

MEG/EEG data processing in Python

<http://mne.tools>

Alexandre Gramfort
<http://alexandre.gramfort.net>

GitHub : @agramfort 

Twitter : @agramfort 

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



Objectives

- MNE: History and vision
- What can you do with MNE-Python? `>>> from mne import *`
- Show you some cool demos



http://bit.ly/mne_sapien_labs2019





MEG + EEG ANALYSIS & VISUALIZATION

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

 Speed

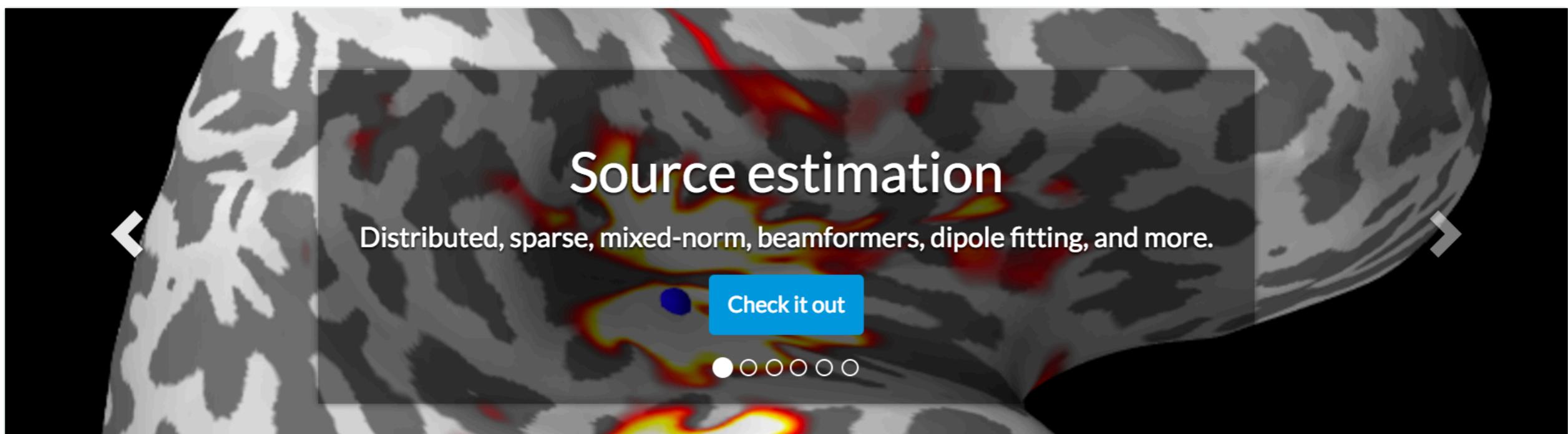
Multi-core CPU & GPU.

 Usability

Clean scripting & visualization.

 Flexibility

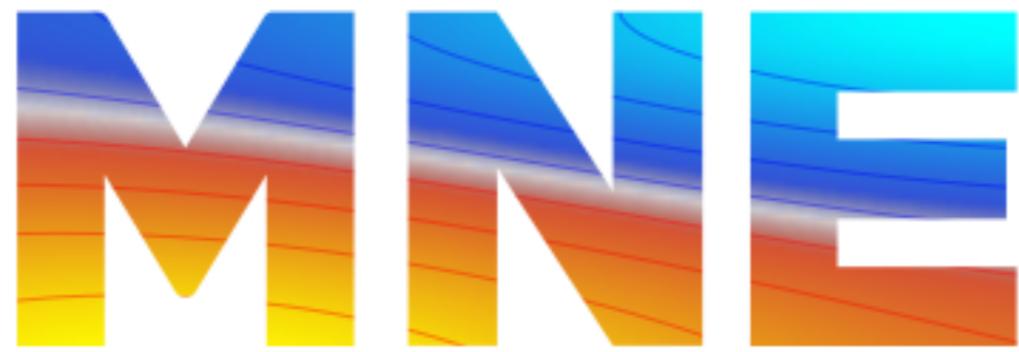
Broad data format & analysis support.



Data I/O

Preprocessing

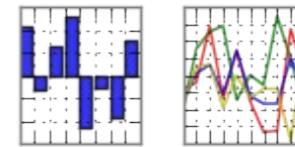
Visualization



built on top of the scientific Python ecosystem



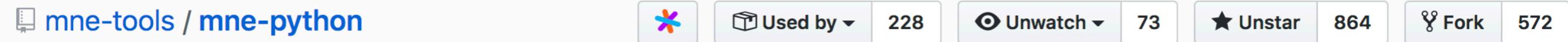
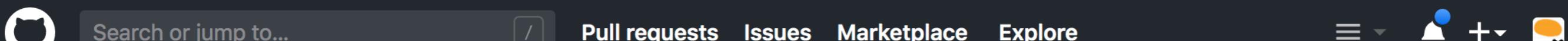
IP[y]:
IPython



PyMC

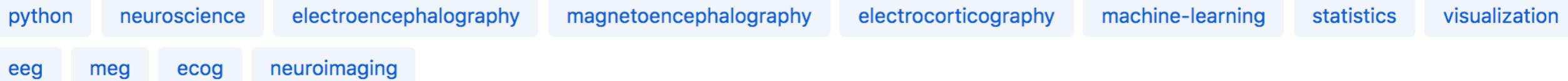


<https://github.com/mne-tools/mne-python>



MNE : Magnetoencephalography (MEG) and Electroencephalography (EEG) in Python <http://martinos.org/mne/>

Edit



[Manage topics](#)

14,257 commits

18 branches

68 releases

169 contributors

BSD-3-Clause

Branch: master ▾

New pull request

Create new file

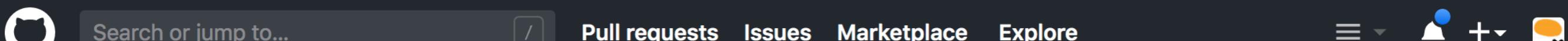
Upload files

Find File

Clone or download ▾

| | | |
|--|--|------------------------------------|
| | larsoner and agramfort ENH: Better error message for bad choice of picks (#6408) | Latest commit e1a160c 14 hours ago |
| | .circleci Merge pull request #6113 from JoseAlanis/limo_example | 4 days ago |
| | .github [MRG] Add default github issue templates (#5413) | 10 months ago |
| | bin Fix couple of PEP8 errors. (#5558) | 8 months ago |
| | doc DOC: Better org of source PSD examples (#6407) | 17 hours ago |
| | examples DOC: Better org of source PSD examples (#6407) | 17 hours ago |
| | logo MAINT: Update logo code (#6328) | 20 days ago |
| | mne ENH: Better error message for bad choice of picks (#6408) | 14 hours ago |
| | tutorials DOC: Better org of source PSD examples (#6407) | 17 hours ago |

<https://github.com/mne-tools/mne-python>



mne-tools / mne-python



Used by

228

Unwatch

73

Unstar

864

Fork

572

Code

Used by

228

Unwatch

73

Unstar

864

Fork

572

MNE : M

python

neuroscience

electroencephalography

magnetoencephalography

electrocorticography

machine-learning

statistics

visualization

eeg

meg

ecog

neuroimaging

Manage topics

14,257 commits

18 branches

68 releases

169 contributors

BSD-3-Clause

Branch: master

New pull request

Create new file

Upload files

Find File

Clone or download



larsoner and agramfort ENH: Better error message for bad choice of picks (#6408)

Latest commit e1a160c 14 hours ago

.circleci

Merge pull request #6113 from JoseAlanis/limo_example

4 days ago

.github

[MRG] Add default github issue templates (#5413)

10 months ago

bin

Fix couple of PEP8 errors. (#5558)

8 months ago

doc

DOC: Better org of source PSD examples (#6407)

17 hours ago

examples

DOC: Better org of source PSD examples (#6407)

17 hours ago

logo

MAINT: Update logo code (#6328)

20 days ago

mne

ENH: Better error message for bad choice of picks (#6408)

14 hours ago

tutorials

DOC: Better org of source PSD examples (#6407)

17 hours ago

About the project

- MNE based on C code developed for ~18 years by
- MNE-Python started in 2010 at MGH, Boston



Matti
Hämäläinen

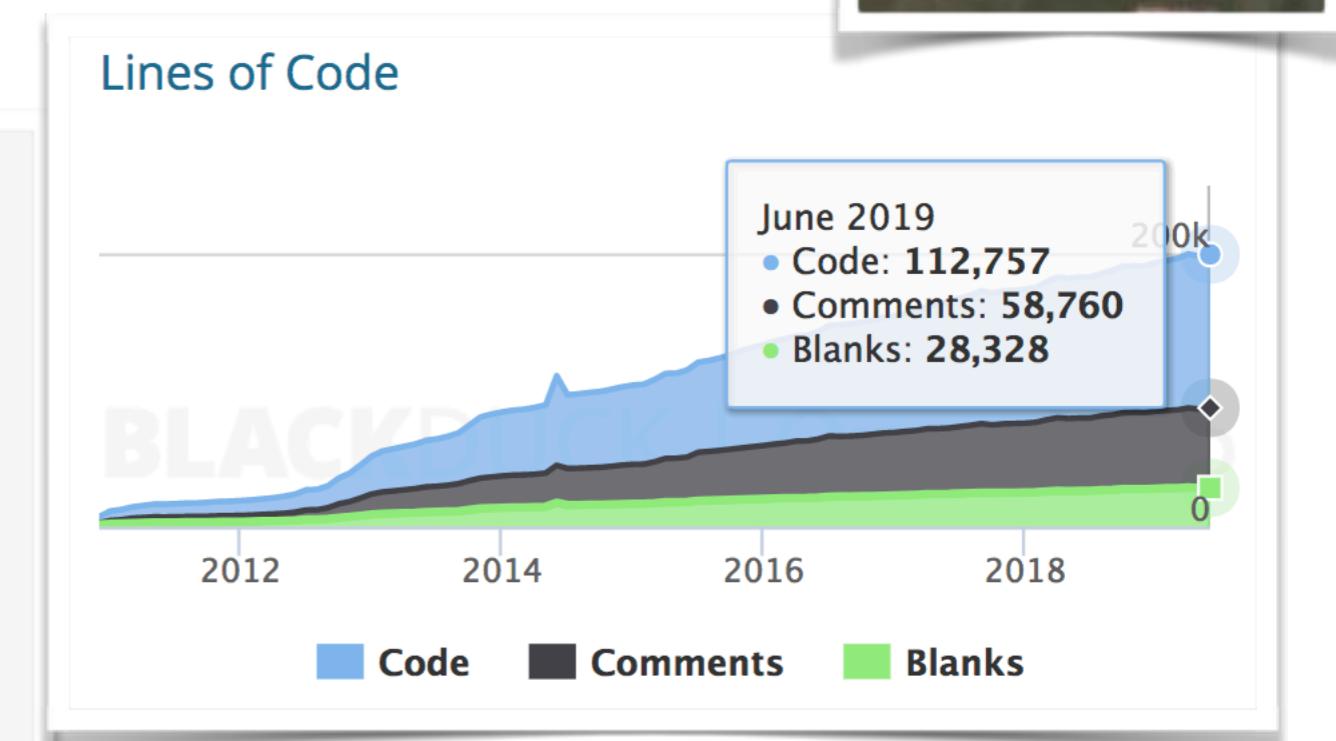
In a Nutshell, MNE-Python...

... has had 14,257 commits made by 236 contributors representing 112,757 lines of code

... is mostly written in Python with a well-commented source code

... has a well established, mature codebase maintained by a very large development team with stable Y-O-Y commits

... took an estimated 29 years of effort (COCOMO model) starting with its first commit in December, 2010 ending with its most recent commit about 14 hours ago



30 Day Summary

May 6 2019 — Jun 5 2019

109 Commits

23 Contributors
including 4 new contributors

12 Month Summary

Jun 5 2018 — Jun 5 2019

732 Commits

Up + 99 (15%) from previous 12 months

78 Contributors

Up + 15 (23%) from previous 12 months

About the project

- MNE based on C code developed for ~18 years by
- MNE-Python started in 2010 at MGH, Boston



Matti
Hämäläinen

In a Nutshell, MNE-Python...

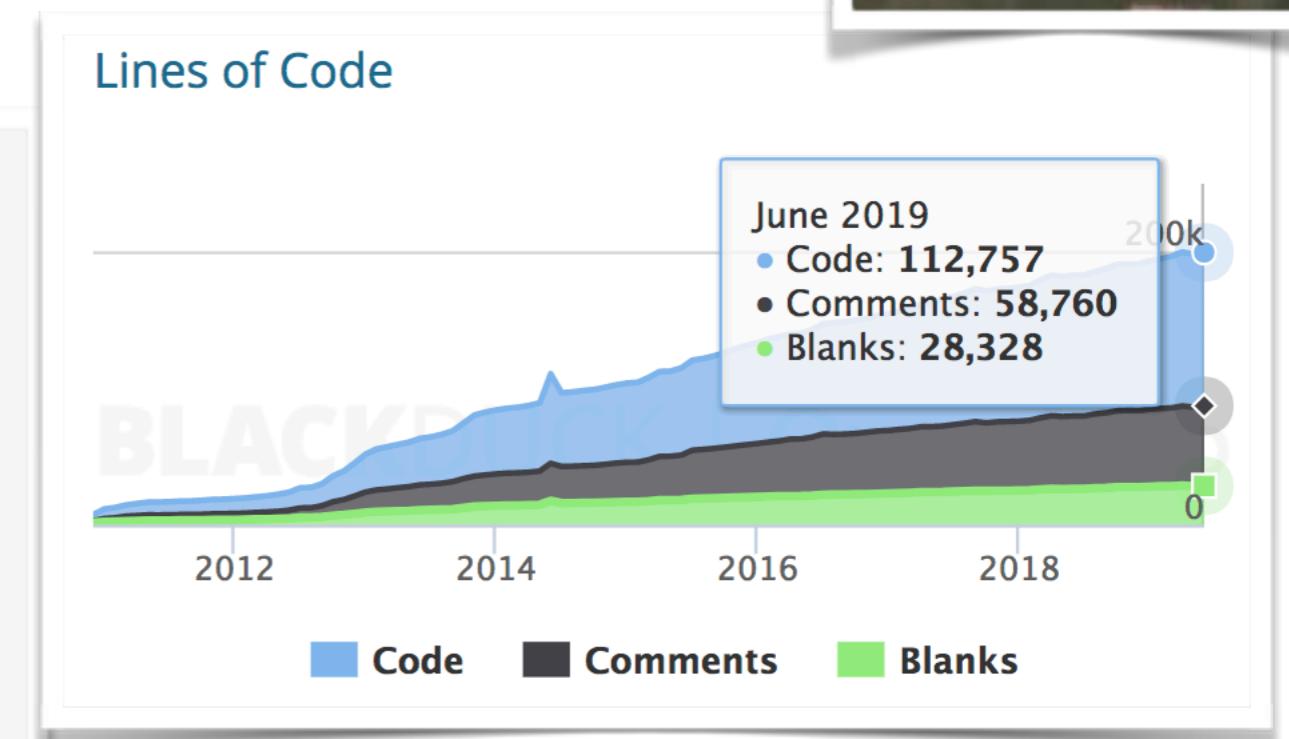
... has had 14,257 commits made by 236 contributors representing 112,757 lines of code

... is mostly written in Python with a well-commented source code

... has a well established, mature codebase maintained by a very large development team

- Pure Python
- BSD licensed (commercial use ok)
- Mac / Linux / Windows

hours ago



12 Month Summary

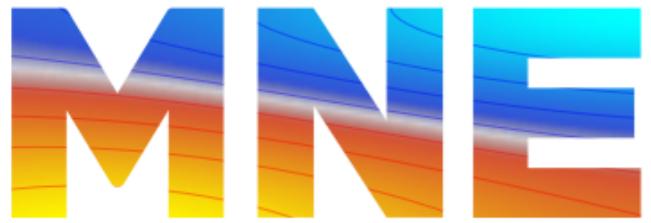
Jun 5 2018 – Jun 5 2019

732 Commits

Up + 99 (15%) from previous 12 months

78 Contributors

Up + 15 (23%) from previous 12 months



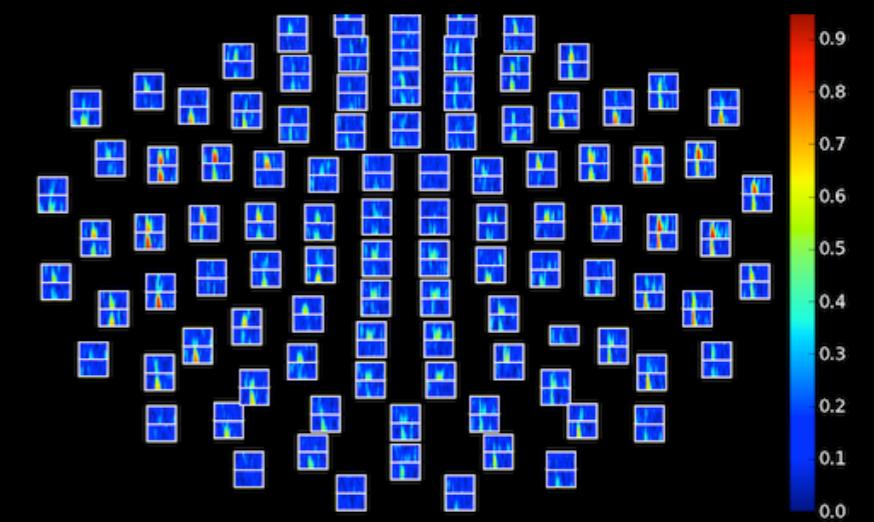
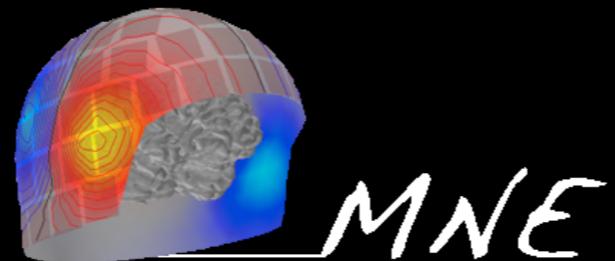
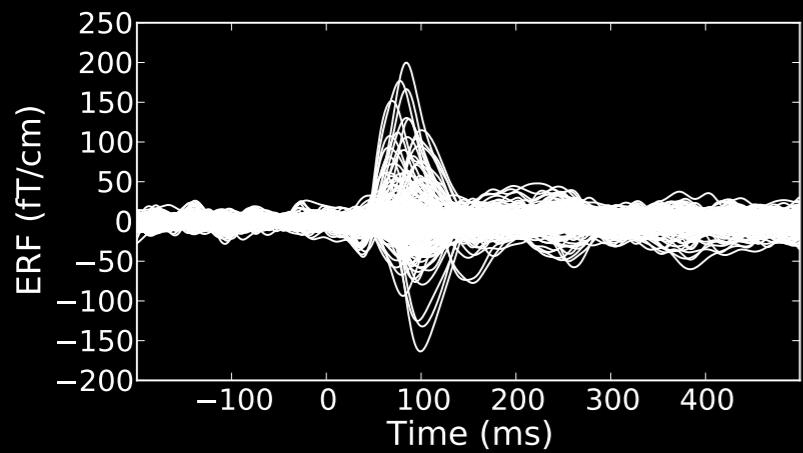
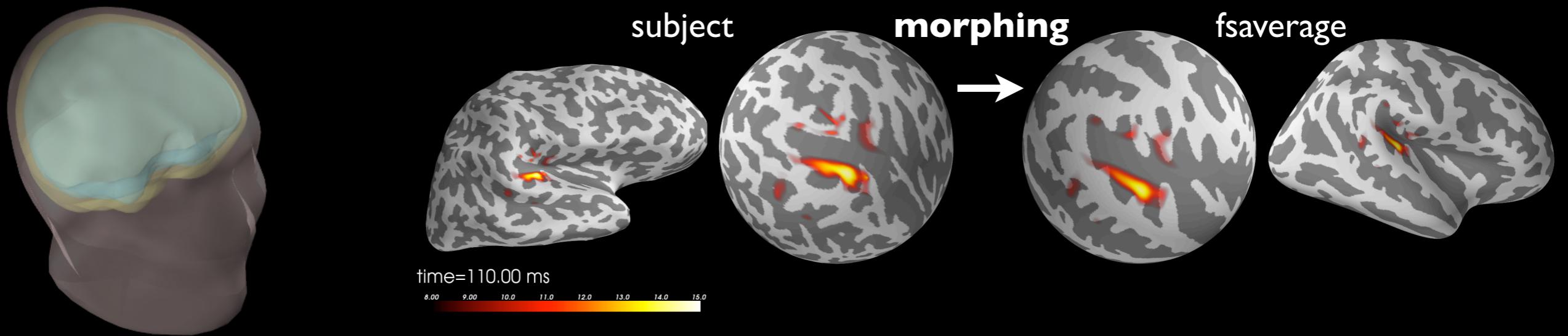
Distributed development



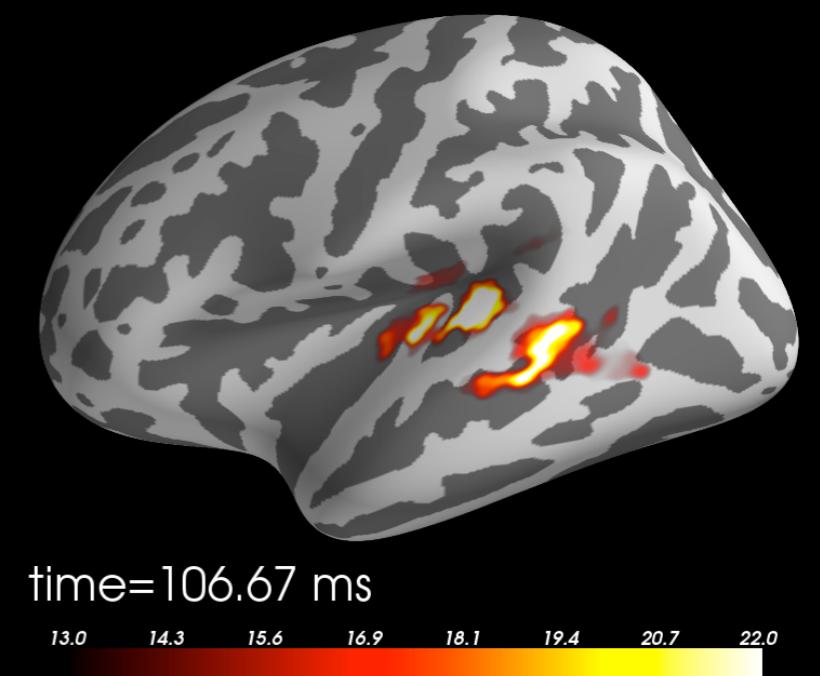
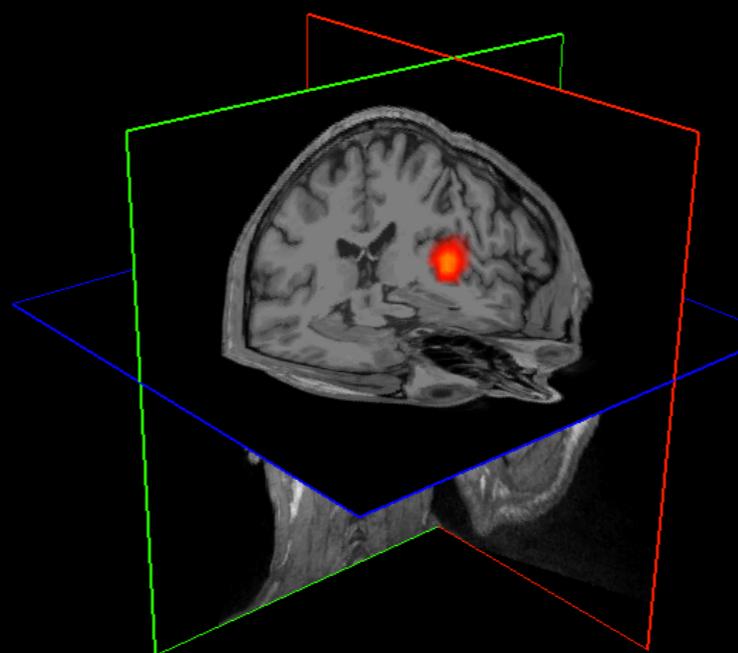
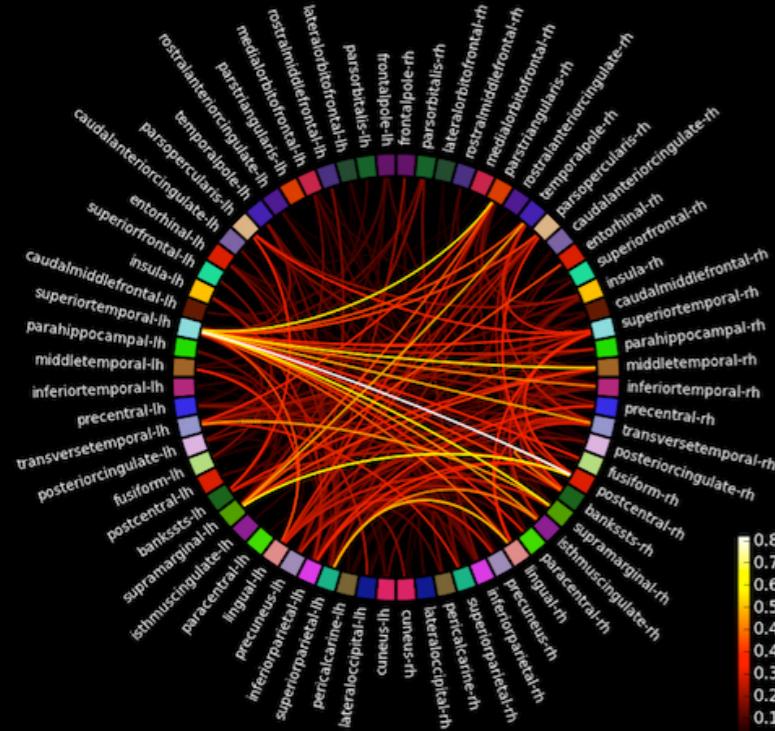
**Vision: Implement, share, document
the best methods from all labs**

A young girl with light brown hair in two pigtails, wearing a pink long-sleeved shirt, is looking upwards with her arms outstretched. An orange speech bubble originates from her hands and points towards the text.

What can I do
with MNE?



All-to-All Connectivity left-Auditory Condition



A close-up photograph of a young girl with light brown hair styled in two pigtails. She is wearing a long-sleeved pink shirt. Her arms are extended wide to her sides, palms facing forward. She is looking upwards and slightly to the right with a neutral expression. The background is plain white.

And if I need
help?

Getting help



Mailing list:

http://mail.nmr.mgh.harvard.edu/mailman/listinfo/mne_analysis



<https://gitter.im/mne-tools/mne-python>

A close-up photograph of a young girl with light brown hair styled in two pigtails. She is wearing a long-sleeved pink shirt. Her arms are extended wide to her sides, palms facing forward. She is looking upwards and slightly to the right with a neutral expression. The background is plain white.

And if I want to
help?

Contributing to MNE-Python

Page contents

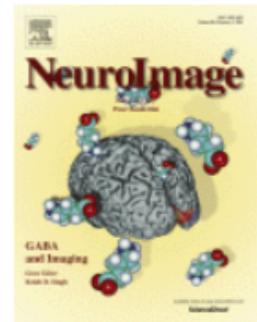
- [Overview of contribution process](#)
- [Setting up your local environment for MNE-Python development](#)
 - [Configuring git](#)
 - [Setting up the development environment](#)
 - [Basic git commands](#)
 - [Connecting to GitHub with SSH \(optional\)](#)
- [MNE-Python coding conventions](#)
 - [General requirements](#)
 - [Code style](#)
 - [Code organization](#)
 - [Running the test suite](#)
 - [Building the documentation](#)
 - [Modifying command-line tools](#)
 - [GitHub workflow](#)

<https://mne.tools/dev/install/contributing.html>

MNE People

Achilleas Koutsou, Alan Leggitt, Alejandro Weinstein, Alexander Kovrig, Alexander Rudiuk, Alexandre Barachant, Alexandre Gramfort, Andrew Dykstra, Annalisa Pascarella, Anne-Sophie Dubarry, Antoine Gauthier, Antti Rantala, Asish Panda, Basile Pinsard, Brad Buran, Britta Westner, Bruno Nicenboim, Burkhard Maess, Camilo Lamus, Cathy Nangini, Chris Bailey, Chris Holdgraf, Christian Brodbeck, Christoph Dinh, Christopher Holdgraf, Christopher J. Bailey, Christopher Mullins, Claire Braboszcz, Clemens Brunner, Clément Moutard, Cristóbal Moënne-Locoz, Dan G. Wakeman, Daniel McCloy, Daniel Strohmeier, David Haslacher, David Sabbagh, Denis A. Engemann, Desislava Petkova, Dirk Gütlin, Dominik Krzemiński, Emanuele Olivetti, Emily P. Stephen, Emily Stephen, Eric Larson, Erik Hornberger, Erkka Heinila, Evgenii Kalenkovich, Ezequiel Mikulan, Fede Raimondo, Federico Raimondo, Félix Raimundo, Guillaume Dumas, Guillaume Favelier, Hafeza Anevar, Hari Bharadwaj, Henrich Kolkhorst, Hermann Sonntag, Hubert Banville, Ingoo Lee, Ivana Kojcic, Jaakko Leppakangas, Jair Montoya, Jakub Kaczmarzyk, Jasper J.F. van den Bosch, Jean-Baptiste SCHIRATTI, Jean-Remi King, Jeff Hanna, Jen Evans, Jesper Duemose Nielsen, Joan Massich, Johan van der Meer, Johannes Kasper, Johannes Niediek, Jon Houck, Jona Sassenhagen, José C. García Alanis, Juergen Dammers, Jussi Nurminen, Kambiz Tavabi, Katarina Slama, Katrin Leinweber, Keith Doelling, Kostiantyn Maksymenko, Laetitia Grabot, Larry Eisenman, Laura Gwilliams, Legrand Nicolas, Leonardo S. Barbosa, Lorenz Esch, Lorenzo Alfine, Lorenzo De Santis, Louis Thibault, Luke Bloy, Lukáš Hejtmánek, Mads Jensen, Mainak Jas, Manfred Kitzbichler, Manoj Kumar, Manu Sutela, Marcin Koculak, Marian Dovgialo, Marijn van Vliet, Mark Wronkiewicz, Marmaduke Woodman, Martin Billinger, Martin Luessi, MartinBaBer, Mathurin Massias, Matt Boggess, Matt Tucker, Matteo Visconti dOC, Matti Hamalainen, Michael Krause, Mikolaj Magnuski, Natalie Klein, Nathalie, Nathalie Gayraud, Nick Foti, Nick Ward

<https://github.com/mne-tools/mne-python/graphs/contributors>



MNE software for processing MEG and EEG data

Alexandre Gramfort ^{a, b, c, d, e}  , Martin Luessi ^{b, c}, Eric Larson ^f, Denis A. Engemann ^{g, h}, Daniel Strohmeier ⁱ, Christian Brodbeck ^j, Lauri Parkkonen ^{k, l}, Matti S. Hämäläinen ^{b, c}

METHODS ARTICLE

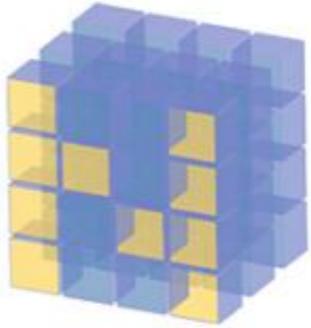
Front. Neurosci., 26 December 2013 | <https://doi.org/10.3389/fnins.2013.00267>

MEG and EEG data analysis with MNE-Python

 **Alexandre Gramfort**^{1,2,3*},  **Martin Luessi**²,  **Eric Larson**⁴,  **Denis A. Engemann**^{5,6},  **Daniel Strohmeier**⁷,  **Christian Brodbeck**⁸,  **Roman Goj**⁹,  **Mainak Jas**^{10,11},  **Teon Brooks**⁸,  **Lauri Parkkonen**^{10,11} and  **Matti Hämäläinen**^{2,11}

Don't forget to give us academic credit 

Thanks !

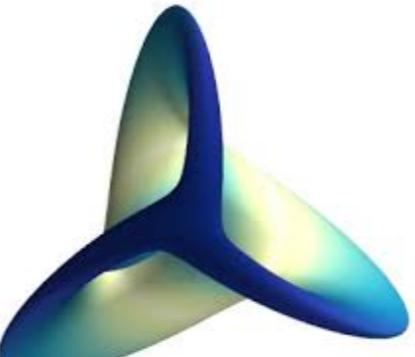


NumPy

matplotlib



scikit
learn



Mayavi

GitHub



Travis CI



circleci



Google



SPHINX
Sphinx-Gallery



ANACONDA®

Contact:

Alexandre Gramfort
<http://alexandre.gramfort.net>

GitHub : @agramfort



Twitter : @agramfort



```
>>> import mne
```

