



# Brain Images

Comparing Images

22<sup>th</sup> November 2011

Version 1.1

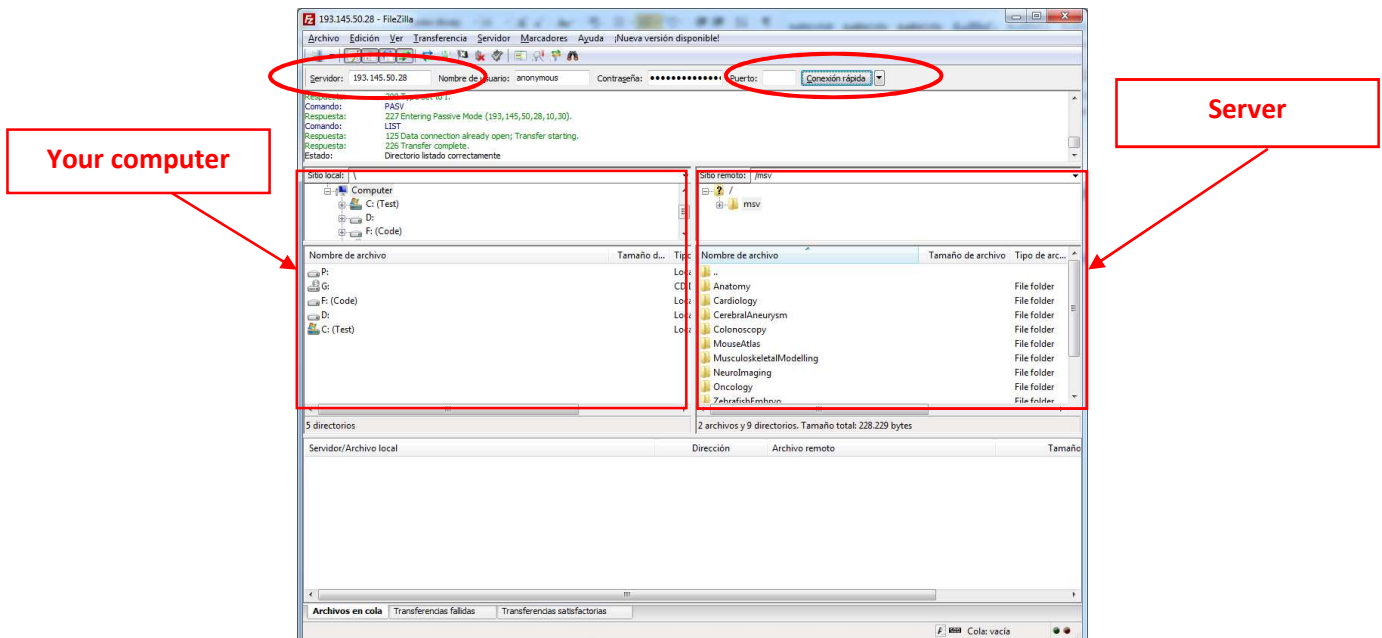
Contact: [cistib.developers@gmail.com](mailto:cistib.developers@gmail.com)

The aim of this exercise is to show different visualization and fusion functionalities applied to Neurological images. The predefined workflow that will be loaded in GIMI4S will allow to load images acquired using different modalities (MRI, SPECT, PET, fMRI) and visualize them as overlaid images, compare them using more Views in the same working area, display the desired number of slice and orientation, flip and rotate the images using the multislice view.

## Download the data

To download the data that will be used in this tutorial, you need to install a FTP client software, like for example FileZilla.

1. Download and install FileZilla from here: <http://filezilla-project.org/download.php>
2. Start the application
3. Enter the following address into the **server field**: <ftp://193.145.50.28/msv/>



4. Click Quick **connect** button to connect to the server
5. In the left panel you can see your computer and in the right panel, the server
6. To **download files** to your computer, you should:
  - a. Browse the desired source file in the server (right)



- b. Browse the desired destination folder in your computer (left)
- c. Drag and drop the desired file or folder from the server to your computer.

You need to **download these files** for this tutorial:

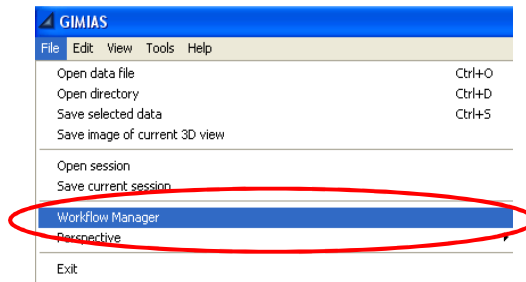
1. The folder: NeuroImaging/ToReorient/
2. The folder: NeuroImaging/SISCOM/
3. The folder: NeuroImaging/Epilepsy/fMRI/

## Activate the Brain Images workflow

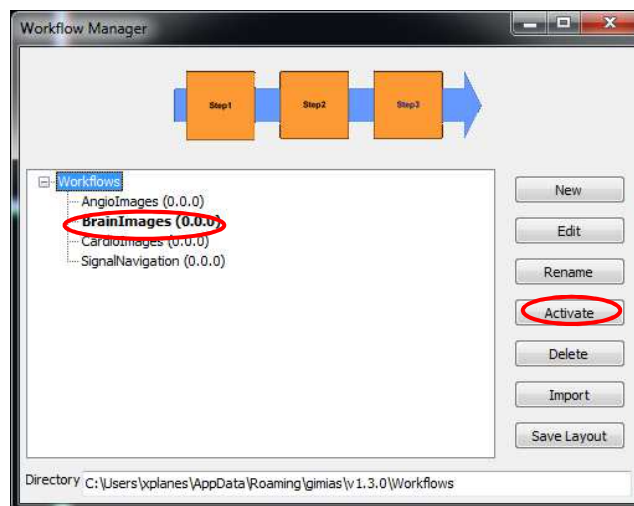
**Note:** If you use GIMIAS-1.3 in Windows 7, you need to execute it as Administrator otherwise it will crash on exit.

Before starting the workflow execution you need to update and activate the BrainImages workflow in GIMIAS.

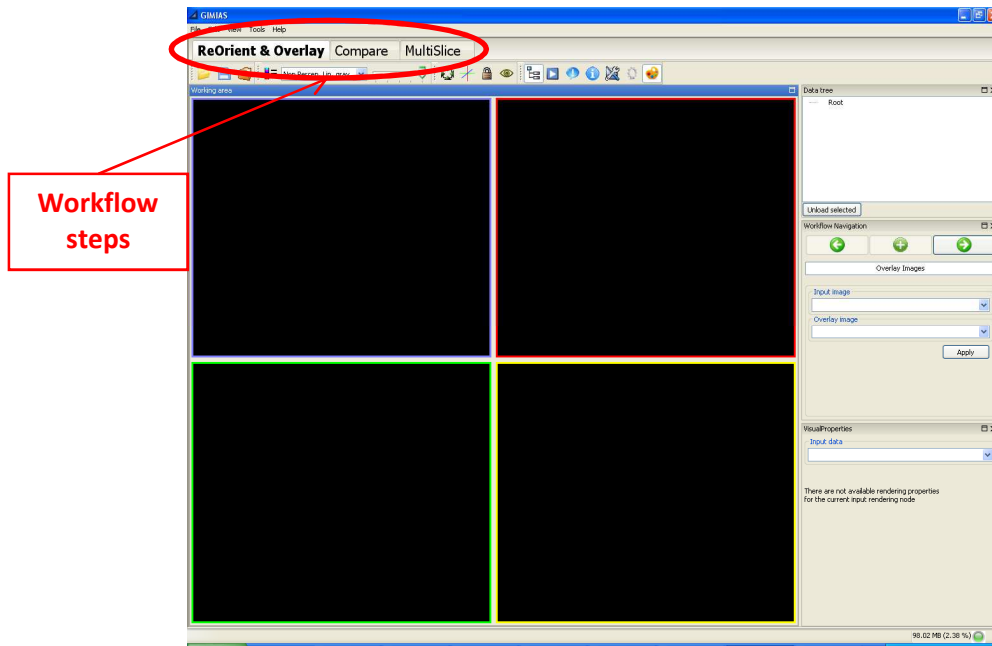
1. Open GIMIAS and from the top menu select File->**Workflow Manager**.



1. **If you are using GIMIAS 1.3 you need to update the workflow**
  - a. **Download** the file from here into your hard disk and **decompress** it:  
<http://www.gimias.org/docs/Tutorials/BrainImages.zip>
  - b. In the Workflow Manager select the **BrainImages** workflow and press **Delete**
  - c. Press **Import** and select the file you downloaded and decompressed:  
BrainImages.xml
2. **Activate the workflow:** Select BrainImages workflow and press Activate button



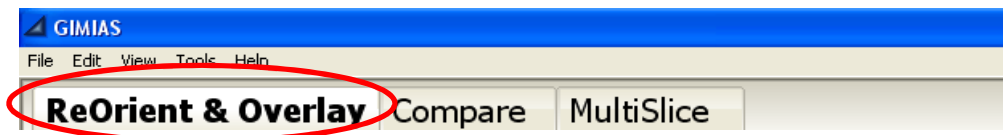
3. GIMIAS will close and open again with the configuration shown in the figure below.



Each tab at the top of the working area corresponds to a workflow step. At the right bottom of the GUI are the processing steps defined for each workflow step.

## Step1: ReOrient and Overlay

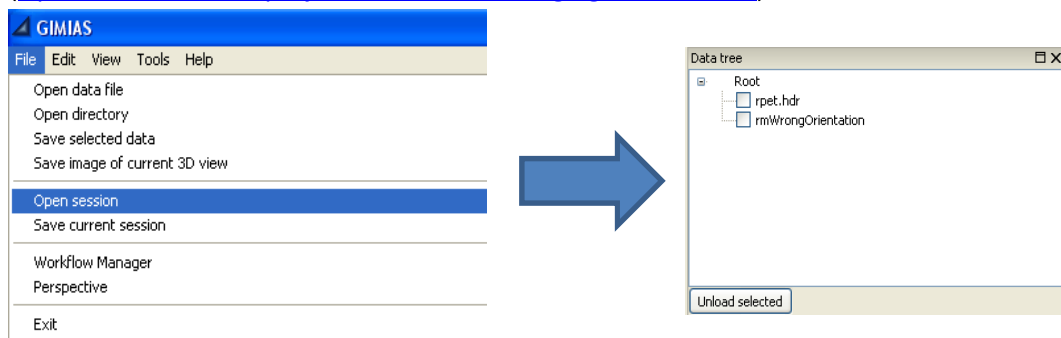
Open the **ReOrient & Overlay** tab and perform the following steps.



### 1. Re-orient and overlay images

- a. Load a previously saved session. From the top menu select File->Open session and load the xml file of the first session

(<ftp://193.145.50.28/projects/msv/NeuroImaging/ToReorient/>)

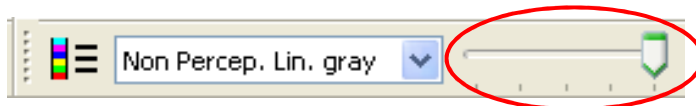


This section contains a PET and a MRI image.

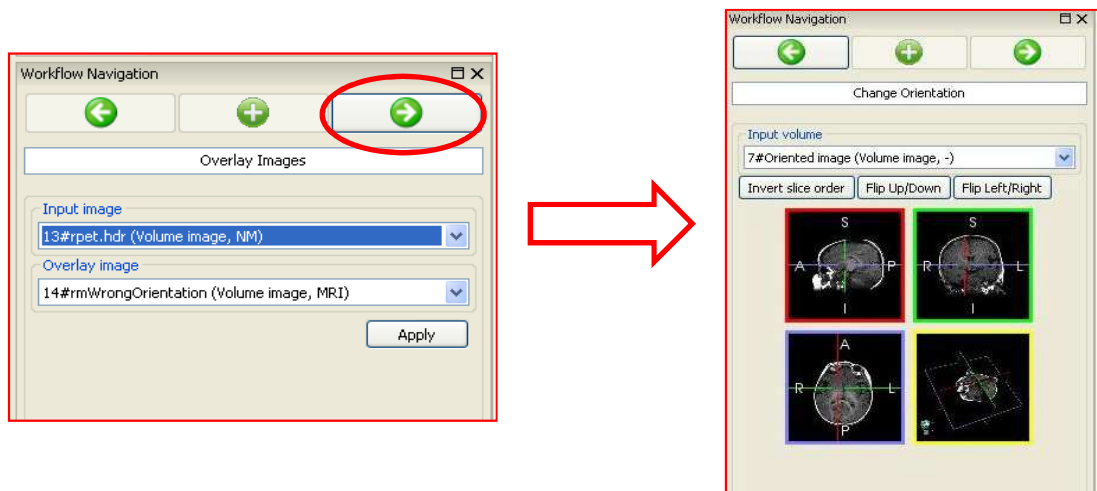
- b. Render both images by checking them in the Data Tree.
- c. Press Ctrl+A to display the annotation cube.
- d. In the Overlay Images tool, set the PET image as input image and the MRI image as overlay image and press Apply.



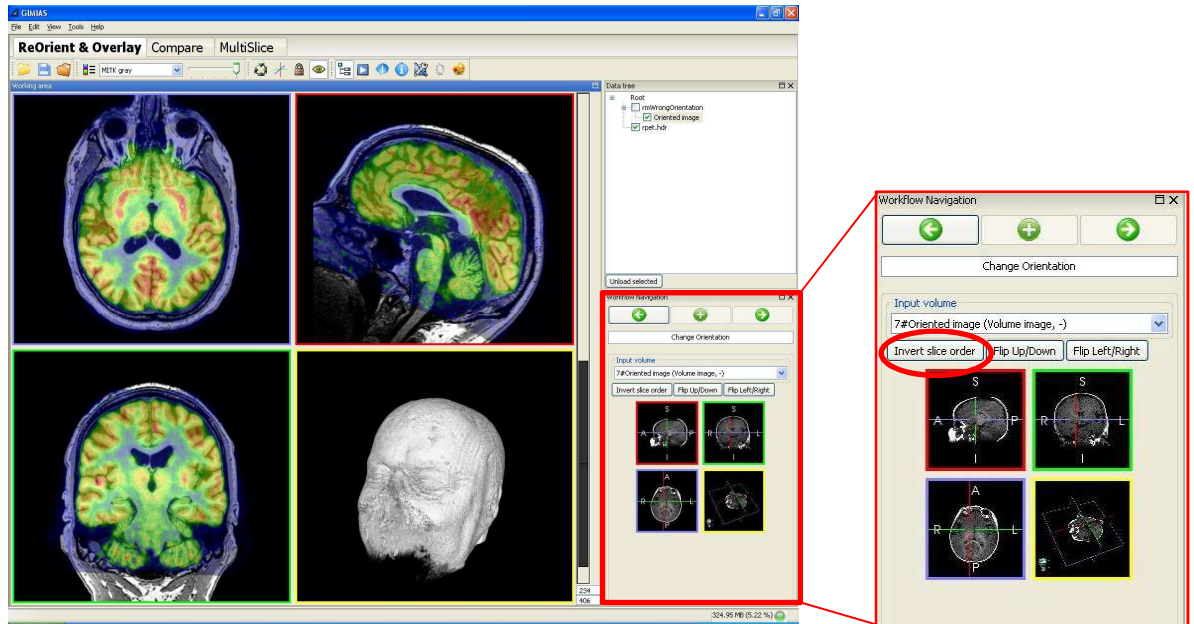
- e. Select the PET image in the Data Tree and use the Opacity bar in the Appearance Toolbar to change its opacity.



- f. Press the right arrow to go to the next processing step.



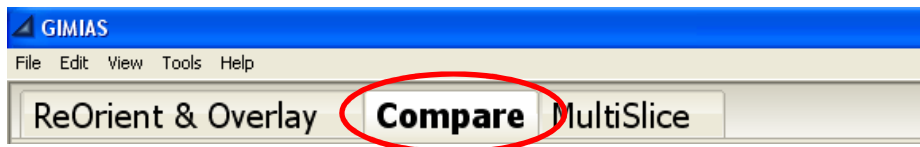
- g. In the Change Orientation Tool, set the oriented MRI image as input data and press invert slice order.



h. Use Visual Properties to do a volume rendering of the reoriented MRI

## Step2: Compare Slices

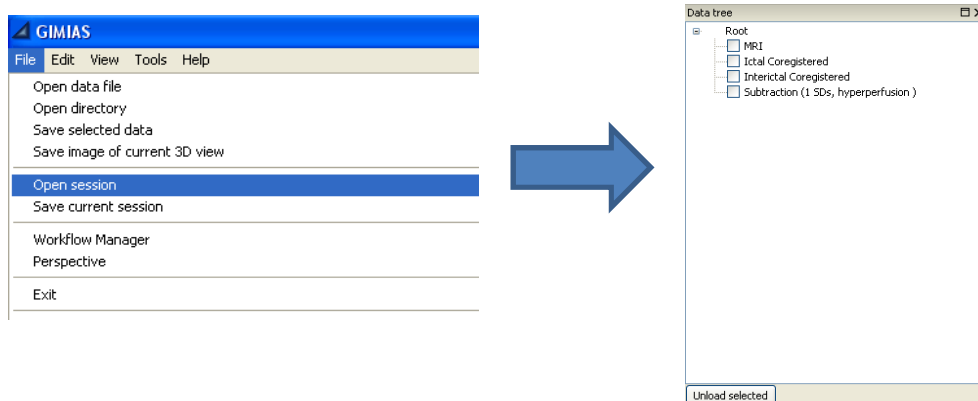
Open the **Compare** tab and perform the following steps.



### 1. Image fusion and comparison

- a. Load a previously saved session. From the top menu select File->Open session and load the xml file of the second session

(<ftp://193.145.50.28/projects/msv/NeuroImaging/SISCOM/>)



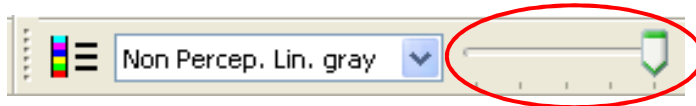
This session contains:

- **MRI\_T1**: MRI image of the brain
- **SPECT\_I\_co**: Ictal (acquired during the epileptic seizure)
- **SPECT\_II\_co**: Interictal (acquired between epileptic seizures)

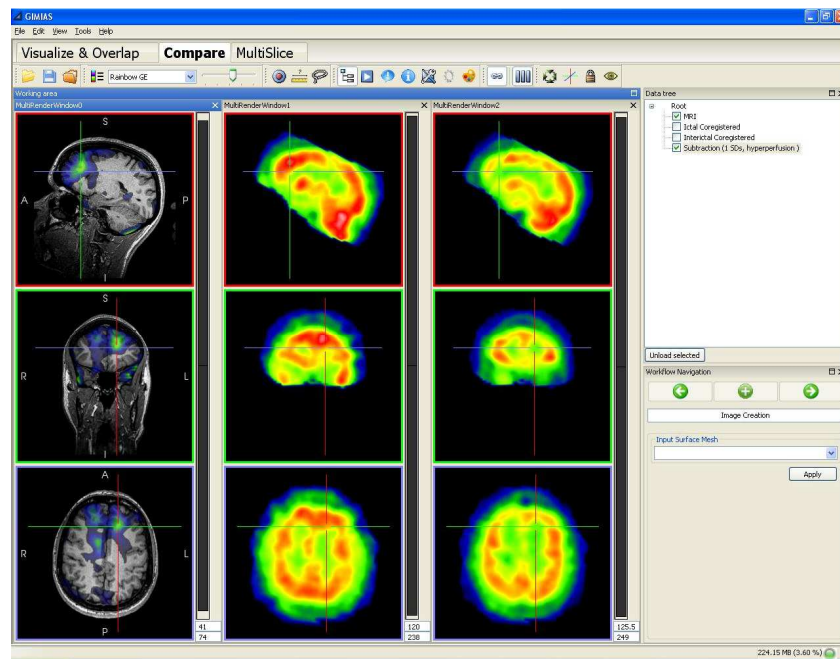
- **SISCOM\_result**: Subtraction image (normalized difference between Ictal and Inter-ictal studies).

The Compare tab Working Area is set to contain three Views, each showing the axial, sagittal and coronal views of the rendered image.

- Select the first Render Window (on the left) and render the MRI image and the Subtraction image  
Select the Subtraction image and in the Data Tree and use the Opacity bar in the Appearance Toolbar to change its opacity.

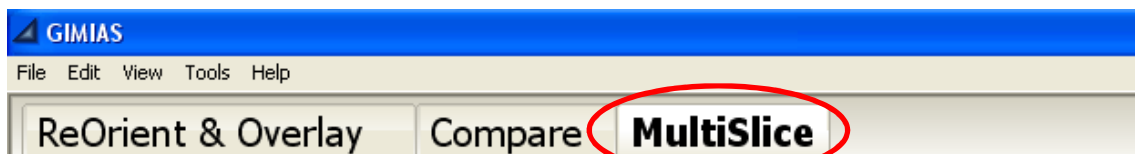


- Select the second View (in the middle) and render the Ictal image.
- Select the third View (on the right) and render the InterIctal image.
- Click on Link Views ( in the MultiRenderWindow Toolbar) and look in the first View for the focus of the epilepsy (yellow/green color) the other views will be automatically updated to the same position.



### Step3: MultiSlice View

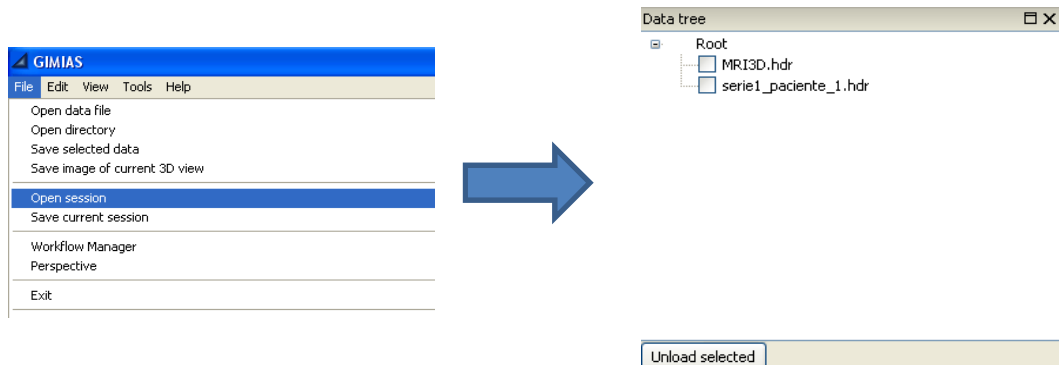
Open the **MultiSlice** tab and perform the following steps



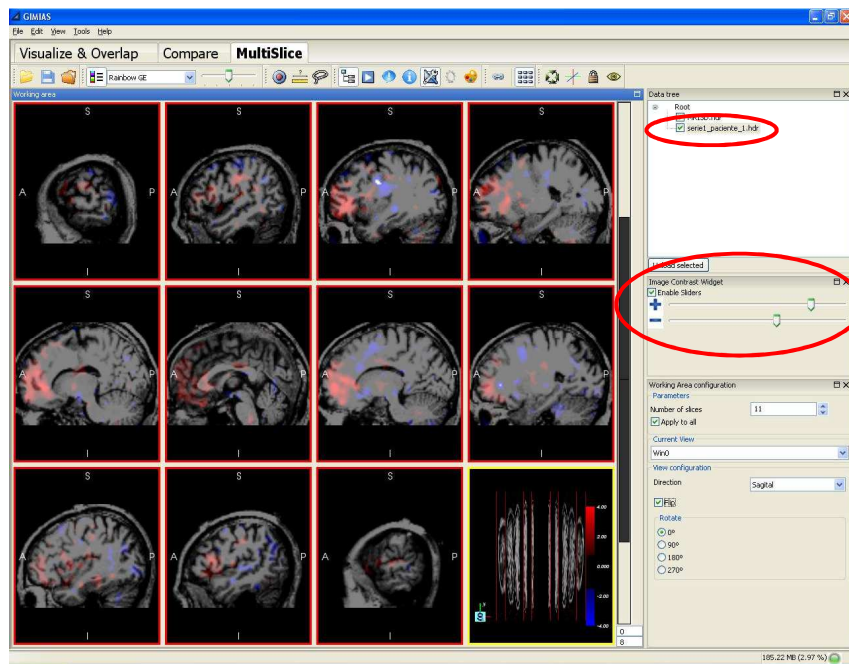
1. Fusion of MRI and fMRI images in MultiSlice View

- a. Load a previously saved session. From the top menu select File->Open session and load the xml file of the third session

<ftp://193.145.50.28/projects/msv/NeuroImaging/Epilepsy/fMRI/>



- b. Render the MRI image and the fMRI image of the brain activation  
 c. Select the activation image and in the image contrast widget adjust the lower and upper contrast levels.



- d. Change the Working Area Configuration using the Working Area Configuration tool. This tool allows to set the following options:
- Number of slices: set the number of slices/planes displayed in the window
  - Apply to all: apply the view configuration settings (direction, rotation, flip) to all views or the current view only.
  - Current View: choose the view/plane to which you want to apply the view configuration settings (direction, rotation, flip).
  - Direction: choose the direction of the selected view(s): Sagittal, Transversal or Frontal.
  - Flip: visualize the mirror-reversal of the selected view(s) across its vertical axis
  - Rotate: choose the rotation angle of the selected view(s)