



„Sparkling Joy”: The role of the INCF network in the open, FAIR, and citable neuroscience movement

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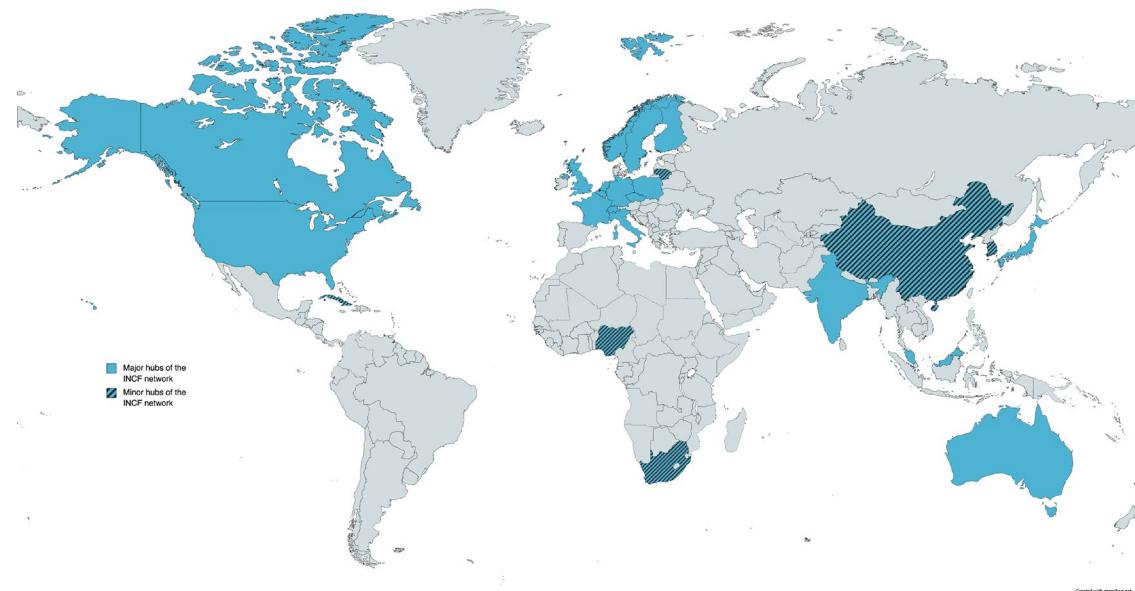


Karolinska
Institutet

Contents:

- Brief introduction to the INCF network
- Brief introduction to the role of standards and best practices in the FAIR partnership
- INCF standards framework:
 - Developing, harmonizing, and extending standards
 - Evaluation and endorsement of community standards
 - Promotion of community adoption of community standards
- Example of the FAIR partnership in practice

An international network for open, FAIR, and citable neuroscience



Community includes: Researchers Software developers Infrastructure providers Funders Industry Publishing Standards developers

Mission

To promote data sharing/reuse and infrastructure integration in neuroscience through the development of standards and best practices and the provide training in neuroinformatics

 Remi Gau
@RemiGau

This needed to be done.

#BIDS is the [#mariekondo](#) for #fMRI #MRI #EEG
#MEG #DataCuration.

site: bids.neuroimaging.io

specification: bids-

specification.readthedocs.io/en/stable/

starter kit: [github.com/bids-standard/...](https://github.com/bids-standard/)



This one sparks joy.



This one does not spark joy.

The "Marie Kondos" of the neuroscience community

Original DICOM

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/
- ❑ 1208200617178_24/
- ❑ 1208200617178_25/



Data structured as BIDS



- 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/
 - sub-03/
 - sub-04/

BIDS is a format for standardizing and describing outputs of neuroimaging experiments (left) in a way that is intuitive to understand and easy to use with existing analysis tools (right).



Capacity Building

- Professional Development Workshops
- Thematic Workshops
- Training/Education courses
- INCF TrainingWeeks
- INCF TrainingSuite
- Mentorship/Internship programs:



Standards and best practices



- Develop
- Endorse
- Extend
- Harmonize

Network Activities



Community Building

- INCF Assembly
- Working Groups:



- Neurostars
- Brain Summit



Community Involvement



Consulting Services

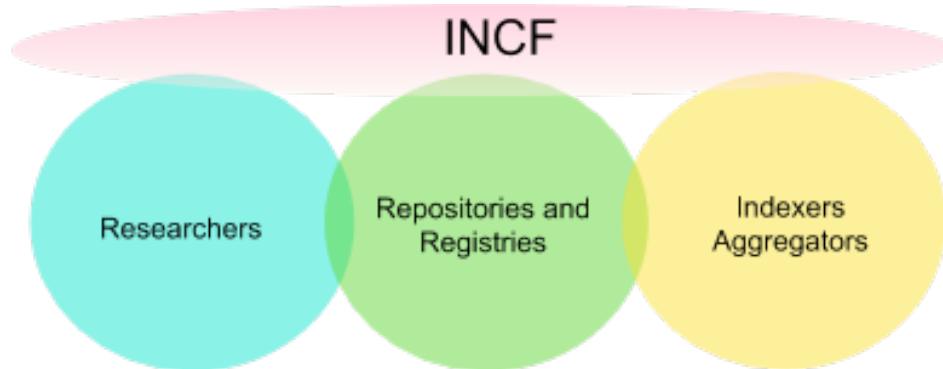


Guidelines

Targeting:

- Software tool developers
- Infrastructure providers
- Standards developers
- Policy makers

The FAIR partnership and the role of standards



- Develop (meta)data standards
- Good data management
- Rich metadata
- Prepare to share
- Open formats
- Adopt/align to standards
- Submit to repository
- Persistent identifier
- Machine based access
- Clear License
- Support for open, domain specific standards
- Machine readable metadata
- Future friendly formats
- Persistent metadata
- Bidirectional links
- Data citation
- FAIR vocabularies
- Index
- Effective search
- Persistent metadata

The INCF framework for developing, extending, and harmonizing community standards and best practices

Working Groups(WGs) are composed of users and developers from across the INCF network working collaboratively to develop, refine, and/or implement community standards.

- Short-term projects that aim to achieve a concrete deliverable
- Serve as forums for getting agreement and community buy-in on the use of these standards and best practices
- All community members are welcome to be WG members, regardless of their location in the world

INCF Working Group on Electrophysiology Stimulation Ontology

ACTIVE, SOLICITING MEMBERS

The Working Group is composed of electrophysiology representatives from the INCF network, Human Brain Project (HBP), Neurodata Without Borders (NWB) Core Development Team, and Stimulating Peripheral Activity to Relieve Conditions (SPARC), sharing use cases from the respective projects....



[Read more](#)

INCF/OHBM Working Group on checklists from transparent methods reporting in neuroscience (eCobidas)

ACTIVE, SOLICITING MEMBERS

This working group will turn the COBIDAS recommendations and guidelines into a series of checklists hosted on a website, to let users report information faster and with more detail.

...



[Read more](#)

INCF Working Group on ARTEM-IS

ACTIVE, SOLICITING MEMBERS

This Working Group aims to develop tools for the ARTEM-IS standard for electrophysiological methods reporting. ARTEM-IS stands for an Agreed Reporting Template for EEG Methodology - International Standard. Accurate reporting is critical for transparent, reproducible, replicable...



[Read more](#)

INCF Working Group on NWB

ACTIVE, CLOSED FOR JOINING

This working group serves the developers and users of MatNWB, the MATLAB interface to the INCF-endorsed Neurodata without Borders (NWB) data standard. Neurodata Without Borders (NWB) is a data standard for neurophysiology, providing neuroscientists with a common standard to share,...



[Read more](#)

INCF Working Group on Reproducibility and Best Practices in Human Brain Imaging

ACTIVE, SOLICITING MEMBERS

This Working Group formed as the result of a merger of several INCF Working Groups working in the areas of neuroimaging and reproducibility. The group has several separate projects that all have reproducibility in neuroimaging as an overarching theme, specifically focusing on data...



[Read more](#)

INCF Working Group on Standardized Representations of Network Structures

ACTIVE, SOLICITING MEMBERS

The motivation for this Working Group is the ongoing development of complex data-driven models of neuronal networks, as well as the emergence of general purpose software packages and standardised formats to make it easier to build, specify and share such networks. To encourage...



[Read more](#)

INCF Working Group on Neuroshapes: Open SHACL schemas for FAIR neuroscience data

ACTIVE, SOLICITING MEMBERS

This Working Group coordinates community efforts for the development of open, use case- driven and shared validatable data models (schemas, vocabularies) to enable the FAIR principles (Findable, Accessible, Interoperable and Reusable) for basic, computational and clinical...



[Read more](#)

INCF Working Group on Standardized Data

ACTIVE, SOLICITING MEMBERS

The goal of this Working Group is to develop a set of specifications and tools that would allow standardization of a directory structure for experimental data, recorded with animal models in neuroscience. It will capitalize on the success of BIDS for human neuroimaging data, while...



[Read more](#)

Webpage

INCF Working Group on Electrophysiology Stimulation Ontology

Tags: [working group](#) [electrophysiology](#) [ontologies](#)

Status: Active, Soliciting members

Chairs
Tom Gillespie, UC San Diego

[Join this working group](#)

About
The Working Group is composed of electrophysiology representatives from the INCF network, Human Brain Project (HBP), Neurodata Without Borders (NWB) Core Development Team, and Stimulating Peripheral Activity to Relieve Conditions (SPARC), sharing use cases from the respective projects. The initial use cases are from intracellular electrophysiology, with good coverage over most typical ICEPhys protocols. This schema is also useful for other 1D signals over time that are used as stimuli. In addition, the ontology defines a specification for parameterizing the stimulus templates. This is a strategy for stimulus description that should eventually be easily extendable to 2D (i.e., visual) stimuli, which is another large class of stimuli that is common in NWB.

How we work
Bimonthly virtual meetings

Members
Tom Gillespie, UC San Diego
Lydia Ng, Allen Institute
Pamela Baker, Allen Institute
Patrick Rey, Allen Institute
Andrew Davison, CNRS
Glynis Mattheisen, CNRS
Oliver Ruebel, LBL
Ben Dichter, LBL
Ulrike Schlegel, University of Oslo
Lyuba Zelt, Research Center Jülich
Stephen Van Hooser, Brandeis University
Mathew Abrams, INCF Secretariat



Aims
The aim of this Working Group is to develop a small, well-scoped ontology for describing electrophysiology stimulation parameters.

Deliverables
2023

- Prototype visualization or validation/comparison tool (expected)
 - so users can verify that the stimuli as stored in the file are as they intended
 - for archives, so stimuli can be visualized when browsing datasets
- Draft proposal best practices for use of the ontology for archives (expected)
- Draft proposal for extension for parameterized 2D visual stimuli (expected)

Completed Deliverables

2021

- [Electrophysiology Stimulation Ontology \(draft version\)](#)
 - Integrating the use of the 1D waveform ontology with NWB

Index of Deliverables

Year	Outcomes	Working group
2023	<ul style="list-style-type: none"> • Shared JSON based notation for network specification/generation • Incorporate NetPyNE UI into OSB 	INCF Working Group on Standardized Representations of Network Structures
2022	<ul style="list-style-type: none"> • BIDS Specification (v1.7.0) • BIDS validator (v1.9.0) 	INCF Working Group on Reproducibility and Best Practices in Human Brain Imaging
2022	An app facilitating completion of the template using an onscreen interface	INCF Working Group on ARTEM-IS
2022	<ul style="list-style-type: none"> • NIDM specification 	INCF Working Group on NIDM (Neuroimaging Data Model)
2022	<ul style="list-style-type: none"> • Detailed list of Quality Control tools for different modalities of neuroimaging 	INCF Working Group on Neuroimaging Quality Control
2021	<ul style="list-style-type: none"> • Electrophysiology Stimulation Ontology (draft version) <ul style="list-style-type: none"> ◦ Integrating the use of the 1D waveform ontology with NWB 	INCF Working Group on Electrophysiology Stimulation Ontology
2021	Brainconnects 2021	INCF Working Group on Neuroinformatics for Aging
2021	<ul style="list-style-type: none"> • BIDSonym application for de-identification of neuroimaging data • BIDSonym: a BIDS App for the pseudo-anonymization of neuroimaging datasets 	INCF Working Group on Reproducibility and Best Practices in Human Brain Imaging
2020	“Neuroimaging and Informatics for Successful Aging” Research Topic in Frontiers	INCF Working Group on Neuroinformatics for Aging
2020	<ul style="list-style-type: none"> • Support for Sonata across NeuroML/PyNN/NetPyNE 	INCF Working Group on Standardized Representations of Network Structures
2019	Brainconnects 2019	INCF Working Group on Neuroinformatics for Aging
2019	<ul style="list-style-type: none"> • NIDM viewer 	INCF Working Group on NIDM (Neuroimaging Data Model)
2019	<ul style="list-style-type: none"> • Course on neuroimaging Quality Control 2019 	INCF Working Group on Neuroimaging Quality Control
2018	<ul style="list-style-type: none"> • DICOM ontology 	INCF Working Group on NIDM (Neuroimaging Data Model)
2016	<ul style="list-style-type: none"> • Training materials for learning NIDM 	INCF Working Group on NIDM (Neuroimaging Data Model)
2015	<ul style="list-style-type: none"> • A restful API and client for NIDM 	INCF Working Group on NIDM (Neuroimaging Data Model)

Notable outcomes:



AtOM



INCF Principles for developing community standards and best practices



1. Create a common vocabulary. It is time consuming, but it is an essential starting point
2. Consider your standard's users and their goals (repeated analysis, visualisation, reuse parts, discover related analyses, etc...)
3. Choose an extensible data model for implementing your standard
4. Incorporate both experimental and computational processes in your standards
5. Assessing computational variability is essential for generalizability
6. Work incrementally, openly, and collaboratively
7. While consensus is the goal, disagreements will occur—remember the previous point: Work incrementally, openly, and collaboratively

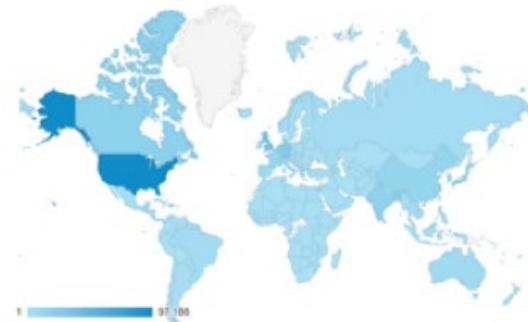


Neuro

search topics, posts, users, or categories

[all categories](#) [Latest](#) [New \(10\)](#) [Unread](#) [Top](#) [Categories](#)[+ New Topic](#)

Topic	Replies	Views	Activity
GSoC Project Idea 14: Producing publication-ready brain network analysis results and visualisations from the command line GSoC neuroimaging, python	7	354	4h
fMRIPrep: how to resample data from T1w space into MNI space new mni, fmriprep	4	36	4h
RuntimeError: ICA-AROMA failed; fmriprep version 1.1.6 ica-aroma, fmriprep	19	463	9h
GSoC Project Idea 13: Improving unit testing and test coverage for the TE-Dependence ANALysis (tedana) toolbox GSoC neuroimaging, python	9	363	10h
Temporal filtering of cifti data new ciftify, cifti	1	16	13h
DIPY streamlines not aligning with image space new streamlines, dipy, trk, space	2	41	14h
Heudiconv across multiple sessions	4	2000	22h



- 318.658 users (2019 to present)
- 1.6 million pageviews (2019 to present)
- 707.039 sessions (2019 to present)

The INCF framework for vetting and endorsing standards and best practices



Accepted into framework

17

Endorsed

9

Not endorsed

2

Ready for Community review

2

Expert & Committee review phase

4

POLICY DOCUMENT

International Neuroinformatics Coordinating Facility review criteria for endorsement of standards and best practices V2.0

✉ Mathew Abrams¹, Jyl Boline², Samir Das³, Ibrahima Faye⁴, Wojtek Goscinski⁵, Jeanette Hellgren-Kotaleski⁶, Ramona Hicks⁷, David Kennedy⁸, Trygve Leergaard⁹, Maryann Martone¹⁰, Roman Mouček¹¹, Sharmila Venugopal¹², Thomas Wachtler¹³

PUBLISHED 13 NOV 2020 (<https://doi.org/10.7490/f1000research.1118367.1>)

▼ Author Affiliations

Abstract

The International Neuroinformatics Coordinating Facility (INCF) is a standards organization for open and FAIR neuroscience that develops, evaluates, and endorses standards and best practices that embrace the principles of Open, FAIR, and Citable neuroscience. The purpose of this document is to describe the criteria used in INCF's formal procedure for evaluating and endorsing community standards and best practices.

Key areas evaluated:

- Open
- FAIR
- Testing and implementation
- Governance
- Adoption and use
- Stability and support
- Extensibility
- Comparison

POLICY DOCUMENT

 Metrics | 730 Views | 77 Downloads

Call for community review of the Brain Imaging Data Structure – a standard for organizing and describing MRI data sets

Maryann Martone¹ Waheed Omosimbi² Connie Das³ Valeria Vassilou⁴ Eric Tatt-Wai Li⁵ Tomasz

28 Sep 2018

PUBLISHED 31

▼ Author A

Abstract

The purpose of this document is to describe the review of the Brain Imaging Data Structure (BIDS) standard for organizing and describing MRI data sets. The review of the BIDS standard includes an overview of the standard, its implementation, comparison with other standards, and feedback from the community.

About BIDS
The BIDS standard unifies the organization and description of neuroimaging datasets across different platforms and software tools. It provides a common language for sharing and reusing neuroimaging data, making it easier for researchers to work together and collaborate.

Alexander von Lautz

\$comment.userAffiliation.renderToString()

A question with regards to FAIR criteria, point 7: Is there a metadata standard from psychological experiments that BIDS metadata conforms to?

COMPETING INTERESTS

No competing interests.

REPORT A CONCERN

Krzysztof J. Gorgolewski

\$comment.userAffiliation.renderToString()

There is one more relevant publication describing how MEG data is covered by BIDS: <https://www.nature.com/articles/sdata2018110>

COMPETING INTERESTS

I am one of the BIDS stewards.

REPORT A CONCERN

Jean-Baptiste Poline

\$comment.userAffiliation.renderToString()

An endorsement by INCF is more than deserved for the BIDS standard.

COMPETING INTERESTS

I am participating to the BIDS efforts and some of the BIDS working groups

REPORT A CONCERN



The INCF Standards and Best Practices Portfolio

The purpose of this portfolio is to provide the community with an index of robust, well-validated standards and best practices that adhere and support the FAIR principles.

The portfolio provides the community with:

- Descriptions of appropriate use cases
- Links to tools/infrastructures
- Links to tutorials for each standard and best practice indexed
- Information about similar standards

Users can search the portfolio by data type, format, or subdomain of neuroscience



BIDS

INCFSN:	INCFSN-18-01
Endorsed on:	2018-11-02
Re-endorsed on:	2021-06-29
Review comments:	https://f1000research.com/documents/7-1368
License:	MIT
RRID:	RRID:SCR_016124
Tags:	Neuroimaging Data format Metadata format Standards

About

The Brain Imaging Data Structure (BIDS) is a standard for organizing neuroimaging data. It is designed to be consistent with other standards and facilitate the sharing of data between different groups and institutions.

POLICY DOCUMENT

BIDS and the NeuroImaging Data Model (NIDM)

Stefan Appelhoff¹, Julianna F. Bates², Satrajit Ghosh³, David B. Keator⁴, David N. Kennedy², Russell Poldrack⁵, Jean-Baptiste Poline⁶, Jason Steffener⁷, B. Nolan Nichols⁸, Franklin Feingold⁵, Cyril Pernet⁹, Gustav Nilsson¹⁰, Camille Maumet¹¹, Guillaume Flandin¹², Rémi Gau¹³, Robert Oostenveld¹⁴, Elizabeth Dupré⁶, Arnaud Delorme¹⁵, Christopher J. Markiewicz⁵, Natacha Perez¹¹, Karl G. Helmer¹⁶, Dorota Jarecka³, Jeffrey S. Grethe¹⁷, Dianne Patterson¹⁸, Tibor Auer¹⁹, Hauke Bartsch²⁰, Thomas E. Nichols²¹, Vince Calhoun²²

PUBLISHED 07 AUG 2019 (<https://doi.org/10.7490/f1000research.1117293.1>)

Author Affiliations



Links

[TrainingSpa](#)

[Publication](#)

[BIDS webp](#)

Similar s

[OpenFMRI](#)

Commen

[BIDS and t](#)

Supporti

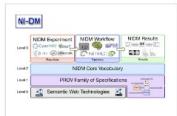
Abstract

The following statement is designed to clarify the complementary nature of the Brain Imaging Data Structure (BIDS) and the NeuroImaging Data Model (NIDM). It is not designed to be a comprehensive review of either of these initiatives, but rather to highlight the synergy of the co-application of each of these emerging technologies. The context for this statement is the preservation and communication of neuroimaging data and the additional experimental data and analytics that are associated with the neuroimaging data.



Current standards and best practices indexed

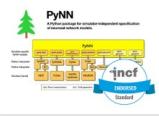
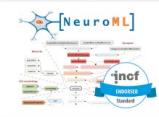
Neuroimaging



E-phys



Comp Neuro



Neuromorphology



Microscopy



Guidelines



PNS



Identifiers



The INCF FAIR roadmap project

A framework for identifying current gaps, challenges, and opportunities, as well as a framework for coordinating community action

Principles of FAIR Data Management Portfolio

 Data governance
Data governance aims to ensure consistently high data quality by establishing processes to ensure effective data management throughout the data lifecycle...

 Data architecture
A data architecture describes how data is managed - from collection to transformation, distribution and consumption - and how it flows through data storage systems...

 Data modeling and design
A data model is a conceptual representation of the data, the relationships between data, and the rules that connect them. It can be used to make datasets compatible...

 Database and storage management
A database is an organized collection of stored data that can be accessed electronically via database management system that enables users to store, retrieve, query and manage the data...

 Data security
Data security refers to protecting data from destructive forces and from the unwanted actions of unauthorized users. Technologies employed to ensure data security include Disk encryption...

 Reference data
Reference data is used to classify or categorize other data. Typical examples are units of measurement or fixed conversion rates, that are static or change slowly over time...

 Data integration
Data integration refers to the process of combining data from different sources in a unified view. Data integration is becoming more common as the volume and the need to share existing data increases...

 Documentation
Documentation is critical. It is recommended to use a document management system to receive, track, manage and store documents, such as an Electronic Lab Notebook (ELN) - a software tool...

 Data warehousing and analytics
A data warehouse is a central repository of integrated data from one or more disparate sources, storing all available data in one single place where it can be used to generate reports...

 Metadata
Metadata is data that describes other data. It summarizes basic information about data, making it easier to find and work with particular instances of data. To be useful as possible...

 Common data elements
Common data elements (CDEs) are pieces of data common to multiple datasets across different studies. The use of CDEs helps improve accuracy, consistency, and interoperability among datasets...

 Data quality
High quality data is data "fit for [its] intended uses in operations, decision making and planning" that correctly represents the real world construct it refers to. When the number of data sources increases...

FAIR Standards and Best Practices Portfolio



About

The Brain Imaging Data Structure (BIDS) is a standard prescribing a formal way to name and organize MRI data and metadata in a file system that simplifies communication and collaboration between users and enables easier data validation and software development through using consistent paths and naming for data files. BIDS is strict regarding file organization, naming, and file metadata; but in order to support wide adoption, permits substantial flexibility in the details of how other dataset metadata are described within the standard.



Links

- [TrainingSpace lectures](#)
 - [Publications](#)
 - [BIDS webpage](#)
- Similar standards**
- [OpenMRI schema](#), [NIDM-Experiment](#), [EEG Study Schema](#), [XCEDE](#)
- Commentaries on endorsed standards**
- [BIDS and the Neuroimaging Data Model \(NIDM\)](#)
- Supporting software**

BIDS

INCFSN: INCFSN-18-01
Endorsed on: 2018-11-02
Re-endorsed on: 2021-06-29
Review comments: <https://1f00research.com/documents/7-1368>
License: MIT
RRID: RRID:SCR_016124
Tags: Neuroimaging, Data format, Metadata format, Standards

Usage scenario

Use BIDS for your MRI data sets, if you want:

- To share your data publicly. Using BIDS speeds up the curation process, and databases such as OpenNeuro.org, LORIS, COINS, Xnat, SciTran and others will accept and export datasets organized according to BIDS

- To facilitate the reuse of your data. Simply refer collaborators to the BIDS documentation for an explanation of the organization of your files and their format
- To validate your data. Validation tools are available that enable you to check the integrity of your dataset and easily spot missing values
- To analyze your data using data analysis software packages that understand data organized according to BIDS

Recommendations

Use BIDS in conjunction with the Neuroimaging Data Structure (NIDM) because NIDM adds context to the BIDS structure and disambiguates experimental details and data elements that may have substantial ambiguity to the eventual data user. Learn more: <https://1f00research.com/documents/8-1373>

FAIR Repositories and Scientific Gateways Portfolio

E BRAINS - RRID:SCR_019260

<https://ebrains.eu/>

software	Code	human brain data	rodent brain data
Recommended by:	NIH BRAIN	Nature	
Standards:	BIDS, NWB, openMINDS		
Can deposit data:	yes		
Storage/data limit:	N/A		
Offers data identifier:	DOI		
License for downloads:	varies between data sets		
Controlled data access:	federated data storage possible		
Computational resources:	Yes		
Server location/jurisdiction:	EU		
User statistics type(s):	None		
Contact:	support@ebrains.eu		



E BRAINS

Type of service
[Find data](#) | [Share data](#) | [Store data](#) | [Share data](#) | [Find models](#) | [Share software](#) | [Simulation](#) | [Analyse data](#)

Data format
[DICOM](#) | [NIfTI](#) | [SWC](#) | [TIFF](#) | [ASC](#) | [AI](#) | [CSII](#)
[JPG](#) | [GIFT](#) | [AVI](#) | [GLB](#)

Update the infrastructure information

Not quite there yet standards

Capacity building activities

Practical Training on Using NIDM Tools to Annotate General Tabular Data and BIDS Datasets

Organizer: David Keator

Date: 1 Sep 2021
Time: 13:00-15:00 EDT / 18:00-21:00 CEST (9 hrs)
Target audience: Analysts interested in tools for annotating BIDS datasets and tabular data and how these techniques, through NIDM, enable improved search across datasets and reusability. The practical training will focus on graphical tools for annotation so no specialized programming skills are needed.
Registration deadline: 25 July 2021
Register for this session: **CLOSED**
Maximum participants: 60

About this tutorial
This training session focuses on the latest developments in the NIDM community and how the tools can be used to conform to the FAIR principles. The training will begin with a brief introduction to the new graphical tools for managing your community's terminologies and/or study data dictionaries and the associated interface to produce improved data dictionaries that incorporate concept-level annotations to improve search. We will use the ENIGMA schizophrenia working group as a running example to provide attendees with experience using the tools, understanding the outputs, and how they can be utilized in your own studies. The final section of the training focuses on your own datasets, where you will be able to use the techniques taught in the first part of the training and apply them to your specific use-cases with support from the trainers.

Agenda

Part 1 (~30-45 min):

- What is dataset annotation in this context and why is it important?
- How do dataset annotations enable more reproducible science?
- How does the Neuroimaging Data Model (NIDM) use annotated datasets for improved search?
- Introduction to graphical tools for dataset annotation and terminology management.

Part 2 (~40 min):

- Using example data from the ENIGMA schizophrenia working group, use the tools from Part 1 to annotate these data.
- Discussion of the outputs and how to use them to query with python/tools.

Part 3 (~ 60 min):

- Annotate your own datasets
- This can be BIDS data or tabular (CSV/TSV) data.

Community building activities

INCF Working Group on NIDM (Neuroimaging Data Model)

Tags: working group | neuroimaging | methods reporting | Status: Active, Soliciting members

Chairs
David Keator, UC Irvine
Camille Maumet, Inria, Univ Rennes, CNRS, Inserm

Join this working group

Links
Follow this WG on GitHub

Aims
The NIDM Working Group is further developing the Neuroimaging Data Model (NIDM) originally conceived by the INCF Neuro Imaging Data Sharing (NIDAISH) Task Force and the BIRN Derived Data Working Group (DDWG).

NIDM describes an extension of the W3C PROV standard for the domain of human brain mapping and, in recent years, has been working closely with the Brain Imaging Data Structure (BIDS).

Currently this Working Group has two active subgroups focusing on:

- NIDM-experiment: Interlinkage of existing BIDS datasets chaired by David Keator
- BIDS-Prov: Representing neuroimaging provenance (follow up of NIDM-Workshop) chaired by Camille Maumet and Sabatir Ghosh

Previously this group developed NIDM-Results, a software-agnostic model to represent results of mass univariate studies (such as fMRI studies).

How we work
Regular calls. Work is coordinated on GitHub.

Members
David Keator, UC Irvine
Camille Maumet, Inria, Univ Rennes, CNRS, Inserm
Alexander Bowring, Nuffield Department of Population Health, U Oxford
Ben Geng Lee, Hospital Saint-Louis, Université Paris-Medical

Deliverables

2023

- Neuroimaging Data Model development; further develop the model to include harmonized terminology and provenance information for pipelines and datasets (expected)
- Develop input interfaces to save information in standardized provenance model (eg. ReproSchema) (expected)
- Develop ReproLuke: NIDM metadata representation for a number of datasets and derived data will be made available in "ReproLuke" hosted by NIF (expected)

Completed Deliverables

2022

- NIDM specification

2019

- NIDM viewer

2018

- ...
INFORMIX architecture

Dissemination activities

FAIRsharing.org standards, databases, policies

search through all content

ACTIONS ▾

GENERAL INFORMATION

Neuroimaging Data Model (NIDM)

10.25504/FAIRsharing.75sn6

Type Model and format

Registry Standard

Open Neuroscience Starter Kit**Purpose of the study track**

Provide a convenient and guided starting point to acquire the knowledge and skills required for open neuroscience.

Research in the neurosciences is becoming ever more demanding of a variety of sophisticated technical skills and computational competence, especially when one factors in the objective of making this science reproducible, open, and FAIR.

In collaboration with the INCF, the Canadian Open Neuroscience Platform (CONP) is assembling a curated set of international content that aims to provide guidance through the increasingly complex landscape of skills and tools required for open neuroscience research. Such initiatives are key to facilitating the acquisition of the skills and knowledge comprising open-science workflows (from 'open-by-design' experimental conception, through reproducible analysis, to safe data sharing). This is a living collection, with many materials to be added and updated still.

The CONP is funded by a Brain Canada Platform Support Grant Competition Award, as well as funds and in-kind support from sponsor organizations. Please visit the CONP and Brain Canada websites linked below for more information.

**3 collection/s** in this Study track

Please click below to view all the collections

Collections

Data science - Tools of the trade

This collection looks to introduce neuroscience trainees to many of the basic tools and techniques essential for most computationally intensive...



Statistics & Machine Learning

These courses will introduce the basics of powerful machine learning techniques and the elements of traditional statistical approaches provide...



Standards & Best Practices

This collection of courses and lessons intends to provide resources for standards and best practices in Open Science, Publishing, Ethics, and more...

[VIEW THE COLLECTION](#)

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Introduction to FAIR neuroscience**Study Track****Introduction to FAIR neuroscience****Purpose of the study track**

This study track is intended for those with a neuroscience background looking to gain a basic understanding of how to implement the FAIR Guiding Principles in their research.

2 lecture/s in this Study track

Please click below to view all the lectures

Lectures**5 course/s** in this Study track

Please click below to view all the courses

Courses

Session 1
Introduction to INCF & perspectives of FAIR

Chair: Marlene Marlow, University of California, San Diego

inncf Neuroinformatics Academy 2021



Session 2
Standards and Best Practices

Chair: Michael Hahn, University of California, San Diego

inncf Neuroinformatics Academy 2021



Session 3
FAIR approaches for computational neuroscience

Chair: Lorna Gibson, MIT

inncf Neuroinformatics Academy 2021



Session 4
FAIR Approaches for Neuroimaging Research

Chair: Lorna Gibson, MIT

inncf Neuroinformatics Academy 2021

General Perspectives on FAIR

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Standards and Best Practices

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FAIR Approaches for Computational Neuroscience

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FAIR Approaches for Neuroimaging Research

View the Course



Session 5
FAIR approaches for electrophysiology

Chair: Thomas Neher, Scripps Research Institute

inncf Neuroinformatics Academy 2021

FAIR Approaches for

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Thalamus

anatomical entity > Anatomical entity > Regional part of organ > Regional part of brain > Thalamus

Synonyms: Th, thalamus opticus, wider thalamus, thalamus, thalamencephalon, thalami

The thalamus is a paired subcortical brain structure joined at the midline and sitting very near the center of the brain. In the human, each half is roughly the size and shape of a walnut. There are two major components. First is the dorsal thalamus, which is comprised of roughly 15 nuclei with relay cells that project to the cerebral cortex. (By "cortex" in this account, we mean "neocortex.") Second is the ventral thalamus, the major portion of which is the thalamic reticular nucleus, which sits like a shield flush against the lateral surface of the dorsal thalamus; reticular cells are GABAergic and project into the dorsal thalamus to inhibit relay cells. The other cellular component of thalamus, in addition to relay and reticular cells, is interneurons, which are also GABAergic, sit amongst the relay cells, and inhibit them. Generally, the relay cell to interneuron ratio is between 3 and 4 to one. An exception is found the mouse and rat, in which interneurons are essentially missing from all thalamic nuclei except the lateral geniculate nucleus (Arcelli et al., 1997).

Most of the relay nuclei topographically innervate the middle layers of cortex, but a few along the midline and extended between other nuclei project rather diffusely to upper cortical layers, including layer 1; rather little is known of these latter, diffusely-projecting nuclei, and they are not further considered in this account (for further details, see Sherman and Guillery, 2006; Jones, 2006). The remaining thalamic relay nuclei each innervates one or a small number of cortical areas. Indeed, all information reaching cortex passes through thalamus, and thus thalamus sits in a strategic position for brain processing.

The major role of thalamus is to gate and otherwise modulate the flow of information to cortex. For example, visual information from the retina is not sent directly to visual cortex but instead is relayed through the lateral geniculate nucleus of the thalamus. In the macaque monkey, there are roughly 1×10^6 geniculate relay cells (Williams and Rakic, 1988), but in primary visual cortex there are roughly 1.6×10^8 neurons (O'Kusky and Colonnier, 1982), which is typical of thalamocortical relationships. Thus thalamus represents the final bottleneck of information flow before it gets into cortex. In other words, to modify information flow for processes of attention and other behavioral requirements, it is more efficient to do this at the level of thalamus before it reaches cortex. While there is still much to learn about the cell and circuit properties of thalamus in this role, what we do know supports this general view of thalamic function. For further details of thalamus, see Jones (2006) and Sherman and Guillery (2006).

Adapted from S. Murray Sherman (2006). *Scholarpedia*. 1(9):1583.



Literature

SEE MORE

13381 results found

[Effects of intranasal oxytocin on distraction as emotion regulation strategy in patients with post-traumatic stress disorder.](#)

Koch SBJ, van Zuiden M, Newjin L, Frijling JL, Veltman DJ, Oif M

In European neuropsychopharmacology : the journal of the European College of Neuropsychopharmacology 29:266-277 - 2019 · Source: PubMed (PMID:30554861)

Post-traumatic stress disorder (PTSD) is characterized by difficulty down-regulating emotional responses towards trauma-reminders. The neuropeptide oxytocin may enhance treatment response in PTSD, by dampening excessive fear and improving fear regulation. However, oxytocin effects on (neural correlates of) cognitive emotion regulation abilities have never been investigated in PTSD patients. Therefore, we investigated behavioral and neural effects of intranasal oxytocin administration (40IU) on distraction as emotion regulation strategy in male and female...

[Bilateral projections to the thalamus from individual neurons in the inferior colliculus.](#)

Mellott JG, Beebe NL, Schofield BR

DataSpace

MODELS

216 results

MORPHOLOGY

12373 results

ANATOMY

147 results

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123671 results

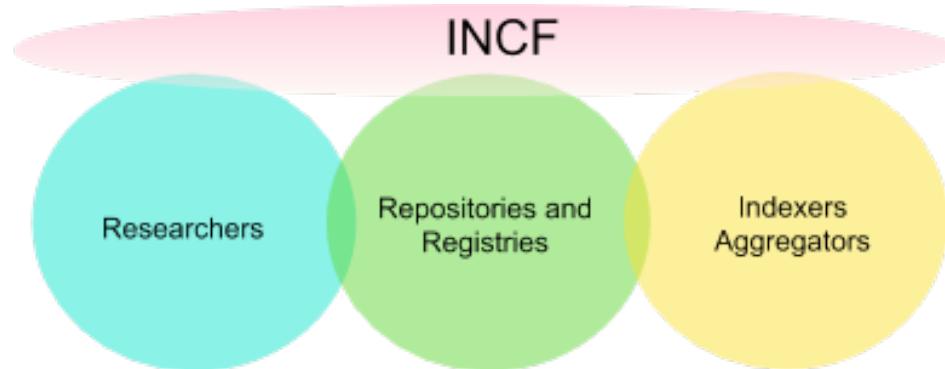
PHYSIOLOGY

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GENERAL

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The FAIR partnership



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- Submit to repository
- Persistent identifier
- Machine based access
- Clear License
- Support for open, domain specific standards
- Machine readable metadata
- Future friendly formats
- Persistent metadata
- Bidirectional links
- Data citation
- FAIR vocabularies
- Index
- Effective search
- Persistent metadata



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