

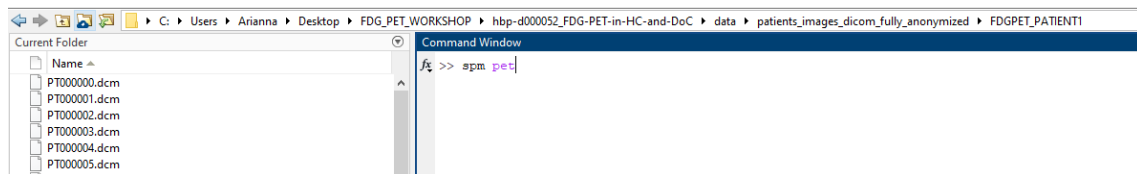
Pre-processing of FDG-PET images

The software used in this procedure are Matlab and SPM 12 (make sure you know where the images and other batches are in the computer).

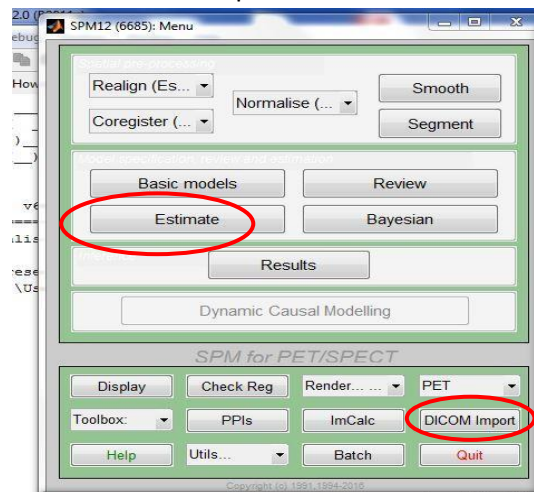
a) Importing the DICOMs

The DICOMs of the FDG-PET image will need to be grouped in order to create a unique image for the patient. Then the created image will need to be comparable to the controls and/or other patients.

- 1) In Matlab, type “spm pet” in the command window after the “>>”, then “enter”.

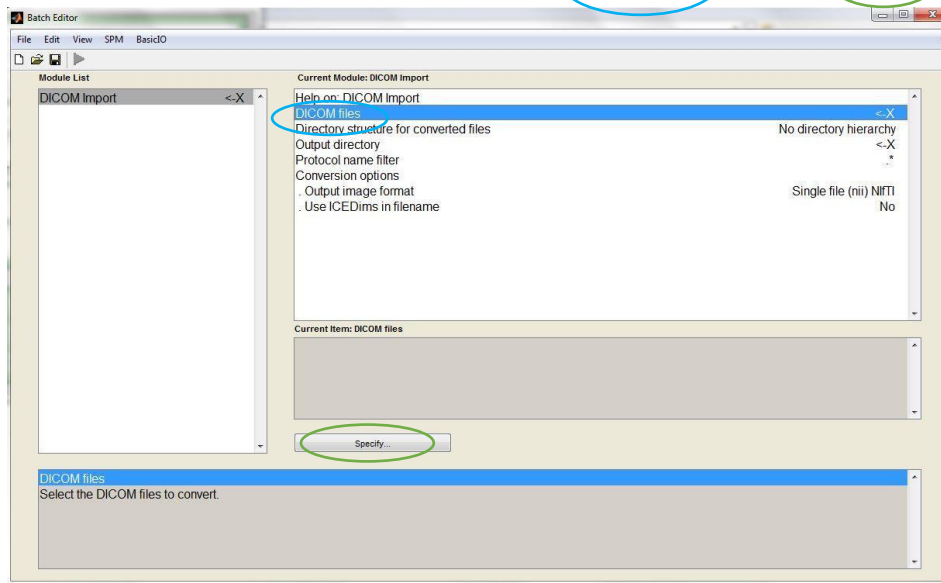


- 2) SPM 12 opens: click on “DICOM import” in the Menu window.

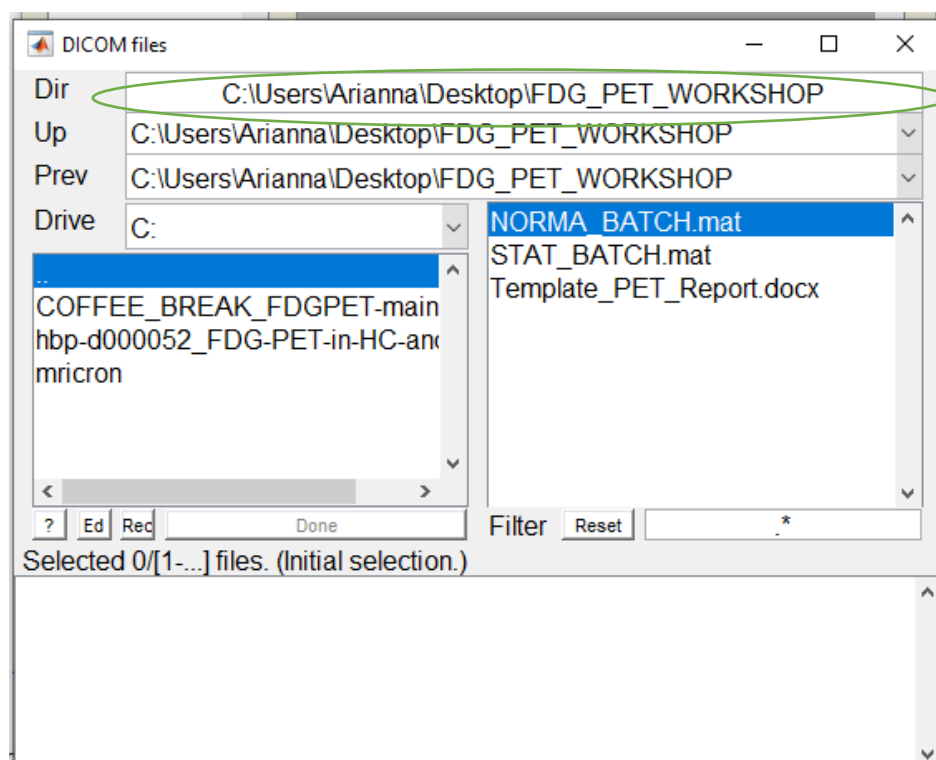


This tutorial was curated by Arianna Sala for the CGS's [18F]FDG-PET workshop, based on materials prepared by Sarah Wannez. Please contact arianna.sala@uliege.be for questions and comments.

- 3) In the batch that opens, indicate the DICOM files you want to group (all included in the patient folder). To do so, click on the option “DICOM files”, and then “Specify”



- 4) Another window opens: you will have to specify the folder that contains the DICOM files (it will have to be in “Dir” that indicates the current folder). To specify the new path, you can use different techniques, explained in the next point



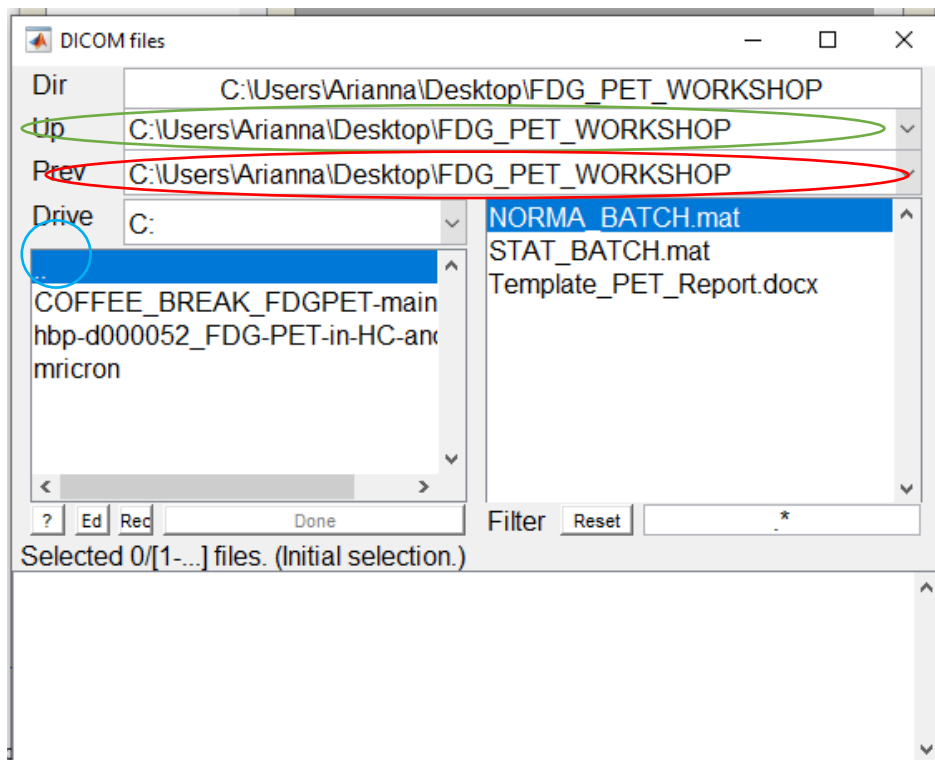
5) Use the following drop-down lists to move through folders:

- a. "Up" permits to go to the parent folders
- b. "Prev" permits to see the previously opened folders (not useful if you just opened Matlab, but very useful later: you'll save time!)

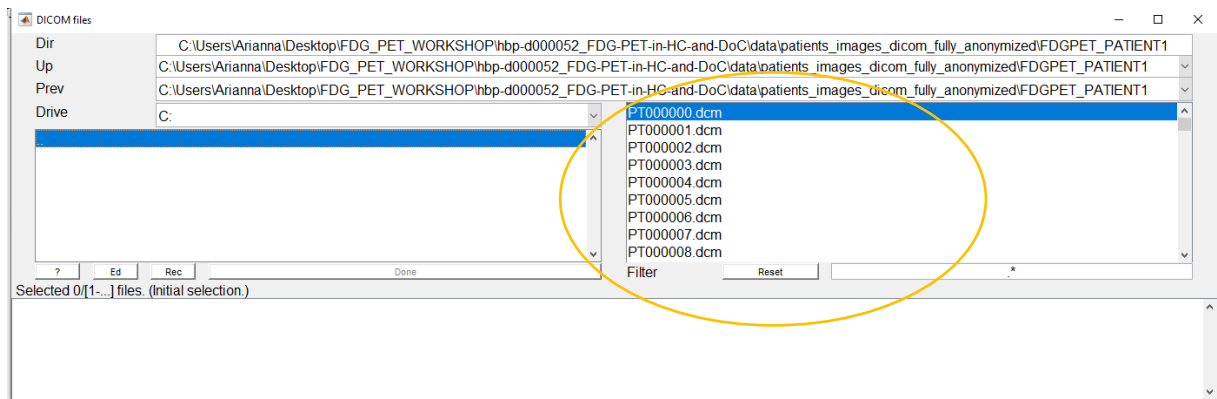
Use the left panel to open folders contained by your current folder (Dir). By clicking on one of its element (e.g. Results), you will open the folder (here, Results). **CLICK JUST ONCE!**

The two points in this left panel (..) permit to go to the parent folder.

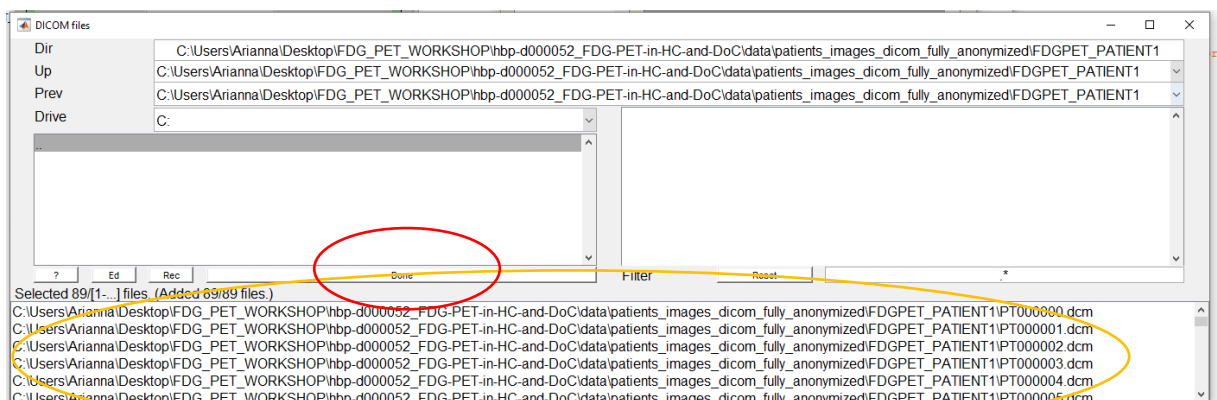
The right panel indicates the files contained in the current folder. If you click on it, it will be considered as the selected file.



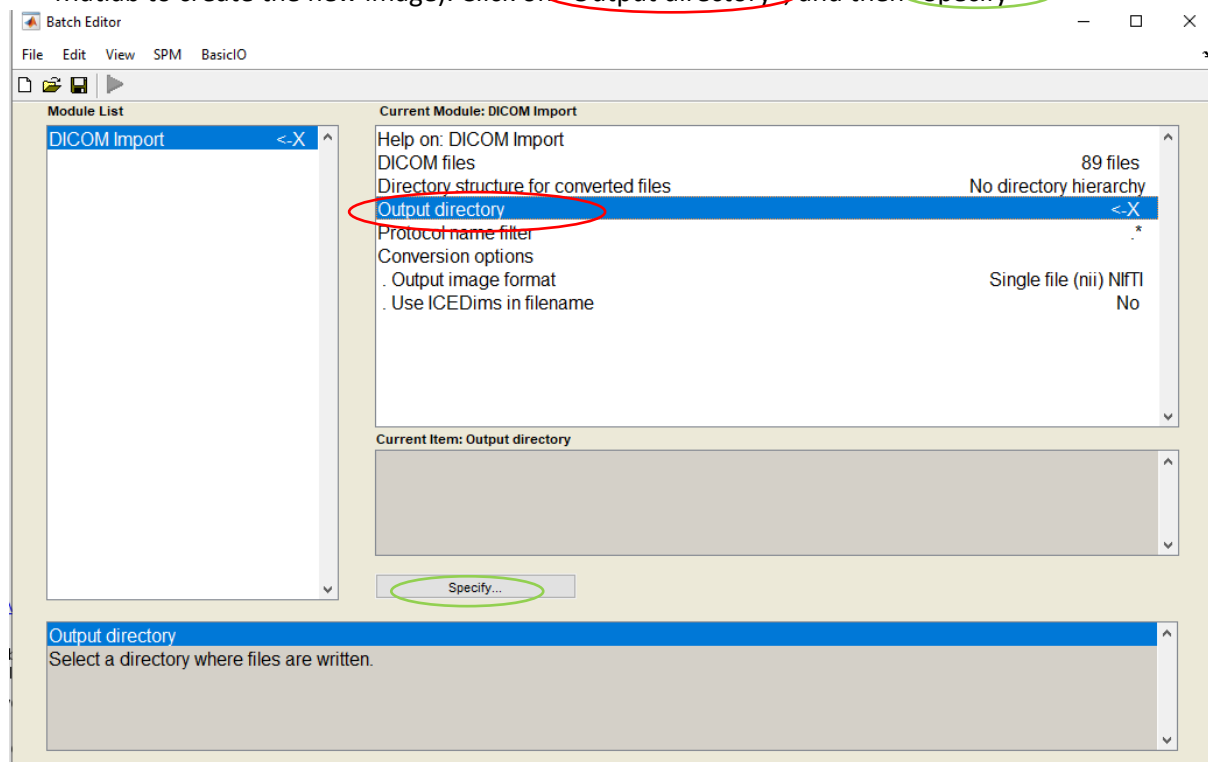
6) When you have found the folder containing the DICOM files, click with the mouse right button on one of the DICOMs (right panel), and click on “select all”.



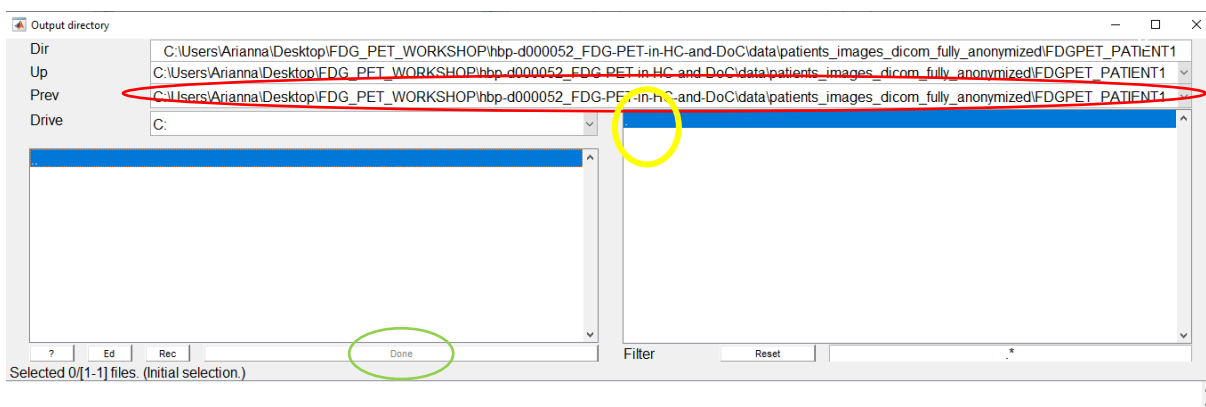
7) The DICOMs disappear from the right panel and appear in the lower panel (Selected files). You should have around 90 files. Click on “Done”. If you did a mistake and want to unselect files, click on them in the selected files panel (you can also unselect all at once by right clicking on one of them and then choosing “unselect all”)



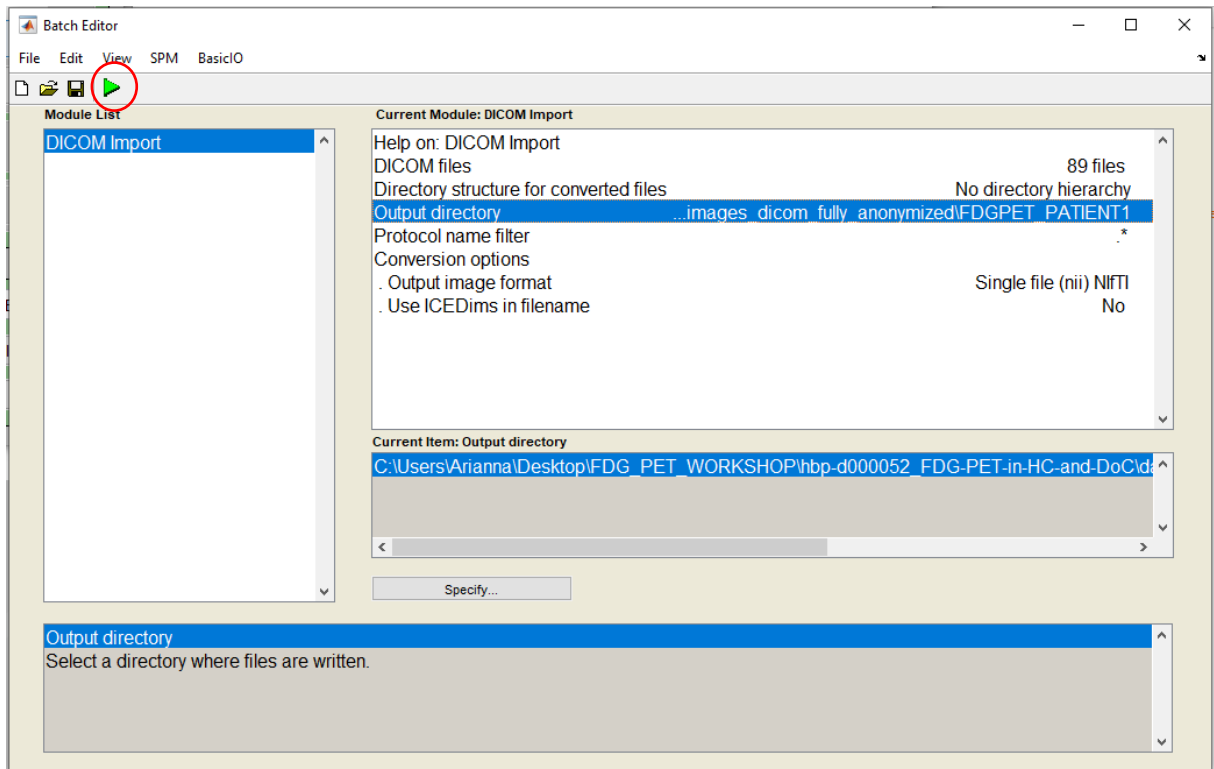
8) Back to the batch, do the same procedure for “Output directory” (in which folder you want Matlab to create the new image). Click on “Output directory” and then “Specify”



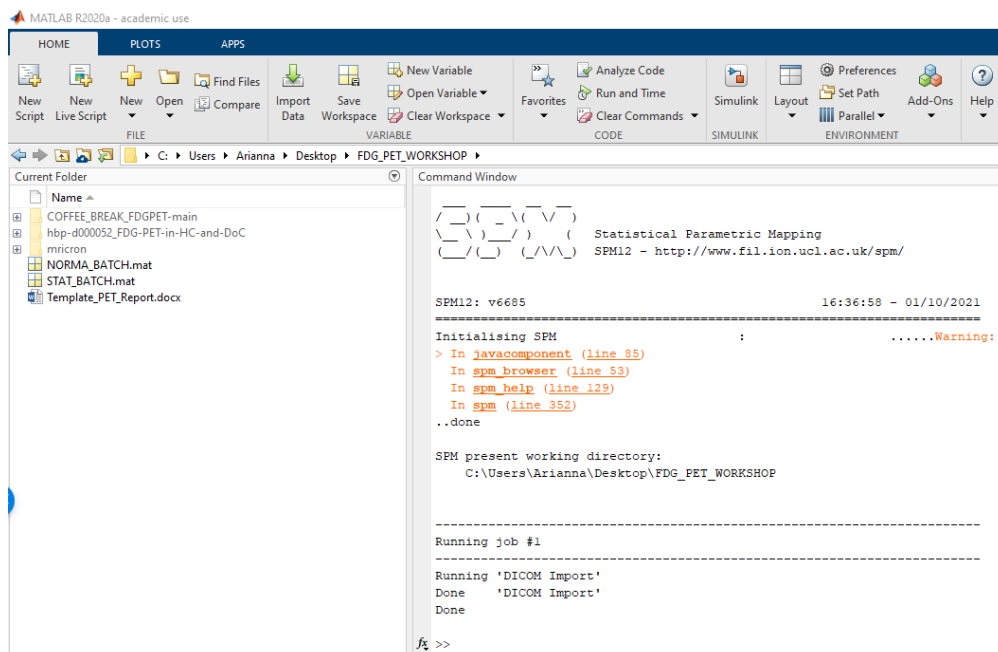
9) In the new window, indicate the target folder, by using “Prev”, and then click on the single point in the right panel. The path will appear in the lower panel, and make “done” available. Click on “Done”.



10) When you're back on the batch editor, click on "run" (the green "play" sign, on the left upper part of the editor).

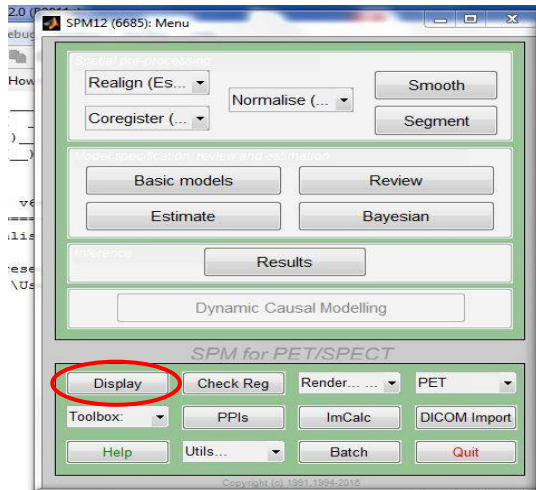


11) When it's done, Matlab will write "done" in the main command window.

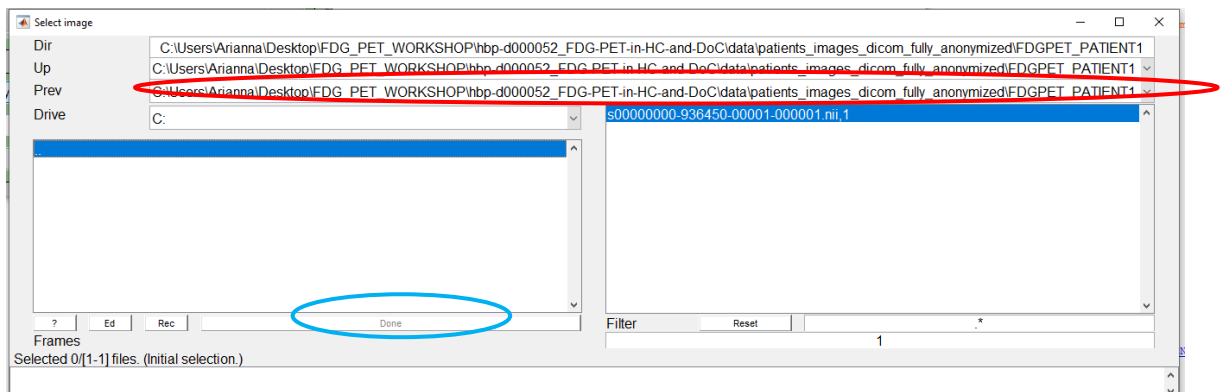


3) Reorienting the image

- 1) When the DICOMs are imported, you need to reorient the new image (the name begins with an "s"). On the Menu window, click on "Display".

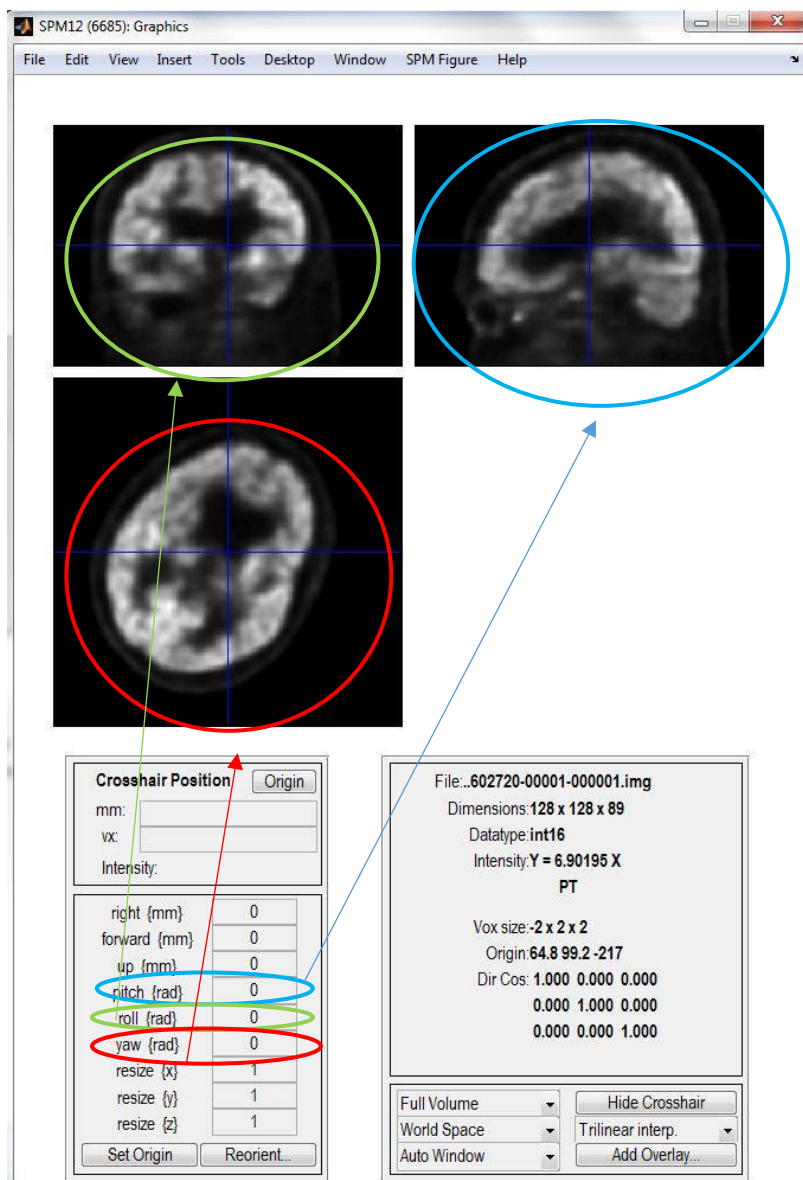


- 2) A window will appear to indicate which image you want to display. Using "Prev", choose the folder of the patient, and choose the created image (beginning with "s") by clicking on it. It appears in the lower panel, and make "done" available. Click on "Done".



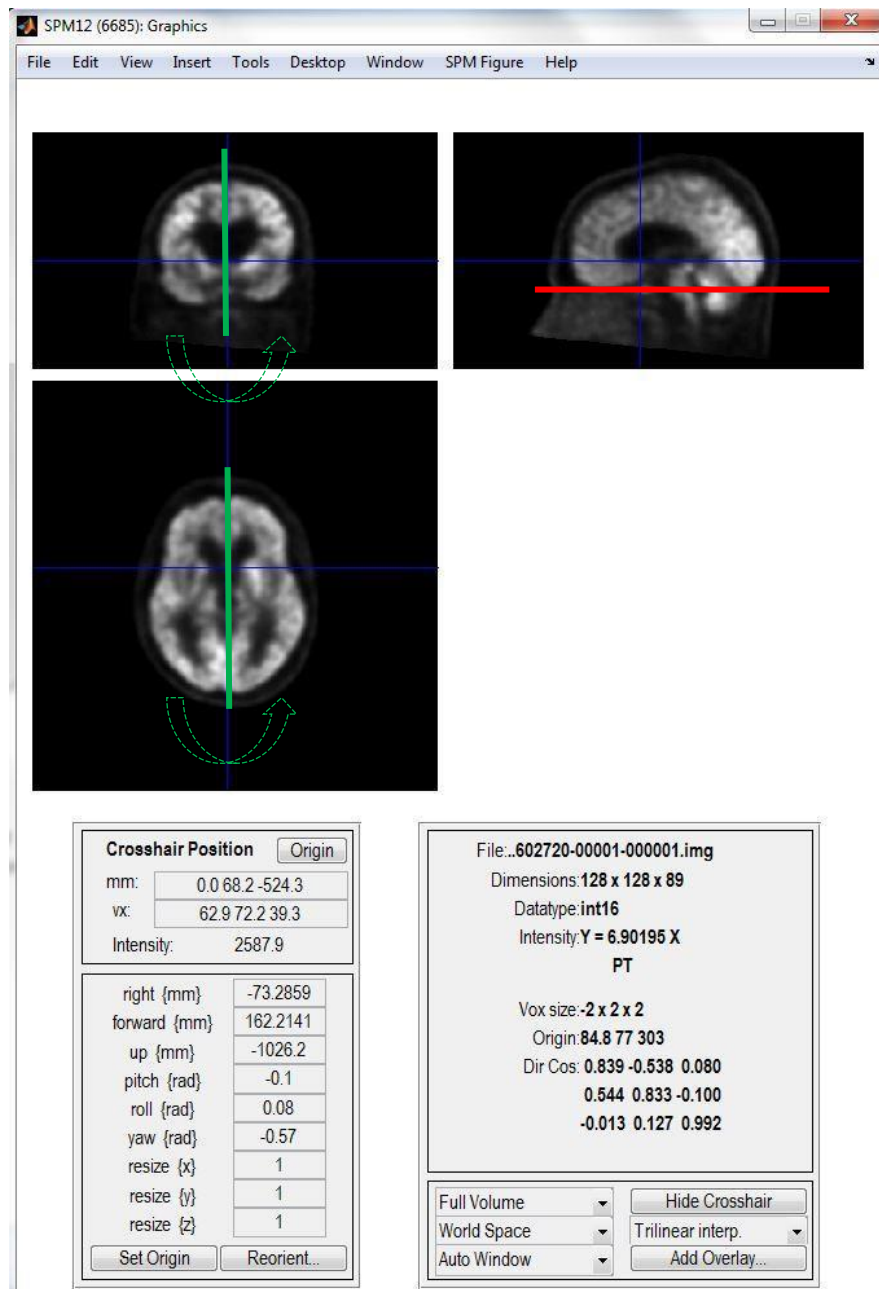
3) A new window appears, displaying the image. To reorient the image (in order to make it comparable to the ones of the controls), indicate the change you want in radians (positive and negative numbers can be used, depending on the direction of the change you need):

- a. **Pitch** is related to the upper right image
- b. **Roll** is related to the upper left image
- c. **Yaw** is related to the lower image



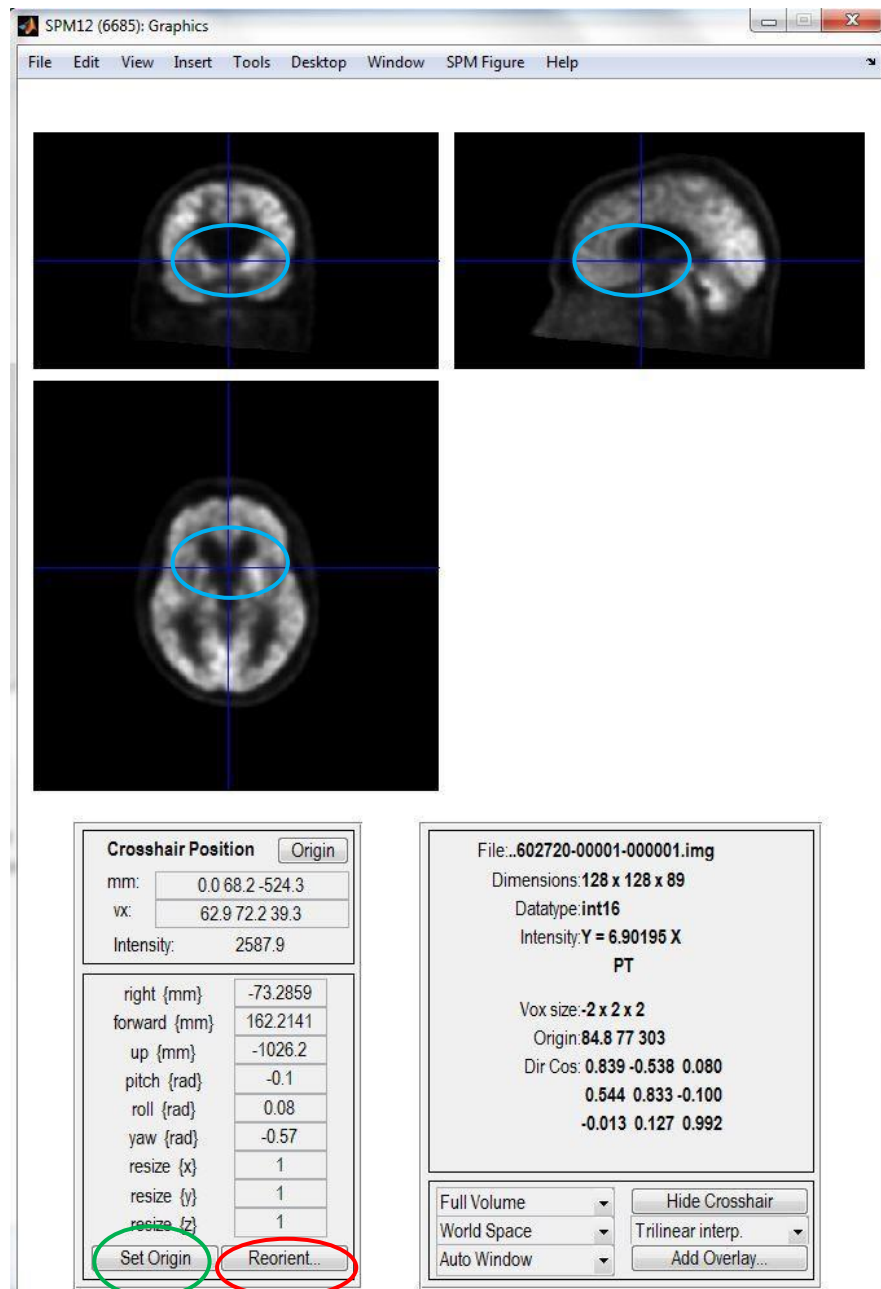
This tutorial was curated by Arianna Sala for the CGS's [18F]FDG-PET workshop, based on materials prepared by Sarah Wannez. Please contact arianna.sala@uliege.be for questions and comments.

4) A correctly reoriented brain looks like put down on a table (frontal and occipital parts, not including the cerebellum) in the “pitch” part (see the red line). The “roll” and “yaw” have to be symmetric (see the green lines). When the image is correctly reoriented, you can move throughout the brain with the mouse to check that the brain is really symmetric.



This tutorial was curated by Arianna Sala for the CGS's ¹⁸F]FDG-PET workshop, based on materials prepared by Sarah Wannez. Please contact arianna.sala@uliege.be for questions and comments.

5) When correctly reoriented, click on the anterior commissure with the mouse, to indicate that the origin is there (the cross should be on the anterior commissure), and click on "Set origin" (lower part of the window), and then "Reorient" (do not matter if the cross moved after your click on "set origin")



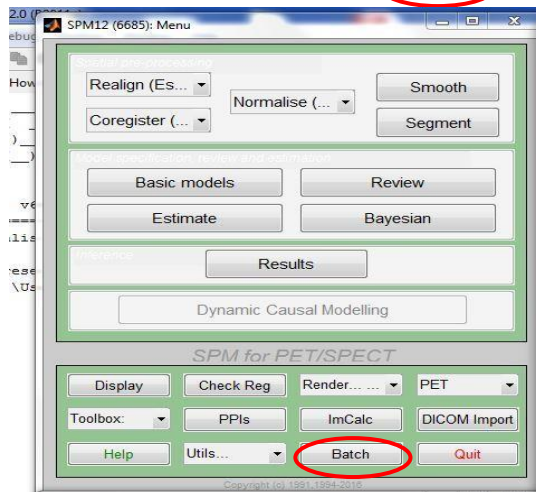
6) In the new window, select the current image to reorient (SPM should directly propose the correct image), and click on "done".

7) When done and back to the displayed image, you can click on "origin" (just below the images) to check that the reorientation and origin were correctly saved.

This tutorial was curated by Arianna Sala for the CGS's [18F]FDG-PET workshop, based on materials prepared by Sarah Wannez. Please contact arianna.sala@uliege.be for questions and comments.

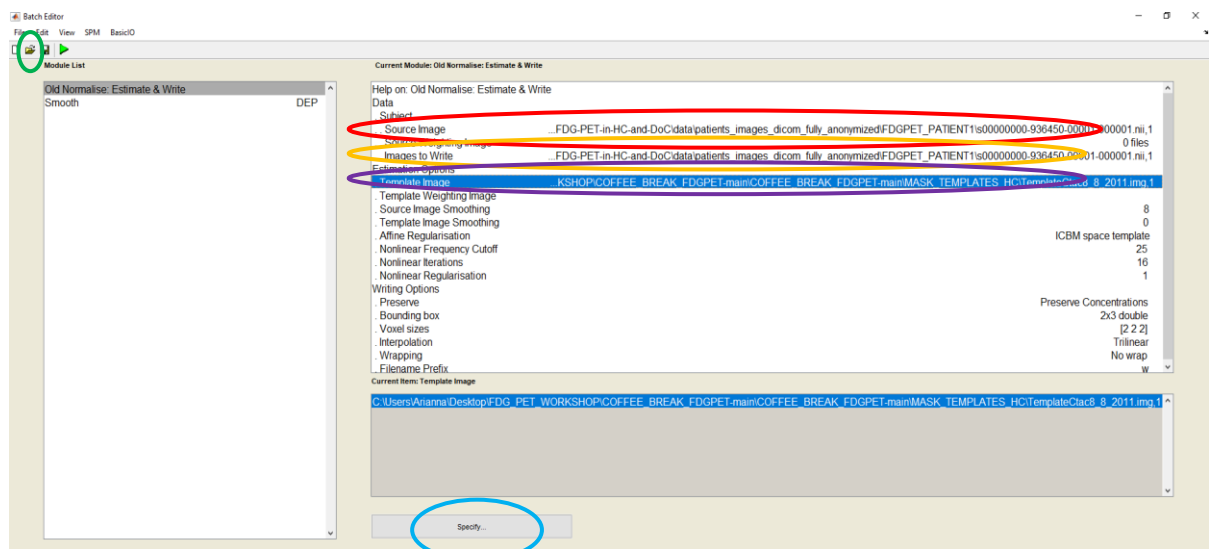
4) Normalisation and smoothing

- 1) On the Menu window, click on "batch".



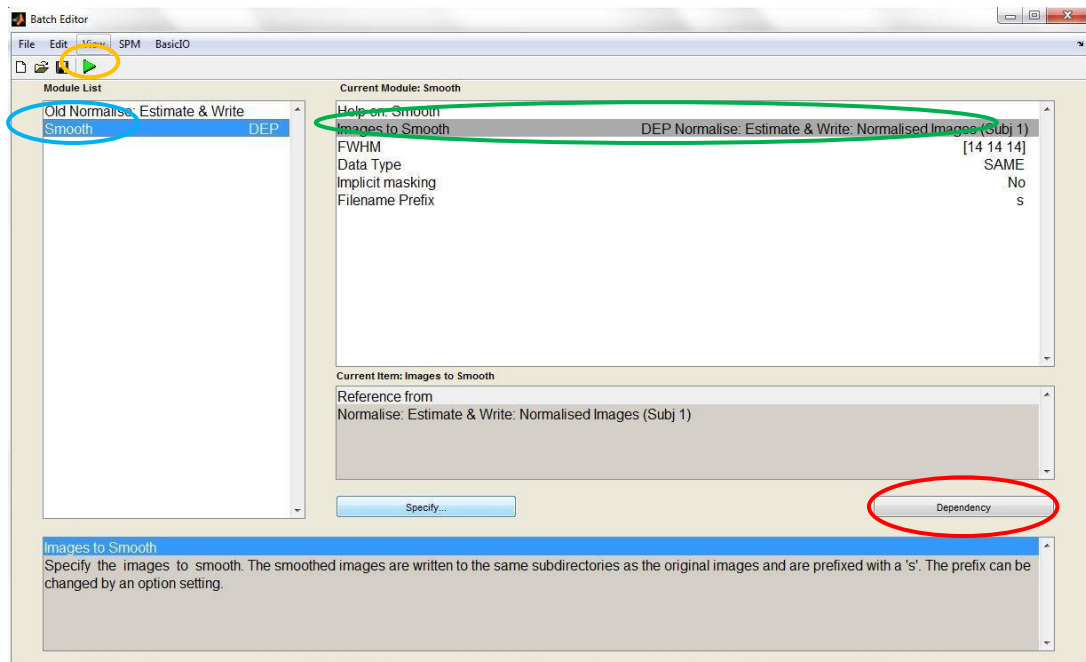
- 2) In the batch, use "File-Load batch" or the "open folder" icon to load the "norma batch" (find the file, with the same procedure described above - you just have to click on "norma batch" – you can only select ONE file).

- 3) When opened, change the path of "source image": click on "source image" and when it is in blue, click on "specify". Delete the previously selected image by clicking on it (lower panel), and then choose the new one (same procedure than for DICOM import, but you only indicate the "s" image here). Do exactly the same for the "images to write". Make sure that "template image" is correctly pathed (change the path if needed, same procedure)



This tutorial was curated by Arianna Sala for the CGS's [18F]FDG-PET workshop, based on materials prepared by Sarah Wannez. Please contact arianna.sala@uliege.be for questions and comments.

- 4) Check that in the smooth module (left panel), the 'images to smooth' are correctly taken from the first module (Normalised). To be sure, click on 'images to smooth' and then on 'dependency'. Save the batch clicking on the save icon (top left). Then click on the run button (green play icon). When done, Matlab command window indicates "done".



You should now have a "sws" image in your DICOM folder: it is reoriented, normalised and smoothed.