



# Building publication ready scientific figure with ScientiFig

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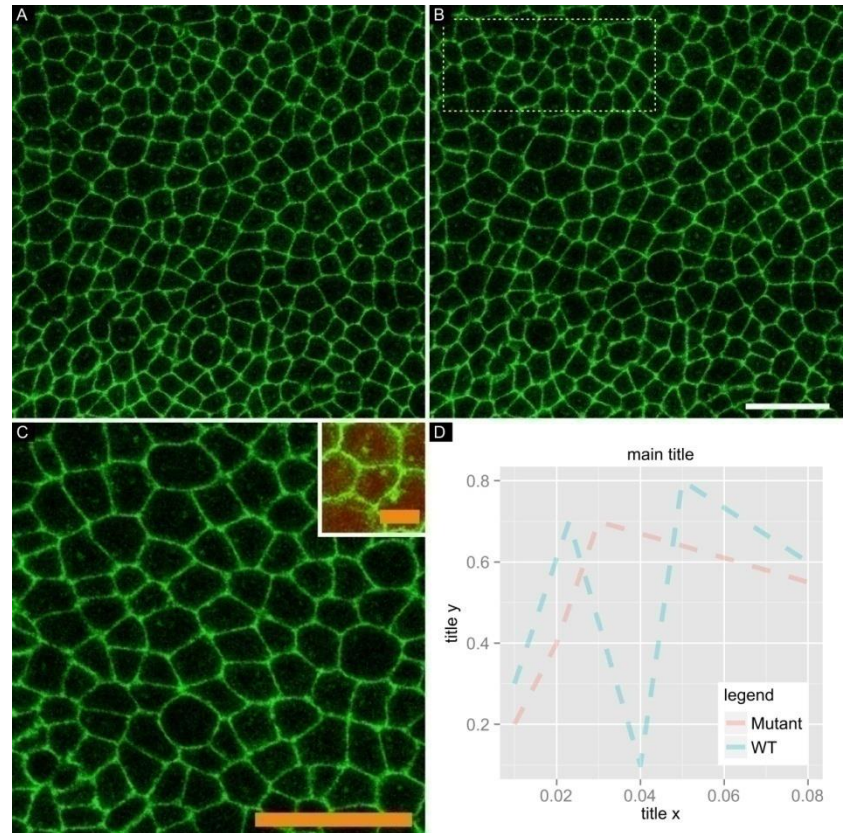
# Figures

## Artistic Figures



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

## Scientific Figures



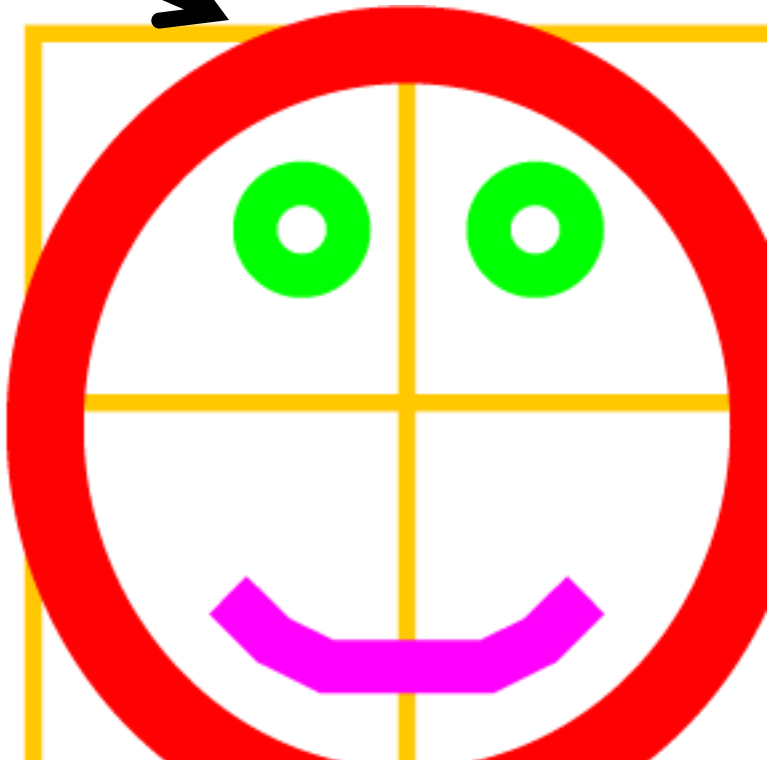
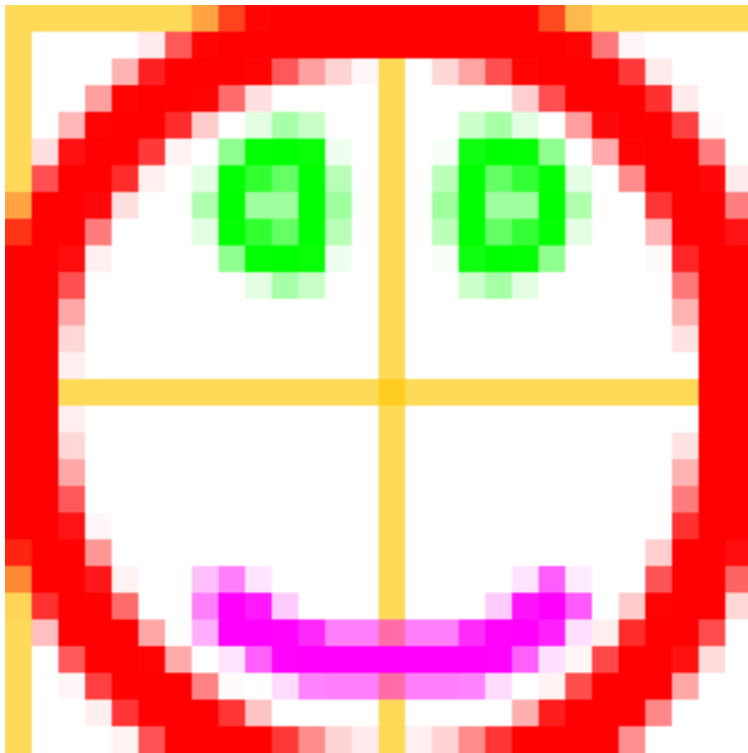
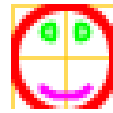
# Image Types

**Bitmap/raster (pixels)**

**Vectorial (objects)**

X 10

X 10

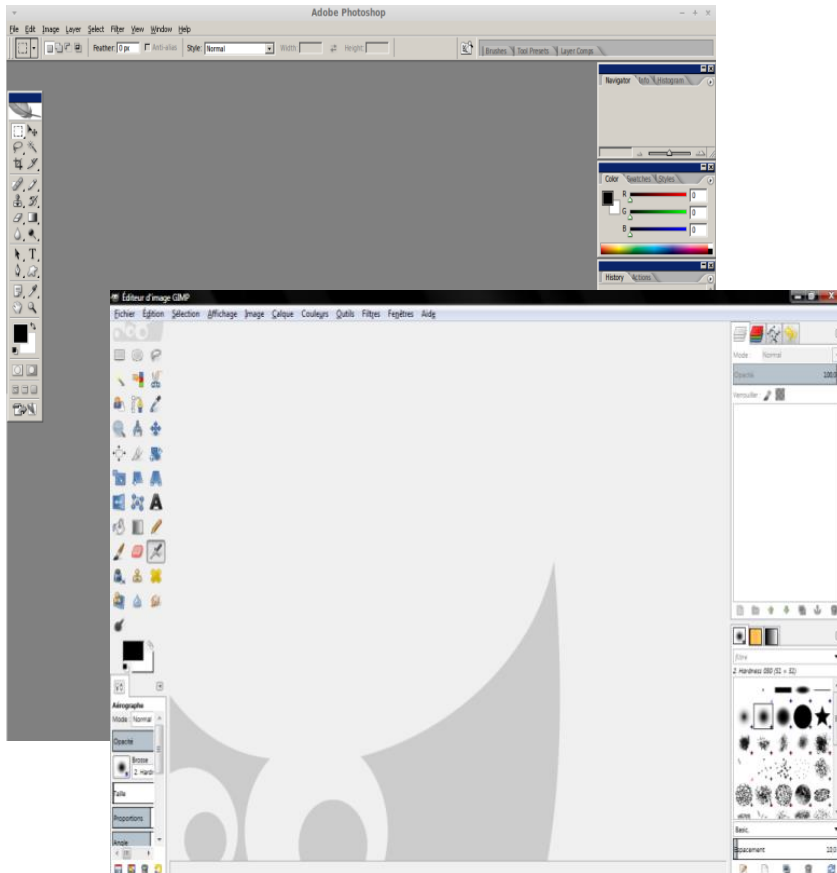


# Exercise 0

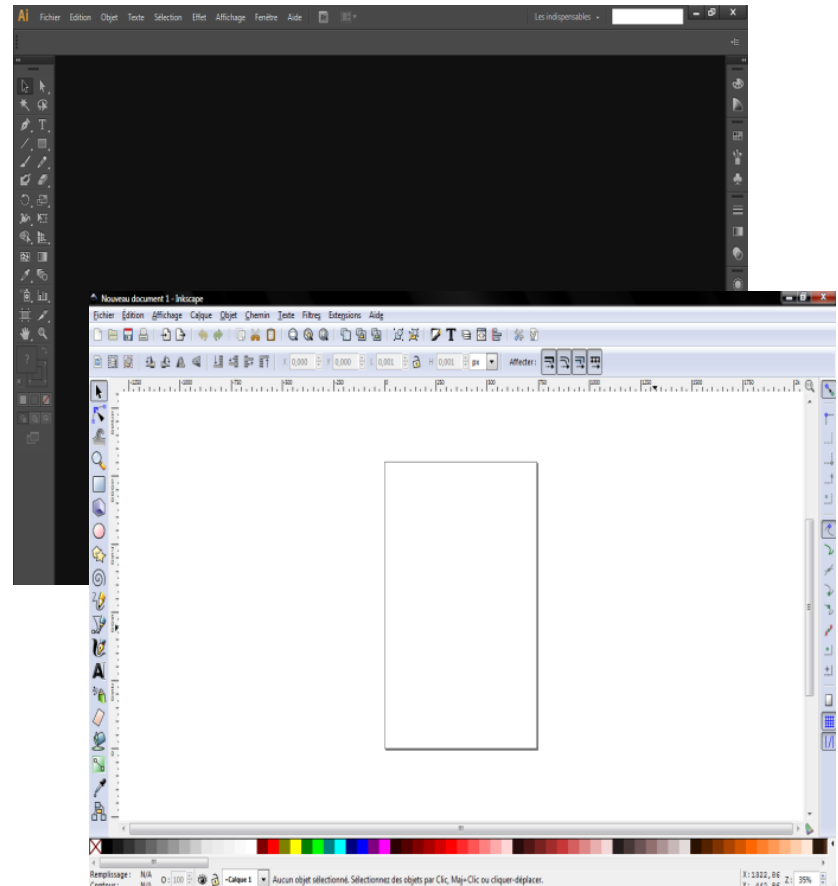
- Open the "Exercice\_00" folder
- The raster image case:
  - Drag and drop the "raster.ppm" file over FIJI
  - Press the up arrow to zoom in
  - Right-click on the "raster.ppm" file, select "Open with ..." and select the notepad software
  - Change the value of the first pixel, save and reopen the image 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 ?



## 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**

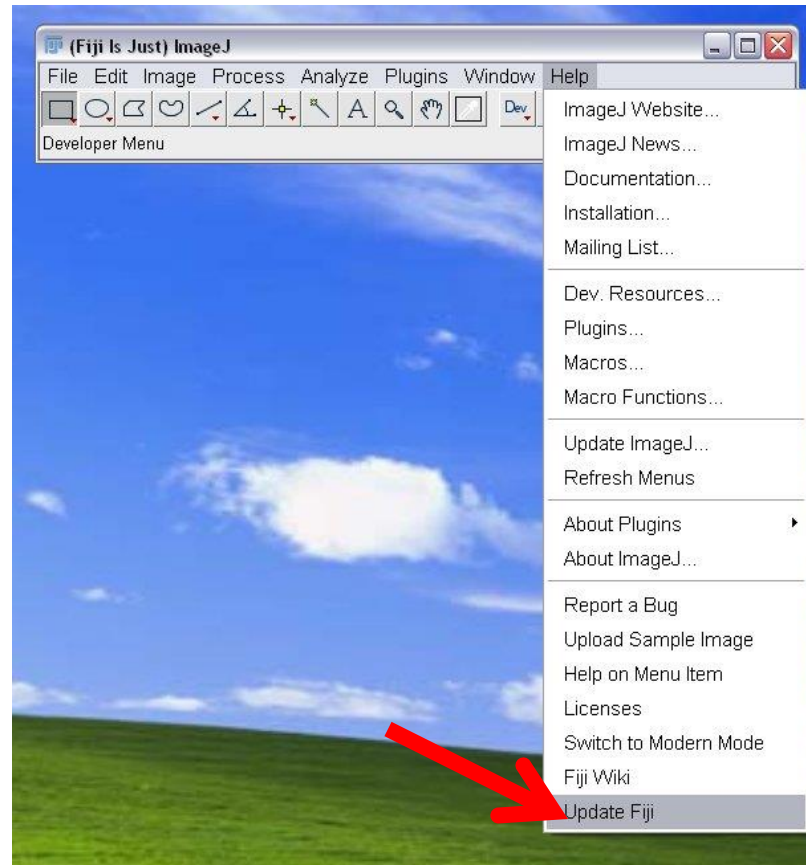
# The ScientiFig software

# Install

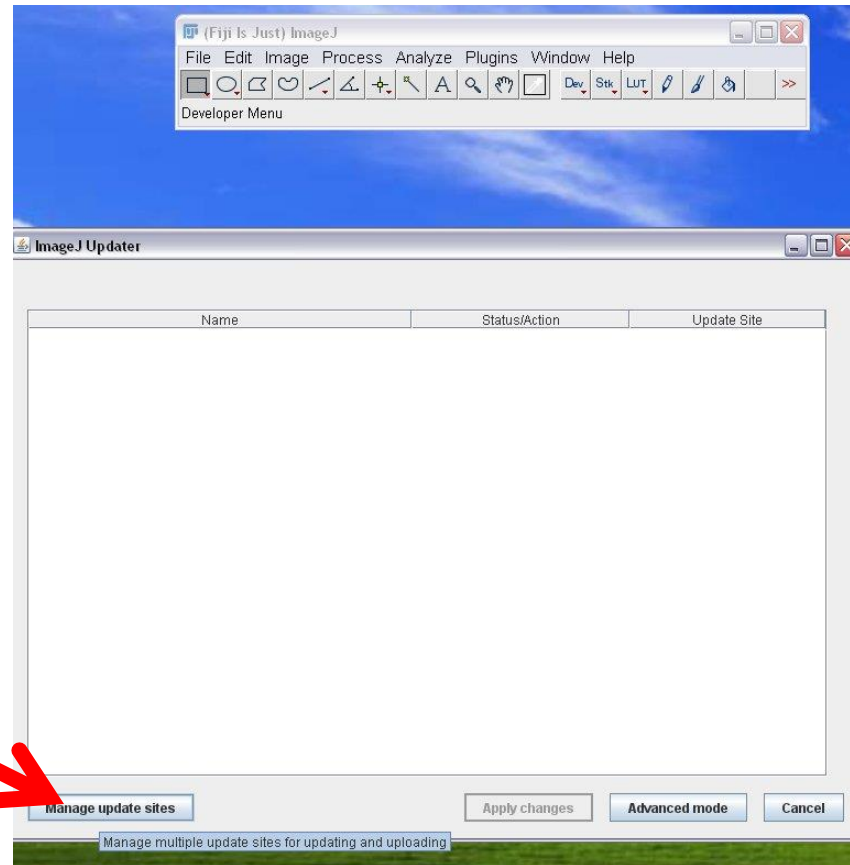
- Standalone software
- Plugin for ImageJ
- Plugin for FIJI (automatic updates)



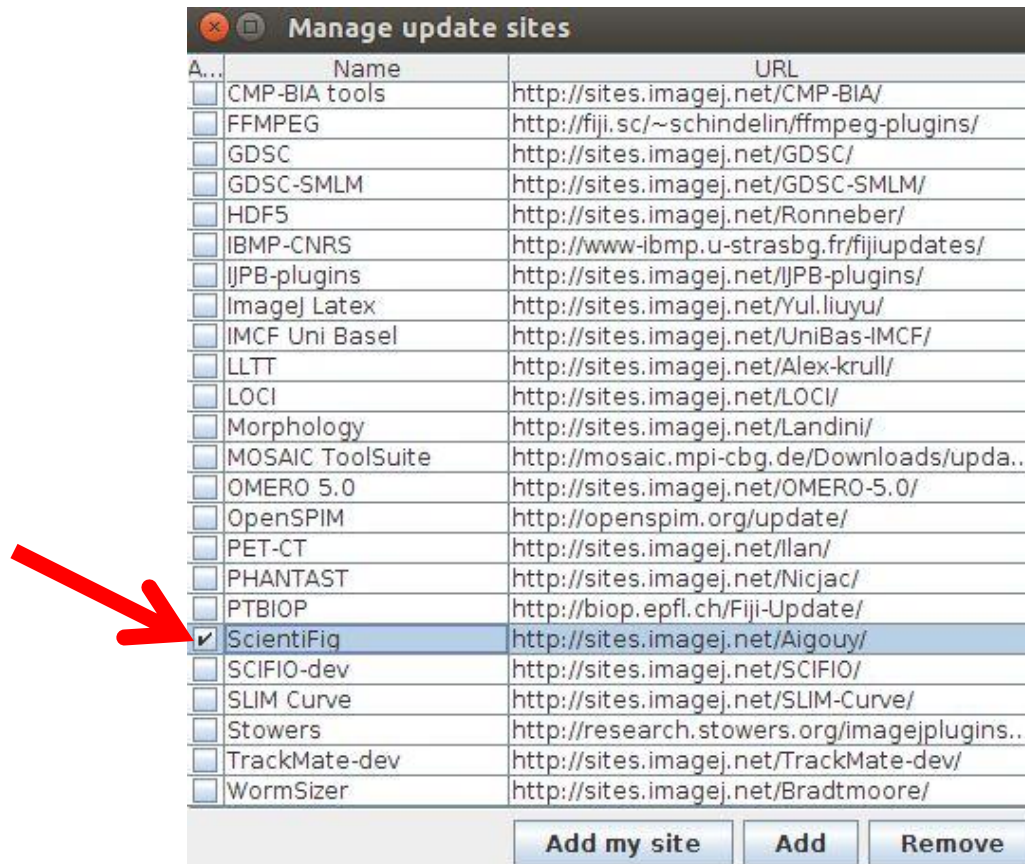
# Install



# Install



# Install

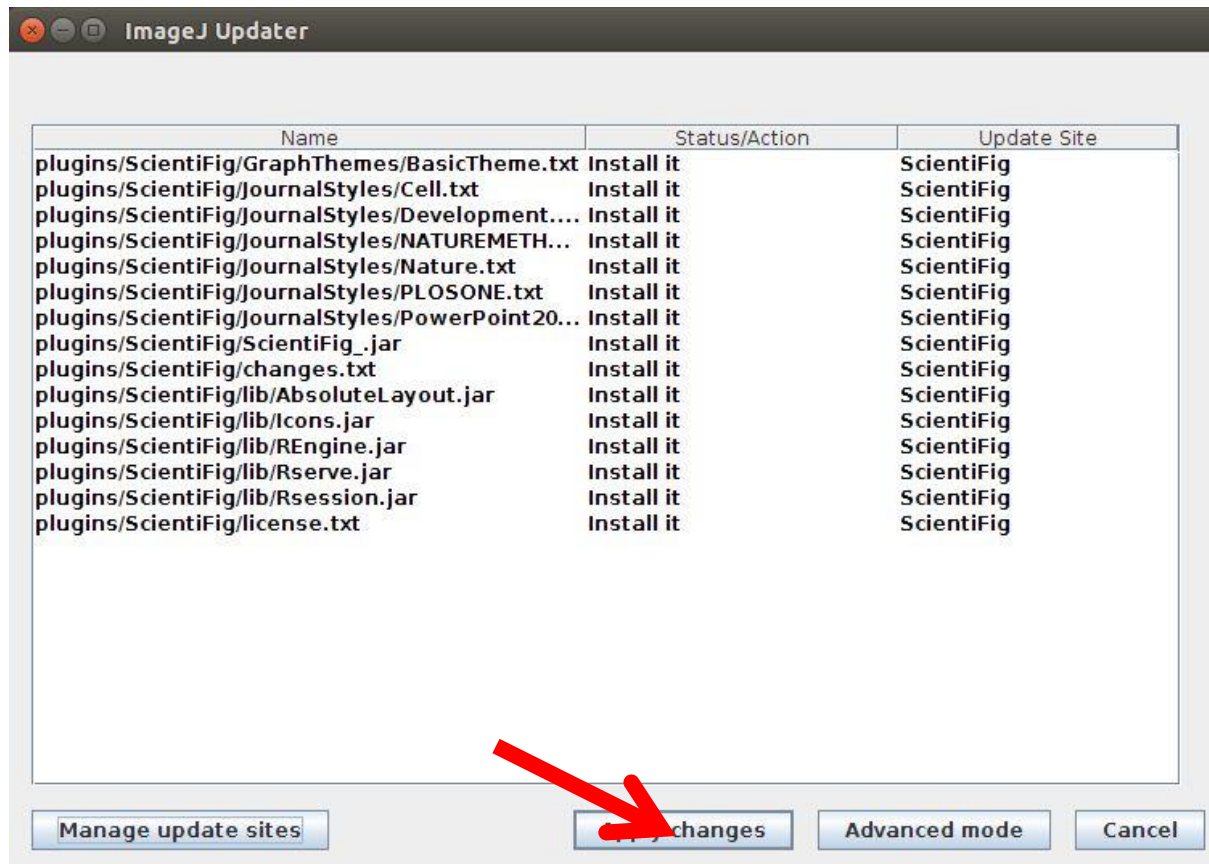


The screenshot shows a window titled "Manage update sites" with a table of update sites. A red arrow points to the "ScientiFig" row, which is highlighted and has a checkmark in the checkbox column. The table lists various update sites with their names and URLs.

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

Buttons: Add my site, Add, Remove

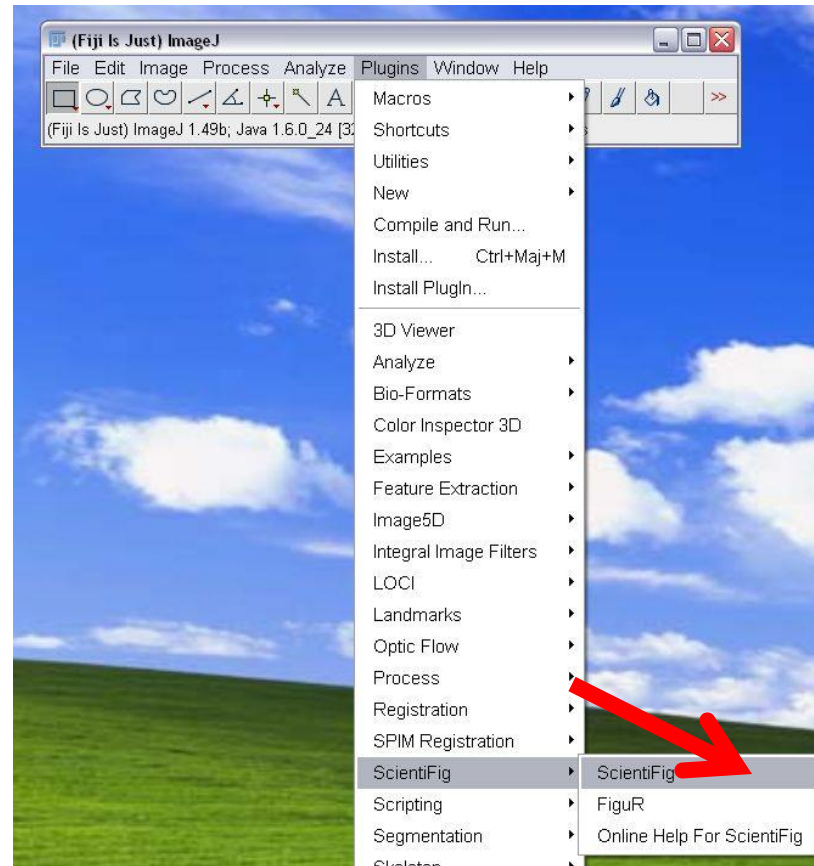
# Install



Install

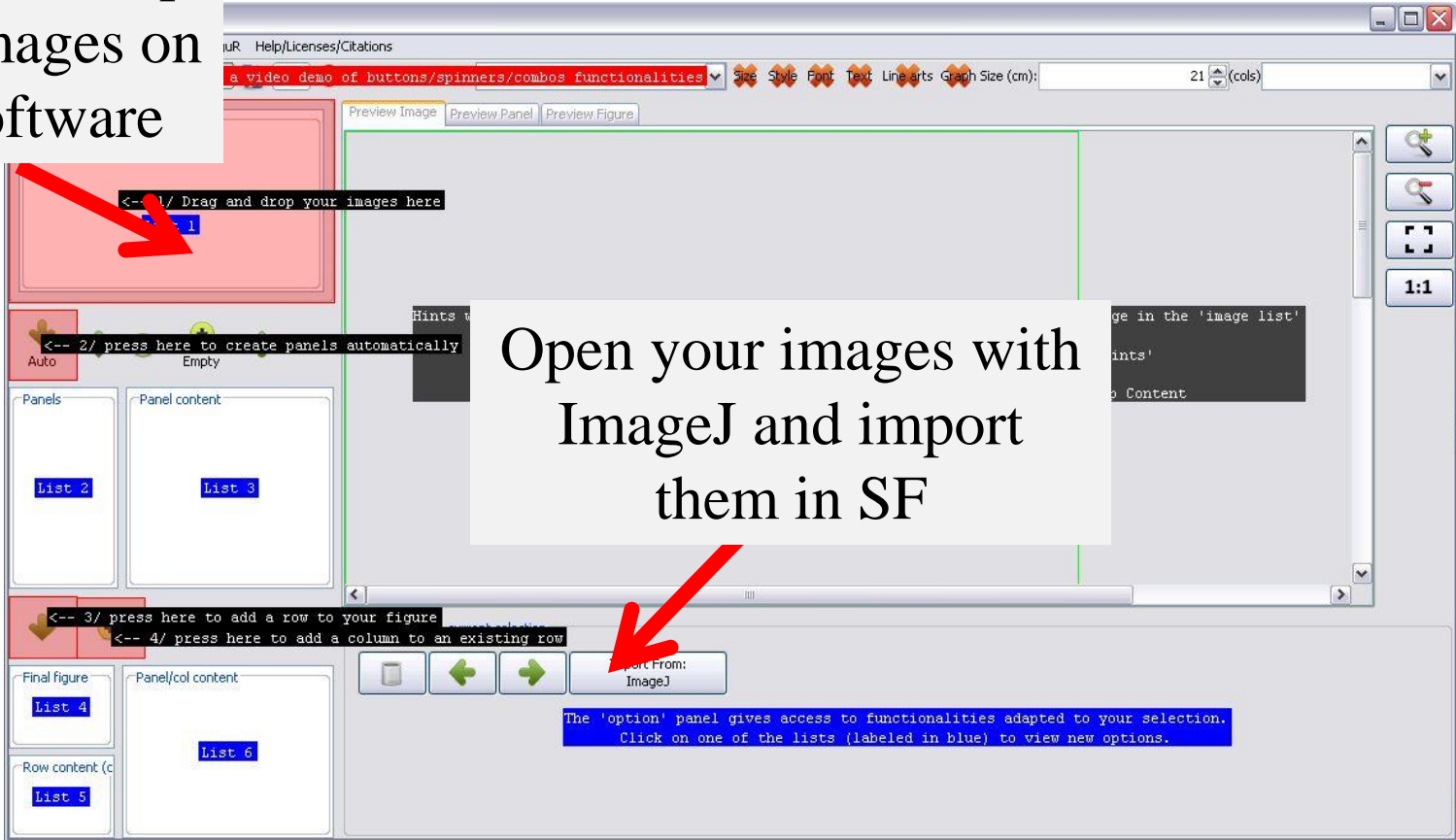
**Restart FIJI**

# Installation



# Load / import images into ScientiFig

Drag and drop your images on the software



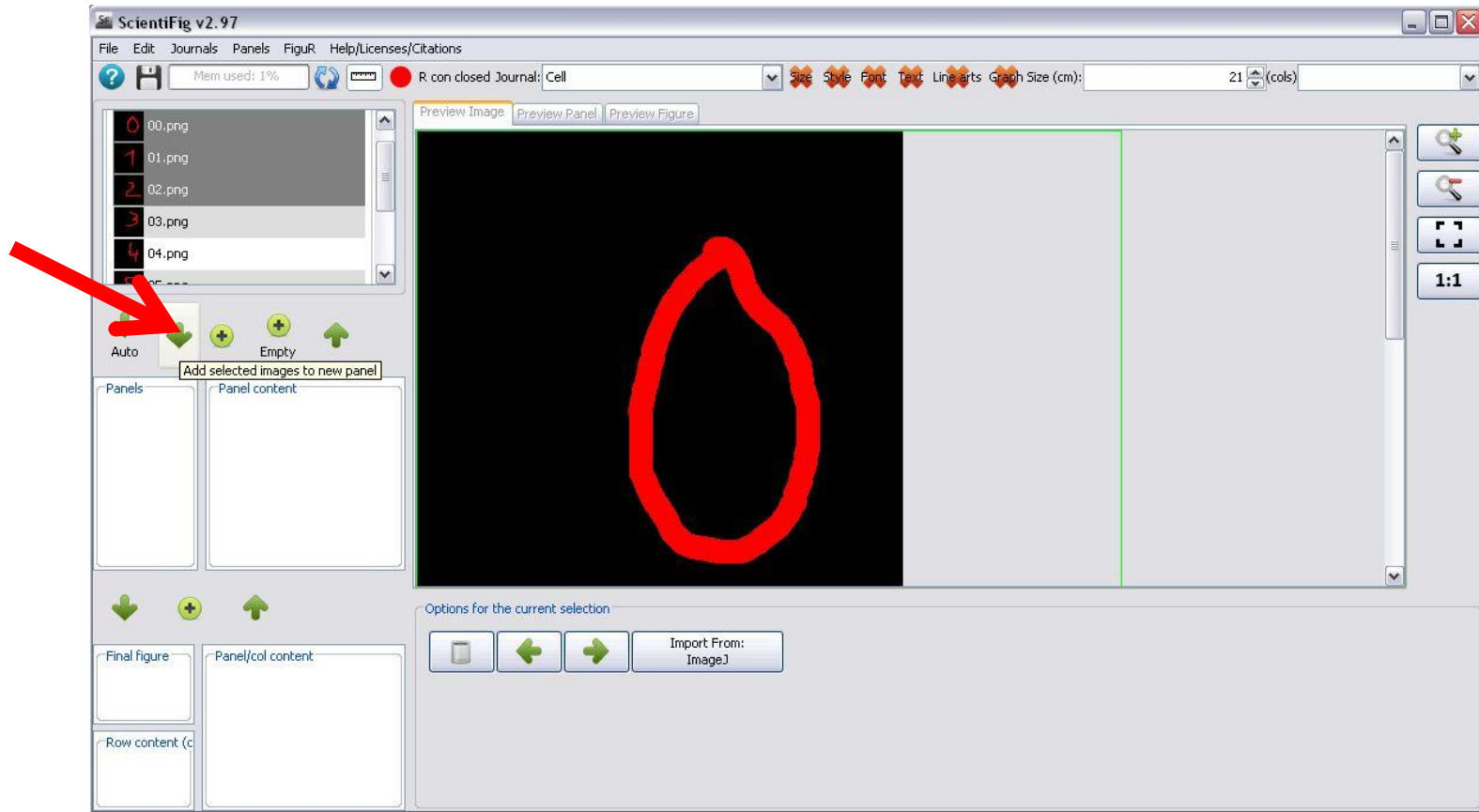
Open your images with ImageJ and import them in SF

# 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



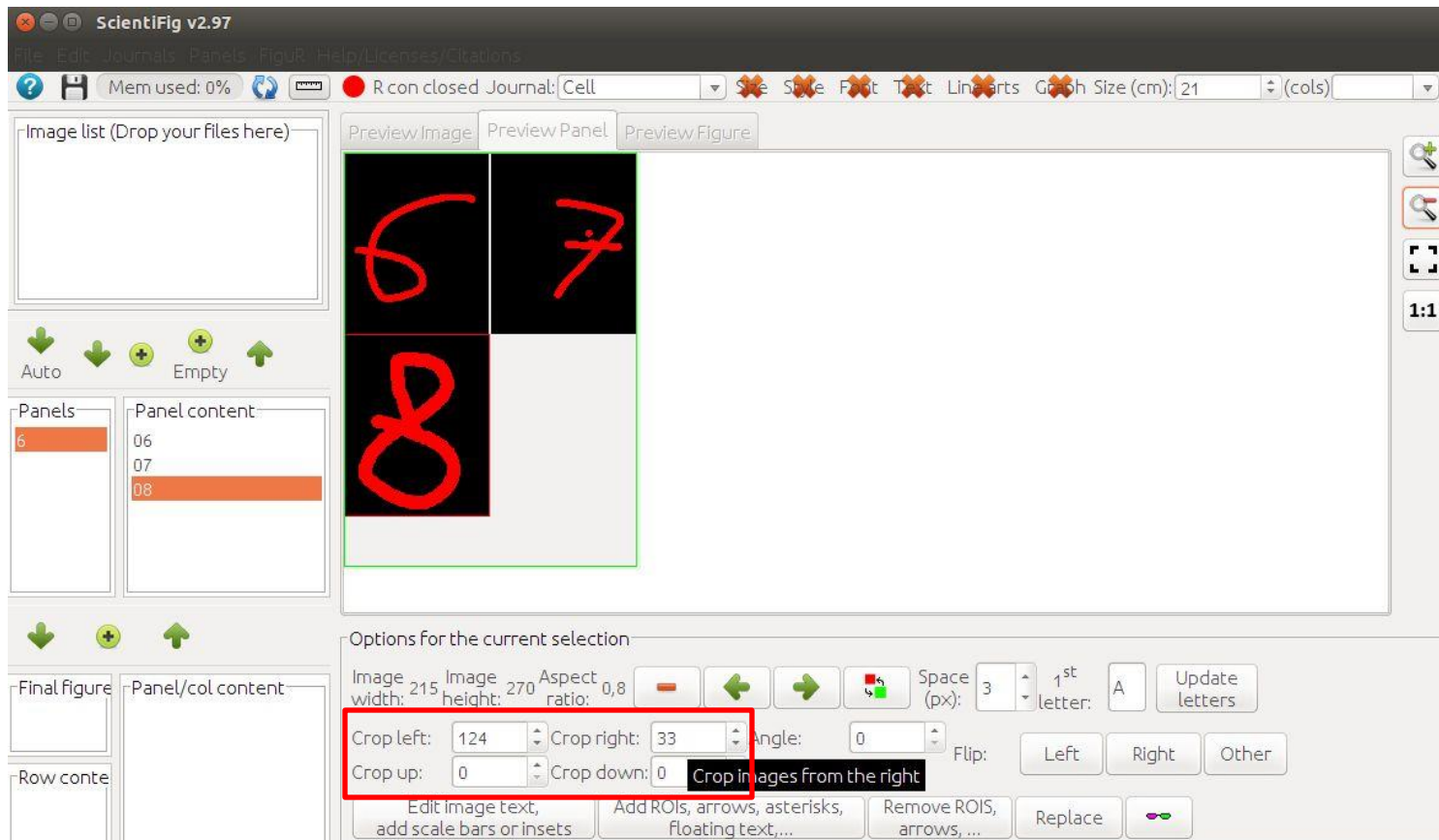
# Organize panels (same size images)



# 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

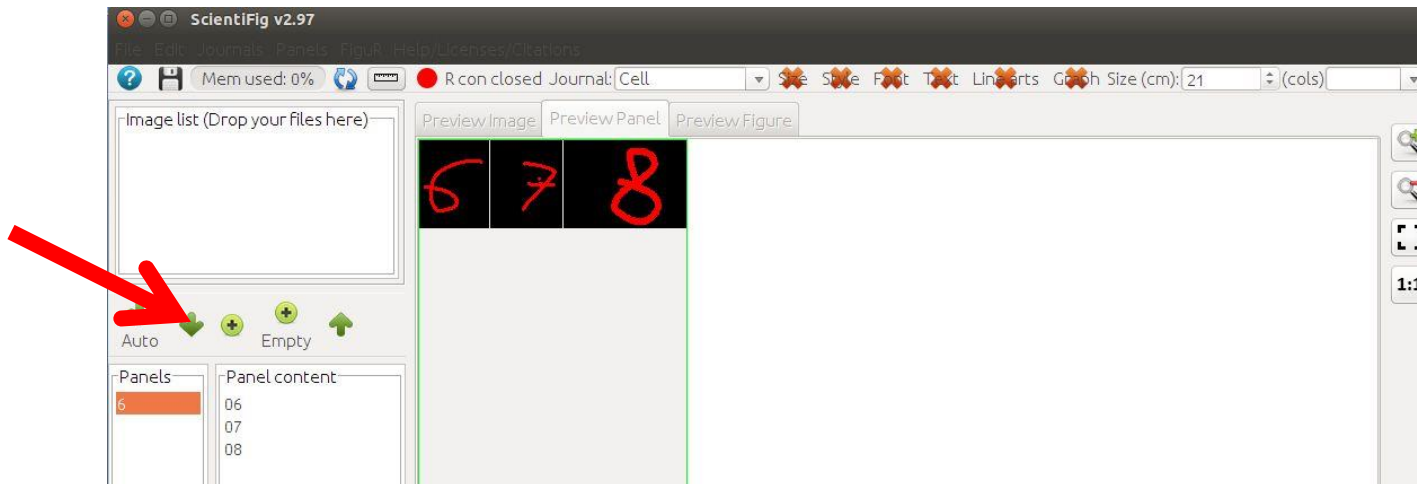
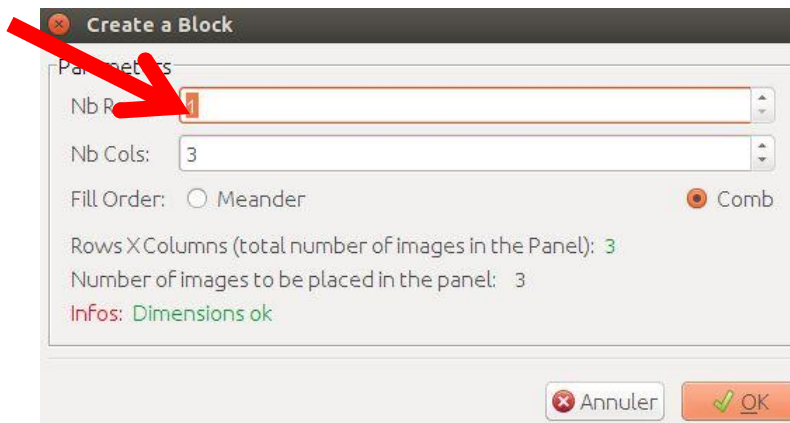
# Assemble panels with images of variable size using a crop



# 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

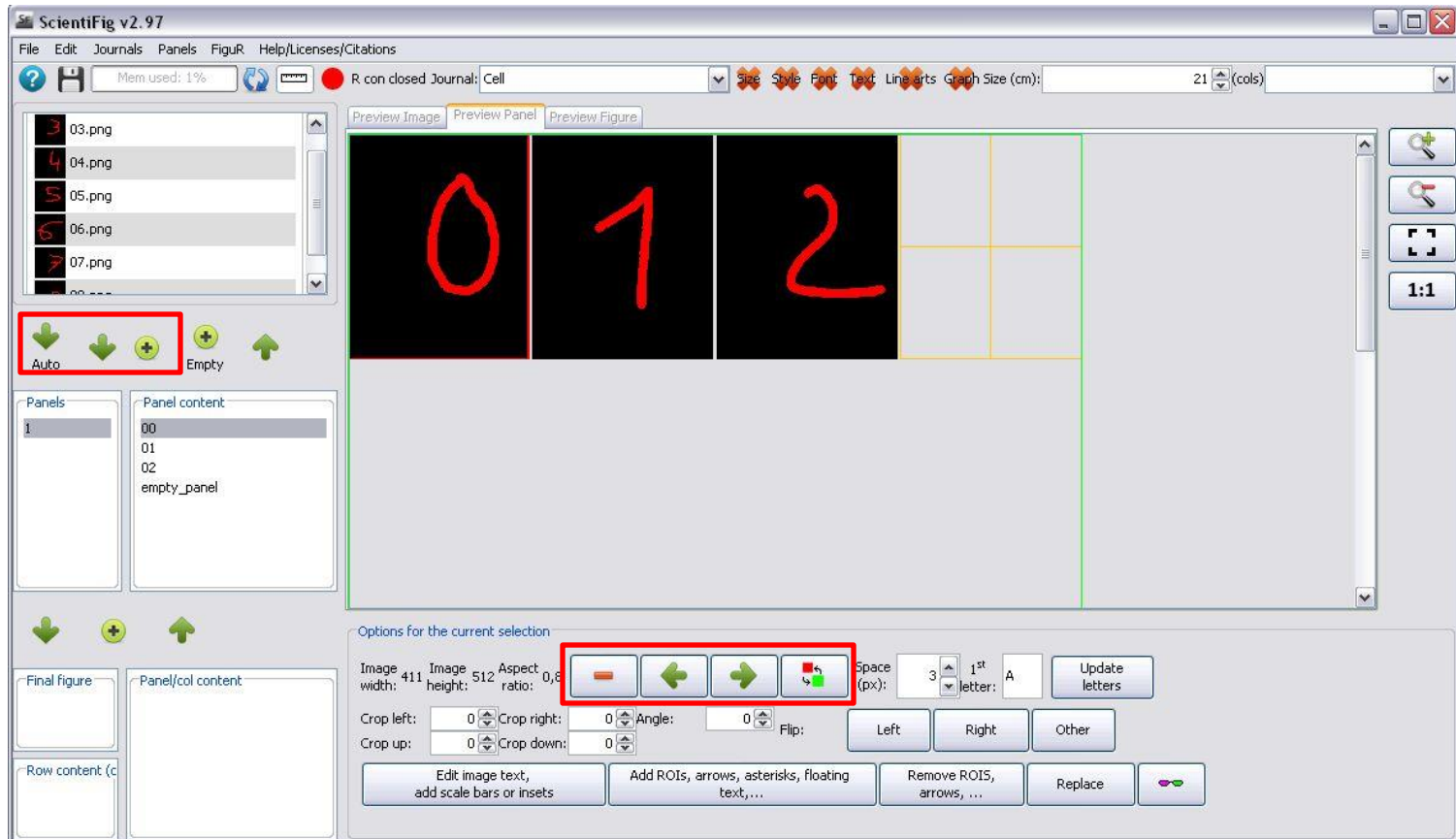
# Organize panels (variable images): the one row/col solution



# 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

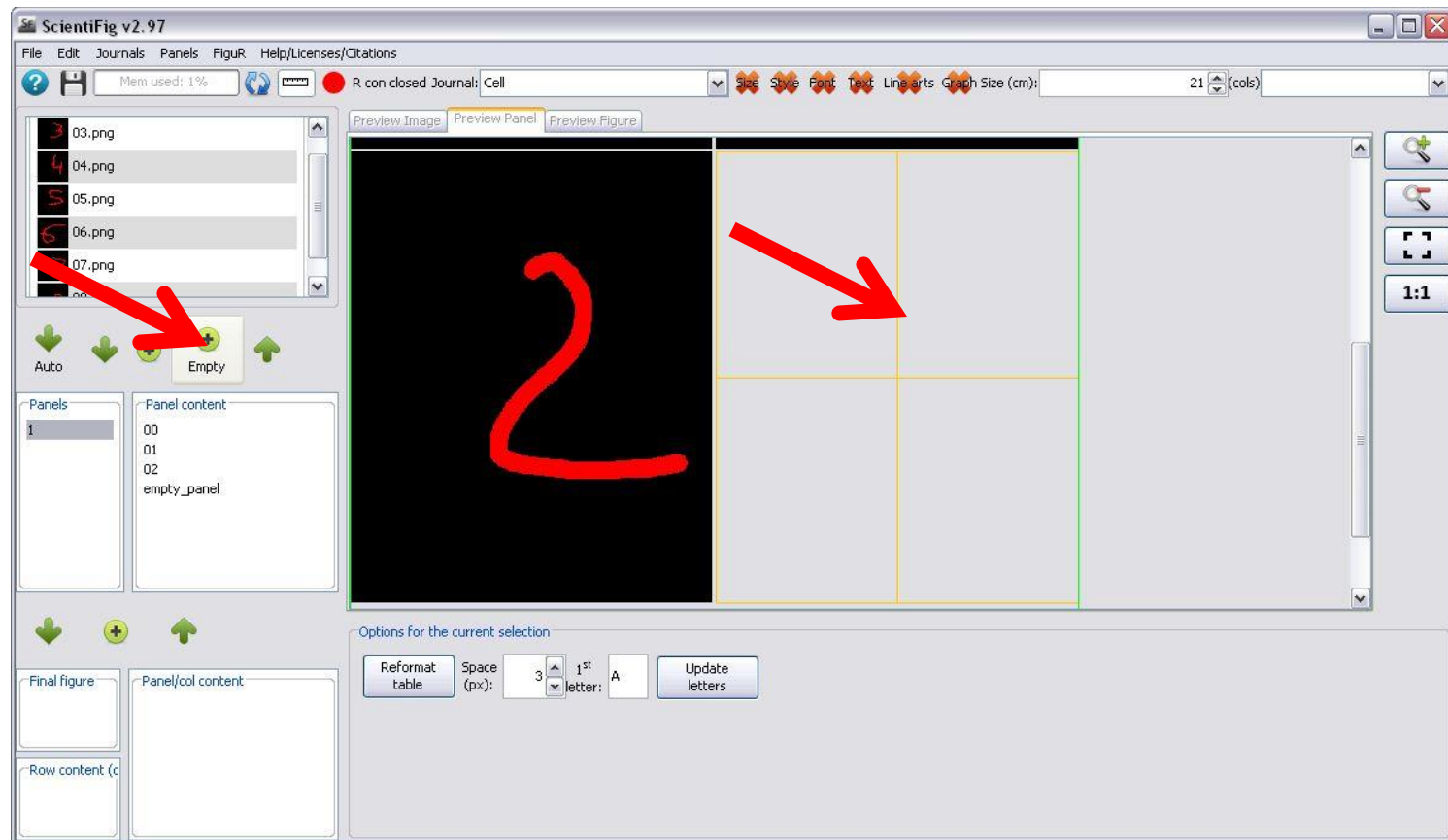


# Exercise 4

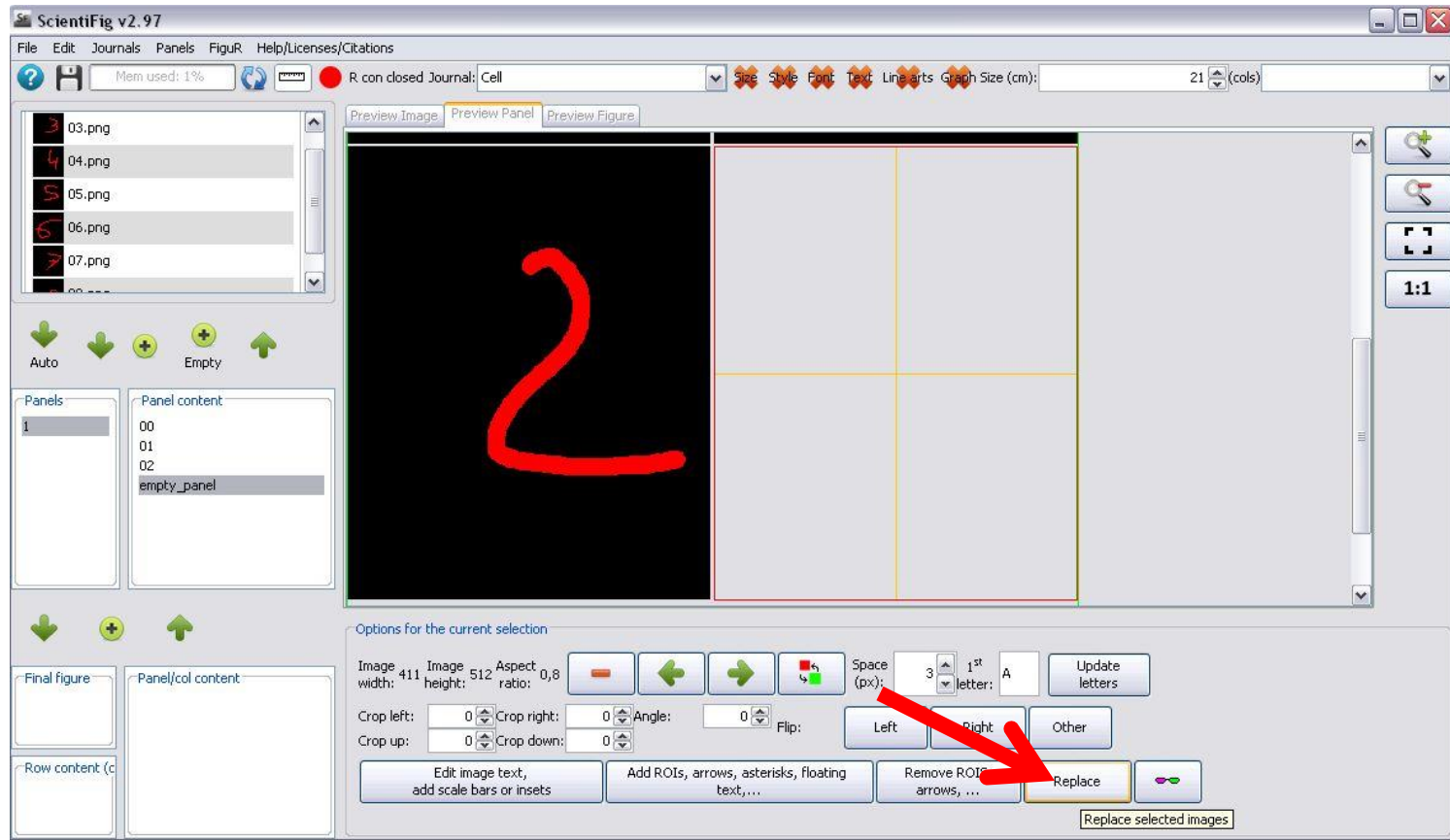
- Click "File>New"
- Open the "Exercice\_04" folder
- Create a panel ("auto" button)
- Delete one or more images from the panel
- Re-add (the) deleted image(s) to the panel ("+" button)
- Select two images (Ctrl or Cmd key on the keyboard) and exchange the position of these two images ("swap" button)
- Select an image and use the horizontal arrows to move it in the panel



# Build panels even when images are missing



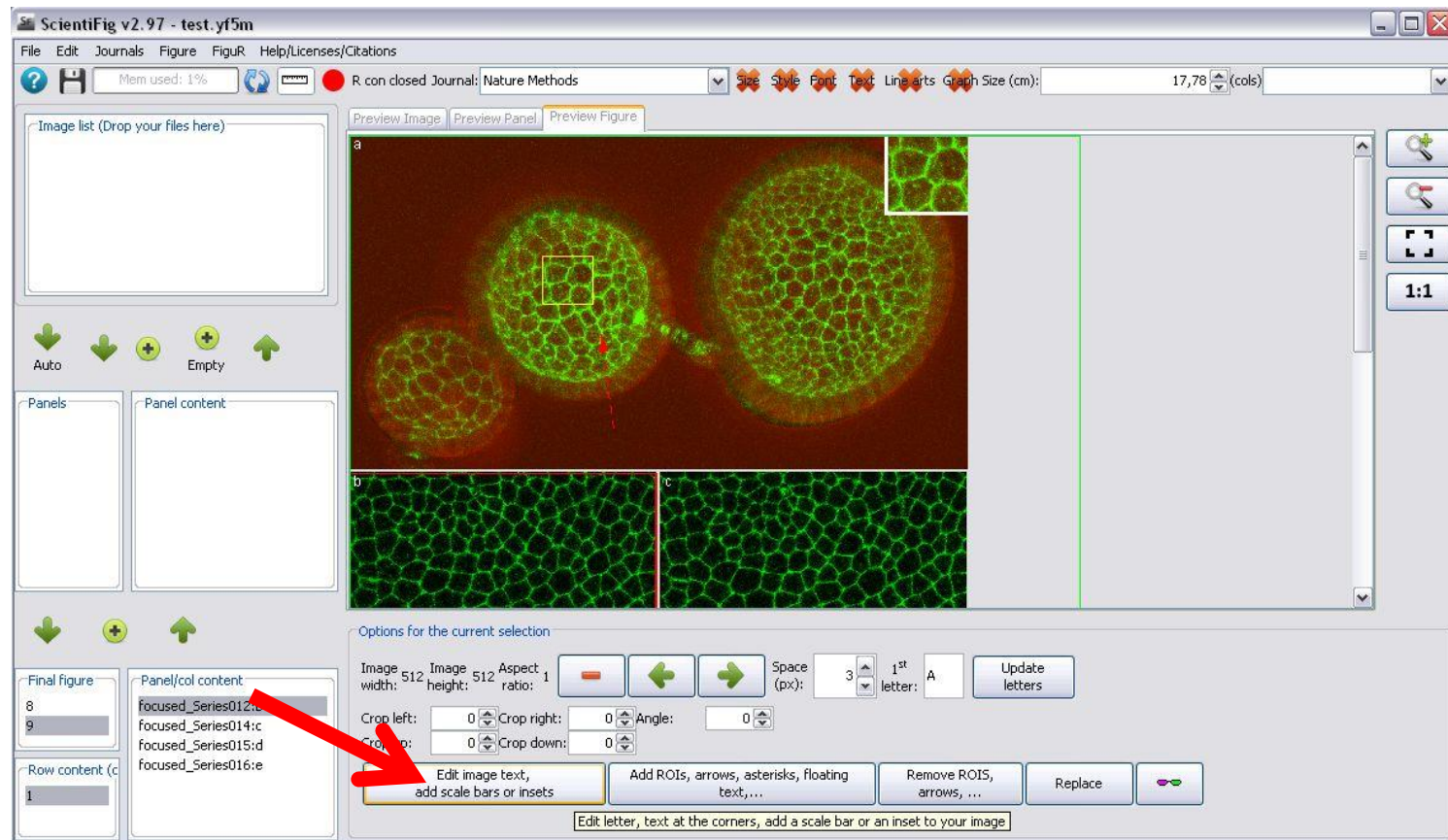
# Build panels even when images are missing



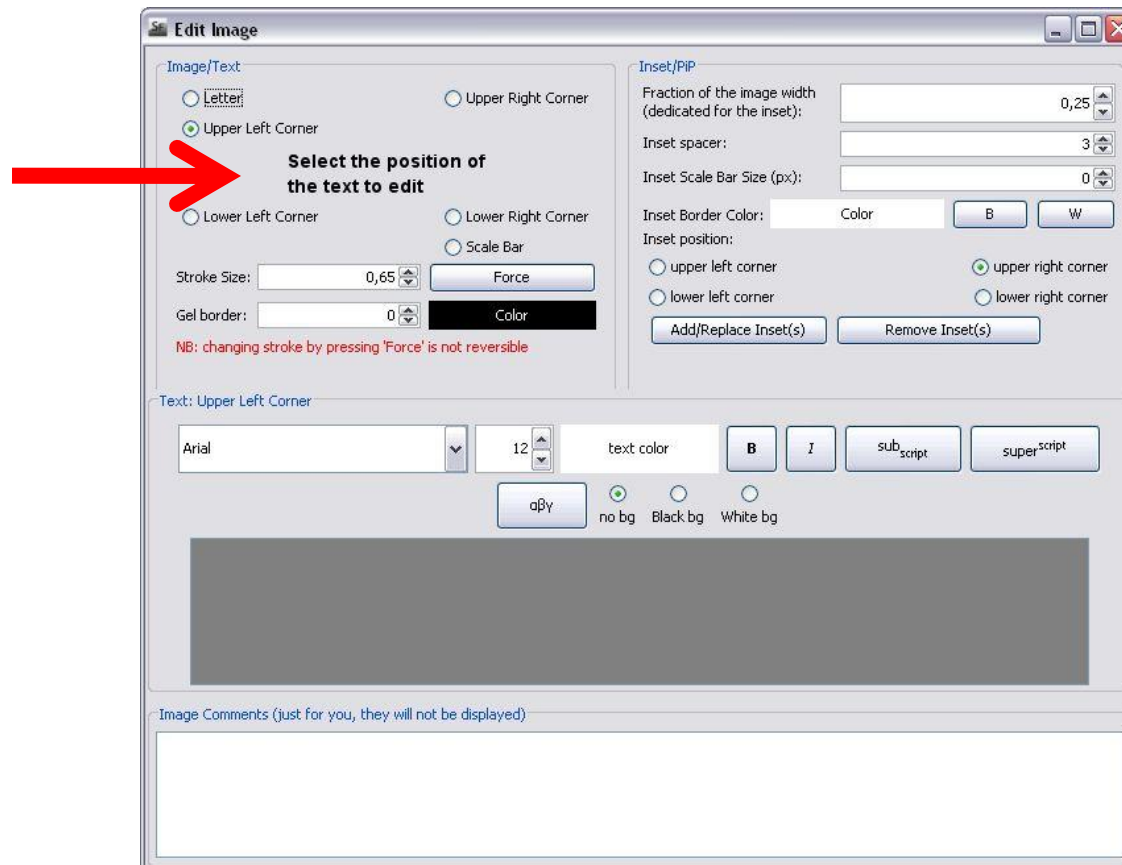
# Exercise 5

- 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

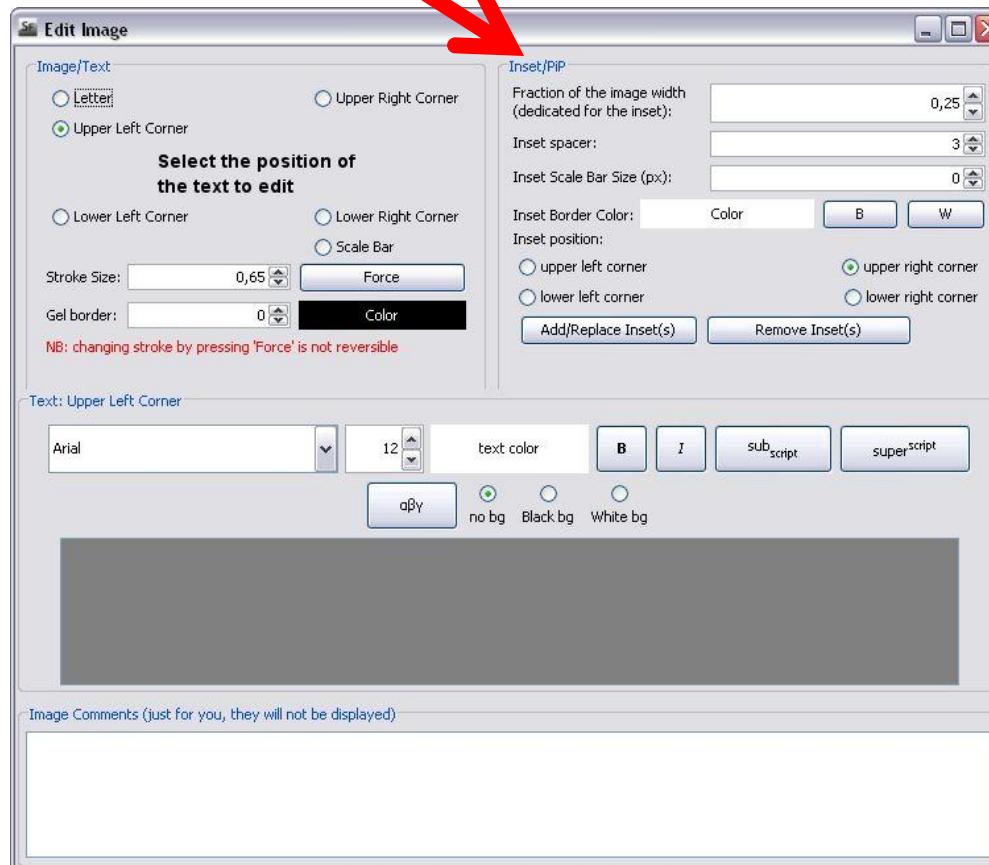


**Note** : the text can expand over several lines, be italicized, superscripted or subscripted.

# 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

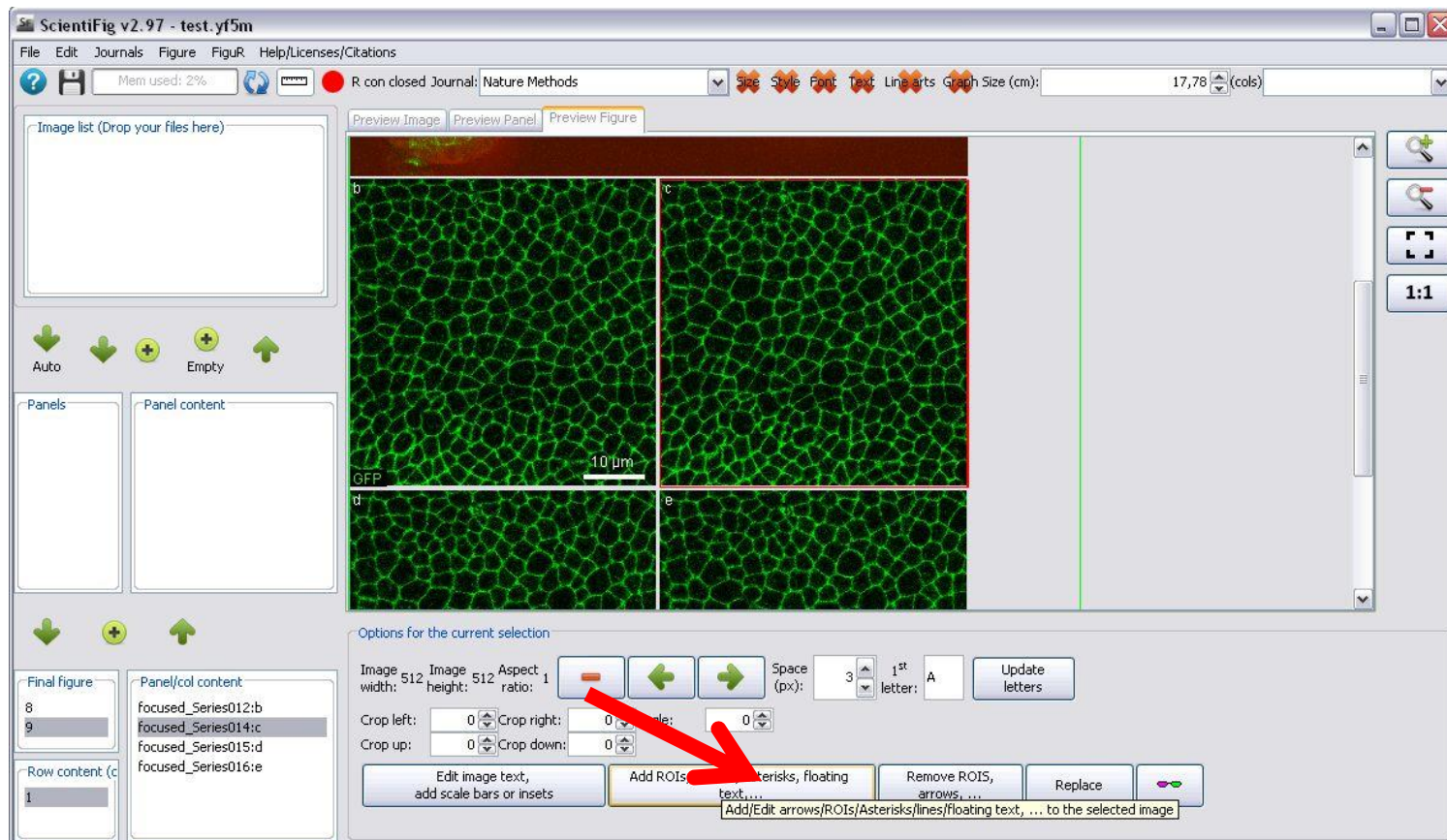


# Exercise 6 bis

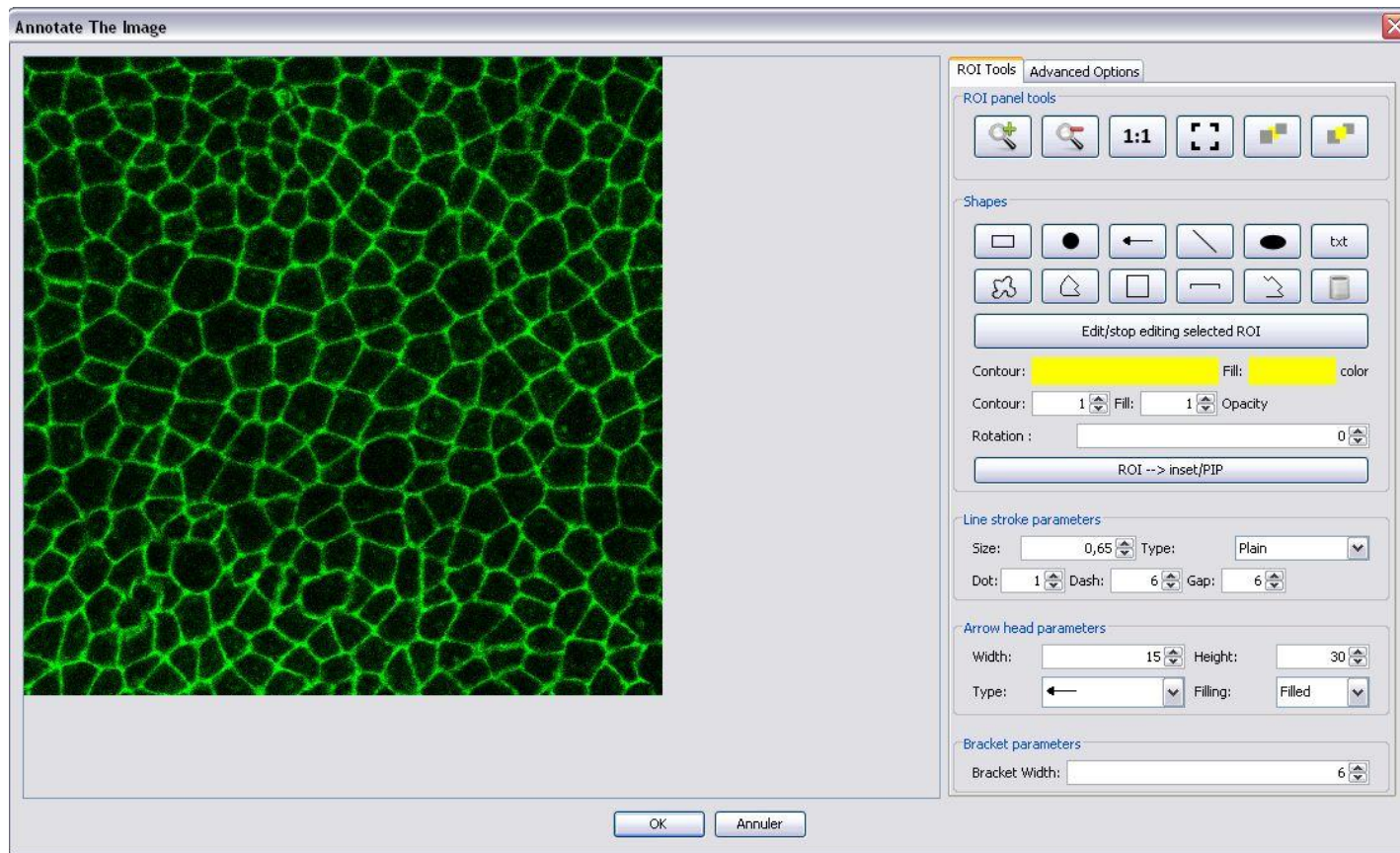
- Click "File>New"
- Load the "exo\_6.yf5m" file
- Click on "add / replace inset" and choose an image from the list
- Change the position and size of the inset
- Add a scale bar to the inset
- Remove the inset



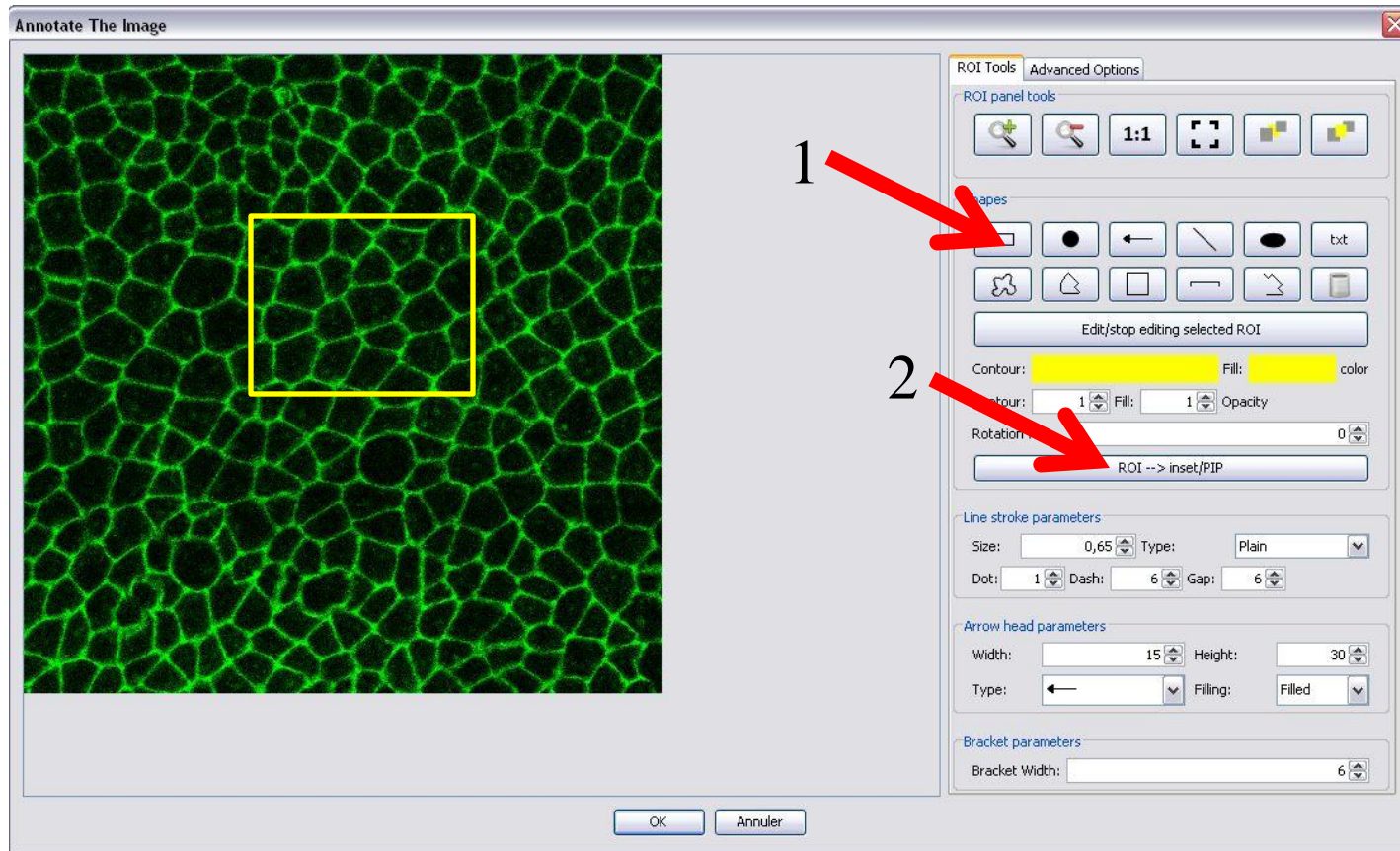
# Add ROIs or draw over an image



# 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)

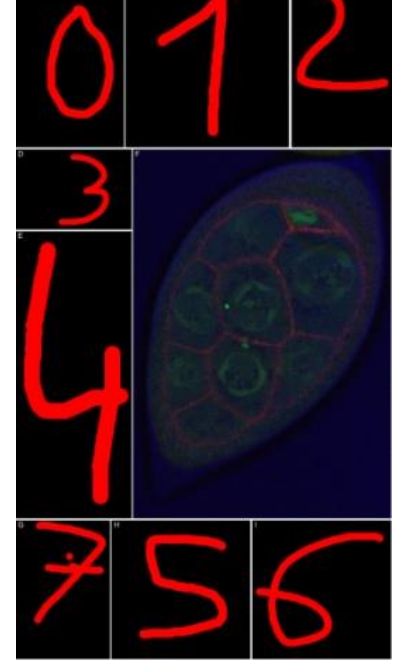
The screenshot shows the ScientiFig v2.97 software interface. The main window displays a grid of handwritten digits (0-9) in red on a black background. The interface includes a menu bar (File, Edit, Journals, Figure, FiguR, Help/Licenses/Citations), a toolbar with icons for help, save, and other functions, and a status bar showing memory usage and journal information. On the left side, there is an 'Image list' panel and a 'Panels' panel. At the bottom left, there are 'Final figure' and 'Panel/col content' panels. The bottom right area contains 'Options for the current selection' with various buttons like 'Add letters outside', 'Add text bars above images', and 'Add text bars below images'. Two red arrows point to the 'Add a line' and 'Add a column' buttons in the bottom left area.

**Add a line**

**Add a column**

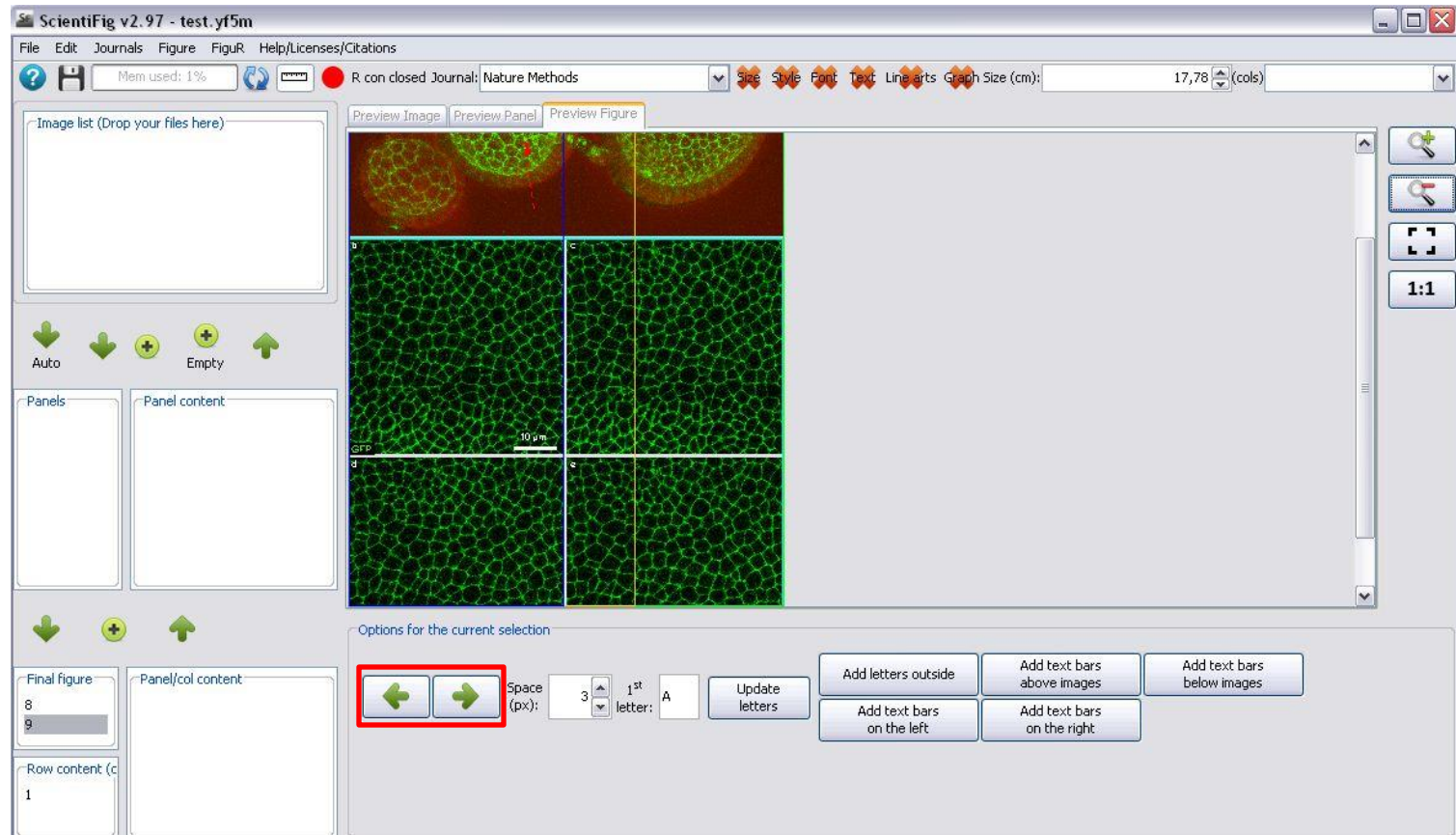


# Exercise 8



- 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

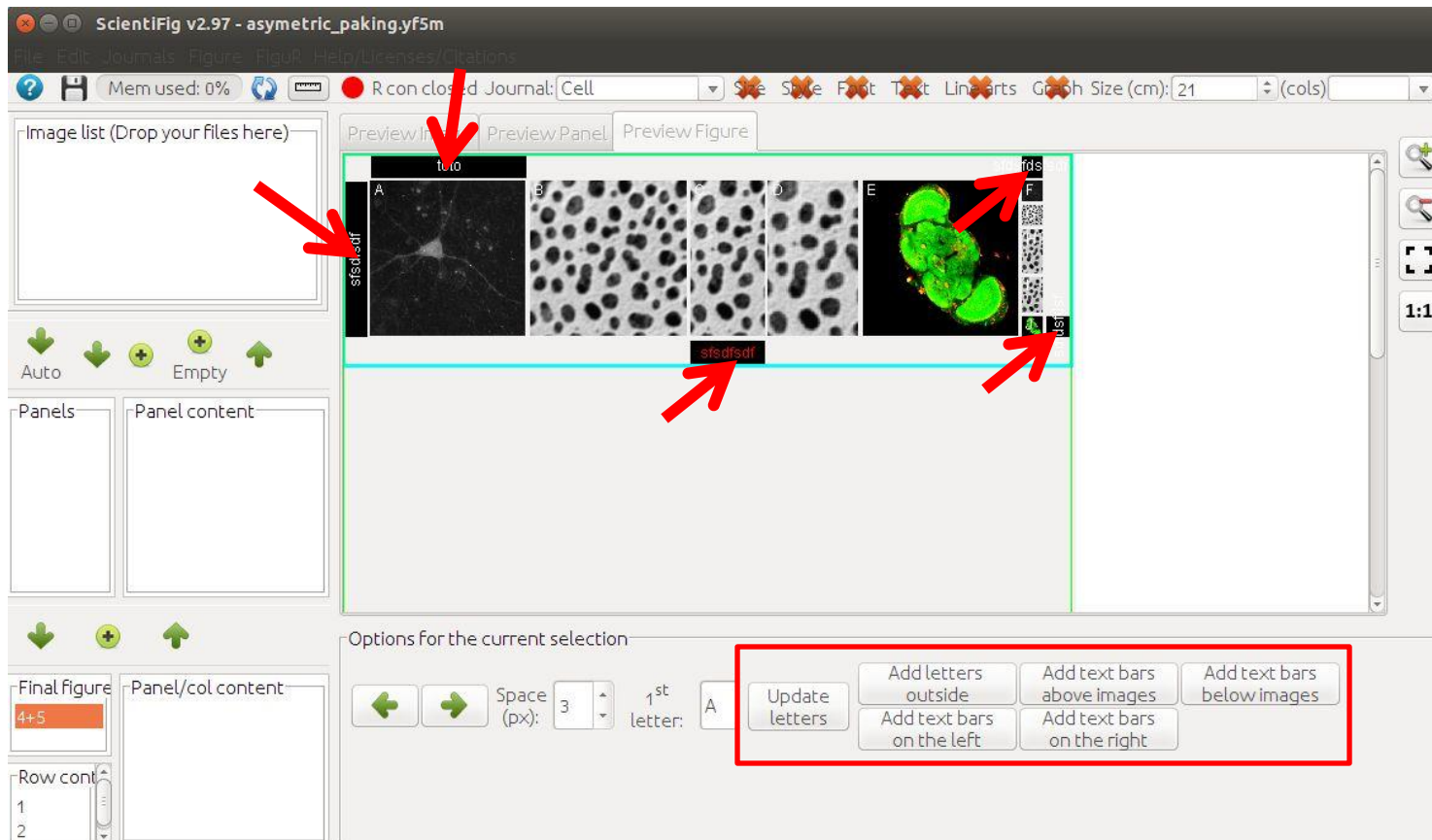


# Exercise 9

- 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)

**Journal Parameters**

Journal Name:

Common Font:  Sel Font  Use Same Font for all the text

Letter Font:  Sel Font  The letter should be:  ▾

Upper Left Text Font:  Sel Font  Lower Right Text Font:  Sel Font

Upper Right Text Font:  Sel Font  Lower Left Text Font:  Sel Font

Scale Bar Text Font:  Sel Font  Outer Text Font:  Sel Font

Full (2 Columns) Page Width (in cm):  Full Page Height (in cm):

1.5 Column Width (in cm):  Column Width (in cm):

Objects Stroke Size:

Advanced Text Formatting Rules:  preferred output DPI for colored:  or B&W images:

---

**Graph Font Settings**

Use Same Font Throughout the Graph  Sel Font

Font size Main Title:  Sel Font

Font size Legend Title:  Sel Font  Text:  Sel Font

Font size x Axis Title:  Sel Font  Text:  Sel Font

Font size y Axis Title:  Sel Font  Text:  Sel Font

Default Line Width (in pts) (values <0 mean inactive):  Default Point Size (in pts) (values <0 mean inactive):

Warn if the graph has a main title:  Yes  No

Warn if the graph has a colored background:  Yes  No

Warn if the graph has a grid:  Yes  No

Warn if axis title is missing:  Yes  No

Warn if units are missing:  Yes  No

Warn if units are not surrounded by brackets:  Yes  No

Warn if the graph legend has a title:  Yes  No

Warn if colors are not color blind friendly:  Yes  No

# Advanced text corrections

**Journal Parameters**

Journal Name:

Common Font:  Sel Font  Use Same Font for all the text

Letter Font:  Sel Font  The letter should be:

Upper Left Text Font:  Sel Font  Lower Right Text Font:  Sel Font

Upper Right Text Font:  Sel Font  Lower Left Text Font:  Sel Font

Scale Bar Text Font:  Sel Font  Outer Text Font:  Sel Font

Full (2 Columns) Page Width (in cm):  Full Page Height (in cm):

1.5 Column Width (in cm):  Column Width (in cm):

Objects Stroke Size:

Advanced Text Form:  preferred output DPI for colored:  or B&W images:

**Graph Font Settings**

Use Same Font Throughout the Graph  Sel Font

Font size Main Title:  Sel Font

Font size Legend Title:  Sel Font  Text:  Sel Font

Font size x Axis Title:  Sel Font  Text:  Sel Font

Font size y Axis Title:  Sel Font  Text:  Sel Font

Default Line Width (in pts) (values <0 mean inactive):  Default Point Size (in pts) (values <0 mean inactive):

Warn if the graph has a main title:  Yes  No Warn if the graph has a grid:  Yes  No

Warn if the graph has a colored background:  Yes  No Warn if axis title is missing:  Yes  No

Warn if units are missing:  Yes  No Warn if units are not surrounded by brackets:  Yes  No

Warn if the graph legend has a title:  Yes  No Warn if colors are not color blind friendly:  Yes  No

# Advanced text corrections

The screenshot shows a software window titled "Advanced Text Rules" with a close button in the top right corner. The window contains five rows of text correction rules, each with a description, a preview of the correction, and control buttons (Edit, Delete, Select).

Rule	Description	Preview	Buttons
<code>matches("[^\\s0-9]{1,2}/[b[^\\s0-9]{1,2}\\b")</code> <code>:([\\s0-9]{1,2})\\b", "&lt;html&gt;\$1·\$2&lt;sup&gt;-1&lt;/sup&gt;")</code> :ext 120m/s 30 m/s 300/60 texte 30µm/s txt qsd/test	Your text (probably) contains unit divisions, we suggest you replace them with superscript:	'10 ms <sup>-1</sup> ' instead of '10 m/s'	Edit Delete Select
<code>matches("[^\\d+]{1,2}/[^\\d-]{1,2}")</code> <code>{0,})X( {0,}[^\\d-]{1,2})", "\$1-\$3")</code> red/green/blue 10/20	Your text contains slashes '/', we suggest you replace them with plain text 'and', 'or' or hyphens '-':	'red - green - blue' instead of 'red / green / blue'	Edit Delete Select
<code>matches("[^\\d+]{1,2}/[^\\d-]{1,2}")</code> <code>{0,})X( {0,}[^\\d-]{1,2})", "\$1-\$3")</code> red/green/blue 10/20	Your text contains slashes '/', we suggest you replace them with plain text 'and', 'or' or hyphens '-':	'red-green-blue' instead of 'red/green/blue'	Edit Delete Select
<code>matches("- {0,}[0-9]{1,}")</code> <code>replaceAll("(^-) ( {0,}[0-9]{1,})", "-\$2")</code> :ext-text text - text - 10 -10 10 -30 10-40 tot 10-20	Your text contains '-' (hyphen) symbols before negative values or as indicators for ranges, we suggest you replace them with (EN_DASH) '-' symbols:	'text-text2 -10 // 10-20' instead of 'text-text2 -10 // 10-20'	Edit Delete Select
<code>matches("[0-9]{1,} {0,}){* {0,}[0-9]{1,}")</code> <code>{0,})X( {0,})X( {0,}[0-9]{1,})", "\$1 ×\$3")</code>	Your text contains one or more '*' (multiplication) symbol we suggest you replace them with '×' symbols:	'a=2×b+c' instead of 'a=2*b+c'	Edit Delete

At the bottom of the window, there are two buttons: "Add New Advanced Text Rule" and "Add Existing Rule". At the very bottom, there are "OK" and "Annuler" buttons.

# The « checks »

2/ Checks



1/ Pick a  
journal style

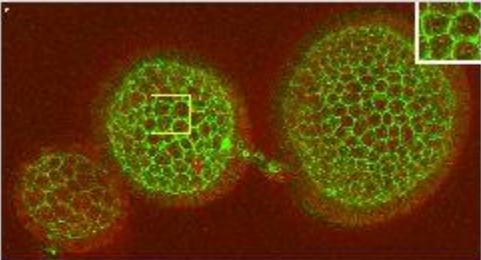
# Check types

- **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 anything, you always have a choice!

# Checks (Size)

Check figure size



Your image size is not optimal:

Your figure is 19,01 cm.  
'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

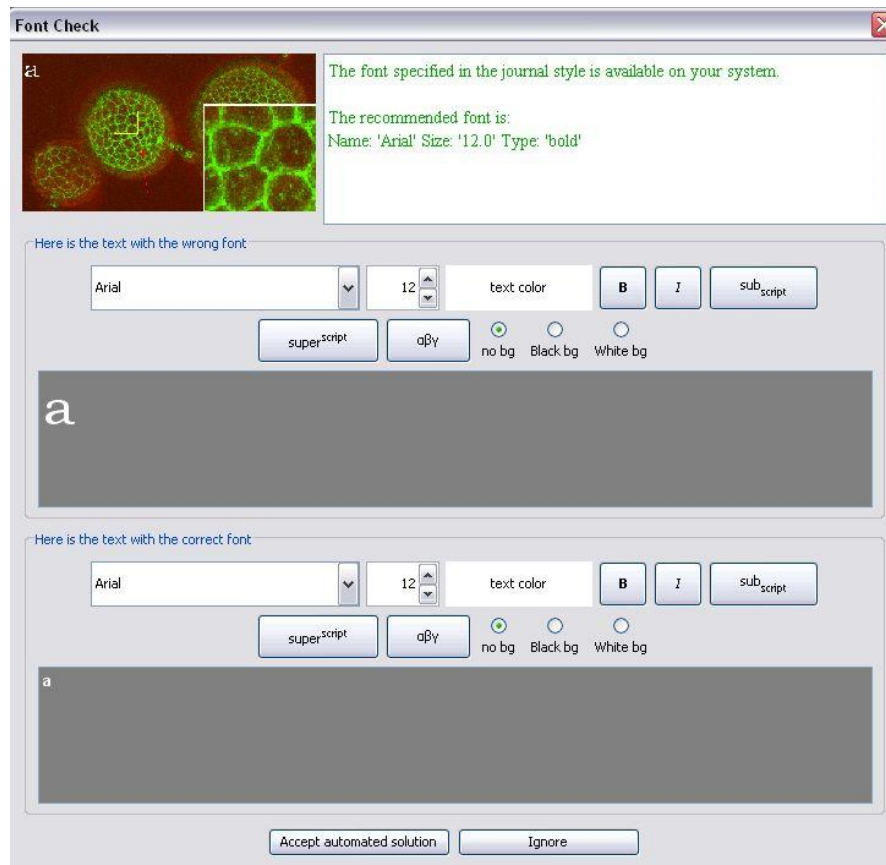
or please specify its size in cm:

17,78

Accept automated solution    Ignore



# Checks (Font)



# Checks (Style)

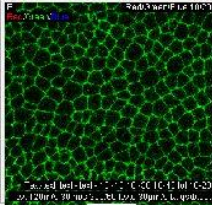
**Checking Style**

The following text generated a warning

text color **B** / sub<sub>script</sub> super<sup>script</sup> aβγ  no bg  Black bg  White bg

Red/Green/Blue

Preview OF The Corresponding Image: Journal Warning Message



Your text contains two or more colors, we suggest you use only one color except if necessary

suggested solution:

text color **B** / sub<sub>script</sub> super<sup>script</sup> aβγ  no bg  Black bg  White bg

Red/Green/Blue

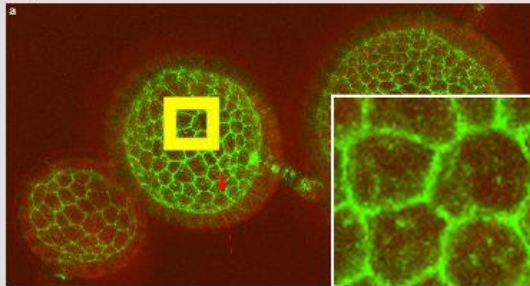
Ignore Accept automated solution

# Checks (Line Art)

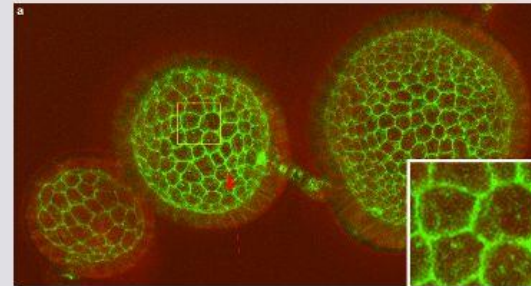
## Check stroke width of line arts

The journal recommends a stroke width of 0,65 for line arts.  
We have detected that at least one of your line arts has a stroke size that significantly differs from this value.  
Right panel is our solution to this problem (left panel is your original image).

Original



Altered Stroke

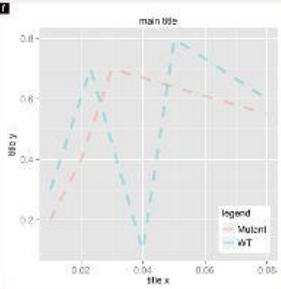


Accept automated solution

Ignore

# Checks (Graph)

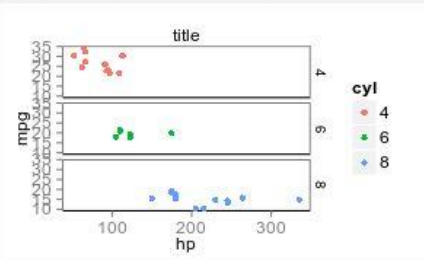
### Check graph



- The guidelines recommend graphs without background, yours has one
- The guidelines recommend graphs without grid, yours has a grid
- +All the fonts match those specified in the guidelines
- +All the fonts specified in the journal guidelines are available in R
- Your graph has a line width that differs significantly from the guidelines
- Your graph has a title, we suggest you remove it
- Your graph legend has a title, we suggest you remove it
- +Your x axis has a title as suggested in the guidelines
- Your x axis does not have units, we recommend you add units to it (use a.u. for arbitrary units)

R con opened R Fonts Available (con required):  Guidelines to install fonts

#### Suggested Theme Preview



Title:  Edit  Remove Title

x Axis:  Edit  add a.u. if units not found  add brackets around units

y Axis:  Edit  add a.u. if units not found  add brackets around units

Legend:  Edit  Remove Title

Select a theme:   Apply selected/suggested theme

Recommended line width:   Update

Your colors might not be color blind friendly:   Update Colors

# 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 further modified/edited), can be converted to other vector formats PS, EPS and PDF

# Graphs with Figur

# Set up R

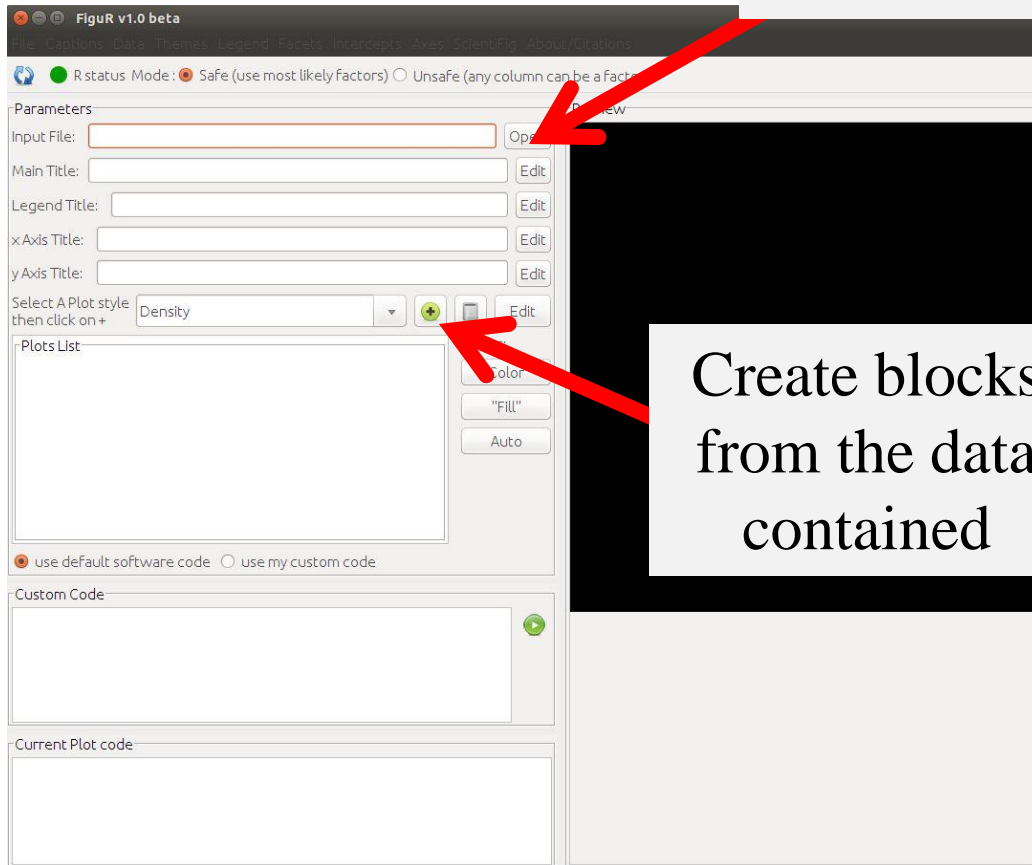
- `install.packages("ggplot2")`
- `install.packages("rJava")`
- `install.packages("xlsxjars")`
- `install.packages("xlsx")`
- `install.packages("grid")`
- `install.packages("mgcv")`
- `install.packages("MASS")`
- `install.packages("Rserve")`
- `install.packages("extrafont")`
- `library(extrafont)`
-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

**Already done**



# Create a graph and add it to a figure

Open your Excel file



Create blocks from the data contained

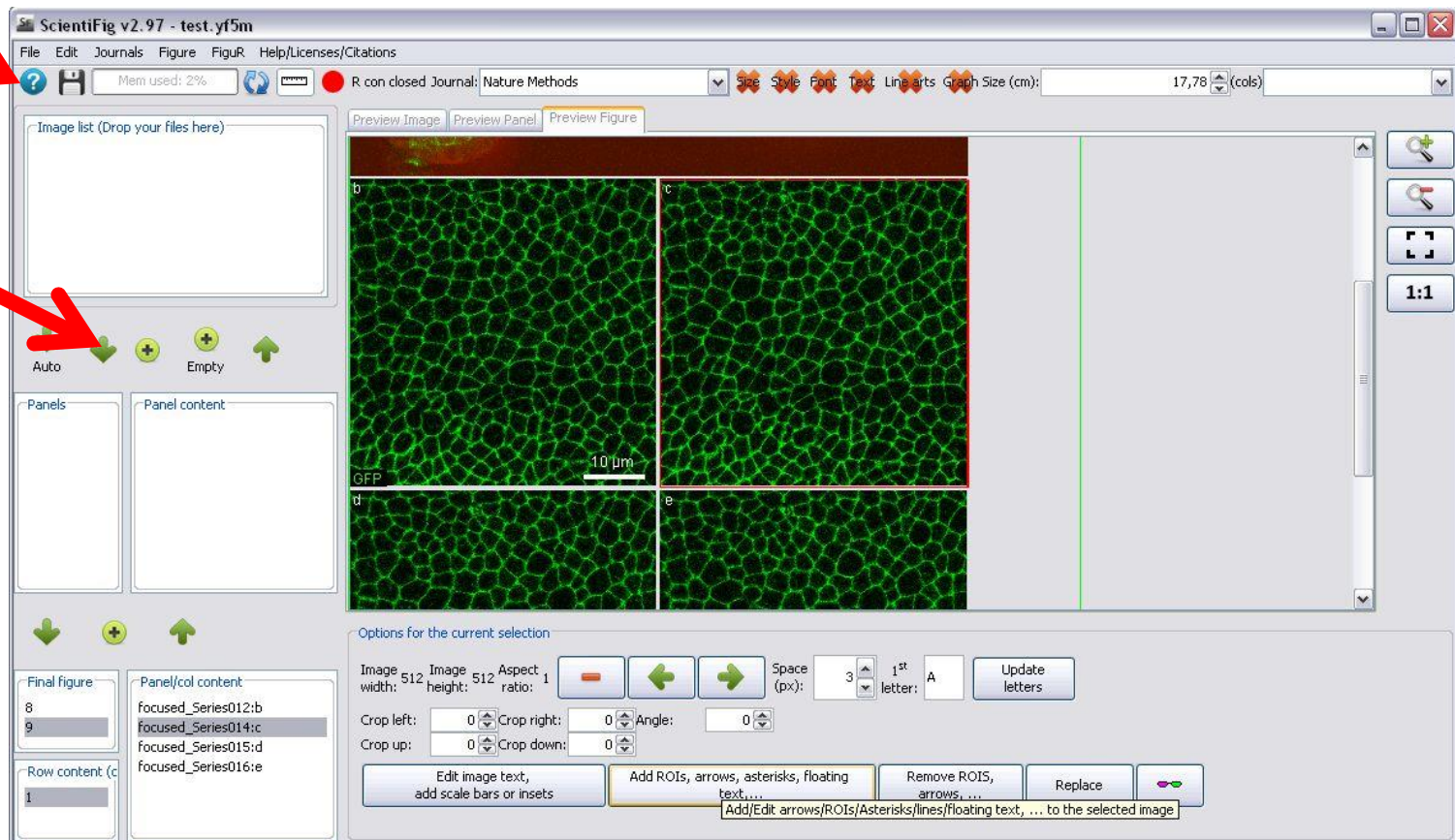
# Exercise 12

- 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!

