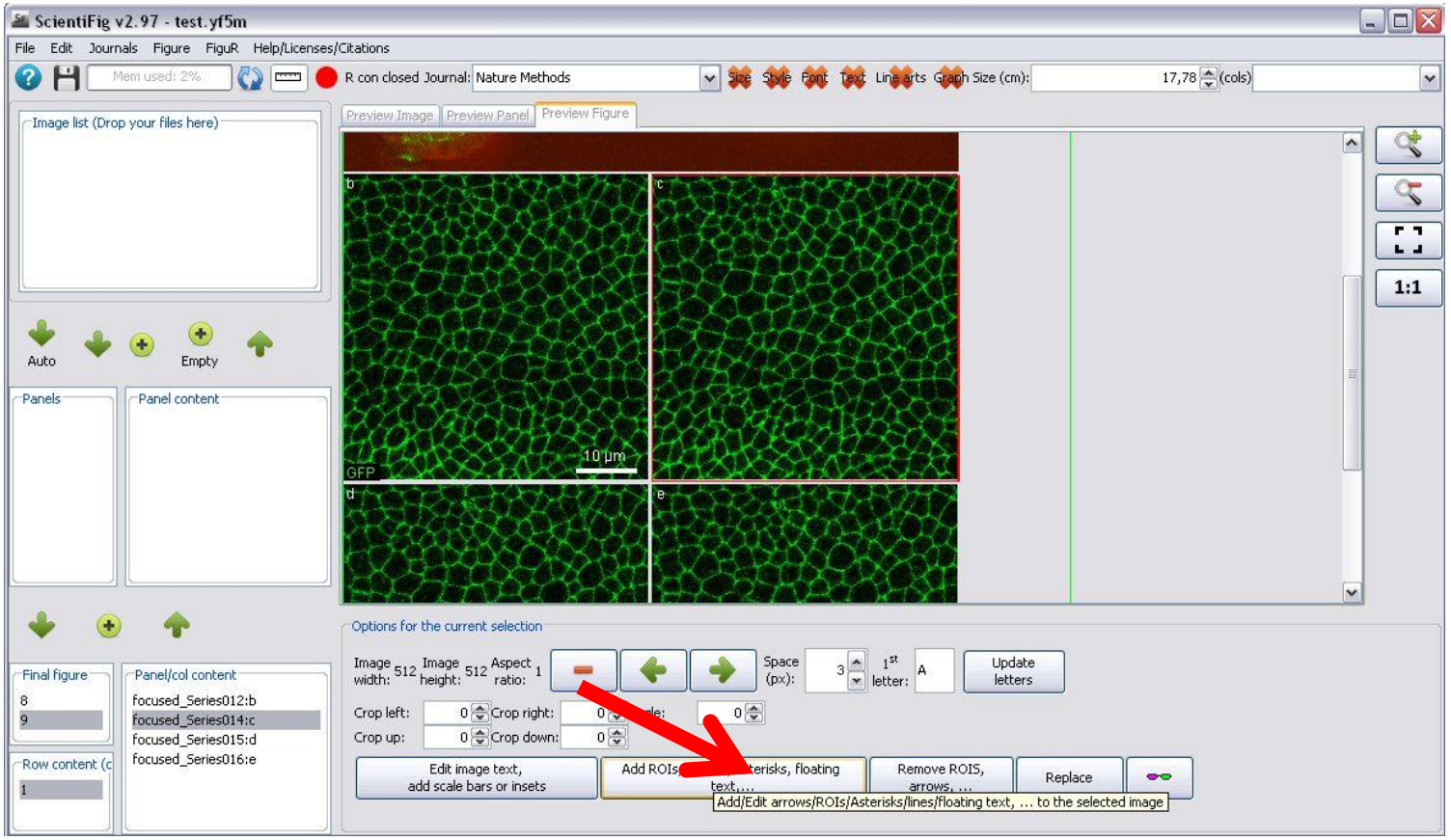
Add insets to an image



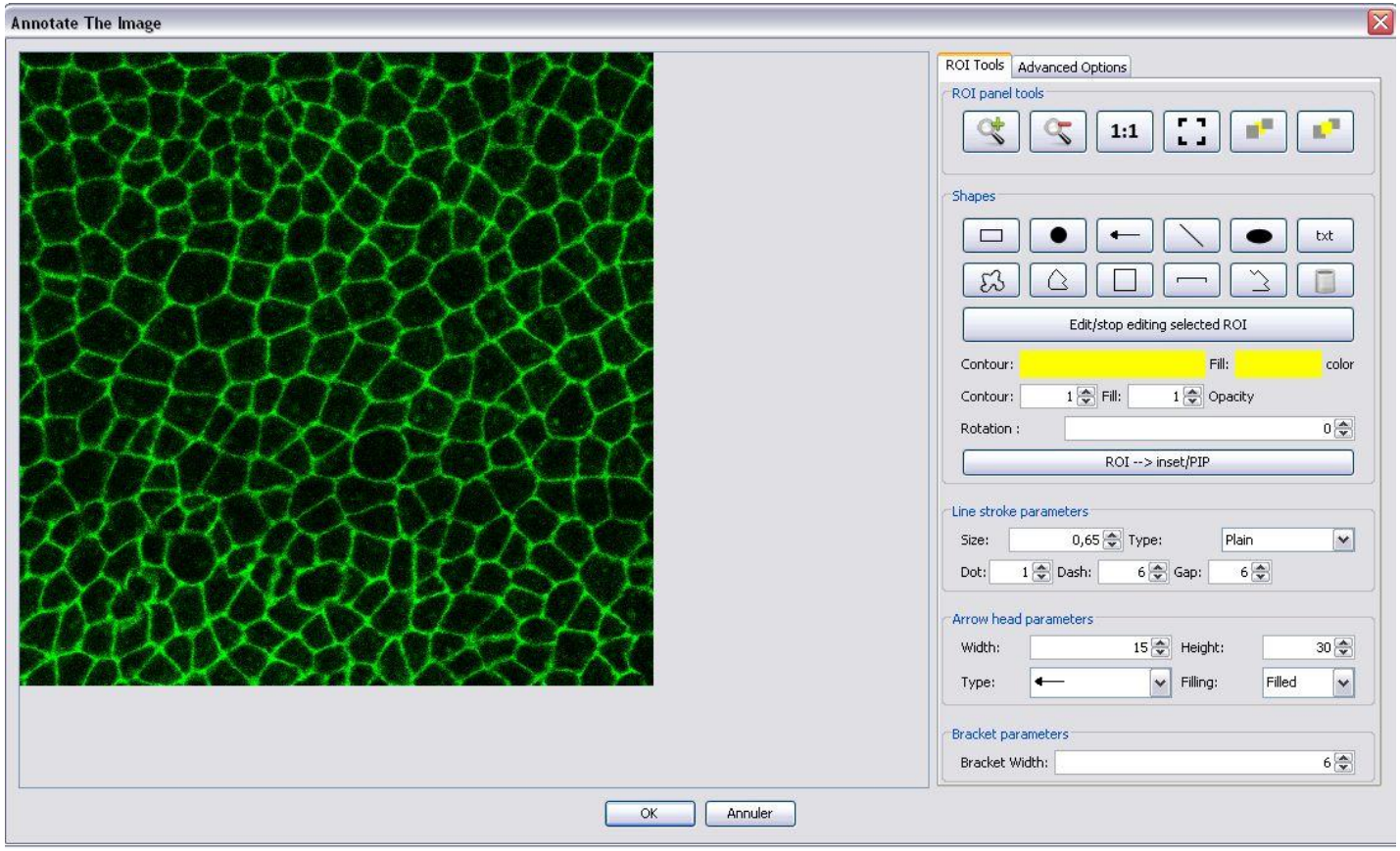
Exercise 6 bis

- Click "File>New"
- Load the "exo_6.yf5m" file
- Click on "add / replace inset" and choose an image from the list
- Change the position and size of the inset
- Add a scale bar to the inset
- Remove the inset

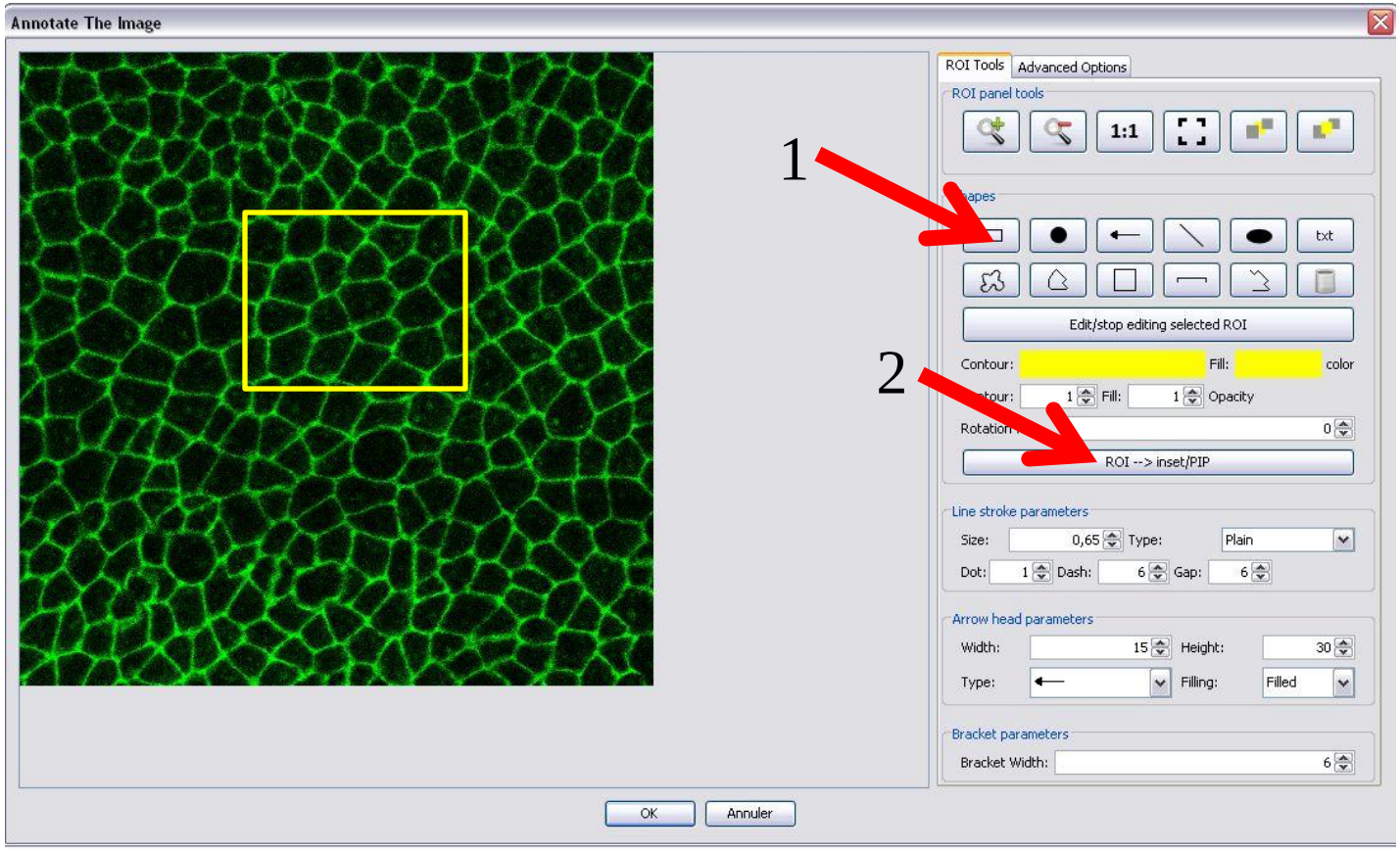
Add ROIs or draw over an image



Add ROIs or draw over an image



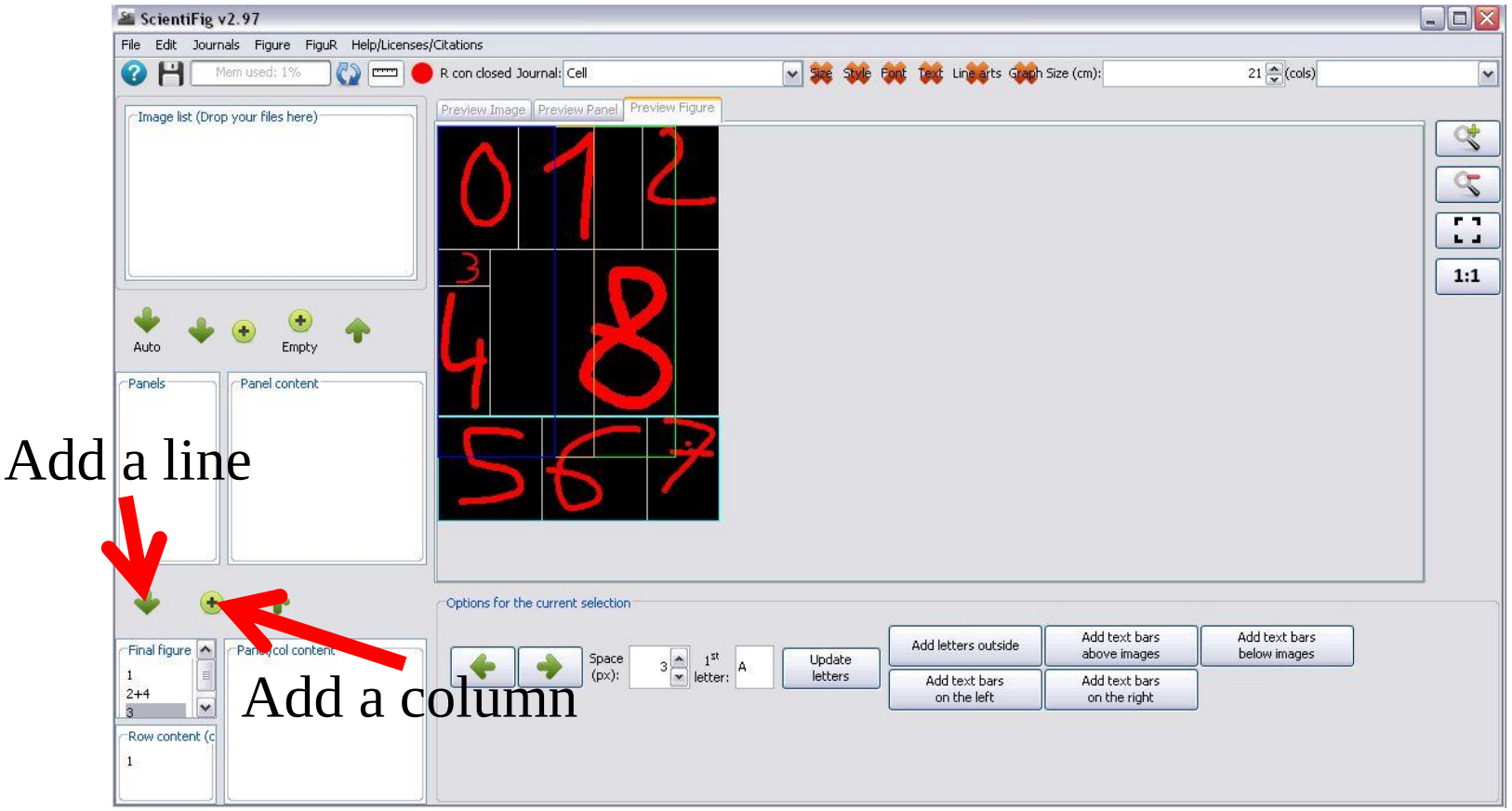
Add an inset (using ROIs)



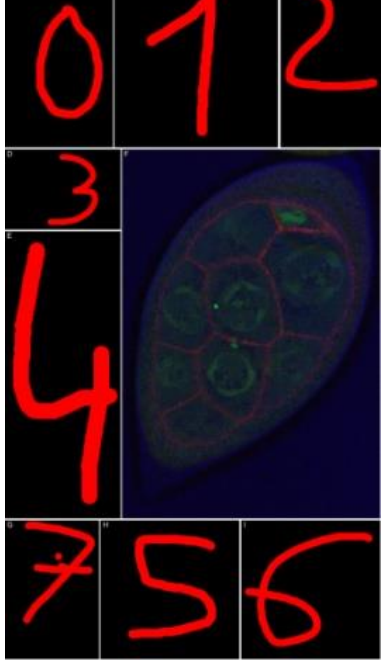
Exercise 7

- Click "File>New"
- Open the "Exercice_07" folder
- Load the .yf5m file in ScientiFig
- Select an image
- Click "Add ROIs, arrows, ..."
- Draw different shapes, play with stroke size, color, transparency, fillings, outlines, orientation, ...
- Edit a shape
- Draw a rectangle over an interesting area then press the "ROI → inset / PiP"
- Press "OK" to apply the changes

Combine panels (finalize your figure)

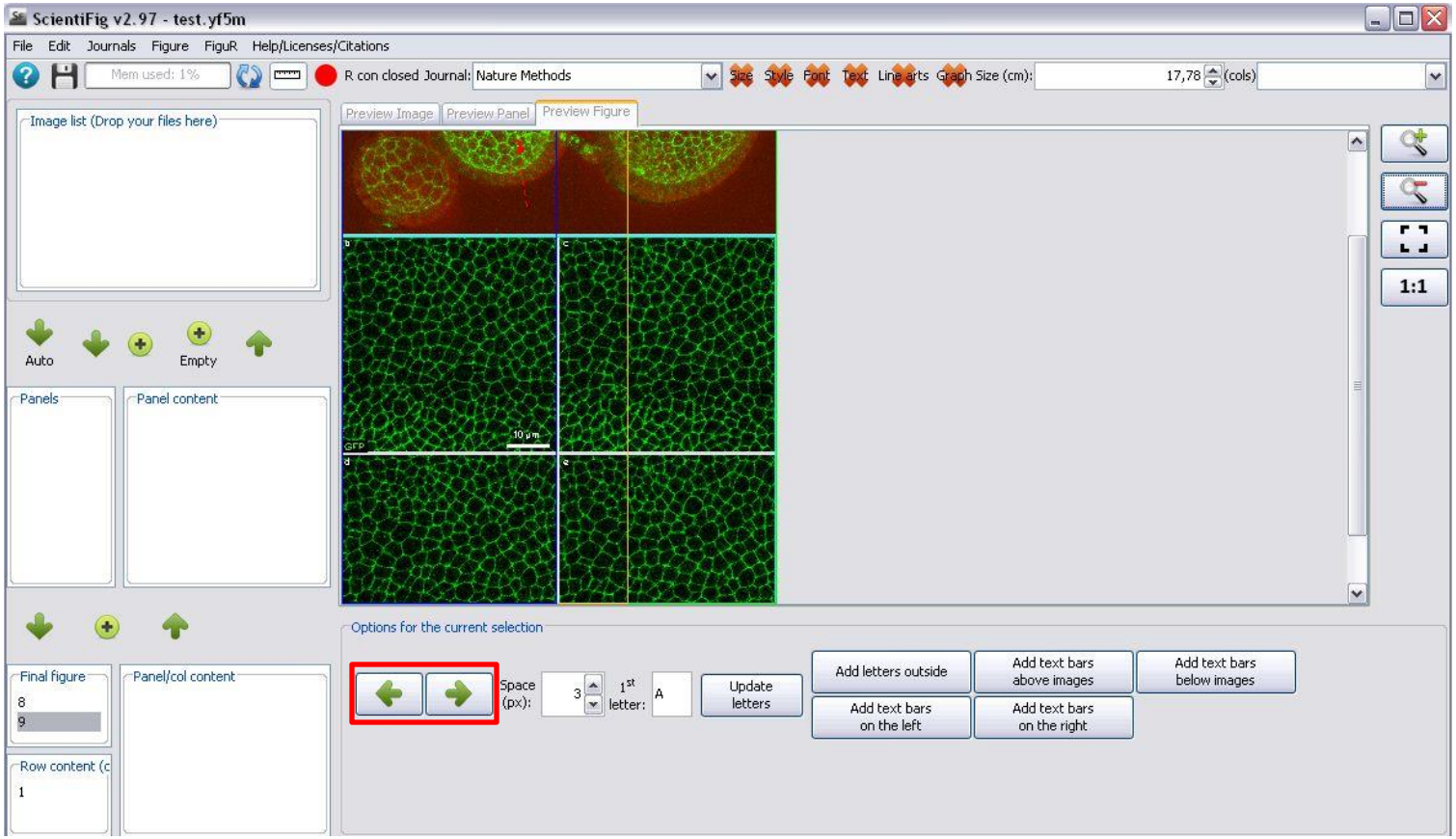


Exercise 8



- Click "File>New"
- Open the "Exercice_08" folder
- Load all images
- Create a 3X1 panel using images 00, 01 and 02
- Create a 1X2 panel using images 03 and 04
- Press "Auto"
- Select the first panel and click on the “down arrow” (add a line)
- Select the second panel and click the "down arrow" (add a line)
- Select the third panel and click the "down arrow" (add a line)
- Select the third line of the figure, select a panel and click the “+” button to add a column to the table
- Sélectionnez la troisième ligne de la figure, sélectionnez un panneau puis cliquez sur le bouton + pour ajouter une colonne au tableau
- Repeat this again
- Select the second line and select the panel containing the image "egg.png" and press the “+” button
- Update letters

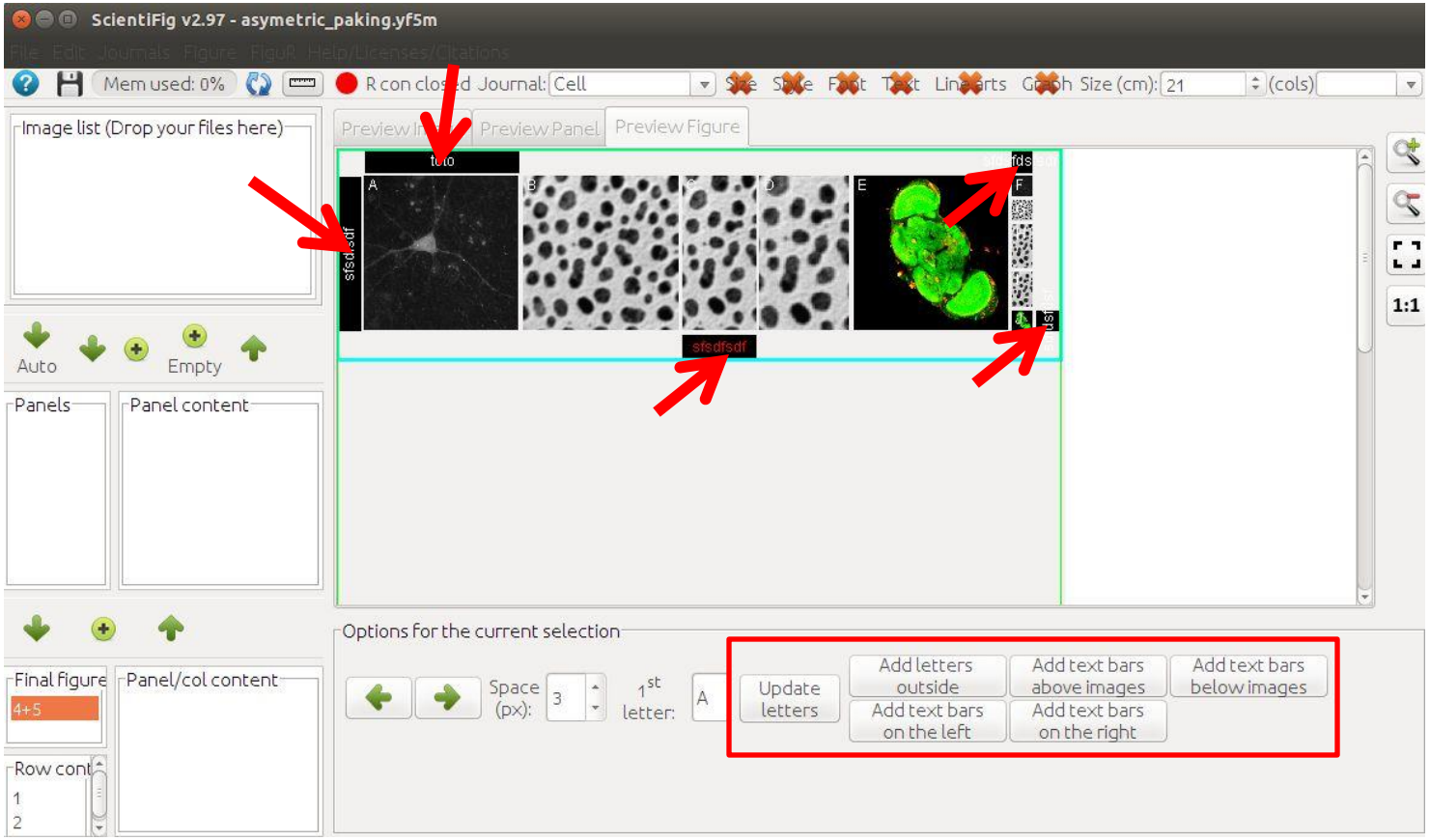
Quickly reorganize your figures



Exercise 9

- Click "File>New"
- Open the "Exercice_09" folder
- Load the .yf5m file in ScientiFig
- Change the order of the lines
- Change the order of columns

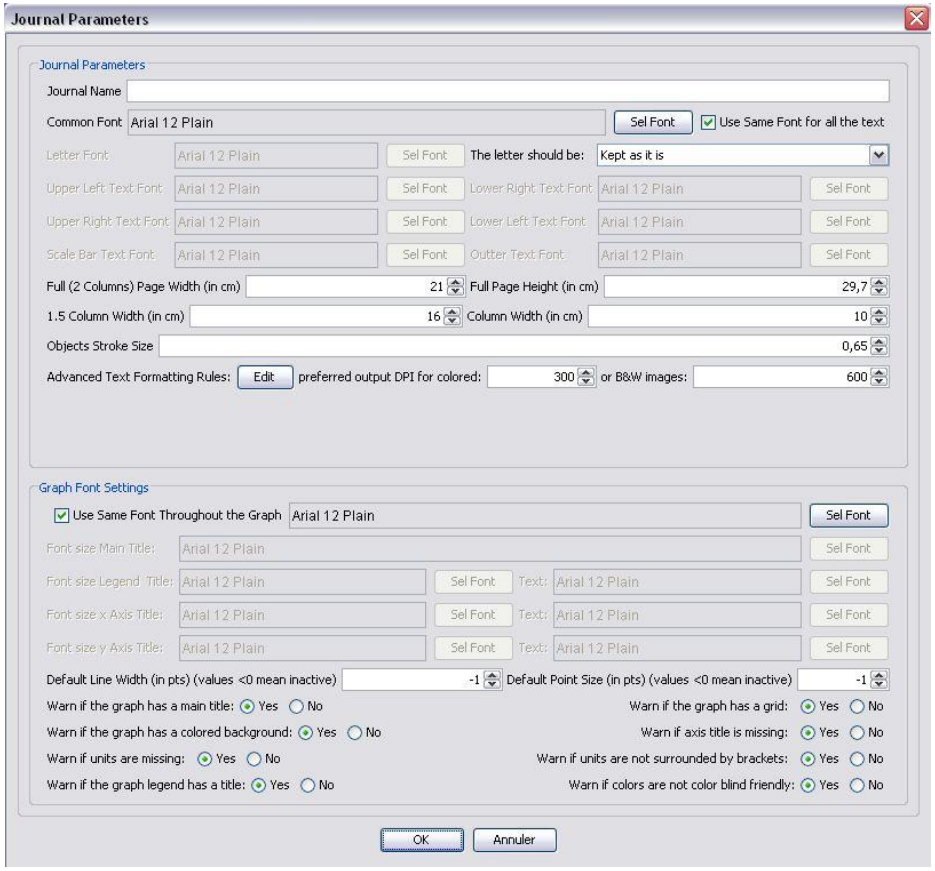
Add text around images



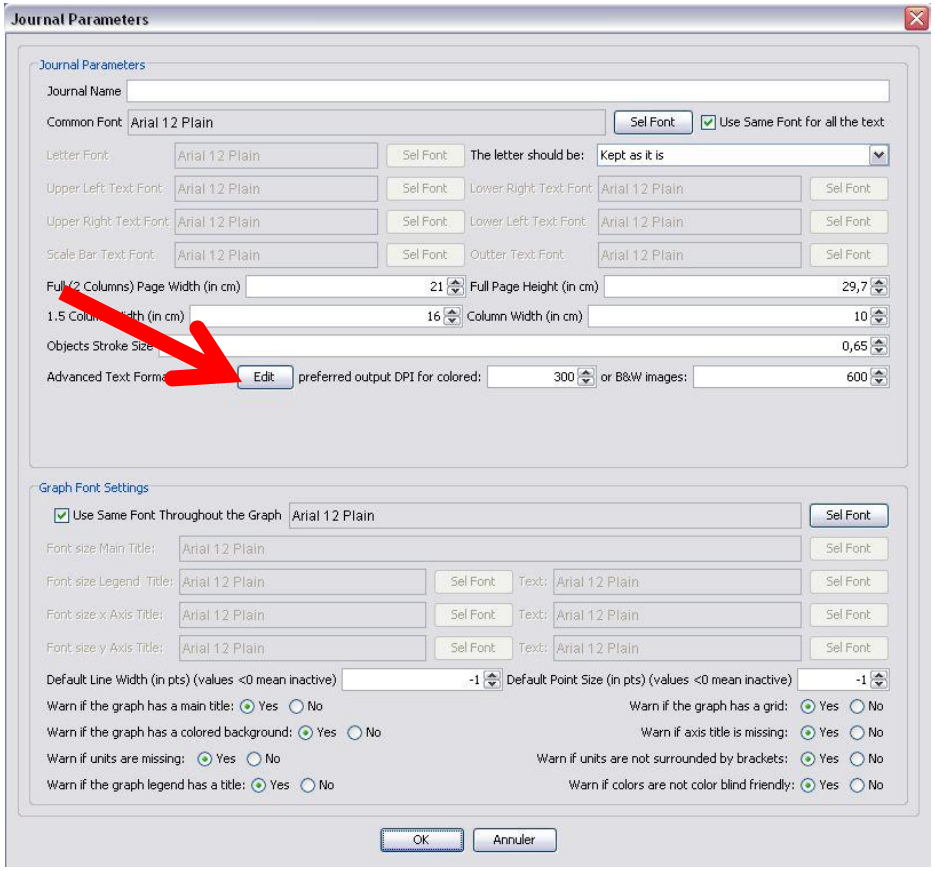
Exercise 10

- Click "File>New"
- Open the "Exercice_10" folder
- Load the .yf5m file in ScientiFig
- Add text around the selected panels

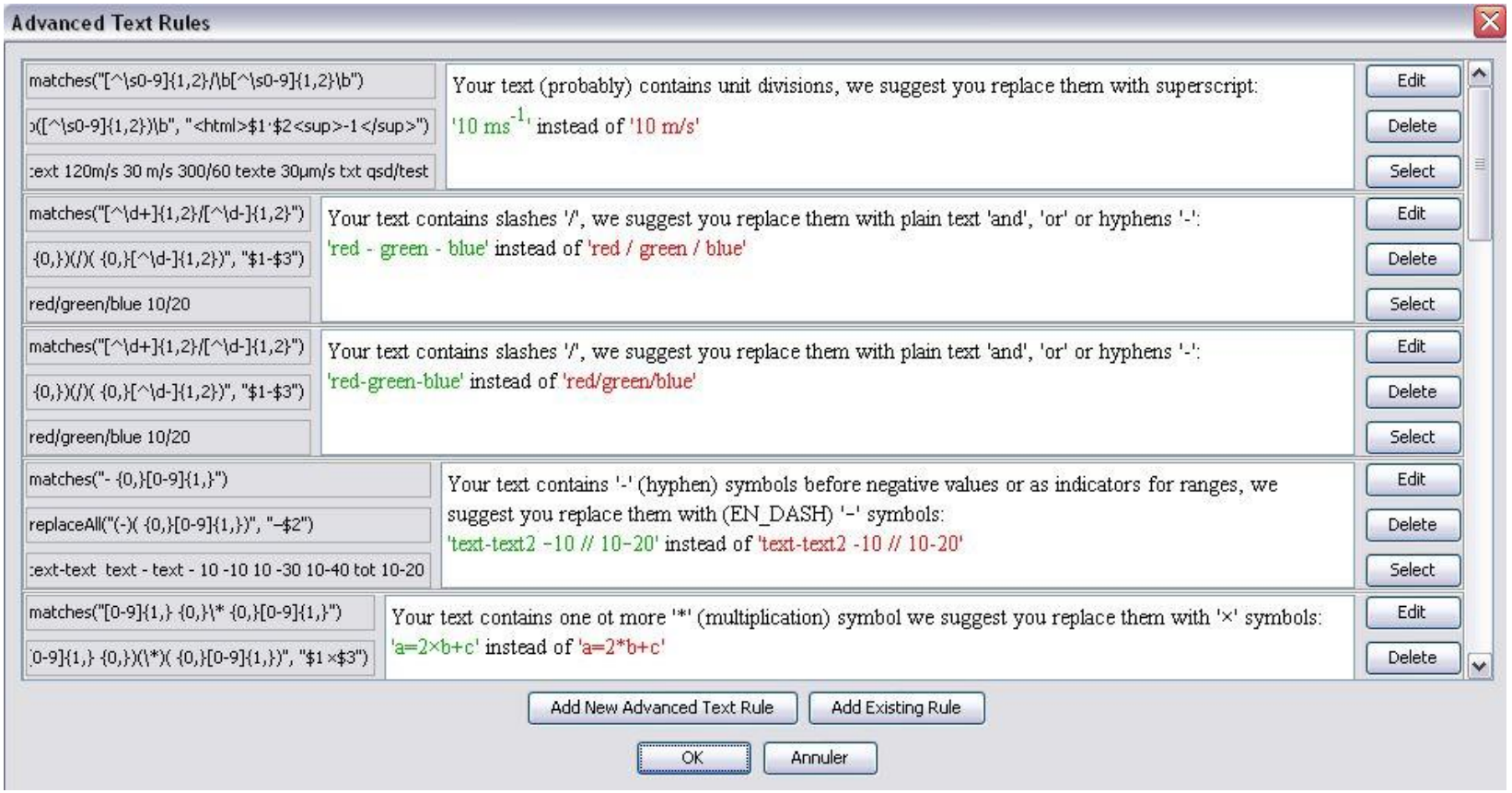
Scientific press styles (editorial guideline)



Advanced text corrections



Advanced text corrections



The « checks »

2/ Checks

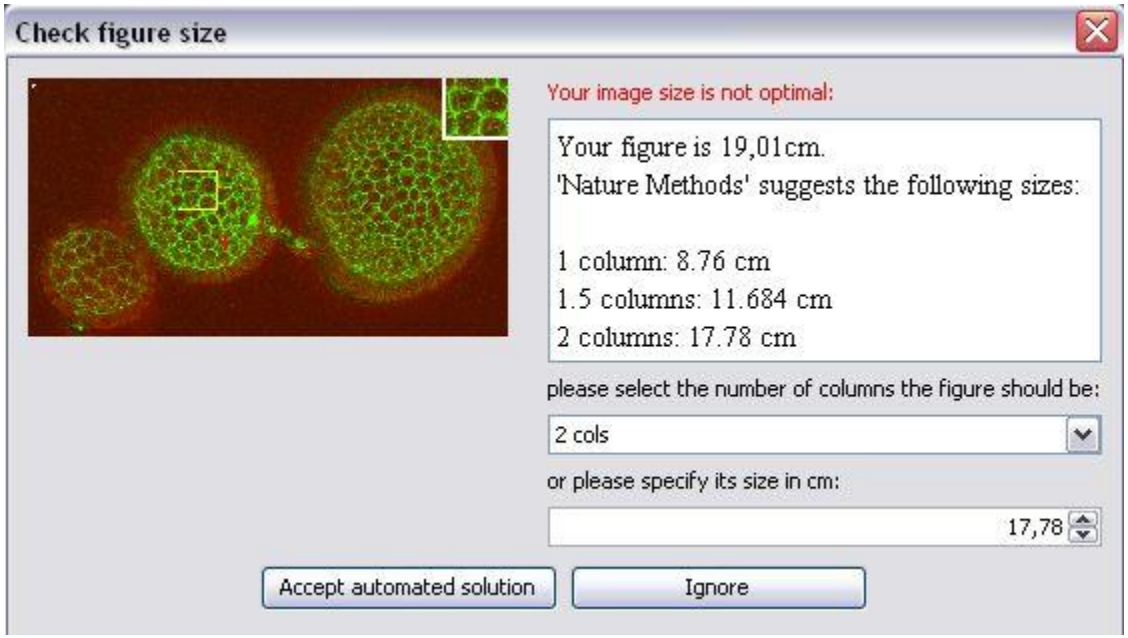
1/ Pick a
journal style

Check types

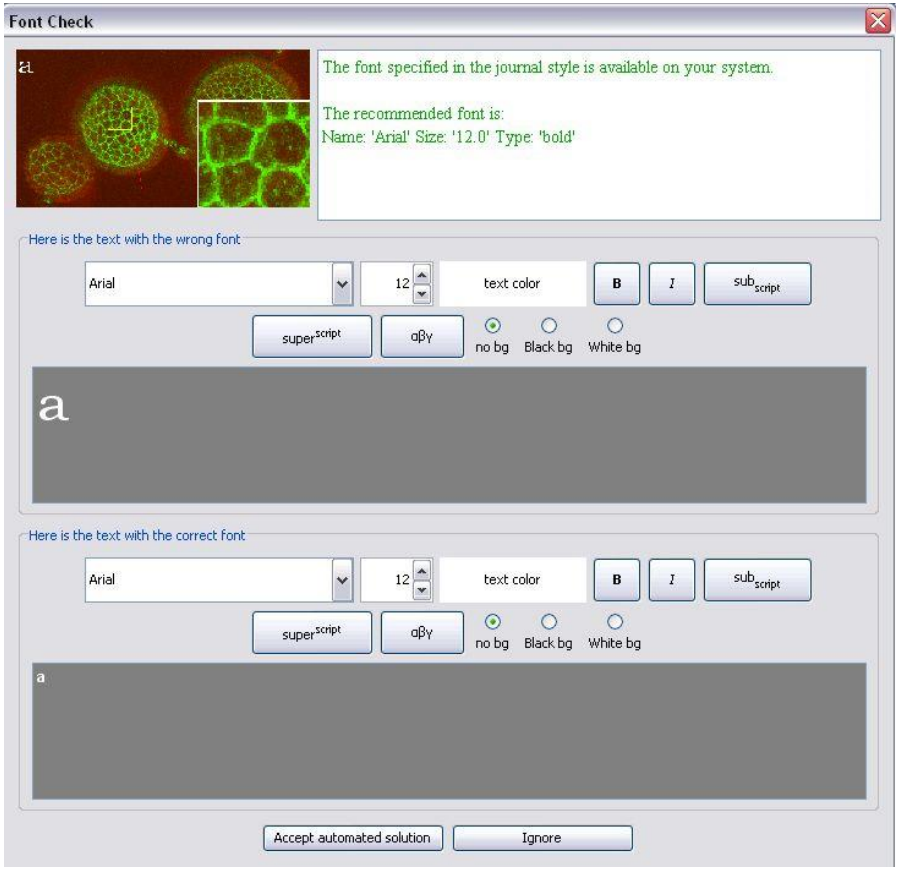
- **Size**: Verify the size of your figures (width of figures/panels in cm)
- **Style**: Checking the style (text color, ...)
- **Font**: Checking the fonts used, case of your text, ...
- **Text**: Checks texts and symbols (units, ...)
- **Line Arts**: Checks drawings (ROIs and/or vector graphics)
- **Graph**: Checks graphs

SF offers solutions and advises you but does not impose anyhing, you always have a choice!

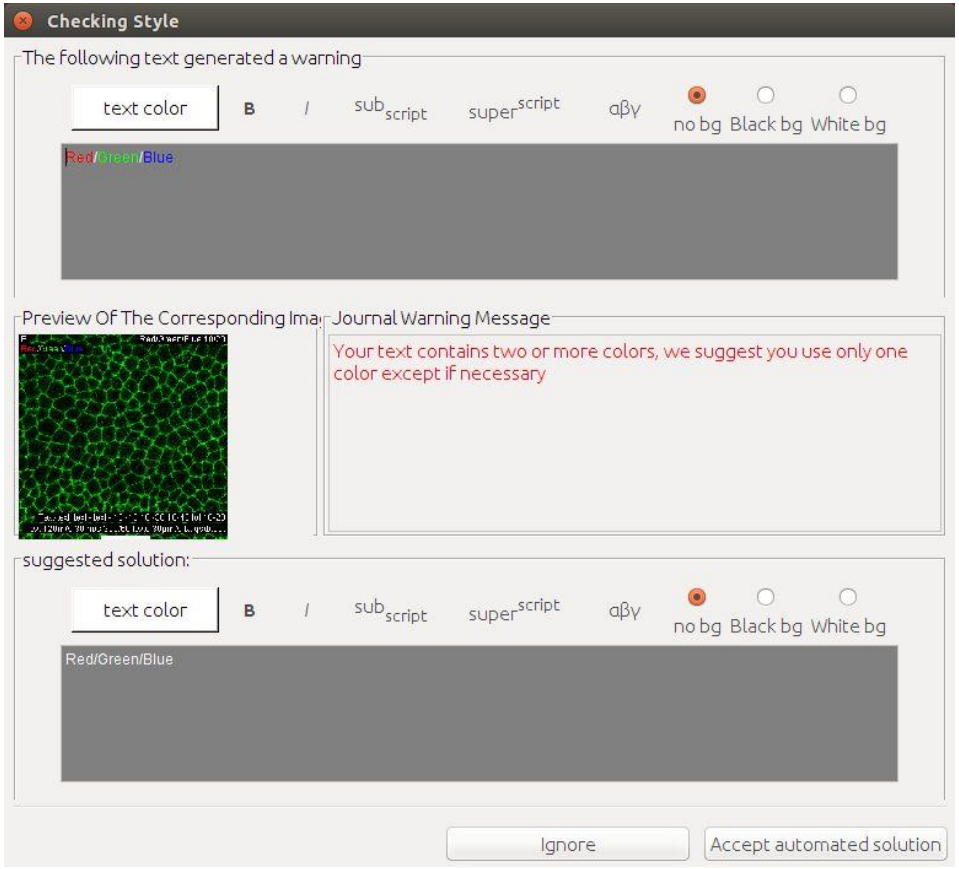
Checks (Size)


Check figure size
Your image size is not optimal:
Your figure is 19,01cm.
'Nature Methods' suggests the following sizes:
1 column: 8.76 cm
1.5 columns: 11.684 cm
2 columns: 17.78 cm
please select the number of columns the figure should be:
2 cols
or please specify its size in cm:
17,78
Accept automated solution
Ignore

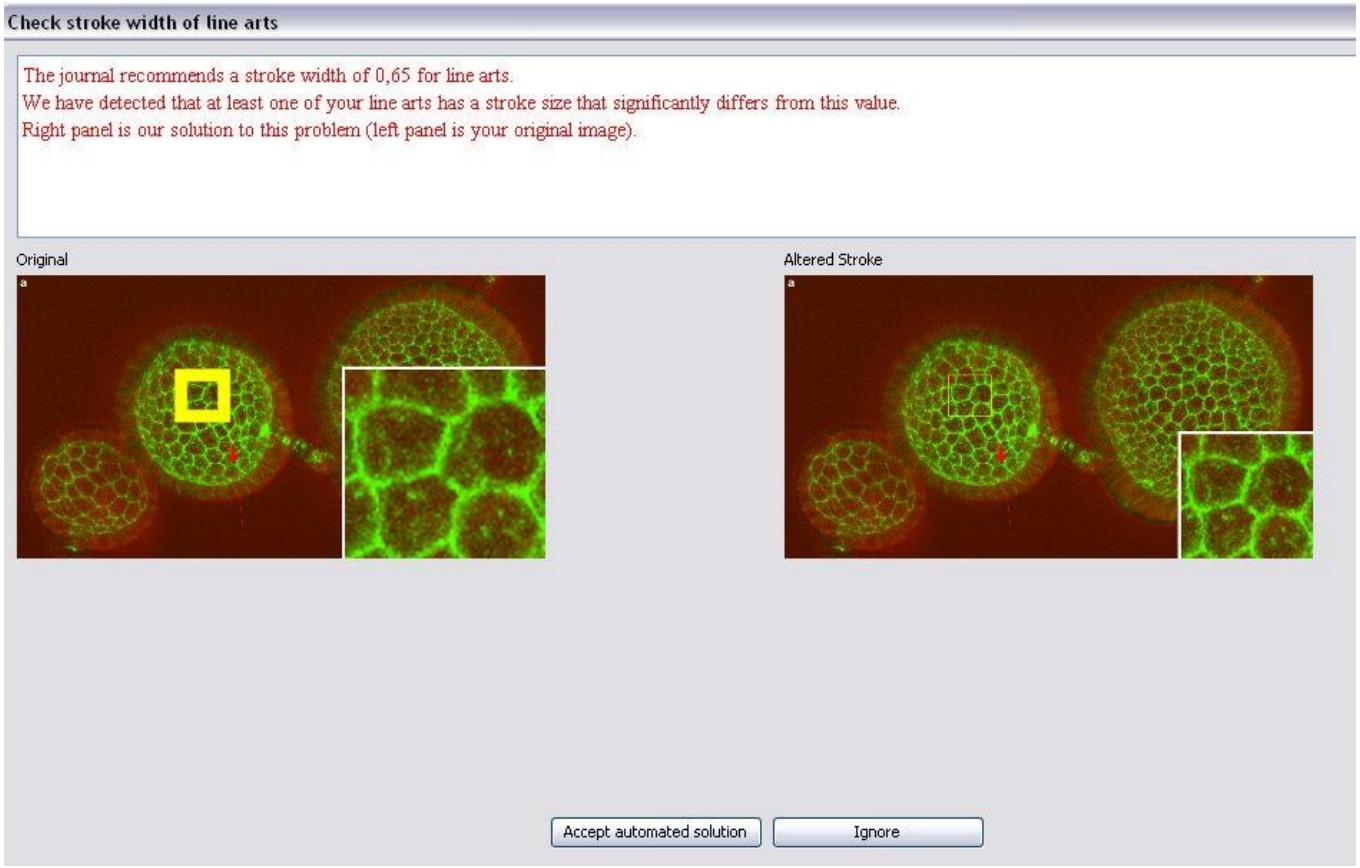
Checks (Font)


Font Check
The font specified in the journal style is available on your system.
The recommended font is:
Name: 'Arial' Size: '12.0' Type: 'bold'
Here is the text with the wrong font
Arial
12
text color
B
I
sub script
super script
αβγ
no bg
Black bg
White bg
a
Here is the text with the correct font
Arial
12
text color
B
I
sub script
super script
αβγ
no bg
Black bg
White bg
a
Accept automated solution
Ignore

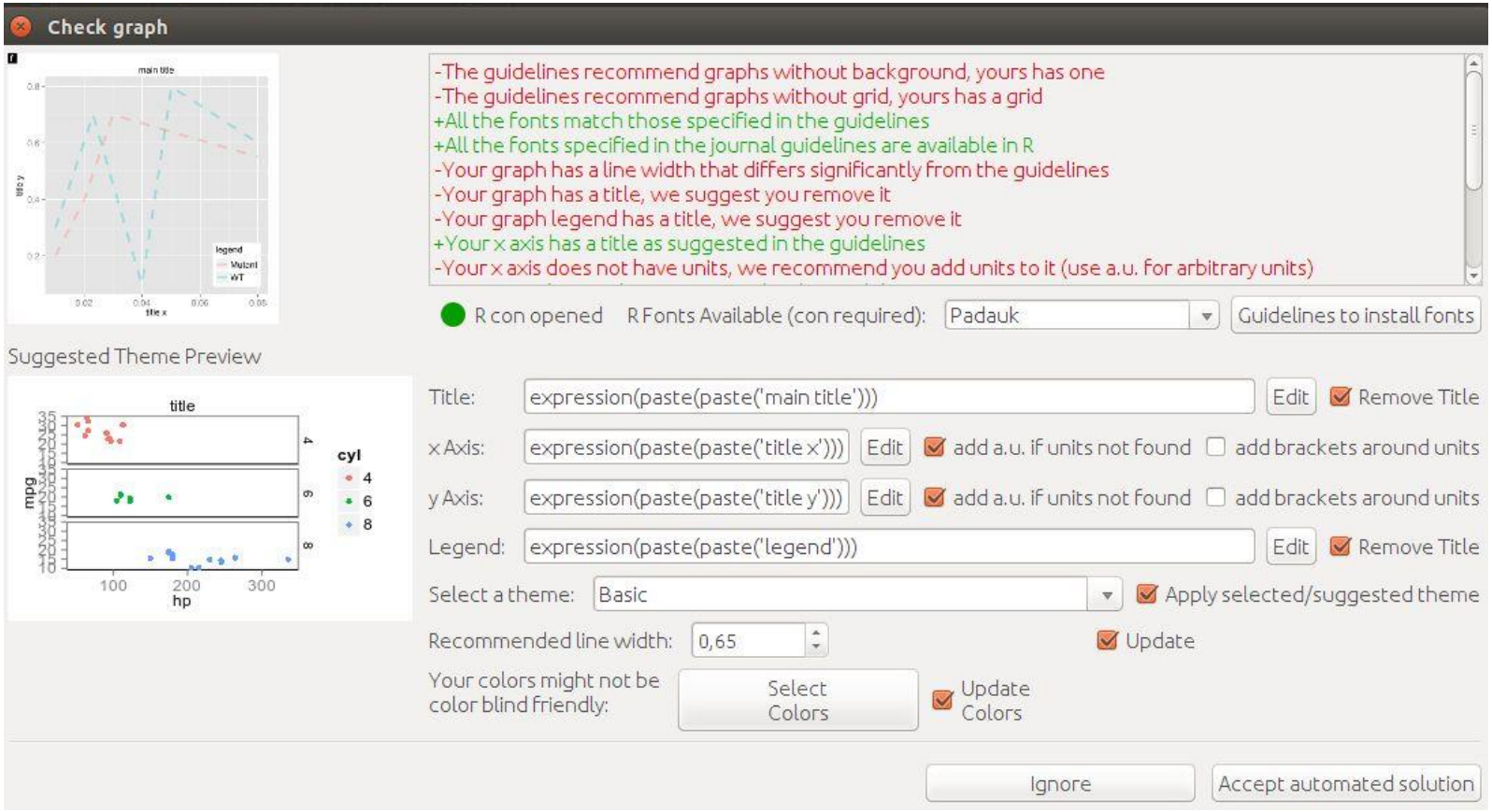
Checks (Style)



Checks (Line Art)



Checks (Graph)



Exercise 11

- Click "File>New"
- Open the "Exercice_11" folder
- Load the .yf5m file in ScientiFig
- Select the "Nature Methods" style
- Apply the various checks to your figure, change style and try again
- Create a custom style and apply it to your figure

Save and export your figures

Default format for saving

- .yf5m (my own format)

Export Format

- Pixels/raster:
  - TIFF (recommended)
  - JPEG (light but low quality)
  - PNG (supports transparency)
- Vectoriel:
  - SVG (can be furter modified/edited), can be converted to other vector formats PS, EPS and PDF

Graphs with Figur

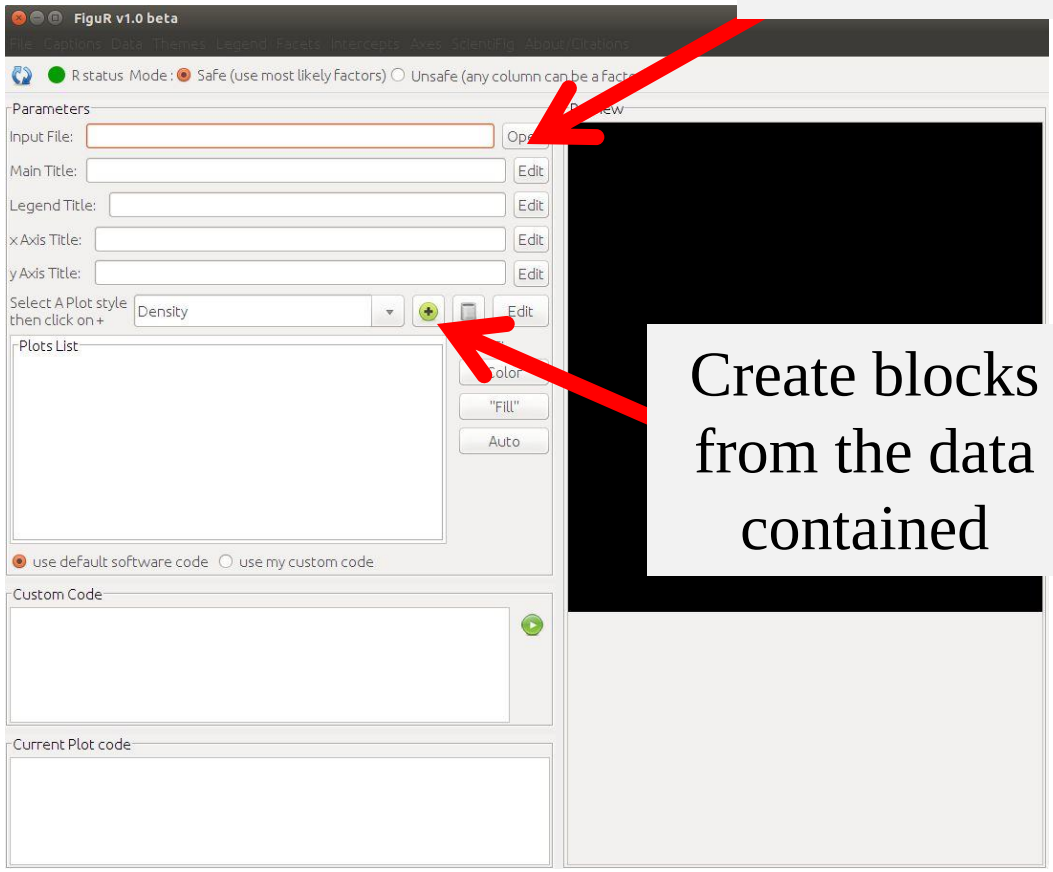
Set up R

- install.packages("ggplot2")
- install.packages("rJava")
- install.packages("xlsxjars")
- install.packages("xlsx")
- install.packages("grid")
- install.packages("mgcv")
- install.packages("MASS")
- install.packages("Rserve")
- install.packages("extrafont")
- library(extrafont)
- font_import()

Already done

Create a graph and add it to a figure

Open your Excel file



Create blocks from the data contained

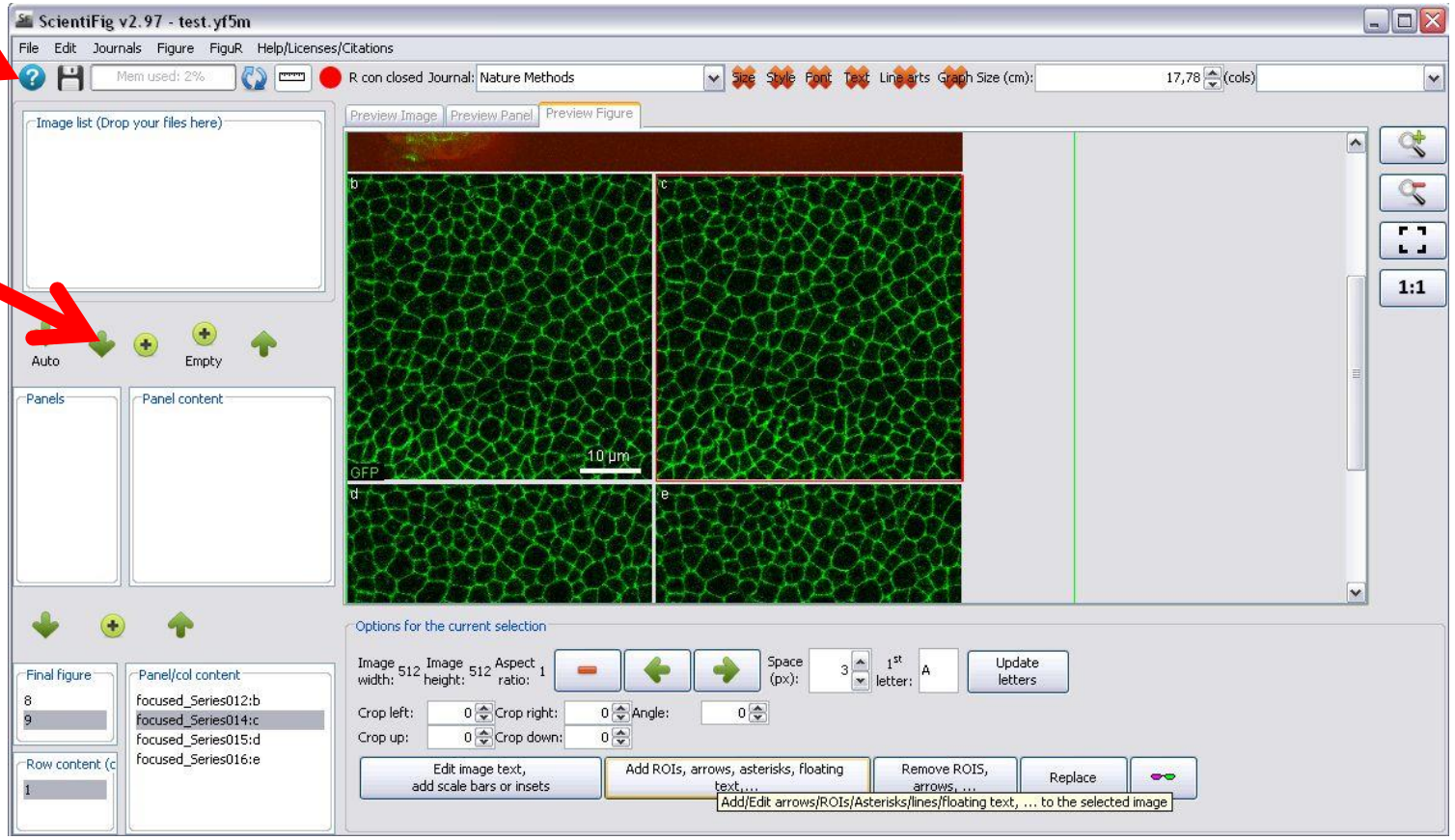
Exercise 12

- Launch "Figur"
- Open the "Exercice_12" folder
  - Load the .xlsx file in Figur
  - Create a line plot (or other)
  - Add captions, a title and a mathematical formula
  - Save the .figur file
- Launch "ScientiFig"
- Click "File>New"
  - Load the "figure.yf5m" file in SF
  - Load the file "exemple_figur.figur" twice in SF
  - Add the graph to panel 1
  - Add the graph to panel 2
  - Resize the panels and see graphs being resized
  - Select the « nature methods » style
  - Check the « Graph »

Online Help (going further)

1

2



Links

- ScientiFig:
  - https://grr.gred-clermont.fr/labmirouse/software/
- FigureJ:
  - http://imagejdocu.tudor.lu/doku.php?id=plugin:utilities:figurej:start
- Omero.Figure:
  - http://will-moore.github.io/figure/demo/

Build your own figures!