Steps for getting fraction of CSF in MRS voxel AFTER using Gannet for Mask Making
(May 12 2017)

All red text are FSL/Unix commands that you can type on the command line.
The spacing is critical with these commands so be careful.
Also, note the difference between a backslash=` and a quote='.

Preparation of Data

1. Use Gannet to make mask of Pfile in BRAVO folder: will end up with <pfilename>_mask.nii and s*.nii which is the BRAVO volume in nifti format.
2. Rename s*.nii as BRAVO.nii (eg. mv s*.nii BRAVO.nii)

Data Processing

1. extract brain using: bet BRAVO Ibet2 -R -f 0.4 (I have reduced the threshold from default, seems to work better, also, I named my betted BRAVO Ibet2)
2. run segmentation using: fast -t 1 Ibet2 (-t 1 is default, means using a T1w image but I am using to be sure)

   This will produce the following (partial volumes): Ibet2_pve_0,Ibet2_pve_1 & Ibet2_pve_2 for CSF (0), GM (1) and WM(2) respectively. Here, you only need the CSF mask: Ibet2_pve_0.

Final CSF fraction computation

1. extract only the ROI of the CSF mask: fslmaths Ibet2_pve_0 -mas <pfilename>_mask Ibet2_masked
2. find average ROImasksc= total# voxels in ROI/tot# voxels in scanned FOV (256x256x200) aveROI=`$FSLDIR/bin/fslstats <pfilename>_mask -m` (see below to view the result!!!)
   You need to include the voxels with zero value, hence the small 'm'. $FSLDIR is the path to your fsl, if you don't know your fsldir, type 'which fslstats' to find the path, eg. $FSLDIR=/usr/lib/fsl/5.0
3. find average CSF mask in ROI=sum of all values of CSF in ROI/tot# voxels in scanned FOV (256x256x200): aveCSF=`$FSLDIR/bin/fslstats Ibet2_masked -m` (see below to view the result!!!)
4. find fraction CSF by computing the ratio: aveCSF/aveROI
5. Also check the total volume (in 10^{-3} ml) of the ROI mask using the FSL command and then Unix echo command:
   TOTvol=`$FSLDIR/bin/fslstats <pfilename>_mask -V | awk '{print $2}'`
   echo $TOTvol

To view the results of aveROI or aveCSF or TOTvol, you use the unix echo command and put a '$' in front of the variable: eg. echo $aveROI

For instructions on how to apply the correction you need to have the handout:
Interpreting MRS Results from LCModel_Jun2016.pdf

CHECKS:
-overlay <pfilename>_mask onto BRAVO to check for placement of voxel
-overlay Ibet2_pve_0 onto BRAVO to check for segmentation of CSF, particularly in ROI
-check TOTvol in ml against expected voxel size (recorded on Lcmodel output)

Please get in touch with me if you have questions/trouble: sofia.chavez@camhpet.ca