OPEN SCIENCE:

GETTING READY FOR THE TRANSITION

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iBBA Open Science workshop 7 juni 2019

VU VRIJE UNIVERSITEIT AMSTERDAM

"After 1 January 2020 scientific publications on the results from research funded by public grants provided by national and European research councils and funding bodies, must be published in compliant Open Access Journals or on compliant Open Access Platforms."

https://www.coalition-s.org/10-principles/

Plan S was launched on Sept 4th 2018 and aspires to make sure that all publications that result from public grants are published open access. Open Access publications are immediately available for everyone to read and are not published behind a paywall. The motivation for open access publications is that science performed with money from the public should be publicly available.

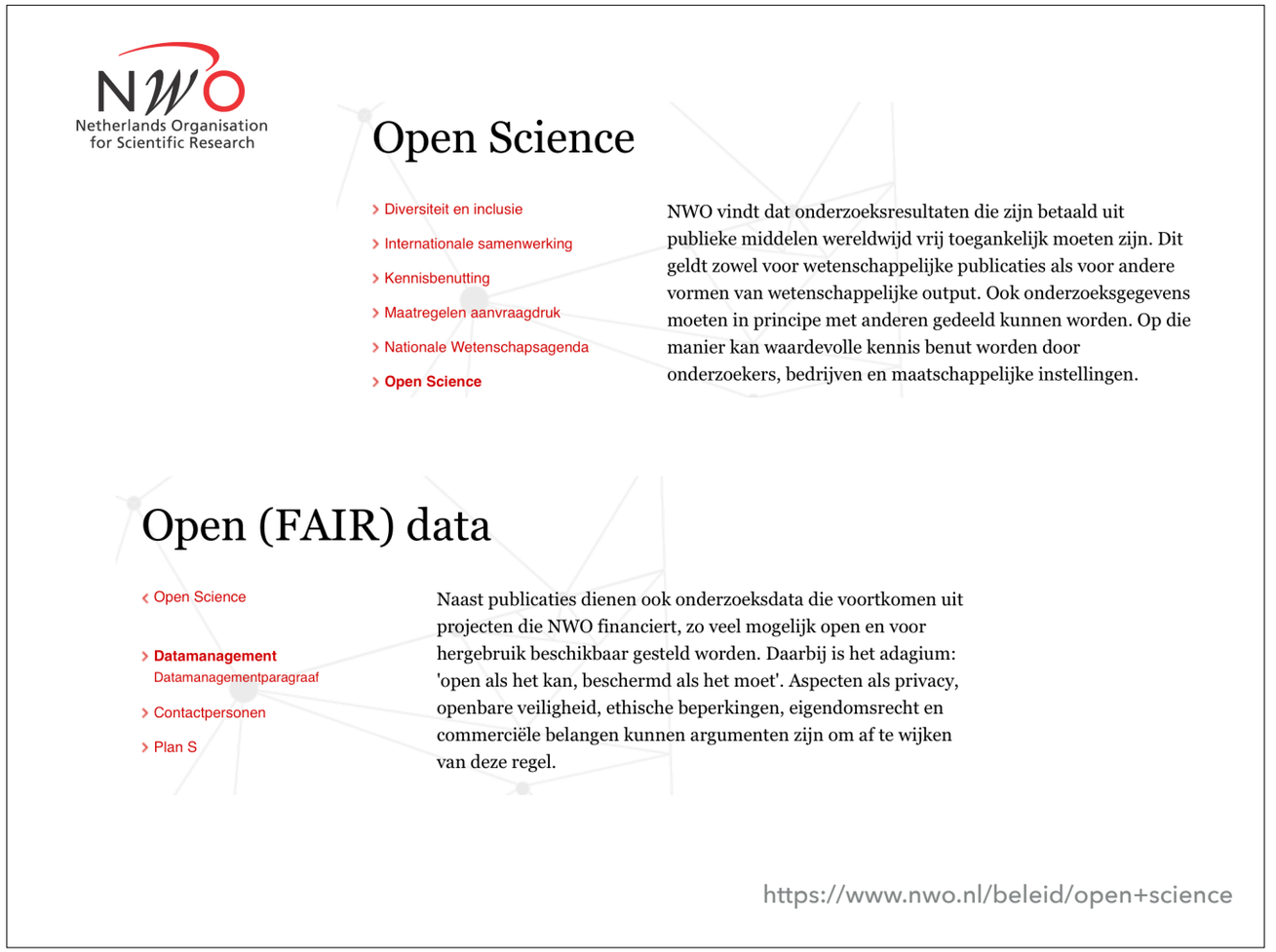
Wetenschapsbrief OCW: open science wordt de norm

In de wetenschapsbrief 'Nieuwsgierig en betrokken – de waarde van wetenschap' maakt minister Van Engelshoven (OCW) drie ambities voor de Nederlandse wetenschap voor de komende vier jaar bekend. 'Open science' komt in deze wetenschapsvisie en -beleid veelvuldig voor.

Naast een toelichting op de financiële impuls voor de wetenschap via de Nationale Wetenschapsagenda, de sectorplannen en een samenwerkingsverband om de grootste radiotelescoop ter wereld te bouwen, benoemt de brief andere mooie kansen. Eén daarvan is het nieuwe kaderprogramma Horizon Europe met open science als de norm voor alle onderdelen. Binnen open science wordt het 'hergebruiken van onderzoeksdata' genoemd als één van de speerpunten. DANS onderstreept dit uiteraard.

https://dans.knaw.nl/nl/actueel/nieuws/wetenschapsbrief-ocw-open-science-wordt-de-norm

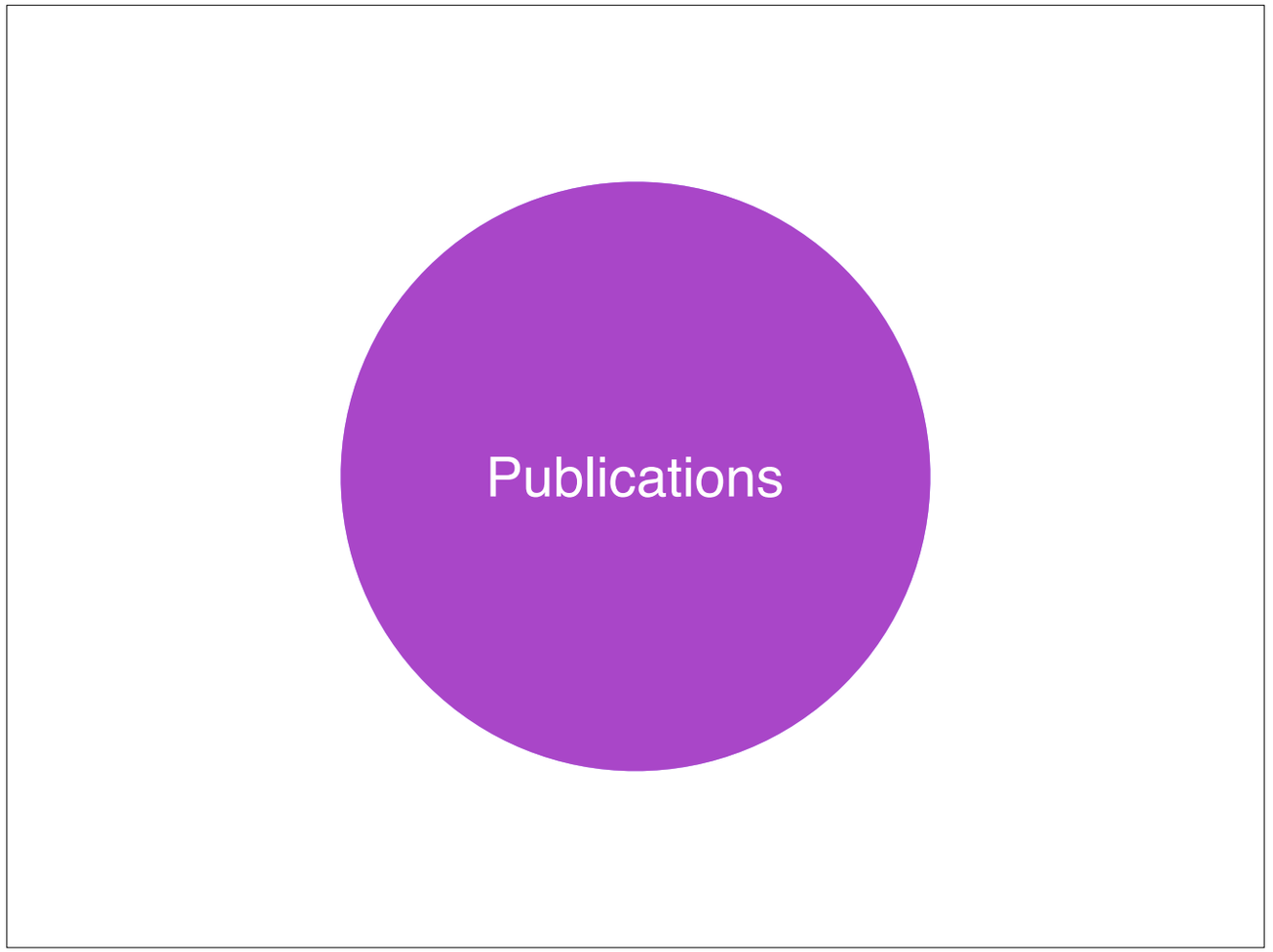
In a recent communication to the house of representatives the minister of science also communicated that Open Science will be norm. Open Science is even broader than Open Access and also includes sharing of data and code.



Lastly, large grant agencies such as ERC and NWO are proponents of Open Science. NWO states that all publications from NWO grants should be published open access and that data from projects financed with NWO money should be made available.

It is clear that we are moving towards a system in which science will be much more open than what we are used to so far. This requires new skills from scientists and changes in how we are evaluated. In this talk I will introduce the concept op Open Science, discuss Open Access, Open Data and Open Source. I'll highlight some of the things that will need to change in the evaluation of scientists and I'll end with three things that you can do today to start being more Open.

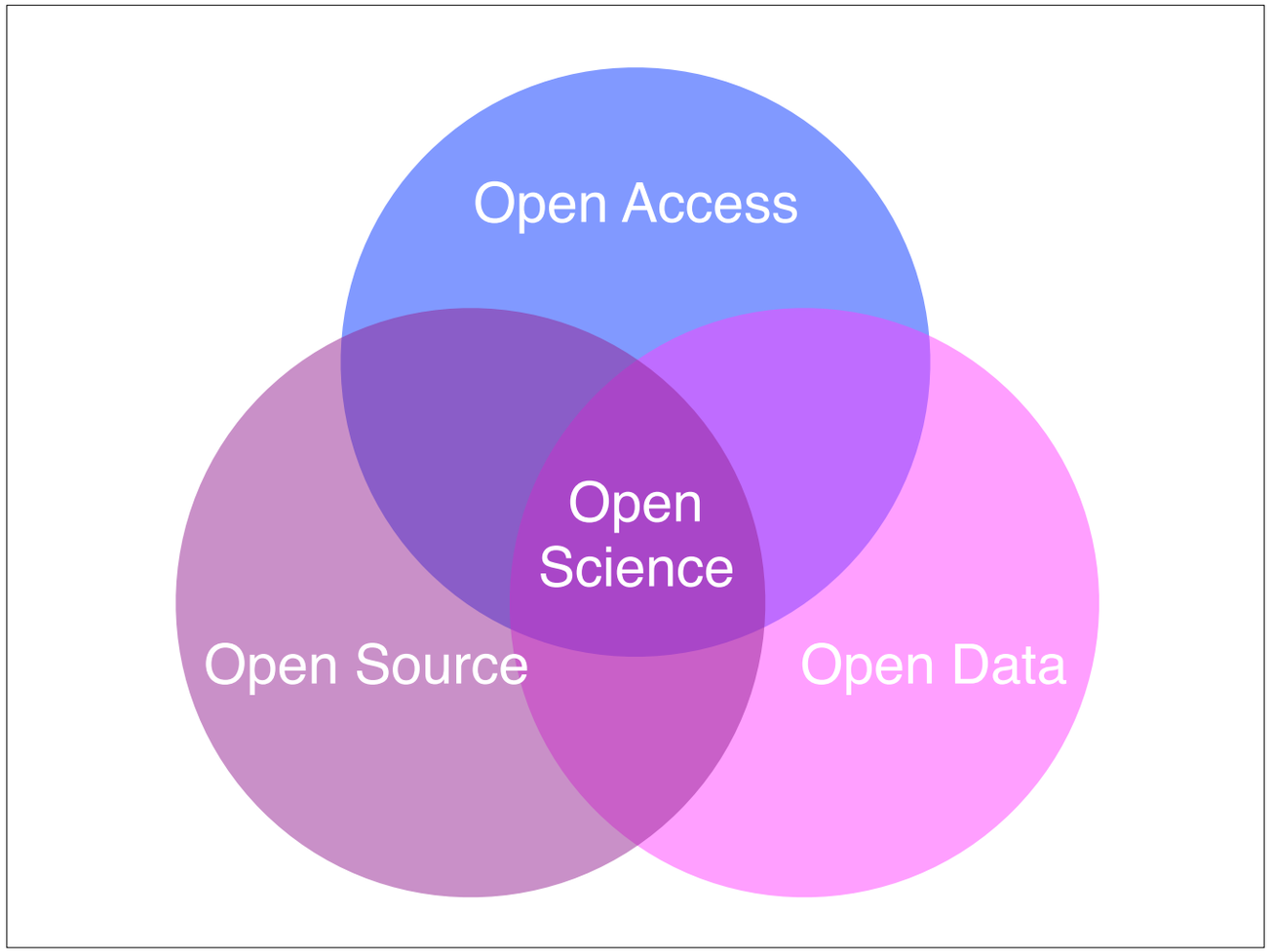
WHAT IS OPEN SCIENCE?



In the current scientific system, everything revolves around publications: the number of publications is important, and the impact factor of these journals is important.

It is now free for a scientist to send an article to a professional journal. These magazines ensure quality control by sending the articles for review to (anonymous) colleagues. After peer review, the article is accepted. At the moment, such an article disappears behind a payment wall, and the articles are only available through, for example, the university libraries. These articles are therefore not freely accessible to everyone.

As I discussed before, we want to make science more open and to make all research that has been funded with public money to be accessible for the public.



This is why we are moving towards Open Science

Open Science consists of three parts:
Open Access: all publications are directly accessible
Open Data: data is available to everyone
Open Source: computer programs and analyses can be downloaded for everyone

This Open Science system is good for science and for society. For example, the verifiability of experiments by Open Data is increased, which helps to prevent the rare excesses of manipulated data. As a scientist you also no longer have to do things twice if the data from studies you want to build on is already available. Open Access ensures that the new knowledge and expertise that you produce as a scientist is available to everyone, and not just to other scientists who have access to literature. GPs, high school teachers and policymakers, for example, can also benefit from this.

WHAT IS OPEN SCIENCE?

OPEN ACCESS

Part I: The Plan S Principles

"With effect from 2021, all scholarly publications on the results from research funded by public or private grants provided by national, regional and international research councils and funding bodies, must be published in Open Access Journals, on Open Access Platforms, or made immediately available through Open Access Repositories without embargo."

In addition:

01 Authors or their institutions retain copyright to their publications. All publications must be published under an open license, preferably the Creative Commons Attribution license (CC BY), in order to fulfil the requirements defined by the Berlin Declaration;

02 The Funders will develop robust criteria and requirements for the services that high-quality Open Access journals, Open Access platforms, and Open Access repositories must provide;

03 In cases where high-quality Open Access journals or platforms do not yet exist, the Funders will, in a coordinated way, provide incentives to establish and support them when appropriate; support will also be provided for Open Access infrastructures where necessary;

04 Where applicable, Open Access publication fees are covered by the Funders or research institutions, not by individual researchers; it is acknowledged that all researchers should be able to publish their work Open Access;

05 The Funders support the diversity of business models for Open Access journals and platforms. When Open Access publication fees are applied, they must be commensurate with the publication services delivered and the structure of such fees must be transparent to inform the market and funders potential standardisation and capping of payments of fees;

06 The Funders encourage governments, universities, research organisations, libraries, academies, and learned societies to align their strategies, policies, and practices, notably to ensure transparency.

07 The above principles shall apply to all types of scholarly publications, but it is understood that the timeline to achieve Open Access for monographs and book chapters will be longer and requires a separate and due process;

08 The Funders do not support the 'hybrid' model of publishing. However, as a transitional pathway towards full Open Access within a clearly defined timeframe, and only as part of transformative arrangements, Funders may contribute to financially supporting such arrangements;

09 The Funders will monitor compliance and sanction non-compliant beneficiaries/grantees;

10 The Funders commit that when assessing research outputs during funding decisions they will value the intrinsic merit of the work and not consider the publication channel, its impact factor (or other journal metrics), or the publisher.

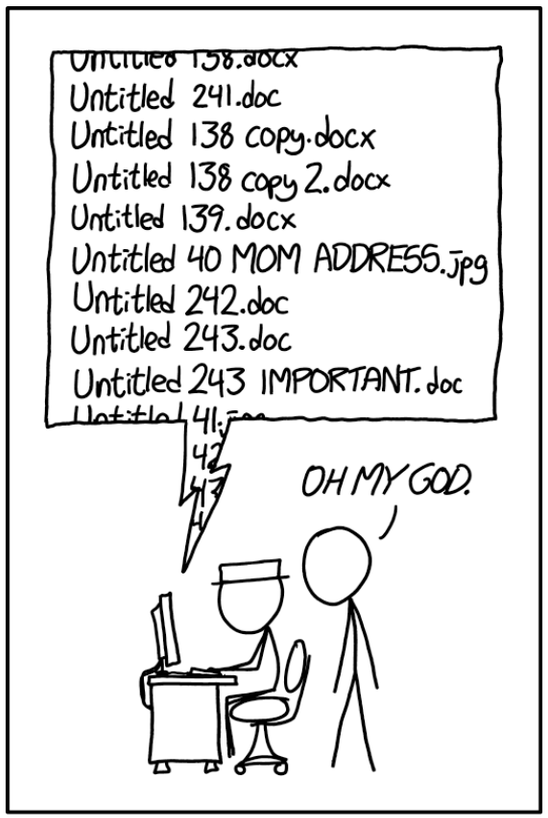
https://www.coalition-s.org/principles-and-implementation/

The transition towards open access sounds really simple, just make all of the publications open, but it is a bit more difficult than that. In the current system publications are heavily weighed on where they are published. The impact factor of the journal is important and when you apply for a grant the reviewers will look at where you published your work. Researchers who have to adhere to Plan S will need to publish their papers Open Access, but not all journals have an Open Access option. This means that researcher who need to adhere to Plan S are not free to choose your outlet anymore. This can lead to unfair competition between researchers who have to adhere to Plan S and those who do not. A new system of evaluating the quality of a publication needs to be developed. In this new system impact factor cannot be leading anymore. This new system is currently being developed and I'll discuss this in more detail towards the end of the talk.

Plan S was originally scheduled for January 1st 2020. New revised guidelines have been published recently and now Plan S will take effect starting January 1st 2021

WHAT IS OPEN SCIENCE?

OPEN DATA



PROTIP: NEVER LOOK IN SOMEONE ELSE'S DOCUMENTS FOLDER.

If you want to share your data, we need to do it in a way that is usable for others. To facilitate this there are some guidelines. One of them is the FAIR data guidelines.

FAIR DATA

Findable

The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the FAIRification process.

https://www.go-fair.org/fair-principles/

Wilkinson, M. D., et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific data, 3.

The F is for Findable. If you want people to use your data they should be able to find it. To facilitate the findability of your data it is important to provide metadata about the dataset that can easily be read by both humans and computers.

FAIR DATA

Findable

Accessible

Once the user finds the required data, she/he needs to know how can they be accessed, possibly including authentication and authorisation.

https://www.go-fair.org/fair-principles/

Wilkinson, M. D., et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific data, 3.

A is voor Accessible. Data should be stored for long term so that they can easily be accessed and/or downloaded. It should be clear what the conditions are for downloading and using the data.

FAIR DATA

Findable

Accessible

Interoperable

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

https://www.go-fair.org/fair-principles/

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I is for Interoperable. This means that the data should be in such a format that it can easily be merged with other datasets.

FAIR DATA

Findable

Accessible

Interoperable

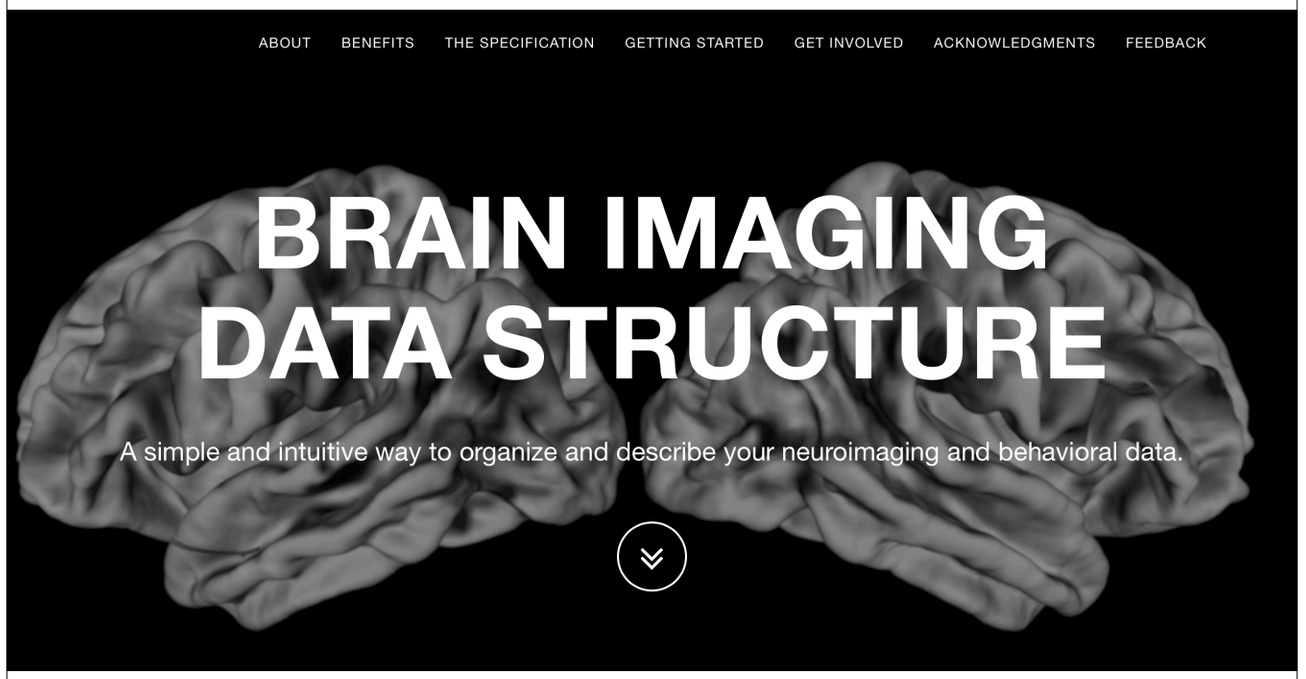
Reusable

The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

https://www.go-fair.org/fair-principles/

Wilkinson, M. D., et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific data, 3.

Lastly the R stands for Reusable. Data should be well described and details of how the data were collected should be provided.



For neuroimaging data we now have the BIDS format. Benefits of putting your data into BIDS are that others know how to use it and once your data is in the BIDS format there are several pipelines that you can use.

MENU nature methods

Article | Published: 10 December 2018

fMRIPrep: a robust preprocessing pipeline for functional MRI

Oscar Esteban, Christopher J. Markiewicz, Ross W. Blair, Craig A. Moodie, A. Ilkay Isik, Asier Erramuzpe, James D. Kent, Mathias Goncalves, Elizabeth DuPre, Madeleine Snyder, Hiroyuki Oya, Satrajit S. Ghosh, Jessey Wright, Joke Durnez, Russell A. Poldrack & Krzysztof J. Gorgolewski

Nature Methods **16**, 111–116 (2019) | Download Citation

If you use fMRI I highly recommend fMRIprep. fMRIprep works with the BIDS format and is a great way of preprocessing your data

WHAT IS OPEN SCIENCE?

OPEN SOURCE

MAKING YOUR CODE USABLE FOR OTHERS

Prlić, A., & Procter, J. B. (2012). Ten simple rules for the open development of scientific software.

Lee, B. D. (2018). Ten simple rules for documenting scientific software.

If we want others to use our code we should write it in such a way that it is easy to follow for others. One obvious example is to comment your code. It might be perfectly clear to you what your code is doing, but that's usually not the case for others.

Include examples of your code so people can play around with it and have a starting point to develop their own code.

Including a Quickstart guide will increase the chances of people actually using your code. If they need to spend a lot of time getting things to run people will be very likely to give up. A Quickstart guide can be anything from a set of examples to a video or a tutorial.

Include a README file that users can use as a starting point. A README should include how to install and configure your software.

MAKING YOUR CODE USABLE FOR OTHERS

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MAKING YOUR CODE USABLE FOR OTHERS

- Rule 1: Write comments as you code
- Rule 2: Include examples (and lots of them)

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MAKING YOUR CODE USABLE FOR OTHERS

- Rule 1: Write comments as you code
- Rule 2: Include examples (and lots of them)
- Rule 3: Include a quickstart guide
- Rule 4: Include a README file with basic information

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MAKING YOUR CODE USABLE FOR OTHERS

- Rule 5: Include a help command for command line interfaces
- Rule 6: Version control your documentation
- Rule 7: Fully document your application programming interface
- Rule 8: Use automated documentation tools
- Rule 9: Write error messages that provide solutions or point to your documentation
- Rule 10: Tell people how to cite your software

Lee, B. D. (2018). Ten simple rules for documenting scientific software.

OPEN ACCESS Freely available online

PLOS | COMPUTATIONAL BIOLOGY

Editorial

Ten Simple Rules for the Open Development of Scientific Software

Andreas Prlić[1]*, James B. Procter[2]

1 San Diego Supercomputer Center, University of California San Diego, La Jolla, California, United States of America, **2** School of Life Sciences Research, College of Life Sciences, University of Dundee, Dundee, Scotland, United Kingdom

SHARING YOUR CODE

Sharing code can be done on GitHUB, which will also be discussed in more detail in the next talk.

HOW TO START BEING OPEN?

I would like to end with three very concrete things that you can do on Monday to start being more Open.

MAKE YOUR PUBLICATIONS OPEN ACCESS

https://www.ub.vu.nl/en/news-agenda/news-archive/2019/jan-mrt/use-your-right-to-open-access-publication-via-the-vu-research-portal.aspx

You can make all your past publications Open Access through the university library, through the 'You share, we take care' program. The library will put all your articles in a repository and makes sure that they are available to others. This is a really easy and great way to share your work and make everything Open Access!

SHARE YOUR STATISTICAL FMRI MAPS ON NEUROVAULT

NEUROVAULT

A public repository of unthresholded statistical maps, parcellations, and atlases of the brain

What is it?

A place where researchers can publicly store and share unthresholded statistical maps, parcellations, and atlases produced by MRI and PET studies.

Why use it?

- Interactive visualization
- A permanent URL
- Publicly shareable
- Improves meta-analyses

Supported by

incf · Stanford University · Nudge-it.

If you work with fMRI data, you can share your statistical maps on neurovault. The statistical maps are not a privacy concern and posting them on neurovaalt will allow others to use them in for instance meta analyses.

PRE REGISTER NEW PROJECTS

Register Your Project

A registration is a frozen, time-stamped copy of an OSF project. Registrations cannot be edited or deleted. You might create a registration to capture a snapshot of your project at certain points in the research cycle - such as right before data collection begins, when you submit a manuscript for peer review, or upon completion of a project.

All registrations will be made public eventually. You can choose to make the registration public immediately or embargoed for up to 4 years. Registrations cannot be deleted, but they can be withdrawn. Learn more about registration withdrawals by following our help guide: **Withdrawing a registration**.

http://help.osf.io/m/registrations/l/524205-register-your-project

Lastly, you can preregister new projects that you are working on. This is technically not part of Open Science, but it is part of the new way we think about science. Preregistration is useful for yourself to really think about your project before you start.