#### Antónia Correia & Pedro Principe

University of Minho. FOSTER and OpenAIRE projects

## Open Science in practice

Open Access Publishing

Managing and Sharing Research Data

Open Science requirements in Horizon 2020

Instituto Gulbenkian de Ciência, 23 April 2019 BioData.pt, FOSTER, OpenAIRE











#### **AGENDA**

#### **Open Access Publishing**

Open Access as part of Open Science What is Open Access and how to provide Open Access Open Access in Horizon 2020: how to comply with H2020 Open Science requirements

#### **Managing and Sharing Research Data**

Open, closed and shared data

Data Management Plans

Open Data in Horizon 2020: how to comply with H2020 Open

Science requirements

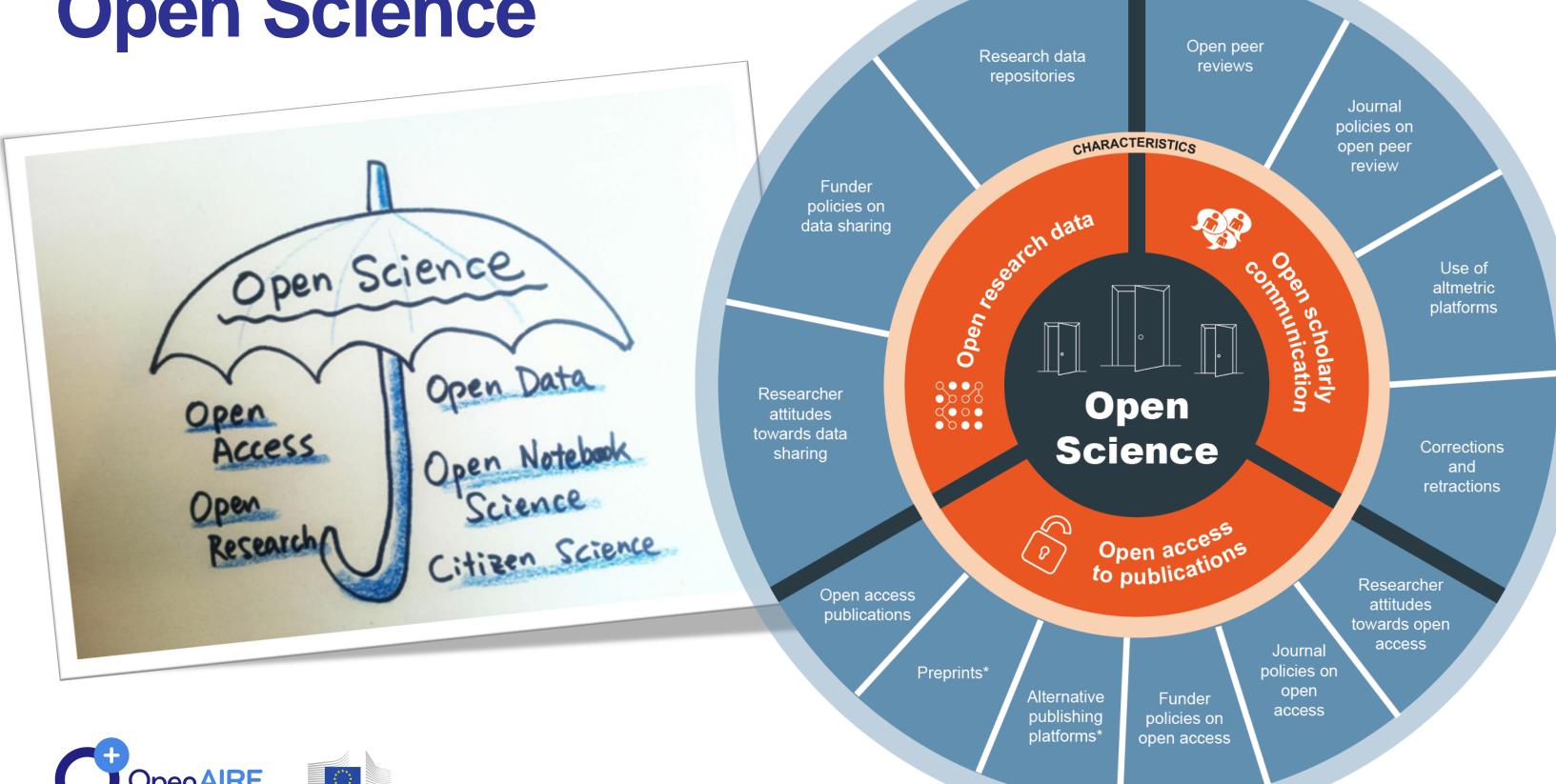








## Open Science



**INDICATORS** 

## Open Science

Results

Publications
Research data
Software

• • •

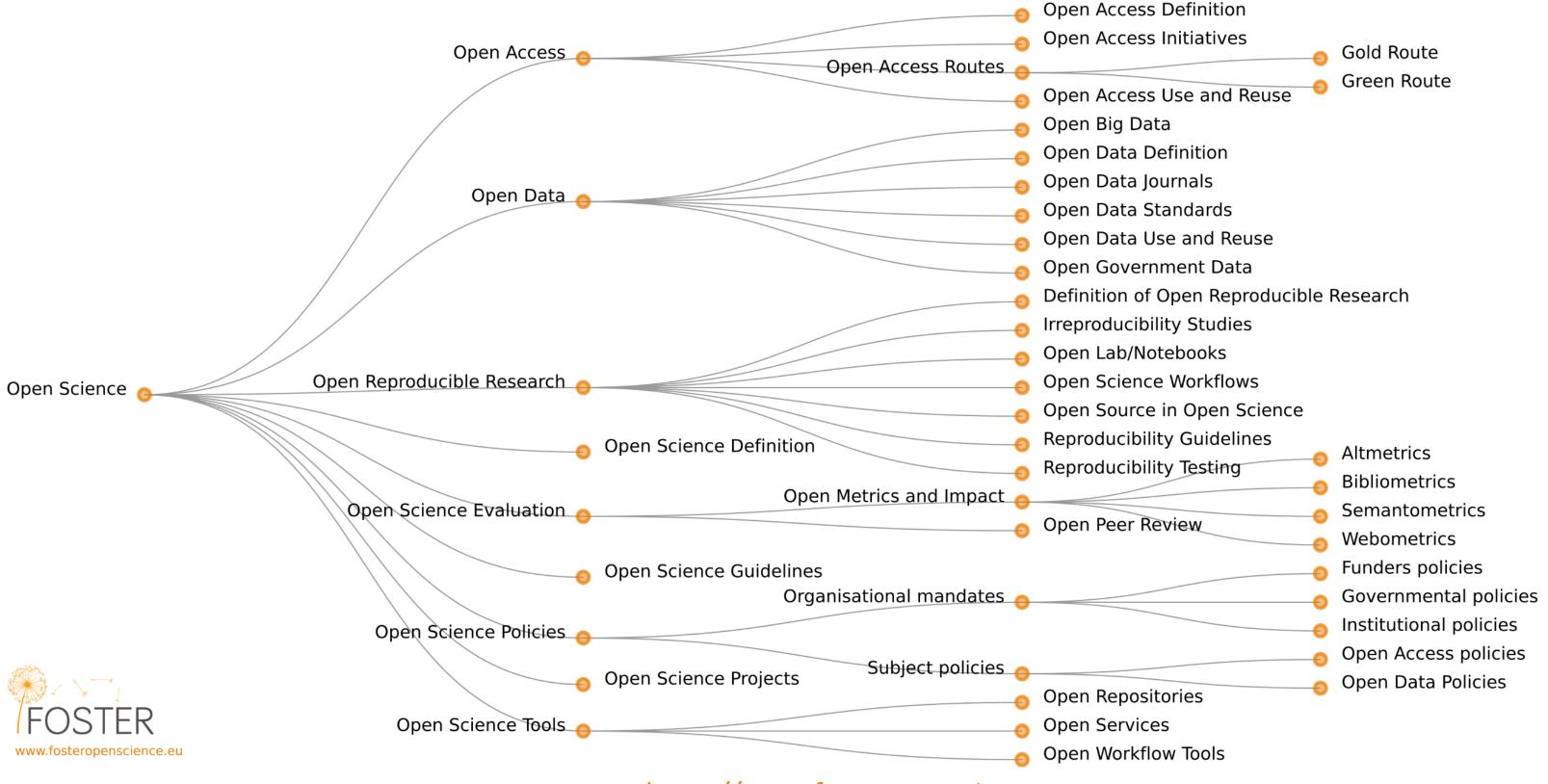
Processes
Tools
Infrastructures

Methods





#### Open Science Taxonomy



https://www.fosteropenscience.eu

## www.menti.com

789034



#### **AGENDA**

#### **Open Access Publishing**

How to implement Open Access and Open Science What is Open Access and how to provide Open Access Open Access in Horizon 2020: how to comply with H2020 Open Science requirements

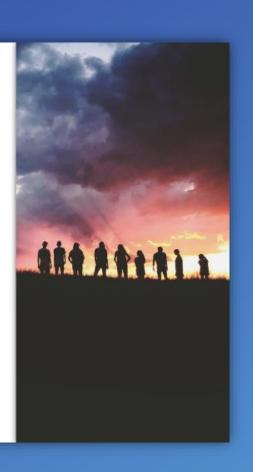
#### Managing and Sharing Research Data

Open, closed and shared data
Data Management Plans
Open Data in Horizon 2020: how to comply with H2020 Open
Science requirements









# 1. Open Access Publishing







## Learning Outcomes

- Open Access as a part of Open Science
- What is Open Access and how to provide Open Access
- Open Access in Horizon 2020: how to comply with H2020
   Open Science requirements

# 1 Open Access and Open Science

## What is Open Science

FOSTER defines Open Science (OS) as the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.



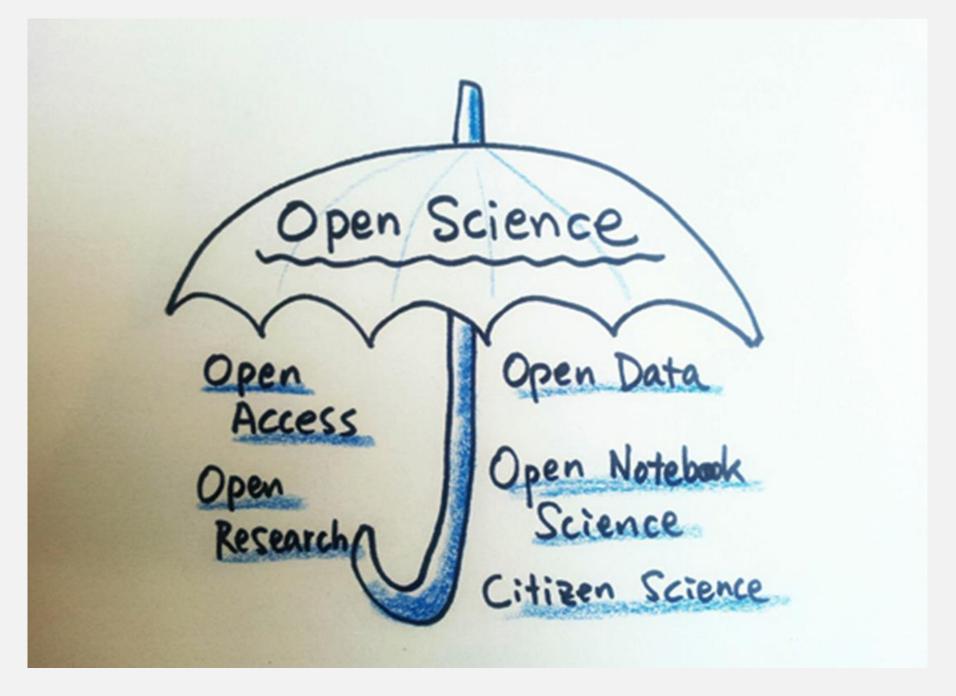
#### What is Open Science?

This introductory course will help you to understand what open science is and why it is something you should care about. You'll get to grips with the expectations of research funders and will le...

https://www.fosteropenscience.eu/learning/what-is-open-science/

## Open Science - Why?

To make science more efficient, transparent, trustable and reproducible



## Scientific progress - Emergency science



## Scientific progress

#### Sharing of Data Leads to Progress on Alzheimer's

By GINA KOLATA

Published: August 12, 2010

In 2003, a group of scientists and executives from the <u>National</u>
<u>Institutes of Health</u>, the <u>Food and Drug Administration</u>, the drug and medical-imaging industries, universities and nonprofit groups joined in a project that experts say had no precedent: a collaborative effort to find the biological markers that show the progression of <u>Alzheimer's</u> <u>disease</u> in the human brain.



Now, the effort is bearing fruit with a wealth of recent scientific papers on the early diagnosis of Alzheimer's using methods like PET scans and tests of spinal fluid. More than 100 studies are under way to test drugs that might slow or stop the disease.

And the collaboration is already serving as a model for similar efforts against <u>Parkinson's disease</u>. A \$40 million project to look for biomarkers for Parkinson's, sponsored by the <u>Michael J. Fox Foundation</u>, plans to enroll 600 study subjects in the United States and Europe.

www.nytimes.com/2010/08/13/health/research/ 13alzheimer.html?pagewanted=all&\_r=0

"It was unbelievable. Its not science the way most of us have practiced in our careers. But we all realised that we would never get biomarkers unless all of us parked our egos and intellectual property noses outside the door and agreed that all of our data would be public immediately."

Dr John Trojanowski, University of Pennsylvania

### Validate/Correct Results

"It was a mistake in a spreadsheet that could have been easily overlooked: a few rows left out of an equation to average the values in a column.

The spreadsheet was used to draw the conclusion of an influential 2010 economics paper: that public debt of more than 90% of GDP slows down growth. This conclusion was later cited by the International Monetary Fund and the UK Treasury to justify programmes of austerity that have arguably led to riots, poverty and lost jobs."

#### The error that could subvert George Osborne's austerity programme

The theories on which the chancellor based his cuts policies have been shown to be based on an embarrassing mistake

Charles Arthur and Phillip Inman
The Guardian, Thursday 18 April 2013 21.10 BST



George Osborne says that Ken Rogoff, the man whose economic error has been uncovered, has strongly influenced his thinking. Photograph: Stefan Wermuth/PA

### Combat fraud



the investigation has not identified as fraudulent), Stapel reported that untidy environments encouraged discrimination (<u>Science</u> 332,

251-252: 2011)

#### **Retraction Watch**

Tracking retractions as a w

#### Raw files help fix 2003 figure by heart researcher accused of fraud

without comments

A researcher accused of misconduct <u>by an anonymous lapanese blogger</u> has corrected a 2003 paper in *Circulation Research*, after providing a university investigation with the original source files.



Allegations of fraud have dogged <u>Shokei Kim-Mitsuyama</u> for years, and even caused him to step down from his position as editor in chief at another journal. However, Kim-Mitsuyama and his colleagues call the latest correction a "mistake," which didn't affect any of the paper's conclusions.

We've unearthed a total of five publications co-authored by <u>Kim-Mitsuyama</u> that have earned corrections, the <u>latest of which</u> cites an investigation by the university:

Read the rest of this entry »

Written by Shannon Palus

April 21st, 2016 at 2:00 pm

#### Share this:

**■** Email **f** Facebook **6 Y** Twitter

Posted in <u>am j physio heart circ phys,American Heart Association,cardiology</u> retractions,cardiovascular research,circulation research,corrections,erroneous data,hypertension research,japan retractions,misconduct investigations,nature publishing group,plos,plos one,scientific reports,society journal retractions

#### Authors retract, replace highly cited JAMA Psych paper for "pervasive errors"

with 4 comments

Authors have retracted a highly cited JAMA Psychiatry study about depression after failing to account for some patient recoveries, among other mistakes.

JAMA Psychiatry

It's a somewhat unusual notice — it explains that the paper has been retracted and replaced with a new, corrected version.

The study, which included 452 adults with major depressive disorder, concluded that cognitive therapy plus medication works better to treat depression than pills alone. But after it was published, a reader pointed out that some of the numbers in a table were incorrect. The authors reviewed the data and redid their analysis, and discovered "a number of pervasive errors."

## What is Open Access



"By 'open access' to [research] literature we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself." [Budapest Open Access Initiative]

## Why publish in a journal?

- Present new and original results or methods
- Exchange ideas, communicate with peers -> advance scientific knowledge and enhance scientific progress
- Credibility of results
- Grant writing, research funding
- Recognition and career advancement
- Personal prestige and satisfaction

## Open Access helps to reach those goals



## Review types

- Single-blind review the reviewer knows who the author is; allows unscupulous actions;
- **Double-blind review** the reviewer doesn't know who the author is and the author doesn't know the reviewer; people know each other;
- Open peer review the reviewer knows who the author is and the author knows the reviewer; reviewers can get credit for their work BUT may create animosity between peers.

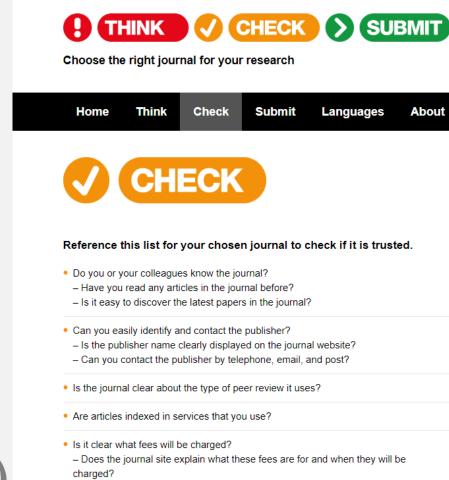
## Publication types



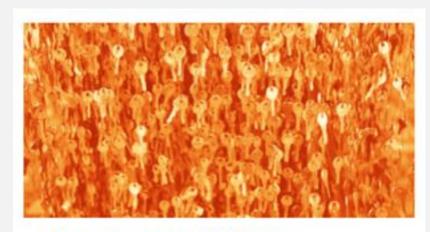
- Subscription-based journals: institutions pay to give access to articles
- **Hybrid journals:** subscription-based, with option for golden OA per article
- Golden OA: journals provide OA to their articles, either by charging the author-institution for refereeing/publishing outgoing articles, or by making their online edition free for all
- Green OA: self-archiving, authors provide OA to their own published articles, by depositing them into an OA repository.

## How to choose an Open Access journal

- Use the <u>Directory of Open Access Journals</u>
- Analyze policies
  - Versions
  - Embargoes
- Analyze article processing charges (APCs)
  - Open Access Journals (may or not charge)
  - Hybrid journals (usually more expensive than full OA)
- Use <u>Think.Check.Submit</u> to see if the publisher is reputable



## eLIFE: Open Access Journal in Life Sciences



#### Open Access Publishing

This course helps you to become skilled in Open Access (OA) publishing in the context of Open Science. By the end of the course, you will:

understand how to publish your work o...

https://www.fosteropenscience.eu/learning/open-access-publishing

#### Case study: example of an OA journal in the Life Sciences

<u>eLife</u> is a not for profit organisation led by scientists. <u>eLife</u> publishes a fully OA journal with content from all areas of life and biomedical sciences. They aim to promote the most responsible practices in science. All content is made freely available to download and reuse as quickly as possible.

Click the arrows to navigate through the content



#### What?

eLife was founded in 2011 by the Howard Hughes Medical Institute, the Max Planck Society and the Wellcome Trust. These organisations continue to provide financial and strategic support, and were joined by the Knut and Alice Wallenberg Foundation for 2018. The mission of eLife is to "accelerate discovery by operating a platform for research communication that encourages and recognises the most responsible behaviours in science". All the published content uses the Creative Commons Attribution (CC-BY) licenses allowing readers to download and reuse text and data for free - provided the authors are given appropriate credit. The authors are charged a standard fee to publish, this is different from traditional models where authors pay to publish and then to read content.

## Repositories

#### Choose a repository

- Institutional
- Discipline-specific
- General, eg. Zenodo.org

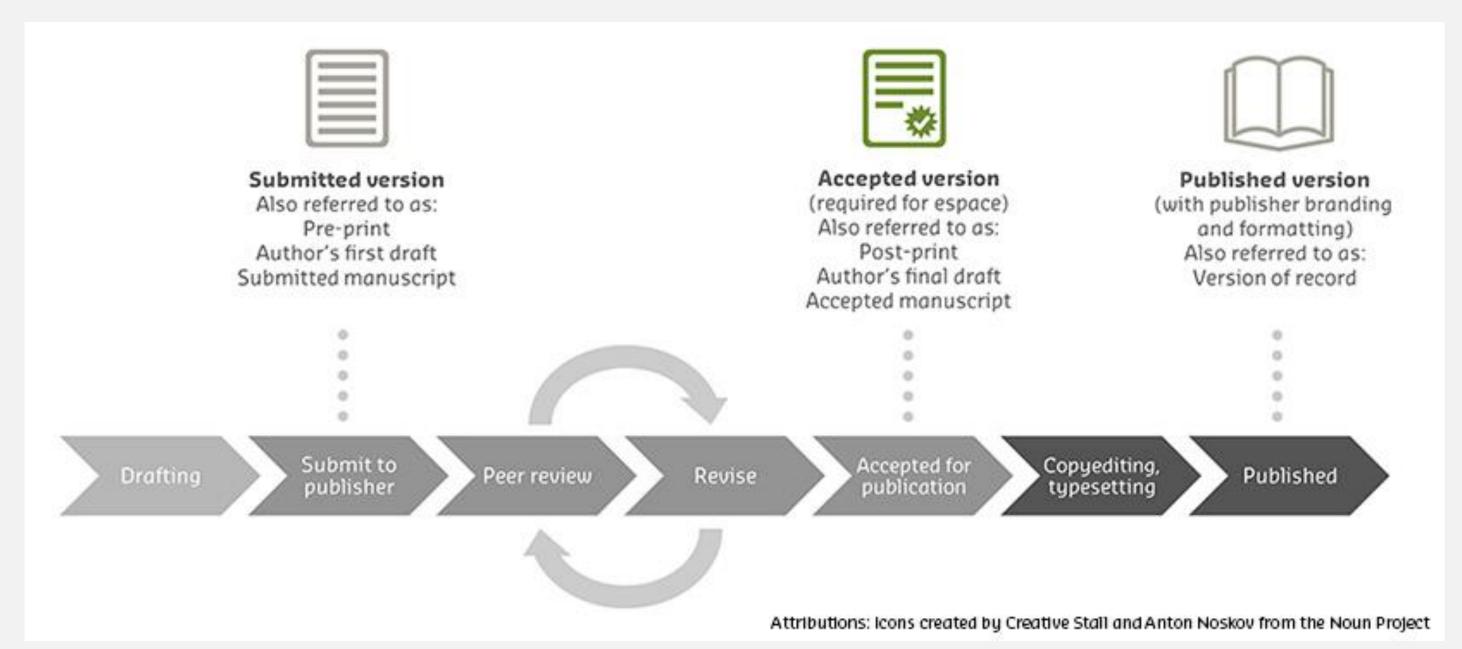
Add metadata (description) + license + allowed version (preprint or post-print)



## Social networking site vs. open access repository

	Open access repositories	Academia.edu	ResearchGate
Supports export or harvesting	Yes	Yes No	
Long-term preservation	Yes No		No
Business model	Nonprofit (usually)	Commercial. Sells job posting services, hopes to sell data	Commercial. Sells ads, job posting services
Sends you lots of emails (by default)	No	Yes	Yes
Wants your address book	No	Yes	Yes
Fulfills requirements of UC's OA policies  (c) PY http://cr	Yes eativecommons.org/lice	No	No ity of California OSC

### Article versions



https://library.curtin.edu.au/

## Not sure if your publisher allows self-archiving?



- 1) Check the journal self-archiving policy on the publisher's web-site.
- If in doubt, check the self-archiving policy of your journal using publisher copyright policies & self-archiving tool SHERPA ROMEO (colours taxonomy).



ROMEO colour	Archiving policy
green	can archive pre-print and post-print or publisher's version/PDF
blue	can archive post-print (ie final draft post-refereeing) or publisher's version/PDF
<u>yellow</u>	can archive pre-print (ie pre-refereeing)
<u>white</u>	archiving not formally supported

- Try also **DULCINEA** which summarises self-archiving policies of **Spanish** journals.
- and Héloïse which summarises self-archiving policies of French journals.
- and Blimunda for the <u>Portuguese</u> journals.

### Licenses

Who owns the IPR?

As a researcher carrying out your work, you may be the owner of the related IPR for the outputs, but this is not guaranteed.

- Check your employment contract and/or Intellectual Property policies at your institution;
- Your funding body's directives
- Your journal publisher may also have specific requirements relating to licenses



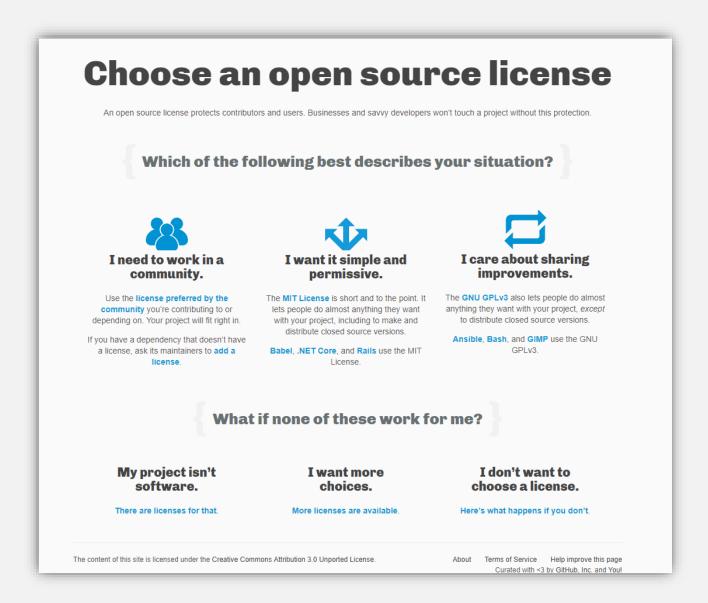
#### **Open Licensing**

Licensing your research outputs is an important part of practicing Open Science. In this course, you will:

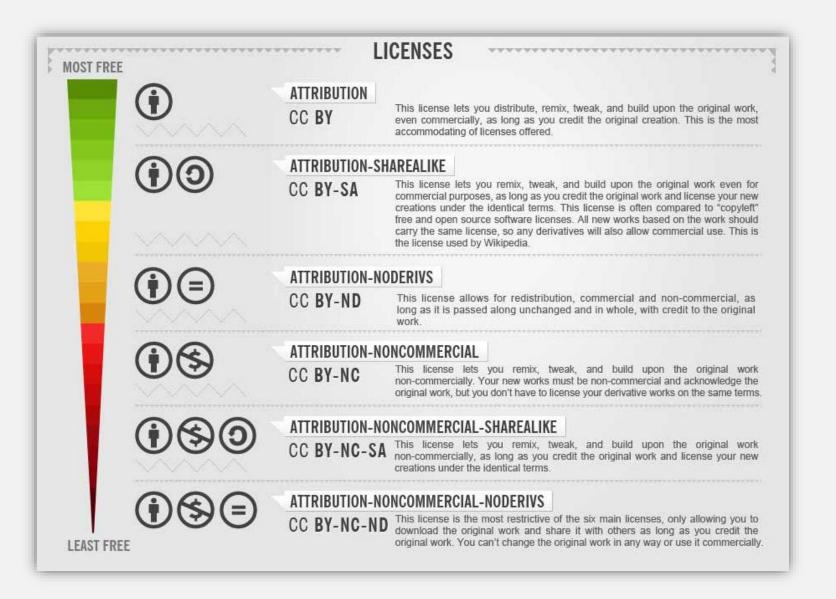
 know what licenses are, how they work, and how to apply them&nbs...

#### Licenses

#### Choosealicense.com



#### **Creative Commons**



https://www.dontwasteyourtime.co.uk/elearning/creative-commons-infographic-licenses-explained/

## Levels of openess

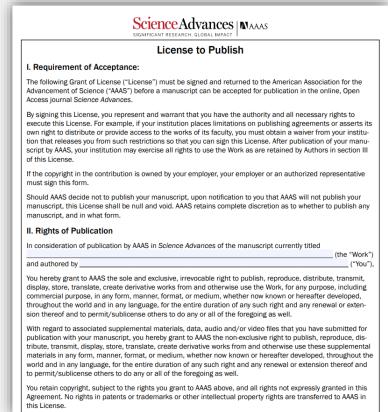
55	READER RIGHTS	REUSE RIGHTS	COPYRIGHTS	AUTHOR POSTING RIGHTS	AUTOMATIC POSTING	MACHINE READABILITY	ACC
34 113	Free readership rights to all articles immediately upon publication	Generous reuse & remixing rights (e.g., CC BY license)	Author holds copyright with no restrictions	Author may post any version to any repository or website with no delay	Journals make copies of all articles automatically available in trusted third-party repositories (e.g., PubMed Central, OpenAire, Institutional) Immediately upon publication	Article full text, metadata, supporting data (including format and semantic markupl & citations may be accessed via API, with instructions publicly posted	No or
	Free readership rights to all articles after an embargo of no more than 6 months	Reuse, remixing, & further building upon the work subject to certain restrictions & conditions (e.g., CC BY-NC &-CC BY-SA licenses)	Author retains/publisher grants broad rights, including author reuse (e.g., of figures in presentations/teaching, creation of derivatives) and authorization rights (for others to use)	Author may post some version (determined by publisher) to any repository or website with no delay	Journals make copies of all articles automatically available in trusted third-party repositories (e.g., PubMed Central, OpenAire, Institutional) within 6 months	Article full text, metadata, & citations may be accessed via API, with instructions publicly posted	
Z CLOTED ACCEPTA	Free readership rights to all articles after an embargo greater than 6 months	Reuse (no remixing or further building upon the work) subject to certain restrictions and conditions (e.g., CC BY-ND license)	-	Author may post some version (determined by publisher) to any repository or website with some delay (determined by the publisher)	Journals make copies of all articles automatically available in trusted third-party repositories (e.g., PubMed Central, OpenAire, institutional) within 12 months	Article full text, metadata, & citations may be crawled without special permission or registration, with instructions publicly posted	
	Free and immediate readership rights to some, but not all, articles (including "hybrid" models)	Some reuse rights beyond fair use for some, but not all, articles (including "hybrid models")	Author retains/publisher grants limited rights for author reuse (e.g., of figures in presentations/ teaching, creation of derivatives)	Author may post some version (determined by publisher) to certain repositories or websites, with or without delays	Journals make copies of some, but not all, articles automatically available in trusted third-party repositories (e.g., PubMed Central, OpenAire, institutional) within 12 months.	Article full text, metadata, & citations may be crawled with permission, with instructions publicly posted	
	Subscription, membership, pay-per-view, or other fees required to read all articles	No reuse rights beyond fair use/dealing or other limitations or exceptions to copyright (All Rights Reserved)	Publisher holds copyright, with no author reuse beyond fair use	Author may not deposit any versions to any repositories or websites at any time	No automatic posting in third-party repositories.	No full text articles available for crawling	CI

## You have a say!

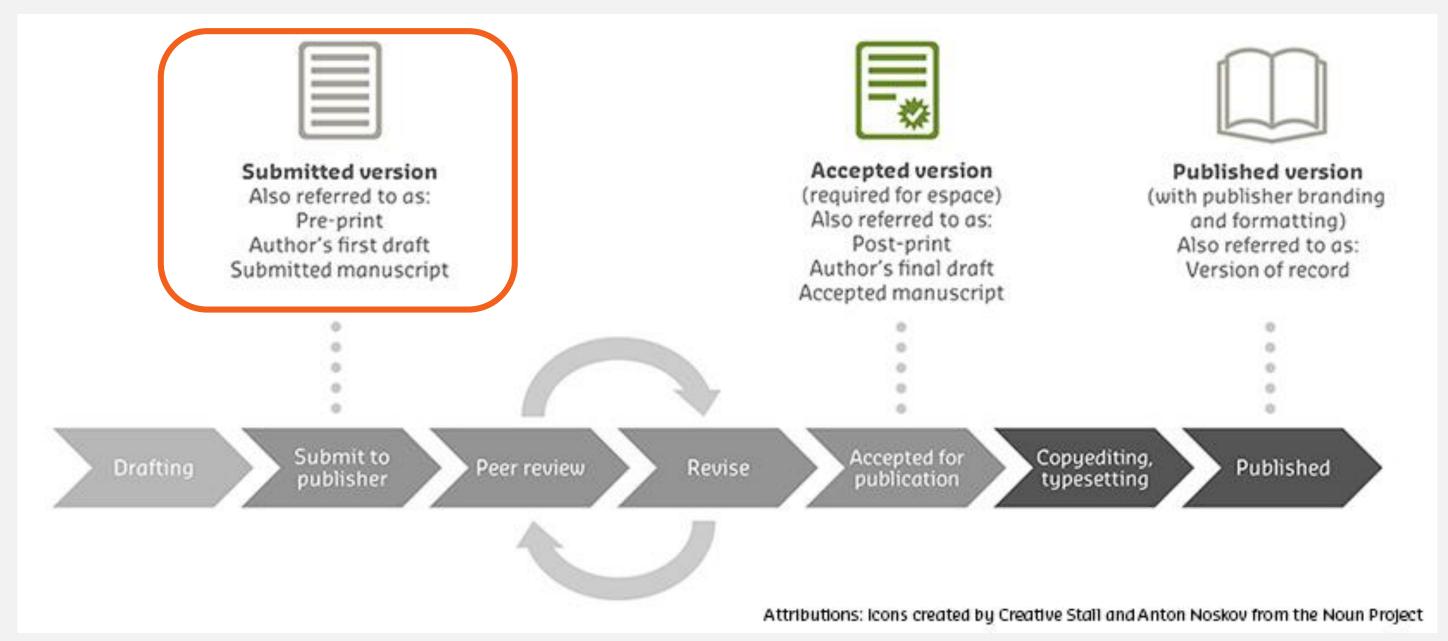
- ✓ Instead of transferring copyright, use a License to publish (agreement that does not transfer the author's copyright to the publisher; several publishers allow it)
- ✓ Negotiate with the publisher
- Rights
- Sharing policy
- Embargo periods

#### Example

https://pandelisperakakis.wordpress.com/2015/09/09/how-to-negotiate-with-publishers-an-example-of-immediate-self-archiving-despite-publishers-embargo-policy/



## What is a preprint?



https://library.curtin.edu.au/

## Sharing preprints



#### Sharing preprints

This course shows you how sharing preprints can improve your research and support Open Science. By the end of the course, you will:

- · know what preprints are
- be able t...

https://www.fosteropenscience.eu/learning/sharing-preprints

#### Pros

Click the plus sign to expand the text box.

- + Faster dissemination of results
- + Establishing primacy
- + Preprint publishing fosters open science
- Evidence of productivity and accomplishment
- Increased visibility of your
   emerging research increases potential dissemination channels
- Feedback on your work andpotential for improvements, enhanced quality
- + Establishing priority of discoveries and ideas
- Potential for developing new collaborations earlier
- + OA to your work across the globe

#### Cons

Click the plus sign to expand the text box.

- Not all journals accept papers that
   have been submitted to a preprint server
- + Risk of 'preprint wars'
- + Risk of embargo violations
- Poor quality and irreproducibledata will be posted in preprint form
- Scientists will rush out data pre maturely to claim priority and get credit
- + Scientists will try to "scoop my work" if I post as a preprint

## Preprint repositories

bioRxiv is a server just for biology PeerJ Preprints hosts preprints in biological sciences and also computer science arXiv (used mainly for he physics and mathematics) also has a section for quantitative biology.

Want to give it a try? Here are some links to discipline-specific and general preprint repositories that you can use.

- arXiv (physics, mathematics, computer science, quantitative biology, statistics, engineering, and economics)
- AgriXiv (agriculture)
- bioRXiv (biology)
- BITSS (research methodology)
- EarthArXiv (Earth sciences)
- engrXiv (Engineering),
- LawArXiv (law)
- LISSA (library and information science)
- MarXiv (ocean and marine-climate sciences)
- Mathematics Preprint Servers (mathematics)
- MindRxiv (research on mind and contemplative practices)
- NutriXiv (nutritional sciences)
- paleorXiv (palaeontology)
- <u>PsyArXiv</u> (psychology)
- RAAG (algebra and analytic geometry)
- SocArXiv (social sciences)
- SportRxiv (sport and exercise-related research)
- Figshare (general)
- OSF Preprints (general)
- PeerJ (general)
- Zenodo (general)

Joseph McArthur, Co-founder of the Open Access Button maintains a list of preprint repositories.

Bear in mind that some Open Access publications repositories allow you to upload preprints as well, for example the Social Science Open Access Repository (SSOAR) run by Germany's Leibniz Association.

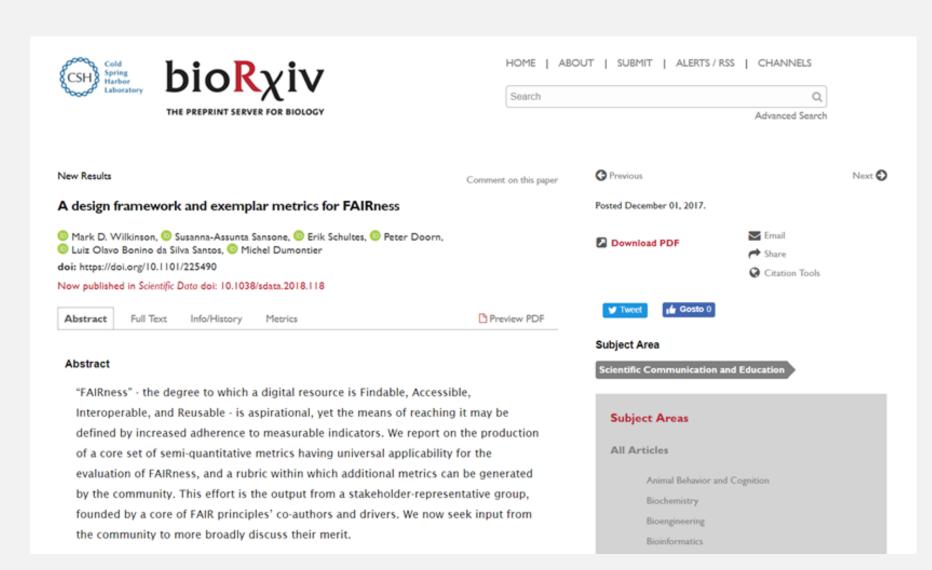
### bioRxiv

bioRxiv is a free online archive and distribution service for unpublished preprints in the life sciences.

- articles are not peer-reviewed, edited, or typeset before being posted online.
- all articles undergo a basic screening process for offensive and/or non-scientific content and for material that might pose a health or biosecurity risk and are checked for plagiarism.
- An article should not be posted if it has already been accepted for publication by a journal.
- Once posted on bioRxiv, articles are **citable** and therefore cannot be removed.

#### How it works

- ✓ Articles in bioRxiv are categorized as:
- New Results describe an advance in a field;
- Confirmatory Results replicate and confirm previously published work;
- Contradictory Results replicate experimental approaches but the results contradict and/or do not support it.
- ✓ Readers comment to articles on bioRxiv and can contact authors directly.



### How it works

- ✓ Authors retain copyright and choose from distribution/reuse options under which to make the article available (CC-BY, CC-BY-NC, CC-BY-ND, CC-BY-ND, CCO, or no reuse).
- ✓ By posting on bioRxiv, authors explicitly consent to **text mining** of their work (e.g., by search engines or researchers).
- ✓ To check if a journal allows preprints, the best source of information is always the journal website. But you can also search SHERPA/RoMEO, a crowd-sourced list of journal policies on preprints on Wikipedia.

Know more:

Who's afraid of bioRxiv: Weighing the pros and cons of preprint publishing
Point of View: Priority of discovery in the life sciences

## How to publish Open Access without spending all your budget

#### Being open doesn't have to break the bank!

~70% of OA journals do not charge.

Many OA journals have low-cost fees.



Most OA journals have fee waivers.

Some institutions have OA publisher memberships.



Some institutions have OA publishing funds.



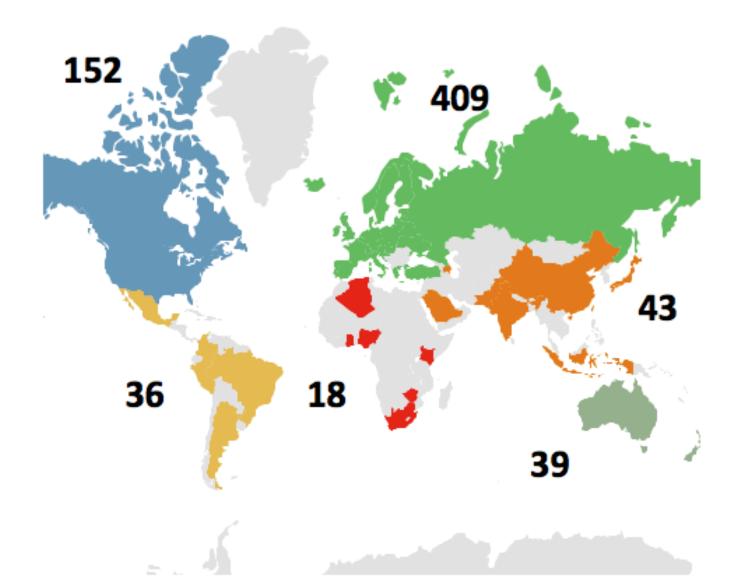
Some funders provide OA publishing fee support.

Self-archiving openly costs nothing.



# How to increase visibility

- Use a precise name and an identifyer (ORCID)
- Create and maintain your researcher profiles
- Send corrections to databases (like Web of Science and Scopus)
- Use the social web to disclose your publication
- · Publish open access when possible and required



# Open Access Policies

Institutional and Funders policies

Africa Asia Central & South America Oceania Europe North America

### **Open Access Policies by Continent**

















Annual Global Meeting

Berlin 27-29 May 2013





"The question is no longer, if" we should have open access. The question is about, how" we should develop it further and promote it."



Neelie Kroes Comisaria Europea para a Agenda Digital, 2011



# Open Innovation,

Open Science,

# Open to the World

### **Carlos Moedas**

Comisario Europeo para a Investigación, Ciencia e Innovación, 2015





# **Open Access in H2020**

### WHY OPEN ACCESS TO SCIENTIFIC PEER-REVIEWED PUBLICATIONS?



### **GOOD FOR SCIENCE**

allows scientists to build on previous research results and avoids unnecessary duplication of effort improved quality and greater efficiency







### **GOOD FOR THE ECONOMY**

speeds up innovation faster progress to market

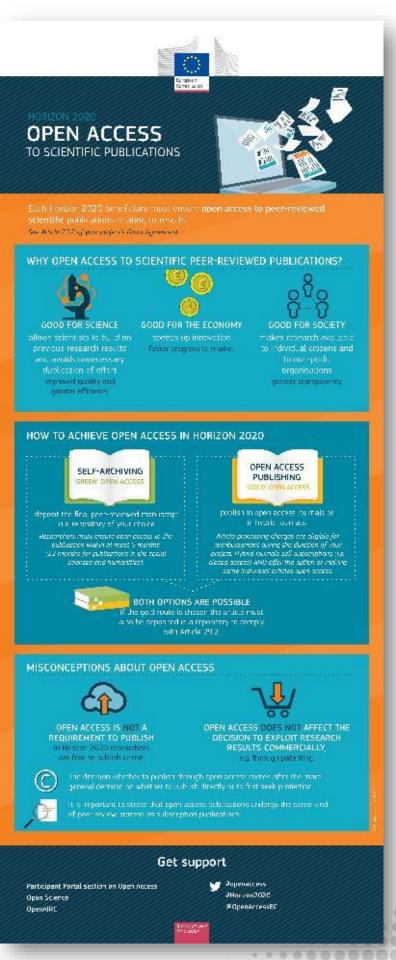


### **GOOD FOR SOCIETY**

makes research available
to individual citizens and
to non-profit
organisations
greater transparency







# Open Access is the default for research results in H2020





# FP7 - Open Access Pilot

FP7 – Pilot for 7 areas (special clause 39)

Horizon2020 - Open Access by default

H2020 - Open Access by default





# Multi-beneficiary General Model Grant Agreement

29.2 Open access to scientific publications

29.3 Open access to research data

http://ec.europa.eu/research/participants/data/ref/h2020/grants \_manual/amga/h2020-amga\_en.pdf







"Ensure open access...
as soon as possible and at the latest on publication,
deposit a machine-readable electronic copy of the
published version or final peer-reviewed manuscript
accepted for publication in a repository for
scientific publications together with
bibliographic metadata providing the name of the
action, acronym & grant number"



# Authors are free to choose between the two main and non-exclusive routes toward Open Access

### **Self-archiving** (,green' open access)

The article is immediately in open access mode, through the publisher. The associated costs are covered by the author/institution/funder.



### Open access publishing (,gold' open access)

The published article or the final peer reviewed manuscript is uploaded in an online repository access is often delayed (,embargo period')







The article must always be deposited in a repository, even if the gold route has been choosen.

# Where to deposit?



- Institutional repository (Repositorio de UJAUME1)
- Disciplinary (arXiv, Europe PubMed Central...)
- Or use Zenodo.org: EC-cofounded, multidisciplinary, free repository
  - The Directories of Open Access Repositories:
    - sV2.herpa.ac.uk/opendoar
    - roar.eprints.org

where

Explore.openaire.eu





# What to deposit?



- Final peer-reviewed manuscript
   OR
- Published version

+ metadata: funder, grant ID number, acronym, publication date....

→ Aplicar a todo tipo de publicación, pero énfasis en artículos revisados por pares





# What can I deposit?

## Check publishers policies



- SHERPA/ROMEO: www.sherpa.ac.uk/romeo
- Overview of copyright policies and self-archiving permissions





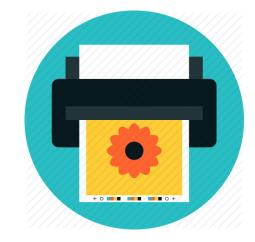
# What can I deposit?



Pre-print
Before peer review



Post- Print After peer review



Publisher's version With lay-out



Embargo
Period during which access to the article is limited

# When should I deposit?

→ As soon as possible, and at the latest on publication

# When should open access be provided?

- Immediately or
- After embargo period:
  - at most 6 months (12 months for publications in the social sciences and humanities)\*

\*EC's model amendment to publishing agreements: <a href="http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/oa-pilot/h2020-oa-guide-model-for-publishing-a\_en.pdf">http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/oa-pilot/h2020-oa-guide-model-for-publishing-a\_en.pdf</a>







# Are Article Processing Charges (APCs) supported?



### Yes

 Both for OA journals AND subscriptions-based journals that offer the possibility of making individual articles openly accessible (hybrid journals)

### but...

• Are eligible for reimbursement during the duration of the action.





## Average APCs

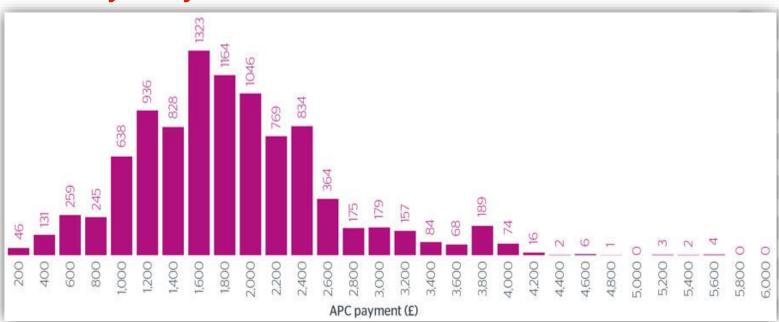
### Average:

- 1378 €¹ 1 978 €²
- 1186 / 1 754 € (OA journal) 2 280 € (hybrid journal)<sup>3</sup>
- 1 479 € (OA journal) 2 493 € (hybrid journal)<sup>4</sup>

Information on APCs per publisher and journal

→ openAPC project

### **APCs vary widely**



# Both types of OA publication cost can be reimbursed in H2020 projects. Currently, there is no price-cap for APCs.

- 1. Open access central funds in UK universities. Learned Publishing, [online] 25(2). Pinfield, S., and Middleton, C., 2012
- 2. Figure 1: APC pricing distribution. Article processing charges (APCs) and subscriptions. Shamash , K. , 2016
- 3. A study of open access journals using article processing charges. Journal of the American Society for Information Science and Technology, 63(8), pp.1485–1495. Solomon, D.J., and Björk, B.-C., 2012
- 4. <a href="https://treemaps.intact-project.org/page/about.html">https://treemaps.intact-project.org/page/about.html</a>





### Some issues to consider

 Publishing all articles in APC based gold OA is not probably the right solution, as this can lead to a substantial amount of the overall project budget.

Therefore, a mixed strategy of GREEN/GOLD open access is highly recommended.



 Lots of new journals/publishers, some of questionable quality (,predatory journals', http://scholarlyoa.com/publishers/)



Some caution is needed when publishing, this holds for all journals. Consult, white lists' such as DOAJ.







# What are projects expected to do?

### Projects have to start planning early on

### DURING PROPOSAL WRITING PHASE

- Outline of dissemination and exploitation strategy, including OA >> impact section of the proposal (how will results be shared, data be managed and shared?)
- Include resources for publication costs (what journals, how many publications, what does it cost on average?)
- Combine GREEN/GOLD strategies to achieve maximum of OA

### DURING THE PROJECT

- · Additional provisions in the Consortium Agreement where to deposit, who is responsible.
- · Implementation of the dissemination strategy, report at reviews and update
- What issues occur and how can they be solved? (publisher embargos, repositories for specific material, etc.)

### AFTER THE PROJECT END

- Are there publications foreseen after the ending of the project (ie which will not be covered by the budget) – for post-FP7 project publications there is a pilot.
- Who takes care of deposit in repositories after the project end?

# What are the consequences for non-compliance with OA requirements?

•If a beneficiary breaches any of its obligations, the grant may be reduced (Article 43) and it may also lead to any of the other measures described in <a href="#">Chapter 6</a> of the General Model Grant Agreement.



http://ec.europa.eu/research/participants/data/ref/h2020/mga/gga/h2020-mga-gga-multi\_en.pdf





# OpenAIRE implements the

# OPEN ACCESS & OPEN DATA

# • EC requirements

& supports OA policy alignment in Europe







Policy alignment & advising



Service provision at all levels for all stakeholders

### Who we are

- In 24x7 operation since Dec 2010
- EC funding (2009-2020)
  - OpenAIRE (2009-2012)
  - OpenAIREplus (2012-2014)
  - OpenAIRE2020 (2015-2018)
  - OpenAIRE Advance (2018-2020)
- Consortium of 50+ partners
- A legal entity in 2018





Open Access / Science experts

Information & Computer Science experts

Legal experts

Data communities

Open Innovation experts

Citizen Science (schools)

OpenAIRE@EOSCpilot Stakeholder event - 28 Nov 2017

# OpenAIRE: what we do

# Support – Accelerate – Monitor Open Science

Implement and align Open Science policies across Europe and the world

Foster innovation for added value services based on open research

Train for Open Science



Monitor Open Science in Europe

Deploy services to embed Open Science into researcher daily workflows

Build global common standards for linking and contextualizing all research







### rd FCG-IGC

Projects (18)

#### **FUNDACAO CALOUSTE GULBENKIAN**

ORGANIZATION PORTUGAL

CentrioleBirthDeath-Mechanism of centriole inheritance and maintenance (683258)

View all 18 results  $\rightarrow$ 

EC (OPEN ACCESS MANDATE FOR PUBLICATIONS)

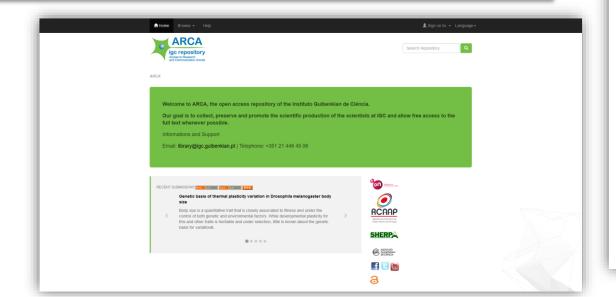
Start year: 2017 - End year: 2021

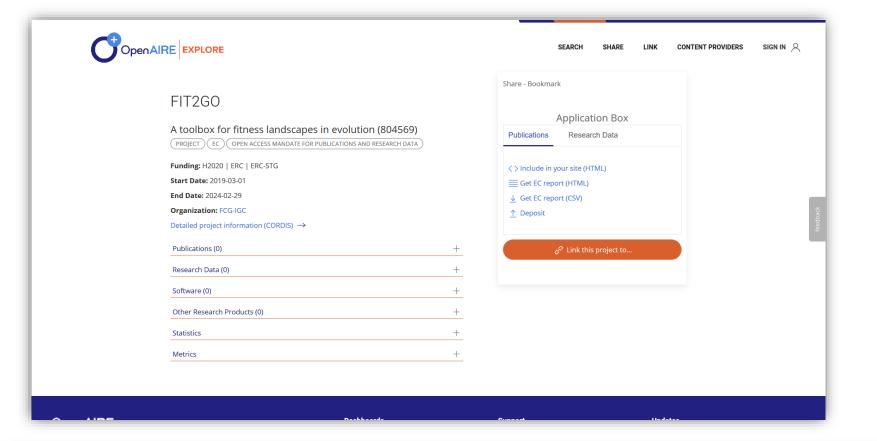
COGBIAS-Neural circuitry and health consequences of cognitive bias (795765)

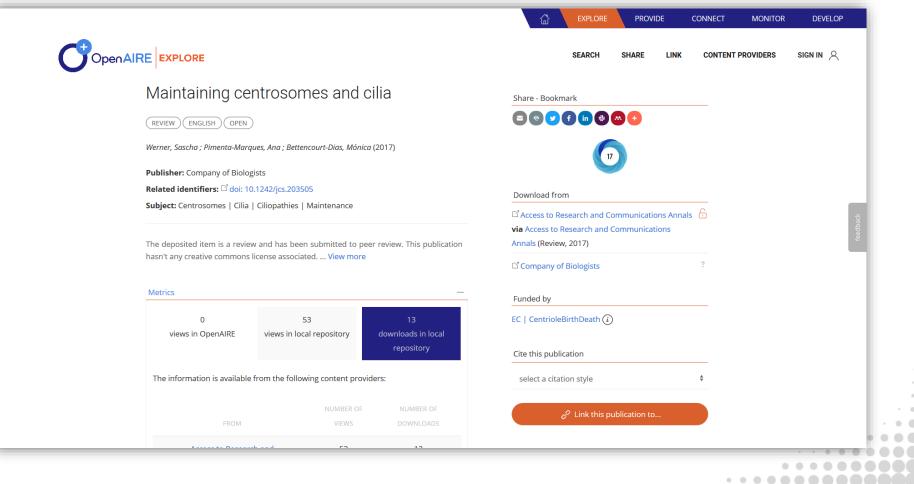
EC OPEN ACCESS MANDATE FOR PUBLICATIONS AND RESEARCH DATA

Start year: 2019 - End year: 2022

ResistEpist-Dissection of the mechanisms causing the epistasis between antibiotic resistance mutations in Escherichia coli (746690)







### **AGENDA**

#### **Open Access Publishing**

How to implement Open Access and Open Science What is Open Access and how to provide Open Access Open Access in Horizon 2020: how to comply with H2020 Open Science requirements

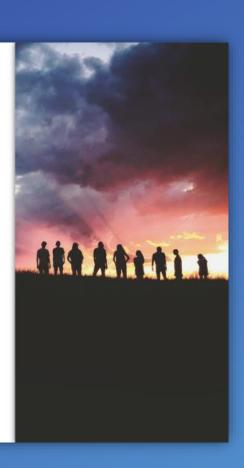
#### Managing and Sharing Research Data

Open, closed and shared data
Data Management Plans
Open Data in Horizon 2020: how to comply with H2020 Open
Science requirements









# 2. Managing and Sharing Research Data



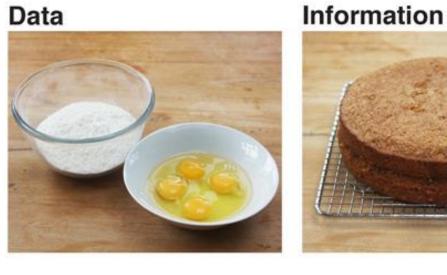






# good research needs good data

Digital Curation Center



Presentation



Knowledge



EpicGraphic.com







NWO - Introduction to the pilot Data Management



RCUK Policy and Code of Conduct on the Governance of Good Research Conduct



Very important!

LAPTOP LOST

in the bus 345

or macbook pro, lost in the bus, line 345, at South Kensington size friday 16° at 7am, within a black bag also contaming my ID card

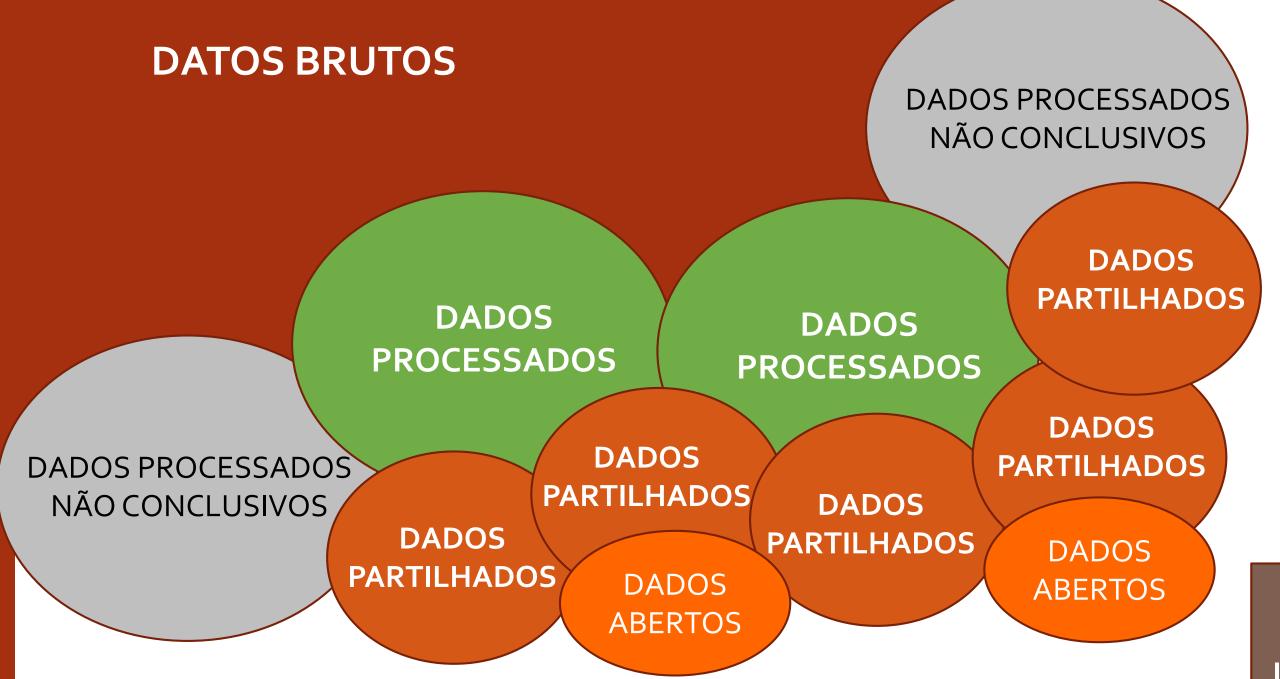
CRUCIAL scientific data

+ many YEARS of

research work inside!

0033-6-07-67-84-04

### Diferentes níveis de processamento e publicação de dados



### **DADOS:**

**FECHADOS** 

**RESTRITOS** 

**PUBLICADOS** 

**EMBARGADOS** 

**ABERTOS** 

Assegurar os requisitos legais e éticos é essencial





### **OPEN RESEARCH** IN HORIZON 2020

#### CHALLENGE

Wider access to scientific facts and knowledge helps researchers, innovators and the public find and re-use data, and check research results:

offers better value for EU research funds

encourages research across scientific fields



a public benefit

essential for solving today's complex societal challenges

#### SOLUTION

Horizon 2020 already mandates open access to all scientific publications



From 2017, research data is open by default, with possibilities to opt out

#### RESEARCH DATA - OPEN BY DEFAULT



HORIZON 2020 GRANTEES ARE REQUIRED



Public Engagement

### RCUK Common Principles on Data Policy

Home > Research > RCUK Common Principles on Data Policy

Making research data available to users is a core part of the Research Councils' remit and is undertaken in a coherent approach across the research base. These RCUK common principles on data policy provide an over data policy.

#### **Principles**

- · Publicly funded research data are a public good, produced in the public interest, which should be made and responsible manner.
- Institutional and project specific data management policies and plans should be in accordance with rele acknowledged long-term value should be preserved and remain accessible and usable for future resea
- To enable research data to be discoverable and effectively re-used by others, sufficient metadata should researchers to understand the research and re-use potential of the data. Published results should always
- RCUK recognises that there are legal, ethical and commercial constraints on release of research data. inappropriate release of data, research organisation policies and practices should ensure that these ar
- To ensure that research teams get appropriate recognition for the effort involved in collecting and analy may be entitled to a limited period of privileged use of the data they have collected to enable them to p varies by research discipline and, where appropriate, is discussed further in the pr
- In order to recognise the intellectual contributions of researchers who generate, p acknowledge the sources of their data and abide by the terms and conditions und
- It is appropriate to use public funds to support the management and sharing of pu from limited budgets, the mechanisms for these activities should be both efficient

### THE ROYAL SOCIETY

Home Fellows Events Grants, Schemes & Awards Topics & policy Journals Collections

### Data sharing and mining

#### Open data policy

To allow others to verify and build on the work published in Royal Society journals, it is a condition of publication that authors make available the data, code and research materials supporting the results in the

Datasets and code should be deposited in an appropriate, recognised, publicly available repository. Where no data-specific repository exists, authors should deposit their datasets in a general repository such as Dryad or Figshare.

To encourage best practice in data sharing, Biology Letters, Proceedings B and Royal Society Open Science have Dryad data deposition integrated into the journal submission system. For all its science journals, the Society will cover the cost of depositing up to 20GB of data with Dryad. In addition, we deposit all supplementary material into the Figshare repository on the author's behalf.

Exceptions to the sharing of data, code and materials may be granted at the discretion of the editor, especially for sensitive information such as human subject data or the location of endangered species. Authors must disclose upon submission of the manuscript any restrictions on the availability of data, code and research

Where possible, deposit should be made prior to publication under embargo until publication of the article

Funding

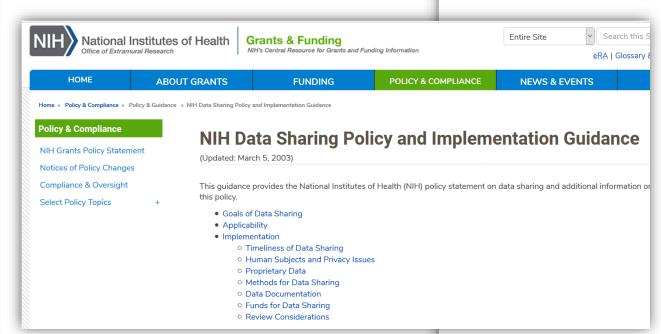
What we do

About us

News

Scheme finder

Managing a grant



### Policy on data, software and materials management and sharing

As a charity, Wellcome works to ensure that the results of the research we fund are applied for the public good. This includes creating an environment that enables and incentivises researchers to maximise the value of their research outputs, including data, software and materials.

We expect our researchers to manage research outputs in a way that will achieve the greatest health benefit. This may involve making outputs widely available or using intellectual property (IP) as a tool to help protect and commercialise an original idea, product or technology.

There is international consensus on the need to share and preserve research datasets in a way that maximises their long-term value. Key documents such as the UK concordat on open research data (2016) articulate this.

# Data Management Plans Requirements

- Description of data to be collected / created (i.e. content, type, format, volume...)
- Standards / methodologies for data collection & management
- Ethics and Intellectual Property (highlight restrictions on data sharing e.g. embargoes, confidentiality)
- Plans for data sharing and access (i.e. how, when, to whom)
- Strategy for long-term preservation























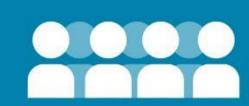






# OPEN RESEARCH DATA IN HORIZON 2020

### BE PART OF THE NEW ERA OF OPEN SCIENCE









reach more people, have greater impact avoid duplication of efforts preserve data for future researchers simplify final
Horizon 2020
reporting
thanks to an
up-to-date DMP





# Open Science policies: the evolution of the EU funding programmes for R&I

### FP7

**OA Pilot** 

Deposit and open access

### H2020

**OA Mandatory** 

Deposit and open access

& ORD/DMP Pilot

### H2020

**OA Mandatory** 

Deposit and open access

& ORD/DMP by default (opt-out)

### Horizon Europe

- OA Mandatory
- Deposit and open access
- DMP + FAIR dataMandatory
- OD by default (optout)
- & Open Science embedded





# Open Research Data Pilot: aims

To make the research data generated by Horizon 2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access.

Information already paid for by the public should not be paid for again. Open data is data that is free to access and reuse

EC









## Requirements of the Data Pilot



1. Data Management Plan (DMP)



3. Provide information to validate results



2. Deposit data in data repository



4. Open up data





#### STEP 1

WRITE A DMP

#### STEP 2

FIND REPOSITORY

Matches data needs

#### STEP 3

**DEPOSIT DATA** 

(Open) Data

Metadata

Other tools

#### SUPPORT

Supporting infrastructure and information



#### Update at

- 6 months
- Periodic evaluation
- Final review



#### Data Repositories

- · discipline/institutional
- www.re3data.org
- Zenodo



- Standard File Formats
- Standards metadata schema
- (Open) Licences

Open Research Data Pilot

- EC guidelines
- OpenAIRE.eu
- peers

# Open Research Data policy requirements

DATA, including metadata, needed to validate the results in scientific publications.





Other data, including metadata, as specified in the Data Management Plan.

Horizon 2020 grantees are encouraged to also share datasets beyond publication





## Where to find a repository?

Use an external data archive or repository already established for your research domain to preserve the data according to recognised standards in your discipline. More information for selecting a

If available, use an institutional research data repository, or your research group's established data management facilities.

More information:

https://www.openaire.eu/opendatapilot-repository

Zenodo: <a href="http://www.zenodo.org">http://www.zenodo.org</a>

Re3data.org: <a href="http://www.re3data.org">http://www.re3data.org</a>

Use a cost-free data repository such as Zenodo.



Search for other research data repositories in http://re3data.org/







data repository.

#### AS OPEN AS POSSIBLE, AS CLOSED AS NECESSARY

Grantees have the right to opt-out, but need to say why









# (PARTIALLY) OPTING-OUT

#### Reasons e.g.

- Exploitation of results
- Confidentiality
- Protection of personal data
- Would jeopardize the main aim of the action
- No data generated
- Any other legitimate reason

#### Projects can opt out at any stage:

- Complete opt-out via project amendment
- Complete or partially opt-out: describe issues in project DMP

As open as possible as closed as necessary

## Reasons for total or partial opting out



- ✓ Incompatible with the Horizon 2020 obligation to protect results if they can reasonably be expected to be commercially or industrially exploited;
- ✓ Incompatible with the need for confidentiality in connection with security issues;
- ✓ Incompatible with existing rules concerning the protection of personal data;
- ✓ If the project will not generate / collect any research data;
- ✓ If there are other legitimate reasons to not take part in the Pilot

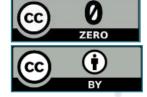


# Open Research Data policy requirements

Write, and keep up-to-date, a Data Management Plan.

Deposit the data in a research data repository.

Licensing research data - Horizon 2020 Open Access guidelines point to:







## Licensing research data



This DCC guide outlines the pros and cons of each approach and gives practical advice on how to implement your licence

**CREATIVE COMMONS LIMITATIONS** 



NC Non-Commercial What counts as commercial?



ND No Derivatives
Severely restricts use

These clauses are not open licenses





#### **RESEARCH DATA - OPEN BY DEFAULT**









#### H2020 Programme

Guidelines on FAIR Data Management in Horizon 2020

> Version 3.0 26 July 2016



## FAIR Data Management guidelines

- ✓ Notes the extension of the pilot
- ✓ Clarifies concept of FAIR data
- ✓ Explains what a DMP is and when they should be updated
- ✓ Notes what happens at proposal, submission and evaluation stage
- ✓ Explains costs are eligible
- ✓ Provides a DMP template





# FAIR DATA PRINCIPLES

#### Findable:

searchable resource;

F1. (meta)data are assigned a globally unique and persistent identifier;

F2. data are described with rich metadata;
F3. metadata clearly and explicitly include the identifier of the data it describes;
F4. (meta)data are registered or indexed in a

## Interoperable:

I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2. (meta)data use vocabularies that follow FAIR principles;

I3. (meta)data include qualified references to other (meta)data;



#### **Accessible:**

A1. (meta)data are retrievable by their identifier using a standardized communications protocol; A1.1 the protocol is open, free, and universally implementable;

A1.2. the protocol allows for an authentication and authorization procedure, where necessary; A2. metadata are accessible, even when the data are no longer available;

#### Reusable:

R1. meta(data) are richly described with a plurality of accurate and relevant attributes;

R1.1. (meta)data are released with a clear and accessible data usage license;

R1.2. (meta)data are associated with detailed provenance;

R1.3. (meta)data meet domain-relevant community standards;





- Metadata
- Persistent identifier
- Naming convention
- Keywords
- Versioning

**Findable** 

- Software, documentation
- Data repository

Accessible

Interoperable

- Standards
- Vocabulary
- Methodologies

Reusable

Licensing

## Difference between "FAIR data" and "Open data"?

#### FAIR data and open data are different, although there are similarities.

- The key difference is that open data should be available to everyone to access, use, and share, without licences, copyright, or patents. It is expected that open data at most should be subject to attribution/share-alike licenses.
- FAIR data, however, uses the term "Accessible" to mean accessible by appropriate people, at an appropriate time, in an appropriate way. This means that data can be FAIR when it is private, when it is accessible by a defined group of people, or when it is accessible by everyone (open data). It depends completely on the purpose of the data, where the data currently is in its lifecycle, and the end-usage of the data. For example, new experimental data may only be accessible by the generator and their group to start, then with consortia partners as the findings become refined, and finally with the public upon publication. Personally sensitive data may never be publicly accessible and usable. Commercially sensitive data may be held privately for stretches of time after collection and interpretation. Users are also free to use more restrictive licenses to govern how the data may be reused.

#### FAIR also explicitly includes other characteristics:

- Findable: where data should be able to be found by appropriate people at appropriate times. This can include shared folders, drives, private databases, public databases or more. It really depends on what part of the data life cycle the data is currently in. The data will likely transition through a few of these different options during its lifecycle.
- Interoperable/Re-usable: these characteristics refer more to how the data is formatted (e.g. standard formatting), whether the software for interpreting/interrogating/using the data is available (e.g. freely, with a license etc.











## **Publishers Data Availability Requirements**







#### nature publishing group

"[...] authors are **required** to make materials, data and associated protocols promptly available to readers without undue qualifications."

"PLOS journals **require** authors to make all data underlying the findings described in their manuscript fully available without restriction, with rare exception."

"Please find your appropriate data repository in the Registry for Research Data Repositories re3data.org."





### Data availability policy - publishers

#### **Scenarios:**

- send the dataset to the publisher and the publisher publishes the dataset online.
- the publisher asks the author to deposit the dataset in a trusted repository and to notify the publisher.
- the publisher asks the author to give contact information for those who wish to have access to the data.

The requirements are generally found on the journal's website.

A number of journals have a specific Data Availability or Data Archiving Policy





# Data Management Plans





## **Data Management Plans**

A DMP is a brief plan to define:

- ✓ how the data will be created?
- ✓ how it will be documented?
- ✓ who will access it?
- ✓ where it will be stored?
- ✓ who will back it up?
- ✓ whether (and how) it will be shared & preserved?





## Create a DMP



Handling of data during and after project



Living document: update



Reflects on curation, preservation, sustainability and security

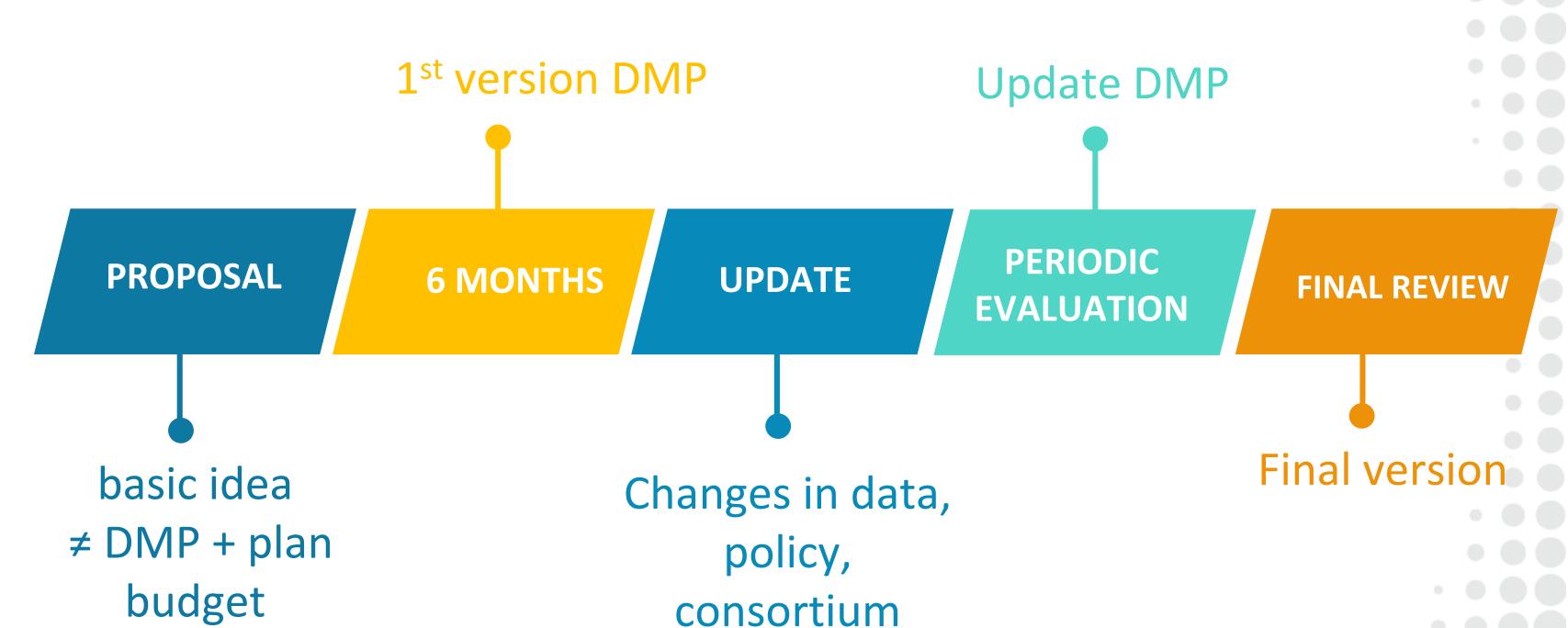


What parts will be open and how?





## Timeline







## Content of H2020 DMP

Template: EC guidelines on FAIR Data Management











Data summary

FAIR
Data
principles

Resources

Data security

Ethical aspects

## H2020 template

- 1. Data summary
- 2. FAIR data
  - Making data findable, including provisions for metadata
  - 2. Making data openly accessible
  - 3. Making data interoperable
  - 4. Increase data re-use (through clarifying licences)
- 3. Allocation of resources
- 4. Data security
- 5. Ethical aspects
- 6. Other issues

#### **Example H2020 DMPs in Zenodo**

https://zenodo.org/search?page=1&size=20&q=dmp&access right=open&type=publication

#### More listed at:

www.dcc.ac.uk/resources/data-management-plans/guidanceexamples

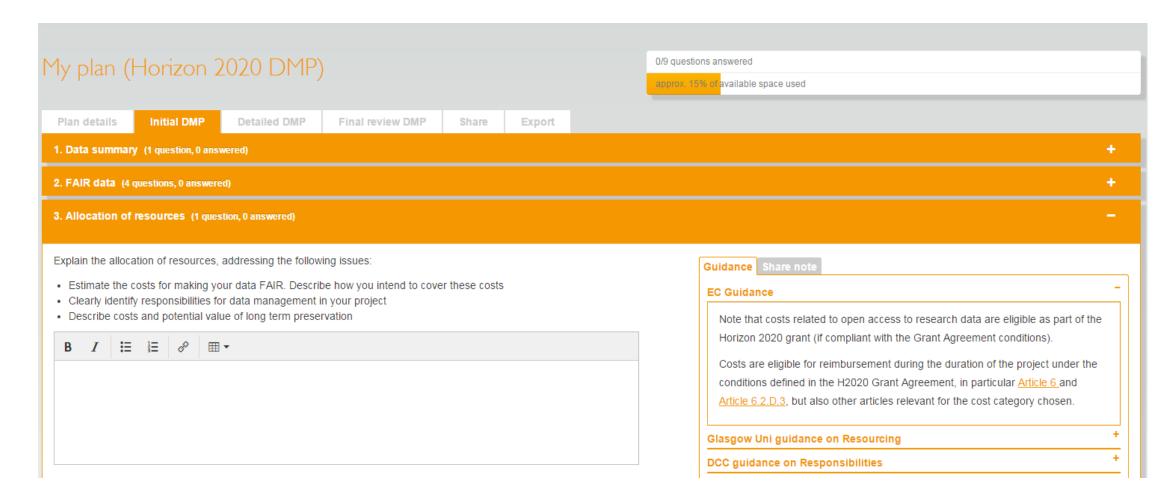
#### OpenAIRE2020

https://zenodo.org/record/1257214#.W\_NeMeKYSY0









#### A web-based tool to help researchers write DMPs

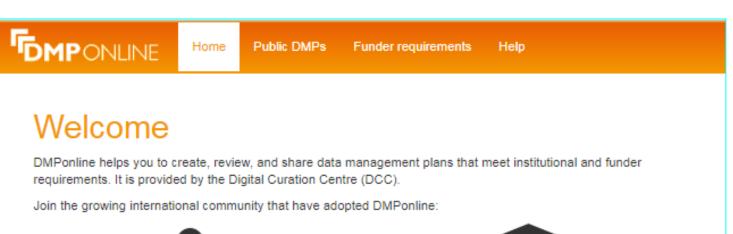
**Includes a template for Horizon 2020** 

https://dmponline.dcc.ac.uk





## DMPonline from the DCC



RDA Europe 4.0

7 000 11

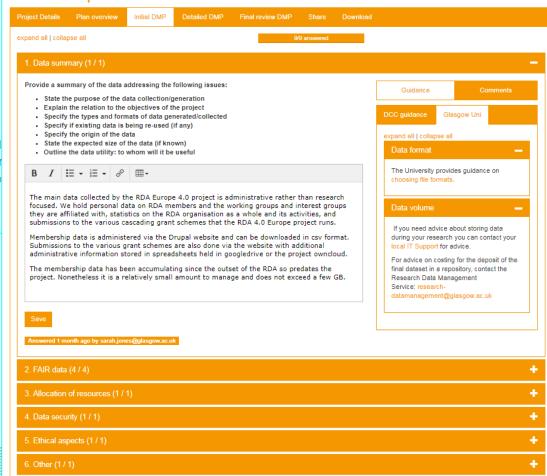




23,083 Plans

Some funders mandate the use of DMPonI templates without logging in, but the tool pr research organisations. Why not sign up fo





https://dmponline.dcc.ac.uk

- ✓ Templates for UK, Dutch funders, EC & ERC
- ✓ Unis can customise to add templates, guidance, examples and see usage stats
- ✓ Support plan review
- ✓ Users can share (co-author) plans, make visible within uni and publish publicly
- **✓ Export to a variety of formats**
- ✓ Run by DCC since 2010

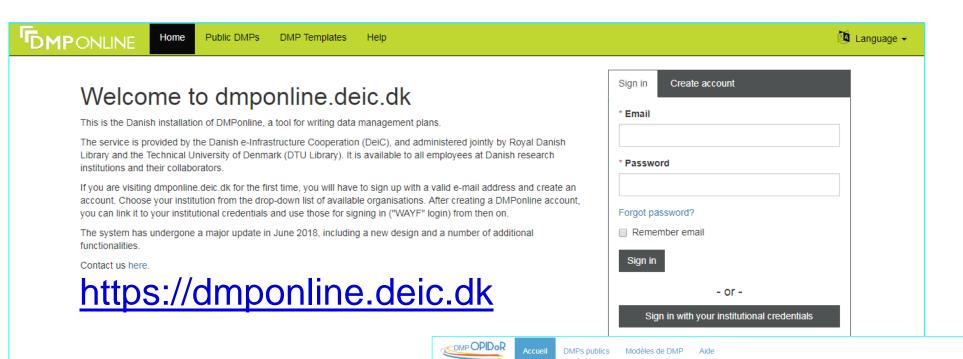


#### **Local instances of DMPonline**

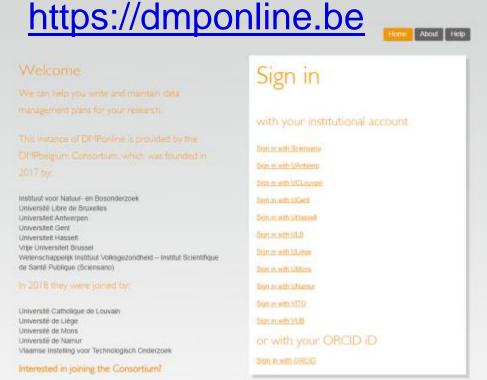


Based on Open Source DMPRoadmap codebase

https://github.com/ DMPRoadmap



à partir de leur profil



Bienvenue!

DMP OPIDoR vous accompagne à travers l'élaboration et la mise en pratique de plans de gestion de données et de logiciels.

Accessible à la communauté scientifique de l'ESR et à ses partenaires français ou étrangers

Personnalisable par tout organisme de recherche pour la mise en place de sa politique de données

Enrichi par des exemples et des recommandations adaptés à l'environnement de recherche

Collaboratif : il facilite les échanges entre les partenaires d'un même projet et les services d'accompagnement

DMP OPIDoR évolue grâce à vos retours. Les développements s'inscrivent dans le cadre d'une

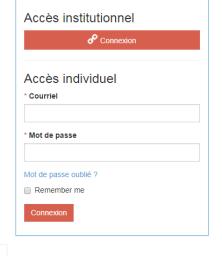
Warning: Bienvenue sur DMP OPIDOR V2.0.4, découvrez la liste des chang Le problème concernant la création de compte a été corrigé. Les utilisateurs ay

Rejoignez la communauté des utilisateurs de DMP OPIDoR

© 2016 - 2018 INIST • V2.0.4 • A propos Conditions générales d'utilisation Tutoriels • Contact 😱 💆 🗩

Créez un compte, connectez-vous et laissez-vous guider !

collaboration internationale autour du logiciel open source DMPRoadmap



https://dmp.opidor.fr



## **German RDM Organiser**



#### Welcome to RDMO

The aim of the RDMO project is to deliver a web application to assist structured planning, implementation and administration of the data in a scientific project. Additionally, the gathered information can be cast into textual forms suitable for funding agencies requirements or for reports.

This is a prototype of the software, for demonstration purposes.

For more information about the project visit rdmorganiser.github.io.

- Funded by DFG
- Different service model: self-deploy, not centrally-hosted
- Demo available at: <u>https://rdmo.aip.de</u>

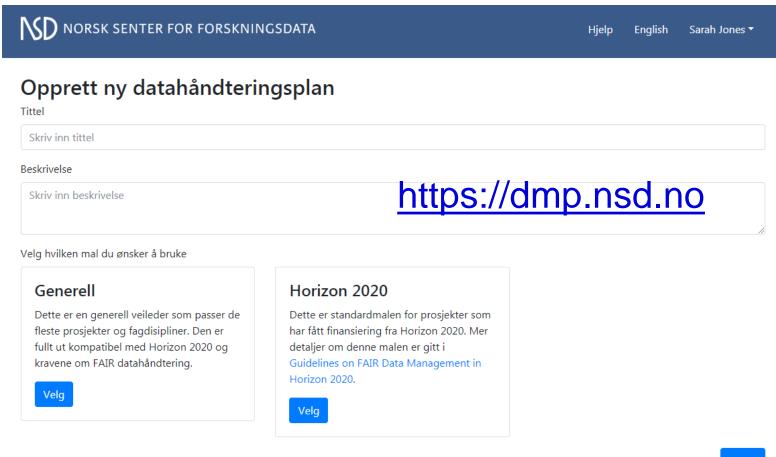






## Norwegian tools



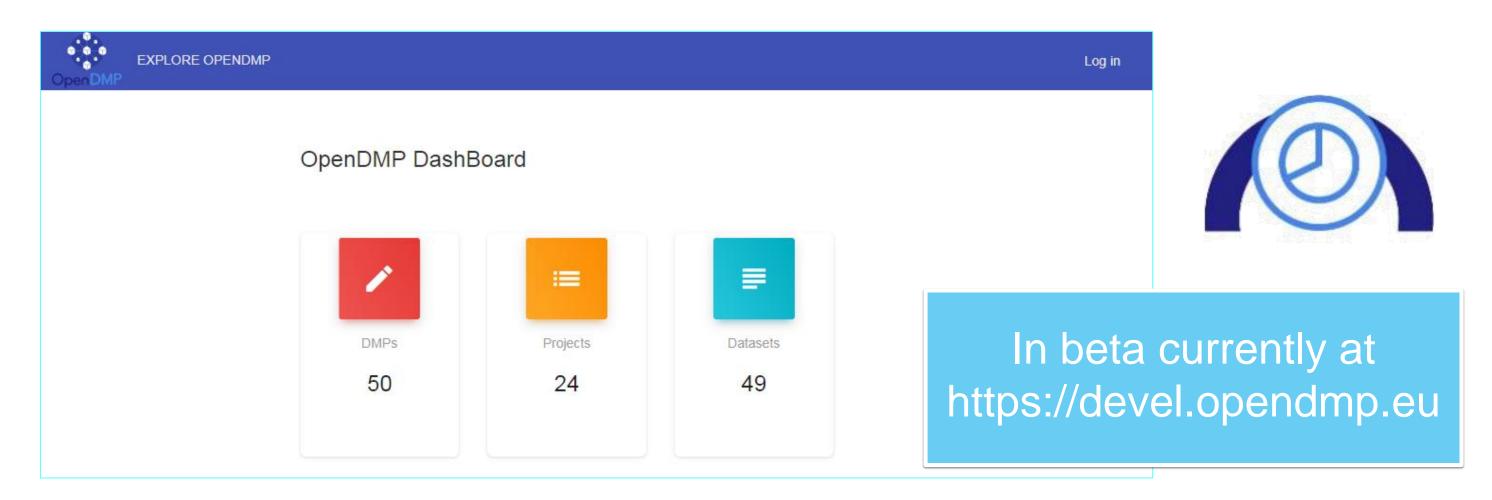


Joint interface / portal to the two tools is planned





## OpenAIRE / EUDAT OpenDMP



- Shifting from funder template to data profile as a central entity
- Currently proprietary format → to adopt RDA recommendation for machine-readability
- Closed source code at <a href="https://gitlab.eudat.eu/dmp/OpenAIRE-EUDAT-DMP-service-pilot">https://gitlab.eudat.eu/dmp/OpenAIRE-EUDAT-DMP-service-pilot</a>





# + info >> Reviewing DMPs in H2020

- DMPs are a deliverable, checked primarily by project officers and in some cases external reviewers too;
- Guidelines are being developed to give reviewers pointers on what to check. These are based on the template;
- The reviewer has access to the full project documentation;
- Process is only just evolving so feedback may be variable initially.





#### 2. FAIR data (1 / 4)

In general terms, your research data should be 'FAIR' that is findable, accessible, interoperable and re-usable. These principles precede implementation choices and do not necessarily suggest any specific technology, standard or implementation-solution.

- 2.1 Making data findable, including provisions for metadata:
  - Outline the discoverability of data (metadata provision)
  - Outline the identifiability of data and refer to standard identification mechanism. Do you make use of persistent and unique identifiers such as Digital Object Identifiers?
  - Outline naming conventions used
  - · Outline the approach towards search keyword
  - . Outline the approach for clear versioning
  - Specify standards for metadata creation (if any). If there are no standards in your discipline describe what metadata will be created and how

B I ☵ - 늘 - @ ▦-

The Research Data Alliance provides a Metadata Standards Directory that can be searched for discipline-specific standards and associated tools.

Guidance

DCC

EC

Save

error

Answered 2 weeks ago by pedroprincipe@sdum.uminho.pt

2.2 Making data openly accessible:

Guidance

Comments

. . . . . . . . . . . . . . . . . . .

Comments

# 4/4







**OPEN DATA IN H2020** 

Requirements of the Open Research Data Pilot in H2020: how to comply & practical implementation.



DMPs
What we need to
know about Data
Management Plans:
H2020 project DMP
template, use cases
and examples.



Open Access
Infrastructure for
Research in Europe:
services to support
Open Research & FAIR
Data and projects.





# support and information



OPENAIRE FOSTERS THE SOCIAL AND TECHNICAL LINKS THAT ENABLE OPEN SCIENCE IN EUROPE AND BEYOND.

www.openaire.eu

# OpenAIRE – services and tools:

- Open Access depositing
- ✓ Storing research data in Zenodo
- Claiming publications and datasets
- ✓ Reporting research outputs
- ✓ Discover, analyse and access
- ✓ Support material and helpdesk
- ✓ Training and support material

**EXPLORE** 

SEARCH

SHARE



#### LASERLAB-EUROPE

The Integrated Initiative of European Laser Research Infrastructures (654148)

Project | EC | Open Access mandate for Publications

Funding: H2020 | RIA

Start Date: 2015-12-01 End Date: 2019-11-30

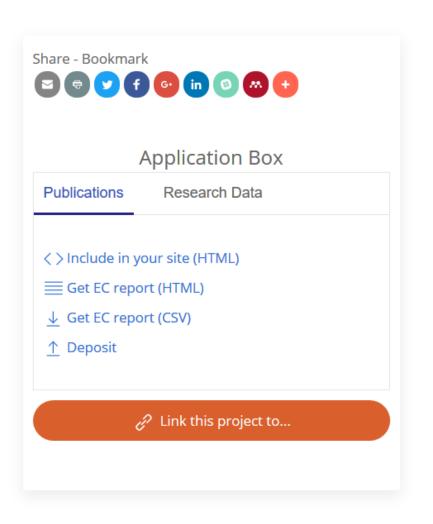
Open Access mandate for Research Data: no

Organization: RU | FORTH | CLPU | FVB | STFC | VU | MPG | LUND | IP-ASCR | CEA ILC | ICFO | IST ID | POLITECNICO DI MILANO | USZ | WAT | LU | CNRS | ELETTRA Vilnius university GSI LENS INFLPR RA HZDR USTRATH UNIVERSIDADE DE

COIMBRA STFC

Detailed project information (CORDIS) →

Publications (187)	
Research Data (1)	+
Software (0)	+
Other Research Products (0)	+
Statistics	+
Metrics	+



## Cross-disciplinary repositories

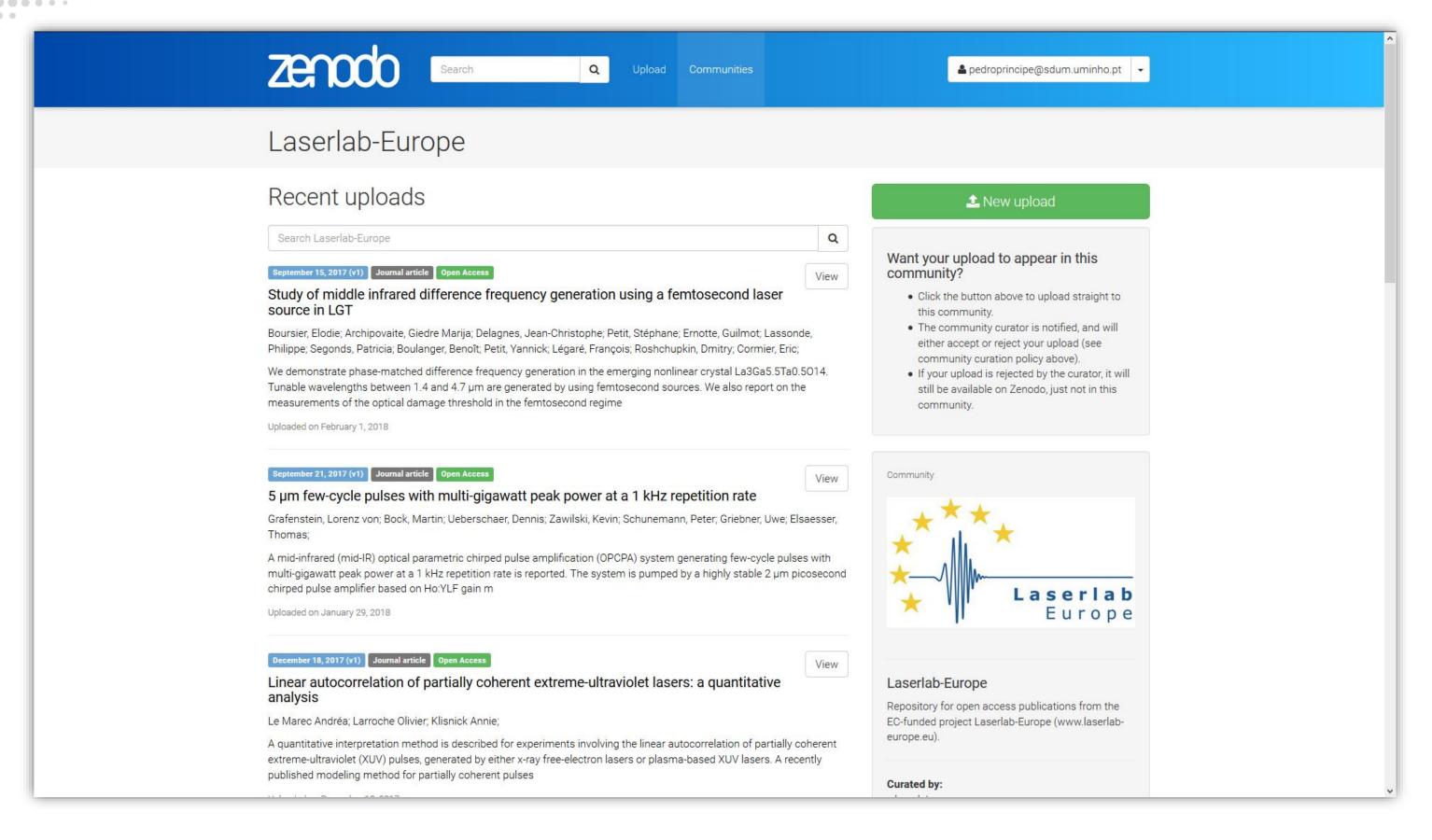
Long tail of research data





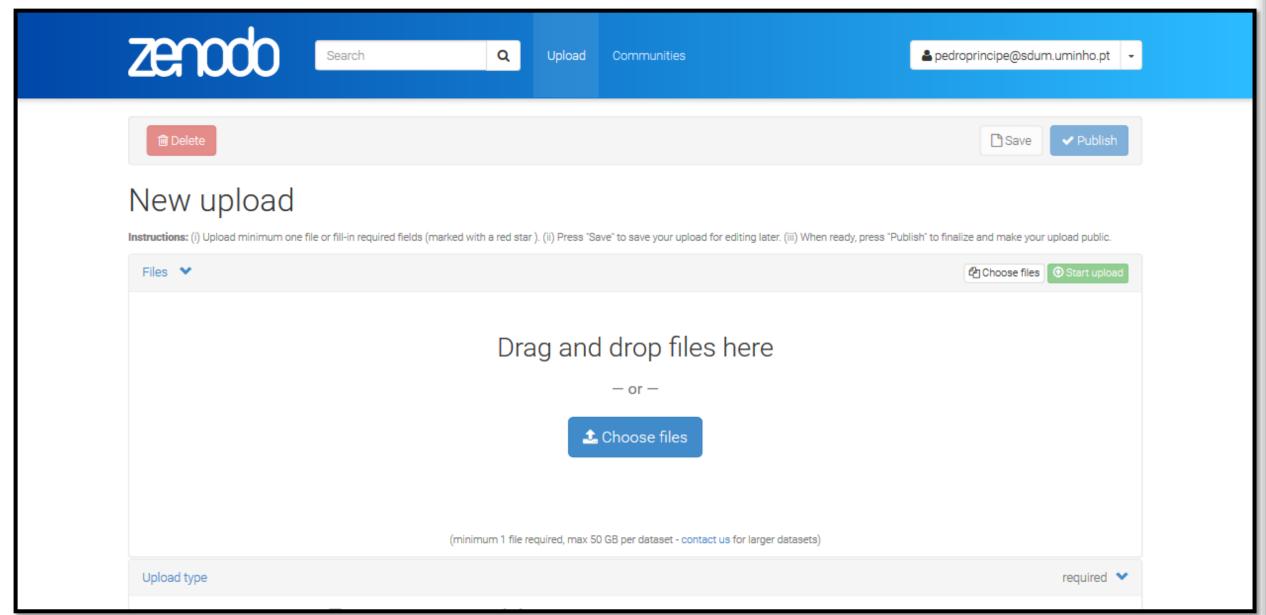






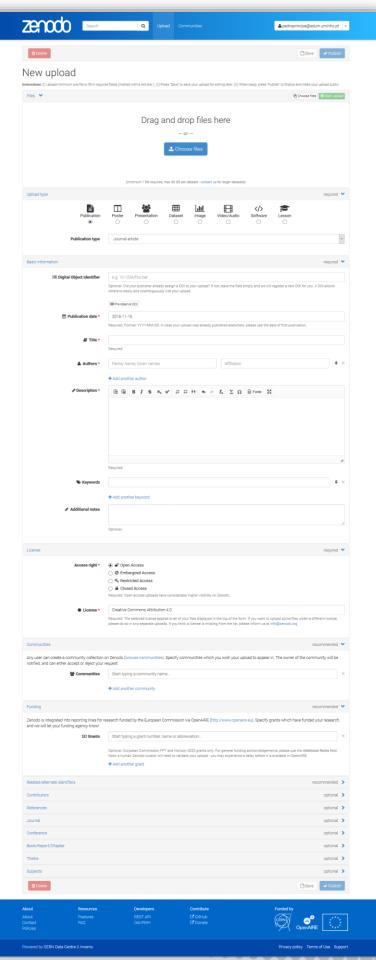
# Upload



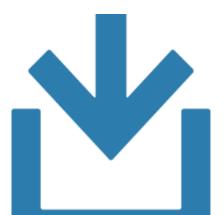








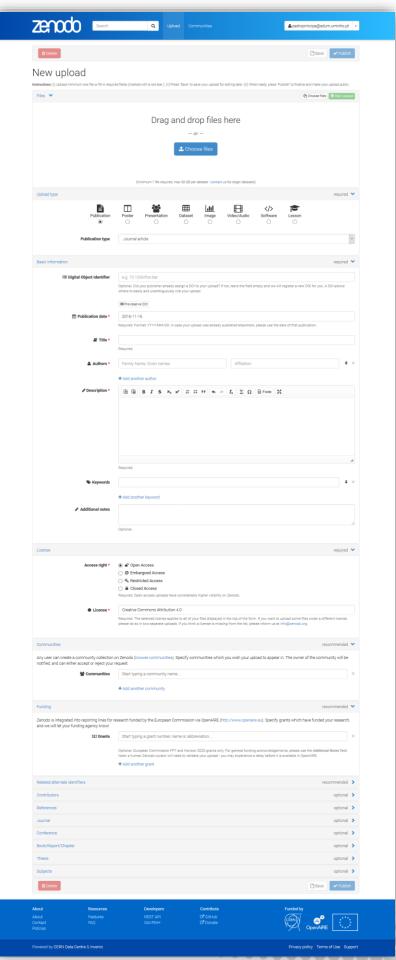
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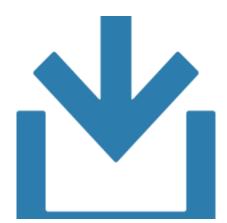
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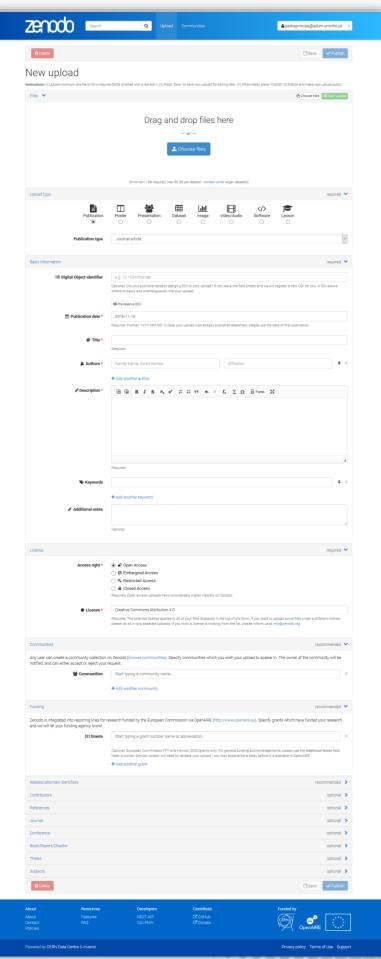
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Storing single photons emitted by a quantum memory on a highly excited Rydberg state -Figure data

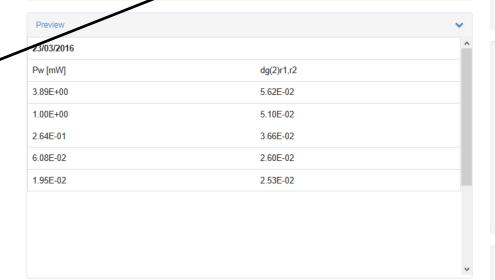
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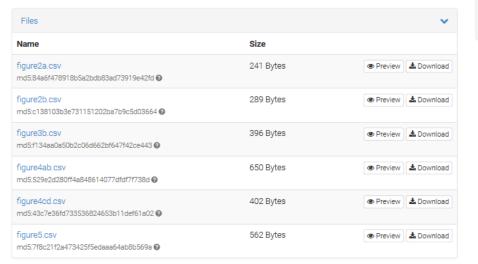
with the paper Distante, Farrera et al. "Mapping single photons emitted by a quantum

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We acknowledge financial support by the ERC starting grant QuLIMA, by the Sp Competitiveness (MINECO) through grant FIS2015-69535-R (MINECO AGAUR via 2014 SGR 1554 and by Fundaci\'{o} Privada Cellex eceived funding from the European Union's Horizon 2020 research and innovation programme arie Skłodowska-Curie grant agreement No 658258. P.F. acknowledges the International PhD-fello gram "la Caixa"-Severo Ochoa @ ICFO. G.H. acknowledges support by the ICFOnest+ internatio toral fellowship program





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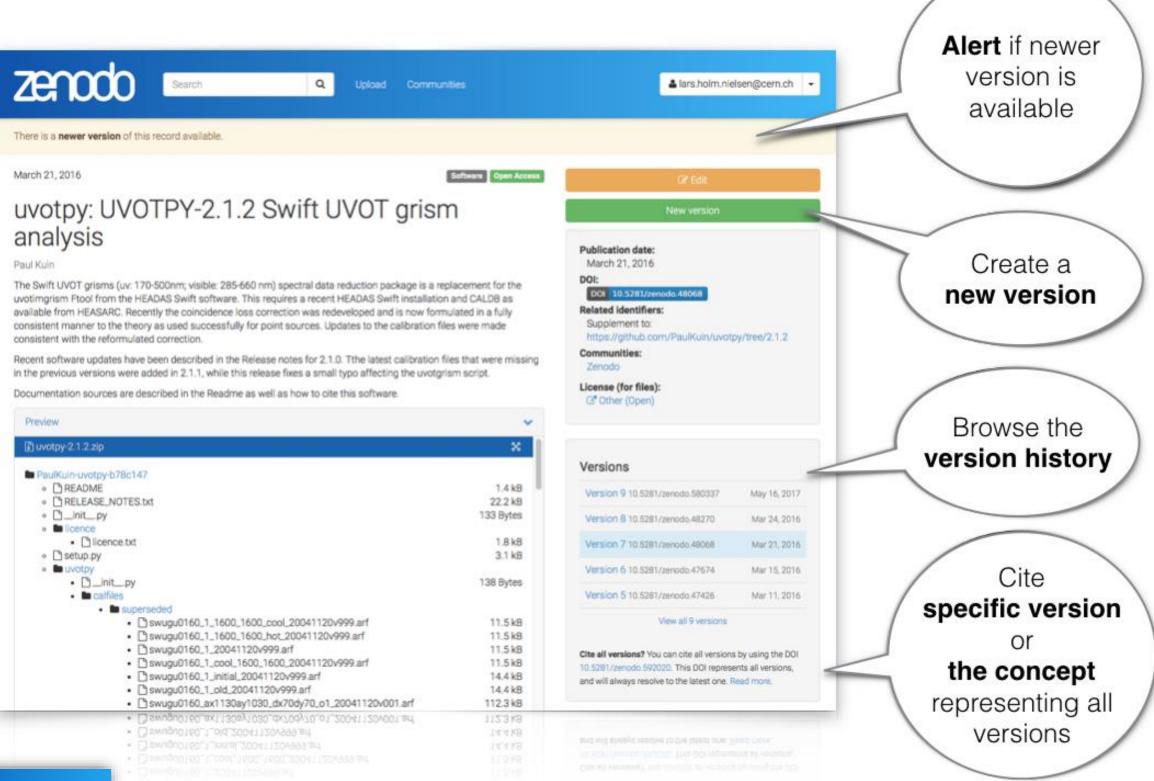
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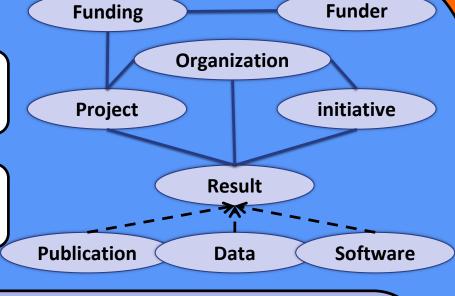
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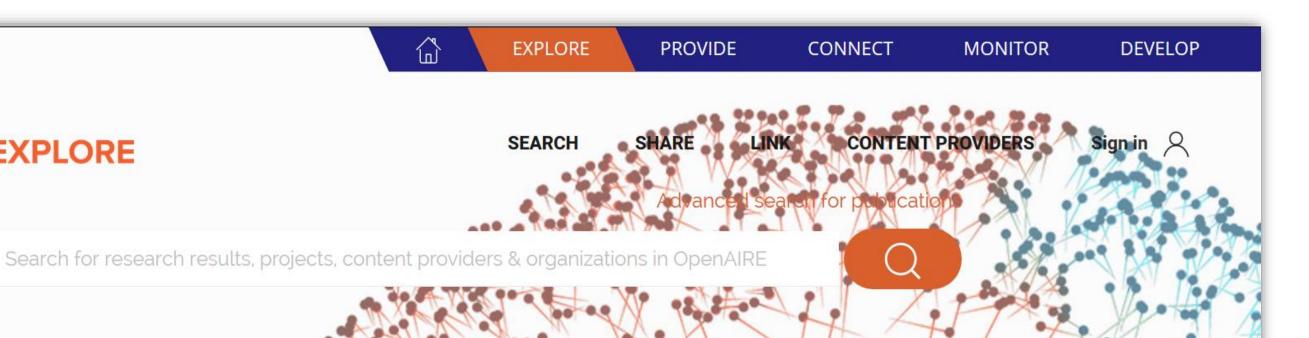
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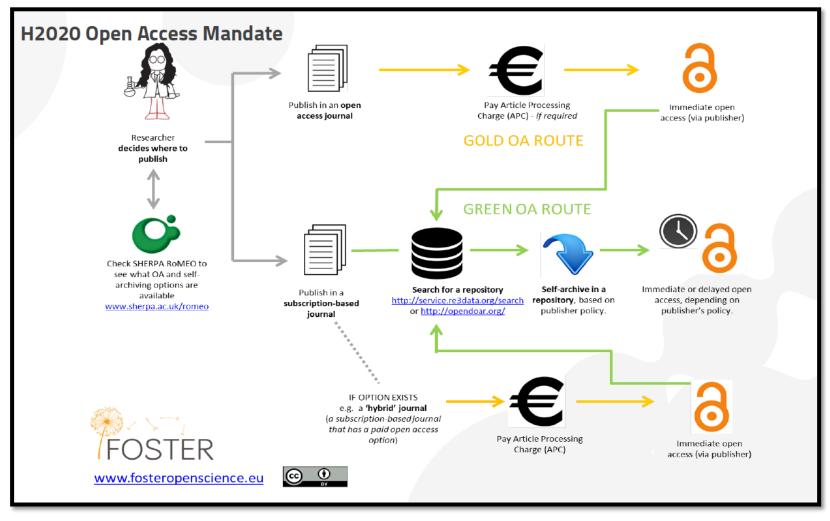


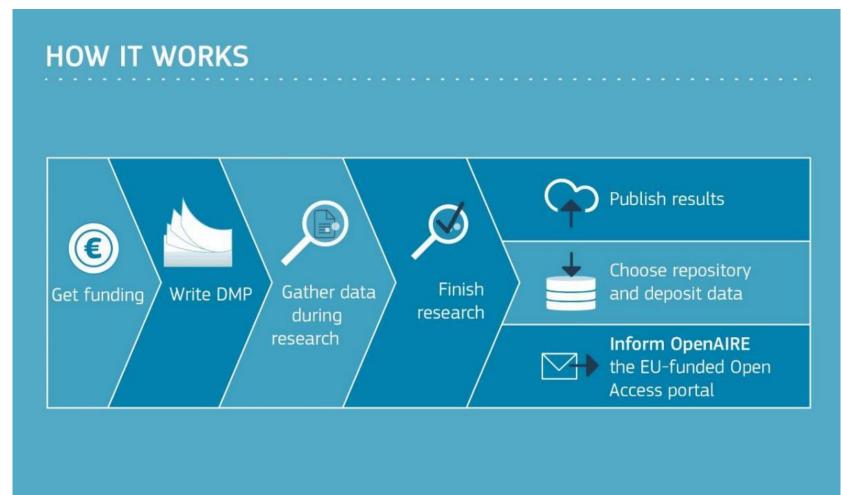
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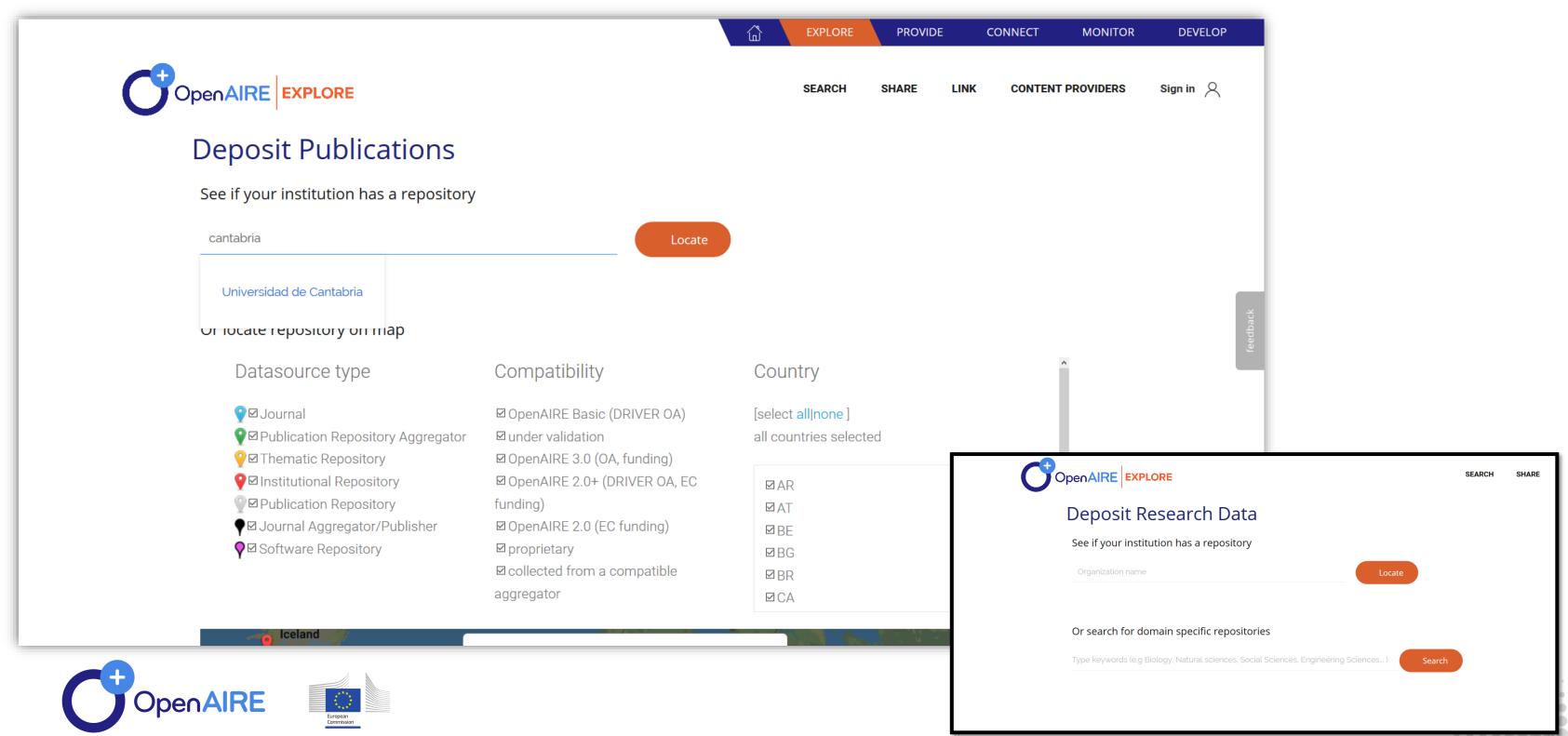








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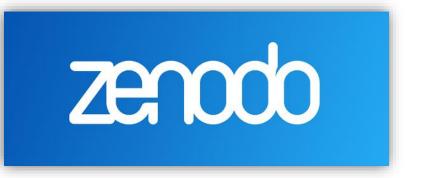


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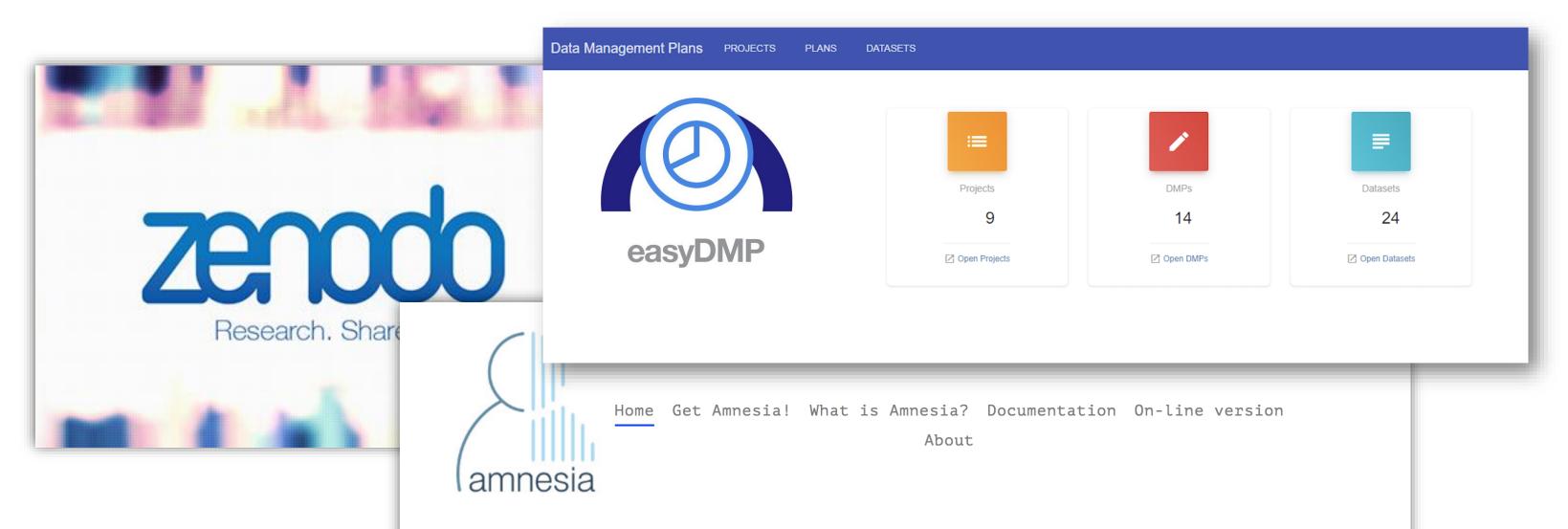








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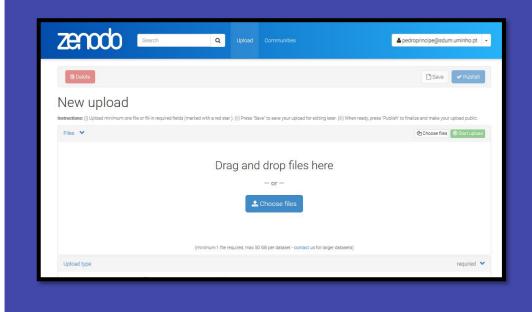
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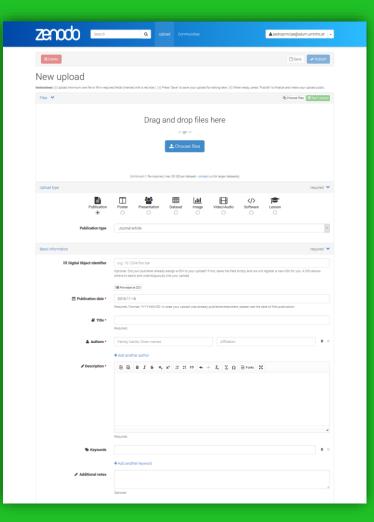




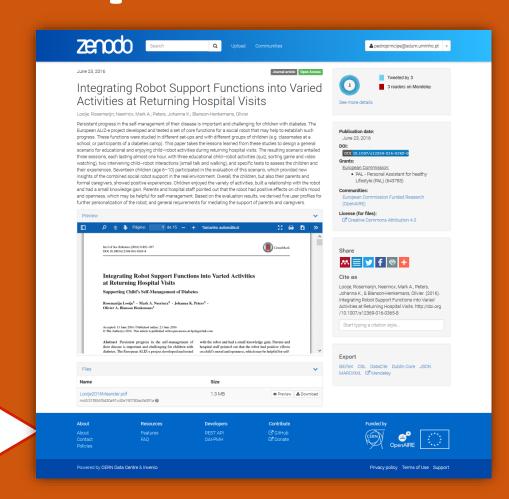
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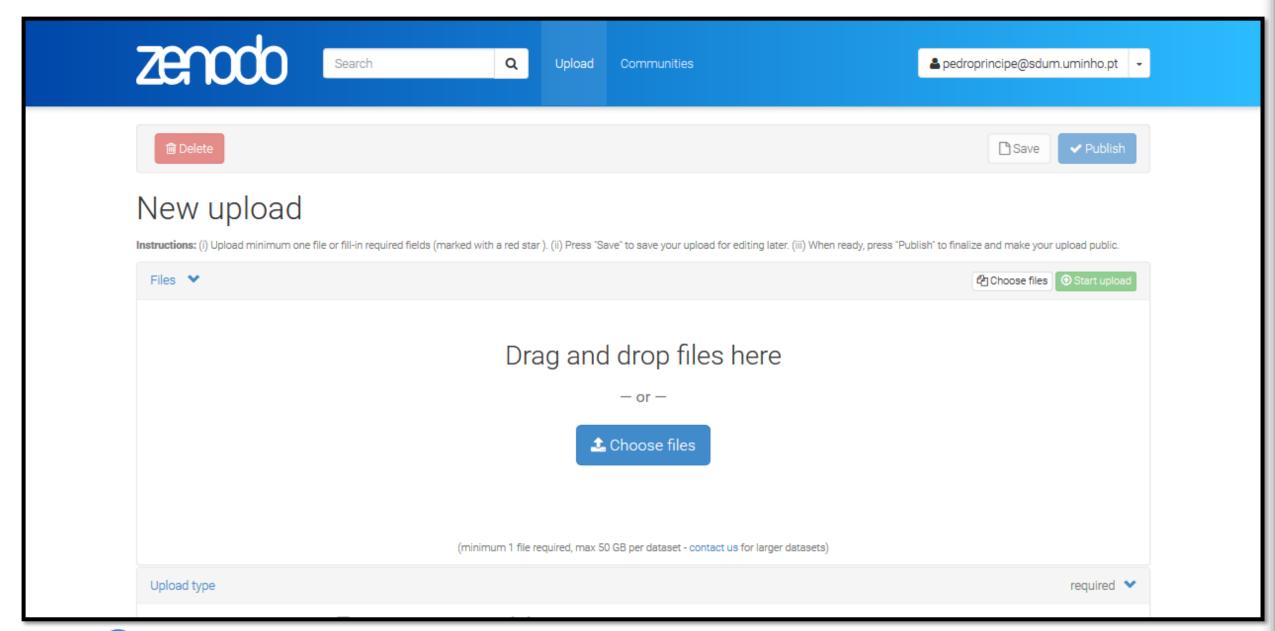






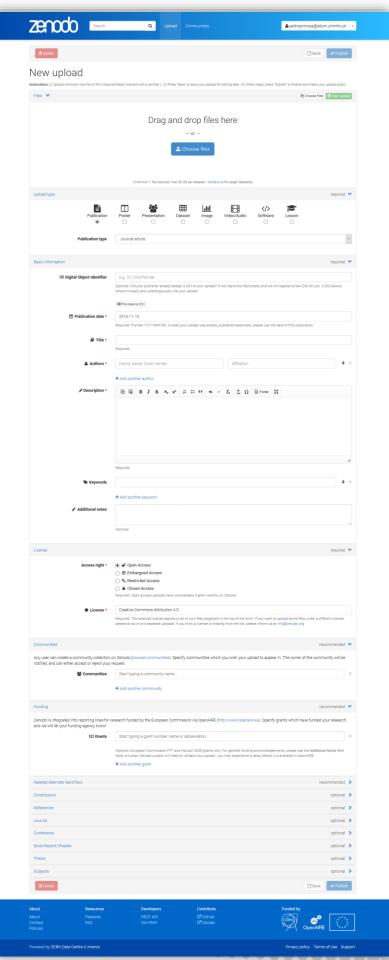
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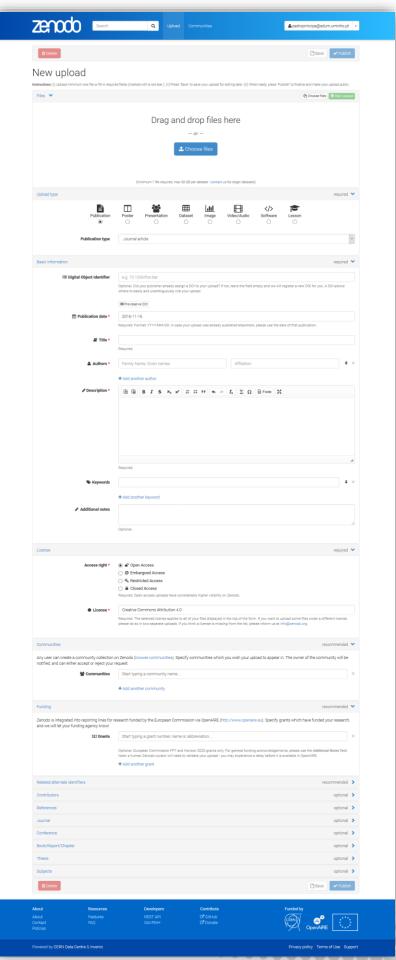


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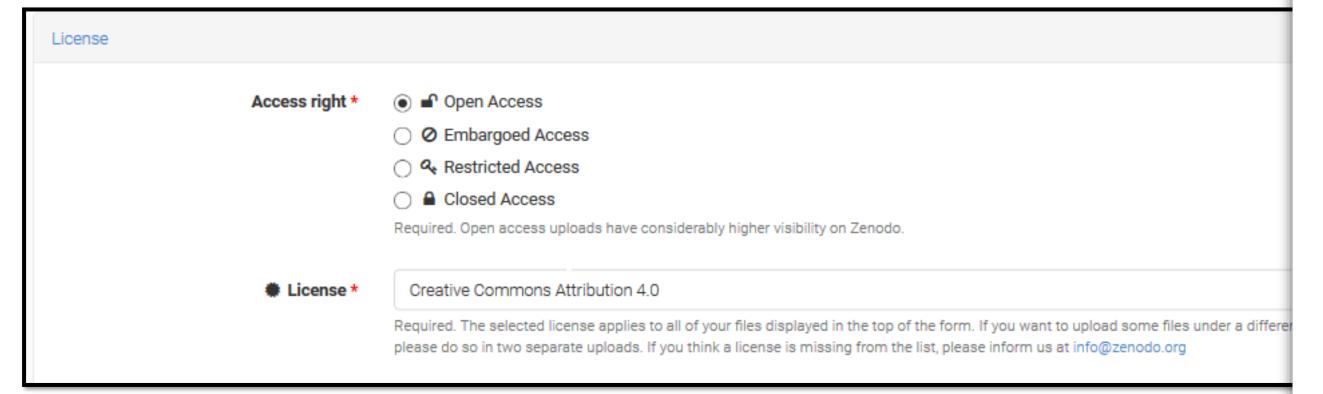
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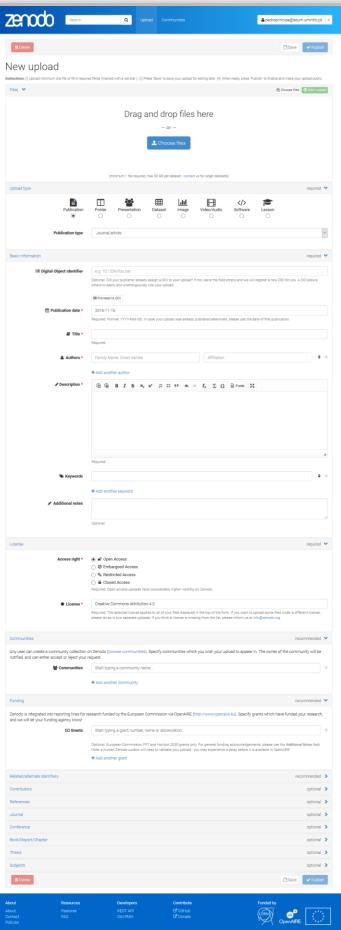


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time-stamping files in the experiment. On reasonable request, we can provide the raw data.

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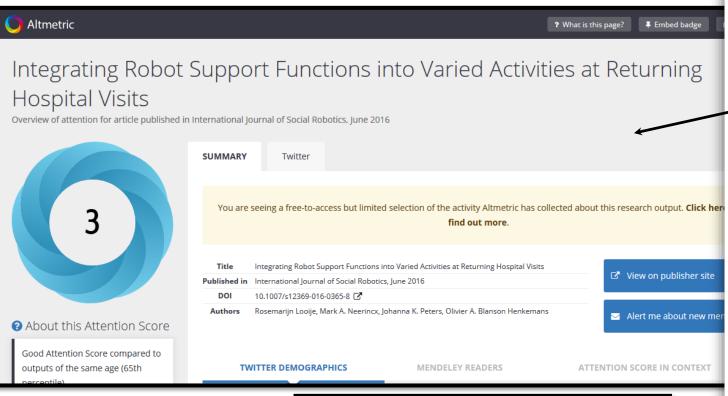
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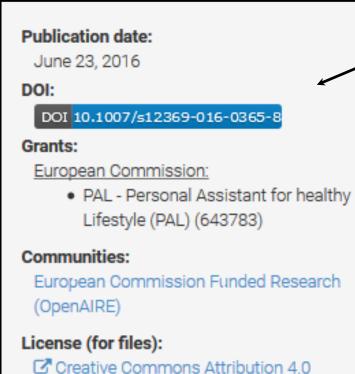
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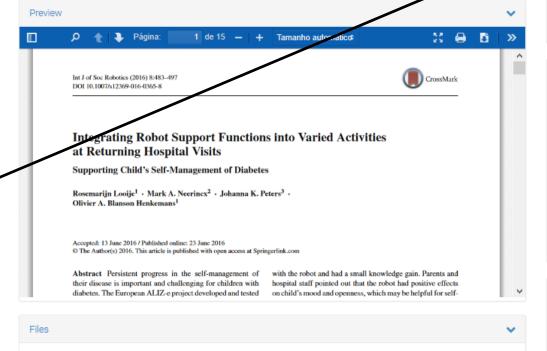
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#### Integrating Robot Support Functions into Varied Activities at Returning Hospital Visits

Looije, Rosemarijn; Neerincx, Mark A.; Peters, Johanna K.;

Persistent progress in the self-management ir disease is important and challenging for children with diabetes. The speciand tested a set of core functions for a social robot that may help to establish such functions were studied in different set-ups and with different groups of children (e.g. classmates at a or participants of a diabetes camp). This paper takes the lessons learned from these studies to design a general scenario for educational and enjoying child-robot activities during returning hospital visits. The resulting scenario entailed three sessions, each lasting almost one hour, with three educational child-robot activities (quiz, sorting game and video watching), two intervening child-robot interactions (small talk and walking), and specific tests to assess the children and their experiences. Seventeen children (age 6-10) participated in the evaluation of this scenario, which provided new insights of the combined social robot support in the real environment. Overall, the children, but also their parents and formal caregivers, showed positive experiences. Children enjoyed the variety of activities, built a relationship with the robot and had a small knowledge gain. Parents and hospital staff pointed out that the robot had positive effects on child's more and openness, which may be helpful for self-management. Based on the evaluation results, we derived five user profiles for further personalization of the robot, and general requirements for mediating the support of parents and



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June 23, 2016

#### DOI 10.1007/s12369-016-036

#### Grants:

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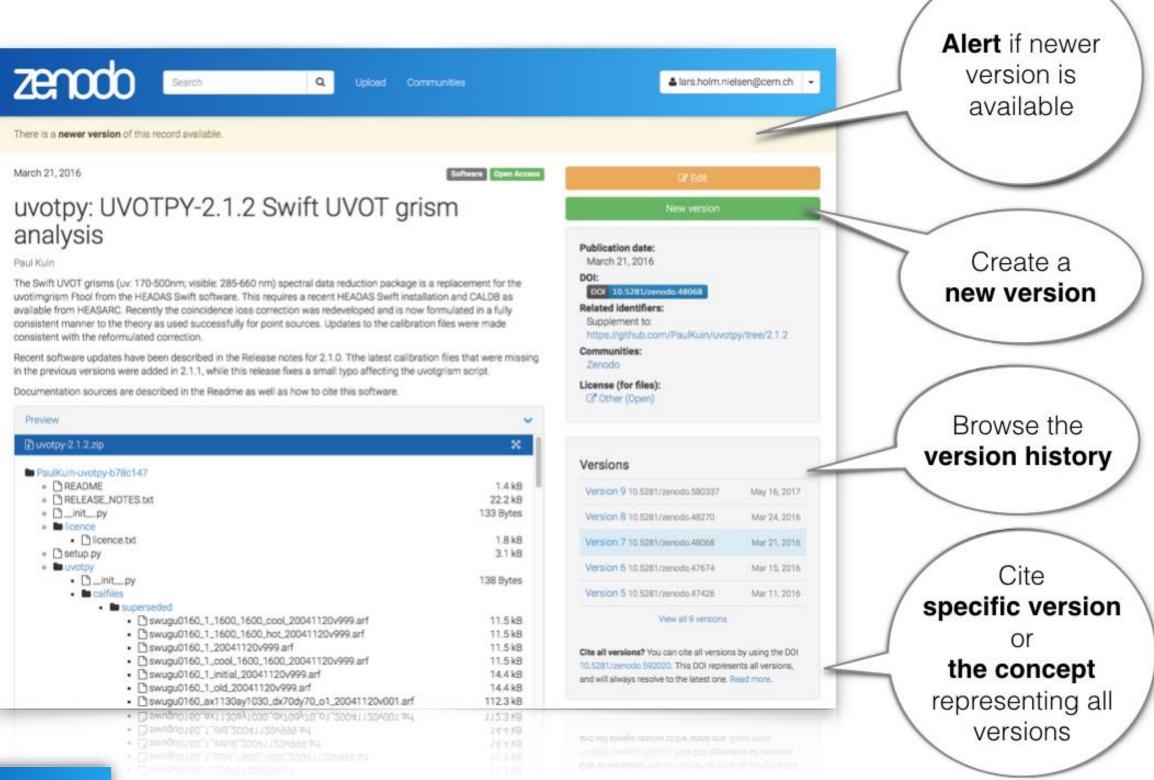
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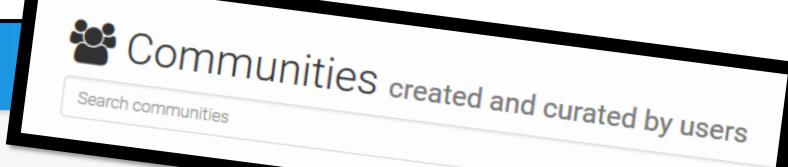








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Sharma, Mayank; Antunes Pequenao, Joao;

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Christos Tzelepis; Eftichia Mavridaki; Vasileios Mezaris; Ioannis Patras;

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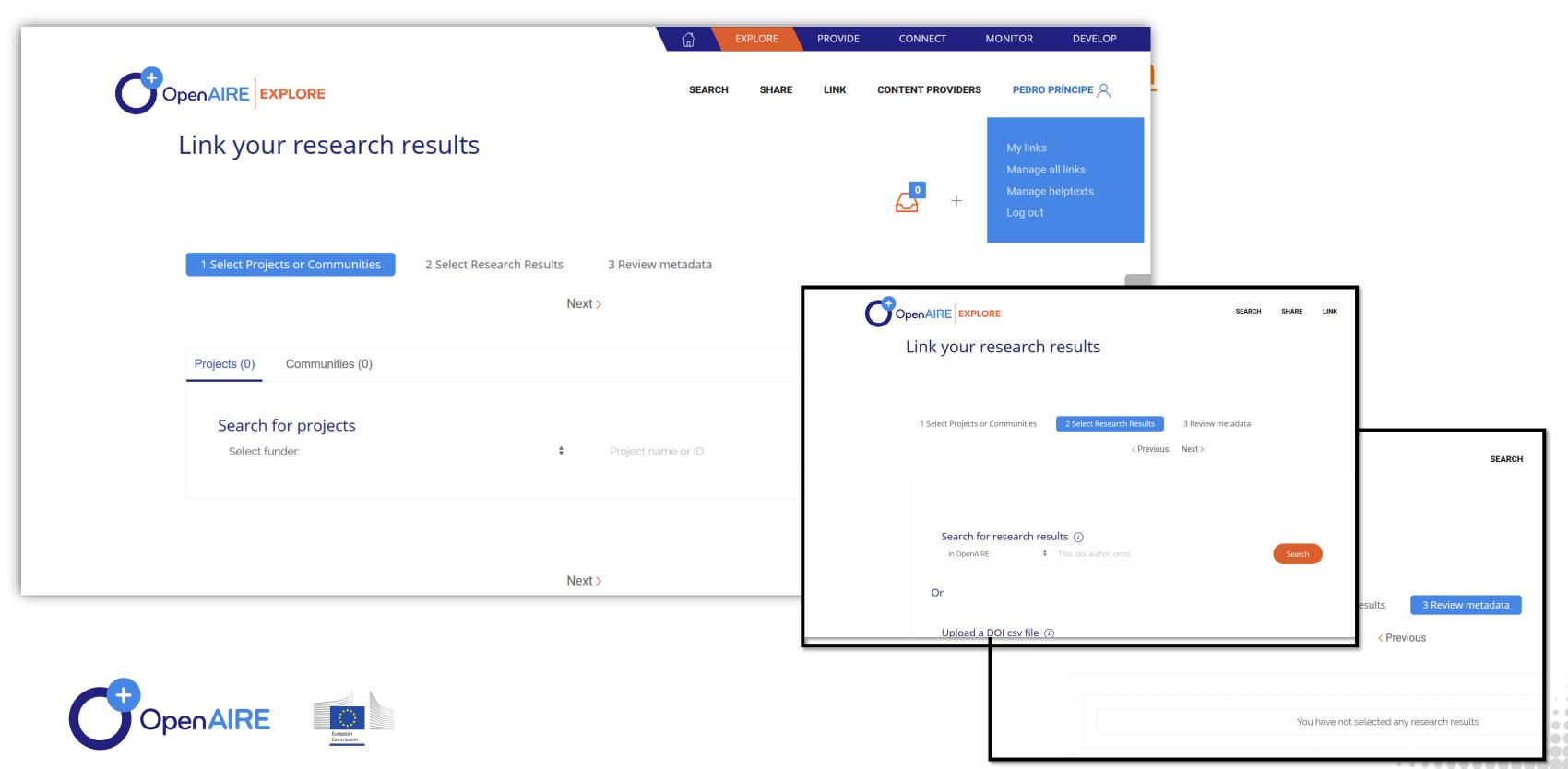
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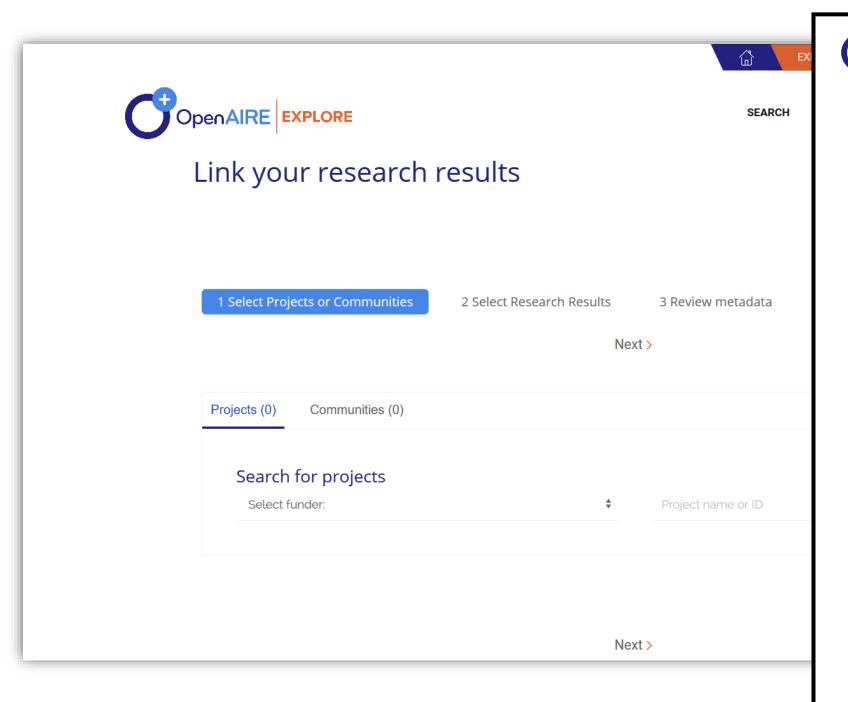


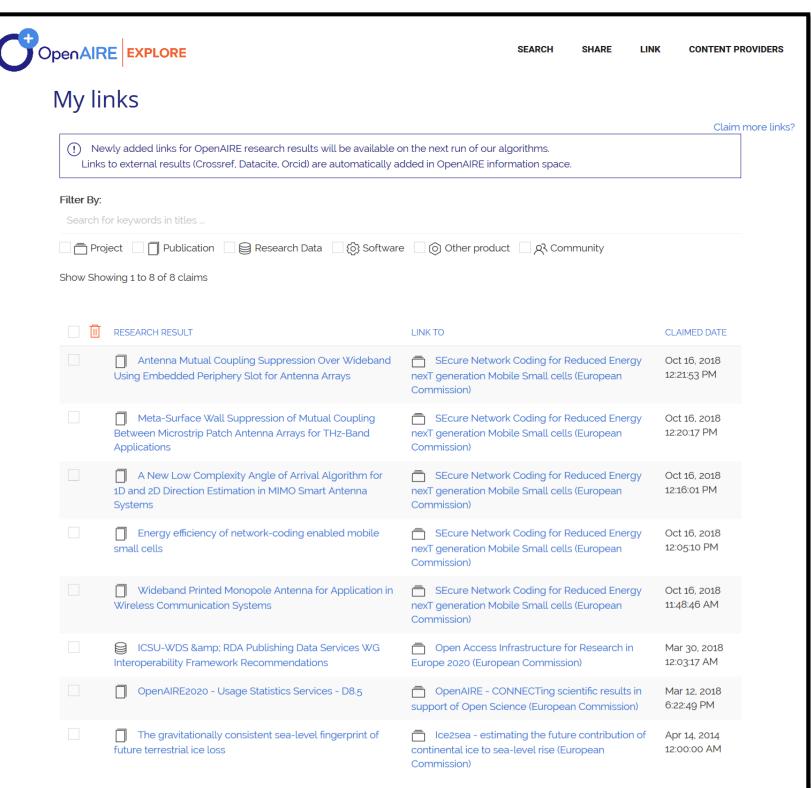


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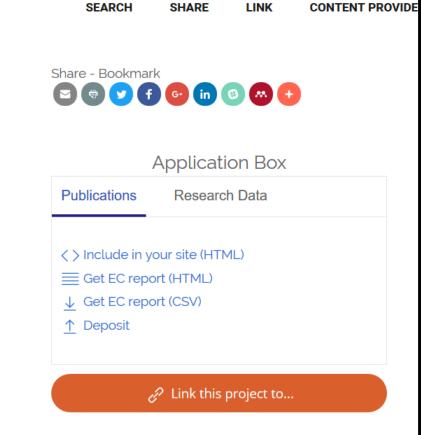
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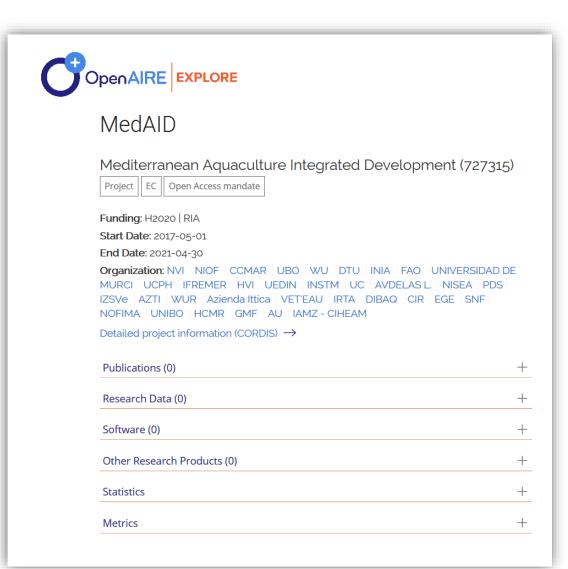
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# Projects: publications and data



### EMF-aware cell selection in heterogeneous cellular networks

Article English OPEN

De Domenico, Antonio ; Díez Fernández, Luis Francisco ; Agüero Calvo, Ramón ; Kténas, Dimitri ; Savin, Valentin (2015)

Publisher: Institute of Electrical and Electronics Engineers Inc.

Related identifiers: ☐ doi: 10.1109/LCOMM.2014.2385094

Subject: HetNets | EMF | Load balancing | Cell selection

The growing concern on the exposure of users to the electromagnetic field (EMF) has recently brought new challenges to the mobile research community. In this letter, we propose a novel cell association framework for heterogeneous cellular networks (HetNets), which aims to balance the load amongst heterogeneous cells so as to improve the resource usage and to increase the user satisfaction in terms of both data rate and EMF exposure. We model the cell selection problem as a General Assignment Problem (GAP) and we present two heuristic algorithms, which solve it with limited complexity. Our analysis shows that the proposed solutions lead to notable improvements with respect to legacy association schemes. This papers reports work undertaken in the context of the project LEXNET. LEXNET is a project supported by the European Commission in the 7th Framework Programme (Grant Agreement n. 318273).

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CONTREX: Design of embedded mixedcriticality CONTRol systems under consideration of EXtra-functional properties

Article English EMBARGO

Grüttner, Kim; Görgen, Ralph; Schreiner, Sören; Herrera Casanueva, Fernando; Peñil del Campo, Pablo; Medina Pasaje, Julio Luis; Villar Bonet, Eugenio; Palermo, Gianluca; Fornaciari, William; Brandolese, Carlo; Gadioli, Davide; Vitali, Emanuele; Zoni, Davide; Bocchio, Sara; Ceva, Luca; Azzoni, Paolo; Poncino, Massimo; Vinco, Sara; Macii, Enrico; Cusenza Salvatore (2017)

Publisher: Elsevier

Related identifiers: doi: 10.1016/j.micpro.2017.03.012

The increasing processing power of today's HW/SW platforms leads to the integration of more and more functions in a single device. Additional design challenges arise when these functions share computing resources and belong to different criticality levels. CONTREX complements current activities in the area of predictable computing platforms and segregation mechanisms with techniques to consider the extra-functional properties, i.e., timing constraints, power, and temperature. CONTREX enables energy efficient and cost aware design through analysis and optimization of these properties with regard to application demands at different criticality levels. This article presents an overview of the CONTREX European project, its main innovative technology (extension of a model based design approach, functional and extra-functional analysis with executable models and

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