FSLeyes and the FSL Python ecosystem

Paul McCarthy

Brainhack Warwick
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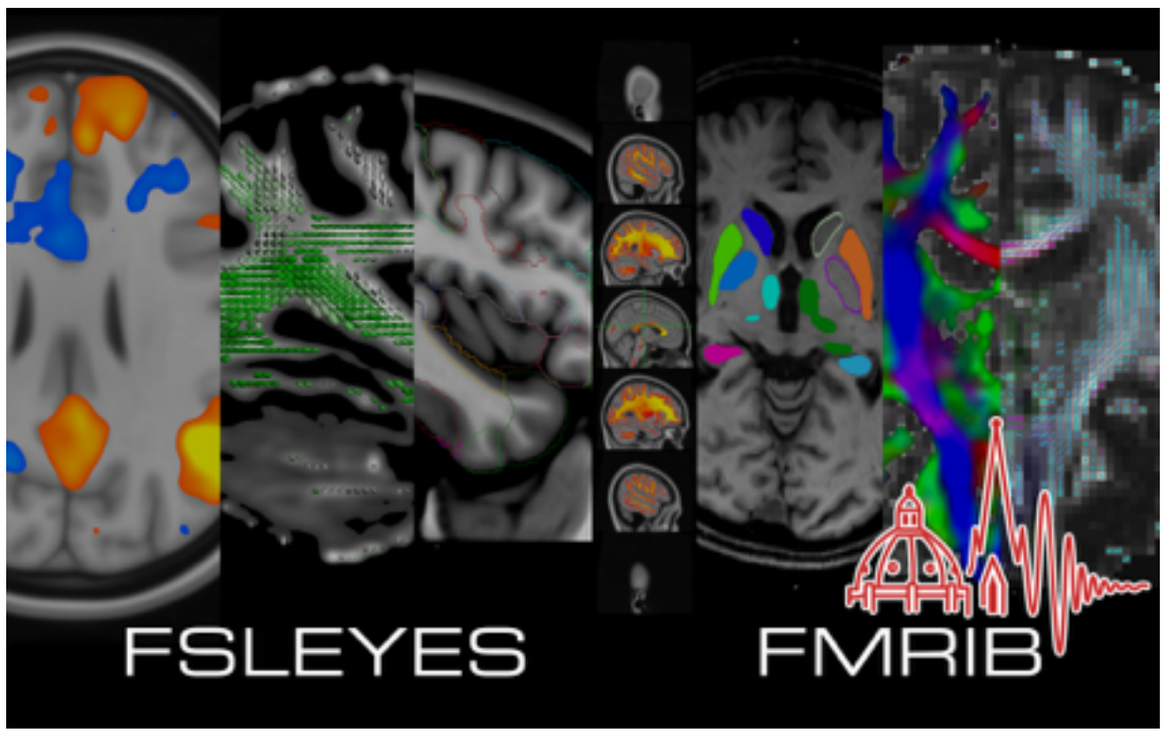
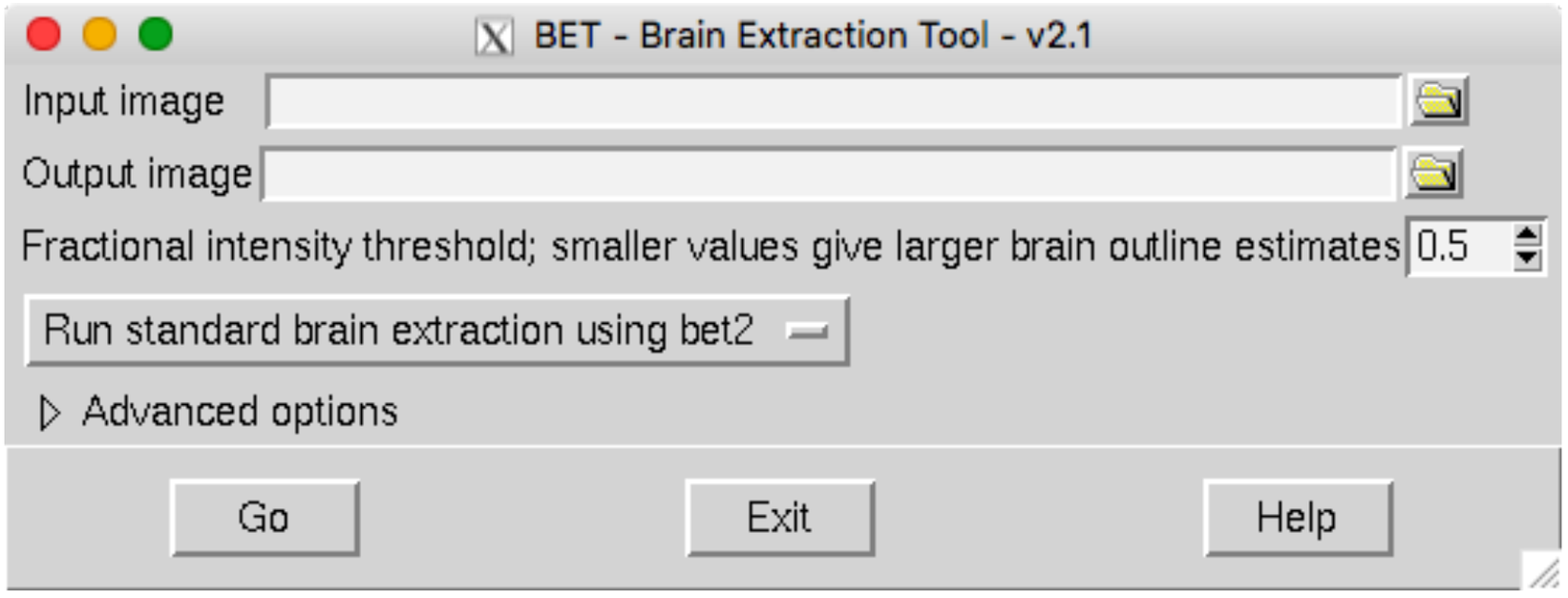


Current state of FSL

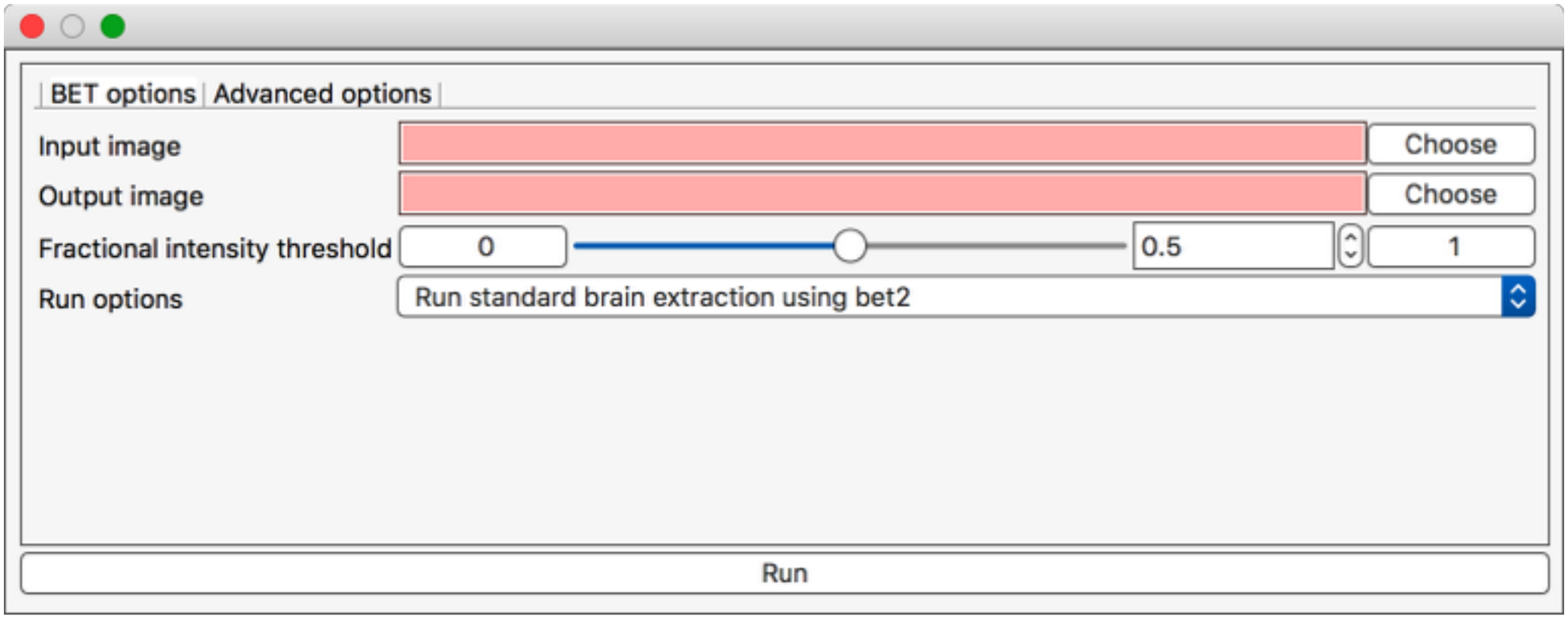
Language	*Use*
C++	Virtually all numerical processing/analysis
Tcl/Tk	GUIs and processing pipelines (FEAT)
Bash/sh	Smaller pipelines
Python	More complex pipelines
Matlab/Octave	FIX, PALM, FSLNets
R	FIX
CUDA / OpenMP	GPU / multithreaded code (EDDY, BEDPOSTX, etc)

Summary courtesy of Matthew Webster/Mark Jenkinson

Tcl/Tk


BET - Brain Extraction Tool - v2.1
Input image
Output image
Fractional intensity threshold; smaller values give larger brain outline estimates
0.5
Run standard brain extraction using bet2
Advanced options
Go
Exit
Help

~~Tcl/Tk~~ Python



Future state of FSL

Language	*Use*
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Future state of FSL

Language	*Use*
Python	Virtually all numerical processing/analysis
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My secret goal

Future state of FSL

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Python/bash/sh	Smaller pipelines
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Python/Matlab/Octave	FIX, PALM, FSLNets
Python/R	FIX
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More realistic goal

The FSLPython environment

- Future versions of FSL will come bundled with a Miniconda Python 3 environment

- FSL tools written in Python will be executed with this environment

- Includes all of your favourite Python libraries (`numpy`, `scipy`, `matplotlib`, `nibabel`, etc)

Other changes in FSL

- Finally migrating from CVS to git

- FSL 5.0.10 coming very soon!
  - FSLeyes
  - FSLPython
  - MSM (Multi-modal surface-based registration)
  - MIST (multi-modal subcortical segmentation)
  - BIANCA (white-matter hyperintensity classification)

- FSL 6 coming later this year
  - Newmat replaced by armadillo
  - Other big internal changes

FSLeyes

Pronounced “fossilise"

- FSL’s new image viewer (to replace FSLView)
- Written in Python (built on wxPython, PyOpenGL, numpy, matplotlib, nibabel, and more)
- Currently Python 2 (due to wxPython), but is easily ported to Python 3
- Does everything that FSLView could do, except for 3D - will be added in a future version

FSLeyes demo

Options!

- General NIFTI visualisation
- NIFTI image editing
- FEAT mode
- MELODIC/Melview mode
- Atlases
- Adjusting NIFTI transforms (a.k.a. “Nudge”)
- Diffusion visualisation
- Surface visualisation
- Off-screen rendering
- Python shell

Questions/links

- Get a pre-release copy of FSLeyes from: https://users.fmrib.ox.ac.uk/~paulmc/FSLeyes/

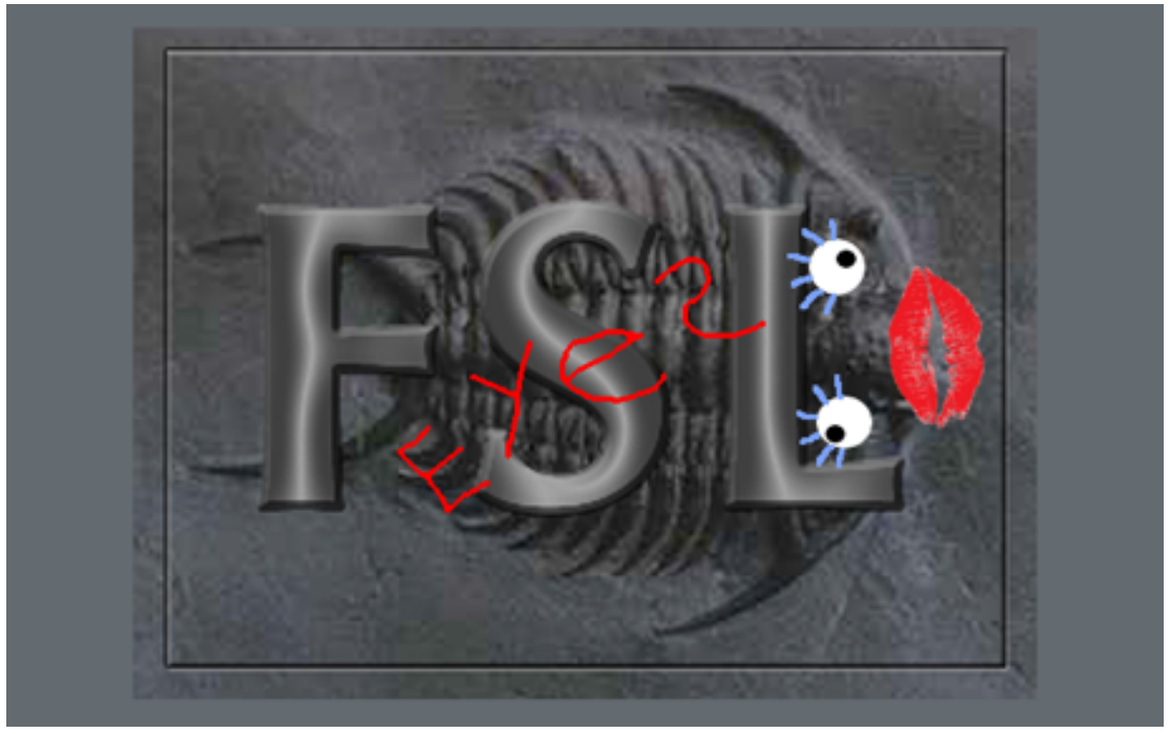
builds available for
- *OSX*
- *CentOS 6*
- *CentOS 7*
- *Ubuntu 16.04)*

- FSLeyes user guide available at: https://users.fmrib.ox.ac.uk/~paulmc/fsleyes_userdoc/

- FSL mailing list: http://www.jiscmail.ac.uk/lists/fsl.html

- Email me! pauldmccarthy@gmail.com

Thanks!



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Oxford Centre for Functional MRI of the Brain

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