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Sharing more than research papers for transparent & reusable research

Camille Maumet

► **To cite this version:**

Camille Maumet. Sharing more than research papers for transparent & reusable research. 2020 - Workshop “Open and reproducible neuroimaging”, Nov 2020, Oldenburg (online), Germany. pp.1-39. inserm-02986992

HAL Id: inserm-02986992

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Submitted on 3 Nov 2020

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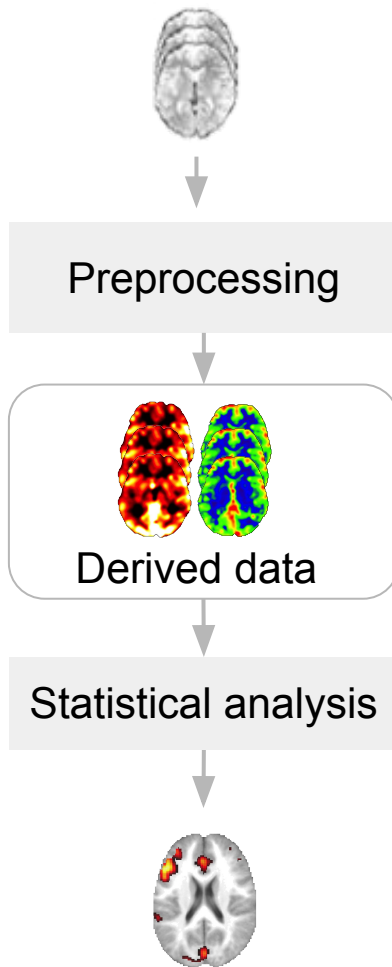
Sharing more than
research papers **for**
transparent &
reusable research

Camille Maumet

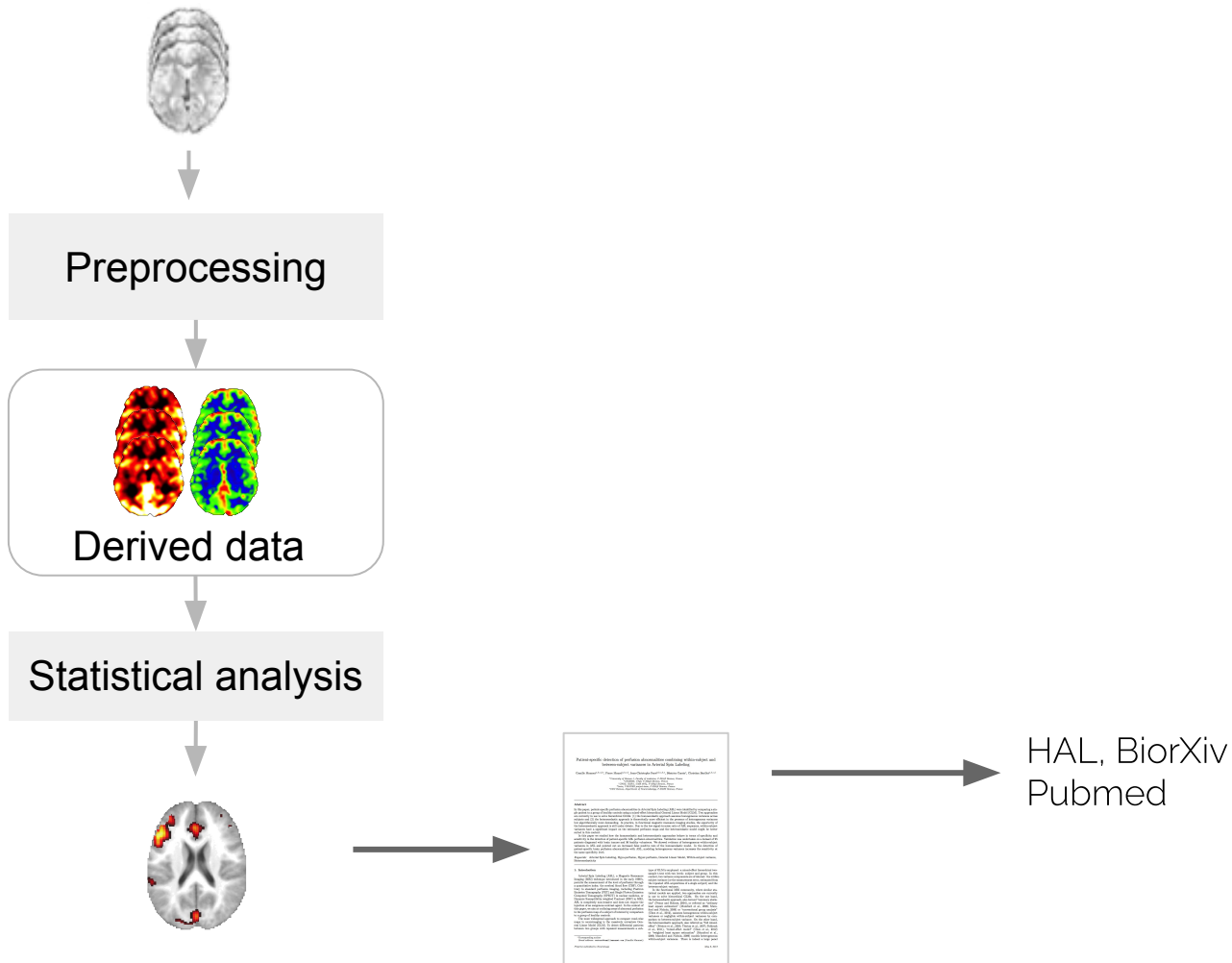
Univ Rennes, Inria, CNRS, Inserm



Sharing research artefacts



Sharing research artefacts



But...



Incomplete reporting

But...



Incomplete reporting

Difficult to build on existing work

Hard to summarize the literature

But...



Incomplete reporting

Difficult to build on existing work

Hard to summarize the literature



Low sample sizes

But...



Incomplete reporting

Difficult to build on existing work

Hard to summarize the literature



Low sample sizes

Unreliability

Lack of diversity

But...



Incomplete reporting

Difficult to build on prior work

Hard to summarize the literature



Low sample sizes

Unreliability

Lack of diversity

We need **bigger, more representative and diverse** samples

with **enough details to enable reuse.**

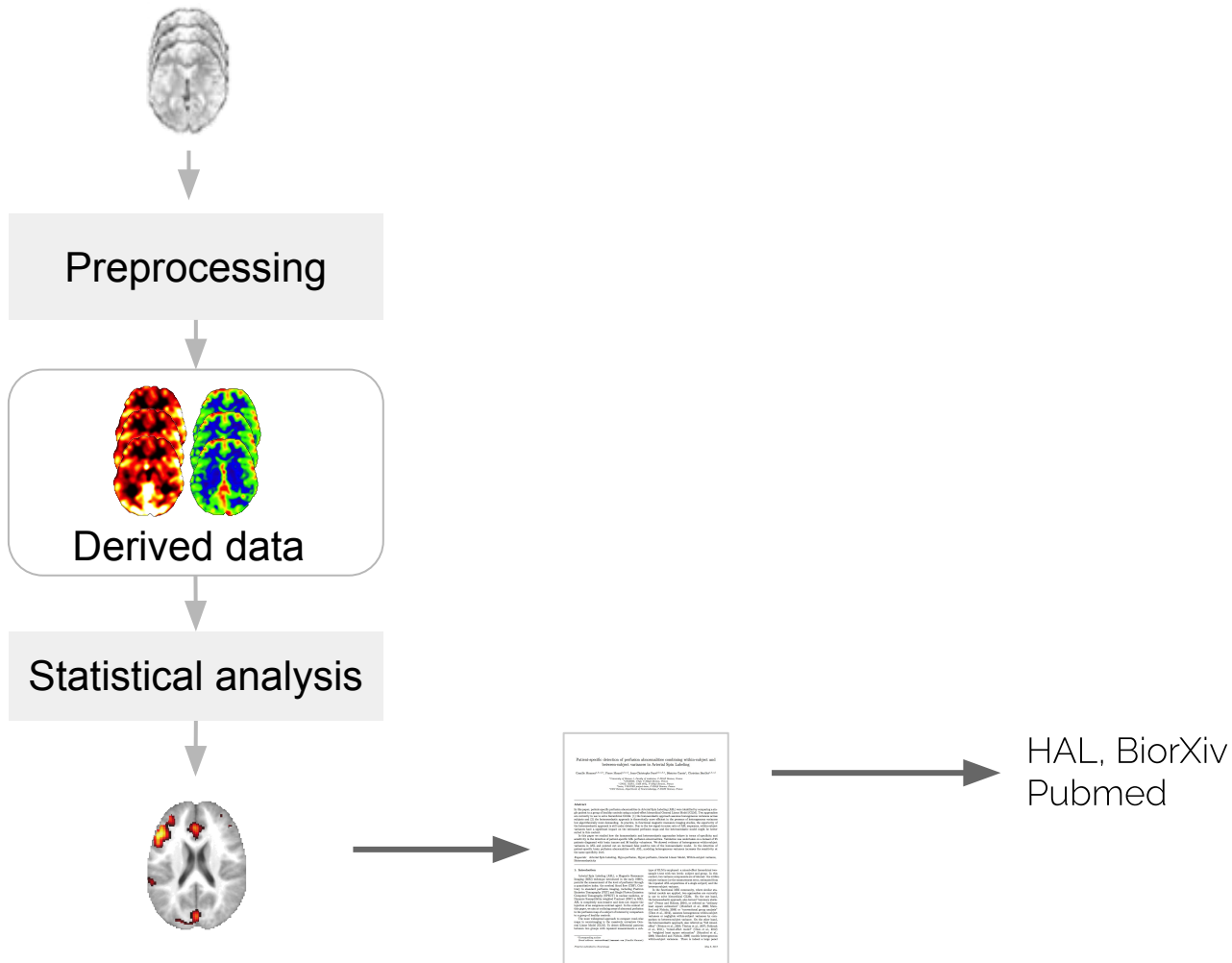


Beyond papers...

Sharing

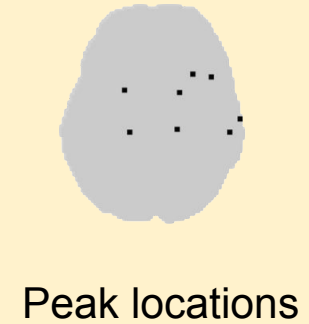
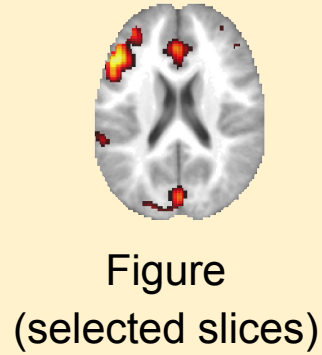
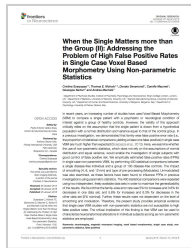
neuroimaging results

Sharing research artefacts



fMRI Results

Paper



fMRI Results

Paper

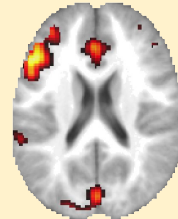
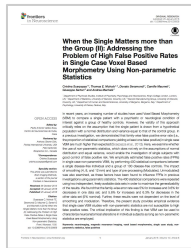
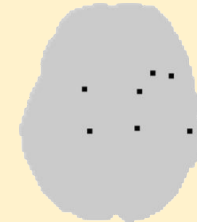


Figure
(selected slices)



Thresholded
statistics



Peak locations



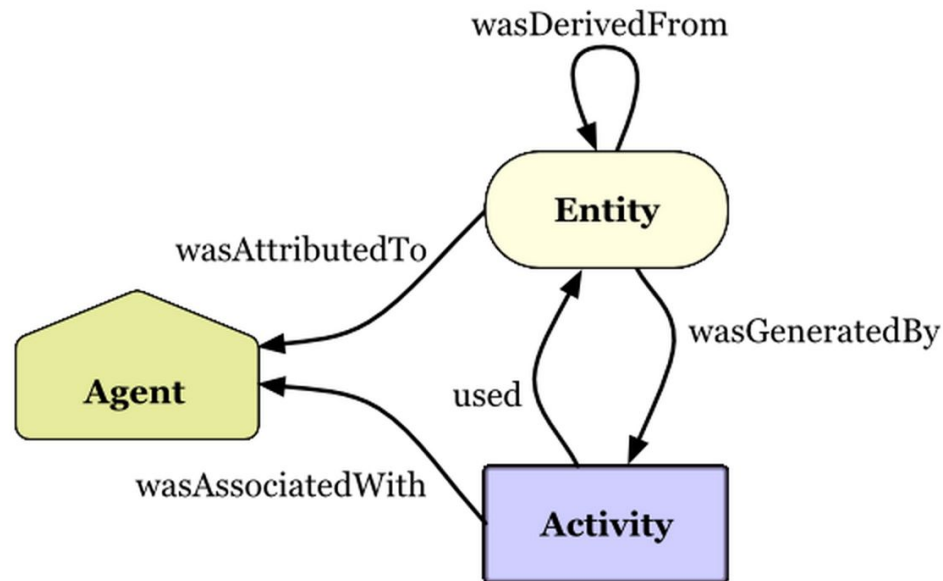
Incomplete statistical results

Ambiguous/incomplete methods

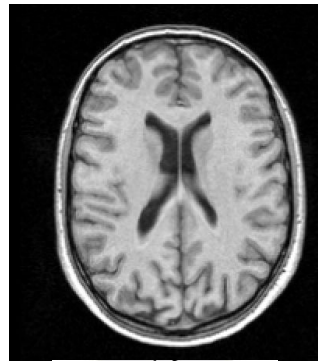
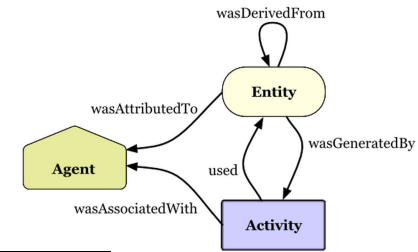
Metadata is not searchable

NIDM - NeuroImaging Data Model

- Based on W3C PROV
- Extensible graph-based representation (RDF)
- With a query language (SPARQL)



W3C PROV Example



Entity

Segmentation

Activity



Entity

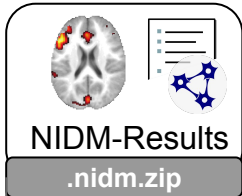


Entity

SPM

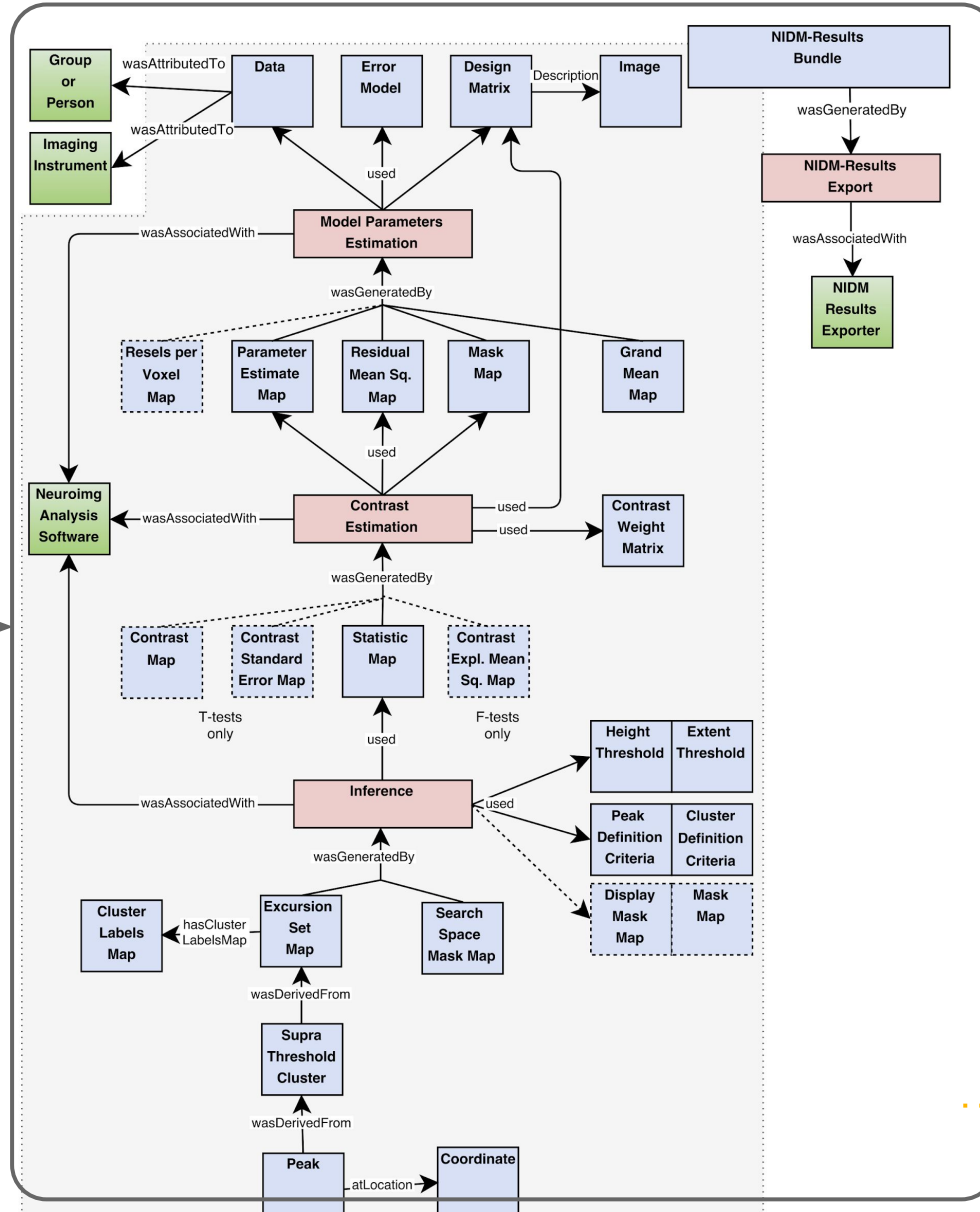
Agent

NIDM-Results



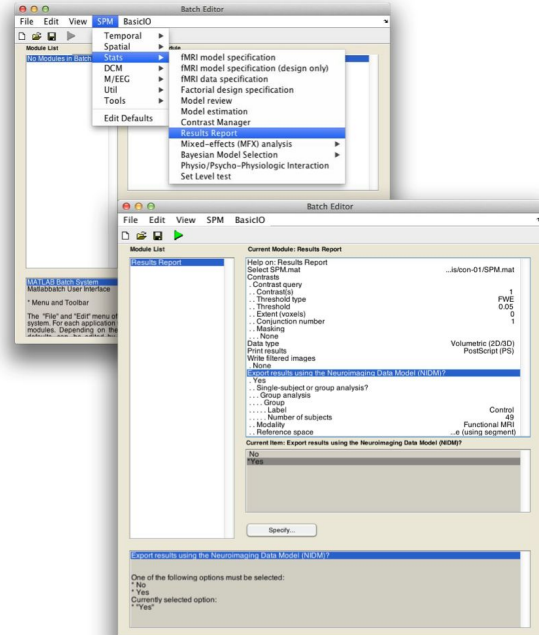
- ClusterLabels.nii.gz
- Contrast.nii.gz
- ContrastStandardError.nii.gz
- DesignMatrix.csv
- DesignMatrix.png
- ExcursionSet.nii.gz
- ExcursionSet.png
- GrandMean.nii.gz
- Mask.nii.gz
- nidm.json
- nidm.ttl
- ParameterEstimate_001.nii.gz
- ParameterEstimate_002.nii.gz
- ResidualMeanSquares.nii.gz
- SearchSpaceMask.nii.gz
- TStatistic.nii.gz
- ZStatistic.nii.gz

[Maumet et al.,
Sci. Data 2016]

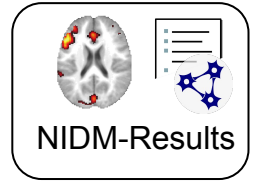


NIDM in SPM, FSL & NeuroVault

SPM



2. Publication on NeuroVault



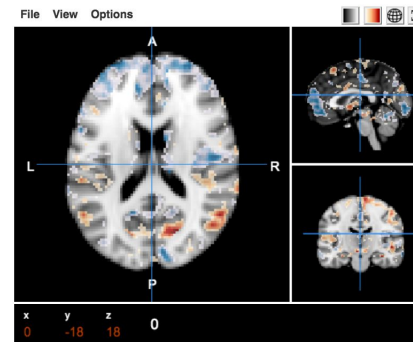
A Correspondence between Individual Differences in the Brain's Intrinsic Functional Architecture and the Content and Form of Self-Generated Thoughts

Contributed by ChrisFilioGorgolewski

Krzysztof J. Gorgolewski, Dan Lurie, Sebastian Urchs, Judy A. Kipping, R. Cameron Craddock, Michael P. Milham, Daniel S. Margulies, Jonathan Smallwood

[Link to the paper](#)

3D View



Images Details

Show 7 entries Search:

View	ID	Name	Type
	25	fALFF: Past	Z map
	26	fALFF: Future	Z map
	27	fALFF: Past > Future	Z map
	28	fALFF: Positive	Z map
	29	fALFF: Negative	T map
	30	fALFF: Positive > Negative	Z map
	31	fALFF: Social Cognition	Z map

Showing 1 to 7 of 30 entries First Previous Next Last

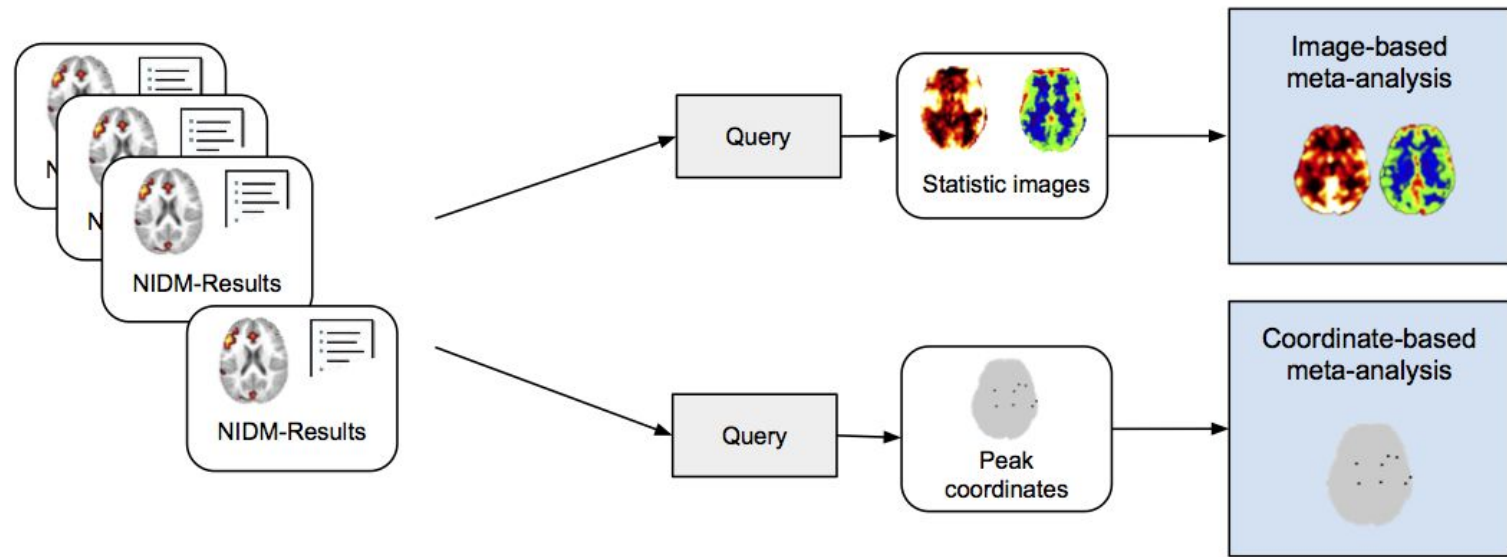
1. Export



```
$ nidmfsfsl fsl_ds107_group 49 -g Control
```

Data reuse

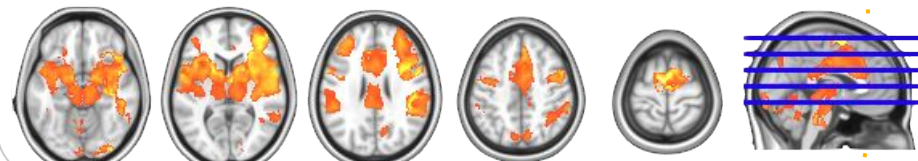
Meta-analysis with NIDM-Results



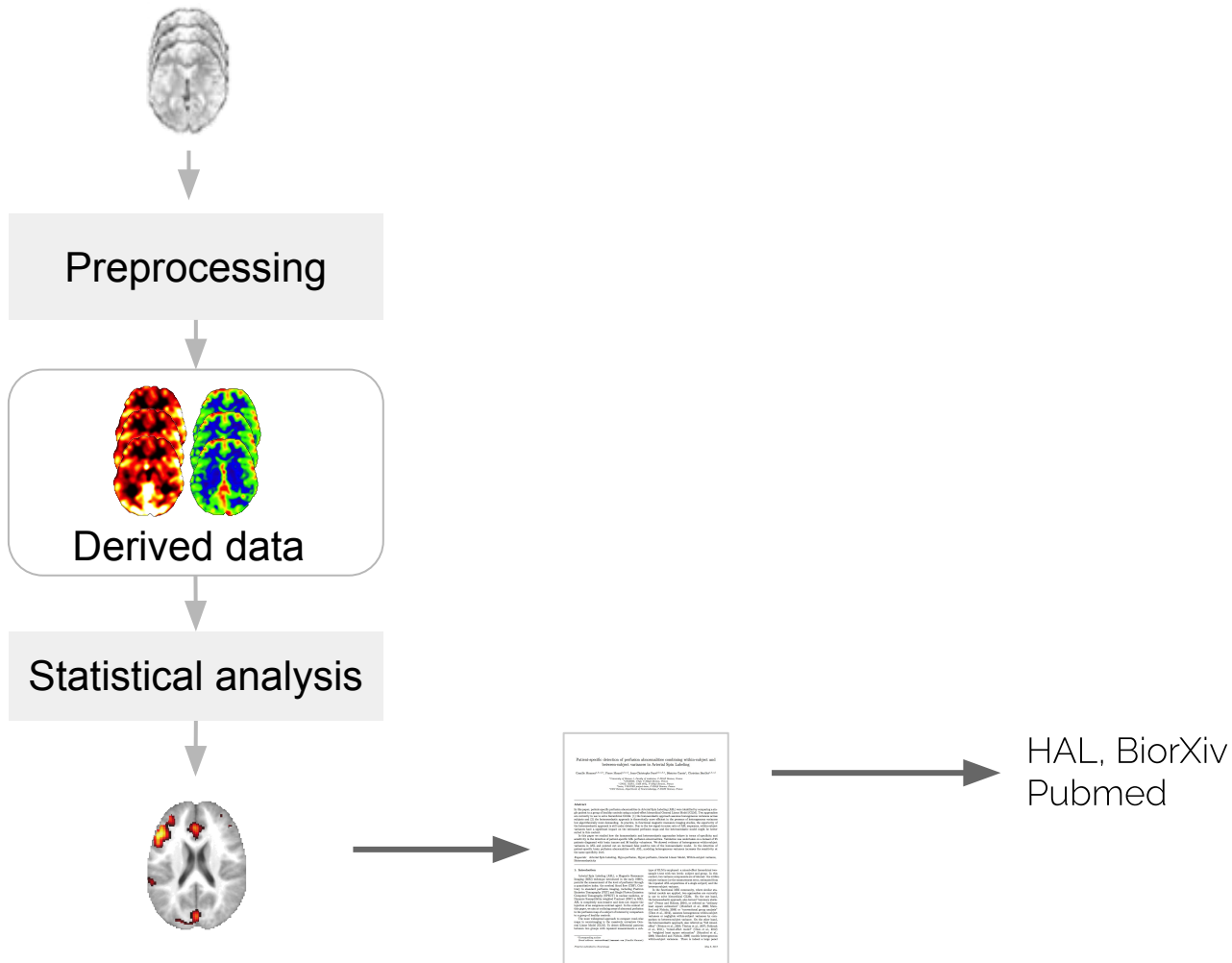
Coordinate-based meta-analysis



Image-based meta-analysis



Sharing research artefacts



Sharing research artefacts

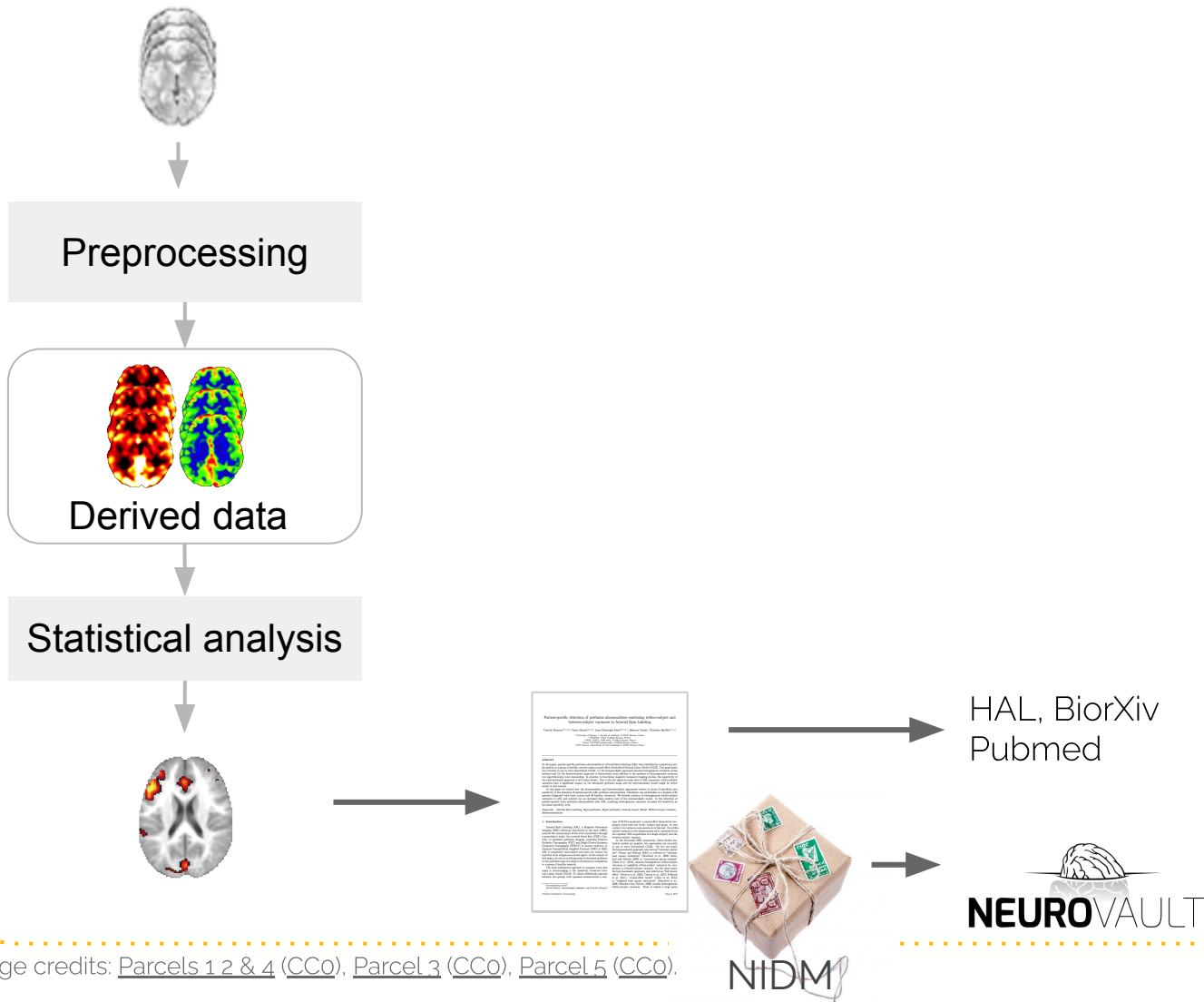


Image credits: [Parcels 1 2 & 4 \(CC0\)](#), [Parcel 3 \(CC0\)](#), [Parcel 5 \(CC0\)](#).

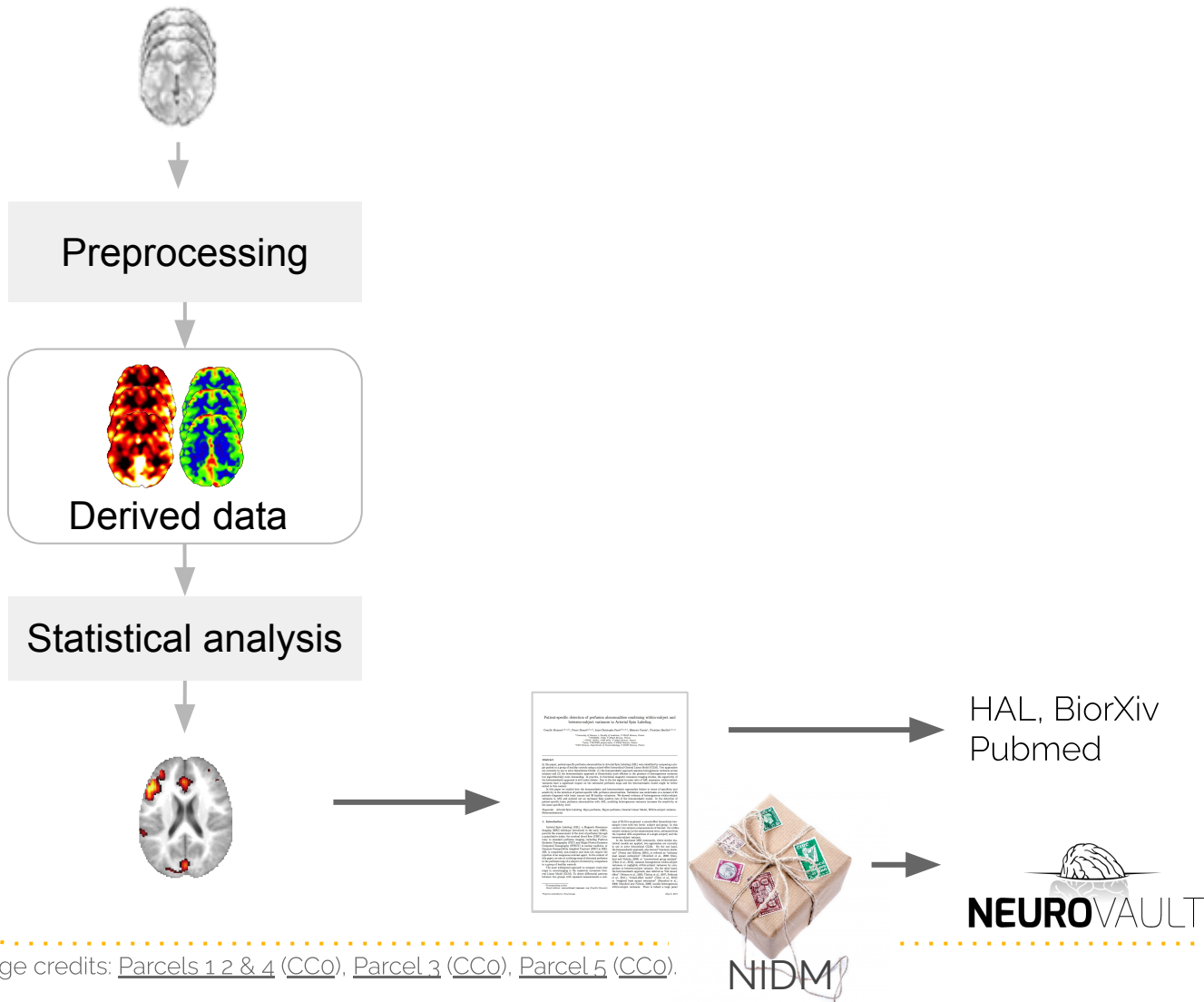
NIDM

Beyond papers...

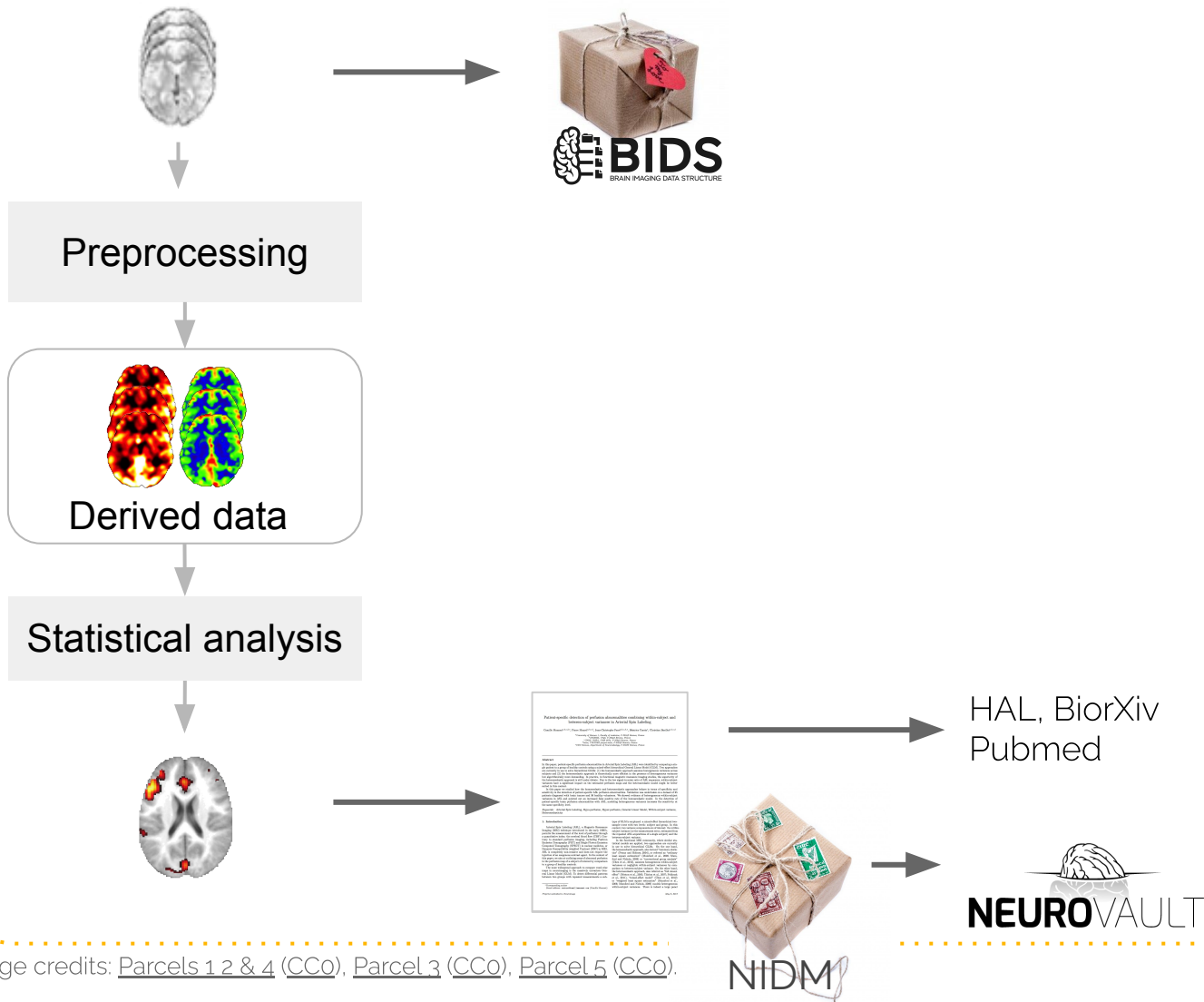
Sharing

neuroimaging data

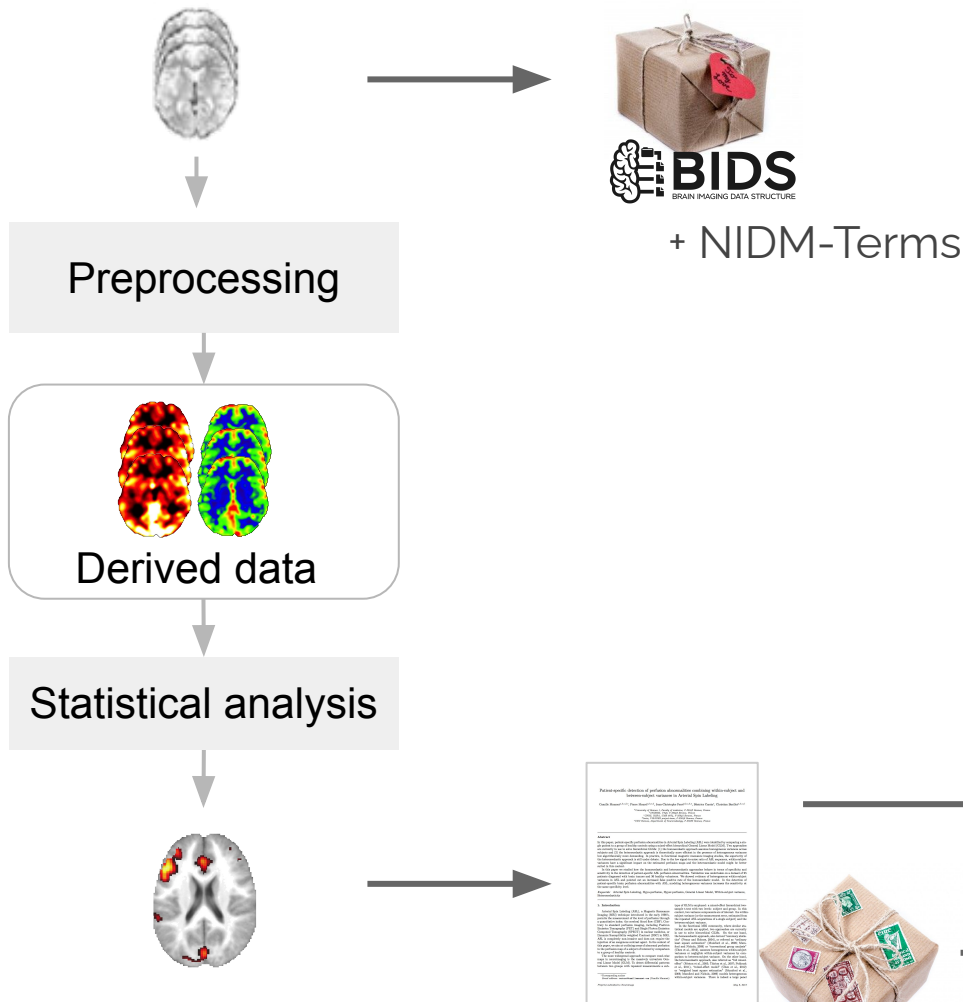
Sharing research artefacts



Sharing research artefacts



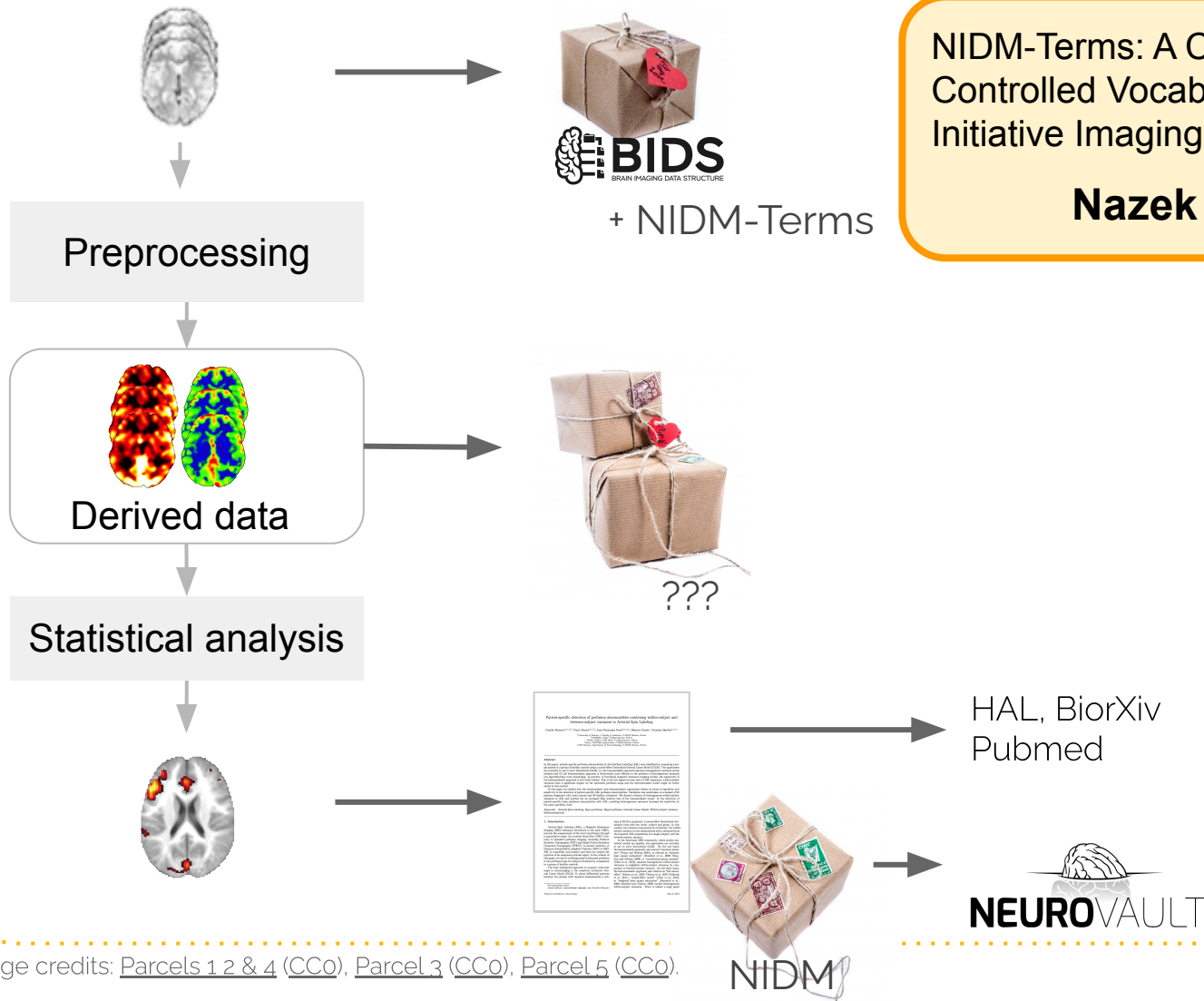
Sharing research artefacts



NIDM-Terms: A Community-Driven
Controlled Vocabulary of Brain
Initiative Imaging Experiments

Nazek Queder

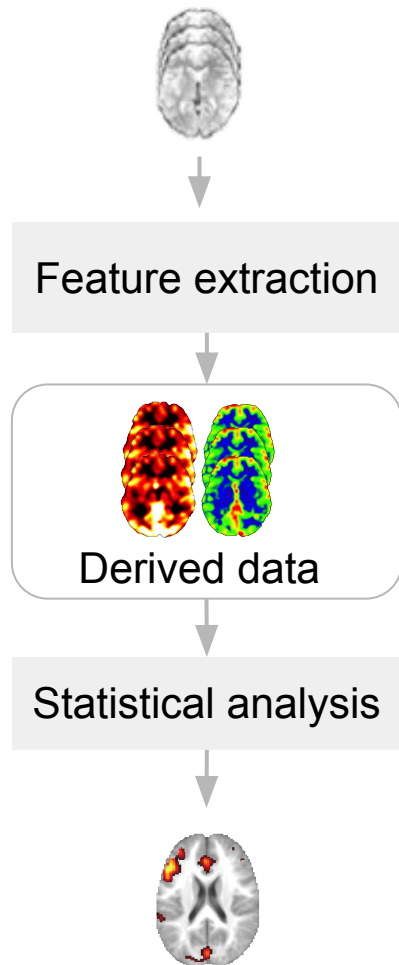
Sharing research artefacts



NIDM-Terms: A Community-Driven
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Nazek Queder

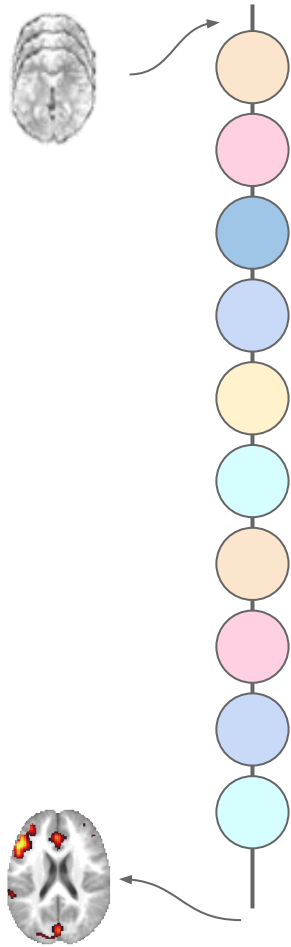
Analytic variability



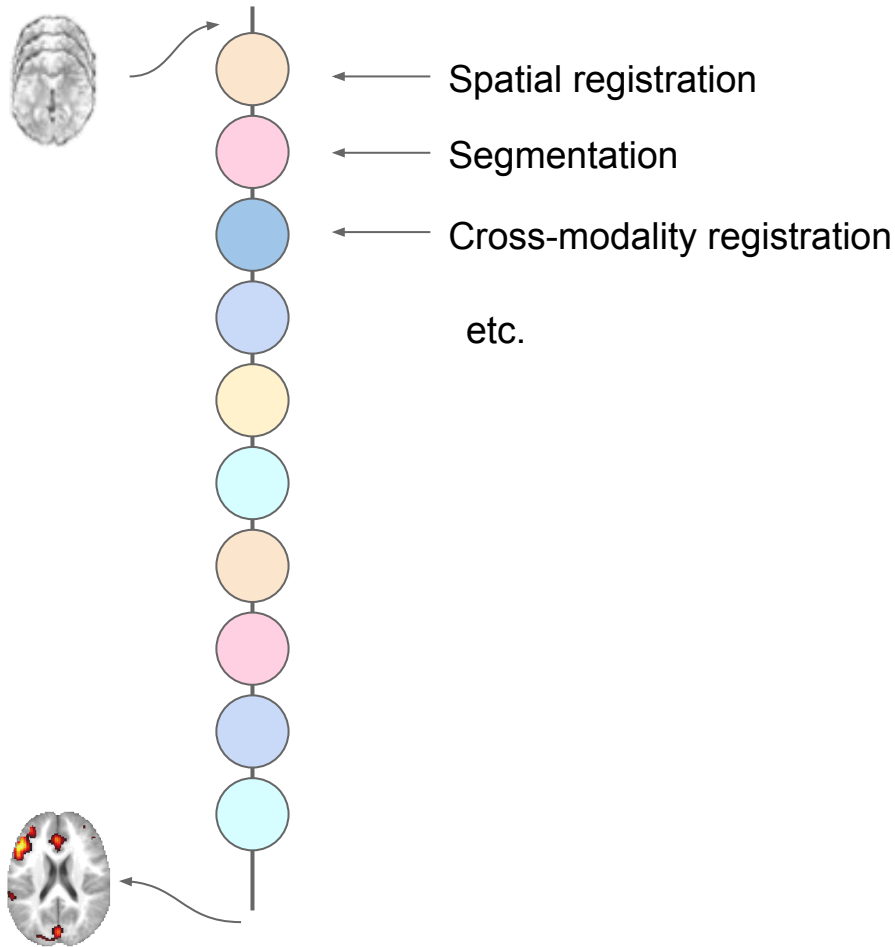
“Different **acceptable** analysis methods”

Carp et al. (2012)

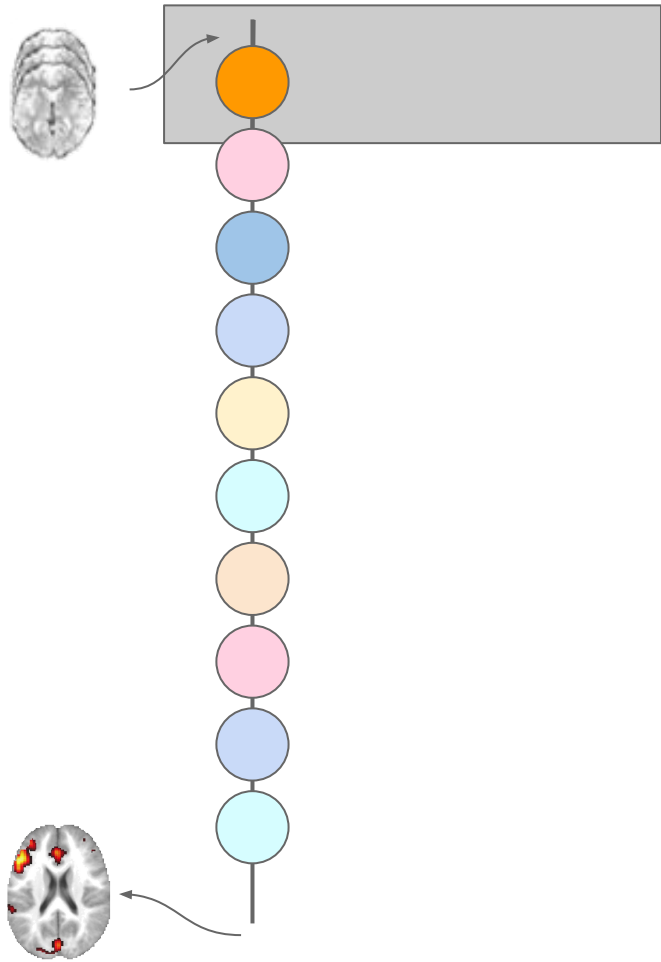
Analytic variability



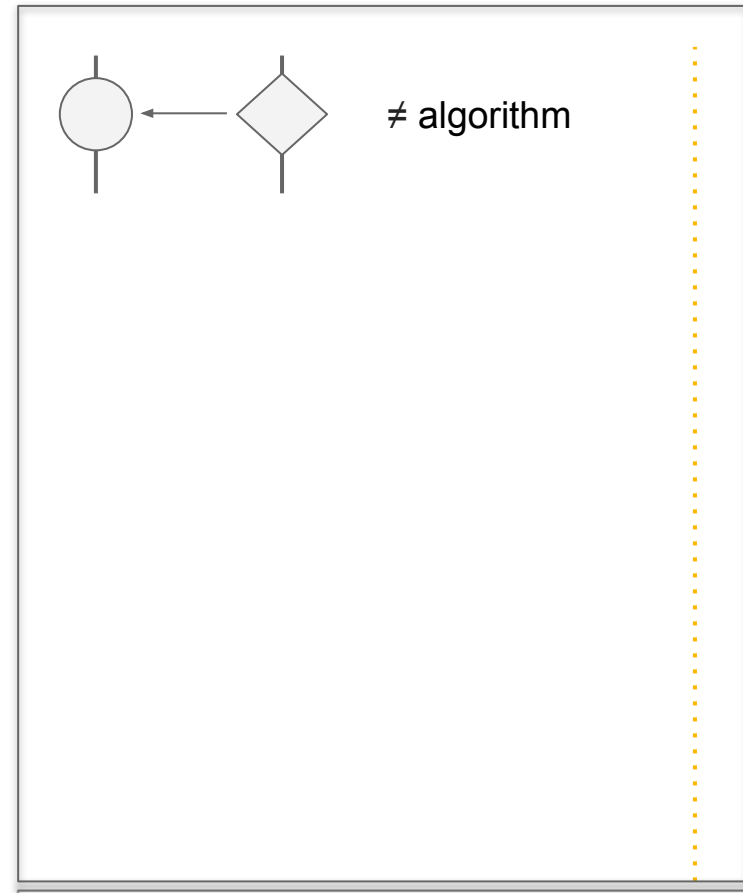
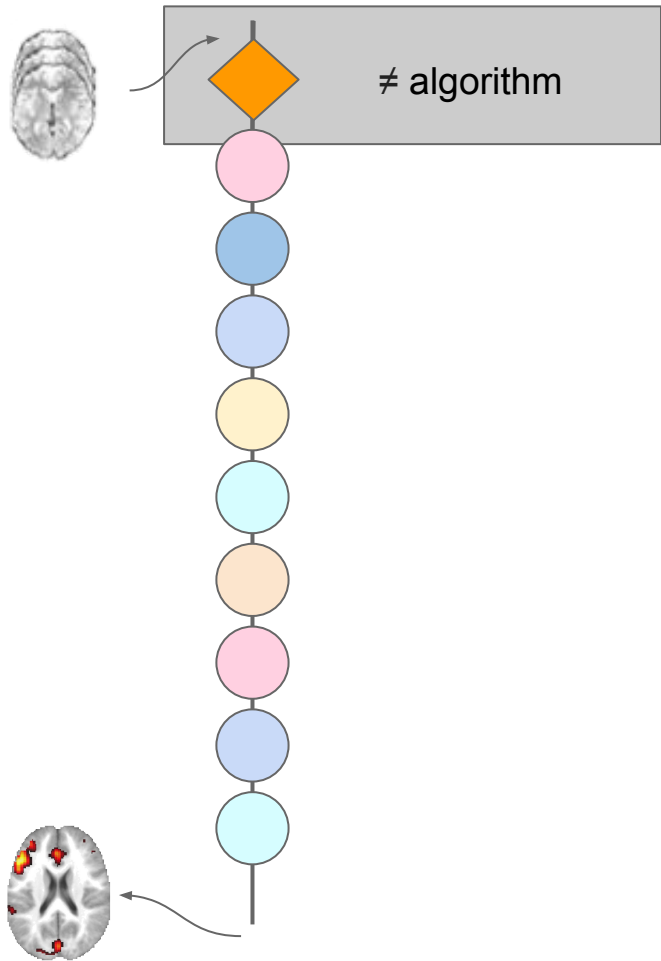
Analytic variability



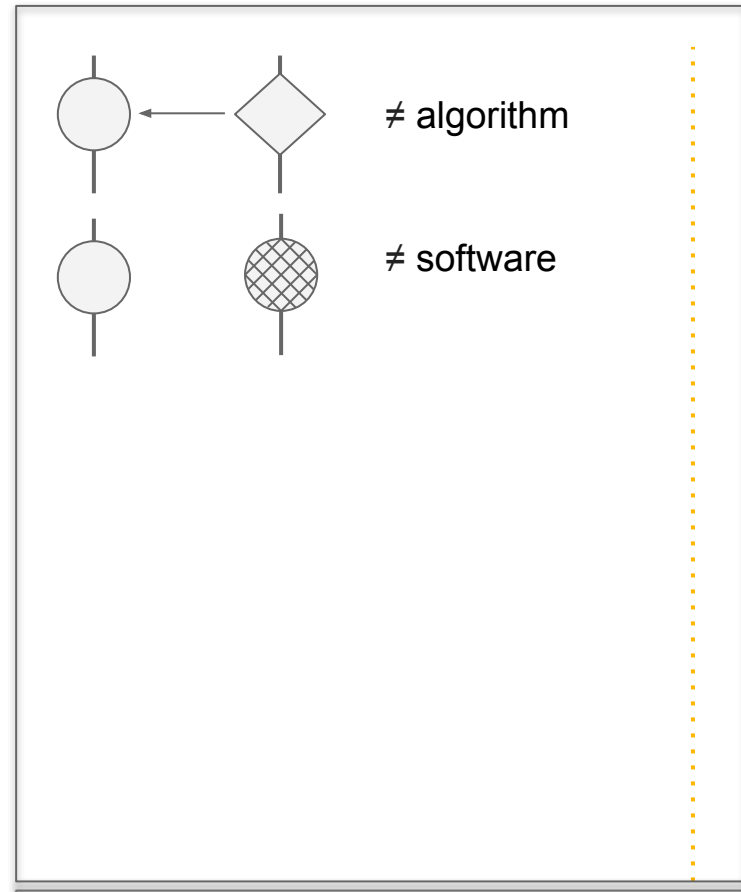
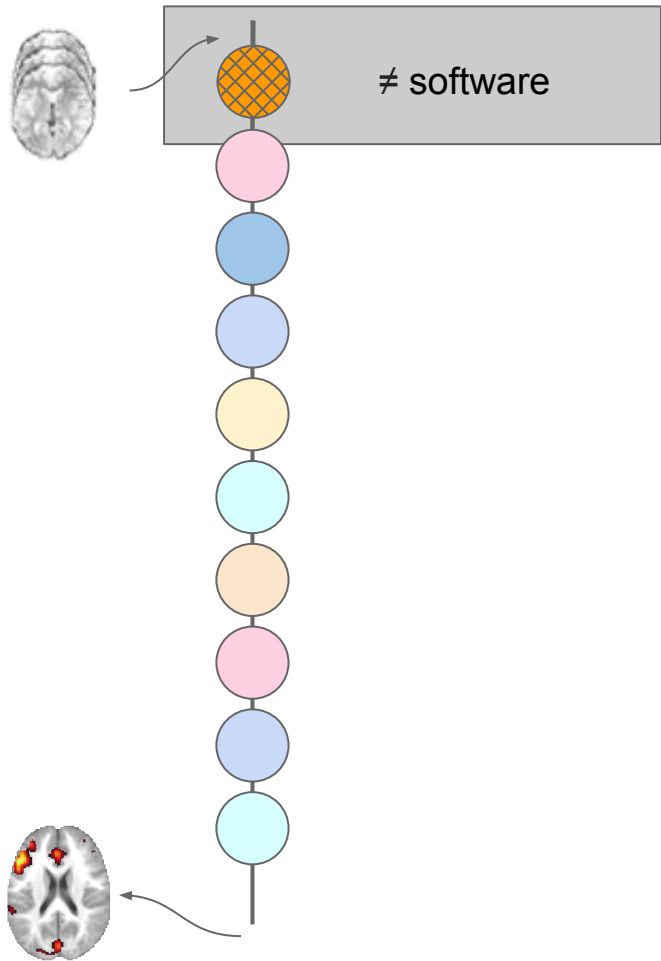
Analytic variability



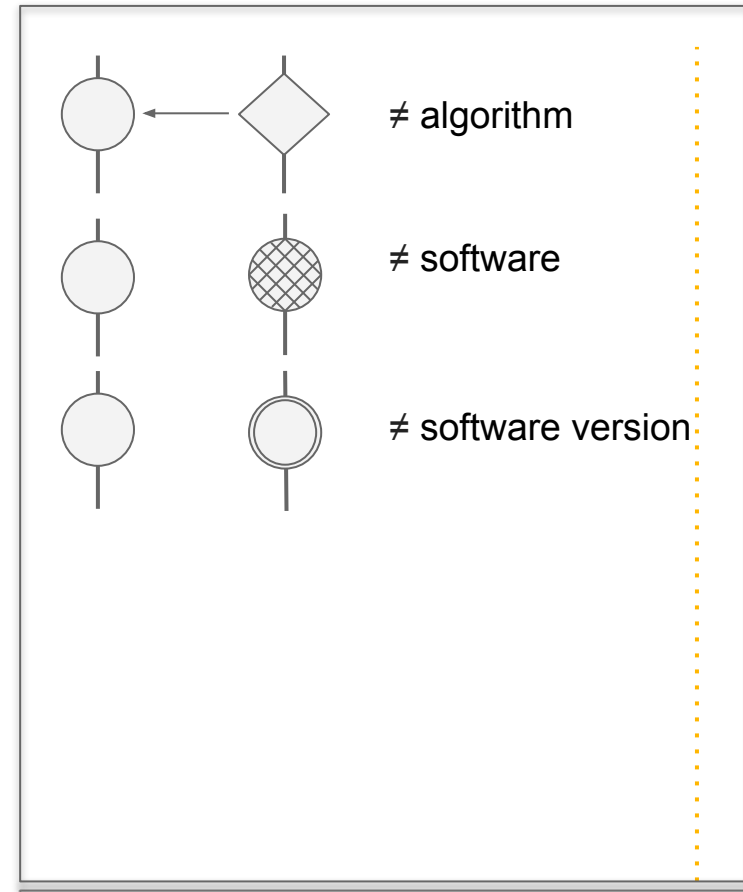
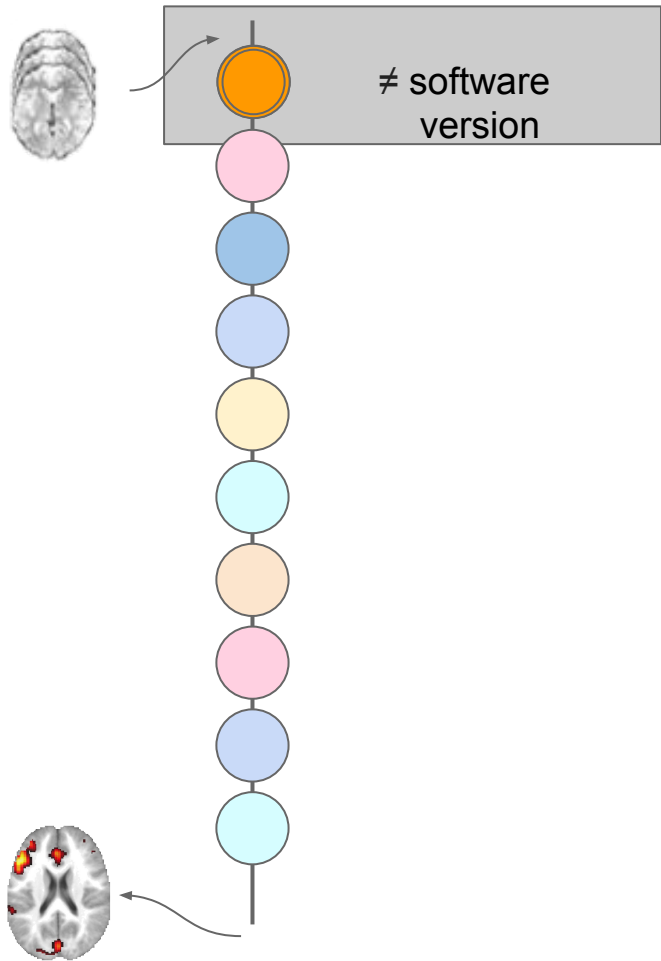
Analytic variability



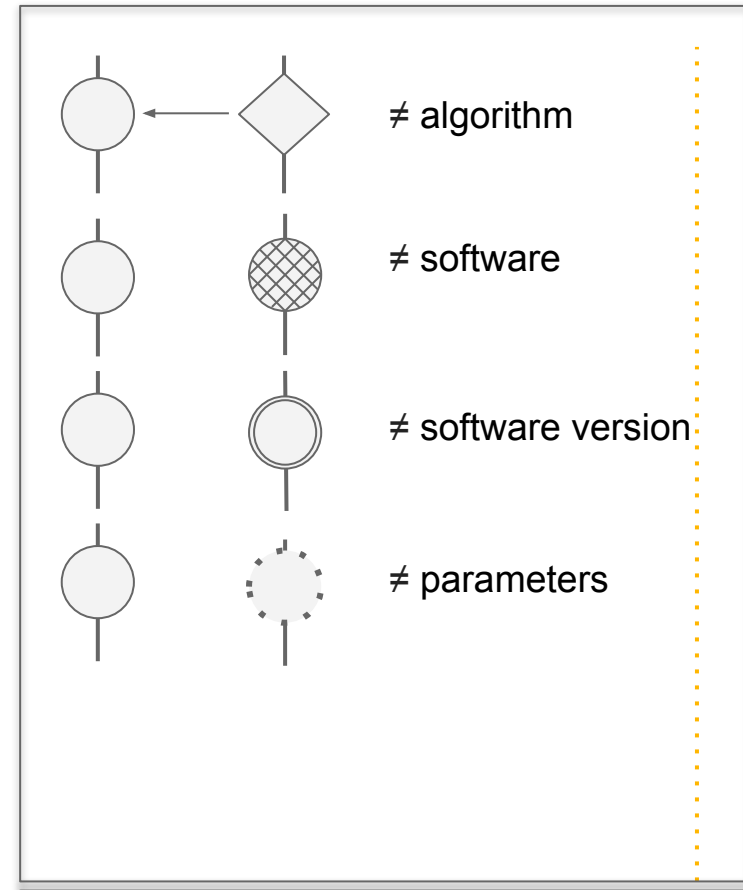
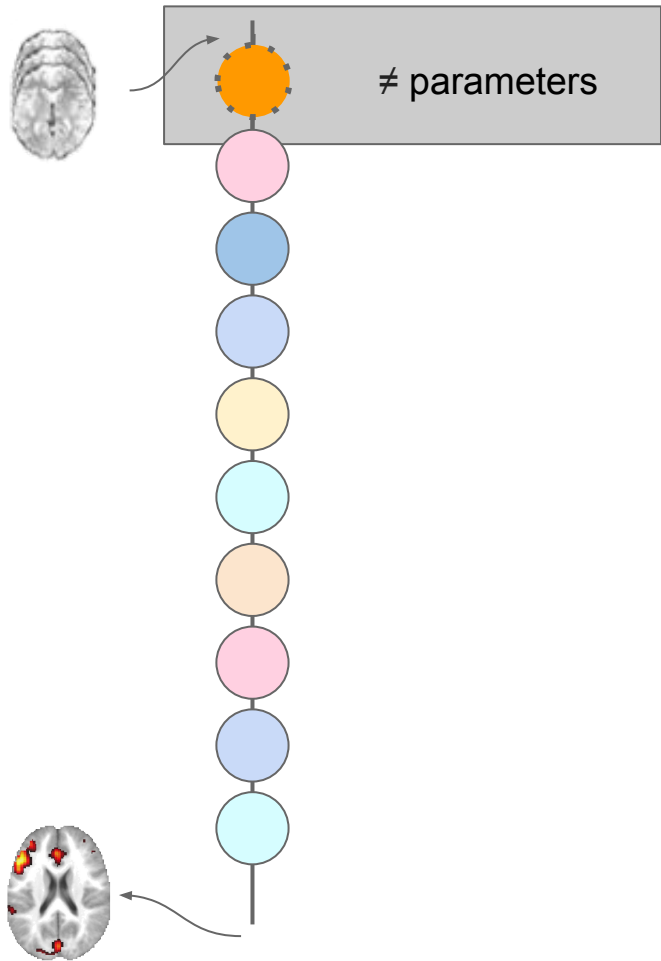
Analytic variability



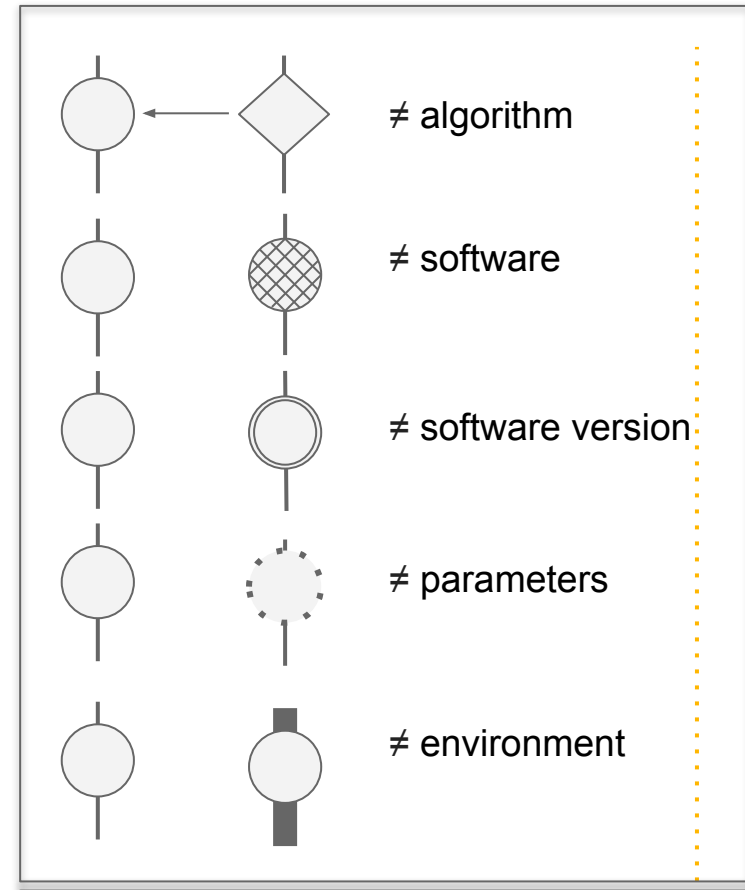
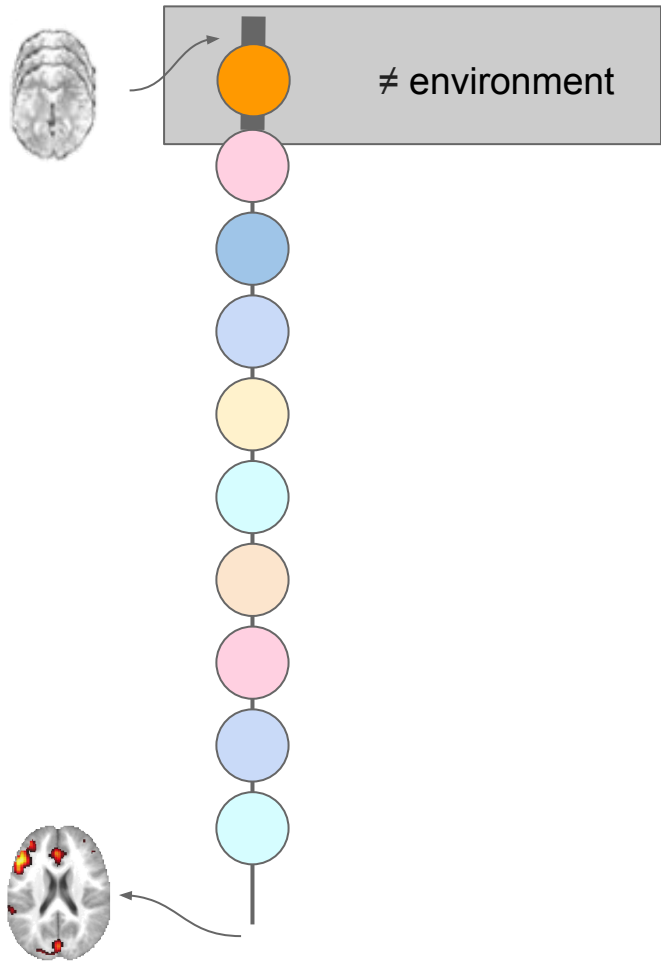
Analytic variability



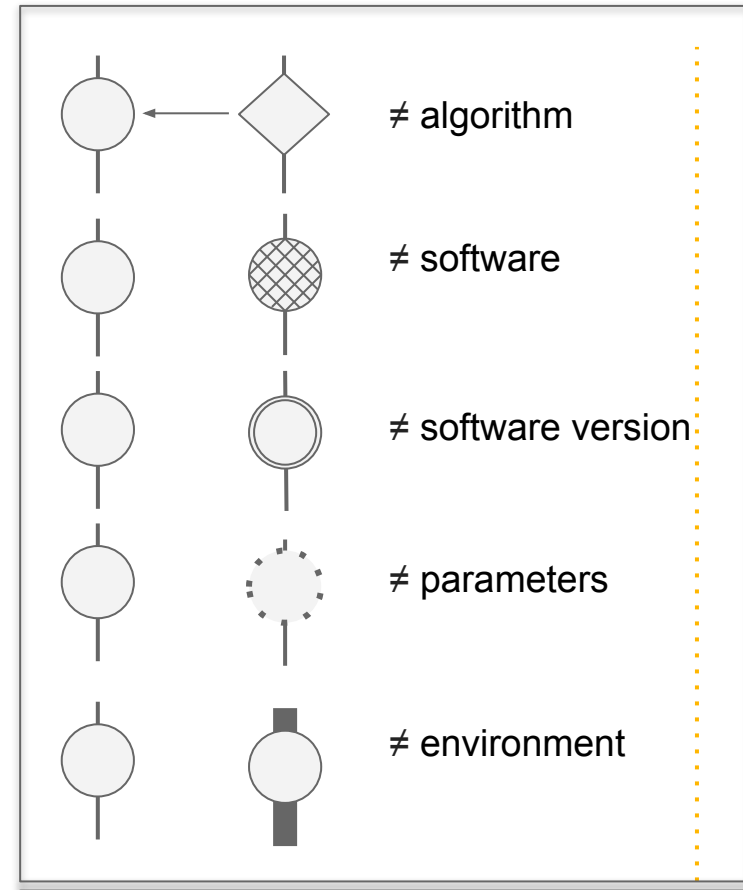
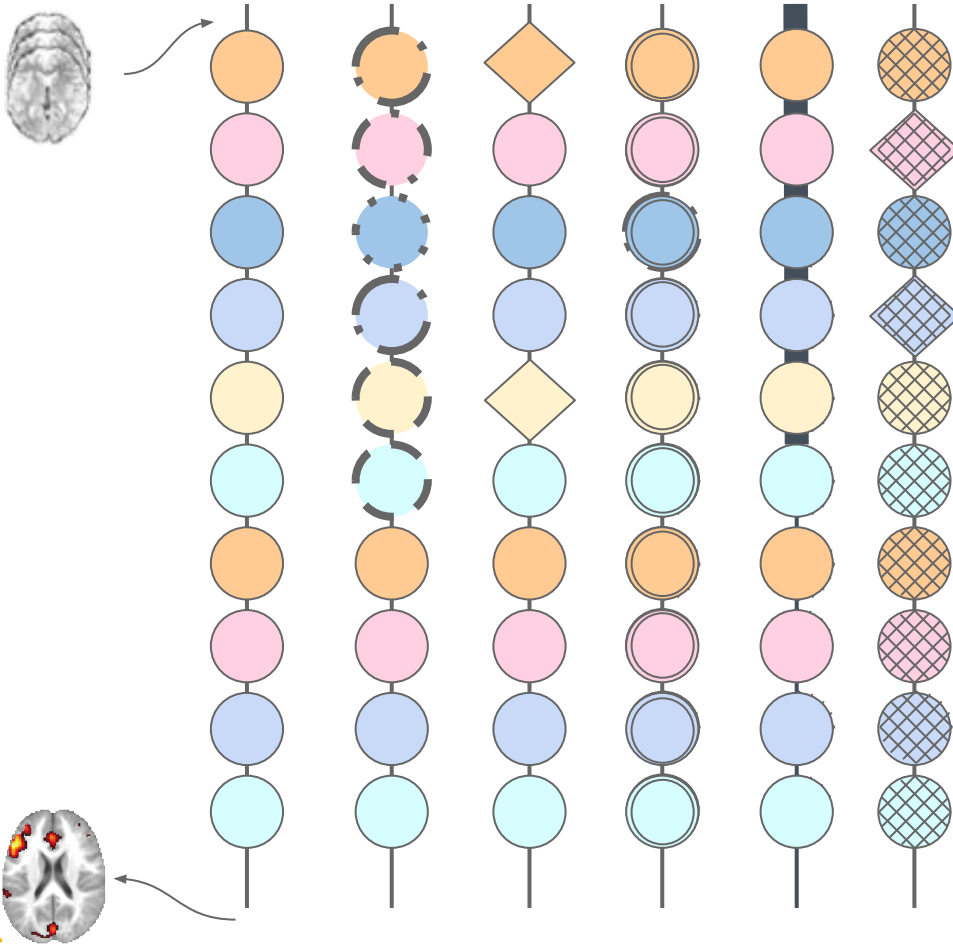
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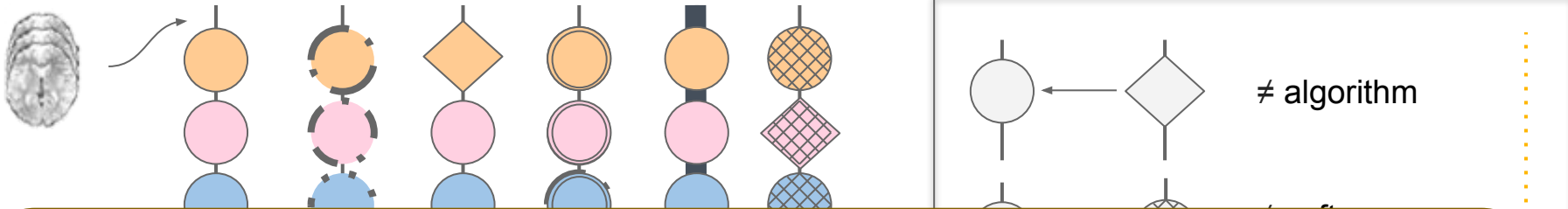
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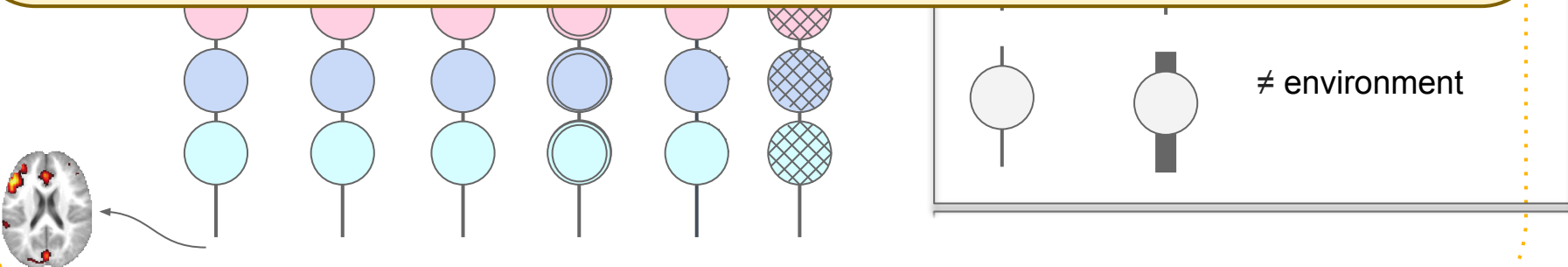
Analytic variability



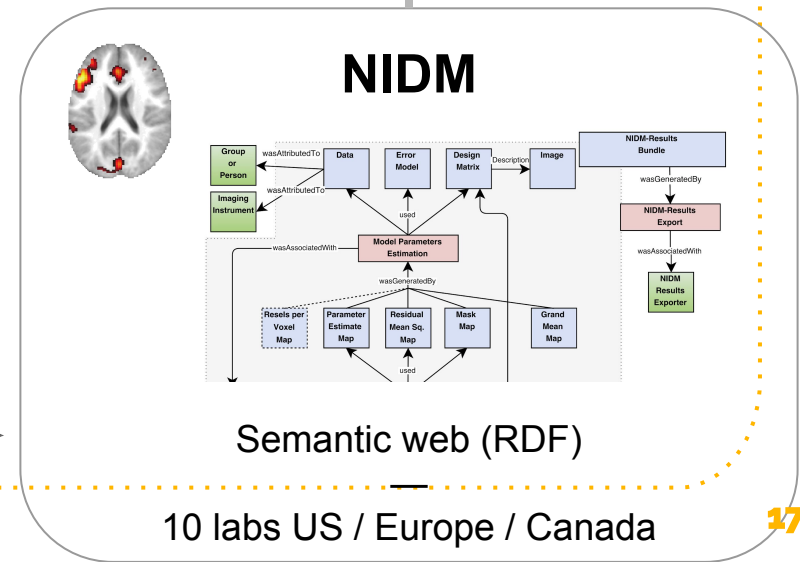
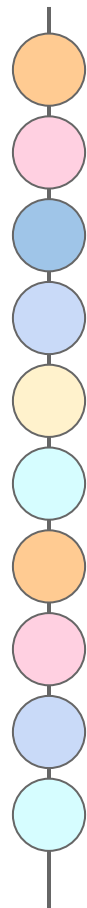
Analytic variability



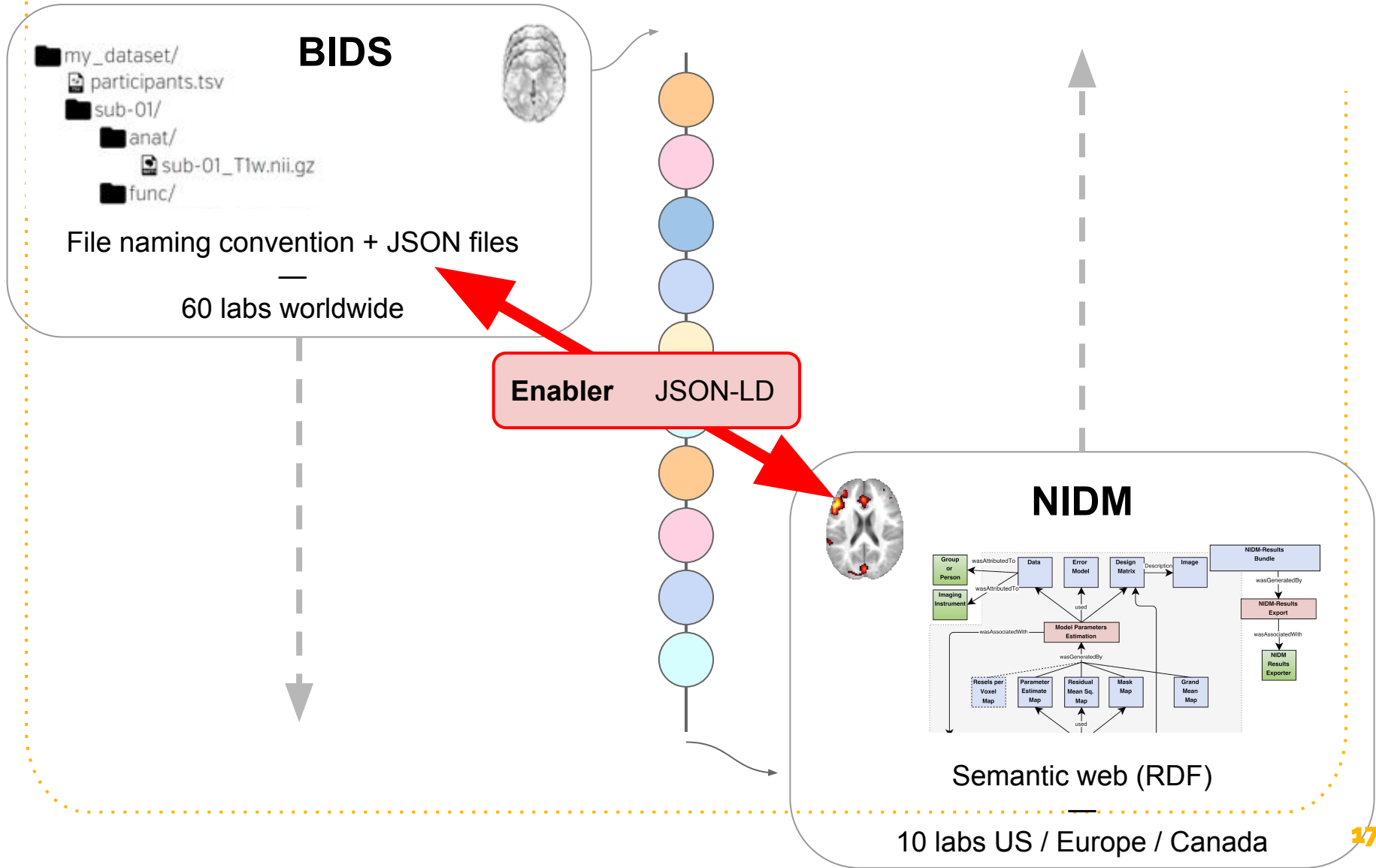
BIDS Prov: Representation of neuroimaging provenance (analysis workflows)



BIDS Prov **Bridging BIDS & NIDM**



BIDS Prov **Bridging BIDS & NIDM**



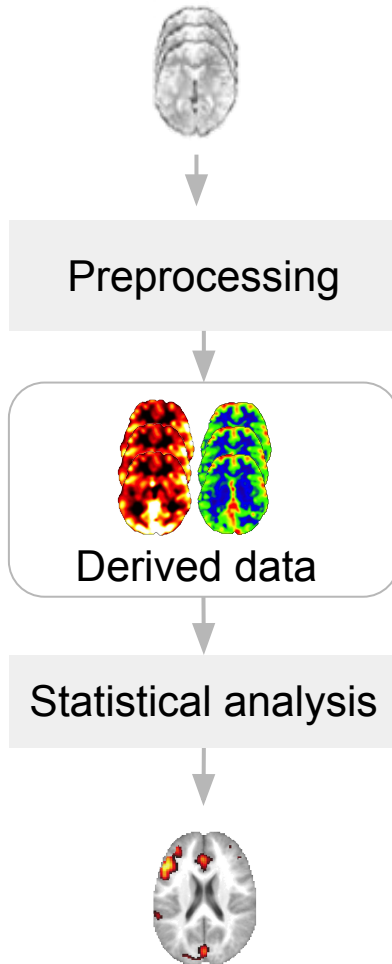
BIDS Provenance



Satra Ghosh



Rémi Adon



BEP028	Provenance	Satra Ghosh and Camille Maumet	new BEP, actively looking for contributors and community input.
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Looking for contributors and community input

Join us!

<https://github.com/bids-standard/BEP028> BIDSprov

Sharing more than research papers **for transparent & reusable research**

Camille Maumet

Thank you!

Join BIDS Prov - BEP028

➤ https://github.com/bids-standard/BEP028_BIDSprov