

DTI Processing - Software Tools

Do Tromp¹

¹Affiliation not available

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DO TROMP

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CORRESPONDENCE:
do.tromp@gmail.com

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When starting out in a new imaging field like diffusion tensor imaging it is easy to be overwhelmed by different processing steps and tools.

A recent publication from [Frontiers in Neuroscience](#) tries to offer an answer to most of these questions in their appropriately named article: "A hitchhiker's guide to diffusion tensor imaging". You can find the full manuscript [here](#).

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A hitchhiker's guide to diffusion tensor imaging

José M. Soares^{1,2*}, Paulo Marques^{1,2,3}, Victor Alves³ and Nuno Sousa^{1,2}

¹ Life and Health Science Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal

² ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal

³ Department of Informatics, University of Minho, Braga, Portugal

The article discusses sources of artifacts during acquisition and how to reduce/correct them, they go into some detail on how to do quality control (see more on this [here](#)), what skull stripping methods are available, how you can use RESTORE for robust tensor estimation, etc.

Most importantly, they supply an exhaustive list of DTI software packages that I adapted into the below table.

DTI tools	Pre- processing	Tensor estimation	Fiber tracking	ROI- analysis	Registration
3D Slicer		X	X	X	
AFNI	X	X			
BioImage Suite		X	X	X	
BrainVoyager QX		X	X		
Camino		X	X		
Dipy		X	X		

DoDTI	x	x	x		
DTI-Query			x		
DTI-TK					x
DTIStudio		x	x	x	
ExploreDTI	x	x	x		
Freesurfer	x	x			
FSL-FDT	x	x	x		
FSL-TBSS					x
JIST	x	x			
MedINRIA		x	x	x	
MrDiffusion		x	x		
MRtrix		x	x		
SATURN		x	x		
SPM	x	x			
TrackVis		x	x	x	
TORTOISE	x	x		x	
	Pre- processing	Tensor estimation	Fiber tracking	ROI- analysis	Registration

Reference: J.M. Soares, P. Marques, V. Alves, N. Sousa (2013). A hitchhiker's guide to diffusion tensor imaging, Frontiers in Neuroscience.

For my own research I use a combination of packages: FSL for preprocessing, Camino for tensor fitting and fiber tracking, DTI-TK for tensor based normalization and TrackVis for visualization and ROI-analysis.