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Citation for final published version:

Driver, Ian D. , Traat, Maarika, Fasano, Fabrizio and Wise, Richard G. 2020. Most small cerebral cortical veins demonstrate significant flow pulsatility: a human phase contrast MRI study at 7T. *Frontiers in Neuroscience* 14 , 415. 10.3389/fnins.2020.00415

Publishers page: <http://dx.doi.org/10.3389/fnins.2020.00415>

Please note:

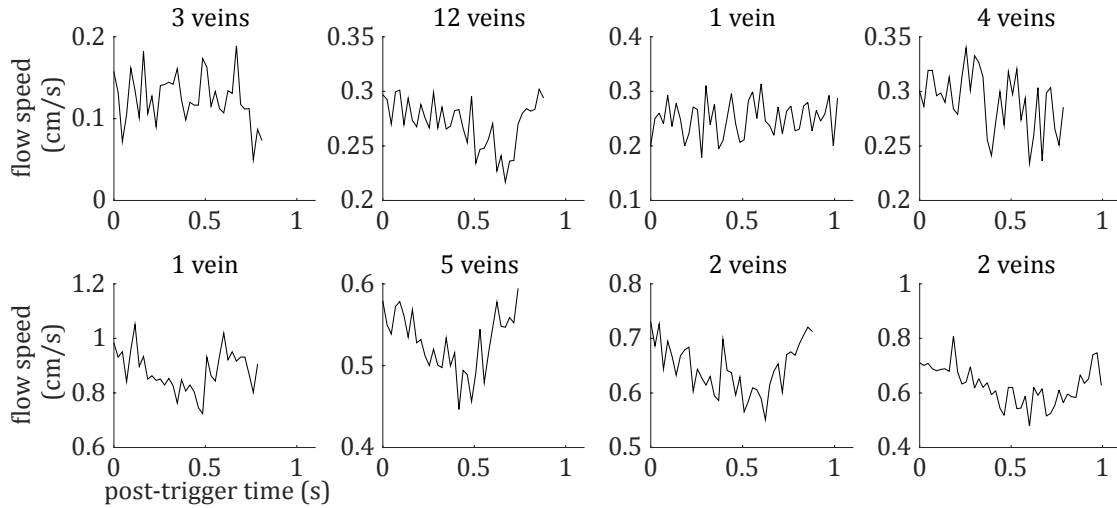
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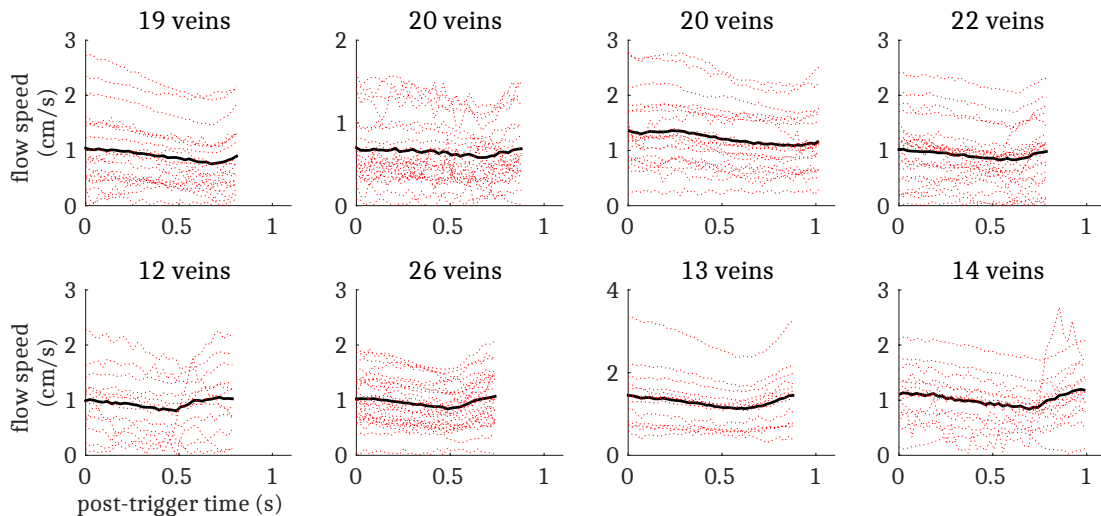


## Supplementary Material

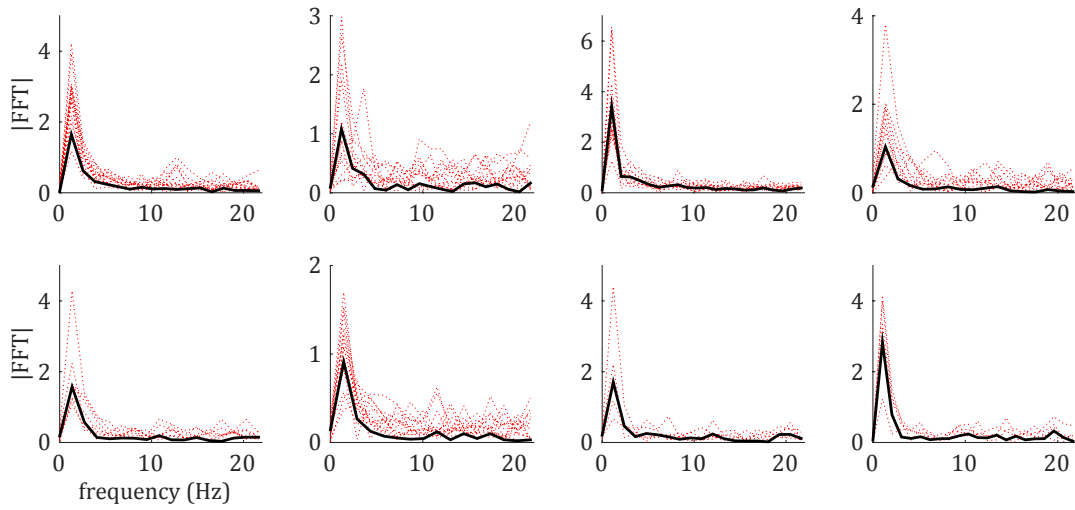
### 1 Supplementary Figures



**Supplementary Figure S1.** Cardiac cycle synchronized venous blood flow time-courses for each subject for veins that do not meet the  $PCNR > 3.9$  threshold (i.e. ‘non-pulsatile veins’). The number of non-pulsatile veins for each subject is displayed above the respective plot.



**Supplementary Figure S2.** Cardiac cycle synchronized venous blood flow time-courses for every vein (red dotted lines) and for the mean across veins (black line). The total number of veins studied for each subject is displayed above the respective plot.



**Supplementary Figure S3.** Frequency spectra for each subject, for every small vein (red dotted lines) and for the mean across small veins (black line). This was calculated by fast Fourier transform of the time-course. Note that the main peak at  $\sim 1$  Hz corresponds to the principle frequency of the cardiac cycle.