

# fmriPrep

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# What is fmriPrep

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- Data preprocessing pipeline created by the Standard Center for Reproducible Neuroscience
- Designed to be robust, easy to use, and transparent
- Performs minimal processing: motion correction, fieldmap correction, normalization, bias field correction, and brain extraction
- Makes use of the best bits of popular software packages (e.g., ANTs, FSL, FreeSurfer, AFNI), as well as custom code

# Reasons to use fmriPrep

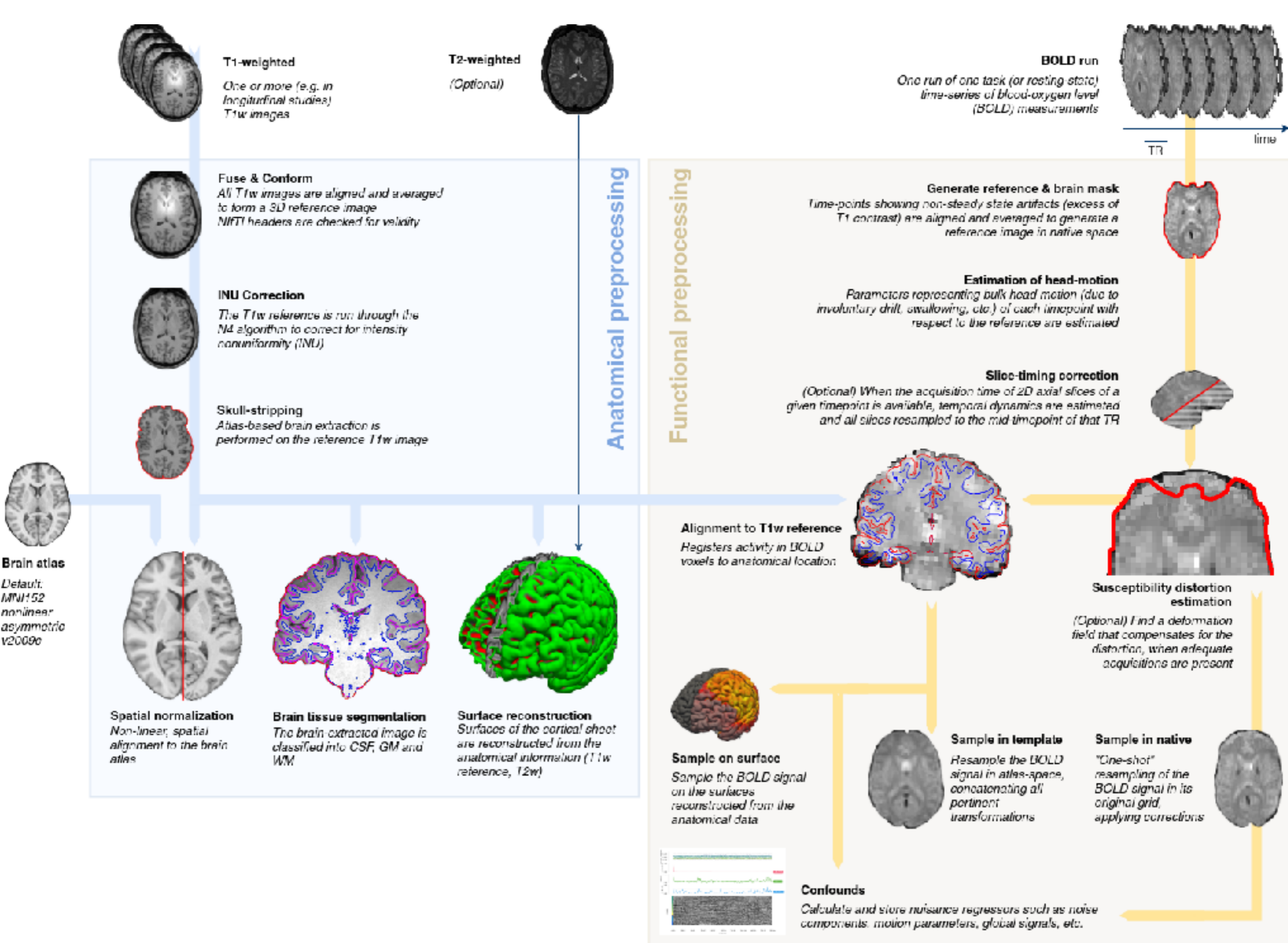
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- Field-tested
- Reproducible
- Each step has been optimized
- Easy to use output
- Automatically generated reports for QC of each step

# Reasons to not use fmriPrep

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- Data do not meet assumptions (e.g., narrow FOV)
- Need unlimited flexibility
- Have study population that does not conform to standard adult MNI templates (e.g., infants, NHP, rodent)



# Options of interest

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- ICA-AROMA
- FreeSurfer (including longitudinal)
- Anatomy only
- Fieldmap-less distortion correction
- Multi-echo EPI
- Multiple output spaces

# Things fmriPrep does not do

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- Smoothing
- ICA-FIXX
- Denoising with user-specified confounds (e.g., in preparation for resting-state analyses)

How to run fmriPrep?



# Option 1: Docker

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- fmriPrep is a Docker container
- Can be run directly from Docker

```
docker run -ti --rm \  
    -v filepath/to/data/dir:/data:ro \  
    -v filepath/to/output/dir:/out \  
    poldracklab/fmriprep:latest \  
    /data /out/out \  
    participant
```

- Can be run using the fmriprep-docker wrapper script

```
pip install --user --upgrade fmriprep-docker
```

```
fmriprep-docker /path/to/data/dir /path/to/output/dir participant  
RUNNING: docker run --rm -it -v /path/to/data/dir:/data:ro \  
    -v /path/to_output/dir:/out poldracklab/fmriprep:1.0.0 \  
    /data /out participant
```

# Option 2: Compute Canada

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- Khan Lab has a set of wrapper scripts: neuroglia-helpers

```
git clone http://github.com/khanlab/neuroglia-helpers ~/neuroglia-helpers  
~/neuroglia-helpers/setup.sh
```

- BIDS apps can be run using bidsBatch

```
bidsBatch fmriprep_1.0.4 ~/my-bids-dataset ~/my-bids-dataset/derivatives/fmriprep-v1.0.4 participant
```

# Tips on running fmriPrep

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- Running time scales with number of functional runs
- If using Docker, it is recommended to only process one subject at a time
- If using Compute Canada, try and keep the job under 24 hours
- If time/memory is an issue, consider omitting FreeSurfer

Output