

# MEG/EEG data processing in Python

<http://martinos.org/mne>

Alexandre Gramfort

<http://alexandre.gramfort.net>

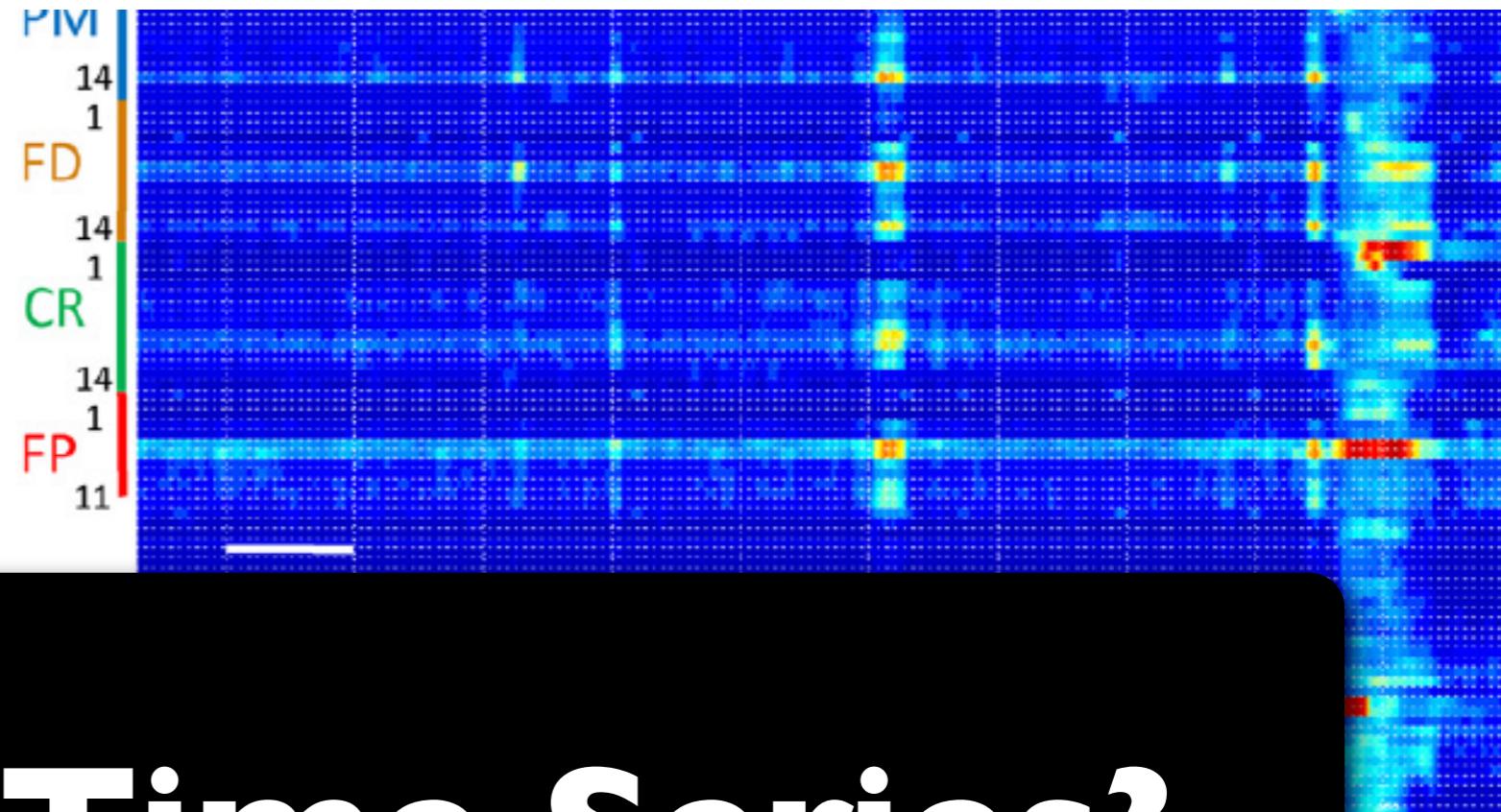
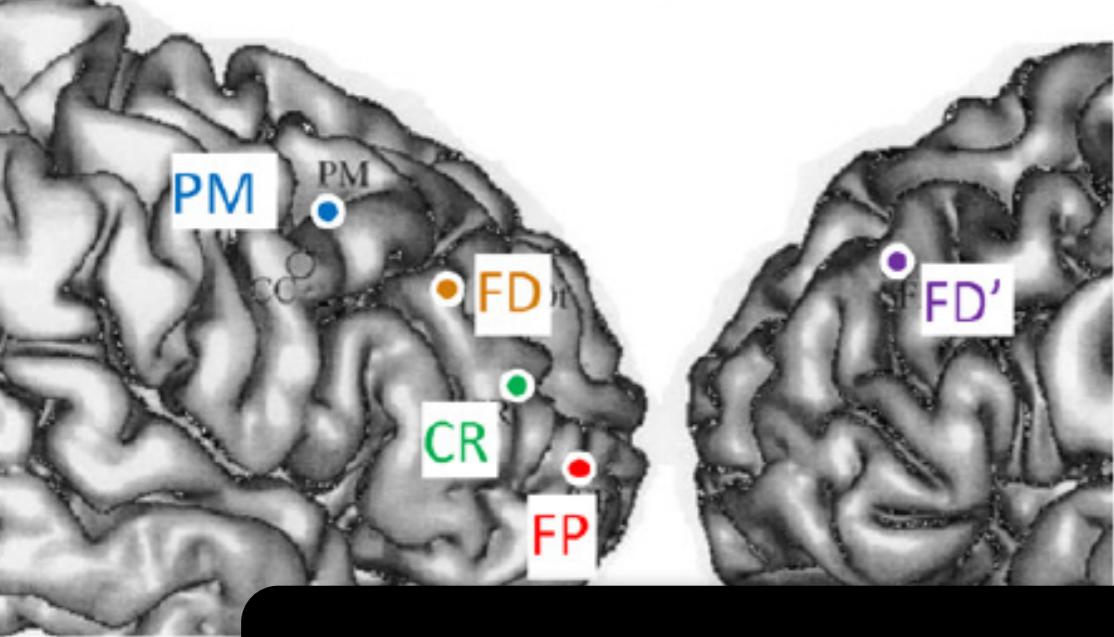
GitHub : @agramfort 

Twitter : @agramfort 

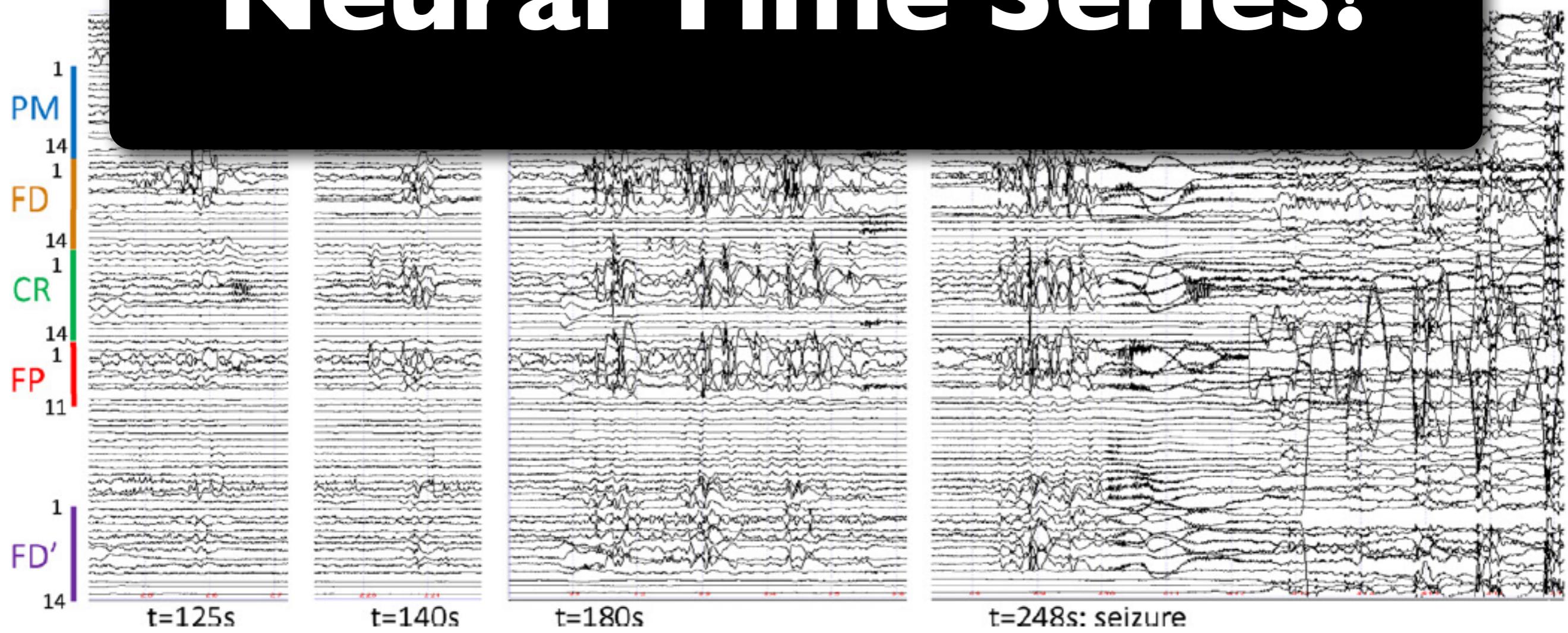
[http://bit.ly/mne\\_ohbm2018](http://bit.ly/mne_ohbm2018)

MNE software for processing MEG and EEG data, A. Gramfort, M. Luessi, E. Larson, D. Engemann, D. Strohmeier, C. Brodbeck, L. Parkkonen, M. Hämäläinen, Neuroimage, 2014



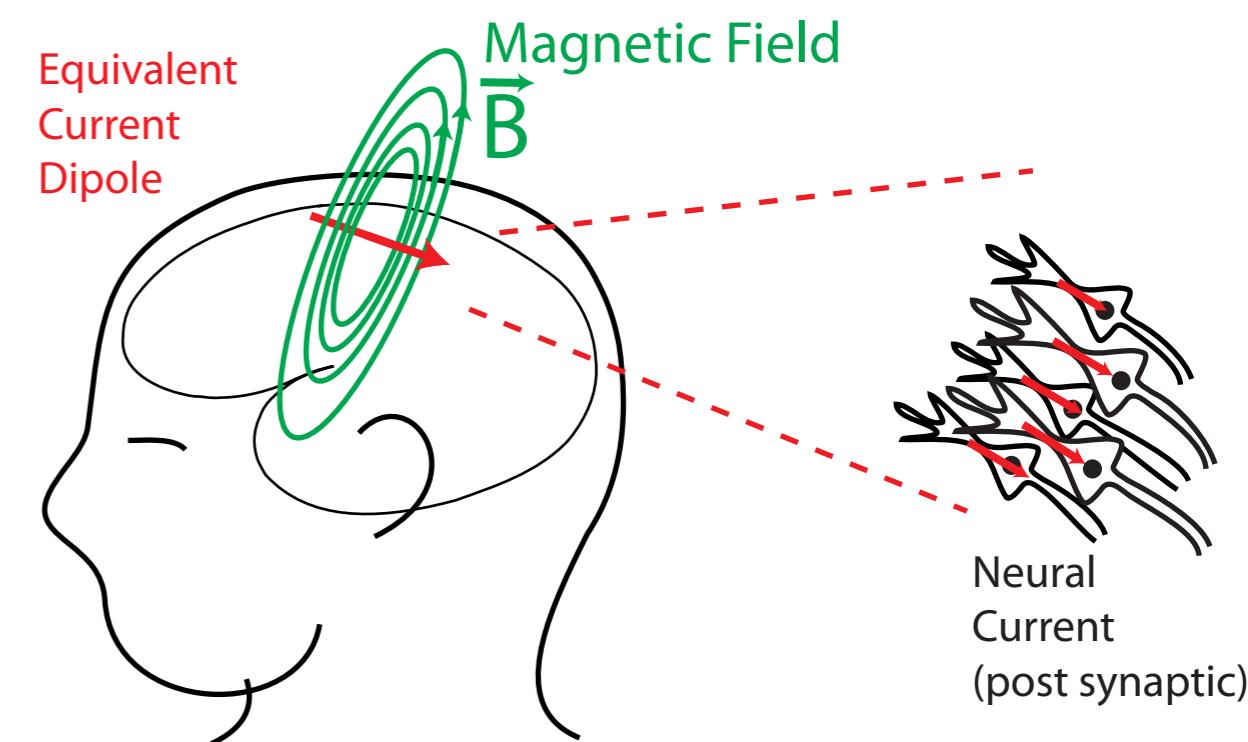
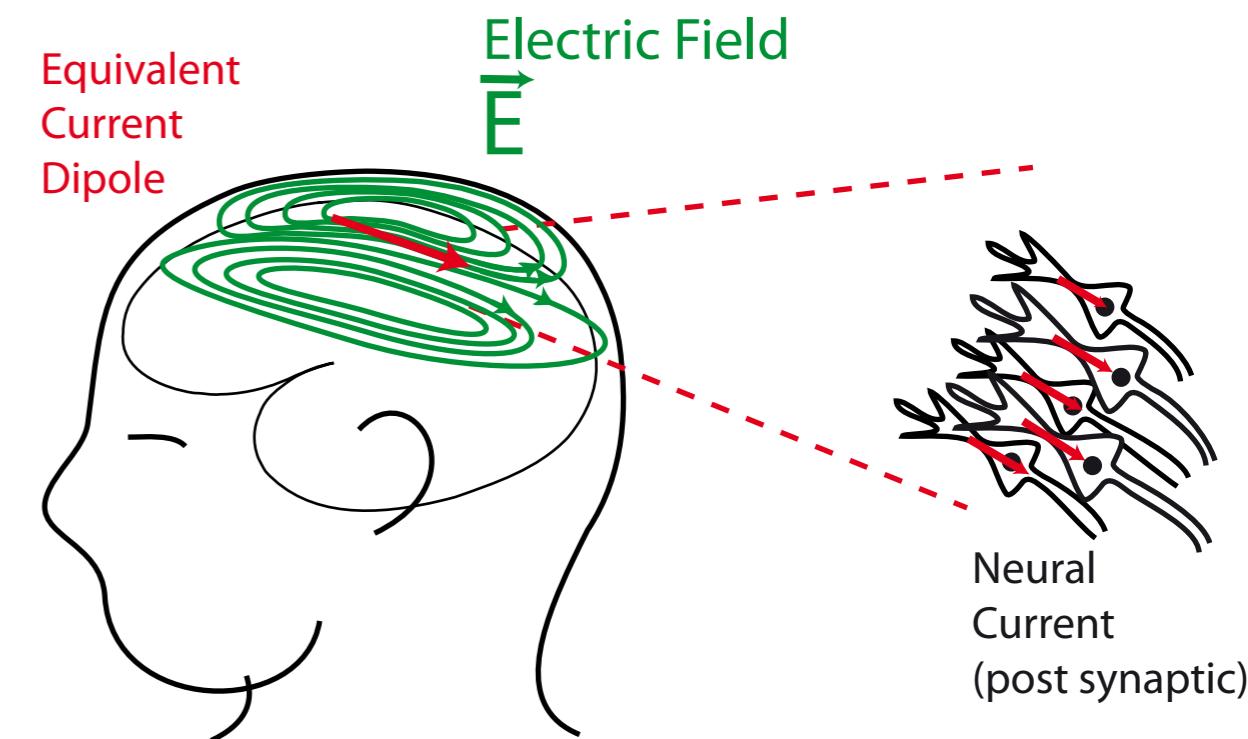
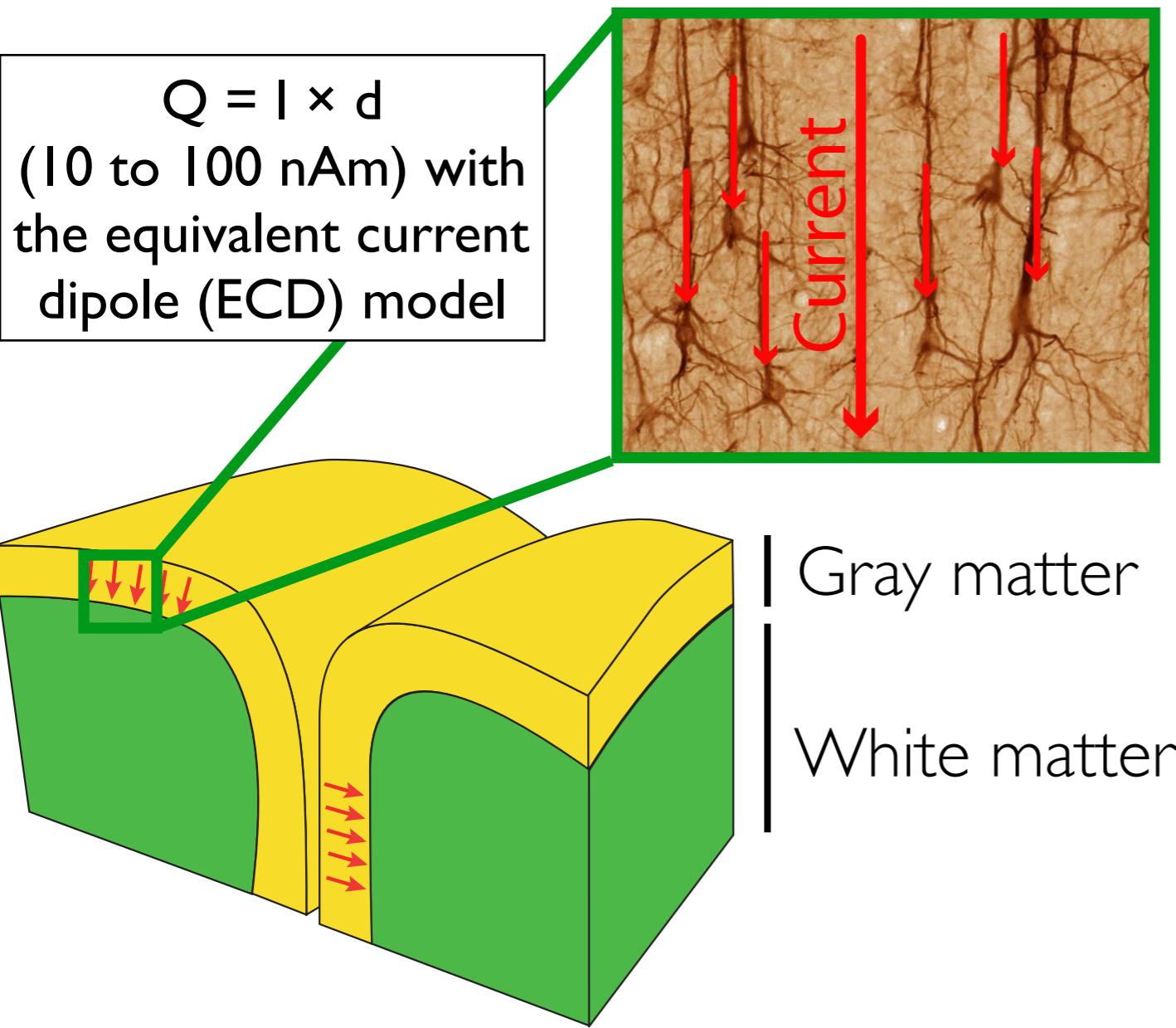


# Neural Time Series?

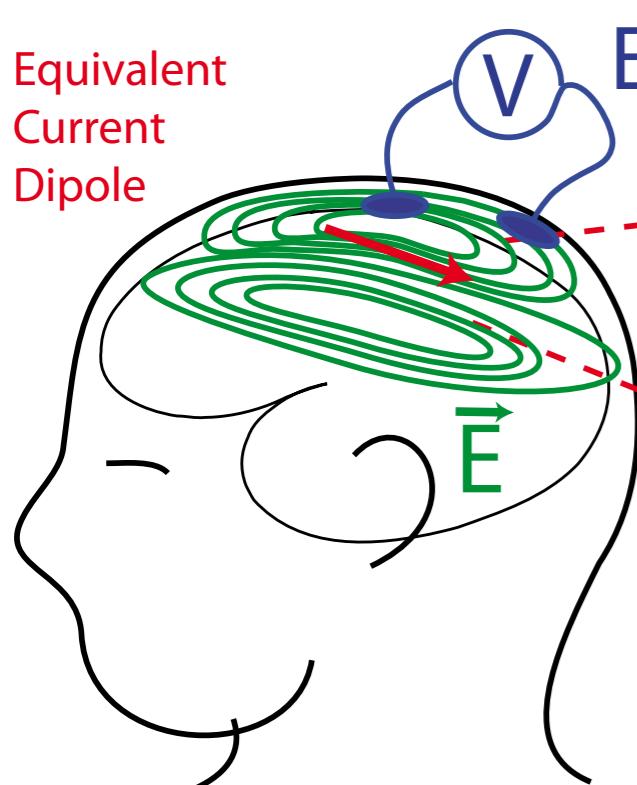


# Neurons as current generators

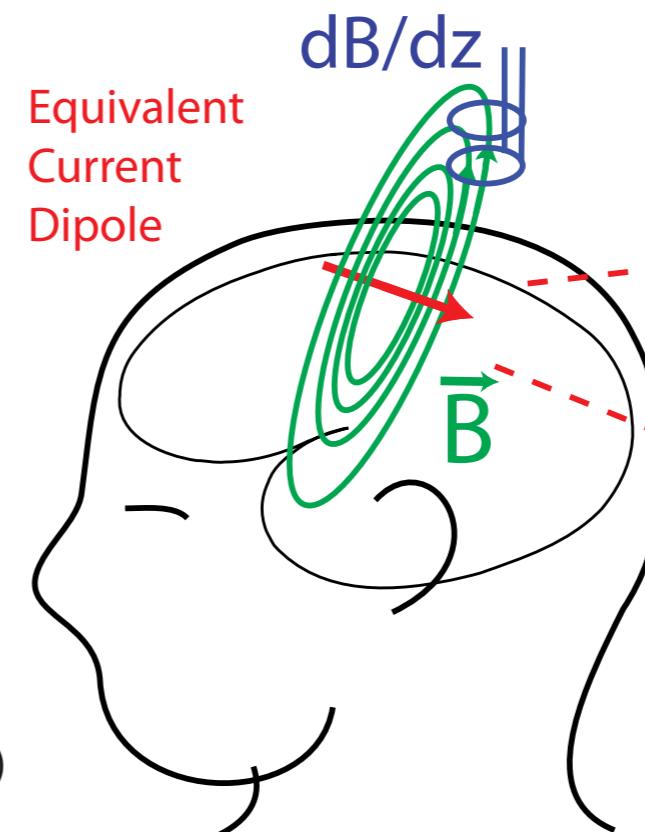
Large cortical pyramidal cells organized in macro-assemblies with their **dendrites** **normally oriented to the local cortical surface**



# Electro- & Magneto-encephalography



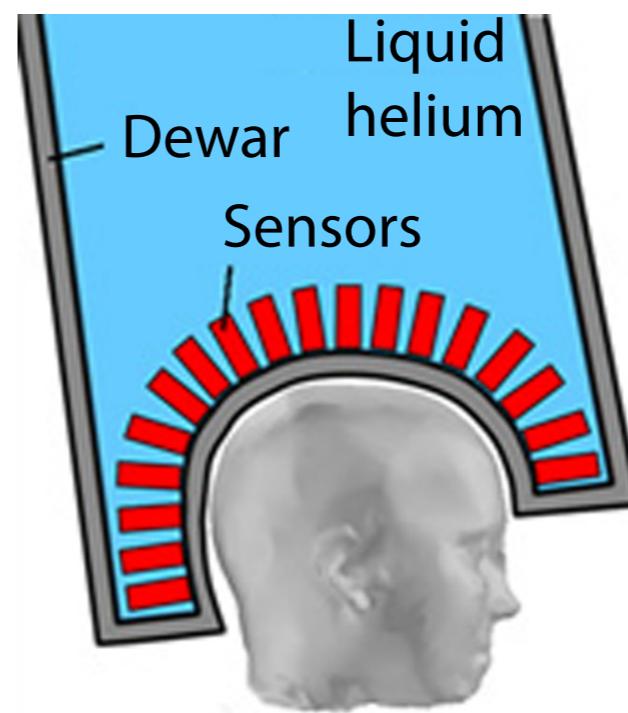
EEG recordings



MEG recordings

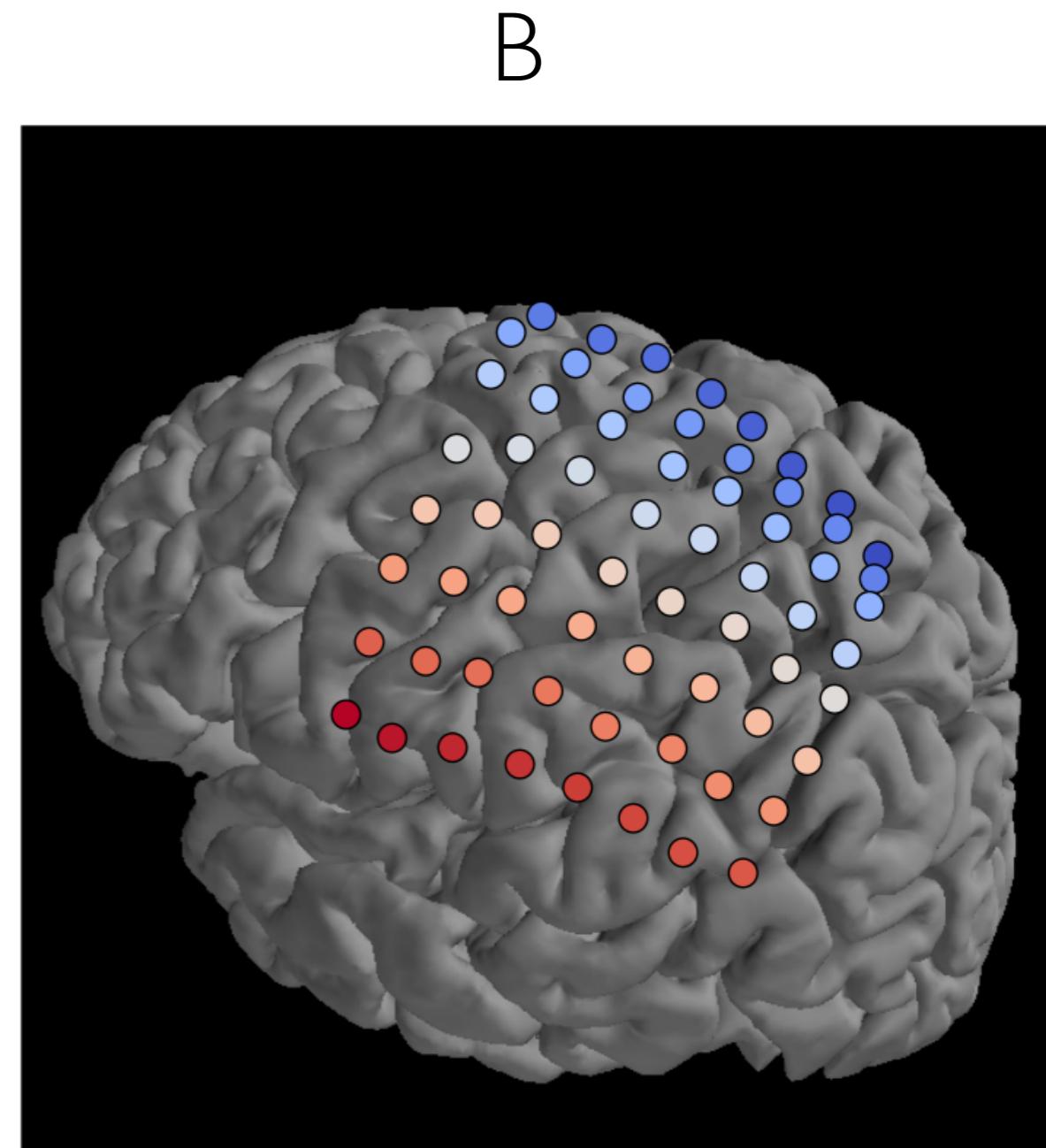
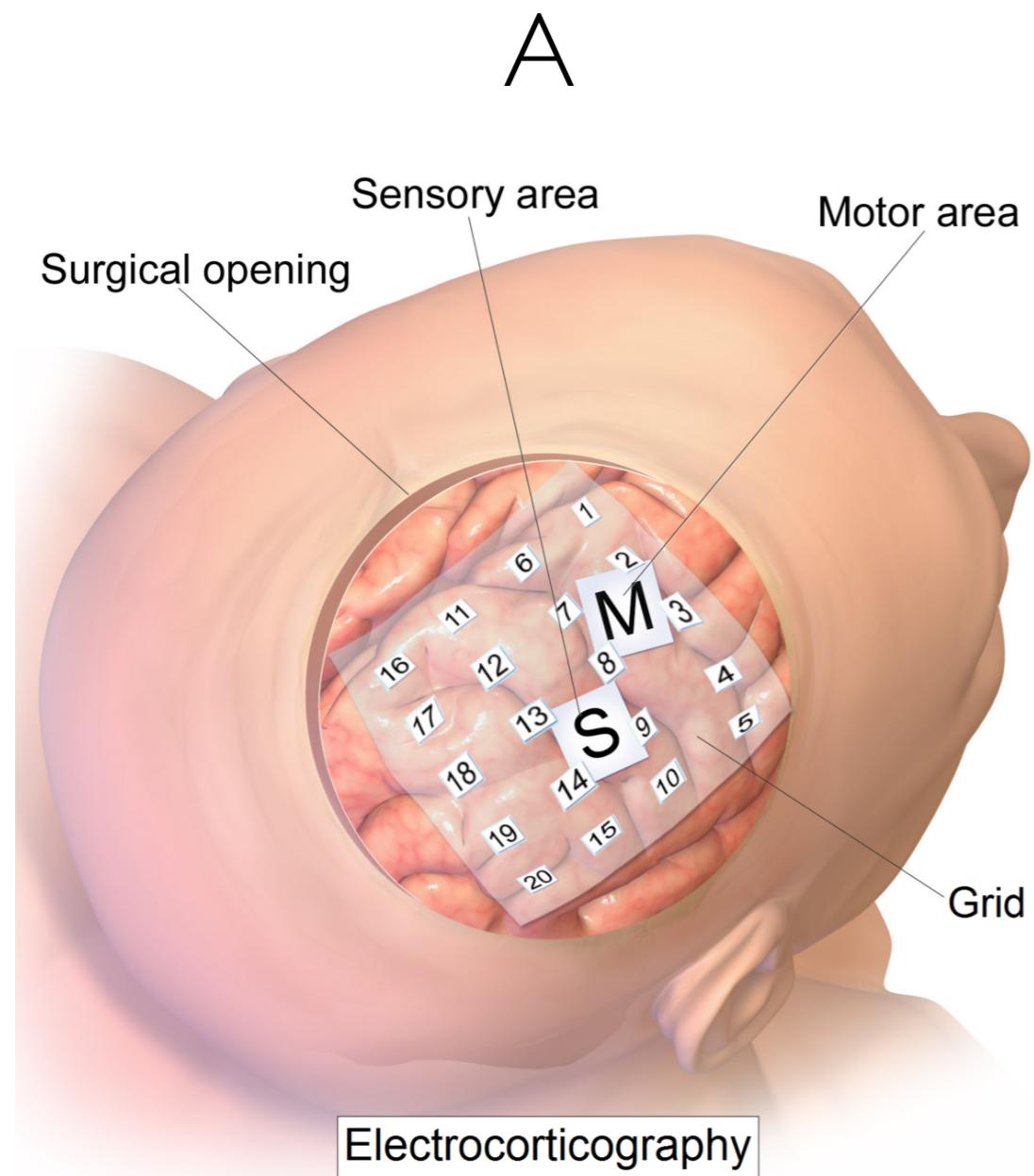


First EEG  
recordings  
in 1929  
by H. Berger



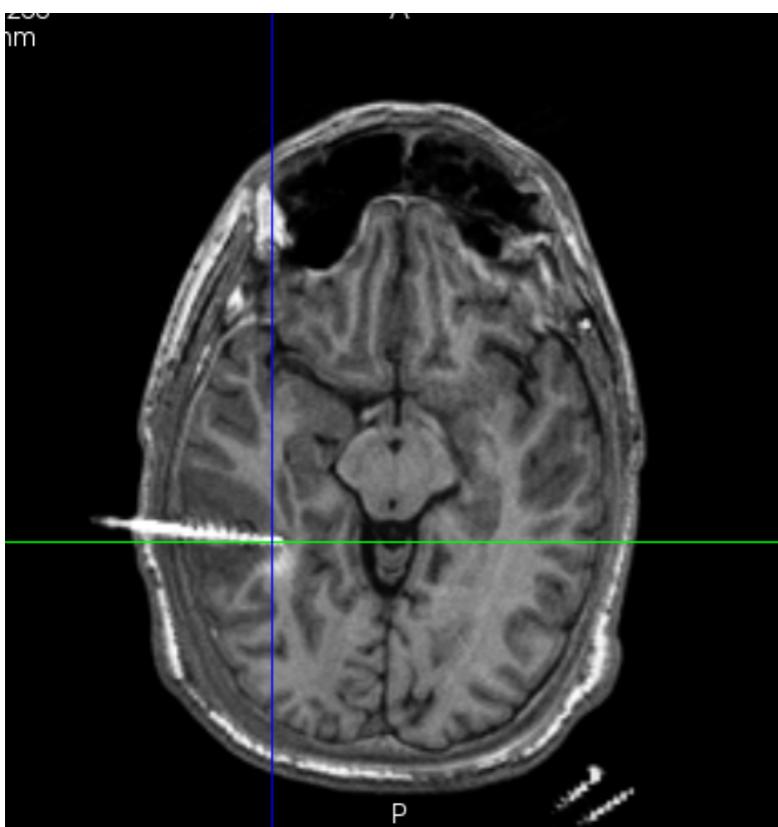
Hôpital La Timone  
Marseille, France

# Electrocorticography (ECoG)



- A) <https://en.wikipedia.org/wiki/Electrocorticography>
- B) [http://martinos.org/mne/dev/auto\\_tutorials/plot\\_ecog.html](http://martinos.org/mne/dev/auto_tutorials/plot_ecog.html)

# Intracranial EEG



5 to 15 contacts per electrode and around 10 electrodes are implanted

**MNE is a Python library to  
process and visualize data  
produced by these devices**



MEG + EEG ANALYSIS & VISUALIZATION

Open-source Python software for exploring, visualizing, and analyzing human neurophysiological data: MEG, EEG, sEEG, ECoG, and more.

 Speed

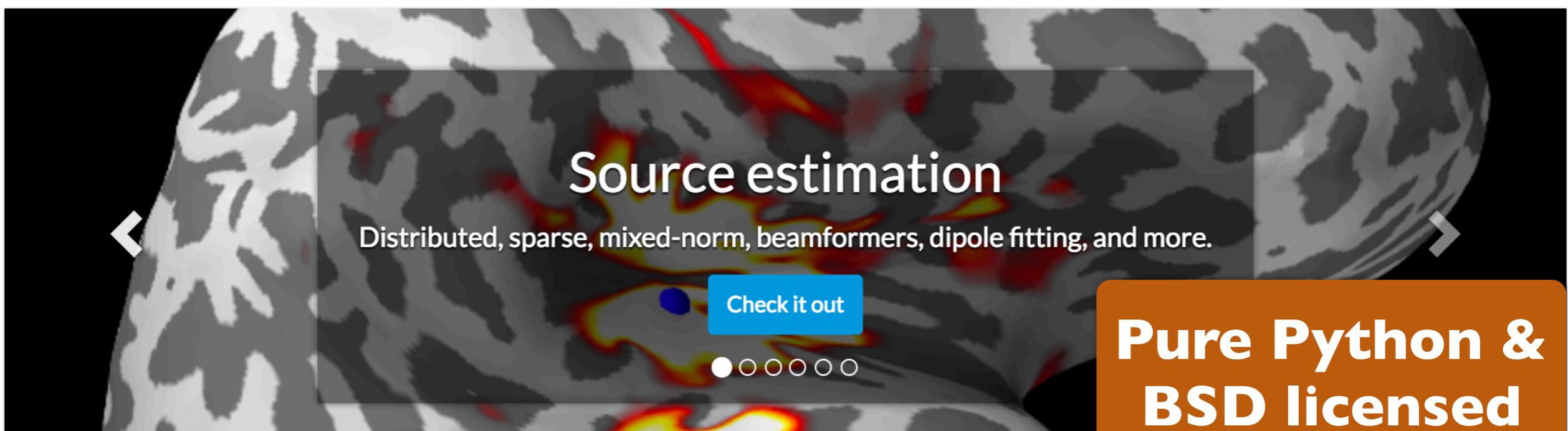
Multi-core CPU & GPU.

 Usability

Clean scripting & visualization.

 Flexibility

Broad data format & analysis support.



Source estimation  
Distributed, sparse, mixed-norm, beamformers, dipole fitting, and more.

Check it out

oooooo

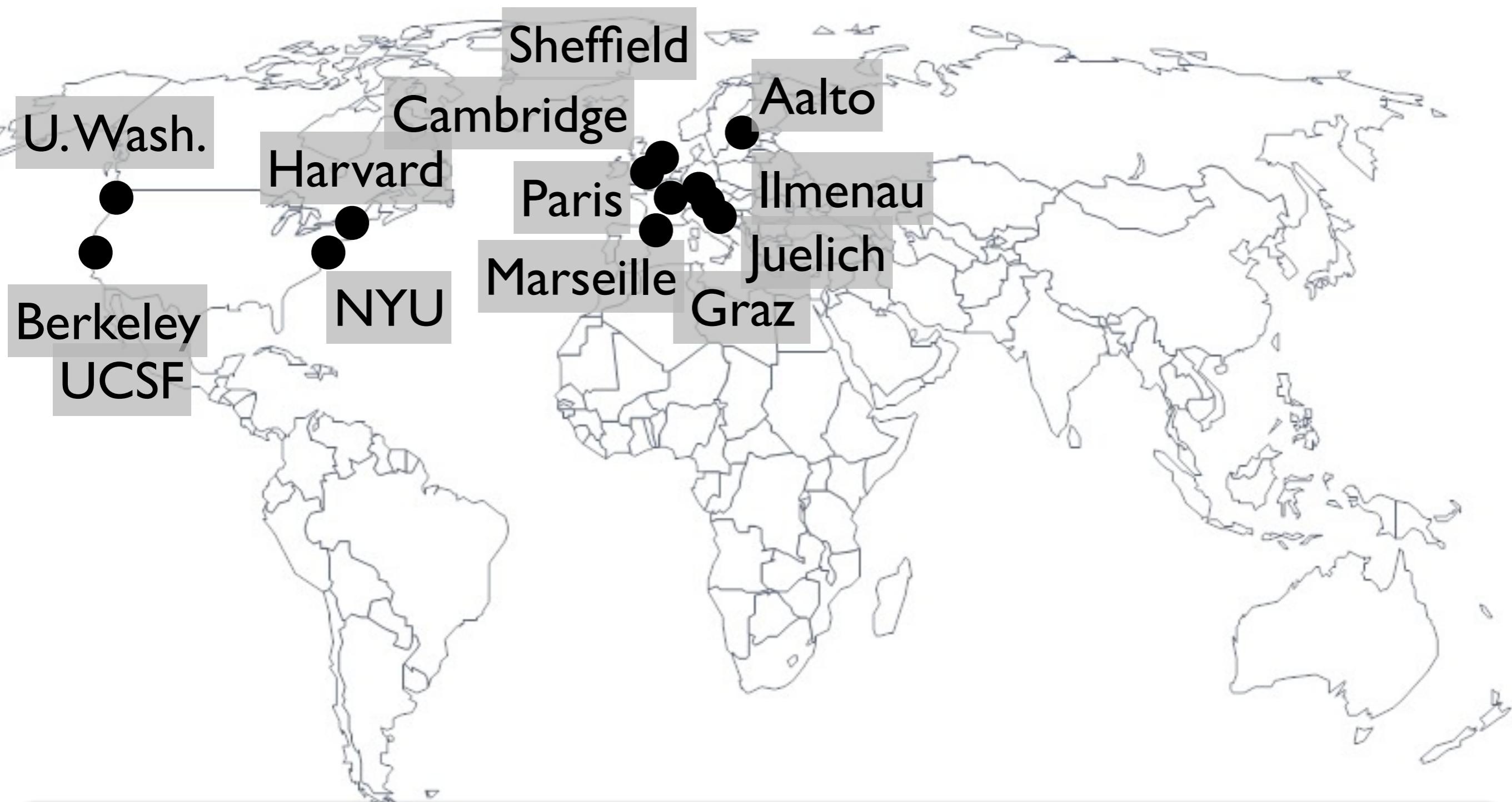
Pure Python &  
BSD licensed

Data I/O

Preprocessing

Visualization

# Distributed development

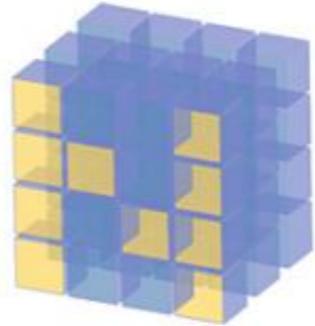


**Vision: Implement, share, document  
the best methods from all labs**

# MNE People

Alan Leggitt, Alexander Rudiuk, Alexandre Barachant, Alexandre Gramfort, Andrew Dykstra, Asish Panda, Basile Pinsard, Brad Buran, Camilo Lamus, Cathy Nangini, Chris Holdgraf, Christian Brodbeck, Christoph Dinh, Christopher J. Bailey, Christopher Mullins, Clemens Brunner, Clément Moutard, Dan G. Wakeman, Daniel McCloy, Daniel Strohmeier, Denis A. Engemann, Emanuele Olivetti, Emily Ruzich, Emily Stephen, Eric Larson, Fede Raimondo, Federico Raimondo, Félix Raimundo, Guillaume Dumas, Hafeza Anevar, Hari Bharadwaj, Ingoo Lee, Jaakko Leppakangas, Jair Montoya, Jean-Remi King, Johannes Niediek, Jona Sassenhagen, Jussi Nurminen, Kambiz Tavabi, Keith Doelling, Lorenzo De Santis, Louis Thibault, Luke Bloy, Mads Jensen, Mainak Jas, Manfred Kitzbichler, Manoj Kumar, Marian Dovgialo, Marijn van Vliet, Mark Wronkiewicz, Marmaduke Woodman, Martin Billinger, Martin Luessi, Matt Tucker, Matti Hamalainen, Michael Krause, Mikolaj Magnuski, Natalie Klein, Nick Foti, Nick Ward, Niklas Wilming, Olaf Hauk, Phillip Alday, Praveen Sripad, Richard Höchenberger, Roan LaPlante, Romain Trachel, Roman Goj, Ross Maddox, Sagun Pai, Saket Choudhary, Simon Kornblith, Simon-Shlomo Poil, Sourav Singh, Tal Linzen, Tanay, Teon Brooks, Tom Dupré la Tour, Yaroslav Halchenko, Yousra Bekhti, Ellen Lau, Mads Jensen !

Thanks !

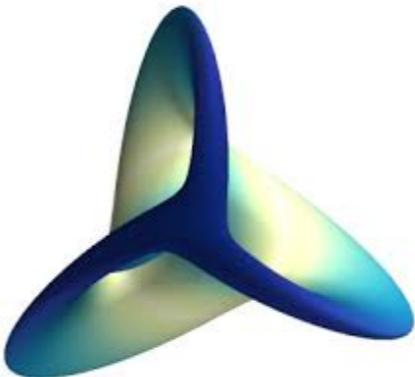


NumPy

matplotlib



scikit  
learn



Mayavi

GitHub



Travis CI



circleci



Google



SPHINX  
Sphinx-Gallery



ANACONDA®

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