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OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Open Data with Novel Techniques

Leveraging the NeuroDesk platform to
Enhance Reproducible Workflows with Open Data

Steffen Bollmann

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Acknowledgement of Country

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

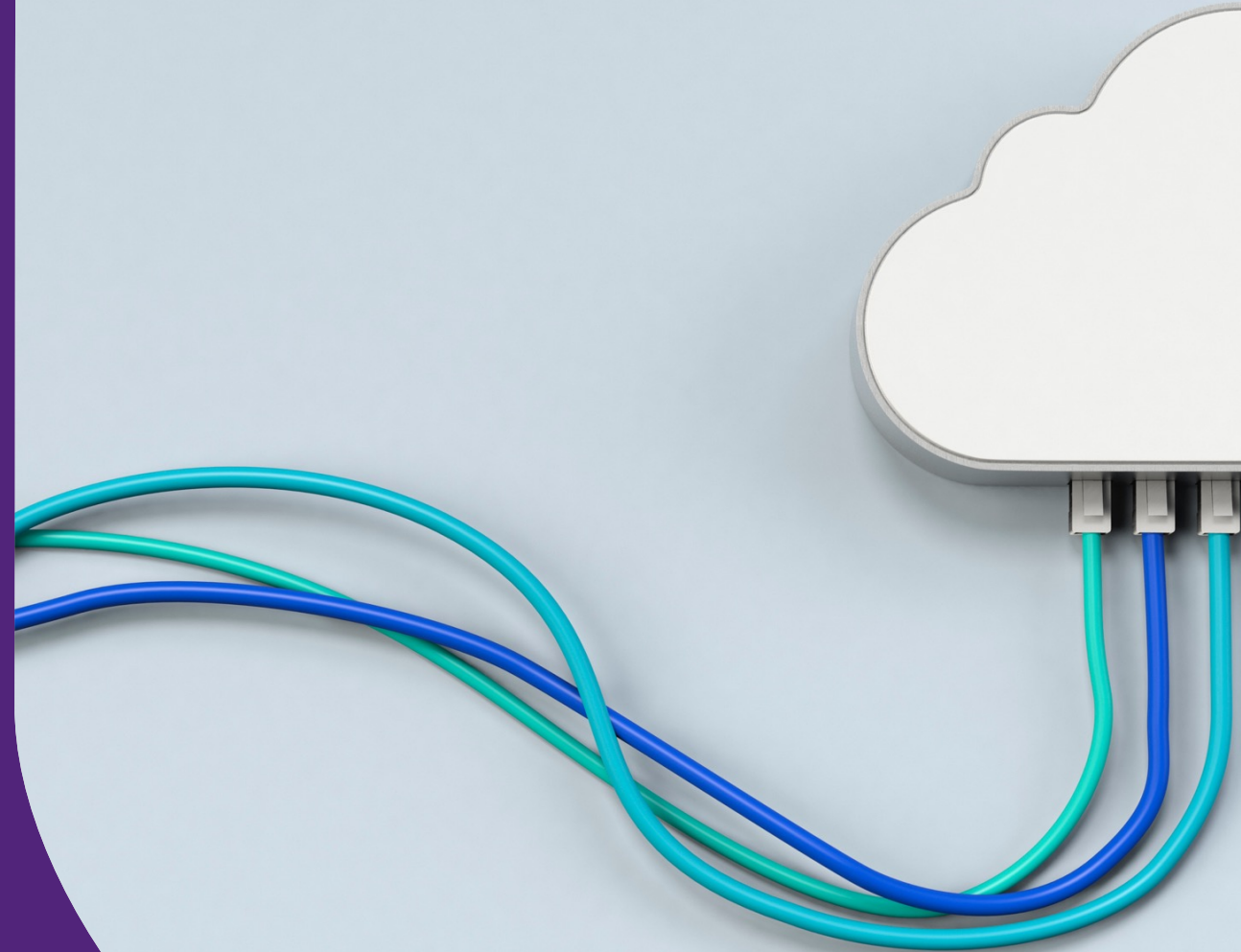
We recognise their valuable contributions to Australian and global society.




Declaration of Potential Conflicts of Interest

I receive research funding from:

1. Oracle for Research
 - a. partially fund NeuroDesk project via cloud credits
 - b. I will talk about a project from Oracle for Research, called “Oracle Open Data”
2. Siemens Healthineers



Talk Outline

- 
- Introducing an Open Data example
 - NeuroDesk & The Open Data workflow
 - Publishing Open Data
 - Accessing Open Data
 - Re-executable papers linking Code and Open Data

Open Data is easy, right?

What if this free service stops?

Download a multiple GB file just to see which functions were used?

DATA AVAILABILITY STATEMENT

- All data and code used in this paper can be found here:
- https://www.dropbox.com/s/ijkxmopv088e4iu/matlab_code_data_mri_paper2022.zip?dl=0 •

Will the code still work in the next version? Does the reader have a matlab license?

I found a bug and need to update this

Platform can
be changed
later

Provide
source code
in an easy
accessible
way

DATA AVAILABILITY STATEMENT

We facilitate the reproducibility of our study by providing an interactive version of our implementation on a publicly accessible cloud-based platform. The readers can explore the implementation of the model (neural network), train the model with different hyper-parameters and architectures, investigate the stability of the training process, and reproduce our results with the identical model used in this manuscript (<https://github.com/sbollmannMRI/scout2B1> 320a6ab). We anonymized and stored the input data (localizer, SA2RAGE B_1^+) of 28 participants in OSF (OSF, Center for Open Science, Inc., Virginia, USA) accessible via <https://osf.io/y5cq9/>.

Interactively
running in
browser – no
setup needed

This commit
was used for
the paper, but
bug fixes
possible

Data and links
can be updated
if bugs found or
services move

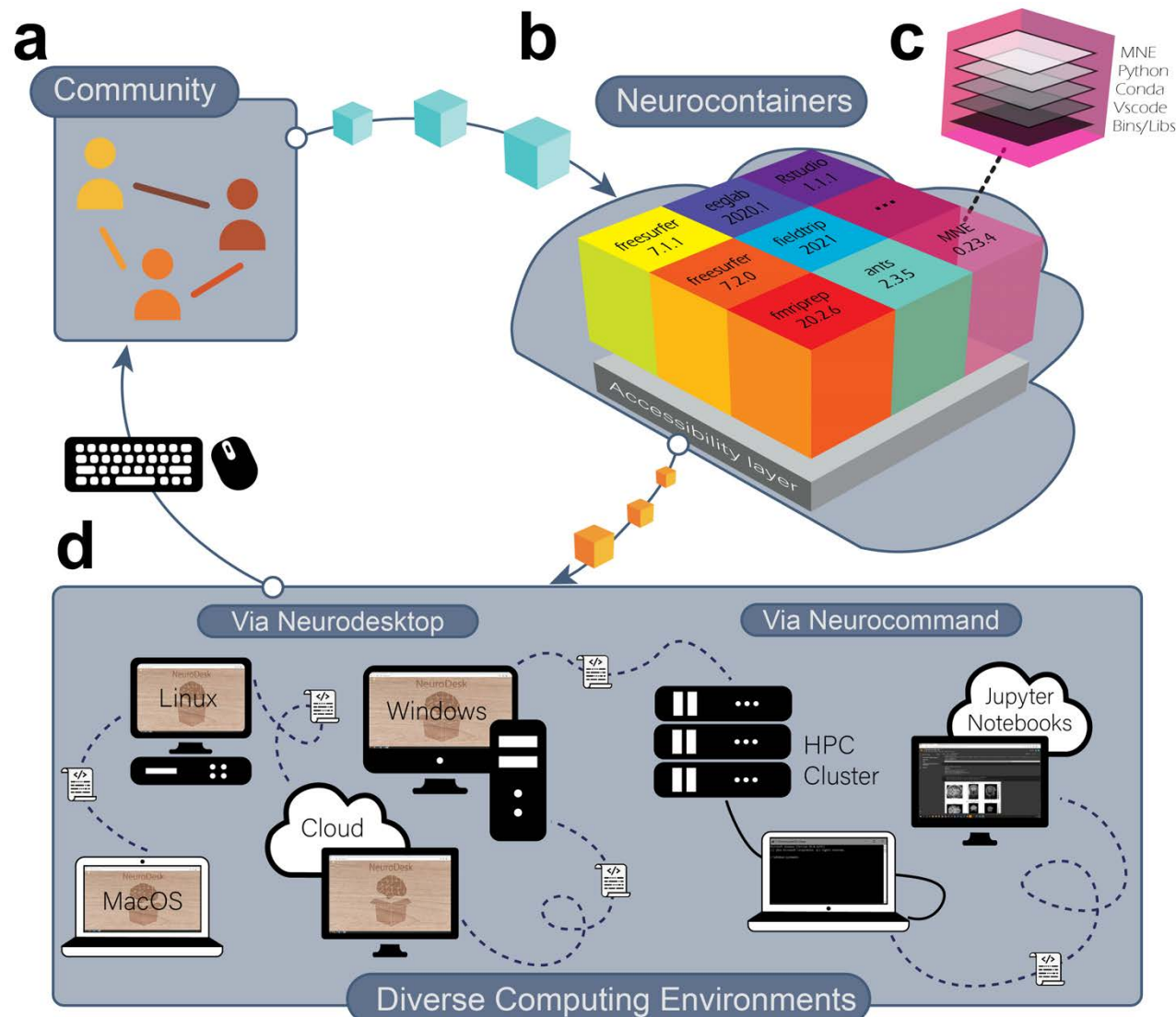


NeuroDesk & The Open Data workflow

What is NeuroDesk?

Which problems does it solve?

The NeuroDesk.org Open-Source Platform



Challenges we tackle:

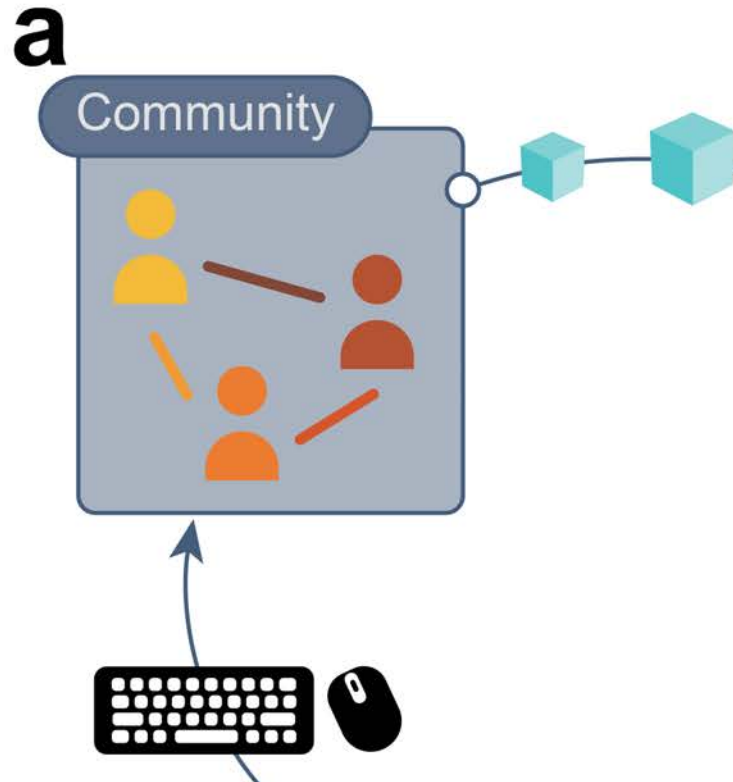
1. Research software is difficult to install (e.g. dependency conflicts, lack of packages/maintenance)
2. Variable compute environments and operating systems (e.g. HPCs, workstations, laptops, cloud ...)
3. Large Datasets

Partners and Funders:



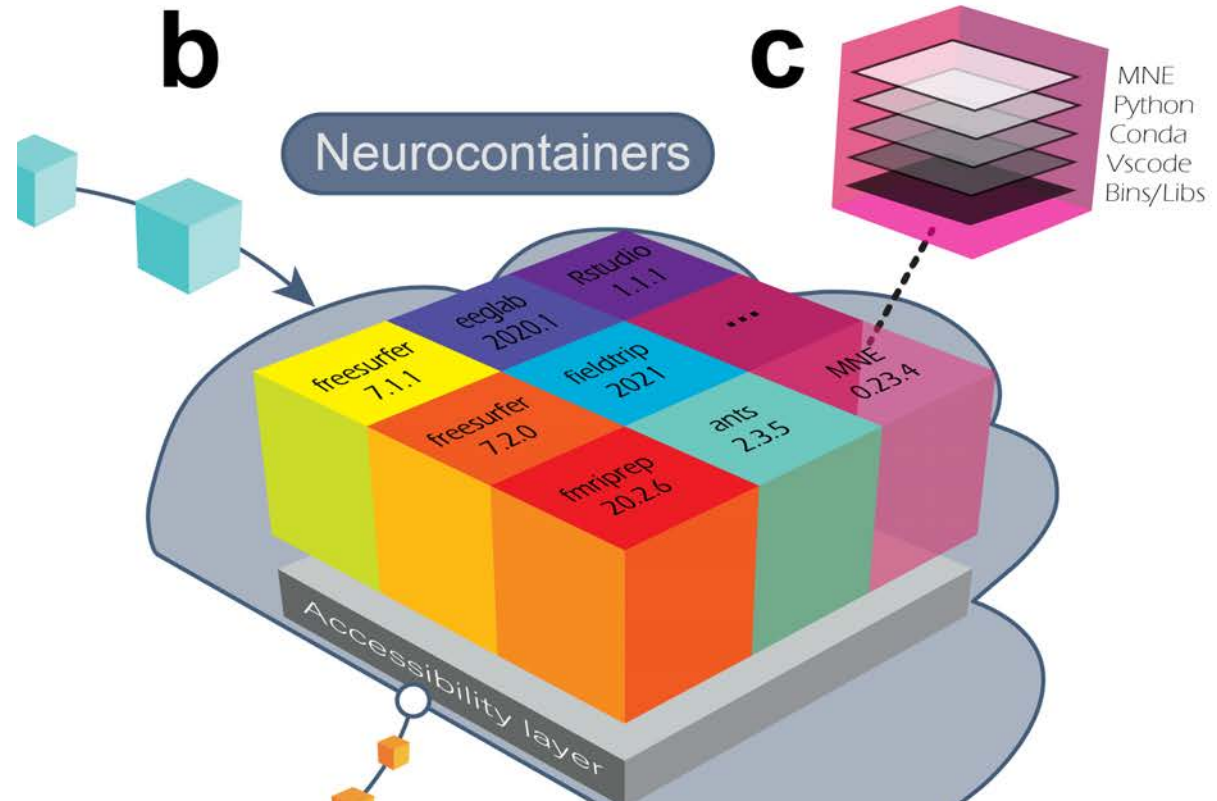
The NeuroDesk.org Open-Source Platform

Community builds and maintains software containers



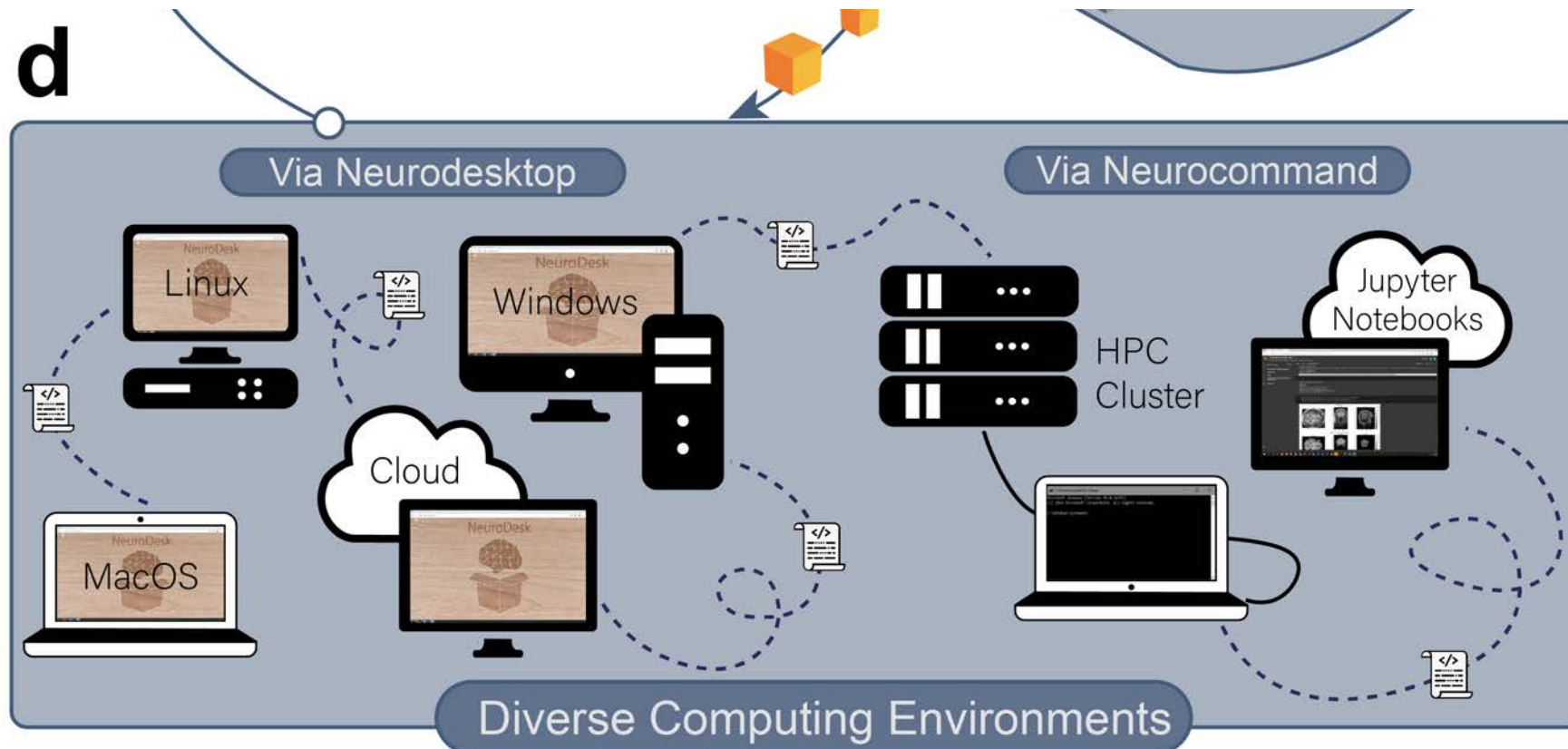
The NeuroDesk.org Open-Source Platform

Neurocontainers automatically builds and distributes a repository of software containers

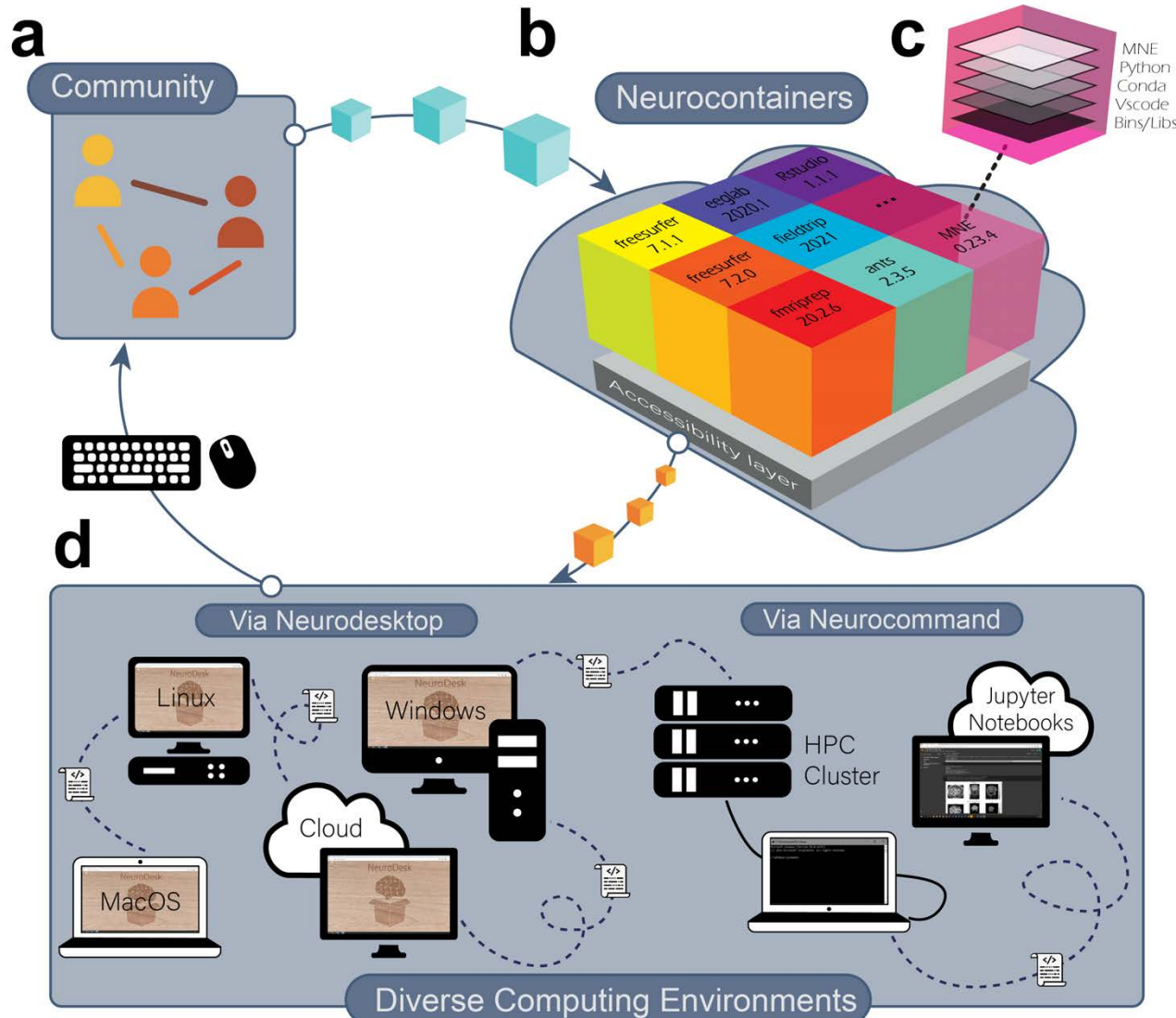


The NeuroDesk.org Open-Source Platform

Software containers are available for all compute environments:



The NeuroDesk.org Open-Source Platform



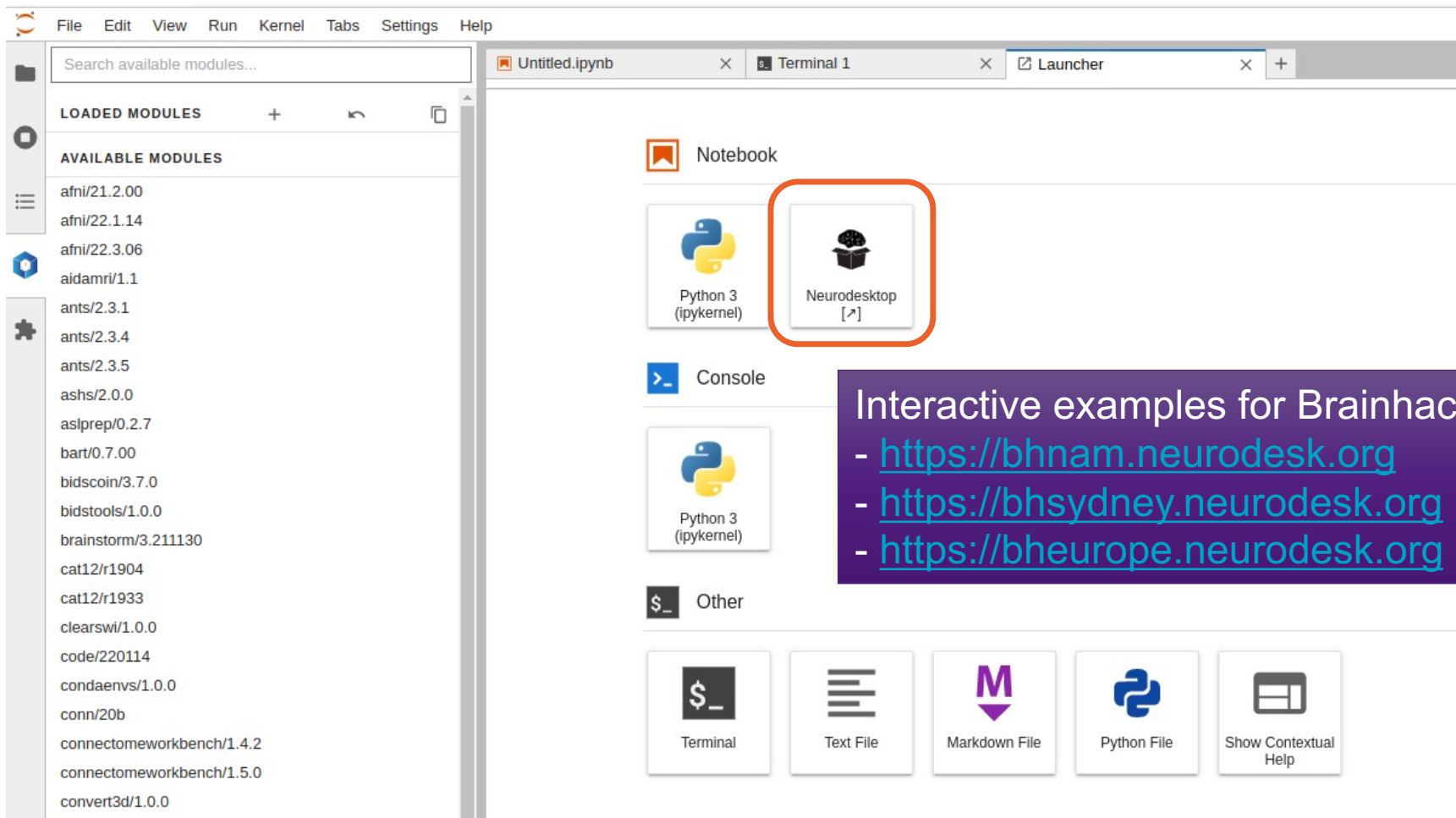
Challenges we tackle:

1. Research software is difficult to install (e.g. dependency conflicts, lack of packages/maintenance)
2. Variable compute environments and operating systems (e.g. HPCs, workstations, laptops, cloud ...)
3. Large Datasets

Partners and Funders:



NeuroDesk can be integrated in Jupyter Lab

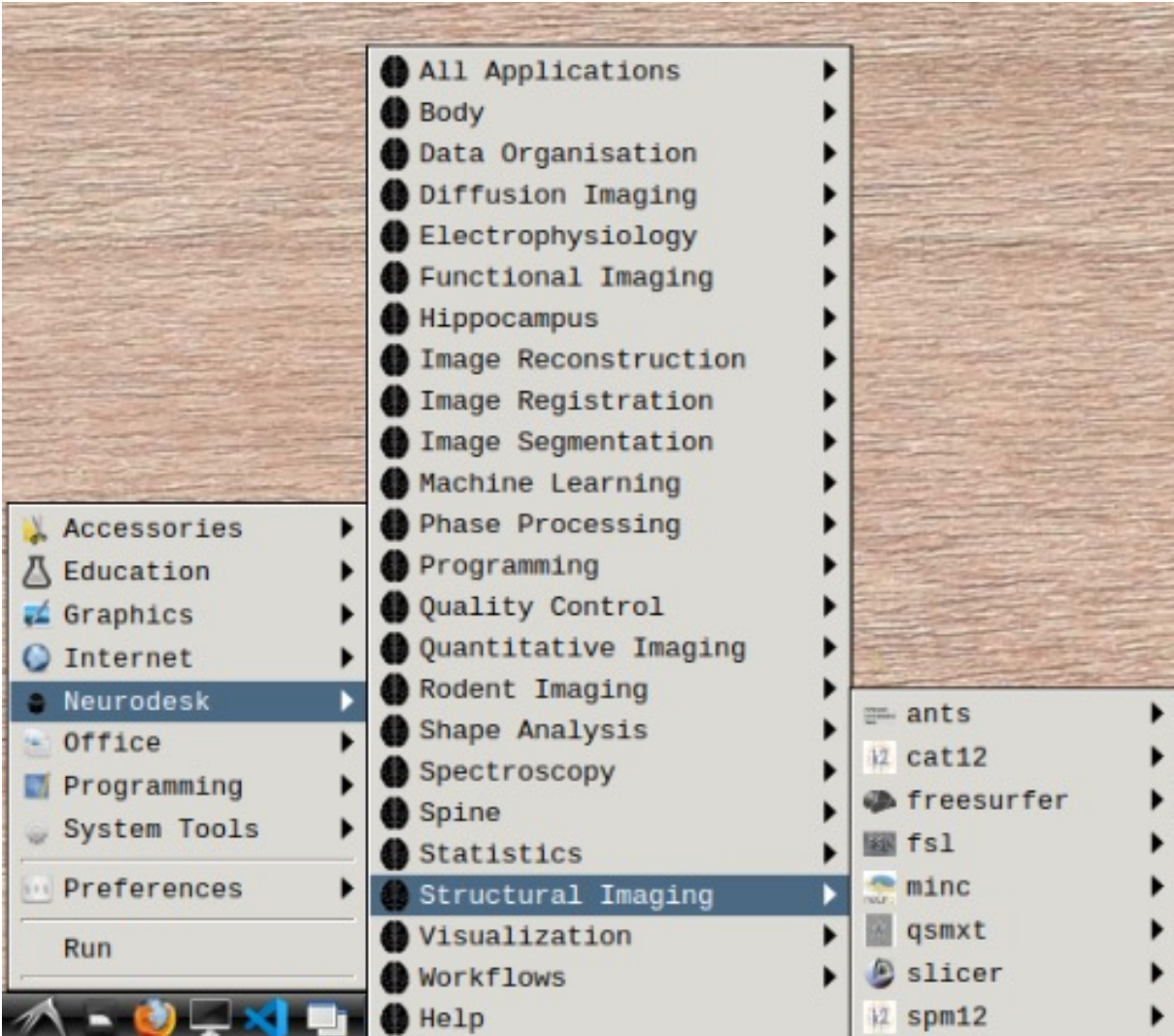


Interactive examples for Brainhack 2022:

- <https://bham.neurodesk.org>
- <https://bhsydney.neurodesk.org>
- <https://bheurope.neurodesk.org>

Supported by:
ORACLE
for Research

NeuroDesktop – A Linux desktop accessible via the browser



The screenshot shows a Linux-style application menu for NeuroDesktop. The main menu is open, listing various categories and sub-items. The 'Neurodesk' category is highlighted, and its sub-menu is also open, showing a list of neuroimaging tools. A separate window shows a list of installed applications.

- All Applications
- Body
- Data Organisation
- Diffusion Imaging
- Electrophysiology
- Functional Imaging
- Hippocampus
- Image Reconstruction
- Image Registration
- Image Segmentation
- Machine Learning
- Phase Processing
- Programming
- Quality Control
- Quantitative Imaging
- Rodent Imaging
- Shape Analysis
- Spectroscopy
- Spine
- Statistics
- Structural Imaging
- Visualization
- Workflows
- Help

- Accessories
- Education
- Graphics
- Internet
- Neurodesk
- Office
- Programming
- System Tools
- Preferences
- Run

- ants
- cat12
- freesurfer
- fsl
- minc
- qsmxt
- slicer
- spm12

Containers solve dependency issues

Full GUI support

comes with all tools required for curating, processing, creating and using Open Data



Publishing Open Data

Where to store the data?

Which tools exist?

Making our Data openly available

DATA AVAILABILITY STATEMENT

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Data and links can be updated if bugs found or services move

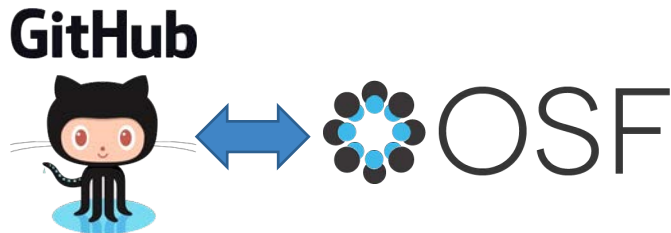















What is the Open Science Framework (OSF)?

- Online platform that enables researchers to plan, collect, analyze and share their work
- Developed and maintained by the non-profit organization Center for Open Science (COS)
- Preservation fund to provide 50+ years read access to the hosted data

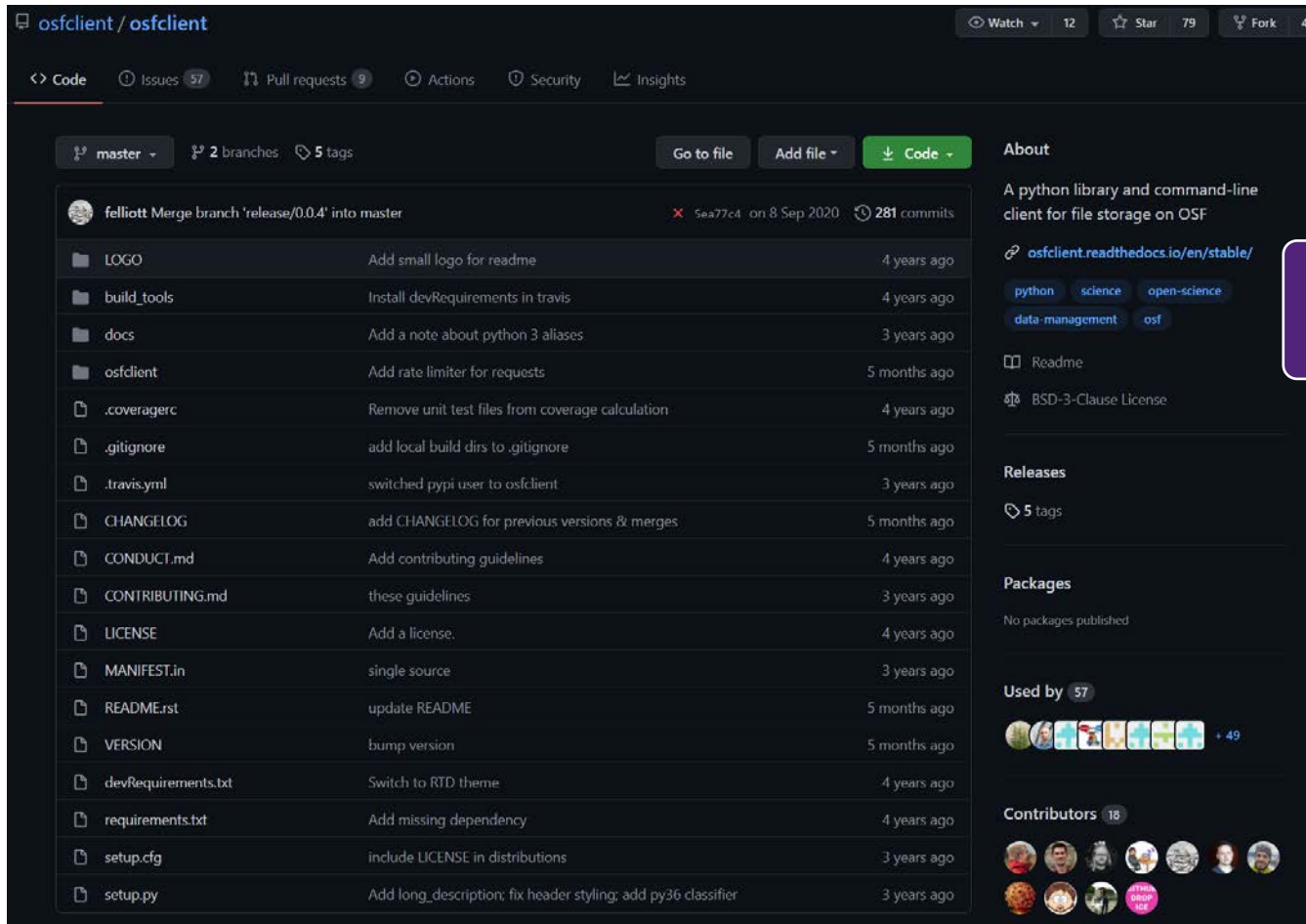


Connecting Services



| Configure Add-on Accounts | |
|--|--|
|  Amazon S3 | Connect or Reauthorize Account |
|  Bitbucket | Connect or Reauthorize Account |
|  Box | Connect or Reauthorize Account |
|  Dataverse | Connect or Reauthorize Account |
|  Dropbox | Connect or Reauthorize Account |
|  figshare | Connect or Reauthorize Account |
|  GitHub | Connect or Reauthorize Account Disconnect Account |
| Authorized by <i>stebo85</i> | |
|  GitLab | Connect or Reauthorize Account |
|  Google Drive | Connect or Reauthorize Account |
|  Mendeley | Connect or Reauthorize Account |
|  OneDrive | Connect or Reauthorize Account |
|  ownCloud | Connect or Reauthorize Account Disconnect Account |
| Authorized by <i>s.bollmann@uq.edu.au</i> on https://cloudstor.aarnet.edu.au/plus | |
|  Zotero | Connect or Reauthorize Account |

Setting up OSF command line client & uploading data



osfclient / osfclient

Watch 12 Star 79 Fork 45

Code Issues 57 Pull requests 9 Actions Security Insights

master 2 branches 5 tags

Go to file Add file Code

fellio Merge branch 'release/0.0.4' into master 5ea77c4 on 8 Sep 2020 281 commits

| File | Commit Message | Time |
|---------------------|---|--------------|
| LOGO | Add small logo for readme | 4 years ago |
| build_tools | Install devRequirements in travis | 4 years ago |
| docs | Add a note about python 3 aliases | 3 years ago |
| osfclient | Add rate limiter for requests | 5 months ago |
| .coveragerc | Remove unit test files from coverage calculation | 4 years ago |
| .gitignore | add local build dirs to .gitignore | 5 months ago |
| .travis.yml | switched pypi user to osfclient | 3 years ago |
| CHANGELOG | add CHANGELOG for previous versions & merges | 5 months ago |
| CONDUCT.md | Add contributing guidelines | 4 years ago |
| CONTRIBUTING.md | these guidelines | 3 years ago |
| LICENSE | Add a license. | 4 years ago |
| MANIFEST.in | single source | 3 years ago |
| README.rst | update README | 5 months ago |
| VERSION | bump version | 5 months ago |
| devRequirements.txt | Switch to RTD theme | 4 years ago |
| requirements.txt | Add missing dependency | 4 years ago |
| setup.cfg | include LICENSE in distributions | 3 years ago |
| setup.py | Add long_description; fix header styling; add py36 classifier | 3 years ago |

About

A python library and command-line client for file storage on OSF

osfclient.readthedocs.io/en/stable/

python science open-science data-management osf

Readme

BSD-3-Clause License

Releases

5 tags

Packages

No packages published

Used by 57

Contributors 18

`pip install osfclient`

`osf init`

`osf upload -r . osfstorage/data`

Scout2B1

116.8MB

Public

0

Contributors: [Steffen Bollmann](#), [Shahrokh Abbasi Rad](#)

Date created: 2020-09-11 02:13 PM | Last Updated: 2021-04-28 03:19 PM

Identifier: DOI 10.17605/OSF.IO/Y5CQ9

Category: Project

Description: *This data and code are available to reproduce the results of the paper Abbasi-Rad, Shahrokh, Kieran O'Brien, Samuel Kelly, Viktor Vegh, Anders Rodell, Yasvir Tesiram, Jin Jin, Markus Barth, and Steffen Bollmann. 'Improving FLAIR SAR Efficiency at 7T by Adaptive Tailoring of Adiabatic Pulse Power through Deep Learning Estimation'. Magnetic Resonance in Medicine n/a, no. n/a (2020). <https://doi.org/10.1002/mrm.28590>. (preprint: Abbasi-Rad, S., O'Brien, K., Kelly, S., Vegh, V., Rodell, A., Tesiram, Y., Jin, J., Barth, M., Bollmann, S., 2019. Improving FLAIR SAR efficiency at 7T by adaptive tailoring of adiabatic pulse power using deep convolutional neural networks. arXiv:1911.08118 [physics].)*

Wiki

>>> [The interactive computational notebook can be found here](#) <<<

Files



Filter



Name ^ v

Modified ^ v

Scout2B1

- OSF Storage (Australia - Sydney)

.osfcli.config

2020-09-12 01:55 PM

+ B1Map

+ checkpoints

Citation

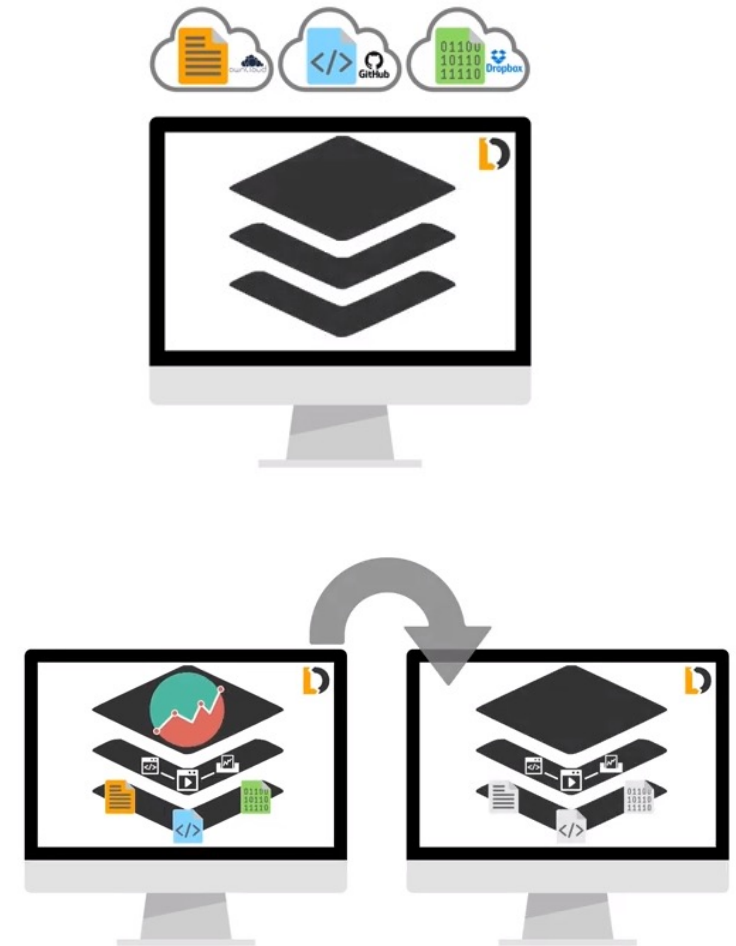


Recent Activity

- [Steffen Bollmann](#) deauthorized the GitHub addon for [Scout2B1](#)
2021-04-28 03:19 PM
- [Scout2B1](#) registered
2021-01-12 03:02 PM
- Registration of [Scout2B1](#) was approved
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2021-01-10 10:21 AM
- [Steffen Bollmann](#) created external identifier(s) doi:10.17605/OSF.IO/Y5CQ9 on [Scout2B1](#)
2021-01-10 09:30 AM
- [Steffen Bollmann](#) edited description of [Scout2B1](#)
2020-12-15 02:23 PM

What is DataLad?

- free and open source distributed data management system
 - Keeps track of data
 - Creates structure
 - Ensures reproducibility
 - Supports collaboration
 - Integrates with widely used data infrastructure -> including the OSF :)



Uploading data using the DataLad OSF extension

Step 1: creating a DataLad dataset

```
jovyan@neurodesktop:~$ datalad create my_dataset
```

```
jovyan@neurodesktop:~/my_dataset$ datalad save -m "added"
```

```
add(ok): B1Map/rB1MapinScout_1.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_10.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_11.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_12.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_13.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_14.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_15.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_16.nii.gz (file)
```

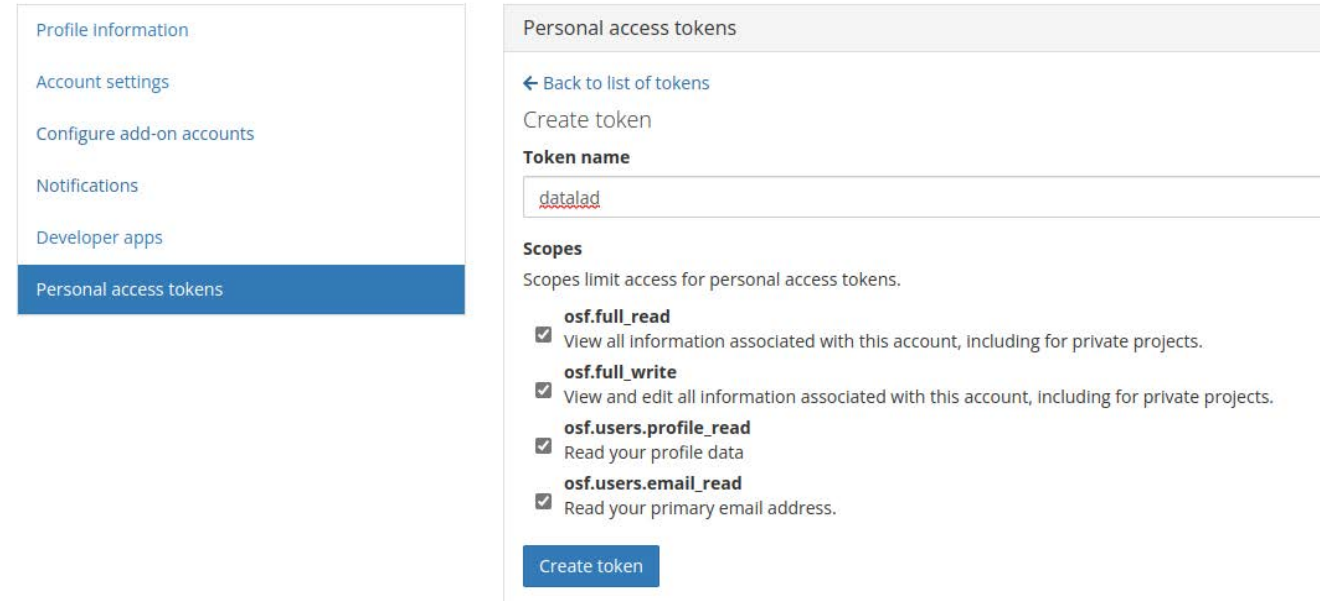
```
add(ok): B1Map/rB1MapinScout_17.nii.gz (file)
```

```
add(ok): B1Map/rB1MapinScout_18.nii.gz (file)
```

Uploading data using the DataLad OSF extension

Step 2: Creating an OSF token & authenticating

Settings



The screenshot shows the 'Settings' page for an OSF account. On the left is a sidebar menu with options: Profile Information, Account settings, Configure add-on accounts, Notifications, Developer apps, and Personal access tokens (which is highlighted in blue). The main content area is titled 'Personal access tokens' and includes a 'Back to list of tokens' link, a 'Create token' button, and a text input field containing 'datalad'. Below this is a 'Scopes' section with the text 'Scopes limit access for personal access tokens.' and a list of four checked checkboxes: 'osf.full_read' (View all information associated with this account, including for private projects.), 'osf.full_write' (View and edit all information associated with this account, including for private projects.), 'osf.users.profile_read' (Read your profile data), and 'osf.users.email_read' (Read your primary email address.). At the bottom of the main area is a blue 'Create token' button.

```
jovyan@neurodesktop:~$ datalad osf-credentials
```

Uploading data using the DataLad OSF extension

Step 3: Creating and pushing a DataLad sibling

```
jovyan@neurodesktop:~/my_dataset$ datalad create-sibling-osf --title best-study-ever -s osf
```

```
jovyan@neurodesktop:~/my_dataset$ datalad push --to osf
```

best-study-ever

116.9MB

Private

Make Public

P 0

...

Contributors: [Steffen Bollmann](#)

Date created: 2022-12-03 04:30 PM | Last Updated: 2022-12-03 04:35 PM

Category:  Data

Description:

This component was built from a DataLad dataset using the `datalad-osf` extension (<https://github.com/datalad/datalad-osf>). With this extension installed, this component can be `git` or `datalad` cloned from a `'osf://ID'` URL, where `'ID'` is the OSF node ID that shown in the OSF HTTP URL, e.g. <https://osf.io/q8xnk> can be cloned from `osf://q8xnk`. This particular project can be cloned using `'datalad clone osf://ehnwz'`.

License: [Add a license](#)

Wiki









Add important information, links, or images here to describe your project.

Files



Click on a storage provider or drag and drop to upload

Filter Name Modified 

| | |
|--|---------------------|
|  best-study-ever | |
| -  OSF Storage (Australia - Sydney) | |
| +  .git | |
|  MD5E-s1368235--8715eca6bd2932b7b52c45fc307c8392.nil.gz | 2022-12-03 04:32 PM |
|  MD5E-s1769952--559200532f66c31ec35b84a3f27ff5a9 | 2022-12-03 04:34 PM |

Citation 

Components

[Add Component](#)[Link Projects](#)

Add components to organize your project.

Tags

[c4e654fd-85d4-4457-af13-8d18362601d8](#) [DataLad dataset](#) [Add a tag](#)

Recent Activity



Accessing Open Data

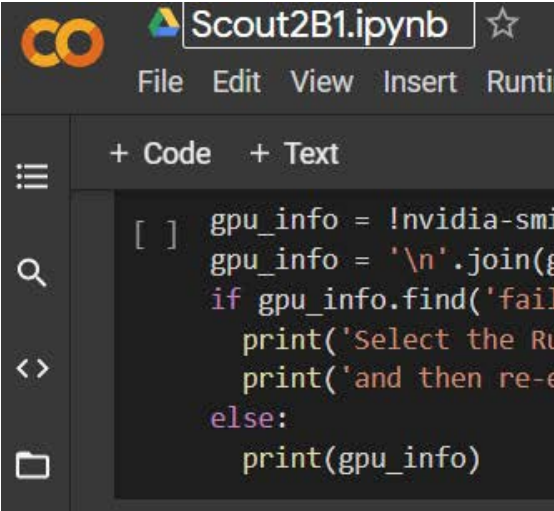
How do we efficiently access the data?

Do we have to download everything at once?

Data access
within Jupyter
notebook.

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```
Scout2B1.ipynb
File Edit View Insert Runti
+ Code + Text
[ ] gpu_info = !nvidia-smi
gpu_info = '\n'.join(g
if gpu_info.find('fail
print('select the Ru
print('and then re-e
else:
print(gpu_info)
```

Scout2B1

116.8MB

Public

0

Contributors: [Steffen Bollmann](#), [Shahrokh Abbasi Rad](#)

Date created: 2020-09-11 02:13 PM | Last Updated: 2021-04-28 03:19 PM

Identifier: DOI 10.17605/OSF.IO/Y5CQ9

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(preprint: Abbasi-Rad, S., O'Brien, K., Kelly, S., Vegh, V., Rodell, A., Tesiram, Y., Jin, J., Barth, M., Bollmann, S., 2019. Improving FLAIR SAR efficiency at 7T by adaptive tailoring of adiabatic pulse power using deep convolutional neural networks. arXiv:1911.08118 [physics].)

Wiki

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Citation



Files



Filter



Name ^ v

Modified ^ v

Scout2B1

- OSF Storage (Australia - Sydney)

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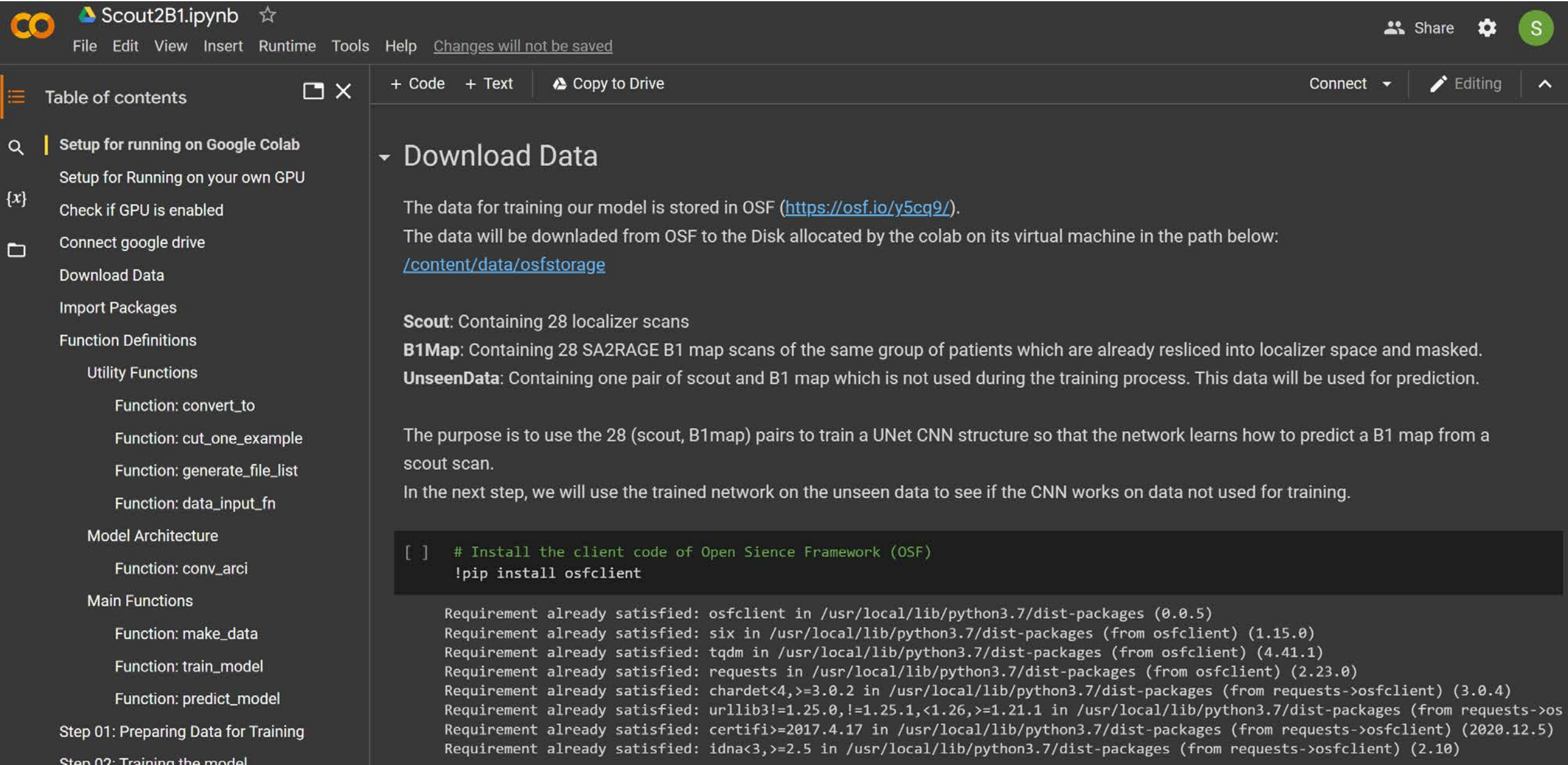
2020-09-12 01:55 PM

+ B1Map

+ checkpoints

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2020-12-15 02:22 PM



Scout2B1.ipynb ☆

File Edit View Insert Runtime Tools Help Changes will not be saved

Share Settings S

Table of contents

- Setup for running on Google Colab
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 - Function: cut_one_example
 - Function: generate_file_list
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 - Model Architecture
 - Function: conv_arci
 - Main Functions
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 - Function: train_model
 - Function: predict_model
 - Step 01: Preparing Data for Training
 - Step 02: Training the model

+ Code + Text Copy to Drive

Connect Editing

Download Data

The data for training our model is stored in OSF (<https://osf.io/y5cq9/>).

The data will be downloaded from OSF to the Disk allocated by the colab on its virtual machine in the path below:

</content/data/osfstorage>

Scout: Containing 28 localizer scans

B1Map: Containing 28 SA2RAGE B1 map scans of the same group of patients which are already resliced into localizer space and masked.

UnseenData: Containing one pair of scout and B1 map which is not used during the training process. This data will be used for prediction.

The purpose is to use the 28 (scout, B1map) pairs to train a UNet CNN structure so that the network learns how to predict a B1 map from a scout scan.

In the next step, we will use the trained network on the unseen data to see if the CNN works on data not used for training.[] # Install the client code of Open Science Framework (OSF)
!pip install osfclient

Requirement already satisfied: osfclient in /usr/local/lib/python3.7/dist-packages (0.0.5)
Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages (from osfclient) (1.15.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (from osfclient) (4.41.1)
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (from osfclient) (2.23.0)
Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages (from requests->osfclient) (3.0.4)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.7/dist-packages (from requests->osfclient) (2020.12.5)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages (from requests->osfclient) (2020.12.5)
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests->osfclient) (2.10)

Using OSF data in a Jupyter Notebook

Installing the osfclient is straight forward:

```
[1]: !pip install osfclient
```

```
Requirement already satisfied: osfclient in /opt/conda/lib/python3.10/site-packages (0.0.5)  
Requirement already satisfied: tqdm in /opt/conda/lib/python3.10/site-packages (from osfclient) (4.64.1)  
Requirement already satisfied: requests in /opt/conda/lib/python3.10/site-packages (from osfclient) (2.28.1)  
Requirement already satisfied: six in /opt/conda/lib/python3.10/site-packages (from osfclient) (1.16.0)  
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/lib/python3.10/site-packages (from requests->osfclient) (2022.9.24)  
Requirement already satisfied: charset-normalizer<3,>=2 in /opt/conda/lib/python3.10/site-packages (from requests->osfclient) (2.1.1)  
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /opt/conda/lib/python3.10/site-packages (from requests->osfclient) (1.26.13)  
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/lib/python3.10/site-packages (from requests->osfclient) (3.4)
```


Using osf data with DataLad

```
jovyan@neurodesktop:~$ datalad clone osf://ehnwz
```

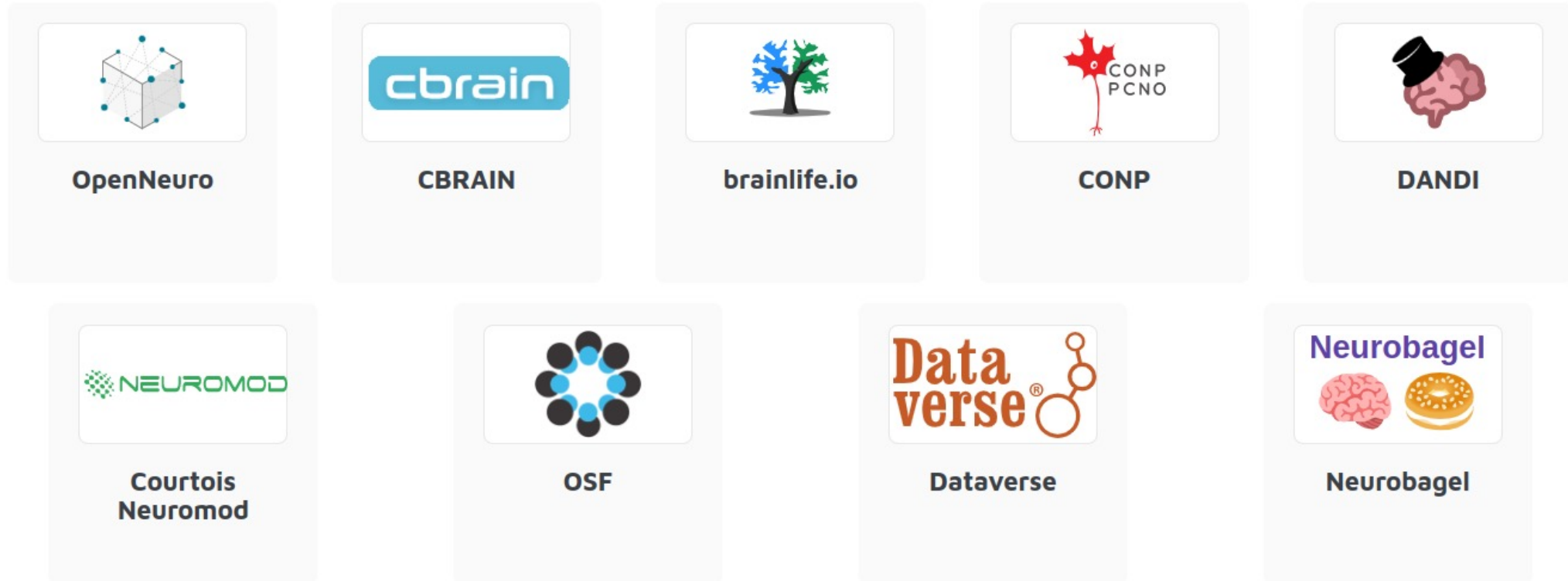
```
jovyan@neurodesktop:~/ehnwz$ ll
total 36
drwxr-sr-x.  8 jovyan users 4096 Dec  3 06:39 .
drwxrwsr-x. 28 root   users 4096 Dec  3 22:11 ..
drwxr-sr-x.  2 jovyan users 4096 Dec  3 06:39 .datalad
drwxr-sr-x. 10 jovyan users 4096 Dec  3 21:31 .git
-rw-r--r--.  1 jovyan users   55 Dec  3 06:39 .gitattributes
drwxr-sr-x.  2 jovyan users 4096 Dec  3 06:39 B1Map
drwxr-sr-x.  2 jovyan users 4096 Dec  3 06:39 Scout
drwxr-sr-x.  2 jovyan users 4096 Dec  3 06:39 UnseenData
drwxr-sr-x.  3 jovyan users 4096 Dec  3 06:39 checkpoints
```

```
jovyan@neurodesktop:~/ehnwz$ datalad get B1Map/
```



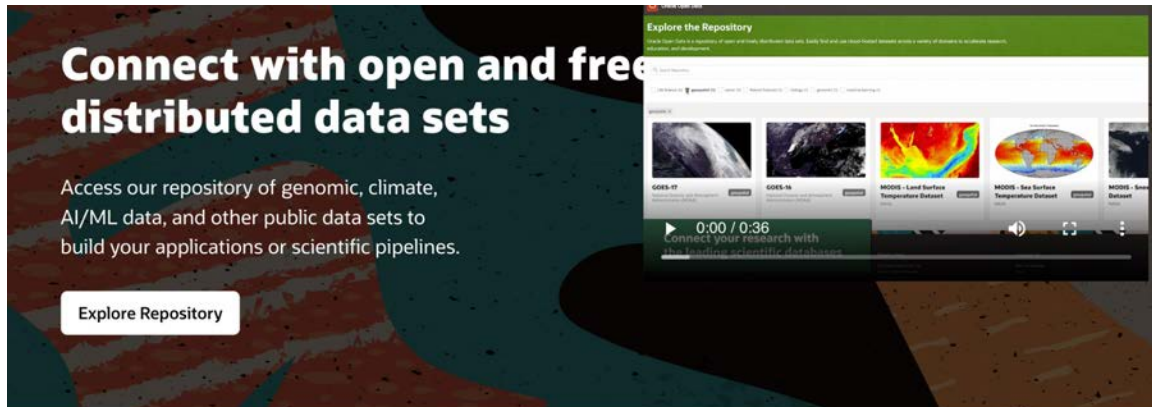
Great feature of DataLad: It doesn't download everything at once, but we can pick which files we want

DataLad provides access to a variety of open data sources



<https://www.data-lad.org/in-the-wild.html>

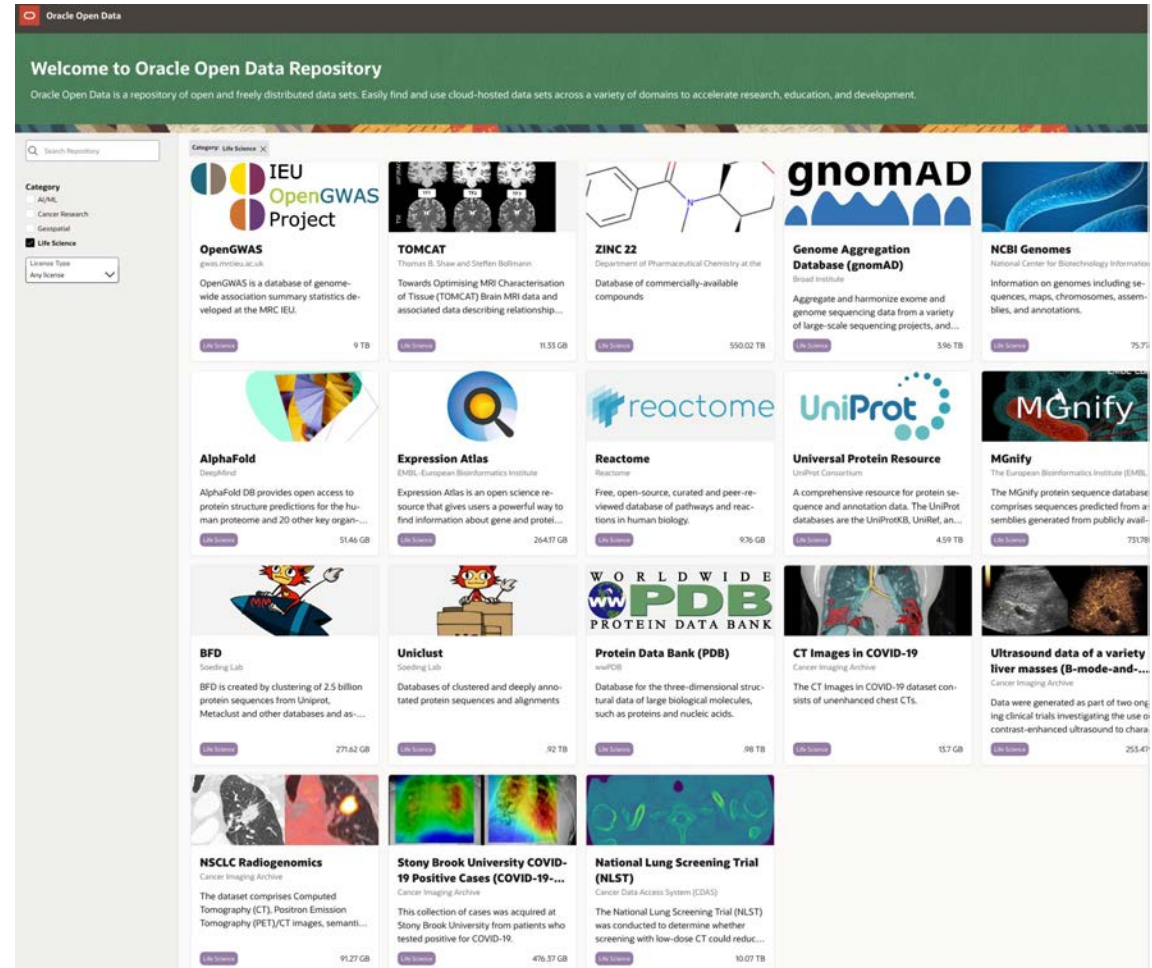
Oracle Open Data – Free Open Data hosting



Connect with open and free distributed data sets

Access our repository of genomic, climate, AI/ML data, and other public data sets to build your applications or scientific pipelines.

Explore Repository



Welcome to Oracle Open Data Repository

Oracle Open Data is a repository of open and freely distributed data sets. Easily find and use cloud-hosted data sets across a variety of domains to accelerate research, education, and development.

Search Repository

Category: Life Science

- AI/ML
- Cancer Research
- Geospatial
- Life Science

License Type: Any license

OpenGWAS (9 TB)

TOMCAT (11.53 GB)

ZINC 22 (550.02 TB)

gnomAD (3.96 TB)

AlphaFold (51.46 GB)

Expression Atlas (26.417 GB)

Reactome (976 GB)

UniProt (4.59 TB)

MGnify (73178)

BFD (271.62 GB)

Unclust (52 TB)

Protein Data Bank (PDB) (98 TB)

CT Images in COVID-19 (117 GB)

Ultrasound data of a variety of liver masses (251.47 GB)

NSCLC Radiogenomics (91.27 GB)

Stony Brook University COVID-19 Positive Cases (476.37 GB)

National Lung Screening Trial (NLST) (10.07 TB)

Why Oracle Open Data?



Findable and accessible data

Curated, managed, and ready to use data sets from trusted institutions like NASA, DeepMind, Stanford.



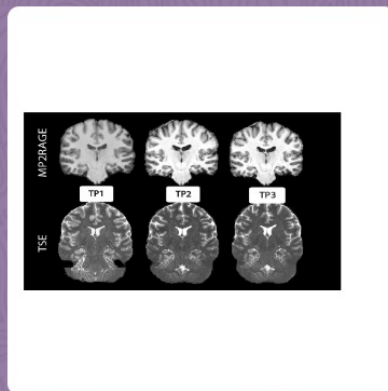
Easy to use

A platform that is easy to navigate, search, and ability to download files anywhere.



Low Cost, On-Premise & Cloud Ready

Each data set consists of code and tooling usage examples for consumption and reproducibility.



TOMCAT

Seven healthy participants were scanned using a Siemens Magnetom 7 Tesla (T) whole-body research MRI scanner (Siemens Healthcare, Erlangen, Germany). The first scan session was acquired in 2016 (time point one), the second and third session in 2019 (time point two and three, respectively) with the third session acquired 45 min following the second as a scan-rescan condition. The following scans were acquired for all time points: structural T1 weighted (T1w) MP2RAGE, high in-plane resolution Turbo-Spin Echo (TSE) dedicated for hippocampus subfield segmentation.

About

Data

Code

About this Data Set

Owner

Thomas B. Shaw and Steffen Bollmann

Owner Contact Information

t.shaw@uq.edu.au (Thomas B. Shaw)

s.bollmann@uq.edu.au (Steffen Bollmann)

Category

Life Science

Files

170

Size

11.33 GB

License Type

BSD 3-Clause "New"/"Revised" License

Tags

Life Science

Hippocampus

MRI/Brain

Oracle Open Data

Bulk downloads

Data Format

Download sample files

https://objectstorage.us-ashburn-1.oraclecloud.com/n/idrvm4tkz2a8/b/TOMCAT/o/example_runSingleSubjectTemplate.tar.gz

List files

HTTP CURL WGET

List files

```
curl https://objectstorage.us-ashburn-1.oraclecloud.com/n/idrvm4tkz2a8/b/TOMCAT/o/
```

List files with prefix

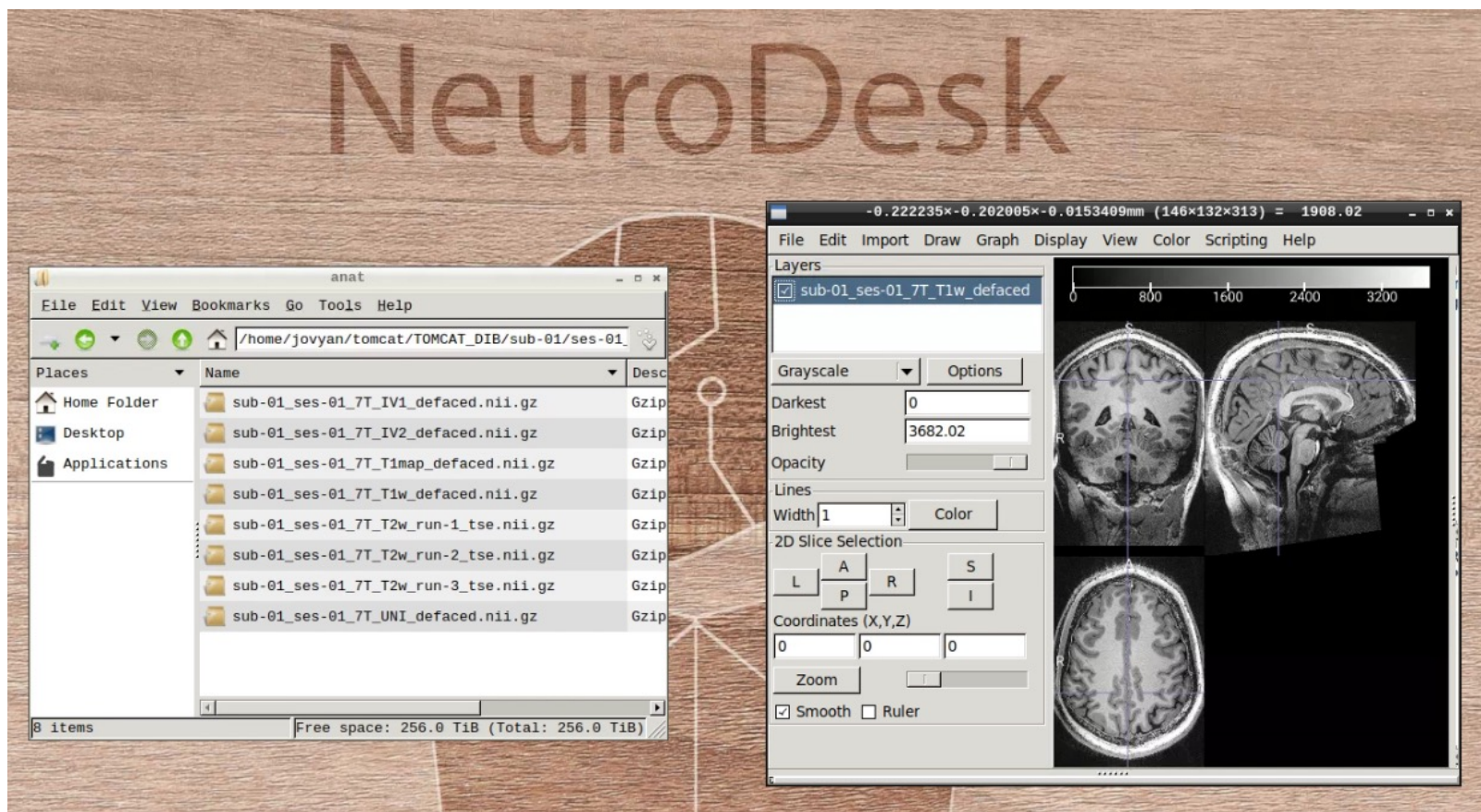
```
curl https://objectstorage.us-ashburn-1.oraclecloud.com/n/idrvm4tkz2a8/b/TOMCAT/o/?prefix=
```

Browse and download

| Download | | Search keywords in all columns | Go | Filters | Rows | 15 |
|--------------------------|--|--------------------------------|----|---------|------|----------|
| <input type="checkbox"/> | Name | | | | | |
| <input type="checkbox"/> | example_run.tar.gz | | | | | 2.59 GB |
| <input type="checkbox"/> | example_runSingleSubjectTemplate.tar.gz | | | | | 116 GB |
| <input type="checkbox"/> | TOMCAT_DIB/sub-01/ses-01_7T/anat/sub-01_ses-01_7T_IV1_defaced.nii.gz | | | | | 44.14 MB |
| <input type="checkbox"/> | TOMCAT_DIB/sub-01/ses-01_7T/anat/sub-01_ses-01_7T_IV2_defaced.nii.gz | | | | | 50.82 MB |
| <input type="checkbox"/> | TOMCAT_DIB/sub-01/ses-01_7T/anat/sub-01_ses-01_7T_T1w_defaced.nii.gz | | | | | 69.32 MB |

Oracle Open Data mounts on NeuroDesk

```
jovyan@neurodesktop:~$ s3fs TOMCAT ~/tomcat/ -o allow_other -o endpoint=us-ashburn-1 -o url=https://idrvm4tkz2a8.compat.objectstorage.us-ashburn-1.oraclecloud.com/ -onomultipar t -o use_path_request_style
```





Re-executable papers linking Open Code and Data

How close are we to a re-executable paper?

Can we use neuroimaging software inside Jupyter notebooks?

Interactive papers

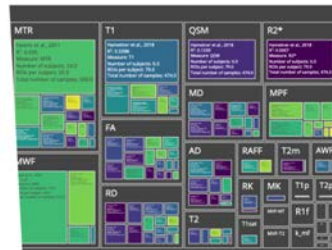


Supported by the **Canadian Open Neuroscience Platform (CONP)**.

The quest for measuring myelin with MRI - An interactive meta-analysis

This study explores an important aspect of quantitative magnetic resonance imaging (qMRI): validation. Focusing specifically on myelin measures, we show the results of our meta-analysis comparing quantitative MRI with histology.

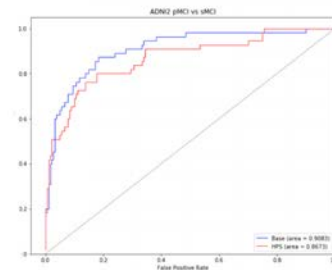
NeuroLibre Book GitHub Code



A highly predictive signature (HPS) of Alzheimer's disease dementia from cognitive and structural brain features

A jupyter notebook containing analyses that give a highly predictive signature (HPS) of Alzheimer's disease dementia from cognitive and structural features using simulated data.

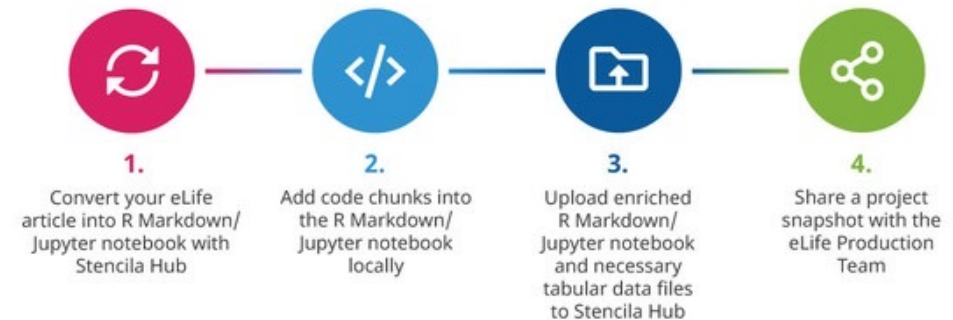
NeuroLibre Book GitHub Code



<https://www.neurolibre.com/>



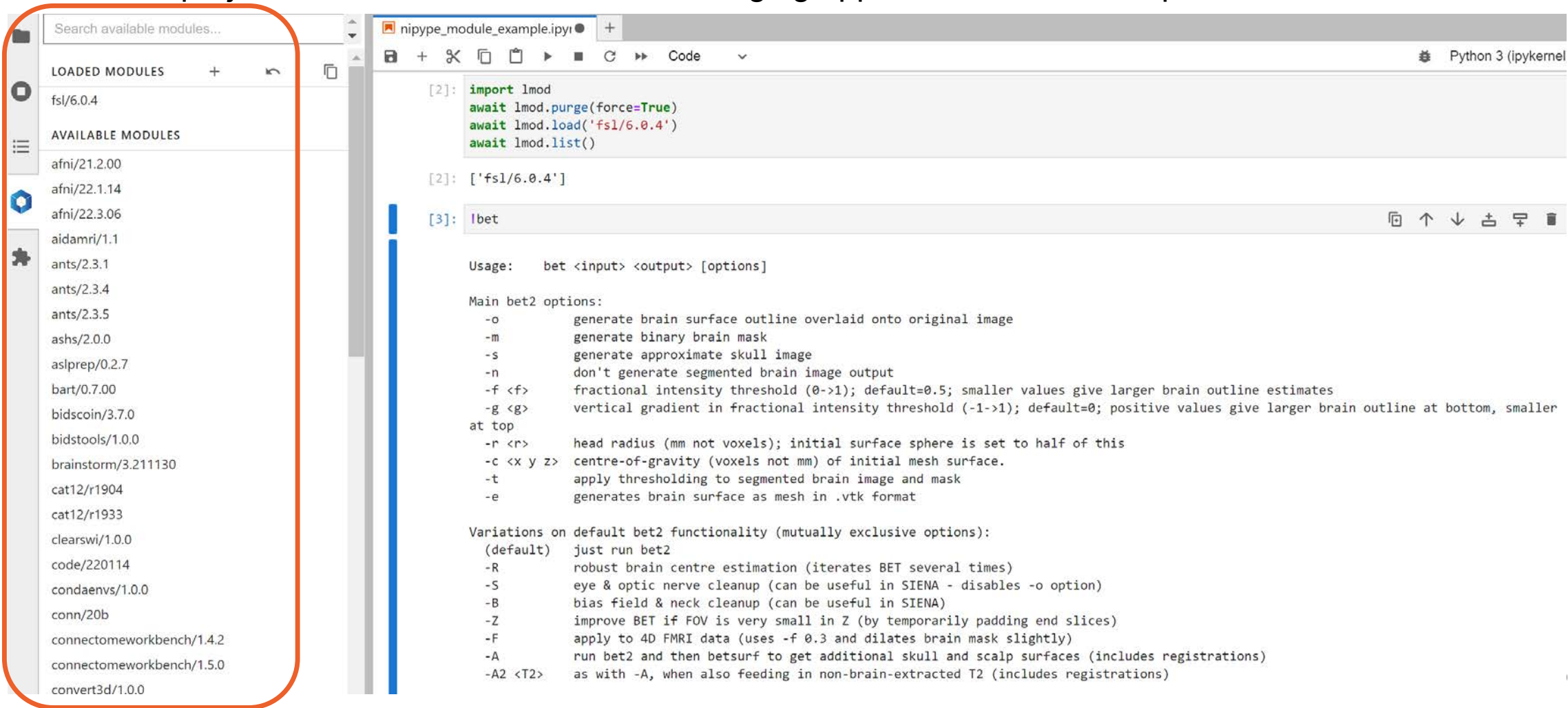
Steps to enrich your published article with code and data



<https://elifesciences.org/labs/dc5acbde/welcome-to-a-new-era-of-reproducible-publishing>

NeuroDesk applications & Jupyter notebooks

NeuroDesk project enables the use of all neuroimaging applications inside computational notebooks:



The screenshot displays a Jupyter notebook environment. On the left, a sidebar titled "Search available modules..." lists various neuroimaging modules. The "LOADED MODULES" section shows "fsl/6.0.4". The "AVAILABLE MODULES" section lists numerous other modules such as "afni/21.2.00", "afni/22.1.14", "afni/22.3.06", "aidamri/1.1", "ants/2.3.1", "ants/2.3.4", "ants/2.3.5", "ashs/2.0.0", "aslprep/0.2.7", "bart/0.7.00", "bidscoin/3.7.0", "bidstools/1.0.0", "brainstorm/3.211130", "cat12/r1904", "cat12/r1933", "clearswi/1.0.0", "code/220114", "condaenvs/1.0.0", "conn/20b", "connectomeworkbench/1.4.2", "connectomeworkbench/1.5.0", and "convert3d/1.0.0".

The main notebook area shows a code cell with the following Python code:

```
[2]: import lmod
      await lmod.purge(force=True)
      await lmod.load('fsl/6.0.4')
      await lmod.list()
```

The output of the code cell is:

```
[2]: ['fsl/6.0.4']
```

Below the code cell, the command "lbet" is entered, and the output shows the usage and main options for the "bet" command:

```
[3]: lbet

Usage:   bet <input> <output> [options]

Main bet2 options:
  -o          generate brain surface outline overlaid onto original image
  -m          generate binary brain mask
  -s          generate approximate skull image
  -n          don't generate segmented brain image output
  -f <f>     fractional intensity threshold (0->1); default=0.5; smaller values give larger brain outline estimates
  -g <g>     vertical gradient in fractional intensity threshold (-1->1); default=0; positive values give larger brain outline at bottom, smaller at top
  -r <r>     head radius (mm not voxels); initial surface sphere is set to half of this
  -c <x y z>  centre-of-gravity (voxels not mm) of initial mesh surface.
  -t          apply thresholding to segmented brain image and mask
  -e          generates brain surface as mesh in .vtk format

Variations on default bet2 functionality (mutually exclusive options):
  (default)  just run bet2
  -R         robust brain centre estimation (iterates BET several times)
  -S         eye & optic nerve cleanup (can be useful in SIENA - disables -o option)
  -B         bias field & neck cleanup (can be useful in SIENA)
  -Z         improve BET if FOV is very small in Z (by temporarily padding end slices)
  -F         apply to 4D FMRI data (uses -f 0.3 and dilates brain mask slightly)
  -A         run bet2 and then betsurf to get additional skull and scalp surfaces (includes registrations)
  -A2 <T2>  as with -A, when also feeding in non-brain-extracted T2 (includes registrations)
```

Platform can
be changed:
link in OSF

Provide
source code
in an easy
accessible
way

DATA AVAILABILITY STATEMENT

We facilitate the reproducibility of our study by providing an interactive version of our implementation on a publicly accessible cloud-based platform. The readers can explore the implementation of the model (neural network), train the model with different hyper-parameters and architectures, investigate the stability of the training process, and reproduce our results with the identical model used in this manuscript (<https://github.com/sbollmannMRI/scout2B1> 320a6ab). We anonymized and stored the input data (localizer, SA2RAGE B_1^+) of 28 participants in OSF (OSF, Center for Open Science, Inc., Virginia, USA) accessible via <https://osf.io/y5cq9/>.

Interactively
running in
browser – no
setup needed

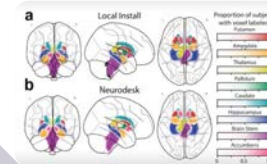
This commit
was used for the
paper, but bug
fixes possible

Data and links
can be updated
if bugs found or
services move

Thank you

- ✉ s.bollmann@uq.edu.au
- 🌐 <https://mri.sbollmann.net>
- 🌐 <https://neurodesk.org>
- 🐦 [@Sbollmann_MRI@masto.ai](https://twitter.com/Sbollmann_MRI)
- 🐦 [@NeuroDesk@masto.ai](https://twitter.com/NeuroDesk)
- 🐙 github.com/sbollmannmri
- 🐙 github.com/NeuroDesk

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Ashley Stewart -
QSMxT: An Open
Pipeline for
Automated
Quantitative
Susceptibility
Mapping

Dao Thanh Thuy -
Investigating the
reproducibility of
the NeuroDesk
Platform



Fernanda Ribeiro -
An open-source
framework for
predicting brain
functional maps
with geometric
deep learning

**Korbinian
Eckstein** - Open-
Source MRI Tools
for Research
(ROMEO, CLEAR-
SWI and MCPC-
3D-S)

