Prospective Harmonization

Thomas Nichols

OHBM Committee on Best practice in Data Analysis & Sharing (COBIDAS) History

- Created at OHBM 2014
  - Prompted by "OHBM Council Statement on Neuroimaging Research and Data Integrity"
- Charged with
  1. Identifying best practices of data analysis and data sharing in the brain mapping community
  2. Preparing a white paper organising and describing these practices
  3. Seeking input from the OHBM community
  4. Publishing these recommendations

COBIDAS Status

- Membership

Simon Eickhoff	Alan Evans	Michael Hanke	Nikos Kriegeskorte
Michale Milham	Russel Poldrack	Jean-Baptiste Poline	Erika Proal
Bertrand Thirion	David van Essen	Tonya White	BT Thomas Yeo
Thomas Nichols			

- Will not prescribe practice (mostly)
- Rather focus on what to report
  - To support open and reproducible research

COBIDAS Status

- fMRI
  - Task & rest
- Divisions of fMRI Practice
  - Experimental design reporting
  - Image acquisition reporting
  - Preprocessing reporting
  - Statistical modeling
  - Results reporting
  - Data sharing
  - Replication and reproducibility
- Produce white paper
  - To be commented on, and ultimately approved by OHBM members

COBIDAS Document Form

- For each division
  - Principals of open and reproducible research
  - When feasible, recommendations for practice
  - Detailed tabular listing of what to report

Best Practices in Data Analysis and Sharing in Neuroimaging using MRI

A report by
Committee on Best Practices in Data Analysis and Sharing (COBIDAS)
Organization for Human Brain Mapping (OHBM)
June X, 2015

A Draft For Consideration by The Membership of OHBM

0. Introduction

The Organization for Human Brain Mapping (OHBM) Committee on Best Practices in Data Analysis and Sharing (COBIDAS) was created by OBHM Council in June 2014 on the basis of the "OHBM Council Statement on Neuroimaging Research and Data Integrity" [link]. COBIDAS was charged with (i) identifying best practices of data analysis and data sharing in the brain mapping community, (ii) preparing a white paper organising and describing these practices, and (iii) seeking input from the OHBM community before ultimately (iv) publishing these recommendations. Dr. Nichols was named as chair and invited nominations from the OHBM membership in July 2015. From over 100 nominees Dr. Nichols selected a dozen experts from the membership that covered reflected the diversity of OHBM, with the final list approved by Council. The different constituencies considered included: Researchers focusing in cognitive applications, clinical applications, methods and database developers; different geographic areas; gender; representation of junior researchers; and, to facilitate communication within OHBM leadership, at least one member from Council and one member from the OHBM Program Committee. The panel of 13 members (including chair) met on a regular basis from October 2014 through May 2015, releasing a draft of this document to the full OHBM membership for comment in June 2015. After a comment period, during which input was solicited from members, a revised document was created and distributed to the membership for an up/down vote. In July XX 2015, an e-ballot was held which approved the document with a simple majority vote. It should be noted that while best practice white papers like this are not uncommon (see, e.g., [Alsop2014,Kanal2013,Gilmore2013]), they are generally authored by and represent the consensus of a small committee or at most a special-interest section of a larger professional body. Hence we are excited to present this work with the explicit consent of a plurality of the OHBM membership.

Experimental Design Reporting

Aspect	**Notes**	**R = Required r = Recommended**
Number of subjects	Elaborate each by group if have more than one group.	
Subjects approached		r
Subjects consented		r
Subjects refused to participate	Provide reasons.	r
Subjects excluded	If any; provide reasons.	R
Subjects participated	Final number of subjects included in the statistical analysis, specifying if that number varies between different anlayses.	R
Inclusion Criteria and Descriptive Statistics	Elaborate each by group if have more than one group.	
Age	Mean, standard deviation and range.	R
Gender	Absolute or relative frequencies	R
Race & Ethnicity	Per guidelines of NIH or other relevant agency	R
SES, Education	Specify measurement instrument used; may be parental SES and education if study has minors.	r

Example: Experimental Design Reporting

Aspect	Notes	R = Required r = Recommended
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Age	Mean, standard deviation and range.	R
Gender	Absolute or relative frequencies	R
Race & Ethnicity	Per guidelines of NIH or other relevant agency	R
SES, Education	Specify measurement instrument used; may be parental SES and education if study has minors.	r
IQ	Specify measurement instrument used.	r
Handedness	Absolute or relative frequencies; basis of handedness-attribution (self-report, EHI, other tests)	R
Exclusion criteria	Describe any screening criteria, including those applied to “normal” sample such as MRI exclusion criteria.	R

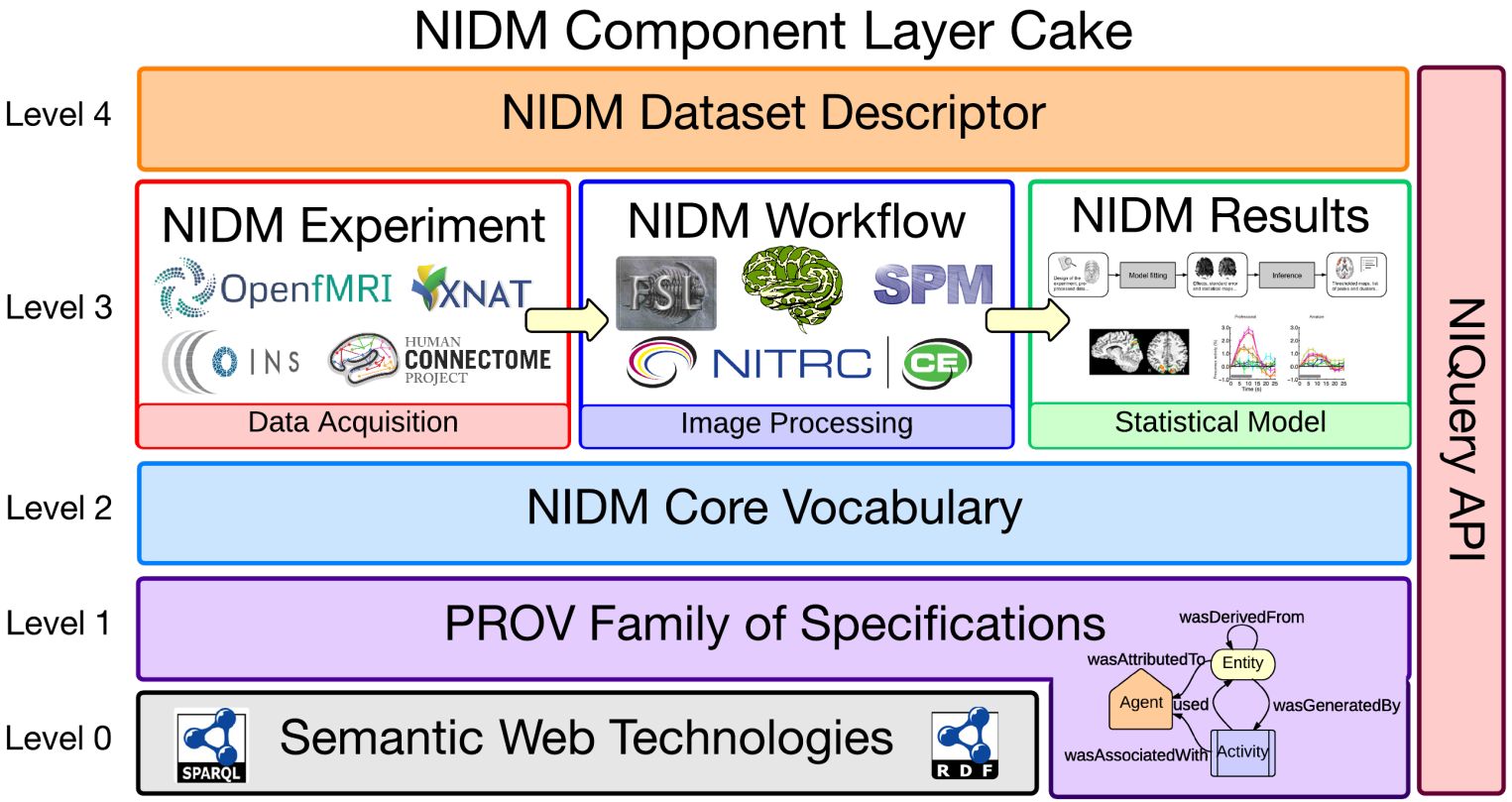
subject to change

COBIAS Status

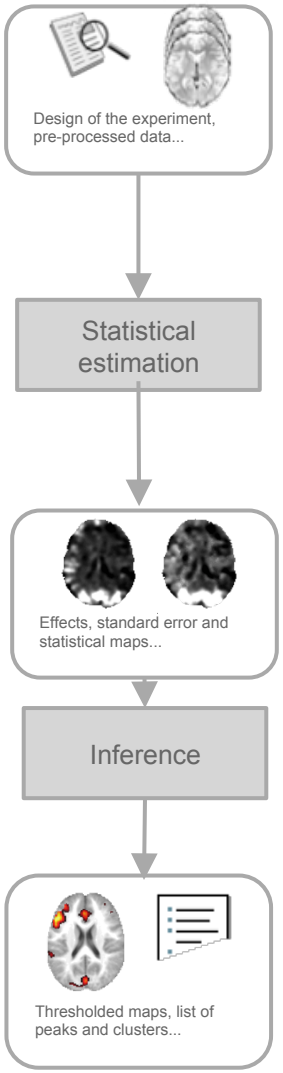
- Now
  - Manuscript finalized, approved by Council
- Mid July
  - Manuscript posted on OHBM website
  - Open for comment for 30 days
- August
  - Member comments integrated
  - Final, approved by Council
- Sept
  - Finalized manuscript posted for up/down vote
  - Upon approval, submission for publication

INCF's Neuroimaging Data Model (NIDM)

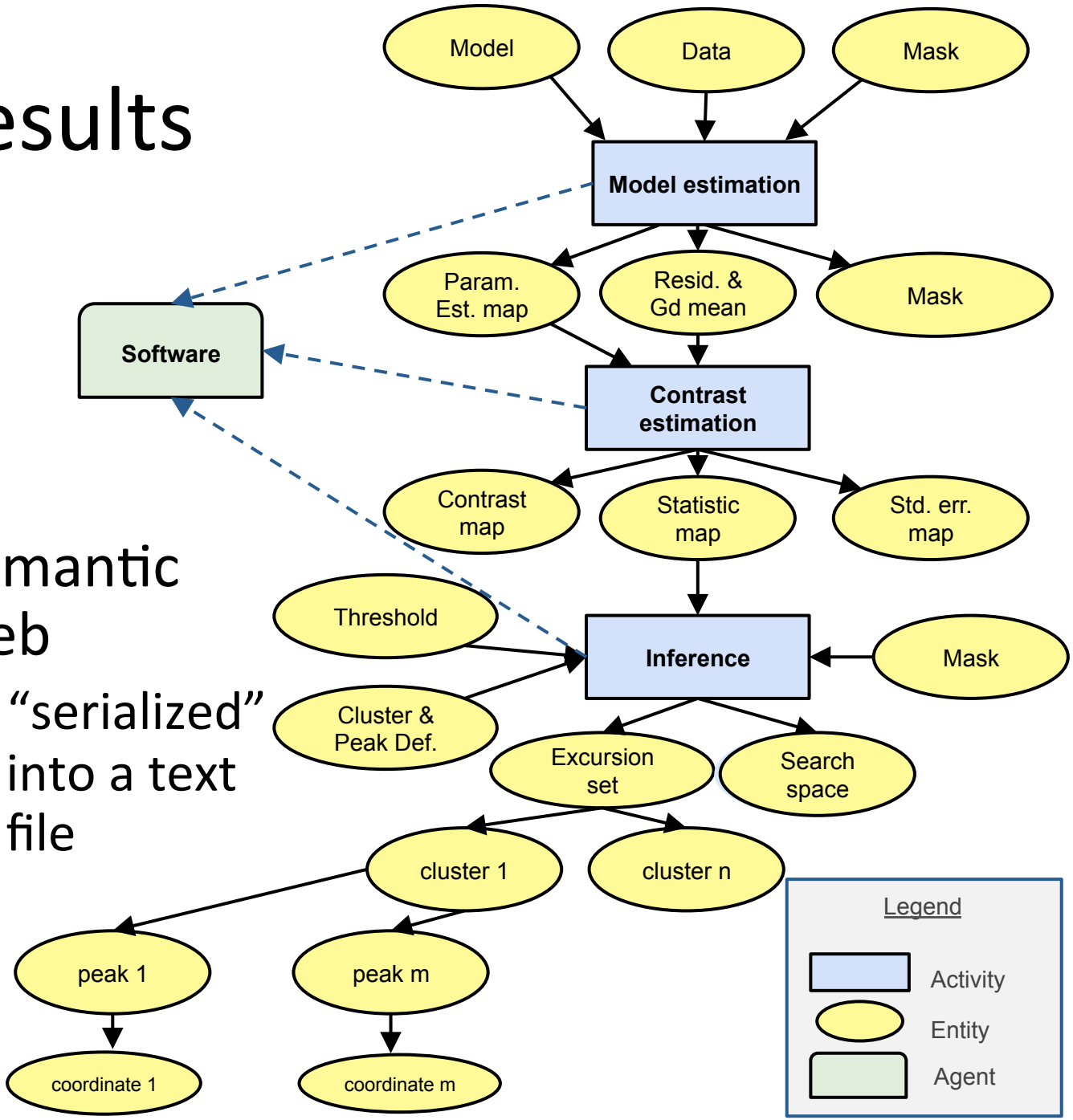
- Collaborative effort to represent all aspects of neuroimaging experiments, data collection & analysis in machine-readable form



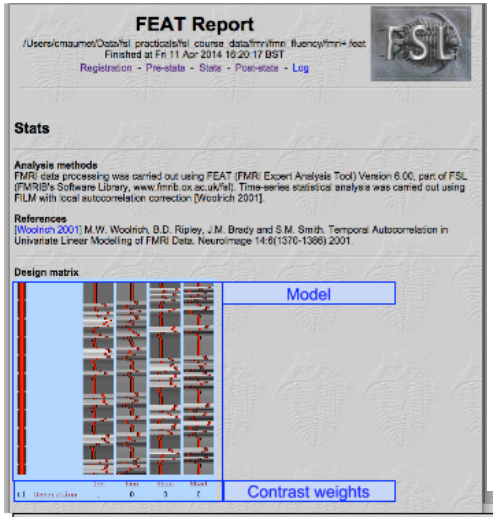
NIDM Results

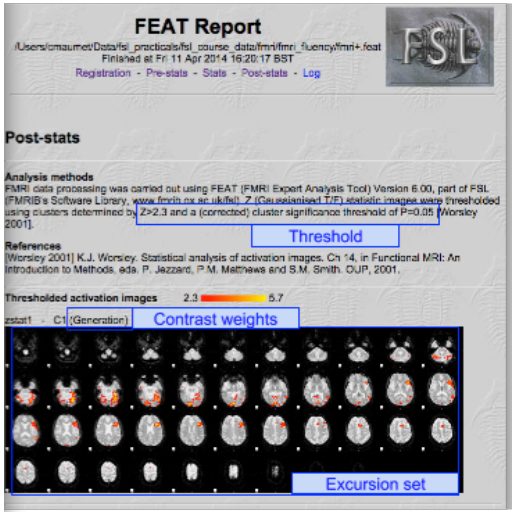


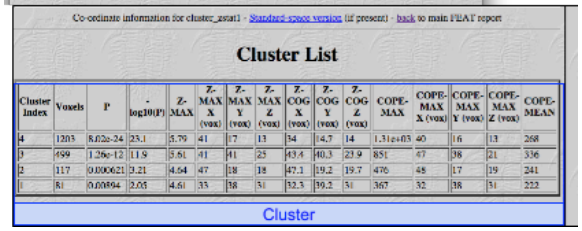
- Semantic web
  - "serialized" into a text file

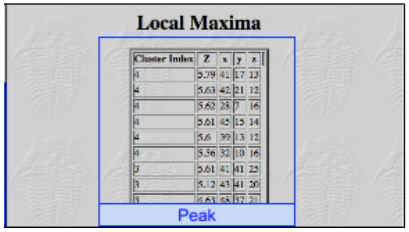


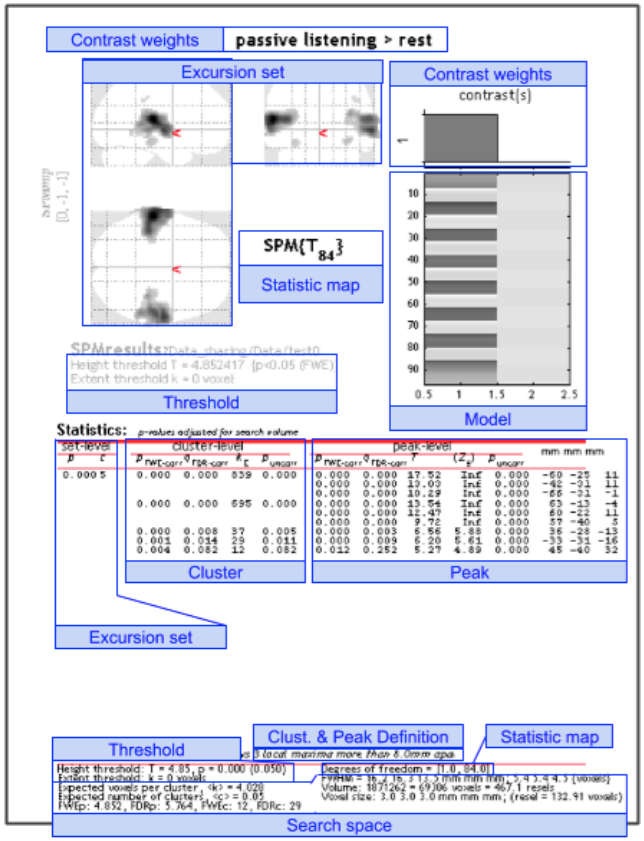
Common Format for all software

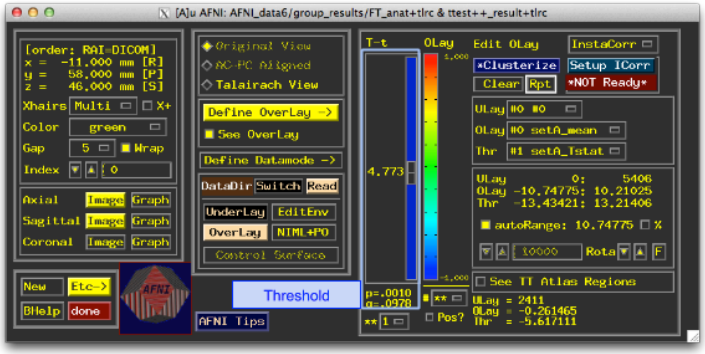


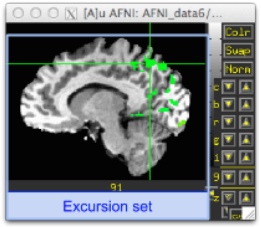


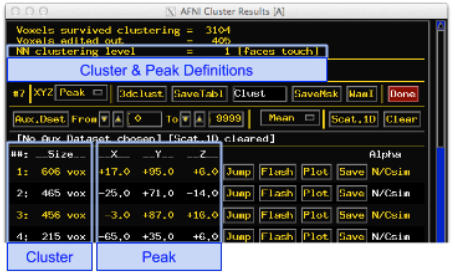








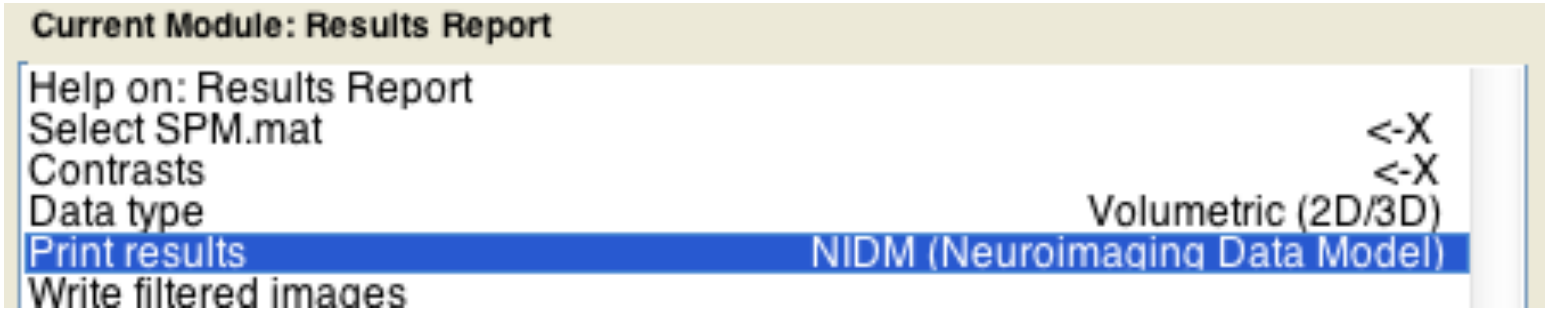




NIDM Exporters

- SPM12 done!

  SPM 12 batch system: SPM ➔ Stats ➔ Results report



  - SPM8 extension underway
- FSL – in beta testing
- AFNI
  - In planning stage