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nordisk
fonden

BIDS Training Day

Melanie Ganz, Granville Matheson,
Martin Nørgaard & Cyril Pernet

Ice breaker

The training involves answering questions and be active

- let's make small groups

- each time prep an answer (1 - 2 min) and tell others

- choose a name for your team and quickly present yourself (main research topic, toy, and location)



Plan for today

- General BIDS information
- Curation and tools
- PET BIDS
- Electrophysiology derivatives



Let's see what do you know about BIDS -- **WHAT IS IT?**

(how would you describe it)

What is BIDS ?

- It's a data **structure** ; nothing to do with **format** per se
- It's about: - how you organize data in a folder
 - how you name files
 - how you document metadata
- It cares about imaging data but also genetics/behaviour/cognition



Do you know **HOW** are BIDS ‘parts’ made?
(MRI, EEG, etc)

How are BIDS parts made?

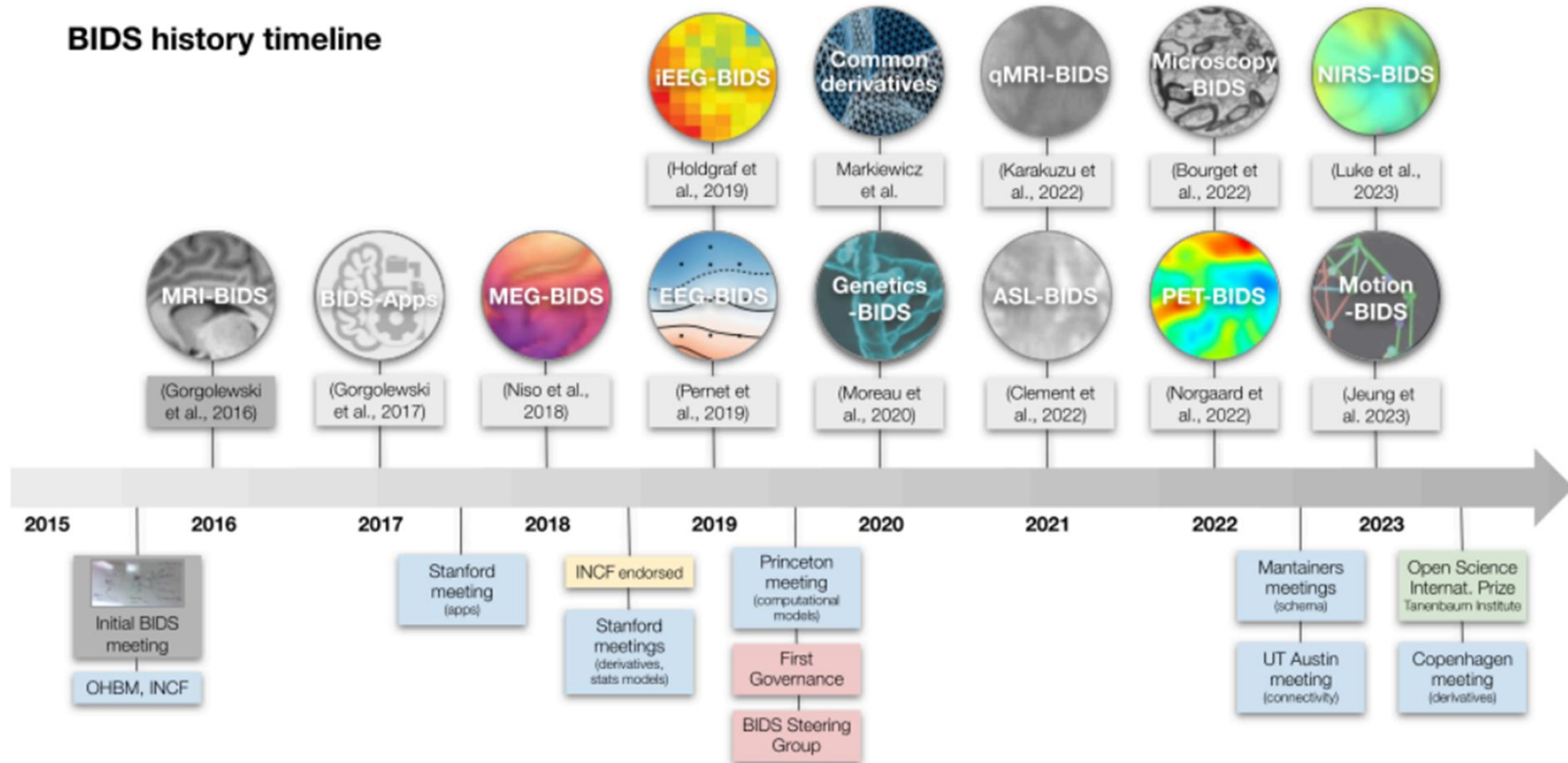
- BIDS uses 'common sense' (a T1w image is called T1w)
- BIDS uses community standards
- 80/20 rule, do not reinvent the wheel
- what data format are you using when analyzing data?
- BIDS uses existing ontologies, dictionaries, etc

-- who writes the different parts? BIDS BEP --

A short history of BIDS

1. Kickoff meeting at Stanford in Spring 2015
2. Meeting at OHBM 2015 (June)
3. Introduced to neuroinformatics community at INCF Congress 2015 (August)
4. First release candidate and public call for comments (September)
5. Version 1.0.0 published along the introductory paper

For a long history, see Poldrack et al. (2024) The Past, Present, and Future of the Brain Imaging Data Structure (BIDS). Imaging Neuroscience





What is the **goal** of BIDS?

The BIDS goal is to make more data accessible to more researchers

Who is benefiting from BIDS?

- Yourself, next time you look at the data
- People in the lab (new students, collaborators, governance)
- Other researchers (data sharing)



What is the **benefits** of using BIDS?

What are the Benefits?

- Time saving
- Data sharing
- Automation
- Reproducibility

BIDS data structure basics

Essence of BIDS

1. Directory hierarchy
2. A file naming system that conveys essential meta-data in filenames alone (sub-value_entity-value_entity-value.ext)
3. Remaining meta-data in “sidecar” files

dicomdir/

1208200617178_22/

1208200617178_22_8973.dcm

1208200617178_22_8943.dcm

1208200617178_22_2973.dcm

1208200617178_22_8923.dcm

1208200617178_22_4473.dcm

1208200617178_22_8783.dcm

1208200617178_22_7328.dcm

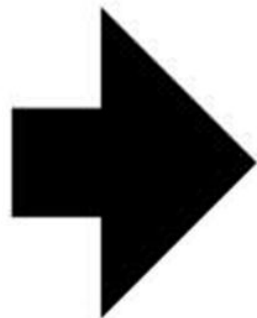
1208200617178_22_9264.dcm

1208200617178_22_9967.dcm

1208200617178_22_3894.dcm

1208200617178_22_3899.dcm

1208200617178_23/



my_dataset/

participants.tsv

sub-01/

anat/

sub-01_T1w.nii.gz

func/

sub-01_task-rest_bold.nii.gz

sub-01_task-rest_bold.json

dwi/

sub-01_dwi.nii.gz























sub-01_dwi.json

sub-01_dwi.bval

sub-01_dwi.bvec

sub-02/

A BIDS folder (any/all modality)

Name	Date modified	Type
 stimuli	21/03/2018 21:58	File folder
 sub-002	24/03/2018 08:56	File folder
 sub-003	24/03/2018 08:56	File folder
 sub-004	24/03/2018 08:56	File folder
 sub-005	24/03/2018 08:56	File folder
 sub-006	24/03/2018 08:56	File folder
 sub-007	24/03/2018 08:56	File folder
 sub-008	24/03/2018 08:56	File folder
 sub-009	24/03/2018 08:56	File folder
 sub-010	24/03/2018 08:56	File folder
 sub-011	24/03/2018 08:56	File folder
 sub-012	24/03/2018 08:56	File folder
 sub-013	24/03/2018 08:56	File folder
 sub-014	24/03/2018 08:56	File folder
 sub-015	24/03/2018 08:56	File folder
 sub-016	24/03/2018 08:56	File folder
 sub-017	24/03/2018 08:56	File folder
 sub-018	24/03/2018 08:56	File folder
 sub-019	24/03/2018 08:56	File folder
 dataset_description.json	15/03/2018 11:30	JSON File
 participants.tsv	19/03/2018 20:21	TSV File
 README.txt	15/03/2018 11:33	TXT File

Anyone can find his/her way around data because one uses a rigid folder structure and naming convention.

A BIDS folder (any/all modality)

Name	Date modified	Type
stimuli	21/03/2018 21:58	File folder
sub-002	24/03/2018 08:56	File folder
sub-003	24/03/2018 08:56	File folder
sub-004	24/03/2018 08:56	File folder
sub-005	24/03/2018 08:56	File folder
sub-006	24/03/2018 08:56	File folder
sub-007	24/03/2018 08:56	File folder
sub-008	24/03/2018 08:56	File folder
sub-009	24/03/2018 08:56	File folder
sub-010	24/03/2018 08:56	File folder
sub-011	24/03/2018 08:56	File folder
sub-012	24/03/2018 08:56	File folder
sub-013	24/03/2018 08:56	File folder
sub-014	24/03/2018 08:56	File folder
sub-015	24/03/2018 08:56	File folder
sub-016	24/03/2018 08:56	File folder
sub-017	24/03/2018 08:56	File folder
sub-018	24/03/2018 08:56	File folder
sub-019	24/03/2018 08:56	File folder
dataset_description.json	15/03/2018 11:30	JSON File
participants.tsv	19/03/2018 20:21	TSV File
README.txt	15/03/2018 11:33	TXT File

```
{  
  "Name": "",  
  "BIDSVersion": "",  
  "License": "",  
  "Authors": "",  
  "Acknowledgements": "",  
  "HowToAcknowledge": " ",  
  "Funding": "",  
  "ReferencesAndLinks": "",  
  "SourceDatasetsURLs": ""  
}
```

Identifiable and citable

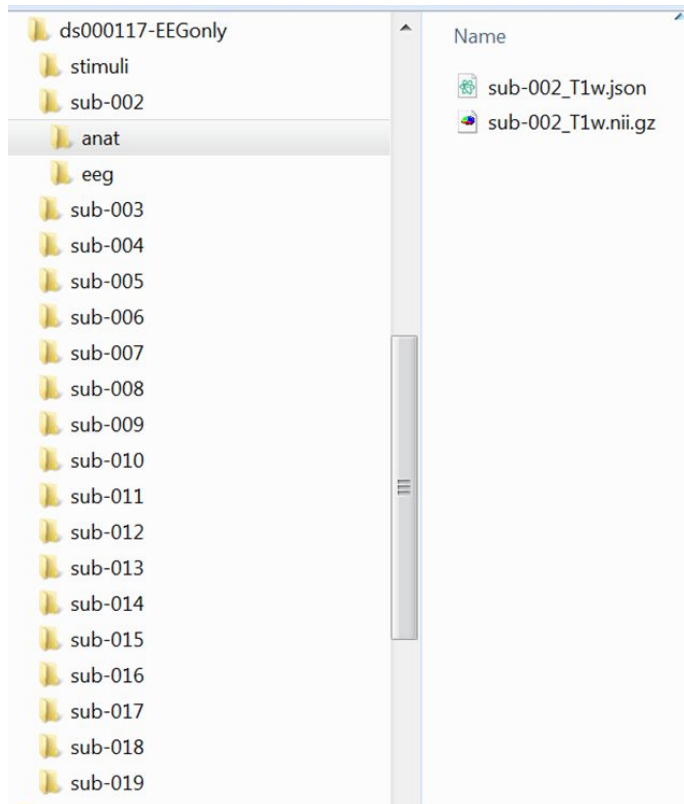
A BIDS folder (any/all modality)

Name	Date modified	Type
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sub-005	24/03/2018 08:56	File folder
sub-006	24/03/2018 08:56	File folder
sub-007	24/03/2018 08:56	File folder
sub-008	24/03/2018 08:56	File folder
sub-009	24/03/2018 08:56	File folder
sub-010	24/03/2018 08:56	File folder
sub-011	24/03/2018 08:56	File folder
sub-012	24/03/2018 08:56	File folder
sub-013	24/03/2018 08:56	File folder
sub-014	24/03/2018 08:56	File folder
sub-015	24/03/2018 08:56	File folder
sub-016	24/03/2018 08:56	File folder
sub-017	24/03/2018 08:56	File folder
sub-018	24/03/2018 08:56	File folder
sub-019	24/03/2018 08:56	File folder
dataset_description.json	15/03/2018 11:30	JSON File
participants.tsv	19/03/2018 20:21	TSV File
README.txt	15/03/2018 11:33	TEXT File

```
participant_id  age  sex
sub-002        34   M
sub-003        12   F
sub-004        33   F
```

Human and machine readable

A BIDS folder (any/all modality)



**Name redundancy – harder to make mistakes
+ files comes with metadata (json)**

Inside folder sub-002

- anat folder
sub-002_T1w.nii.gz
- eeg folder
????
- pet folder
????

What BIDS is NOT

- The Brain Imaging Data Structure, is not a new file format
- BIDS is not a database tool, but it helps archiving and major imaging databasing tools (XNAT, Loris, etc) are BIDS compliant
- BIDS is not a search engine, but it facilitates data discovery for search engines
- BIDS is not a sharing tool, but it facilitates sharing



What makes a BIDS dataset a **valid** dataset?

Select a [BIDS dataset](#) to validate

Choose File No file chosen

Options: ☐ Ignore Warnings ☐ Ignore NIFTI Headers ☐ Skip Subject Filename Consistency Check

Note: Selecting a dataset only performs validation. Files are never uploaded.



BIDS

BRAIN IMAGING DATA STRUCTURE

How to get started?

<https://bids-specification.readthedocs.io/>



Brain Imaging Data Structure
v1.9.0

The BIDS Specification

Introduction

Common principles

Modality agnostic files

Modality specific files

Derivatives

Longitudinal and multi-site
studies

Glossary

BIDS Extension Proposals

Appendix

Changelog

The BIDS Starter Kit

Website

Tutorials

GitHub repository

Introduction

Motivation

Neuroimaging experiments result in complicated data that can be arranged in many different ways. So far there is no consensus how to organize and share data obtained in neuroimaging experiments. Even two researchers working in the same lab can opt to arrange their data in a different way. Lack of consensus (or a standard) leads to misunderstandings and time wasted on rearranging data or rewriting scripts expecting certain structure. Here we describe a simple and easy-to-adopt way of organizing neuroimaging and behavioral data. By using this standard you will benefit in the following ways:

- It will be easy for another researcher to work on your data. To understand the organization of the files and their format you will only need to refer them to this document. This is especially important if you are running your own lab and anticipate more than one person working on the same data over time. By using BIDS you will save time trying to understand and reuse data acquired by a graduate student or postdoc that has already left the lab.
- There are a growing number of data analysis software packages that can understand data organized according to BIDS (see the [up to date list](#)).



Table of contents

Motivation

Extensions

Citing BIDS

Original publication

Datatype specific publications

EEG

iEEG

MEG

PET

Genetics

Microscopy

qMRI

ASL

NIRS

Motion

Research Resource Identifier
(RRID)

<https://bids-standard.github.io/bids-starter-kit/>

Welcome to the BIDS
Starter Kit

FOLDERS AND FILES

Folders

Filenames

Metadata and file formats

BIDS files templates [↗](#)

Derivatives

TUTORIALS

Annotating a BIDS dataset

iEEG data conversion

ASL data conversion

PET data conversion

MRI data conversion

Tutorials

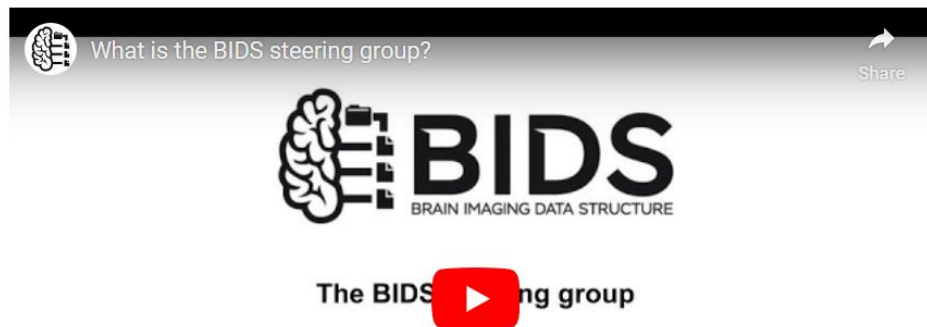


Welcome to the BIDS Starter Kit

How to get started with the Brain Imaging Data Structure

A community-curated collection of tutorials, wikis, and templates to get you started
with creating BIDS compliant datasets.

[Specification](#) | [FAQ](#) | [Chat](#) | [Forum](#) | [Youtube](#) | [Podcast](#)





Let's convert data, explore the specification and ask questions