



# Overview of conducting fMRI research

*from study design to data acquisition to data analysis and beyond...*

created by the Princeton "Pygers" neuroimaging support group

## Getting started

1

### STUDY DESIGN

*What in the world am I doing?!!*

[DESIGN  
YOUR  
EXPERIMENT](#)

[BEST PRACTICES FAQ](#)

[GLOSSARY](#)

2

### SETUP SEQUENCES

*How do I get the scanner to work?...*

[ACQUISITION](#)

[PROGRAM CARD SETUP  
USING REPROIN](#)

3

### CHECKLISTS + FORMS

*What else do I need before I can scan?*

[PRE-SCAN  
CHECKLIST](#)

[MRI BUDDY  
SIGN-UP](#)

[SCANNING  
CHECKLIST](#)

4

### AFTER YOU COLLECT YOUR FIRST SUBJECT'S DATASET

*Am I doing this right?!?!?*

[BEST PRACTICES FAQ](#)

[FIND YOUR DATA](#)

## Post-Acquisition Processing

5

### CONVERT DICOMS TO BIDS-FORMATTED NIFTI FILES

*Now what do I do with my data? What are all the things I need to do before I preprocess my data?*

[WHY USE  
BIDS?](#)

[WHY USE  
DATALAD?](#)

[USE HEUDICONV  
\(STEP1\\_PREPROC.SH\)](#)

[PREPARE DATA FOR BIDS  
\(STEP2\\_PREPROC.SH\)](#)

[BIDS  
VALIDATOR](#)

[DEFACE T1W  
IMAGES](#)

6

### QUALITY ASSURANCE

*Does this look OK?*

[RUN MRIQC  
\(RUN\\_MRIQC.SH\)](#)

7

### PREPROCESSING

*Let's preprocess this baby!*

[RUN FMRIprep  
\(RUN\\_FMRIPREP.SH\)](#)

# STOP!

*What are all of  
these files?!!*

[KNOW YOUR  
OUTPUTS](#)

## fMRIPrep & FreeSurfer Reconstruction

### ANATOMICAL DATA

*Oh, the many ways to view your data!*

[ATLASES](#)

[MASKS](#)

[SURFACES](#)

### FUNCTIONAL DATA

*What was happening during the task?*

[REGISTRATION](#)

### UNIVARIATE ANALYSIS

*aka Regression!*

[CONFOUNDS](#)

[TEMPORAL FILTERING](#)

[GLM](#)

### FURTHER DENOISING

*Let's clean up the data...*

[TEMPORAL FILTERING](#)

[Z-SCORING](#)

### FUNCTIONAL ROIs

*Another way to mask  
your data...*

[MASKS](#)

### BETA ESTIMATES

*An output that might  
be of interest...*

### MULTIVARIATE ANALYSIS

*Another type of analysis  
you can do...*

[BRAINIAC  
\(EXTERNAL LINK\)](#)

### GROUP-LEVEL ANALYSIS

*To group, or not to group.*

[STANDARD SPACE](#)

[STATISTICAL INFERENCE](#)