## Instructions for using ALVIN

*Please also see our publication validating this method which may be found here:* <u>http://dx.doi.org/10.1016/j.neuroimage.2011.06.080</u>

1. Firstly download the software from the ALVIN website if you haven't done this already <a href="http://sites.google.com/site/mrilateralventricle/">http://sites.google.com/site/mrilateralventricle/</a>

Click on the download link on the webpage as shown below.



## 2. Unzip the downloaded file ALVIN\_v1.zip

In Windows this can be done by right clicking on the downloaded file and selecting Extract all... In Linux/unix at the command prompt navigate to the downloaded file then type 'unzip ALVIN\_v1.zip'. Move the unzipped directory to a directory of your choosing. In the examples below the ALVIN\_v1 directory as been moved to '/home' in unix but this could be your desktop or a directory where your analysis is.

[Continued...]

3. Load up SPM8 within Matlab, click either fMRI or PET&VBM (it doesn't matter which). Click on the Utils... button and select 'Run mfile' (see below).

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Spatial pre-processing	Eile Edit View Insert Iools Desktop Window SPM Figure Help
Realign (Es 👻 Slice timing Smooth	
Coregister 👻 Normalise ( 👻 Segment	
Model specification, review and estimation	SDMO
Specify 1st-level Review	Welcome to SPM8
Specify 2nd-level Estimate	
Inference Results	Please refar to this variion as "SPMS" in papers and communications.
Dynamic Causal Modelling	SDM is developed under the suspices of Functional Imaging Laboratory (FIL), The Wellcome Trust Centre for NeuroImaging, in the Institute of Neurology at University College London (UKL) UK
SPM for functional MRI	Neurology at University College London (UCL), UK.
Display Check Reg Render FMRI Toolbox: PPIs imCalc DICOM Imp Help Utils CD Batch Quit Delete files Show SPM Run mFile SPMweb	Although SPNS will read image files from previous versions of SPM, there are differences in the algorithms, templates and models used. Therefore, we recommand you use a single SPM version for any given project. The SPMS Release Notes can be found online:
	http://www.fil.ion.ucl.ac.uk/spm/software/spm8/ Further information may be found at the SDMweb site: http://www.fil.ion.ucl.ac.uk/spm/ where details of the SDM emeil discussion list can be found: http://www.fil.ion.ucl.ac.uk/spm/support/ A PDF manual is also available in the 'man' folder of SPM and online: http://www.fil.ion.ucl.ac.uk/spm/doc/manual.pdf
	SDM is free but copyright software, distributed under the terms of the GNU General Public Licence as published by the Free Software Foundation (either version 2, as given in file spm_LICENCE.man, or at your option, any later version). Further details on "copyleft" can be found at http://www.gmu.org/copyleft/. Copyright (C) 1991,1994-2011 Wellcome Trust Centre for Neuroimaging

4. Navigate and locate the unzipped ALVIN file downloaded from the website and select ALVIN\_v1.m (see below), click Done. The file location will depend on where you downloaded the file.

-	🛃 Select mFile to run 🧃 🗖 🗙	
Dir	/home/ALVIN_v1/	
Up	/home/ALVIN_v1/	
Prev	/home/ALVIN_v1/	
	ALVIN_v1.m	
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Select mFile to run		

5. Most users have not already produced CSF segmented images, and should click 'no' to the first question (see below).

-If you have already produced segmented, modulated, normalised CSF images click yes. You will be asked to select these files. In this case only files with the prefix mwc3 will be shown in the file selection window. Once you have selected these files go to step 7 -If you click 'not sure', ALVIN will proceed as if you had clicked no.

🔽 🛃 SPM8 🛛 🖓 🗖 🗸			
ALVIN ventricle segmentation v1.0			
Determines lateral ventricle volume from structural			
MRI data.			
Have you already segmented your images and			
produced mwc3 CSF files? yes no not sure			

6. Choose the images you want ALVIN to determine lateral ventricle volumes from. The downloaded data contains 3 example MRI scans within the subdirectory 'ALVIN test data'. To select these navigate to this directory and select all 3 images. Alternatively select your own MRI scans, these should be structural MRI scans in ANALYZE or NIfTI format (ending .img or .nii) and in roughly the correct orientation (i.e. close to the orientation of the SPM template images), the images can be T1 or T2 weighted.

-	🛃 Select MRI images	「 <b>_</b> □ ×	
Dir	/home/ALVIN_v1/ALVIN_test_data/		
Up	/home/ALVIN_v1/ALVIN_test_data/		
Prev	/home/ALVIN_v1/ALVIN_test_data/		
	test_image1.img,1	<b>^</b>	
	test_image2.img,1 test_image3.img,1	•	
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		<b>^</b>	

7. The next prompt asks you to select the ALVIN mask which was downloaded in the zipped file from the website (see below). The file is called **ALVIN\_mask\_v1.img**.

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ALVIN ventricle segmentation v1.0	Dir	/home/ALVIN_v1/	
Determines lateral ventricle volume from structural	Up	/home/ALVIN_v1/	-
MRI data.	Prev	/home/ALVIN_v1/	-
Have you already segmented your images and produced mwc3 CSF files? no Choose correctly oriented images to segment Select ALVIN mask	ALVIN	ALVIN_mask_v1.img,1	

7. If you want to save a text file with the lateral ventricle volumes in (recommended) click yes, then change the suggested filename if you wish (see below) and press enter.



8. ALVIN will then start processing the images (see below, the processing takes approx 10 minutes per subject depending on the computer system you use).



9. When ALVIN is finished the volumes are produced (in millilitres) in the command line window and are also saved in the text file if specified by the user. The screen shot below shows the output when the 3 test images are selected

✓ ✓ SPM8	ImCalc: done	
ALVIN finished -please s	ee command line	- Torminal
window for the results		<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>T</u> erminal Ta <u>b</u> s <u>H</u> elp
		Lateral Ventricle Volumes in millilitres Name Volume test_imagel 8.25367 ml test_image2 14.3114 ml test_image3 9.84928 ml Values also saved to text file /ALVIN_v1/ALVIN_Vols.txt ALVIN Finished

10. The text file can be viewed and imported into a spreadsheet such as Excel for statistical analysis.

Other functionality –see next page

## **Other functionality**

ALVIN produces normalised lateral ventricle images of each subject which can be checked if required. The images contain the initial filename and the prefix 'ALVIN\_' and are saved as ANALYZE files.

Using the SPM8 Check Reg button it is possible to inspect the lateral ventricle segmentations. In the image below, the segmentations are compared with the templates provided in the SPM directories, apriori/csf.nii and canonical/single\_subj\_T1.nii



## Questions? Contact <u>matthew.kempton@kcl.ac.uk</u>