

BrainSuite Diffusion Pipeline (BDP) offers a flexible open source, novel set of processing tools for diffusion weighted images (DWI) with arbitrary q-space sampling schemes.

#### **Features:**

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- Correct for well-known susceptibility induced distortion with or without fieldmap
- Co-register DWI and T1 weighted structural MRI
- Perform diffusion orientation analysis for white matter tractography modelling
- Estimate microstructure related quantitative maps to infer about brain connectivity and tissue integrity.
- ROI wise single subject and group statistical analysis

#### **Novel BDP algorithms:**

- **INVERSION** is a robust image-registration technique that uses novel contrast normalization for accurate non-rigid alignment of diffusion and T1w MR images and allows distortion correction without a  $B_0$  fieldmap [1].
- FRACT [2] and ERFO [3,4] are novel orientation distribution functions (ODFs) estimators that improve white matter tractography using linear theory and machine learning.

#### Interoperability and availability:

- BDP seamlessly integrates with BrainSuite's collection of image and surface processing, analysis and statistical tools. • BDP ODFs can be used with DSI Studio tractography
- BDP is available for Windows, Linux, MacOS, and is included as part of the BrainSuite BIDS App. An interface for BDP is also provided for NiPype [5].

### **BDP Resources**

- BrainSuite website: <u>http://brainsuite.org</u>
- BDP main: http://brainsuite.org/processing/diffusion/
- Download: <a href="http://forums.brainsuite.org/download/">http://forums.brainsuite.org/download/</a>
- BDP tutorial: <a href="http://brainsuite.org/tutorials/dtiexercise/">http://brainsuite.org/tutorials/dtiexercise/</a>

## References

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# **BrainSuite Diffusion Pipeline (BDP): Processing tools for diffusion-MRI**

## **BDP Workflow**



### **Brain Mapping Center**

**BrainSuite Software:** http://brainsuite.org

