

Open Science in Astronomy

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Jodrell Bank Centre for Astrophysics, University of Manchester

EWASS/NAM 2018 – S6d: Software in Astronomy – Room 11A – Thurs, 5 April @ 9:00

MANCHESTER
1824

The University of Manchester



moz://a



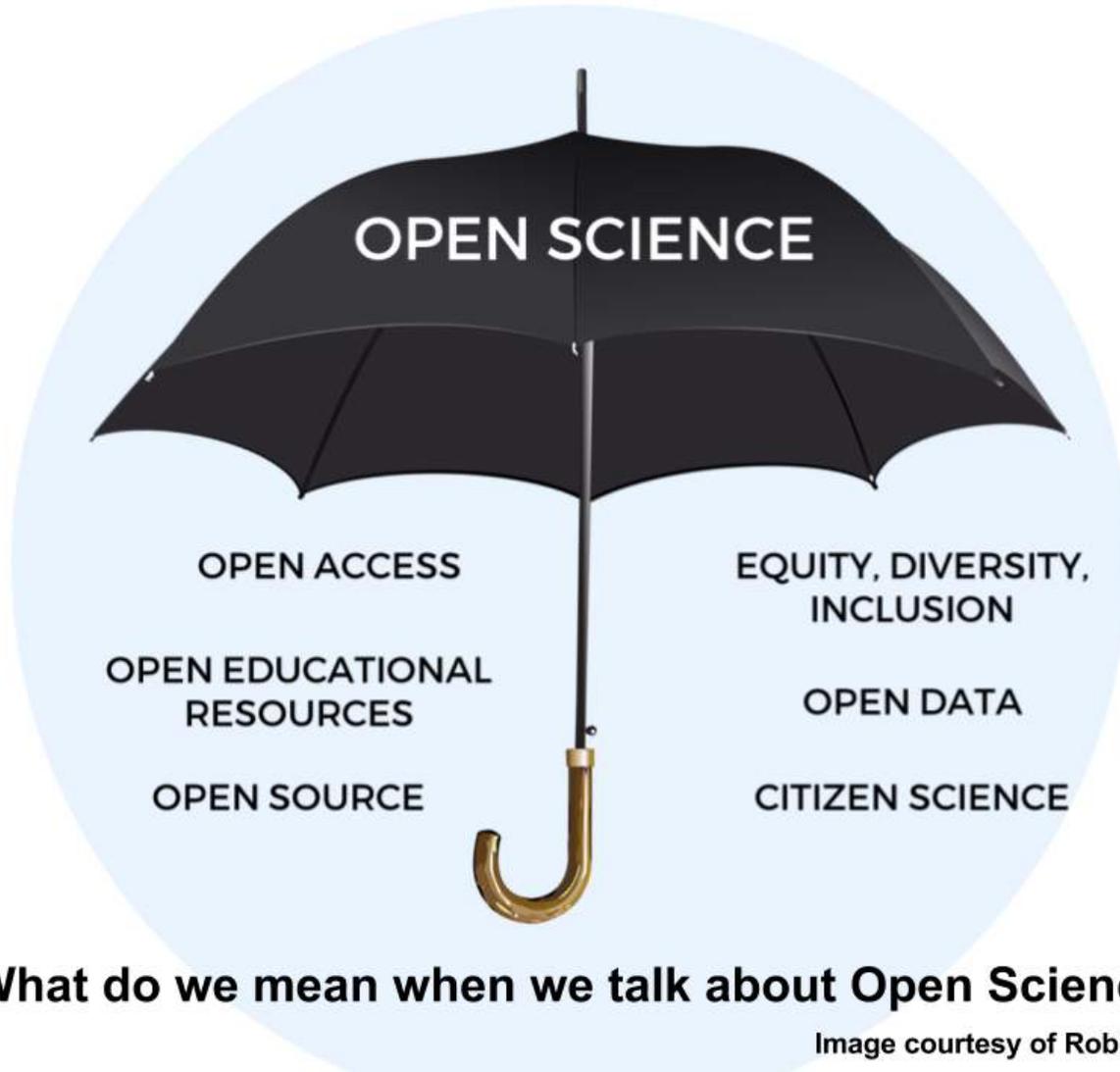
Outline

- What is Open Science?
- Barriers to Open Science
- Why research openly?
- Platforms to help you open up your research workflow
- Mozilla Open Leaders project: Resources for Open Science in Astronomy
- Open Science projects in Astronomy

What is Open Science?

The concept of transparency at all stages of the research lifecycle, combined with free and open access to data, publications, source code, etc. to ensure that anyone can fully reproduce your results.

...but isn't this just science?



What do we mean when we talk about Open Science?

Image courtesy of Robin Champieux

Barriers to Open Science

From Tennant, Jon (2017):
Barriers to Open Science for
junior researchers.
<https://doi.org/10.6084/mg.figshare.5383711.v1>

- Fear of
 - Scooping or ideas being stolen
 - Not being credited for ideas
 - Errors and public humiliation
 - Risk to reputation
 - Reduced scientific quality
 - Information overload
- Lack of awareness and training
- Cultural inertia and misinformation
- Challenging the establishment
- Follow the status quo to succeed
- Perceived lack of reward



<https://doi.org/10.6084/mg.figshare.5558653>

Why research openly?

Making research results more accessible contributes to better and more efficient science, and to innovation in the public and private sectors (EU Commission, Horizon 2020).

McKiernan+ (2016, DOI: 10.7554/eLife.16800) demonstrated that open research is associated with increases in citations, media attention, potential collaborators, job opportunities and funding opportunities.



CC-BY Danny Kingsley & Sarah Brown

Open Access

- Gold route: Royal Society Open Science journal
 - Open access, open data & open peer review
 - Author retention of copyright & liberal reuse rights via CC BY 4.0
- Green route: arXiv.org
 - Provides open access to 1,329,580+ e-prints in (Astro)Physics & many other fields
 - Started in August 1991
 - Consider posting pre-prints (vs post-prints) to arXiv to gain community insight before peer review!

The image shows two overlapping website screenshots. The top one is the Royal Society Open Science website, which features a red header with the Royal Society logo and navigation links. Below the header, there's a search bar and a navigation menu. The main content area includes a section for 'LATEST ARTICLES' with three article titles and authors, and a 'ROYAL SOCIETY OPEN SCIENCE' banner with a 3D model of a biological structure. The bottom screenshot is the arXiv.org website, showing the Cornell University Library logo, the arXiv.org logo, and a search bar. Below the search bar, there's a navigation menu and a list of featured articles, including 'Open access to 1,329,580 e-prints in Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance, Statistics, Electrical Engineering and Systems Science, and Economics'. The arXiv.org website also has a 'Login' button and a search bar with a dropdown menu for 'All papers'.

Chat to Alice Power at the Royal Society Publishing stand in the Exhibition Hall!

Open repositories

The Zenodo logo consists of the word "zenodo" in a white, lowercase, sans-serif font, centered on a solid blue rectangular background.The GitHub logo features the word "GitHub" in a large, bold, black, sans-serif font, positioned to the right of the Zenodo logo.The Open Science Framework logo features the text "Open Science Framework" in a white, sans-serif font, centered at the top of a dark blue rectangular box.

A scholarly commons to connect the entire research cycle





A catch-all repository that enables researchers, scientists, projects & institutions to:

- Share research results in a wide variety of formats including text, datasets, audio, video & images across all fields of science
- Display their research results & get credited by making the research results citable & integrating them into existing reporting lines to funding agencies like the EU
- Easily access & reuse shared research results

zenodo

https://zenodo.org/deposit/new

zenodo Search Upload Communities rainswor@gmail.com

Delete Save Publish

New upload

Instructions: (i) Upload minimum one file or fill-in required fields (marked with a red star). (ii) Press "Save" to save your upload for editing later. (iii) When ready, press "Publish" to finalize and make your upload public.

Files Choose files Start upload

Drag and drop files here

— or —

Choose files

(minimum 1 file required, max 50 GB per dataset - contact us for larger datasets)

Upload type required

Publication Poster Presentation Dataset Image Video/Audio Software Lesson Other

Publication type Journal article

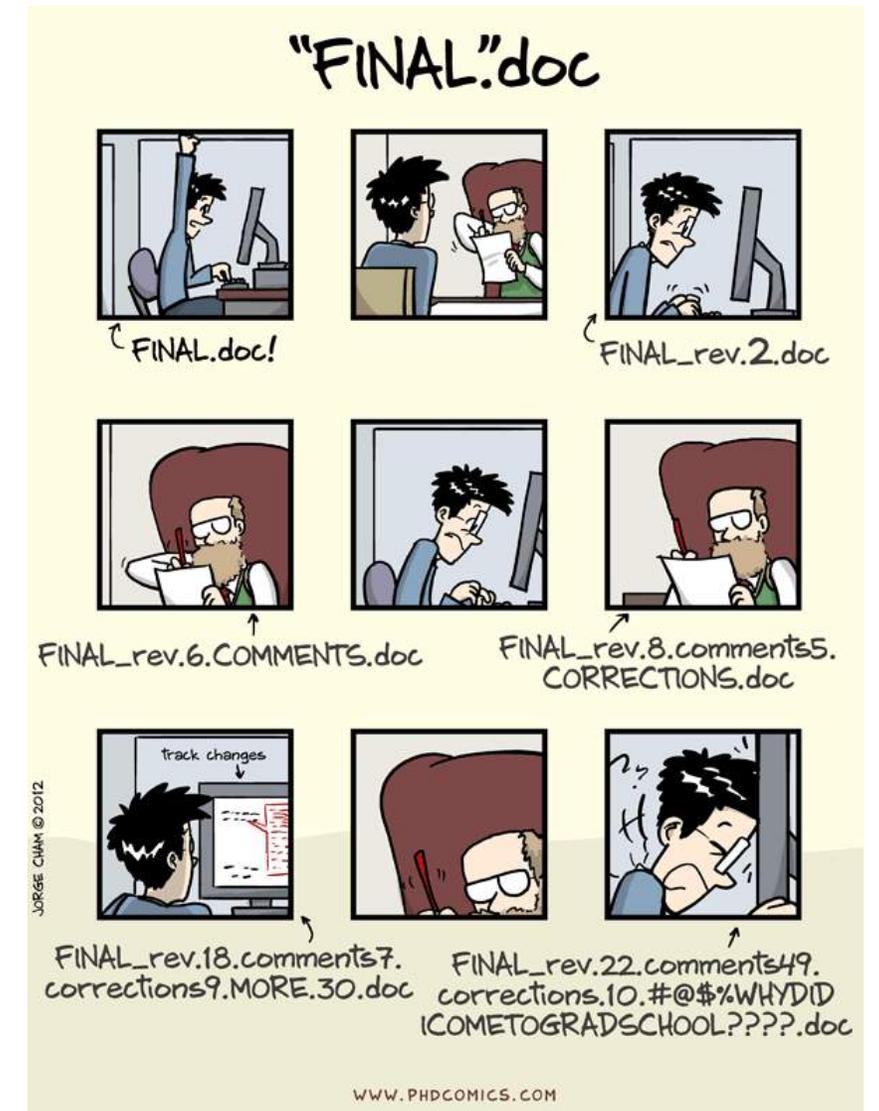
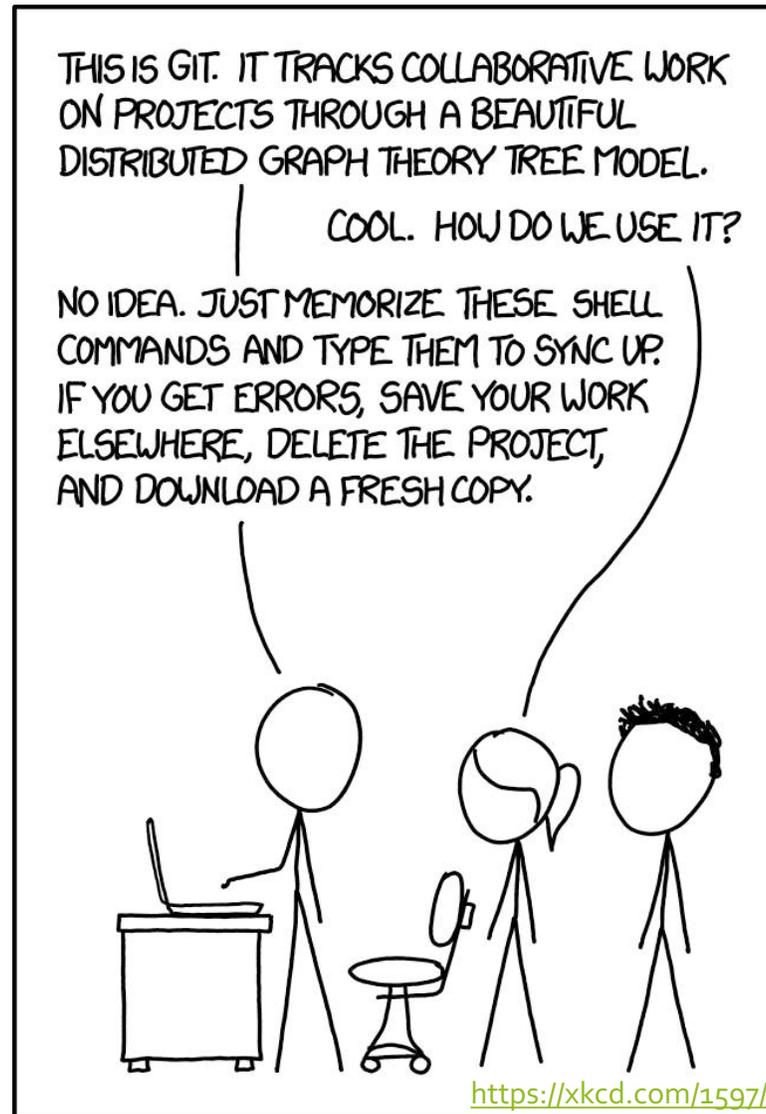


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GitHub

- Git is an open source program for tracking changes in text files (version control)
- GitHub is a code hosting platform for version control & collaboration. It lets you & others work together on projects from anywhere
- Open & reproducible science/code/research!
- Online portfolio & webpage for your research
- Archive your repo & make citable with Zenodo



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The screenshot shows the GitHub profile page for Rachael Ainsworth. At the top, the browser address bar shows 'https://github.com/rainsworth'. The navigation bar includes 'Search GitHub', 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. The profile header shows 'Overview', 'Repositories 11', 'Stars 65', 'Followers 17', and 'Following 35'. The profile picture is a woman with long red hair. Below the picture, the name 'Rachael Ainsworth' and username 'rainsworth' are displayed. Her bio reads: 'Radio Astronomer & Open Science Champion at the Jodrell Bank Centre for Astrophysics 🐼🌟 Mozilla Open Leader, Cohort 4C #RebelFoxes 🦊'. Her affiliation is 'University of Manchester, Manchester, UK' with a link to 'https://rachaelainsworth.wor...'. The 'Popular repositories' section lists: 'ROSA' (Resources for Open Science in Astronomy), 'rainsworth.github.io' (personal website), 'GMRT-TAU_catalogue' (A GMRT survey of regions towards the Taurus Molecular Cloud), 'Spectral-Energy-Distributions' (SED data from radio to sub-mm wavelengths), 'awesomeCV' (My CV using the awesome CV template), and 'paper_scripts' (A collection of scripts used to make plots in my publications). At the bottom, a '317 contributions in the last year' heatmap shows activity from Dec to Nov, with a 'Contribution activity' section for the year 2017.

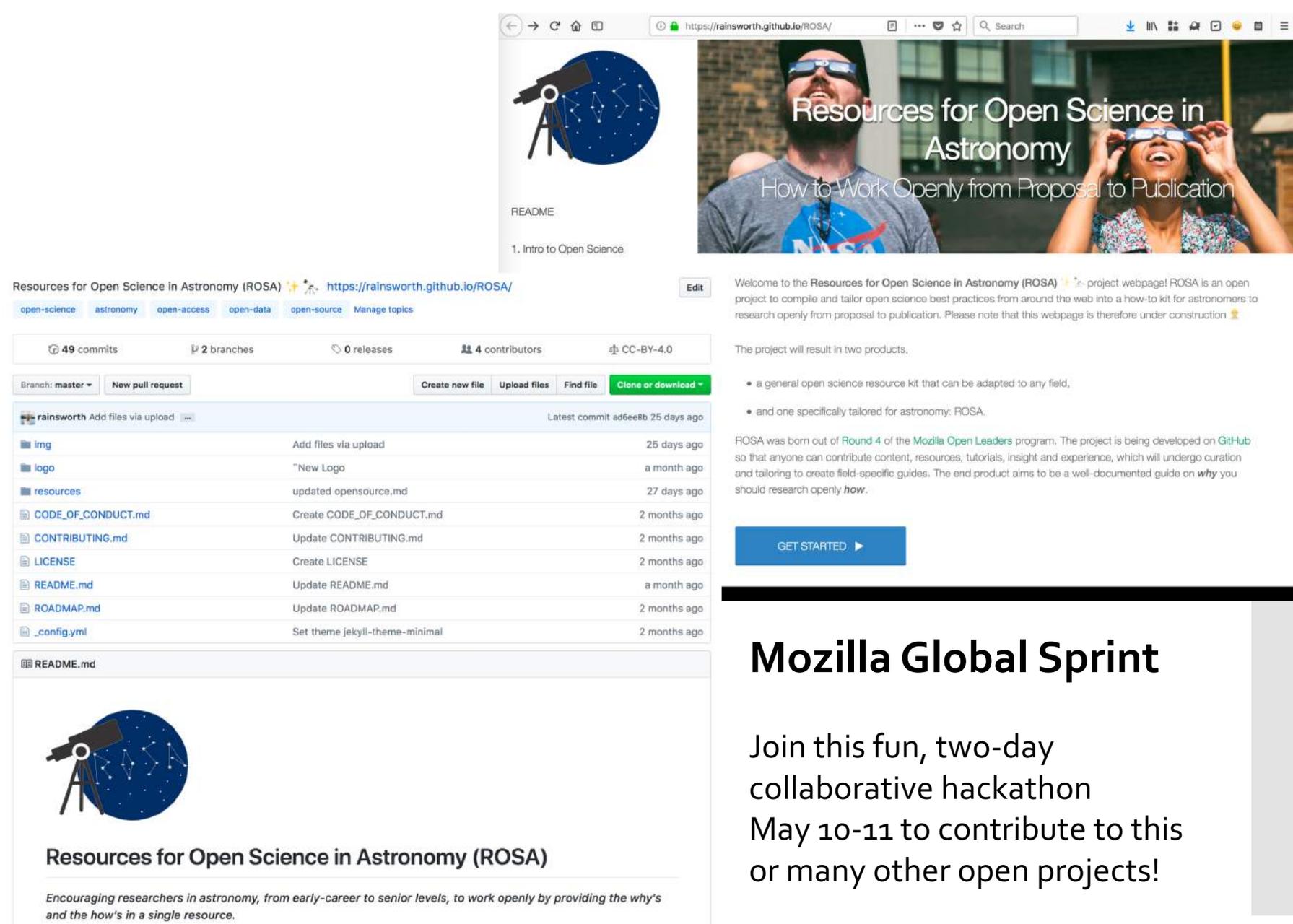
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Open Leaders Round 4 project: Resources for Open Science in Astronomy (ROSA)

- github.com/rainsworth/ROSA
- An open project to compile & tailor open science best practices from around the web into a how-to kit for astronomers to research openly from proposal to publication.
- A guide to help astronomers comply with Horizon 2020 open science mandates!

5 April @ 9:00 - Room 11A - S6d

Dr. Rachael Ainsworth - @rachaelevelyn - EWASS/NAM 2018



The screenshot shows the GitHub repository for 'Resources for Open Science in Astronomy (ROSA)'. The repository page includes the following information:

- Repository name: Resources for Open Science in Astronomy (ROSA)
- URL: <https://rainsworth.github.io/ROSA/>
- Topics: open-science, astronomy, open-access, open-data, open-source
- Statistics: 49 commits, 2 branches, 0 releases, 4 contributors, CC-BY-4.0 license
- Branch: master
- Buttons: New pull request, Create new file, Upload files, Find file, Clone or download
- File list:

File Name	Description	Last Commit
img	Add files via upload	25 days ago
logo	"New Logo	a month ago
resources	updated opensource.md	27 days ago
CODE_OF_CONDUCT.md	Create CODE_OF_CONDUCT.md	2 months ago
CONTRIBUTING.md	Update CONTRIBUTING.md	2 months ago
LICENSE	Create LICENSE	2 months ago
README.md	Update README.md	a month ago
ROADMAP.md	Update ROADMAP.md	2 months ago
_config.yml	Set theme jekyll-theme-minimal	2 months ago

The README content includes:

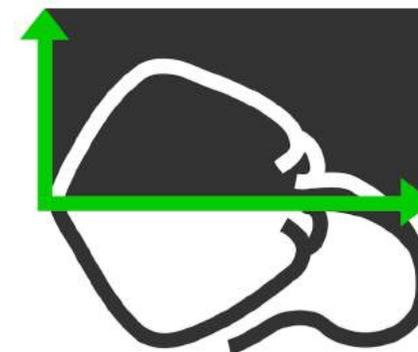
- A header image with the text: "Resources for Open Science in Astronomy" and "How to Work Openly from Proposal to Publication".
- A welcome message: "Welcome to the Resources for Open Science in Astronomy (ROSA) project webpage! ROSA is an open project to compile and tailor open science best practices from around the web into a how-to kit for astronomers to research openly from proposal to publication. Please note that this webpage is therefore under construction."
- Project goals: "The project will result in two products,"
 - a general open science resource kit that can be adapted to any field,
 - and one specifically tailored for astronomy: ROSA.
- Background: "ROSA was born out of Round 4 of the Mozilla Open Leaders program. The project is being developed on GitHub so that anyone can contribute content, resources, tutorials, insight and experience, which will undergo curation and tailoring to create field-specific guides. The end product aims to be a well-documented guide on why you should research openly how."
- A "GET STARTED" button.

Mozilla Global Sprint

Join this fun, two-day
collaborative hackathon
May 10-11 to contribute to this
or many other open projects!

<https://mzl.la/global-sprint>

Open Projects in Astronomy

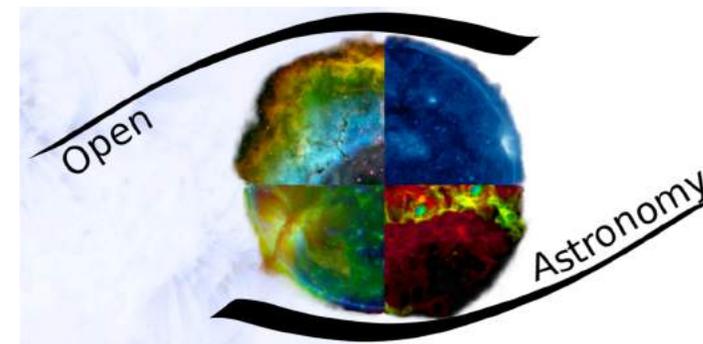


This organization Search Pull requests Issues Marketplace Explore

 **LOFAR telescope** ⓘ

A collection of LOFAR tools to process LOFAR data, more found at:
<http://astron.nl/radio-observatory/lofar-data-processing/software-processing-tools/software-processing-tools>

Repositories 10 People 1 Projects 0



Summary

- Open Science is making research outputs freely available and accessible for others to use in order to increase efficiency, maximize impact, encourage collaboration, and promote inclusion, equity and diversity in science. (You also get more citations.)
- Further reading:
 - Tennant JP, Waldner F, Jacques DC *et al.* The academic, economic and societal impacts of Open Access: an evidence-based review. *F1000Research* 2016, 5:632 (doi: [10.12688/f1000research.8460.3](https://doi.org/10.12688/f1000research.8460.3))
 - McKiernan EC, *et al.* Point of View: How open science helps researchers succeed. *eLife* 2016;5:e16800 (doi: [10.7554/eLife.16800](https://doi.org/10.7554/eLife.16800))
- Contact:
 - Email - rachael.ainsworth@manchester.ac.uk
 - GitHub - @rainsworth
 - Twitter - @rachaelevelyn
 - Resources for Open Science in Astronomy: <https://github.com/rainsworth/ROSA/>