



UM fMRI Lab Data: BIDS Conversion

MICHIGAN FMRI COURSE 2022

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Outline

- ▶ Current data structure (“MIDS”)
- ▶ Conversion to BIDS
- ▶ Example of converted data (multiband EPI)
- ▶ Derived data (e.g. fMRIPrep/MRIQC)
- ▶ fMRIPrep output example

Current Data Structure (MIDS)

```
s01/  
├── anatomy  
├── dicom.tgz  
├── DTI  
├── func  
├── log  
├── master_process_out.json  
├── preproc.pdf  
├── raw  
└── rawdata.json
```

anatomy/

```
├── tloverlay_60sl
│   ├── dicom.tgz
│   ├── ehtloverlay_60sl.nii
│   ├── htloverlay_60sl.nii
│   └── tloverlay_60sl.nii
├── t1spgr_208sl
│   ├── dicom.tgz
│   ├── eht1spgr_208sl.nii
│   ├── ht1spgr_208sl.nii
│   └── t1spgr_208sl.nii
```

func/

```
├── faces
│   └── run_01
│       ├── dicom.tgz
│       ├── meanutrun_01.nii
│       ├── rp_trun_01.txt
│       ├── run_01.nii
│       ├── trun_01.mat
│       ├── trun_01.nii
│       ├── trun_01_uw.mat
│       ├── utrun_01.nii
│       ├── vdm5_fpm0000.hdr
│       ├── vdm5_fpm0000.img
│       └── wfmag_trun_01.nii
├── fieldmaps
│   ├── FM_faces
│   │   └── dicom.tgz
│   ├── FM_gng
│   │   └── dicom.tgz
│   ├── FM_rest
│   │   └── dicom.tgz
│   └── FM_reward
│       └── dicom.tgz
```

DTI

```
├── dti
│   ├── dti_104multihb
│   │   └── run_01
│   │       ├── dicom.tgz
│   │       └── run_01.nii
├── fieldmap
│   ├── dicom.tgz
│   └── fieldmap.nii
```


Converting to BIDS

```
s01
├── anatomy
│   └── dicom.tgz
├── DTI
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├── log
├── master_process_out.json
├── preproc.pdf
├── raw
└── rawdata.json
```


Converting to BIDS

- ▶ Use DICOM files as source data
- ▶ dcm2bids (<https://cbedetti.github.io/Dcm2Bids/>)
 - ▶ Relies on defined configuration files to sort/classify the data

```
s01
├── anatomy
│   └── dicom.tgz
├── DTI
├── func
├── log
├── master_process_out.json
├── preproc.pdf
├── raw
└── rawdata.json
```

```
dicom/
├── s00001
├── s00002
├── s00003
├── s00004
├── s00005
├── s00006
├── s00007
├── s00008
├── s00009
├── s00010
├── s00011
├── s00012
├── s00013
├── s00014
└── s00015
```


BIDS Data Format: Example

- ▶ Parent directory

```
subjects/  
├── CHANGES  
├── code  
├── dataset_description.json  
├── derivatives  
├── participants.json  
├── participants.tsv  
├── README  
├── sourcedata  
└── sub-s01
```

BIDS Data Format: Example

```
sub-s01/  
├── anat  
│   ├── sub-s01_inplaneT1.json  
│   ├── sub-s01_inplaneT1.nii.gz  
│   ├── sub-s01_T1w.json  
│   └── sub-s01_T1w.nii.gz  
├── dwi  
│   ├── sub-s01_dwi.bval  
│   ├── sub-s01_dwi.bvec  
│   ├── sub-s01_dwi.json  
│   └── sub-s01_dwi.nii.gz  
└── func  
    ├── sub-s01_task-faces_run-01_bold.json  
    ├── sub-s01_task-faces_run-01_bold.nii.gz  
    ├── sub-s01_task-faces_run-02_bold.json  
    ├── sub-s01_task-faces_run-02_bold.nii.gz  
    ├── sub-s01_task-rest_bold.json  
    └── sub-s01_task-rest_bold.nii.gz
```


BIDS Data Format: Example

```
anatomy/  
├── t1overlay_60sl  
│   ├── dicom.tgz  
│   ├── eht1overlay_60sl.nii  
│   ├── ht1overlay_60sl.nii  
│   └── t1overlay_60sl.nii  
├── t1spgr_208sl  
│   ├── dicom.tgz  
│   ├── eht1spgr_208sl.nii  
│   ├── ht1spgr_208sl.nii  
│   └── t1spgr_208sl.nii
```

MIDS



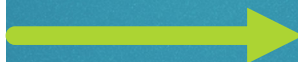
```
anat/  
├── sub-s01_inplaneT1.json  
├── sub-s01_inplaneT1.nii.gz  
├── sub-s01_T1w.json  
└── sub-s01_T1w.nii.gz
```

BIDS

BIDS Data Format: Example

```
func/  
├── faces  
│   └── run_01  
│       ├── dicom.tgz  
│       ├── meanutrun_01.nii  
│       ├── rp_trun_01.txt  
│       ├── run_01.nii  
│       ├── trun_01.mat  
│       ├── trun_01.nii  
│       ├── trun_01_uw.mat  
│       ├── utrun_01.nii  
│       ├── vdm5_fpm0000.hdr  
│       ├── vdm5_fpm0000.img  
│       └── wfmag_trun_01.nii
```

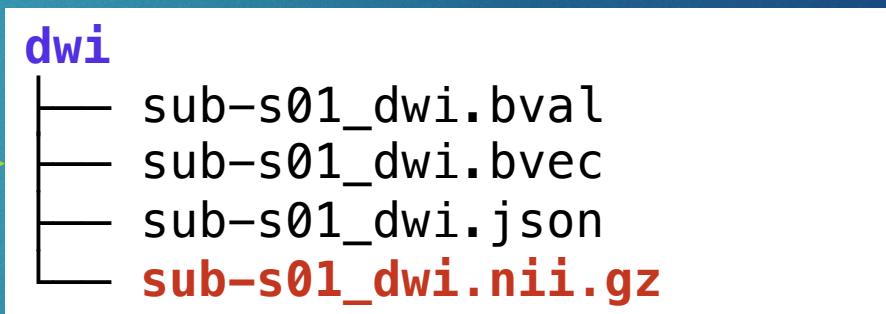
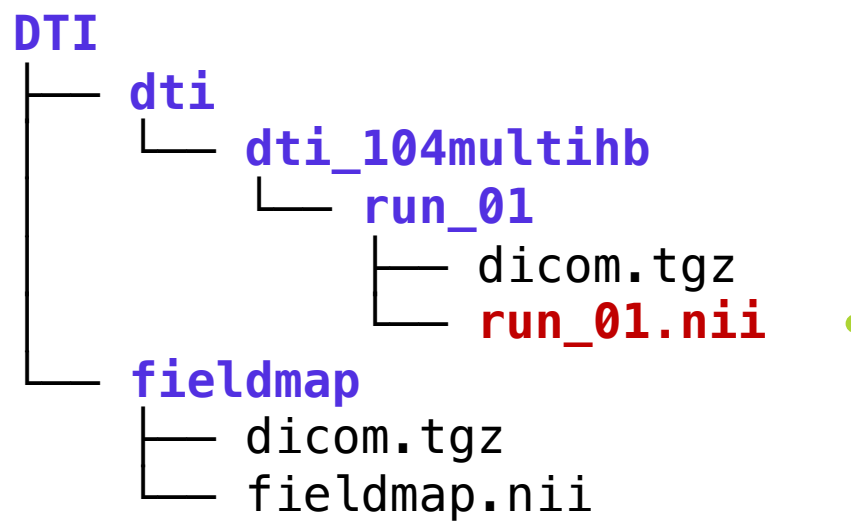
MIDS



```
func  
├── sub-s01_task-faces_run-01_bold.json  
├── sub-s01_task-faces_run-01_bold.nii.gz  
├── sub-s01_task-faces_run-02_bold.json  
├── sub-s01_task-faces_run-02_bold.nii.gz  
├── sub-s01_task-rest_bold.json  
└── sub-s01_task-rest_bold.nii.gz
```

BIDS

BIDS Data Format: Example



MIDS

BIDS

Derivatives

- ▶ Main directory used for processed outputs
- ▶ Does not have to be BIDS-compliant
- ▶ Can store as many pipeline analyses as necessary

```
subjects/  
├── CHANGES  
├── code  
├── dataset_description.json  
├── derivatives  
├── participants.json  
├── participants.tsv  
├── README  
├── sourcedata  
└── sub-s01
```


derivatives/

fmriprep

dataset_description.json

desc-aparcaseg_dseg.tsv

desc-aseg_dseg.tsv

logs

sub-s01

sub-s01.html

freesurfer

fsaverage

fsaverage5

sub-s01

um-preproc

sub-s01

anatomy

dicom.tgz

DTI

func

log

master_process_out.json

preproc.pdf

raw

rawdata.json

Use of fMRIPrep

- ▶ Able to run from BIDS-ified data
- ▶ Can use docker or singularity container
- ▶ Easy-to-use wrappers available:

```
fmriprep-docker /path/to/subjects /path/to/subjects/derivatives participant --participant-label s01 \  
--ignore fieldmaps sbref \  
--fs-license-file ~/freesurfer/license.txt
```


fMRIprep: Sample Output