

Toolbox for Frequency-based Fingerprinting

ToFFi Toolbox

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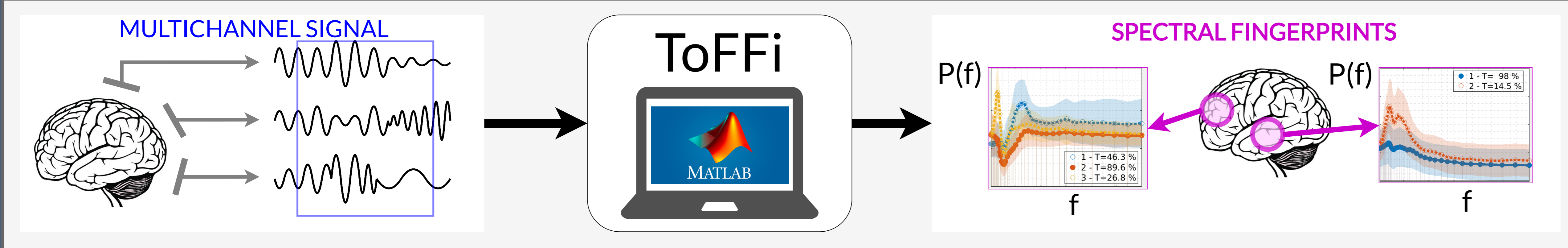
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Check
preprint
and code
on GitHub!



Toolbox:
https://github.com/micholeodon/ToFFi_Toolbox/

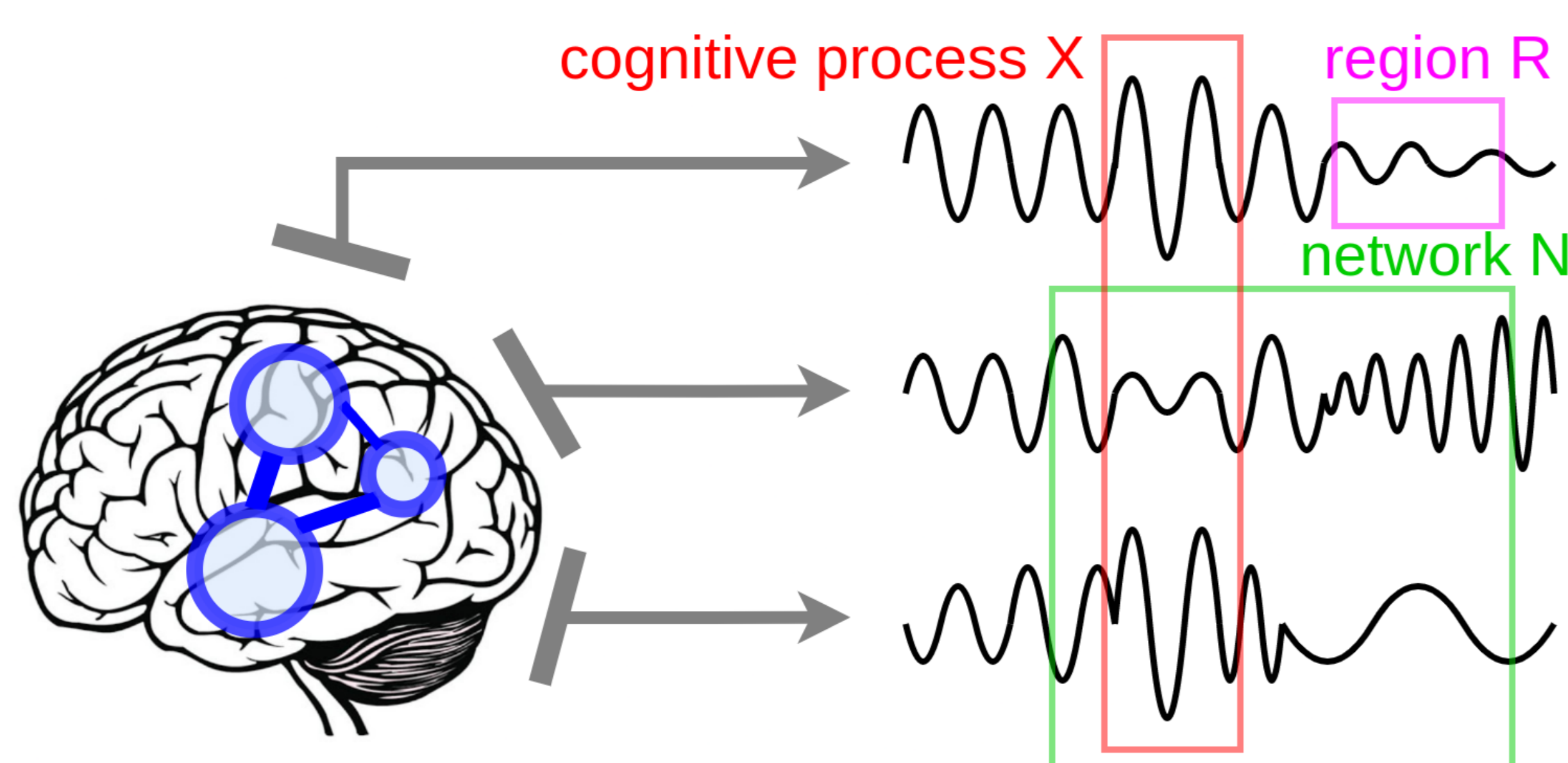
Manual:
https://github.com/micholeodon/ToFFi_Toolbox/blob/master/ToFFi_Toolbox-20211013/docs/ToFFi_Manual.pdf



CONTEXT: BRAIN FINGERPRINTING

Common understandings of the term "brain fingerprinting":

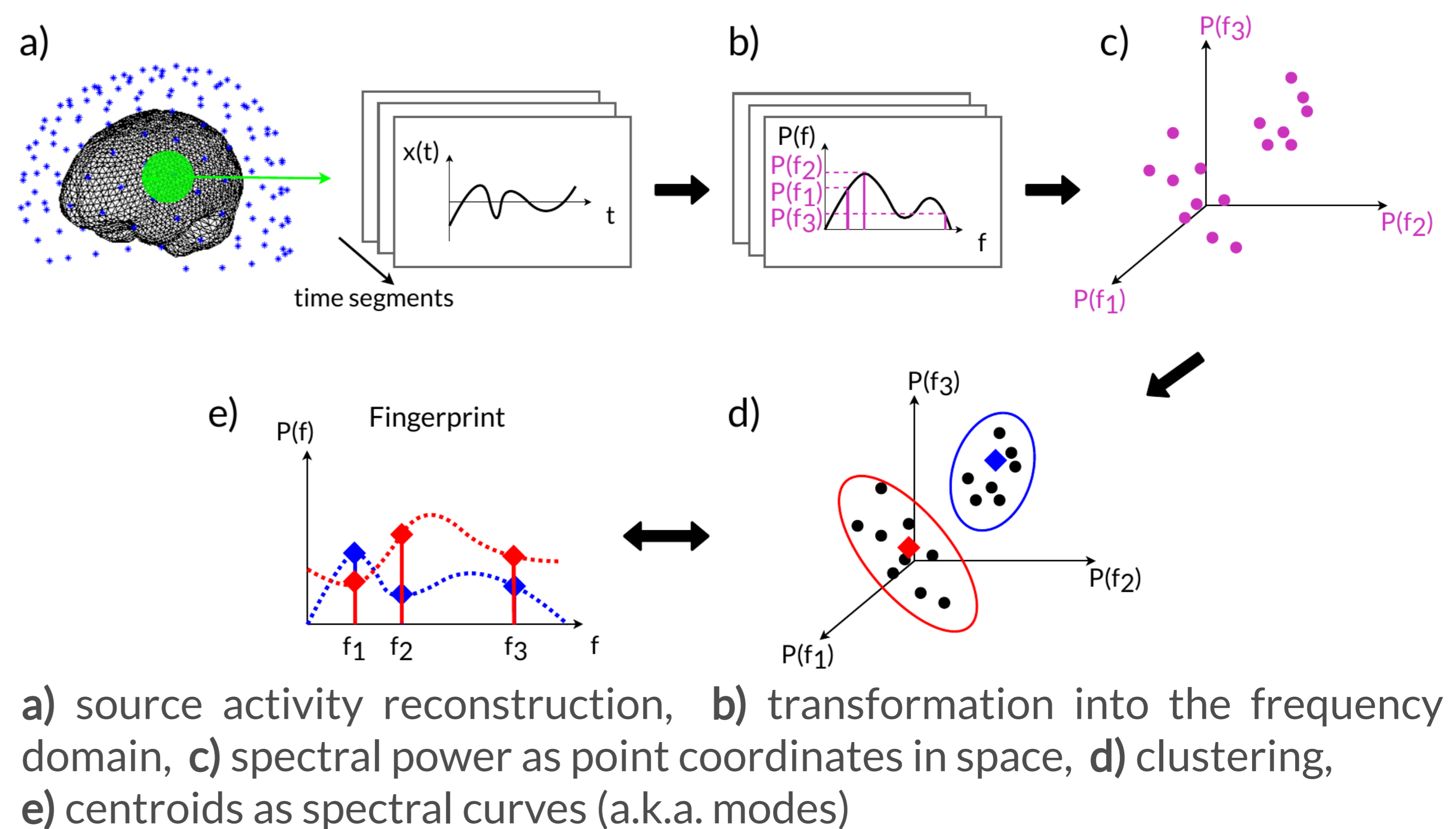
- detection of concealed information (Farwell, 2012)
- subject identification (Chauvin et al., 2021)
- brain activity features for studying regions/networks dynamics (Singer, 2013)



MAIN METHOD: SPECTRAL FINGERPRINTING

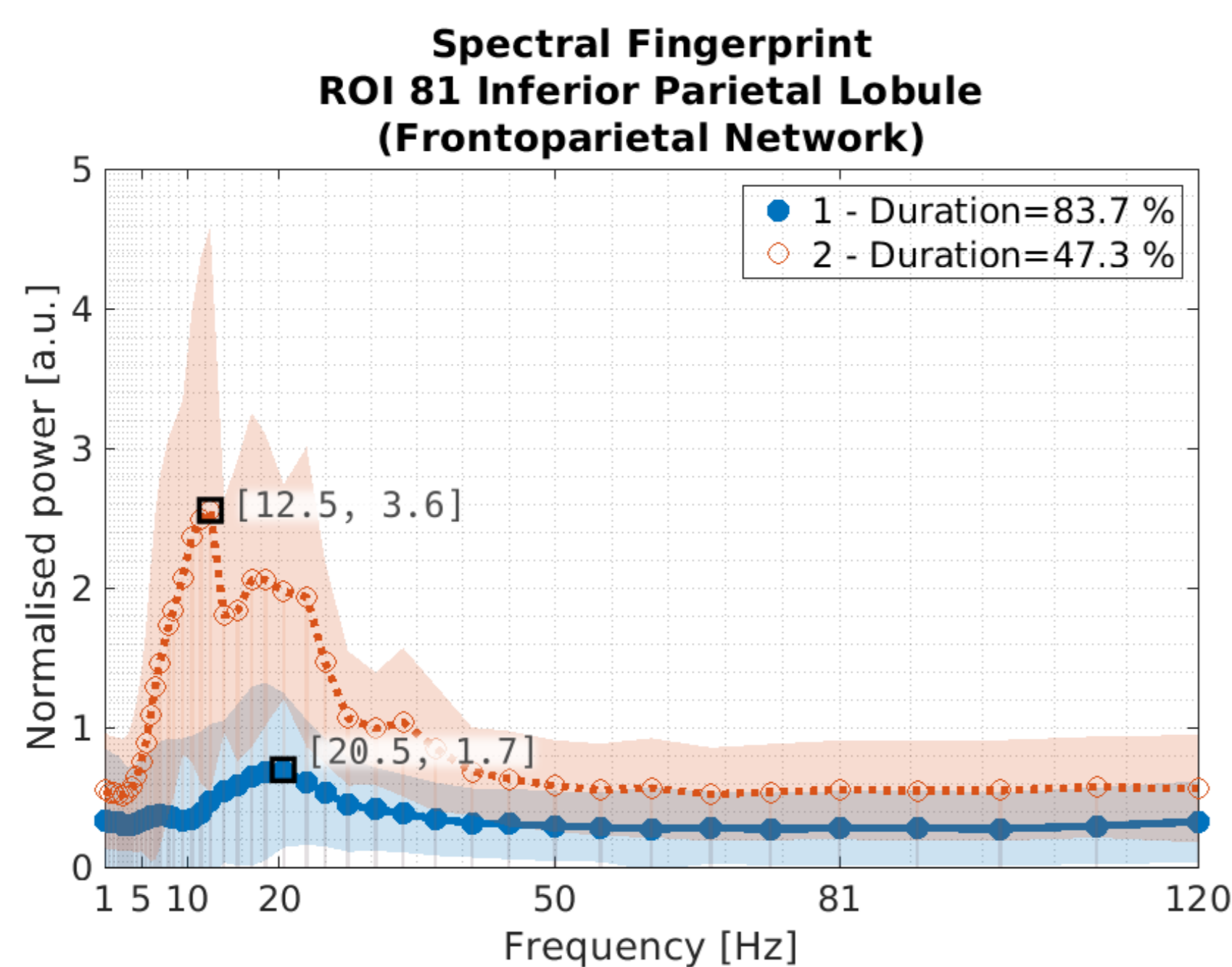
Input: MEG/EEG signal, lead field

Output: Fingerprints representing individual-level / group-level activity in the frequency-domain



TOOLBOX CAPABILITIES

FINGERPRINT GENERATION

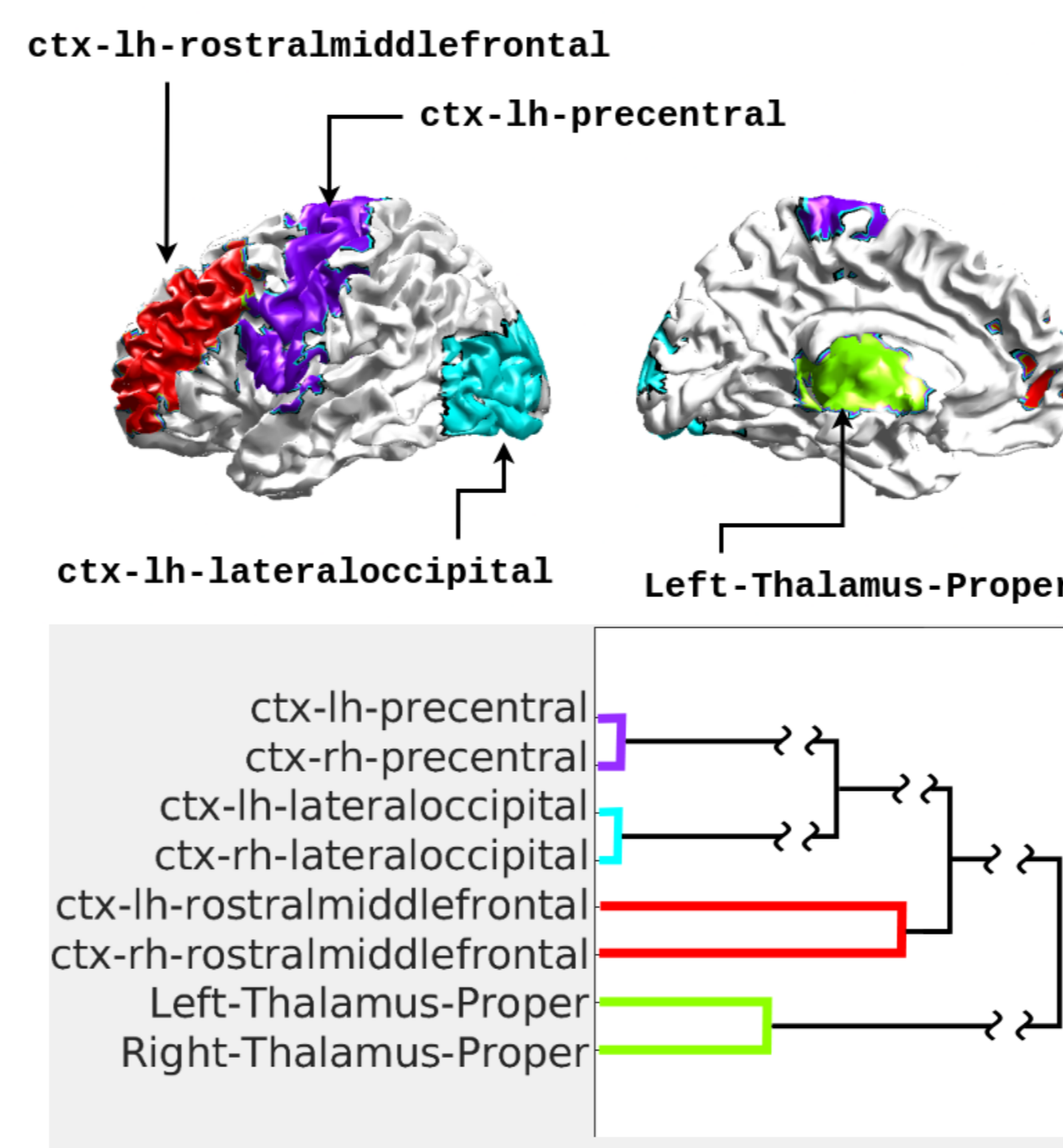


$$SF_{81} = \{(m_1, t_1 = 83.7\%), (m_2, t_2 = 47.3\%)\}$$

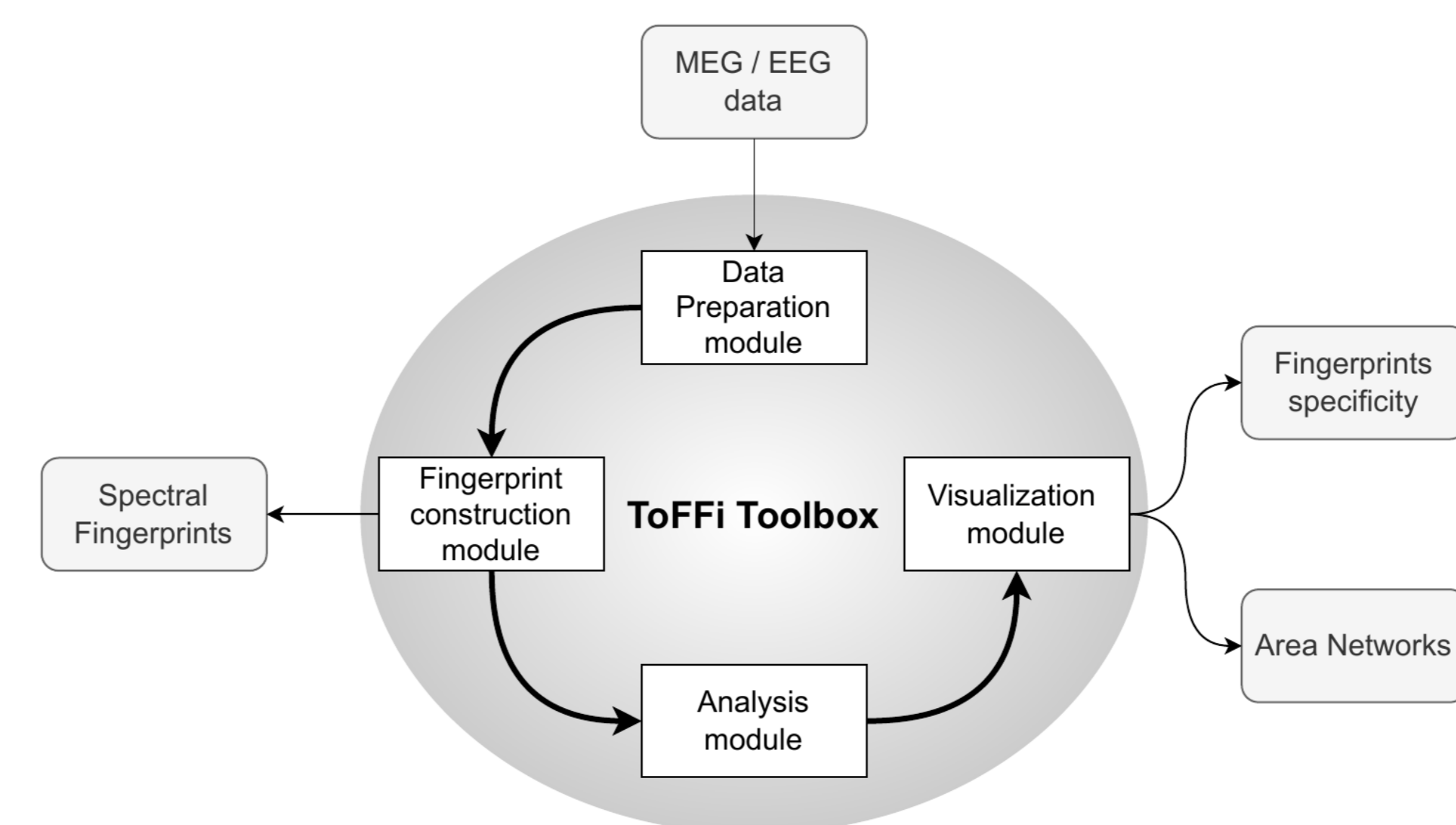
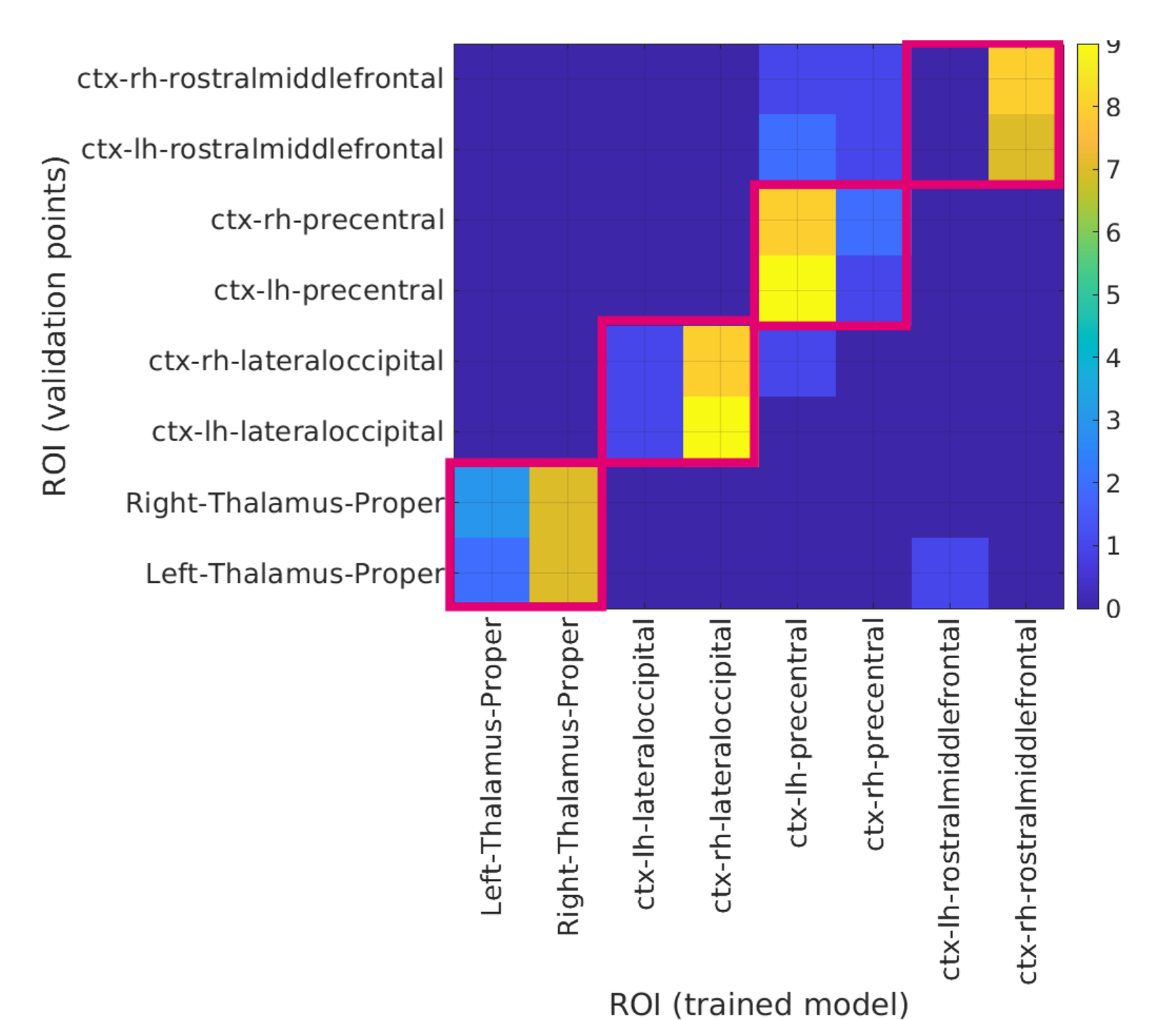
POTENTIAL APPLICATIONS

- normative bases of cognitive process fingerprints of healthy/diseased brains
- regions/networks identification underlying cognitive process (Keitel & Gross, 2016; Komorowski et al., 2018)
- subject identification via their individual fingerprints
- relationship between fingerprint features and psychological traits and behavioral measures ;
- identification of brain disorders (Lubinus et al., 2021)

AREA SIMILARITY ANALYSIS



IDENTIFICATION ACCURACY SIMULATION



- parallel computations supported
- build-in reproducibility control
- visualization modules included
- highly-configurable
- open-source
- languages: Matlab, Bash
- runs on: Linux, Windows, macOS

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