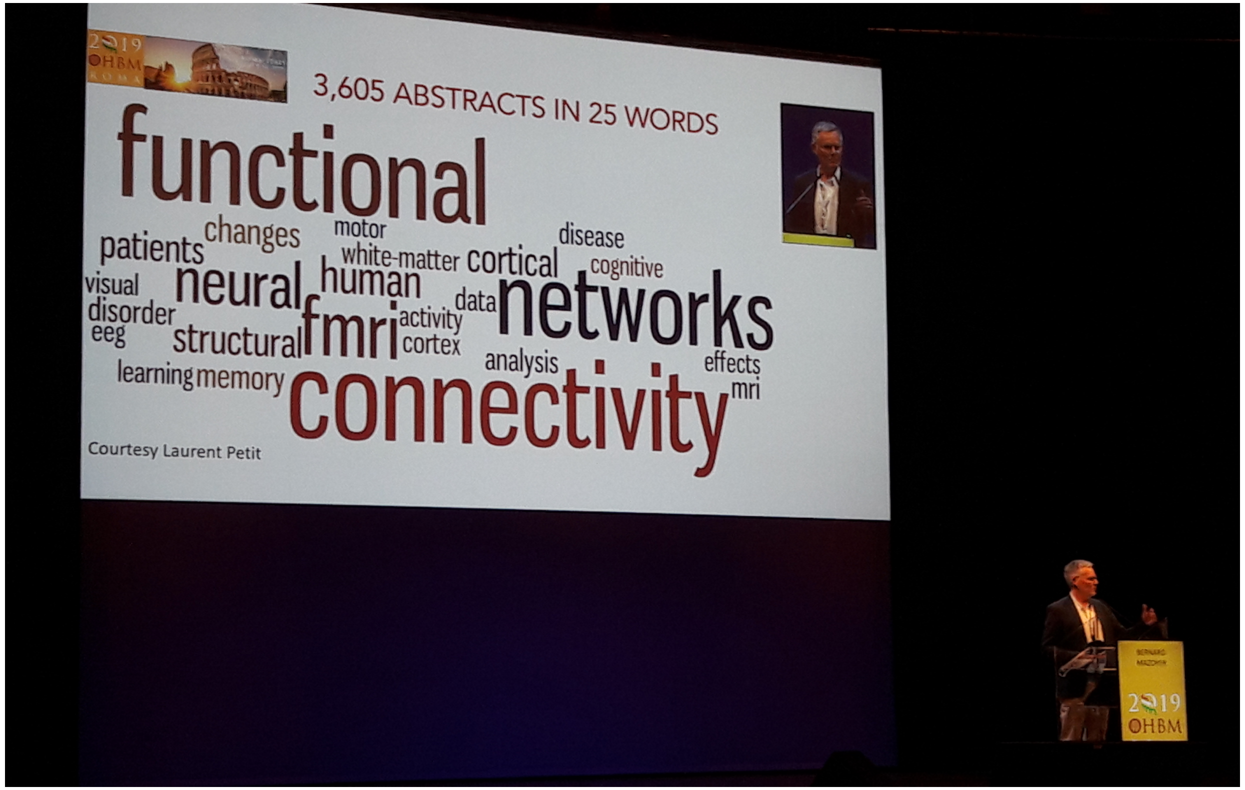

2019 OHBM ROMA
ABSTRACTS PER CATEGORY
Physiology, Metabolism and Neurotransmission
Genetics
Motor Behavior
Informatics
Social Neuroscience
Emotion and Motivation
Language
Learning and Memory
Brain Stimulation Methods
Neuroanatomy
Higher Cognitive Functions
Lifespan Development
Perception and Attention
Imaging Methods
Disorders of the Nervous System
Modeling and Analysis Methods
0 100 200 300 400 500 600 700 800
METHODS 1950 (50%)
COGNITION 900 (25%)
DISORDERS 750 (20%)

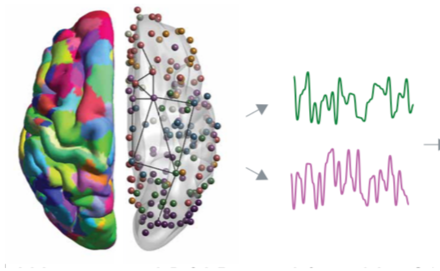
1996

2019



Mazoyer

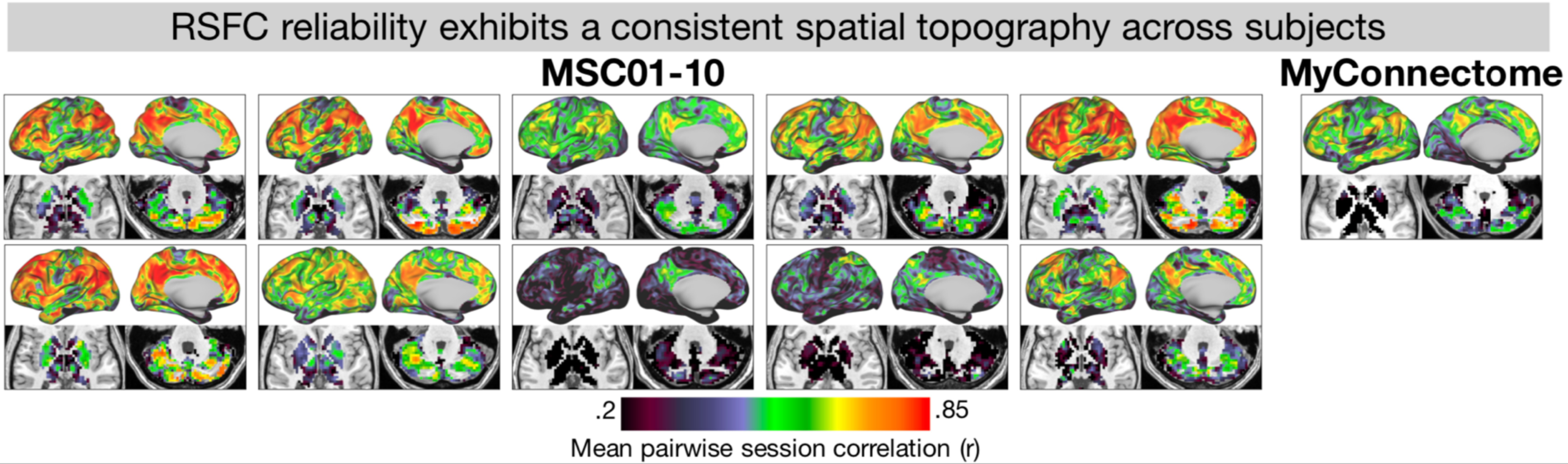
A few reflections on resting-state data



- Reliability across and within individuals
  - Population neuroscience : e.g. Biobank; PNC; ABCD
  - Precision neuroscience : Midnight scanning club & MyConnectom

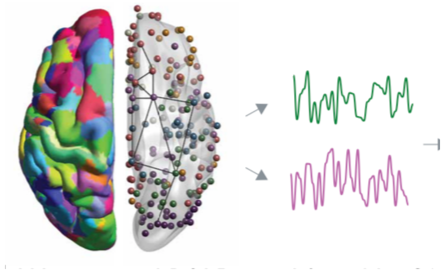
=> Necessitates a certain amount of “good data” (17 min)

⇒ Region dependent



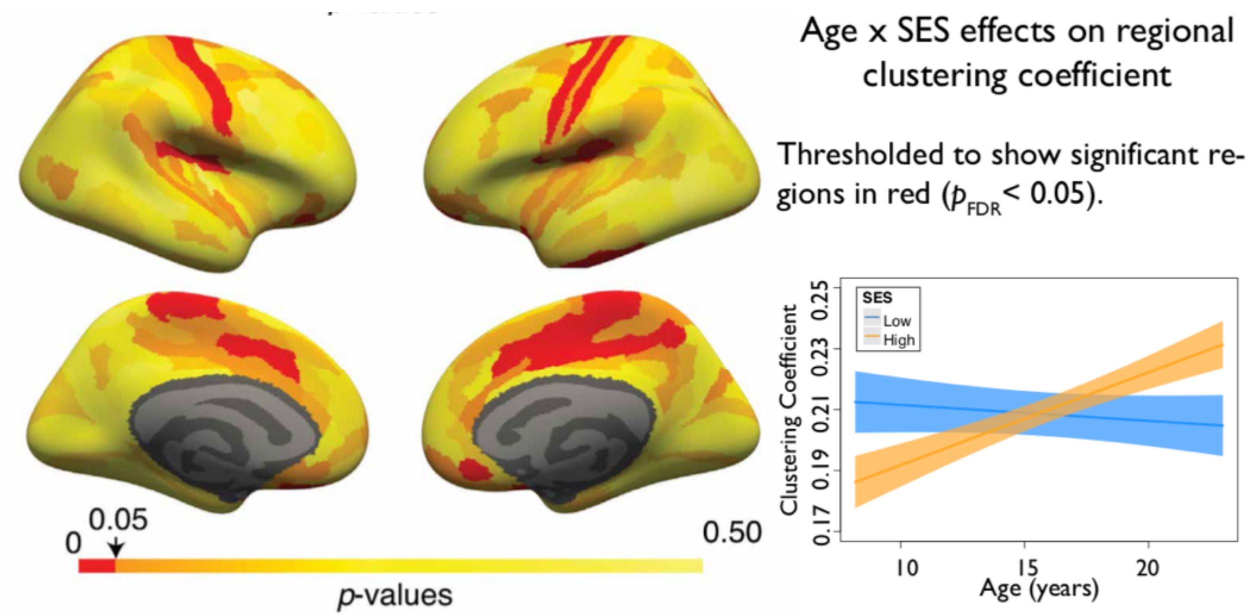
Dosenbach talk (New Approaches for probing neurobehavioural basis of development; Gordon poster T613

A few reflections on resting-state data



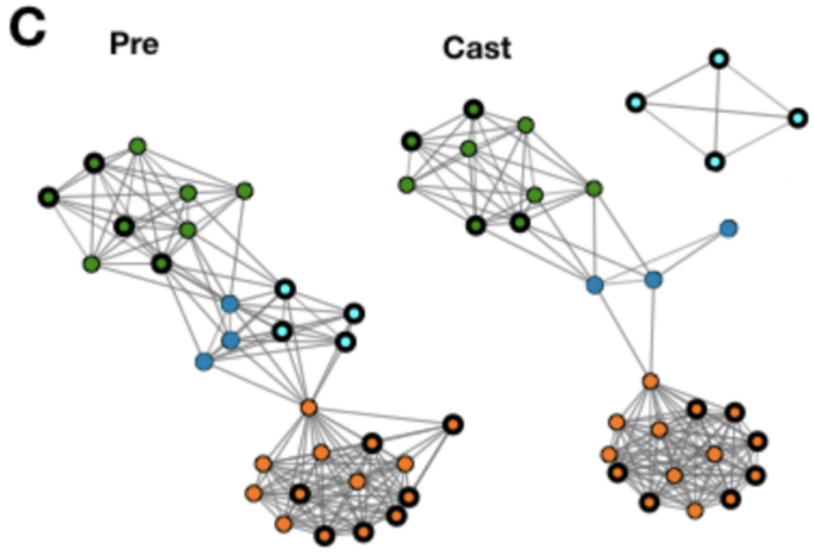
- Marker of experience dependent plasticity

Stronger age effect in High SES youth



Daniele Bassett, Keynote; Ursula Tooley, Lifespan Development; session; poster T454

Change in M1 rsFC after 2 weeks of wearing cast

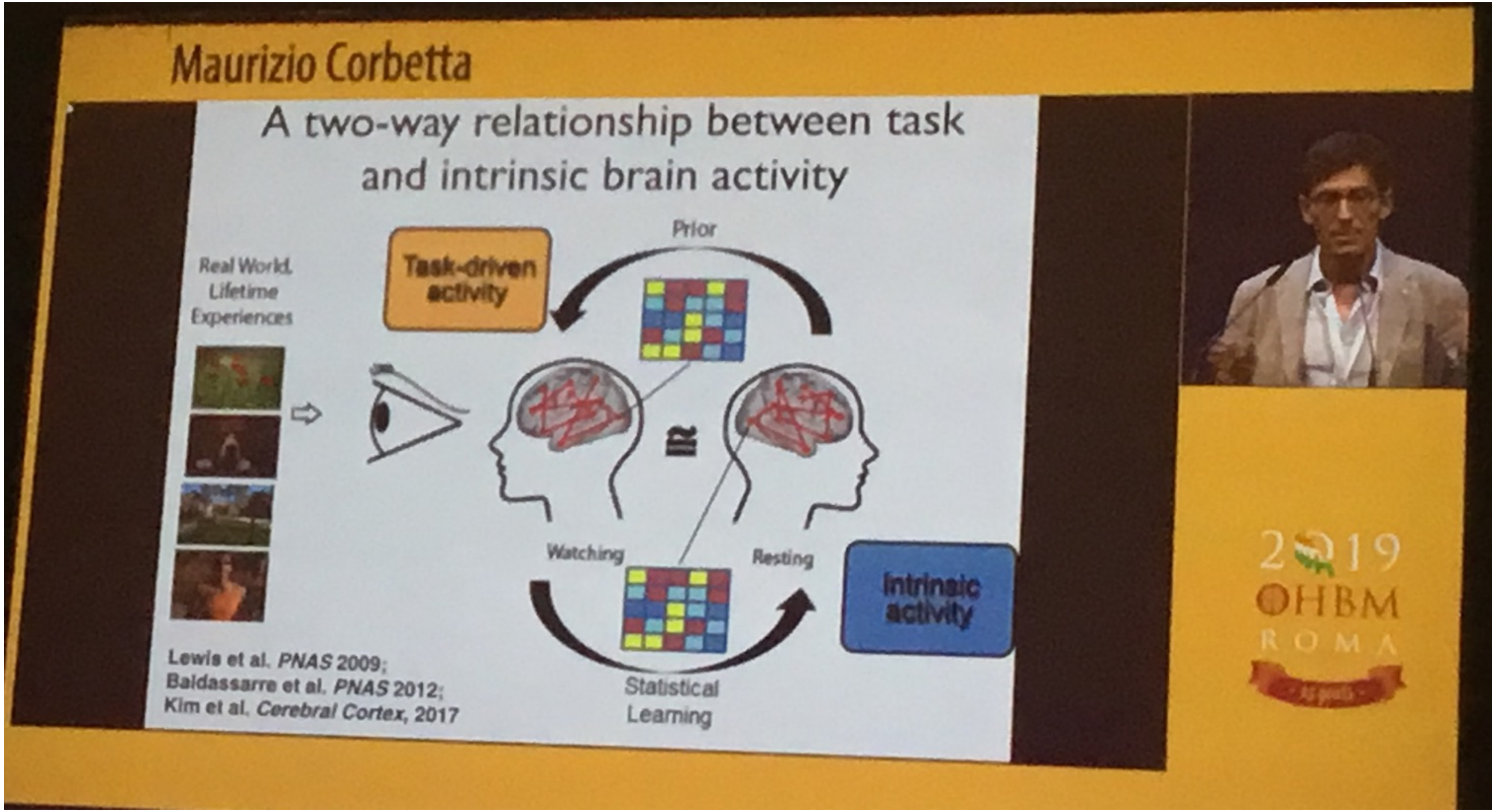


Somatotopy +
30 min daily RSfMRI for 64 days

D Newbold; Learning and Memory session

A few reflections on resting-state data

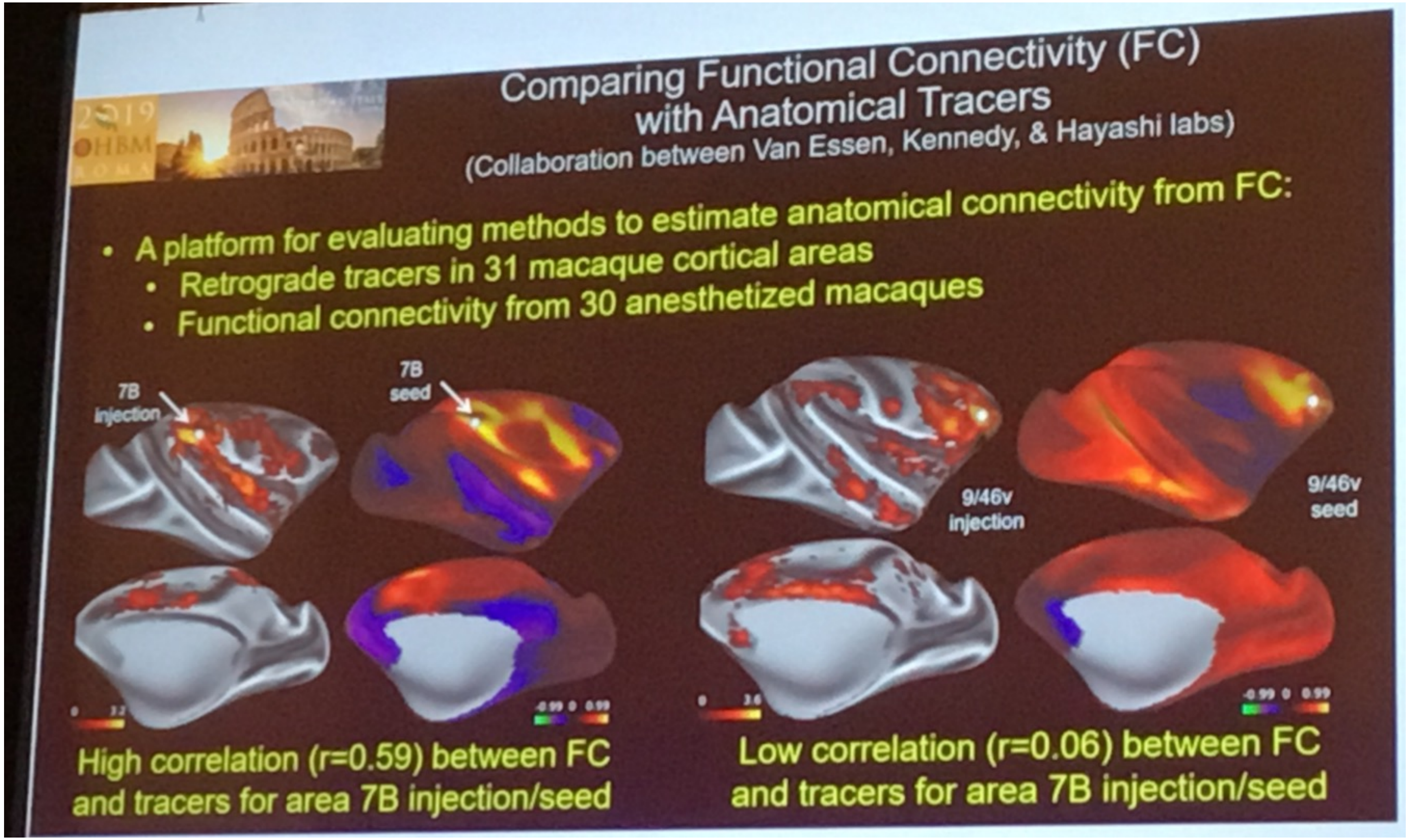
- Linked to task-based patterns of activity



Maurizio Corbetta, LOC

A few reflections on resting-state data

- Validation with retrograde tracer mapping

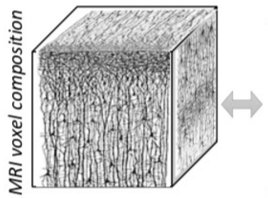


David Van Essen ;
Recent advance in neuroanatomy session
Poster Th696

Non-invasi

Marco Palombo[1*], Dani
[1]Center for Medical Image C
[2]Champalimaud Neuroscien
*marco.palombo@ucl.ac.uk

CURRENT MODEL OF B



Model parameters

Myeloarchitectur

f_{sticks} ∝ *neurite den*

D_{sticks} ∝ *intra-neurite vi*

Pour des cellules
100μm (macro et
20ms et b>>5000

corps
tion de

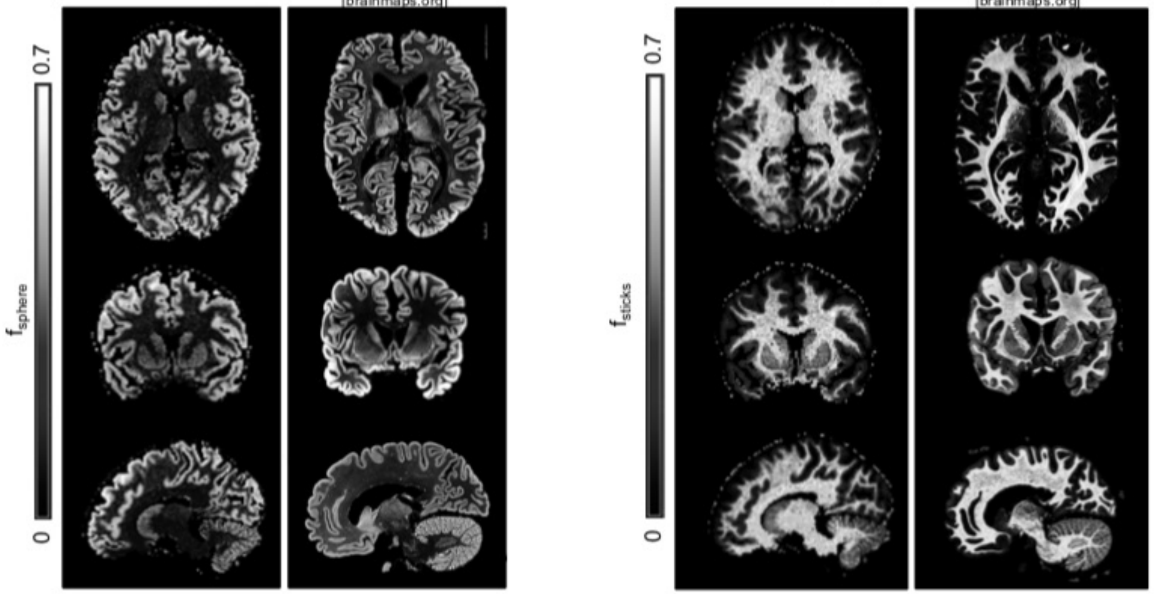
In-Vivo Human Brain (MGH Adult Diffusion Dataset)

ACQUISITION PROTOCOL

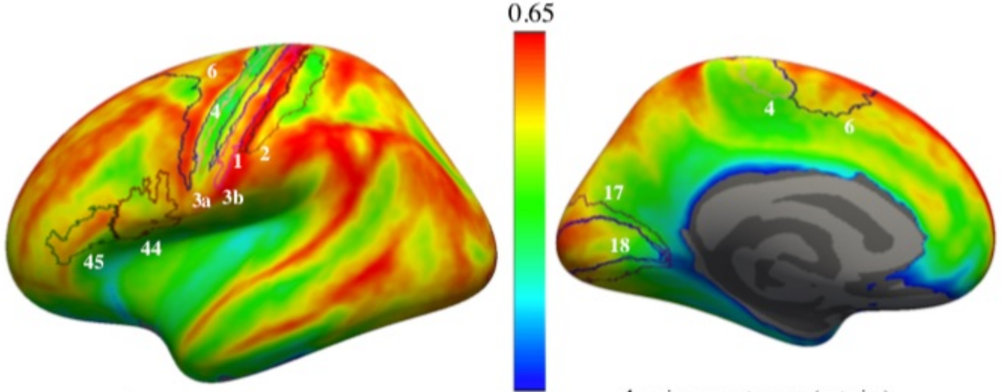
N = 25 healthy subjects (age 25-35)
PGSE @ 3 T (Siemens/Connectom)
TE/TR = 57/8800 ms
δ/Δ = 13/22 ms
6 b values = 0 – 10 ms/μm²
Directions: [0, 64, 64, 128, 256, 256]
Resolution: 1.5 x 1.5 x 1.5 mm³

PROCESSING

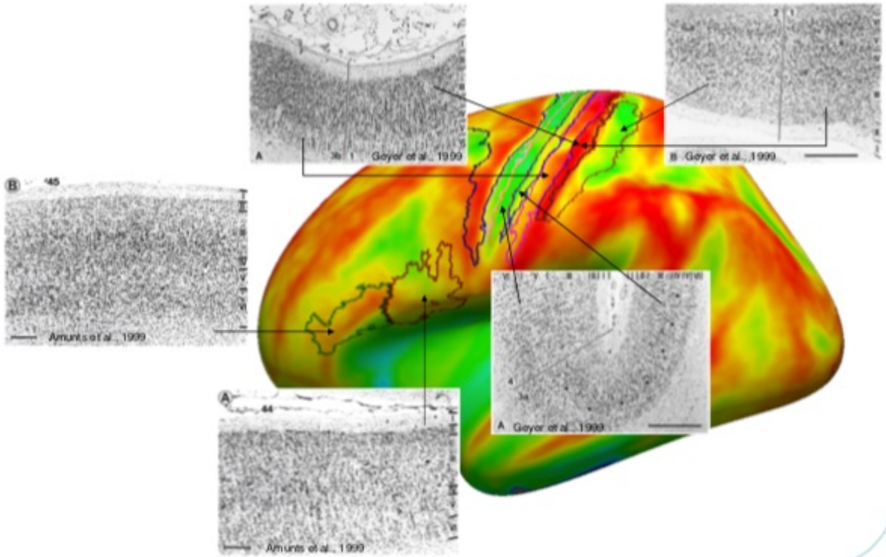
Motion and eddy current correction with FSL
Denoising with MRTrix
Gibbs ringing correction
Voxel-wise fitting of the 3-compartment model using custom scripts in MATLAB
Parcellation in Brodmann areas and surface extraction by FreeSurfer

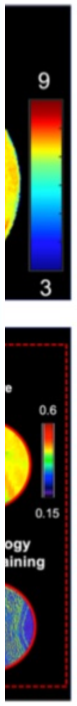


Cytoarchitecture
Average soma density map on cortical surface (N=25)

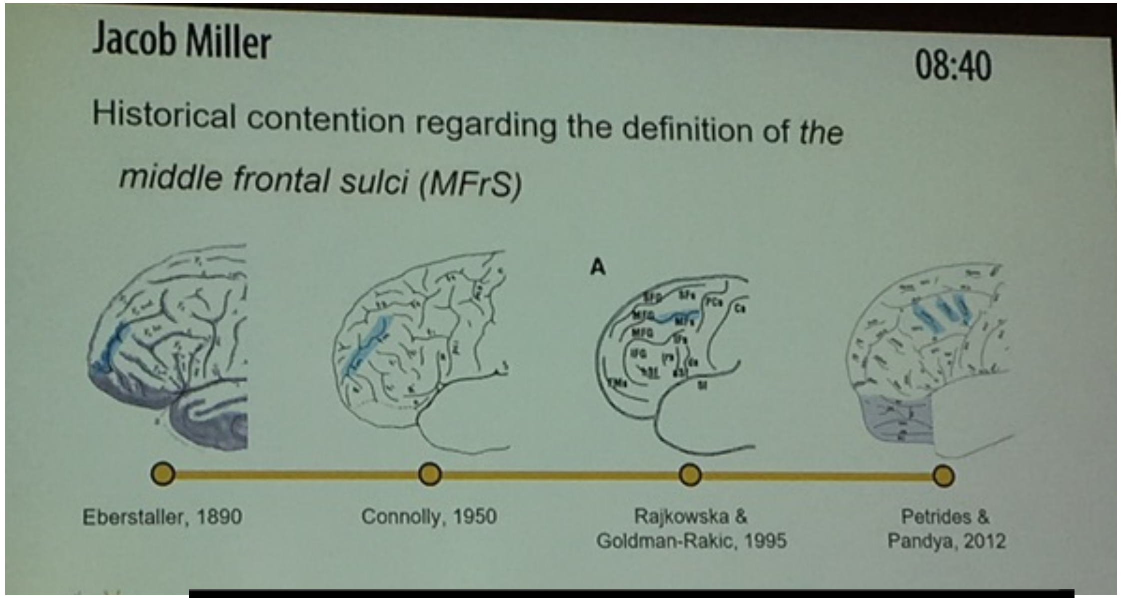


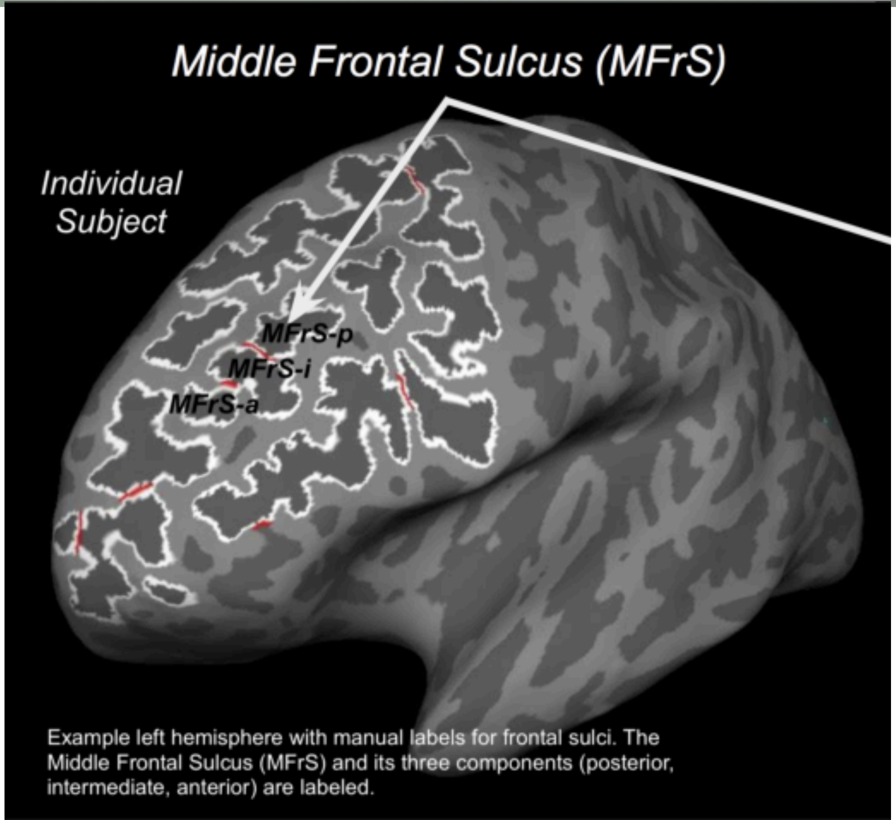
1 - somatosensory area
2 - somatosensory area
3a - somatosensory area
3b - somatosensory area
4 - primary motor area (anterior)
6 - pre-motor area
44 - Broca's area (pars opercularis)
45 - Broca's area (pars triangularis)

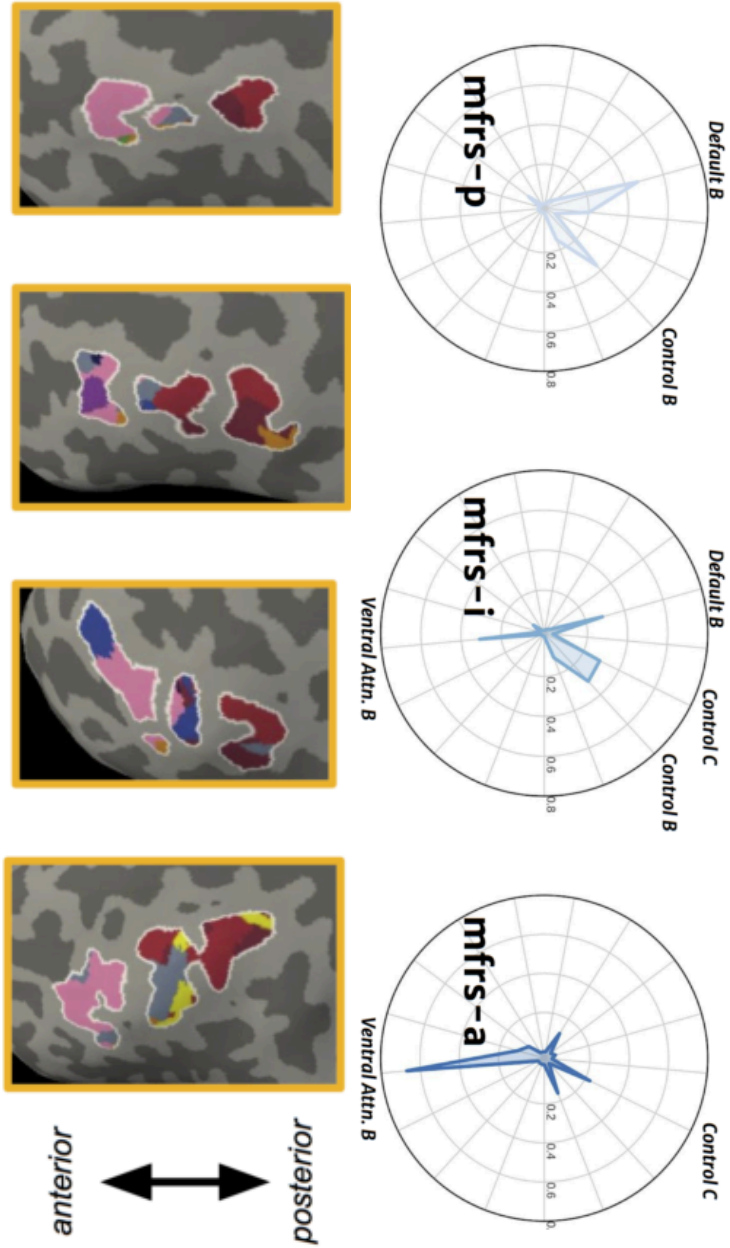




A new sulcal landmark in human prefrontal cortex







Anatomy and Function of Four New Cytoarchitectonic Areas in the Human Lateral Orbitofrontal Cortex

Magdalena Wojtasik[1], Sebastian Bludau[2], Simon Eickhoff[3,4], Hartmut Mohlberg[2], Svenja Caspers[2,5], Katrin Amunts[1,2]

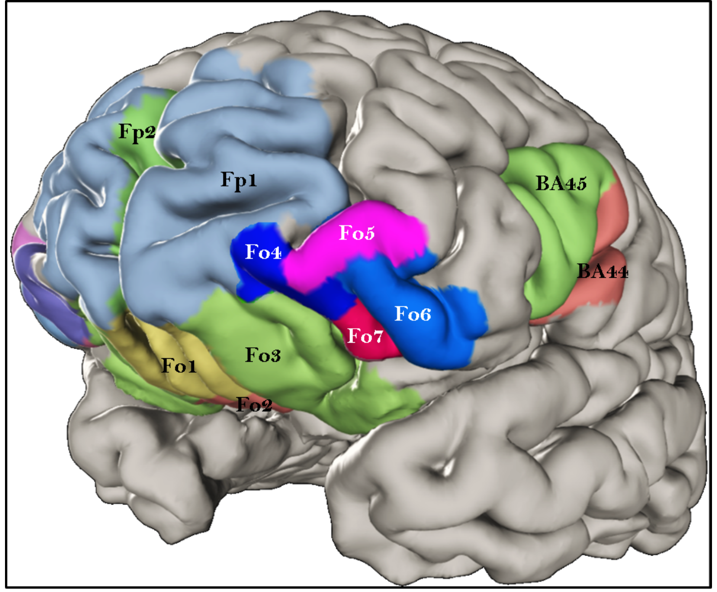


Figure 2: Maximum probability map of the lOFC areas Fo4 – Fo7 and adjacent histologically delineated areas.

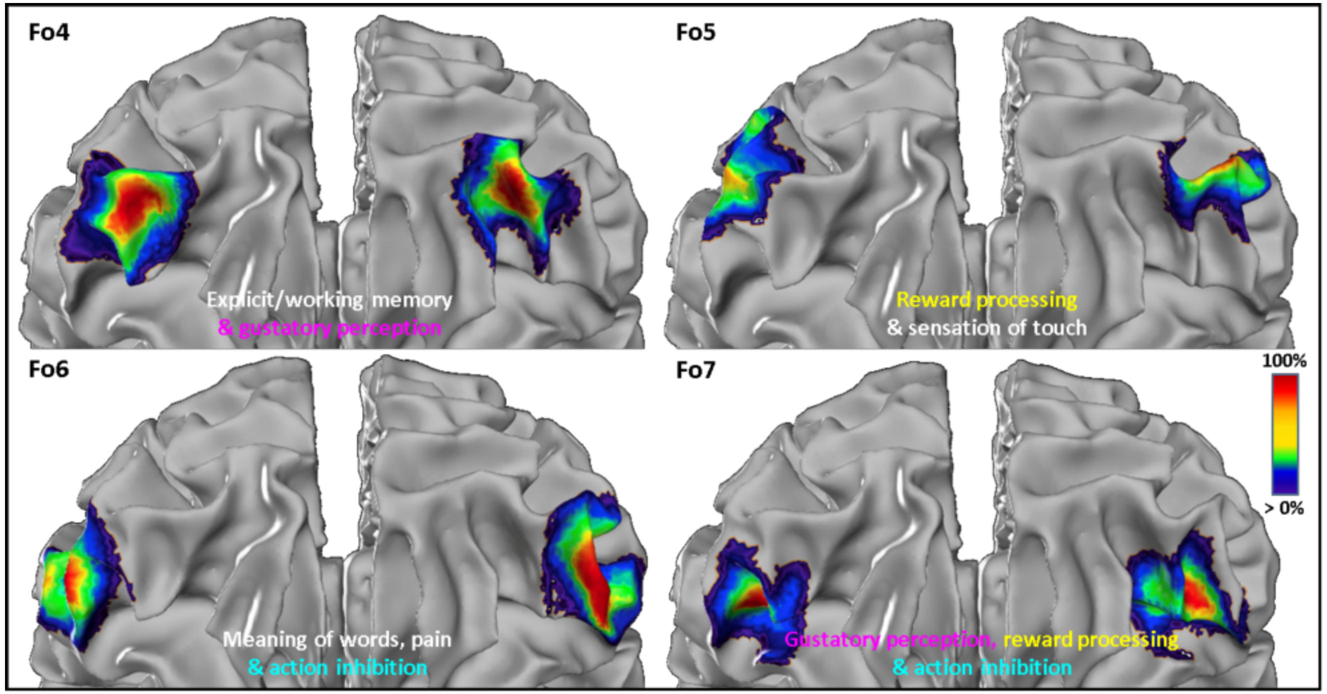
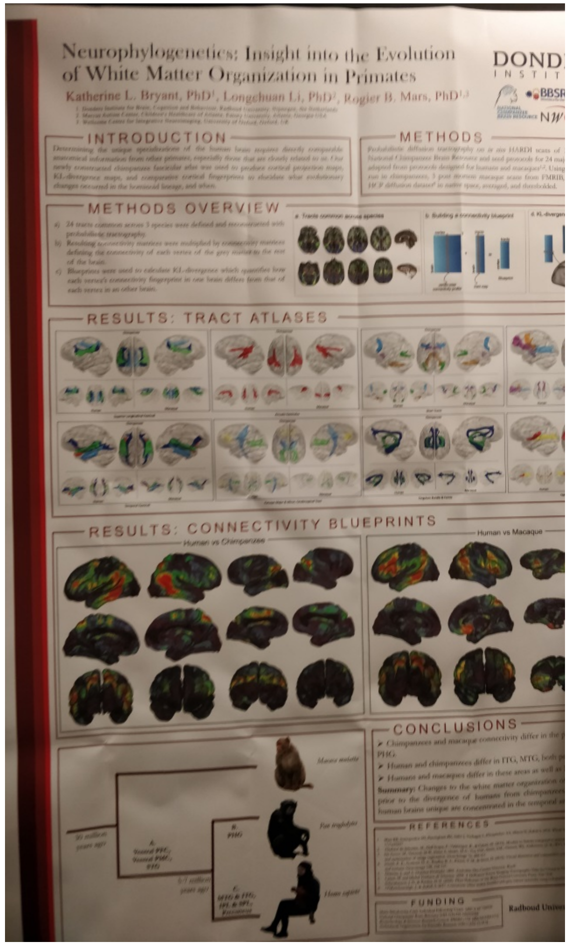
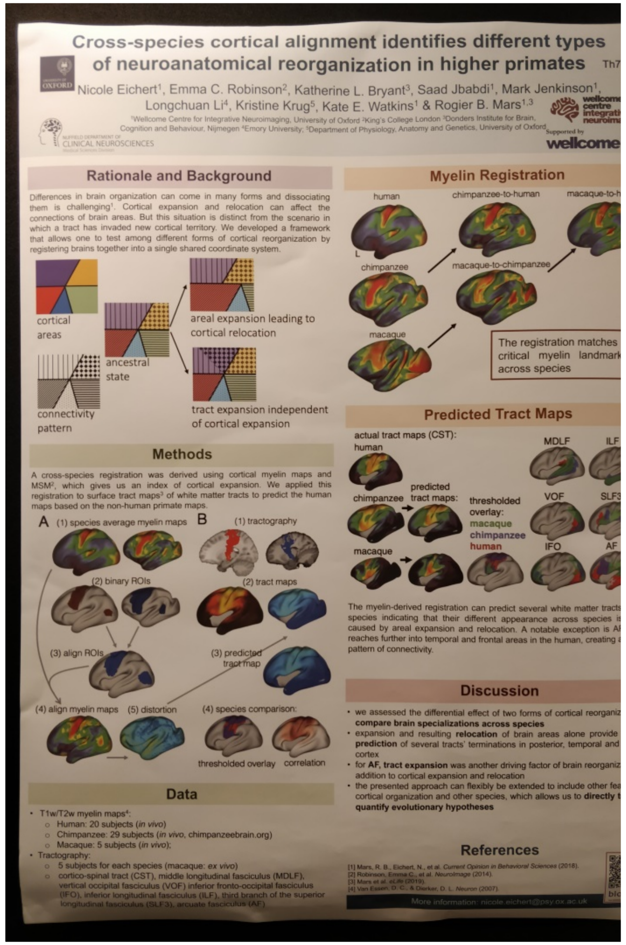


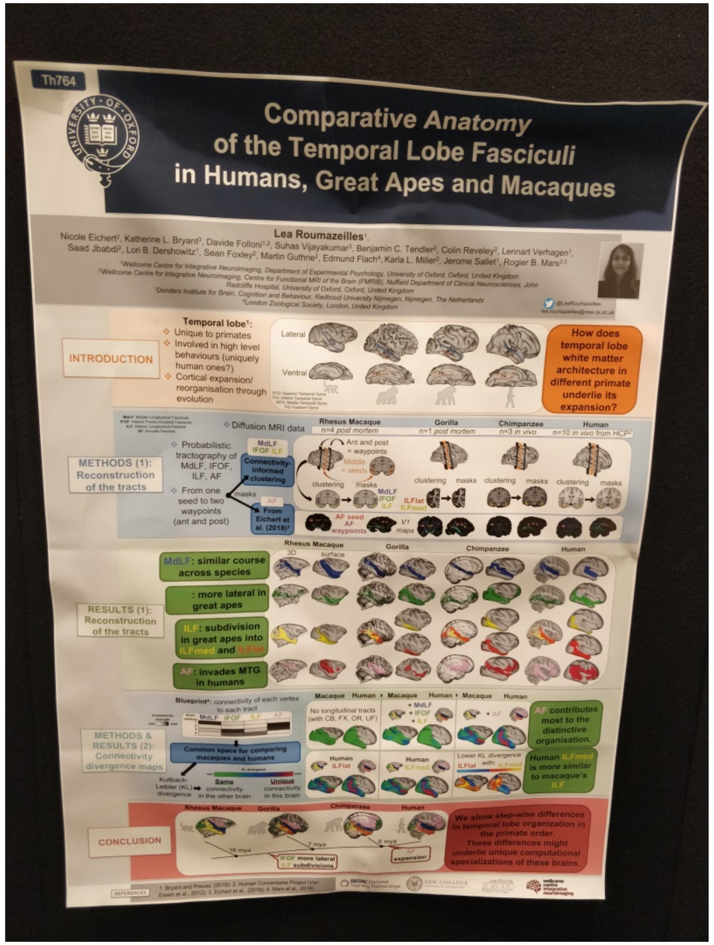
Figure 1: Probabilistic maps of area Fo4 - Fo7 projected onto the white matter surface of the MNI reference brain in combination with their probable functionality investigated through the BrainMap database. Location of respective areas ranging from a high (red) to a rather low (blue) probability.

Rogier Mars team : K. Bryant, N. Eichert, L. Roumazeilles

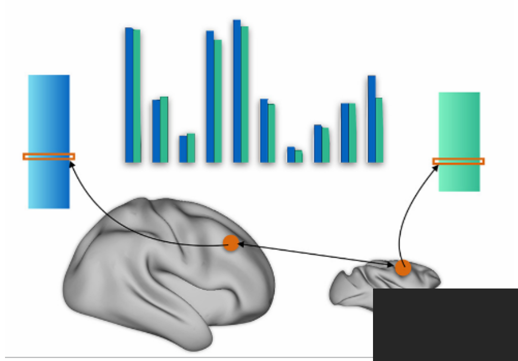
COMPARATIVE ANATOMY ACROSS PRIMATES



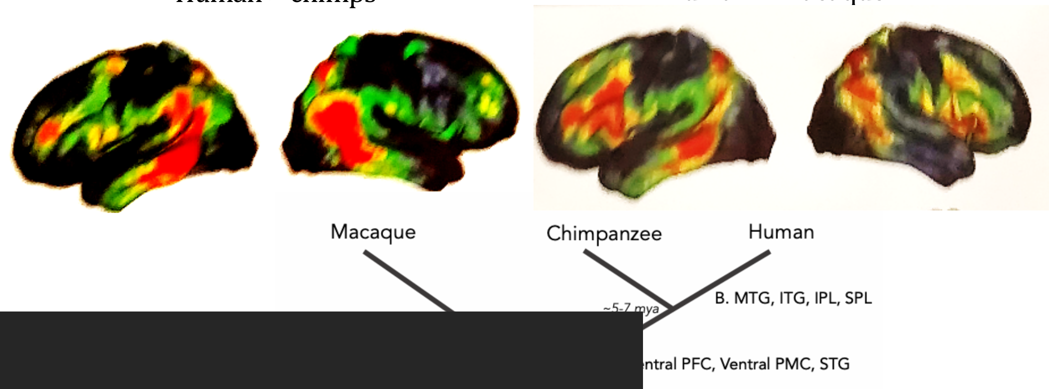


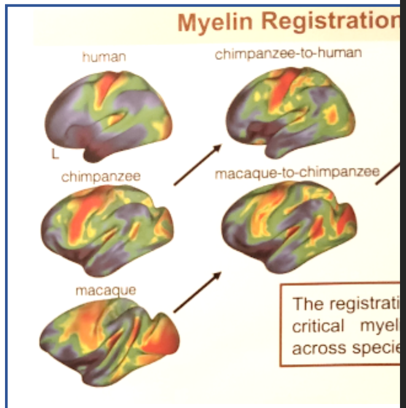


Connectivity blueprint (Mars, 2019)



Where connectivity differs ?

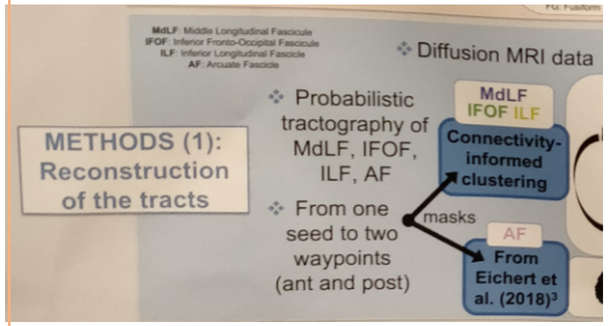




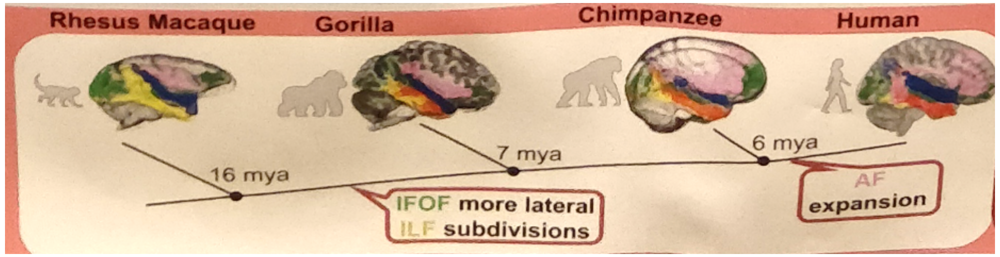
Along primate evolution …

- Expansion induced repositionning connections
- Maybe additionnal factors for language streams
- Mostly driven by temporal lobe AF invasion

n areas alone provide a good
posterior, temporal and parietal
factor of brain reorganization, in



Expansion dependant or independant ?



7T MRSI evidence for changes in GABA/Glu ratios through adolescent development

Beatriz Luna

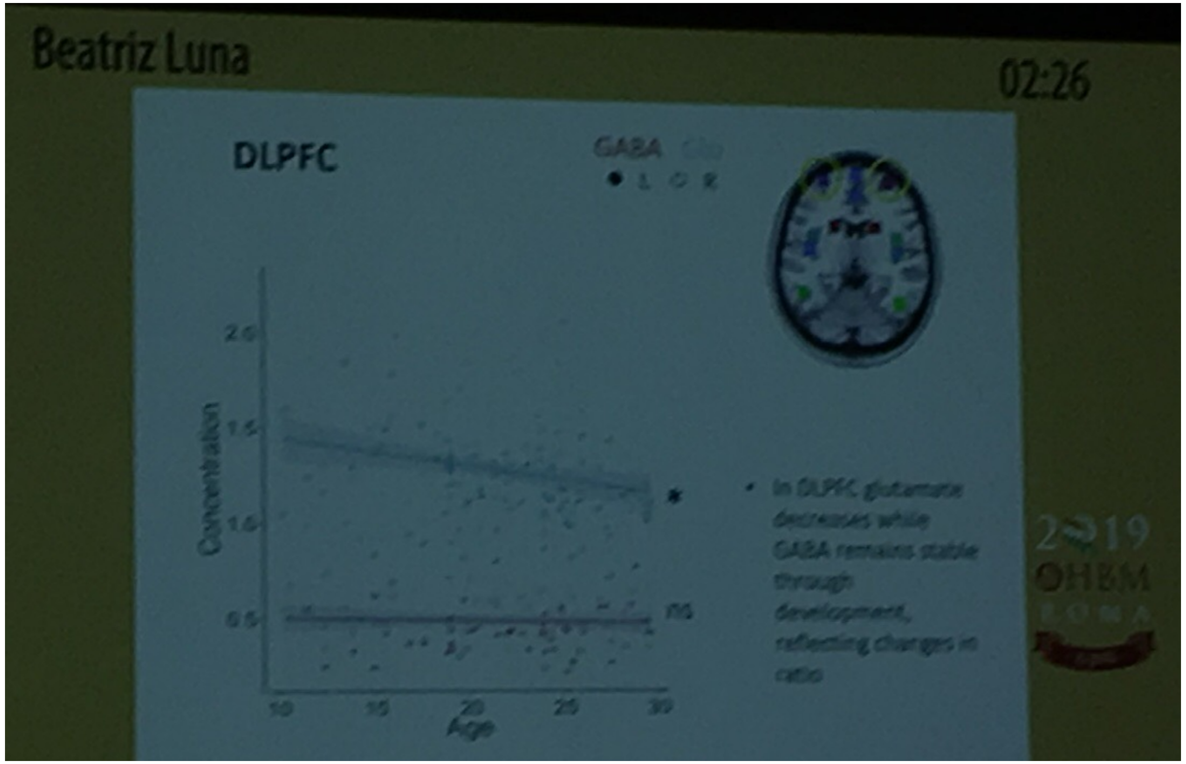
Adolescence = Critical period plasticity – Balance shifting between excitatory Glutamate and inhibitory GABA

7T Magnetic Resonnance Spectroscopy Imaging aquisition:

- 71 10 to 29 year olds
- **QPASA** (quantitative partial aquisition slice alignment): defined slice within scan on to participant's native space on MPRAGE to position MRSI aquisition

Results:

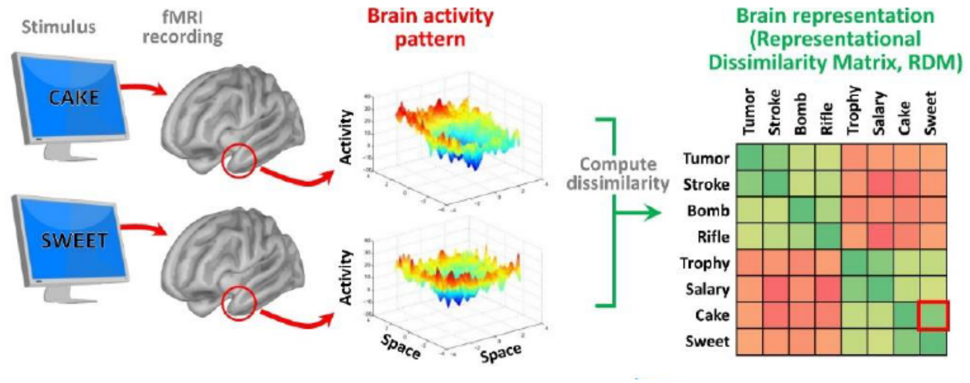
- Age related changes in GABA/Glu **ratio**
- Association between differences in Nt ratio and working memory



+poster M414

Representational Similarity Analysis

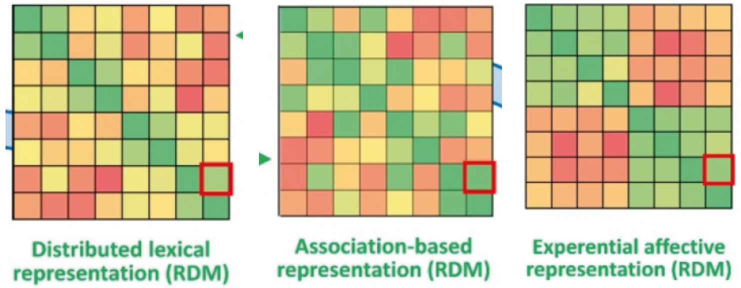
- Matrice cérébrale



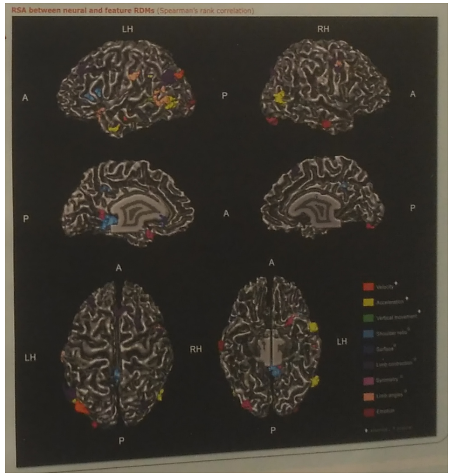
➢ Pour une région

➢ En searchlight pour tout le cerveau

- Comparaison avec différentes matrices théoriques



Montefinese ; T271

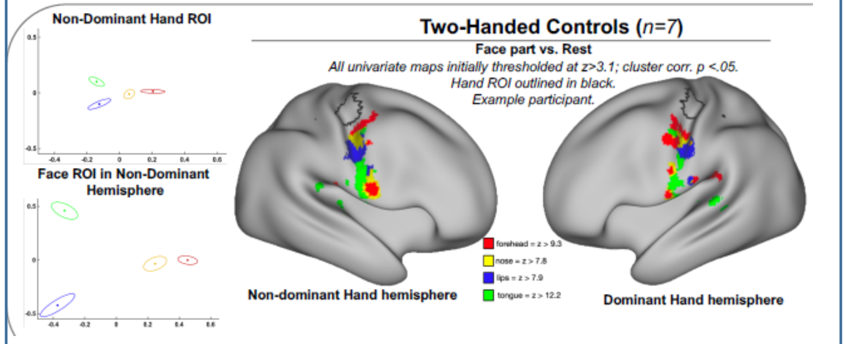
- 

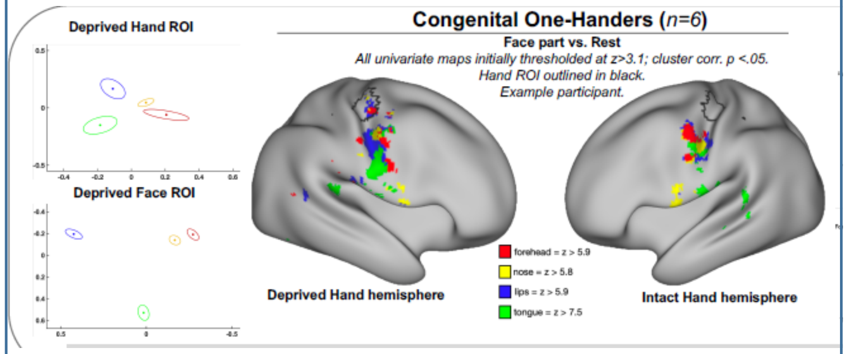
→ Régions dont l'activité est corrélée avec différentes matrices.

Poyo Solanas ; M310

Representational Similarity Analysis

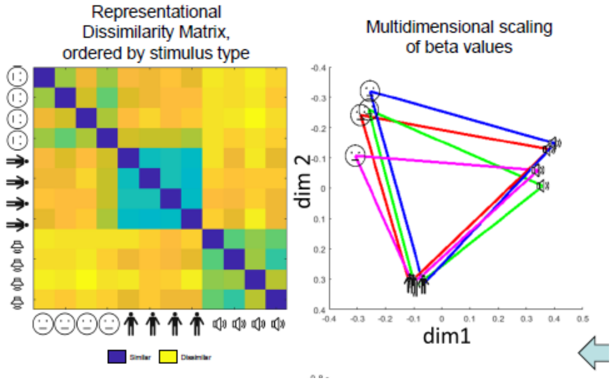
Une réorganisation du cortex moteur chez les amputés?



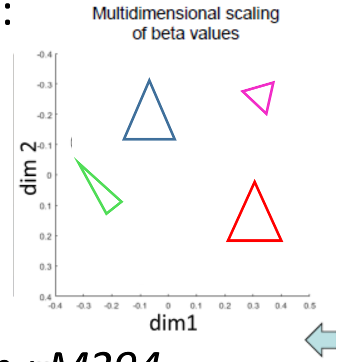


Root ; W448

Des régions qui codent les émotions de façon amodale?

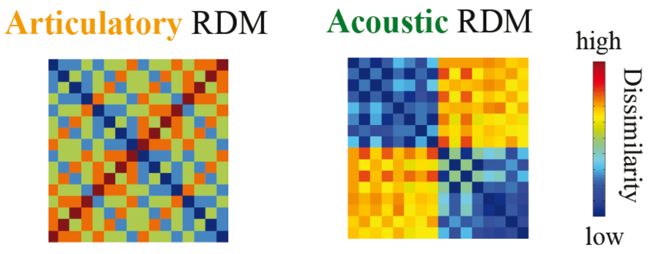


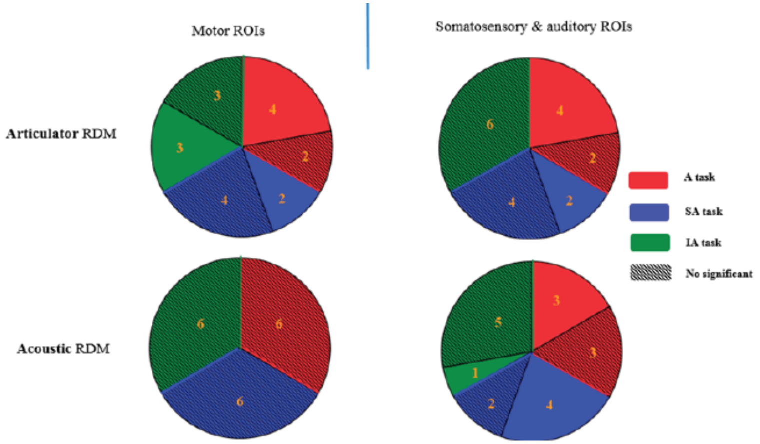
Si région décode émotions de façon amodale :



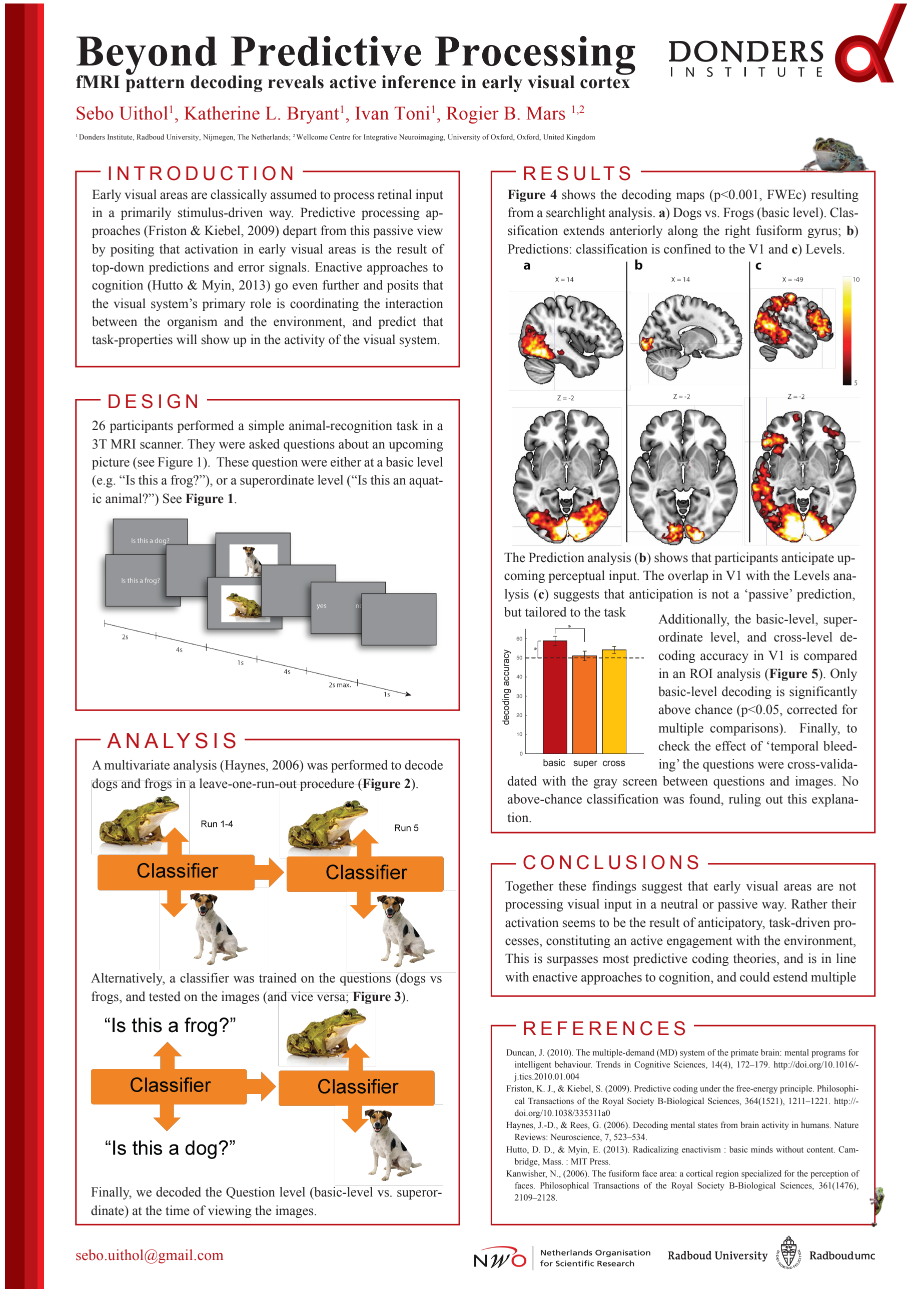
Vaessen ; M294

Quelles sont les relations entre sensoriel entre moteur ?





Tian ; T346



Beyond Predictive Processing

fMRI pattern decoding reveals active inference in early visual cortex

Sebo Uithol[1], Katherine L. Bryant[1], Ivan Toni[1], Rogier B. Mars [1,2]

[1] Donders Institute, Radboud University, Nijmegen, The Netherlands; [2] Wellcome Centre for Integrative Neuroimaging, University of Oxford, Oxford, United Kingdom

DONDERS INSTITUTE

INTRODUCTION

Early visual areas are classically assumed to process retinal input in a primarily stimulus-driven way. Predictive processing approaches (Friston & Kiebel, 2009) depart from this passive view by positing that activation in early visual areas is the result of top-down predictions and error signals. Enactive approaches to cognition (Hutto & Myin, 2013) go even further and posits that the visual system's primary role is coordinating the interaction between the organism and the environment, and predict that task-properties will show up in the activity of the visual system.

DESIGN

26 participants performed a simple animal-recognition task in a 3T MRI scanner. They were asked questions about an upcoming picture (see Figure 1). These question were either at a basic level (e.g. "Is this a frog?"), or a superordinate level ("Is this an aquatic animal?") See **Figure 1**.

ANALYSIS

A multivariate analysis (Haynes, 2006) was performed to decode dogs and frogs in a leave-one-run-out procedure (**Figure 2**).

Alternatively, a classifier was trained on the questions (dogs vs frogs, and tested on the images (and vice versa; **Figure 3**).

Finally, we decoded the Question level (basic-level vs. superordinate) at the time of viewing the images.

RESULTS

Figure 4 shows the decoding maps (p<0.001, FWEc) resulting from a searchlight analysis. **a**) Dogs vs. Frogs (basic level). Classification extends anteriorly along the right fusiform gyrus; **b**) Predictions: classification is confined to the V1 and **c**) Levels.

The Prediction analysis (**b**) shows that participants anticipate upcoming perceptual input. The overlap in V1 with the Levels analysis (**c**) suggests that anticipation is not a 'passive' prediction, but tailored to the task

Additionally, the basic-level, superordinate level, and cross-level decoding accuracy in V1 is compared in an ROI analysis (**Figure 5**). Only basic-level decoding is significantly above chance (p<0.05, corrected for multiple comparisons). Finally, to check the effect of 'temporal bleeding' the questions were cross-validated with the gray screen between questions and images. No above-chance classification was found, ruling out this explanation.

CONCLUSIONS

Together these findings suggest that early visual areas are not processing visual input in a neutral or passive way. Rather their activation seems to be the result of anticipatory, task-driven processes, constituting an active engagement with the environment, This is surpasses most predictive coding theories, and is in line with enactive approaches to cognition, and could estend multiple

REFERENCES

Duncan, J. (2010). The multiple-demand (MD) system of the primate brain: mental programs for intelligent behaviour. Trends in Cognitive Sciences, 14(4), 172–179. http://doi.org/10.1016/-j.tics.2010.01.004

Friston, K. J., & Kiebel, S. (2009). Predictive coding under the free-energy principle. Philosophical Transactions of the Royal Society B-Biological Sciences, 364(1521), 1211–1221. http://-doi.org/10.1038/335311a0

Haynes, J.-D., & Rees, G. (2006). Decoding mental states from brain activity in humans. Nature Reviews: Neuroscience, 7, 523–534.

Hutto, D. D., & Myin, E. (2013). Radicalizing enactivism : basic minds without content. Cambridge, Mass. : MIT Press.

Kanwisher, N., (2006). The fusiform face area: a cortical region specialized for the perception of faces. Philosophical Transactions of the Royal Society B-Biological Sciences, 361(1476), 2109–2128.

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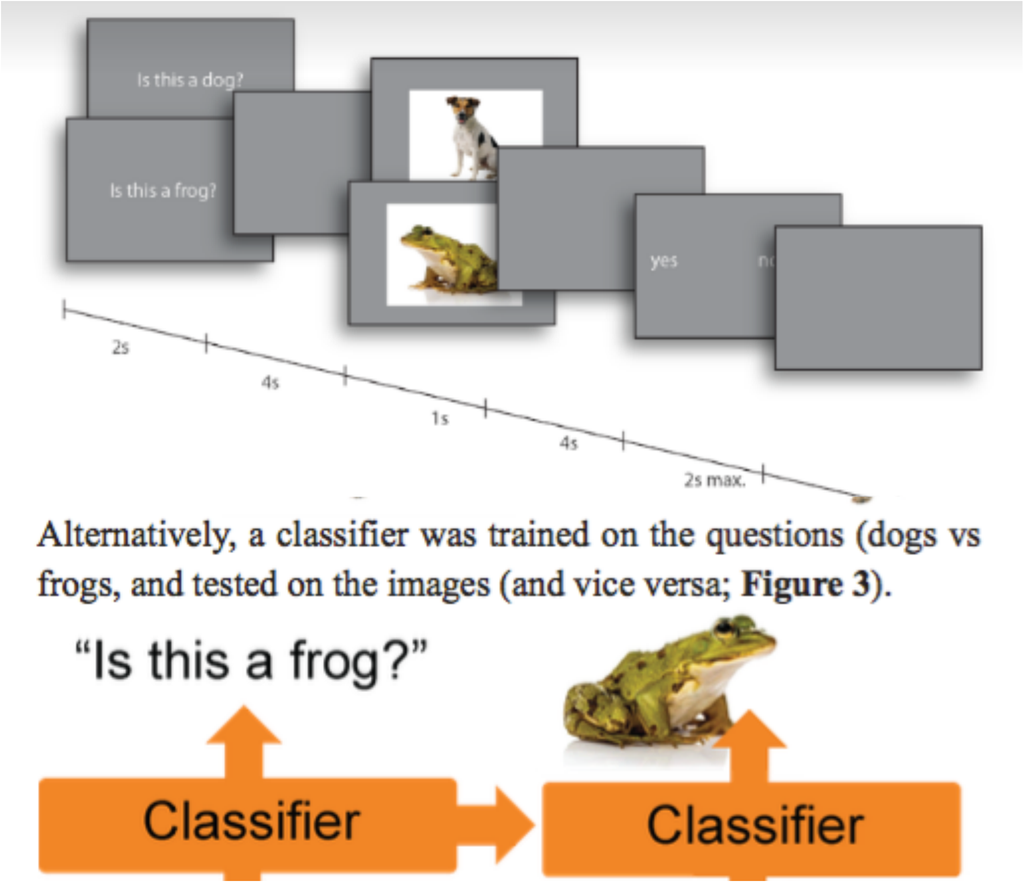
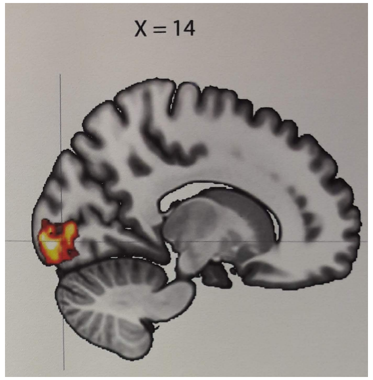




Searchlight MVPA analysis

- activity @question predicts activity @image

=> top-down predictive coding in V1

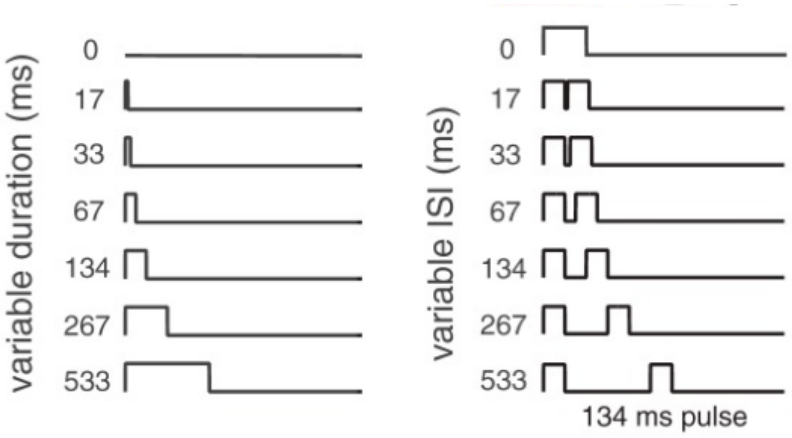
- PROBLEM? - fixed ISI

⇒ activity @question does *not* predict activity @ISI

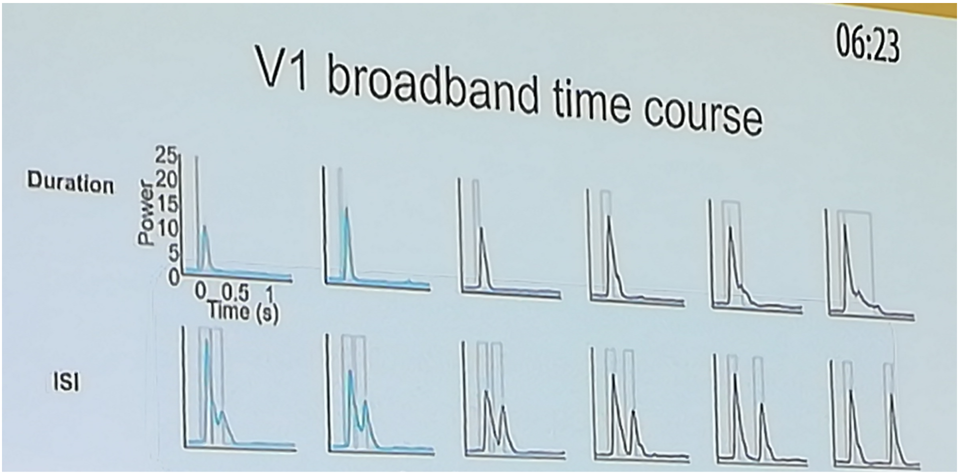
NB. 25 trials per condition!

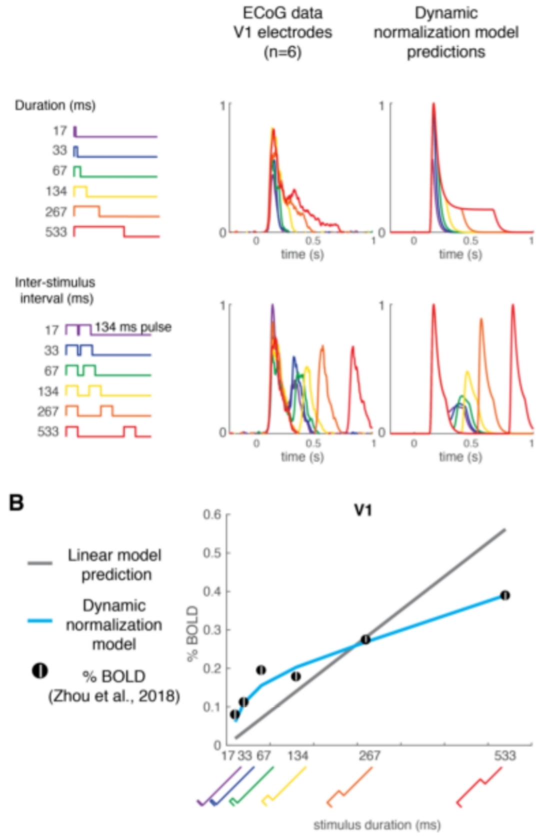
The Temporal Dynamics of Neuronal Responses in Human Visual Cortex

Iris Groen



Zhou et al., 2017



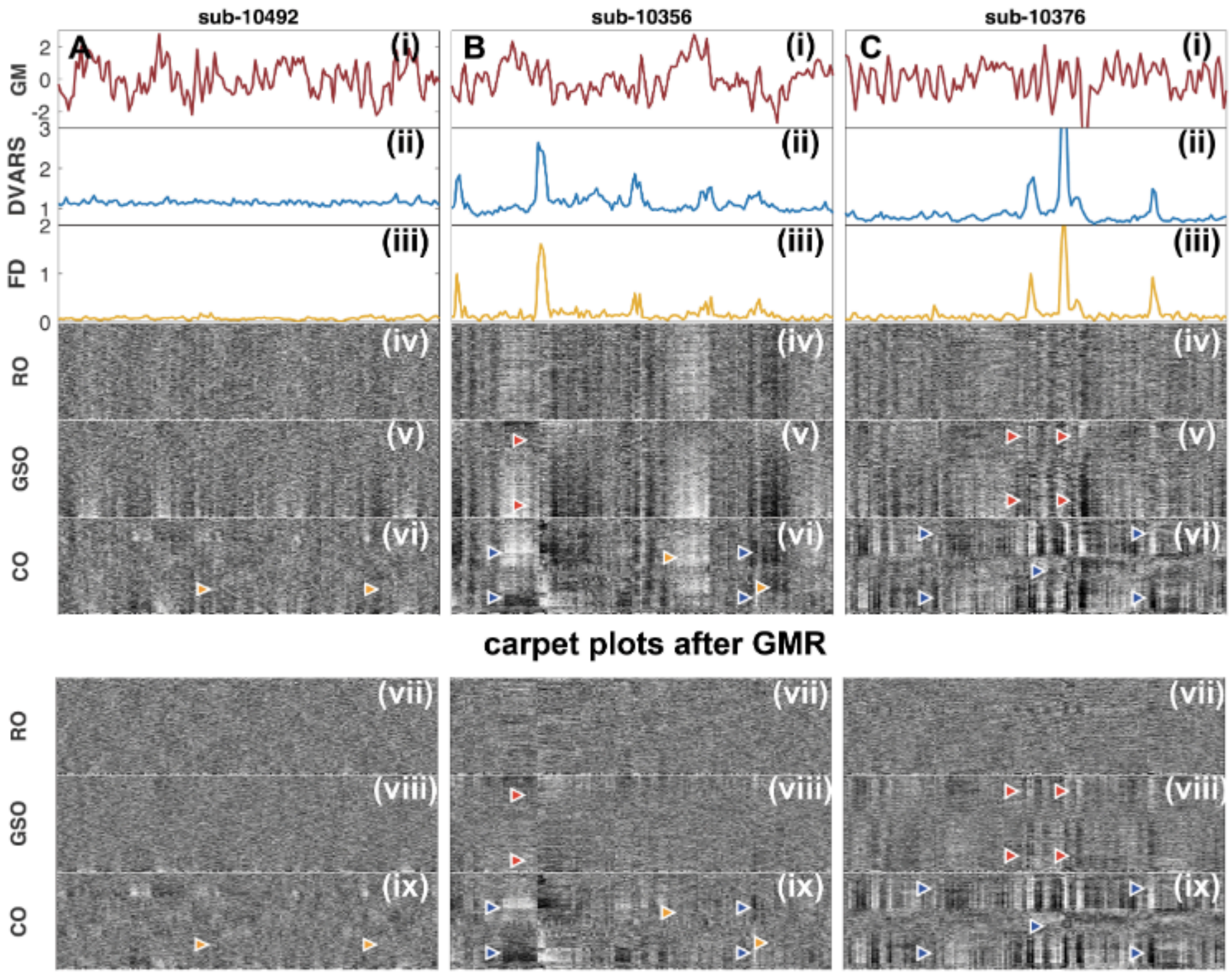


Poster T 875

- Question : How does the brain transform visual inputs into dynamical cortical responses ?
- Technique : Electrocorticography (ECoG)

→ Dynamics of visual responses show systematic, non linear modulations by the temporal structure of the input.
→ A computational model predicts these dynamical response properties. (*Jonathan Winawer*)

fMRI : The Global Signal Strikes Back



Aquino & al

fMRI : The Global Signal Strikes Back

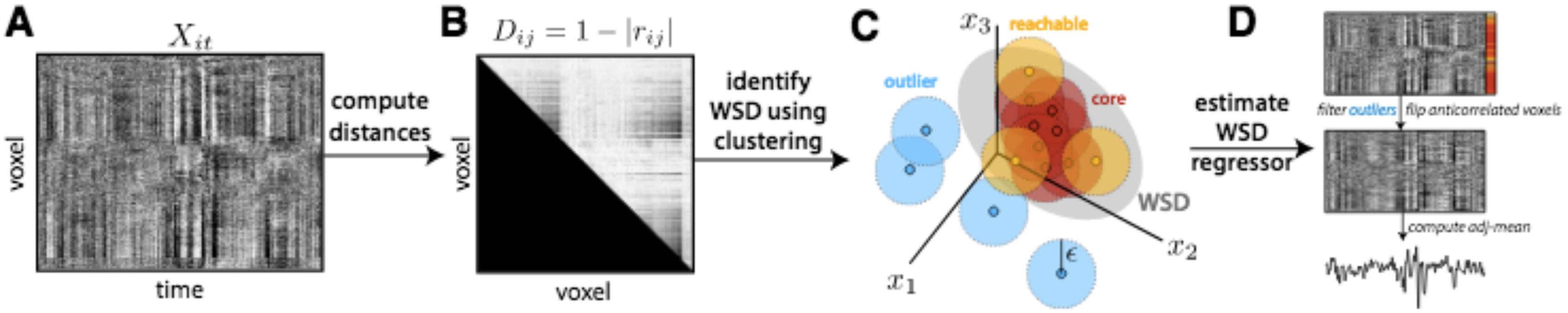
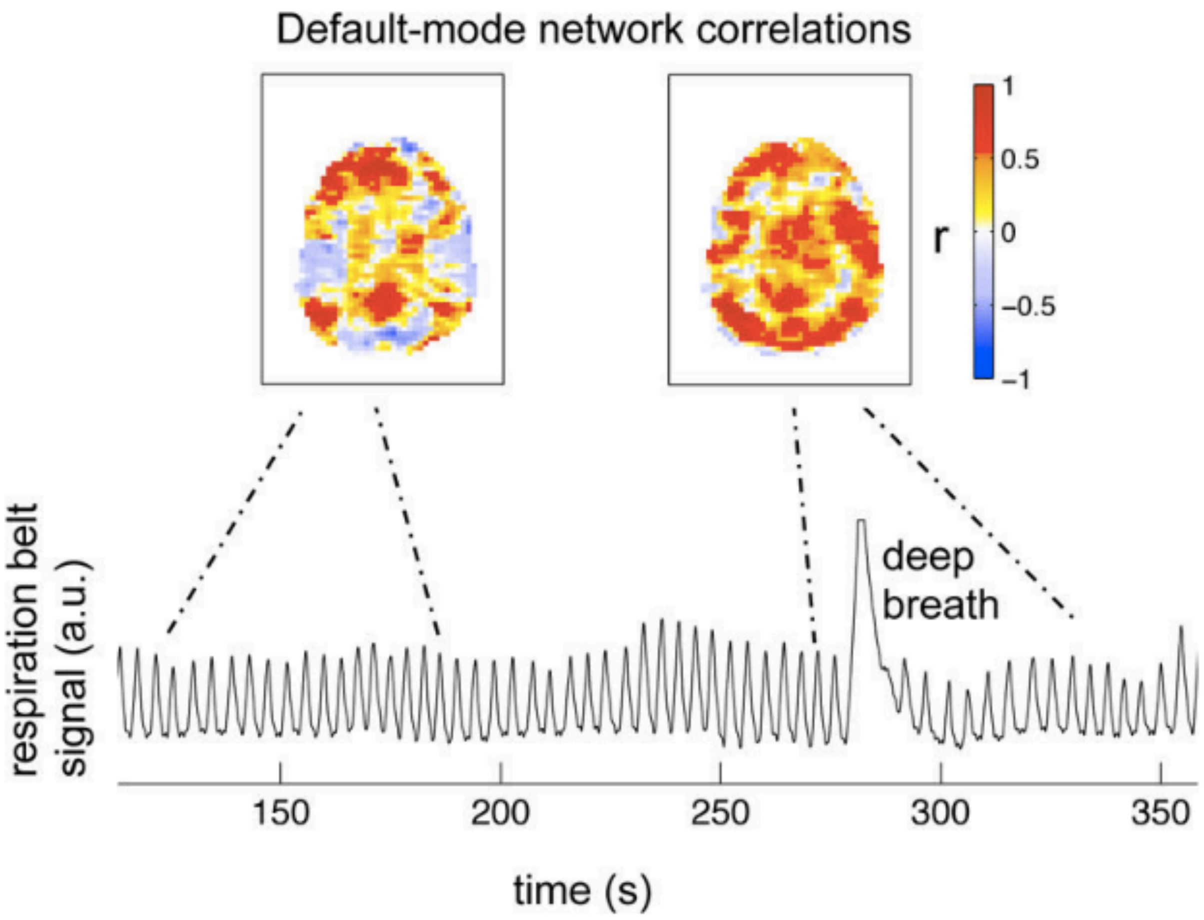


Fig. 3. An iteration of DiCER involves using clustering to identify voxels involved in a WSD, and then estimating the WSD regressor as an adjusted mean. We show: **A** CO carpet plot for an example UCLA control participant, Subject 10376. **B** Upper triangle of the pairwise distance matrix, $D_{ij} = 1 - |r_{ij}|$, from low D_{ij} (black) to high D_{ij} (white). **C** dbscan is used to estimate a diffuse common signal, or WSD, and label the core and reachable voxels that contribute to it. **D** A regressor is estimated from core and reachable voxels, after flipping the sign of voxels that are anticorrelated to the cluster center, as the *adj-mean*. This procedure is repeated until either no WSDs are identified, or a maximum number of iterations, $k_{\max} = 5$, is reached.

Aquino & al

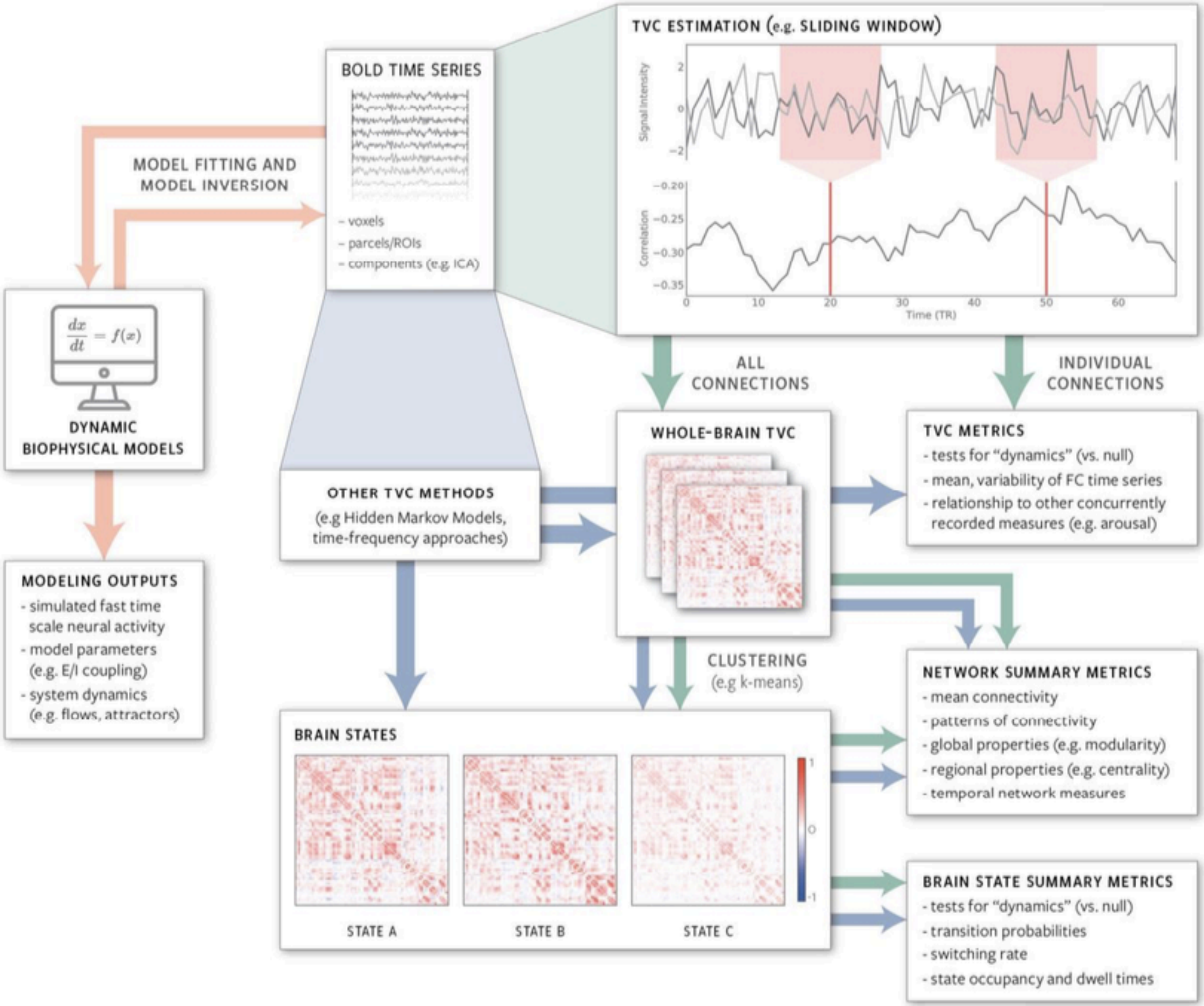
fMRI : The Global Signal & Physiology



Chen, Rubinov & Catie Chang

fMRI : The Global Signal & Physiology

“Resting- State” Time-Varying Functional Connectivity



OHBM 2019 Hackathon

PROGRAM

Thursday 6 June 2019

9h Check-in & breakfast
Welcome and introduction
9.30h Ignite talk: "A Brainhack carol.
The Ghost of Hackathons Past: Pierre Bellec"
10.30h Project pitches
12h Lunch
13-20h Hackathon /
TrainTrack: Best practices in
open source development
TrainTrack: Reproducible Science I
20.30h Social at Annalemma

Friday 7 June 2019

9h Breakfast
9.30h Ignite talk: "A Brainhack carol.
The Ghost of Hackathon Present: Katie Bottenhorn"
10.30h Hackathon /
TrainTrack: Reproducible Science II
12h Lunch
13-20h Hackathon

Saturday 8 June 2019

9h Breakfast
9.30h Ignite talk: "A Brainhack carol.
The Ghost of Hackathons Future: Satrajit Ghosh"
10.30h Hackathon
12h Lunch
13-20h Hack & Project summaries

PROGRAM TrainTrack, tentative, see here for live updates!

Session 1: Best practices in open source development
Thursday 13:00 - 16:00 Options include:

13:30-15:00 Intro to Git/GitHub (ReproStaff)
15:00-16:00 Introduction to testing and Continuous Integration (Dorota
16:00-17:00 Available!

Session 2: Open and Reproducible Science (Part 1)
Thursday 17:00-20:00 Options include:

17:00-18:00 DataLad - Everything you ever wanted to know, but were afraid to ask... (Yarik Halchenko/Satra Ghosh)
18:00-19:00 Containers: Using docker for open & reproducible science - an introduction (Peer Herholz/Dorota Jarecka)
19:00-20:00 Available!

Session 3: Open and Reproducible Science (Part 2)
Location: Palazzo Montemartini (Largo Giovanni Montemartini, 00185 Roma RM)

Friday 10:30 - 15:30. Options include:

10:30-11:30 Interactive Introduction to C-PAC (Anibal Solon)
11:30-12:30 Binder and NeuroLibre! (Loic Tetrel)

Lunch!

13:30-14:30 ReproIn - The ReproNim image input management system (Yarik Halchenko/Satra Ghosh)
14:30-15:30 Teaching an Old BIDS New Tricks - Semantic Markup of BIDS data (David Keator/Jeff Grethe)

OHBM 2019 Hackathon

https://github.com/ohbm/hackathon2019/issues?page=2&q=is%3Aissue+is%3Aopen

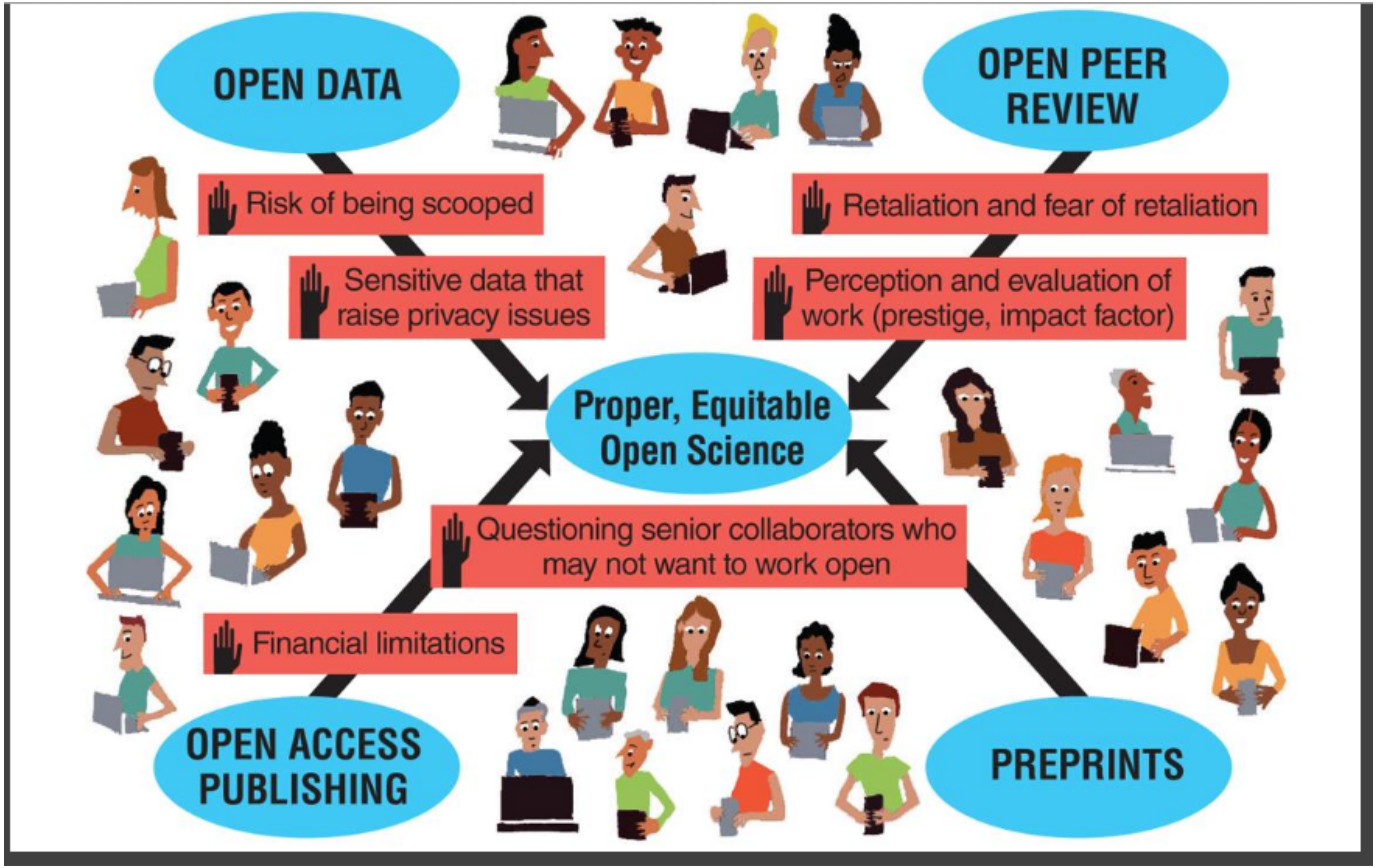
https://ohbm.github.io/hackathon2019/

https://github.com/

Brainlife – network neuroscience

https://brainlife.io/

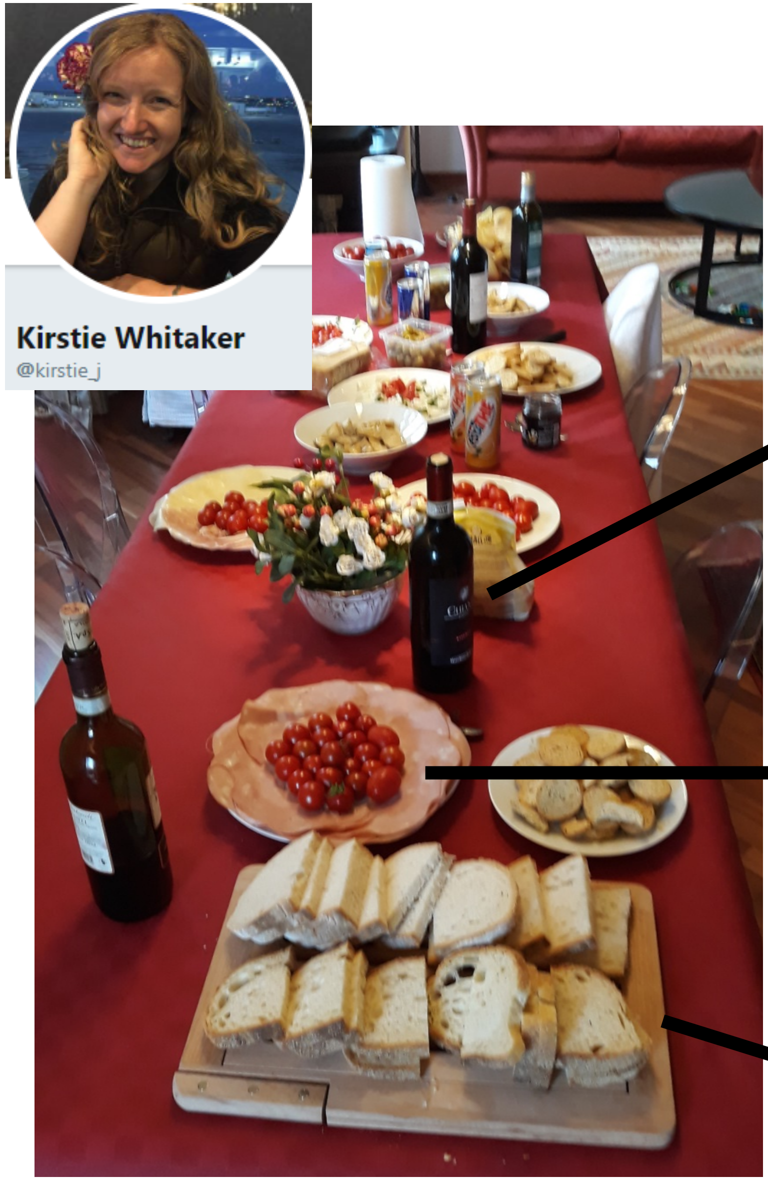
https://ww5.aievolution.com/hbm1901/index.cfm?do=abs.viewAbs&abs=3106

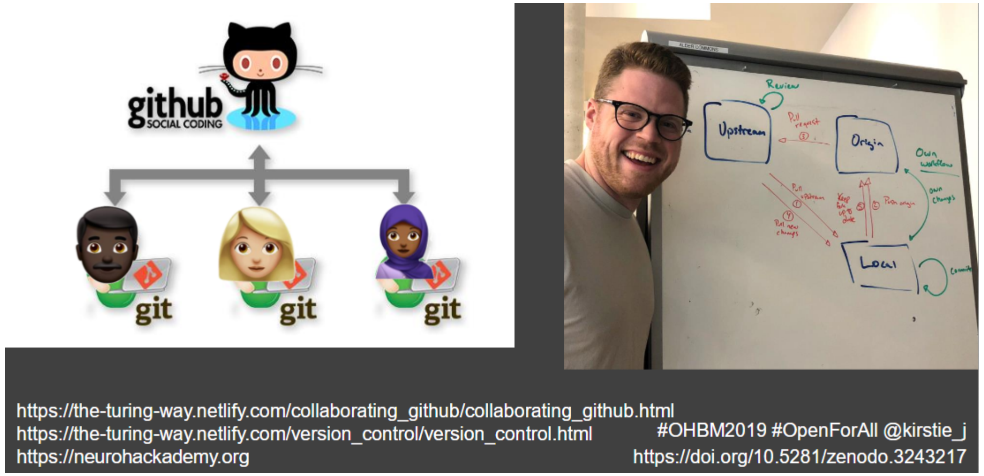

OPEN DATA
OPEN PEER REVIEW
Risk of being scooped
Retaliation and fear of retaliation
Sensitive data that raise privacy issues
Perception and evaluation of work (prestige, impact factor)
Proper, Equitable Open Science
Questioning senior collaborators who may not want to work open
Financial limitations
OPEN ACCESS PUBLISHING
PREPRINTS

Do we really want collaboration?

- Academia currently rewards the individual
- Who gets money?
- Who chooses how it is spent?

https://www.nhm.ac.uk/visit/wpy/gallery/2010/images/eric-hosking-portfolio-award/4372/a-marvel-of-ants.html





DataLad

docker

Elizabeth DuPre
@emdupre_

binder

Turn a Git repo into a collection of interactive notebooks

Have a repository full of Jupyter notebooks? With Binder, open those notebooks in an executable environment, making your code immediately reproducible by anyone, anywhere.

Build and launch a repository

GitHub repository name or URL

GitHub repository name or URL | GitHub ▾

Git branch, tag, or commit

Git branch, tag, or commit

Path to a notebook file (optional)

Path to a notebook file (optional) | File ▾

launch