OHBM
2021
Schedule overview
PDT EDT CEST CST
Open Science SIG
Tips for poster presenters
+29
BIDS
BRAIN IMAGING DATA STRUCTURE
BIDS Town Hall Meeting
Monday 21st June 2021
1pm PDT / 4pm EDT / 10pm CEST / 3pm CST
BIDS Steering Group
Guiomar Niso
Spain
Melanie Ganz
Denmark
Robert Oostenveld
The Netherlands
Russ Poldrack
USA
Kirstie Whitaker
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BIDS Maintainers
Stefan Appelhoff
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# BIDS Town Hall

OHBM - Open Science Room
June, 2021

# BIDS Town Hall outline

- BIDS Organizational updates
- BIDS Extension Proposal (BEP) updates
- Community projects
- Open floor to community feedback

# BIDS Organizational Updates

- Steering Group election coming up in the Fall
  - More information later in the summer for submitting self-nominations and election process
  - 1 position available
- BEPs recently incorporated into the specification
  - BEP001 (qMRI), BEP005 (ASL), and BEP009 (PET)
- BIDS adoption survey: https://bit.ly/35H75Oi
- Open call for interested community members to join the Maintainers group
  - Opportunities to contribute or lead technical discussions, community development, or outreach initiatives

# BEP002 - The BIDS Stats Models Specification

## BEP leads: Tal Yarkoni and Chris Markiewicz

- Finalization workshop in May 2021
  - Goals: Consolidate current practice, build example models
  - Results:
    - Reworked structure - list of steps is now a directed graph
    - Model zoo - https://github.com/bids-standard/model-zoo
    - Abstracted transformations, to ease interoperability of implementations
- Stat Models released v1.0.0-rc1 in June 2021 - Please review!

# BEP004 - Susceptibility Weighted Imaging (SWI)

## BEP lead:

- BEP open for new leadership

# BEP011: The structural preprocessing derivatives

## BEP lead: Vivana Siless

- Blocked by BIDS-validator extending and PyBIDS implementation for common derivatives
- Current state: https://github.com/bids-standard/bids-specification/pull/518
- Features:
    - Surfaces
    - Scalar maps on surfaces
    - Morphometrics

# BEP012: fMRI derivatives

## BEP lead: Chris Markiewicz

- Blocked by BIDS-validator extending and PyBIDS implementation for common derivatives
- Current state: https://github.com/bids-standard/bids-specification/pull/519
- Features:
  - Derivative images (mean, ALFF, ReHo, etc.)
  - Time series (confounds, decompositions, etc.)

# BEP014: Spaces and mappings

## BEP lead: Oscar Esteban

- BEP has been progressing slow, but will be more active in the coming months

- NiTransforms has been integrated and working within fMRIPrep

# BEP016: The diffusion weighted imaging derivatives

## BEP leads: Oscar Esteban and Franco Pestilli

- Basic Diffusion-weighted model description has been merged.
  - But we need to comply to this: https://github.com/bids-standard/bids-bep016/issues/7
- Upcoming integration across connectivity-related BIDS
  - DWI
  - Tractography, Tractometry
  - Connectivity (from fMRI and DWI)
- Tractography file format:
  - We are working on a generalized Tractography File format (Pestilli, Rokem, Rheault, Garyfallidis and others)

# BEP017: Generic BIDS connectivity data schema

## BEP leads: Eugene Duff

- Current state: https://bids.neuroimaging.io/bep017
- This BEP is intended to be a meeting point for minimal harmonisation of connectivity-based formats across modalities
- There were meetings late 2020 w/ Franco, Chris M, Sebastien + Derek (PyNets) about pushing forward such integration
- Challenges include widely varying data requirements for different types of connectivity - need good basic use cases that span modalities (e.g. visualisation)
- We would be very keen to hear from others defining connectivity based formats!

# BEP020: Eye Tracking, Gaze Position and Pupil Size

## BEP lead: Dejan Draschkow

- BEP lead looking for another BEP lead to help finish the BEP and incorporate into the standard
- If you are interested, please reach out to Dejan (dejan.draschkow@psy.ox.ac.uk)

# BEP021: Common Electrophysiological Derivatives

BEP leads: Stefan Appelhoff, Arnaud Delorme, Dora Hermes, Mainak Jas, Guiomar Niso, Robert Oostenveld, and Cyril Pernet

- Mostly on hold
- Some efforts to release derived BIDS by Donders center (Infant study) and UCSD (Stern study epoched data), but no agreement yet on derived M/EEG data structure.
- UCSD to include anonymized boundary element head models with BIDS EEG data for Child Mind Project. Need to discuss file formats with others.
- BIDS M/EEG pipelines are being developed (Brainlife, etc...) which will trigger discussion as to how to store the derived data

# BEP022: Magnetic Resonance Spectroscopy (MRS)

## BEP leads: Mark Mikkelsen, William Clarke, and Martin Wilson

- Finalized the NIfTI-MRS data format
  - Presented abstract at ISMRM
  - Manuscript in preparation
  - Current discussion thread: https://forum.mrshub.org/t/nifti-mrs-discussion-thread/443
- Restarted MRS BEP discussions on the MRSHub Forum
  - https://forum.mrshub.org/t/bids-for-spectroscopy/83

# BEP023: PET Preprocessing Derivatives

## BEP leads: Martin Nørgaard, Graham Searle and Melanie Ganz

- Effort is moving forward
  - PET-BIDS specification was recently finished
  - Coordination kickoff in the beginning of September
    - Capture various experimental designs and needs for preprocessing and pharmacokinetic modeling
  - Important to stay aligned with derivatives for MRI (structural, functional, ASL, diffusion)

# BEP024: Computed tomography scan (CT)

## BEP lead: Hugo Boniface

- BEP lead is looking for domain experts and contributors

- Early stage of BEP development

# BEP025: Medical Imaging Data Structure (MIDS)

## BEP leads: Jose Manuel Saborit and Maria de la Iglesia

- The paper "Medical imaging data structure extended to multiple modalities and anatomical regions" is pending of peer-review.
- Two datasets implemented in MIDS were designed to research the COVID-19 illness
  - Covid-19 Positive cases
  - Covid-19 negative cases
- The dataset "COVID-19 +" has been included in the Kaggle challenge "SIIM-FISABIO-RSNA COVID-19 Detection"
- The software XNAT2MIDS is still in the process of updating

# BEP026: Microelectrode Recordings

## BEP lead:

- BEP open to new leadership
- See also BEP032 (animal electrophys)

# BEP027: BIDS Applications 2.0

## BEP leads: Greg Kiar and Chris Markiewicz

- Re-conception of BIDS Apps, with focus on ease of automatic preparation of tasks with an emphasis on interoperability
- This specification will heavily rely upon the Boutiques standard
- While the BIDS data specifications aim at providing a *prescriptive* standard, the BIDS Applications 2.0 specification focuses on being *descriptive* instead, whenever possible. e.g.:
  - Structure of parameters and arguments on the command-line or config file are at the discretion of tool developers
  - The spec defines which arguments MUST and SHOULD be available, and how they must be identified (for retrieval) within Boutiques

# BEP028: Provenance

## BEP leads: Satra Ghosh and Camille Maumet

- Provide a description of a data manipulation and transformations steps related to a BIDS data element.
- BIDS-Prov adds provenance information to the BIDS structure in the form of sidecar JSON-LD files.
- The generic model can represent any pipeline regardless of the tools that were used.
  - The semantics are described using controlled vocabularies consistent with the Neuroimaging Data Model (NIDM), which includes BIDS terminologies.
  - This supports queries of experimental metadata and computational workflows used to generate scientific results.
- BIDS-Prov can be used to describe provenance at different levels of granularity.
  - For instance, when directly using a neuroimaging software package, BIDS-Prov could be used to describe each call to a module and its input / outputs.
  - In another use case, in which data processing would be done using a docker container, BIDS-Prov could be used to describe a much simpler pipeline of a single Activity and linking to the container image (for an example see Fig.1.B).
- We are working to improve the set of processes and entities that can be described
- More examples at: https://github.com/bids-standard/BEP028_BIDSprov/

# BEP029: Virtual and physical motion data

## BEP leads: Sein Jeung and Julius Welzel

- Pull request not opened yet
- A few open points are being discussed (In preparation of example data sets to compare different solutions)

  One .json to list all tracking systems in the session versus multiple .json files for multiple tracking systems

  Supporting quaternions in addition to Euler angles to represent rotations.

# BEP030: Near Infrared Spectroscopy (NIRS)

## BEP leads: Robert Luke and Luca Pollonini

- SNIRF data format
- Extension proposal opened as a pull request
  - https://github.com/bids-standard/bids-specification/pull/802
- Current proposal primarily for continuous wave NIRS (CW-NIRS), but want to ensure not to preclude future extensions
- Inviting colleagues from time- and frequency-domain fNIRS to review proposal
- Examples and validator in progress

# BEP031: Microscopy

## BEP leads: Marie-Hélène Bourget and Julien Cohen-Adad

- Finalizing proposal and community review, preparing to submit to specification in the fall
- First 2 pull requests for integration of sample entity, sample metadata and animal-specific metadata, in collaboration with BEP032:
  - **Sample entity and *samples.tsv*** : https://github.com/bids-standard/bids-specification/pull/812
  - **New recommended columns to *participants.tsv*** : https://github.com/bids-standard/bids-specification/pull/816
- Remaining points to address:
  - Confirm **file formats and extensions** (PNG, TIFF, OME-TIFF)
  - Clarify usage of the new **stain entity**
  - Confirm **image acquisition metadata** fields
  - Finalize **chunk transforms** description
  - Extend **BIDS-validator**
  - Generate **example datasets** (please contact us if you would like to share your microscopy dataset in BIDS format)

# BEP032: Animal electrophysiology

## BEP leads: Sylvain Takerkart and Julia Sprenger

- Currently:
  - collecting community feedback
  - **looking for researchers willing to BIDS-ify their ephys data!**
  - cooperation with BEP031 for animal data support in BIDS (“sample” entity)
  - ~monthly meeting as part of the INCF Working Group on Data structure: https://www.incf.org/sig/incf-working-group-standardized-data

- Example datasets: https://gin.g-node.org/NeuralEnsemble/BEP032-examples

- Early stage integration with software tools
  - ProbeInterface & SpikeInterface (unified probe description and spike sorting): https://github.com/SpikeInterface
  - AnDO (Generation, Validation): https://github.com/INT-NIT/AnDO
  - Interoperability with NWB and NIX data/metadata formats

- Contact: sylvain.takerkart@univ-amu.fr & julia.sprenger@univ-amu.fr

# BEP033: Advanced DWI

## BEP leads: James Gholam, Leandro Beltrachini, and Filip Szczepankiewicz

- Collecting community feedback:
  - Determining best supported binary structured formats
    - CBOR? HDF5? MsgPack?
  - Determining priority sequences to support
- Generating example datasets:
  - Examples added to: https://github.com/JAgho/MISP_plot/tree/main
  - Determining with vendors best practice to record data in-sequence

# Community projects

**BIDS Starter Kit**

- Project to move to a “website” (mkdoc, jupyter book…)
- Started up a YouTube channel: https://www.youtube.com/channel/UCxZUcYfd_nvIVWAbzRB1tlw

**BIDS Matlab**

- Close to a candidate-release

# Community feedback