

PIDs in the Context of Open Science

Helena Cousijn (DataCite), Paloma Marín-Arraiza (ORCID)

National EOSC Tripartite Event and Czech Open Science Day

June 1st, 2023



Co-funded by
the European Union



National Centre for Persistent Identifiers

A new team of the National Library of Technology formed in 2023

Mission: To support and coordinate the implementation of internationally recognised identifiers in the Czech R&D&I environment

- **National ORCID Centre**



launching on June 1st, 2023

- **National DOI Centre**



launching on June 1st, 2023

- **National ISSN Centre**



Speakers

Helena Cousijn



Community Engagement Director,
DataCite

Paloma Marín-Arraiza



Engagement Manager for Global
Consortia, ORCID

Agenda

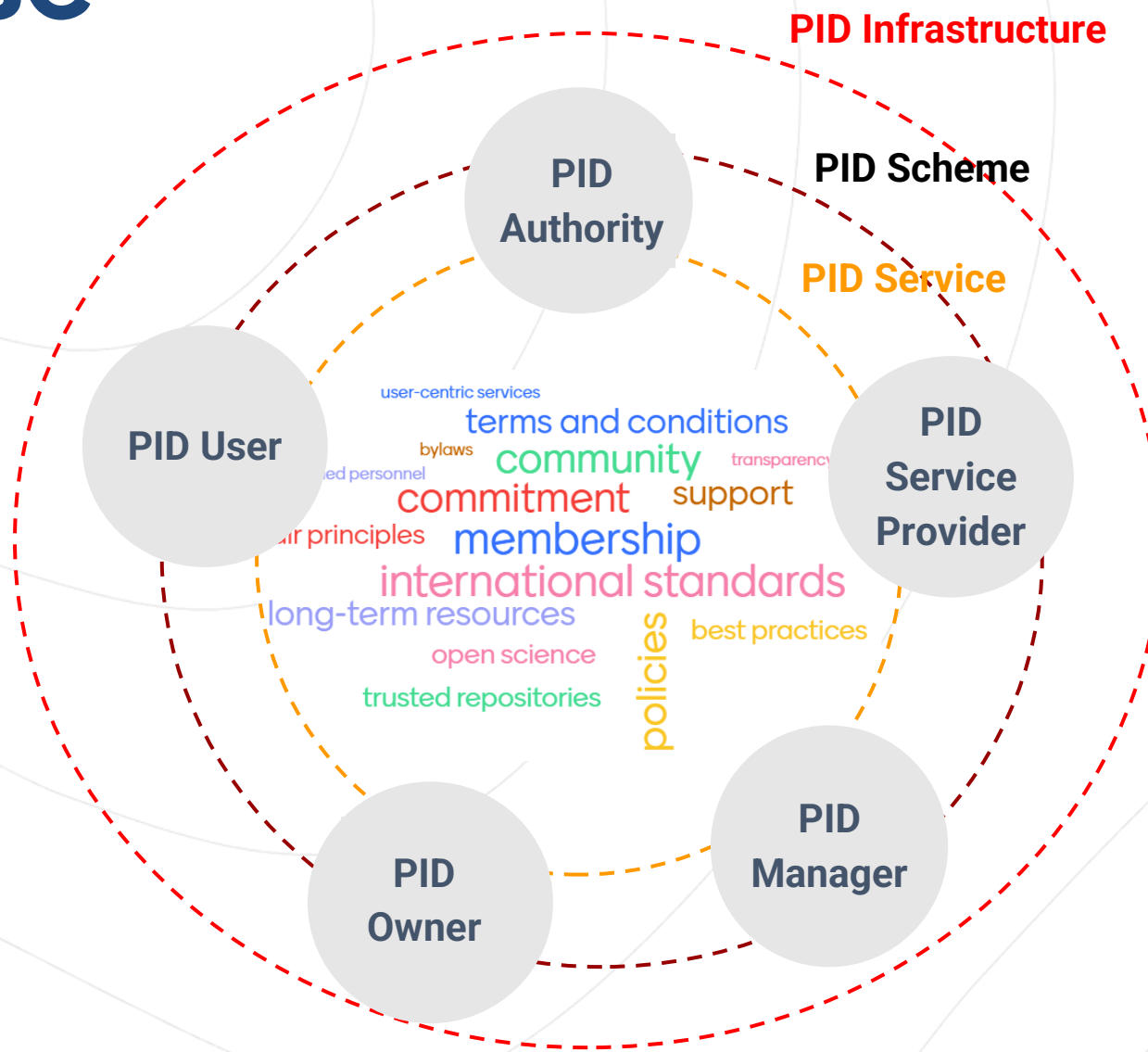
- Introduction to PIDs
- ORCID / DataCite Overview
- PIDs in the research cycle
- Examples from abroad

Q&A via Menti [menti.com 8242 5205](https://menti.com/82425205)

Workshop is being streamed and recorded

An introduction to Persistent Identifiers

PIDs in EOSC



PIDs

What is a persistent identifier (PID)?

<https://doi.org/10.5061/dryad.708gr>

Special URL that's registered in a known system, like DOI, ORCID or ROR



<https://datadryad.org/stash/dataset/doi:10.5061/dryad.708gr>

Always points to the same resource (or a metadata representation)

DOIs for scholarly outputs
<https://doi.org/10.5281/zenodo.3630248>



ORCID iDs for people
<https://orcid.org/0000-0001-6622-4910>



ROR IDs for research organizations
<https://ror.org/01y2jtd41>



PIDs for places, people, and things

PIDs for people (researchers)
include ISNIs and ORCID iDs



PIDs for places (research organizations)
including ROR



PIDs for things (research outputs) include DOIs,
handles, IGSNs, ARKs, and more



Why are we talking about this?

DOIs (digital object identifiers) and other **PIDs** are an important part of the digital scholarly infrastructure that includes ***all types of resources/outputs*** and ***all disciplines***.

Why are we talking about this?

PIDs like DOIs, ORCID iDs and ROR IDs increase
discovery, access, citation, reuse, and recognition
of resources



A dashed orange line starts from the left side of the text box containing 'discovery, access, citation, reuse, and recognition' and curves downwards and to the right, ending with an arrowhead pointing to the 'VALUE' box.

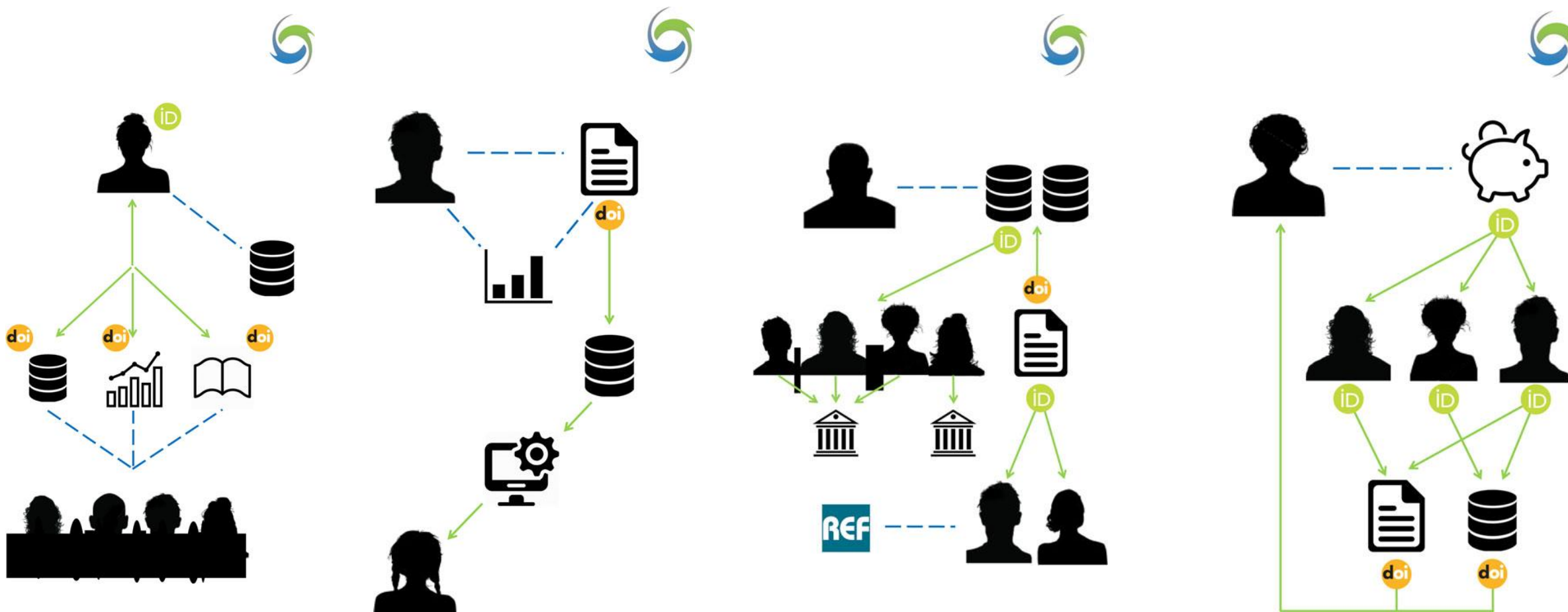
VALUE



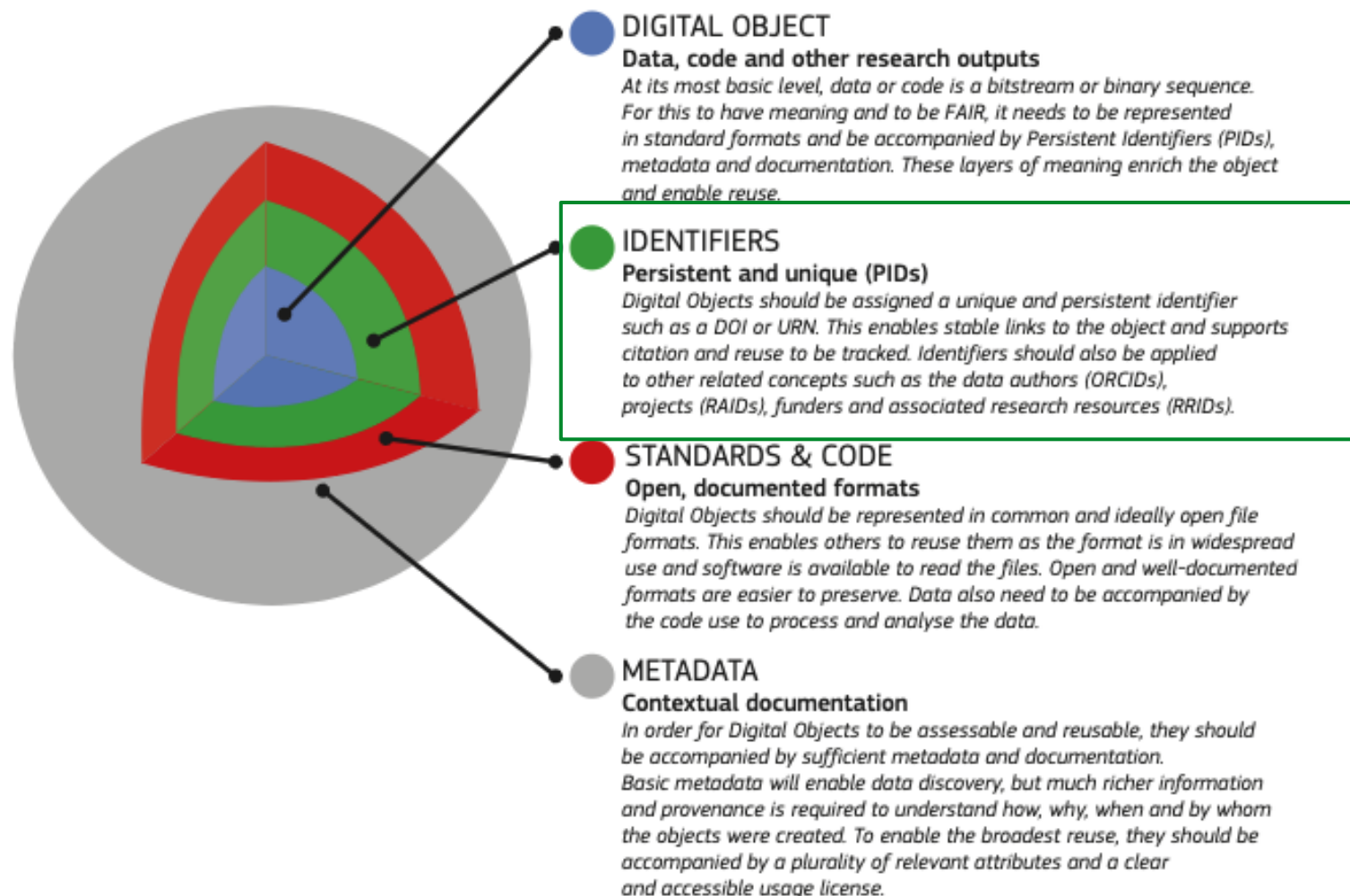
PIDs are for everything!

All disciplines, all resource types and all processes

PIDs for every thing and everything



PIDs are a key part of FAIRification



About ORCID

ORCID's Mission

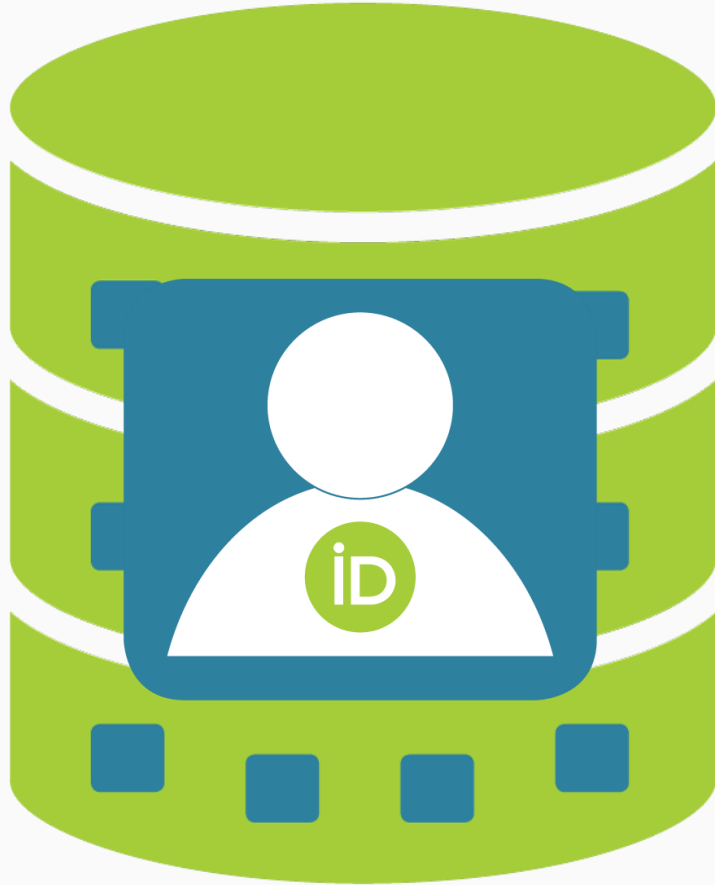
ORCID's mission is to **enable transparent and trustworthy connections** between **researchers**, their **contributions**, and their **affiliations** by providing a **unique, persistent identifier** for **individuals** to use as they engage in **research, scholarship, and innovation activities**.

The ORCID iD

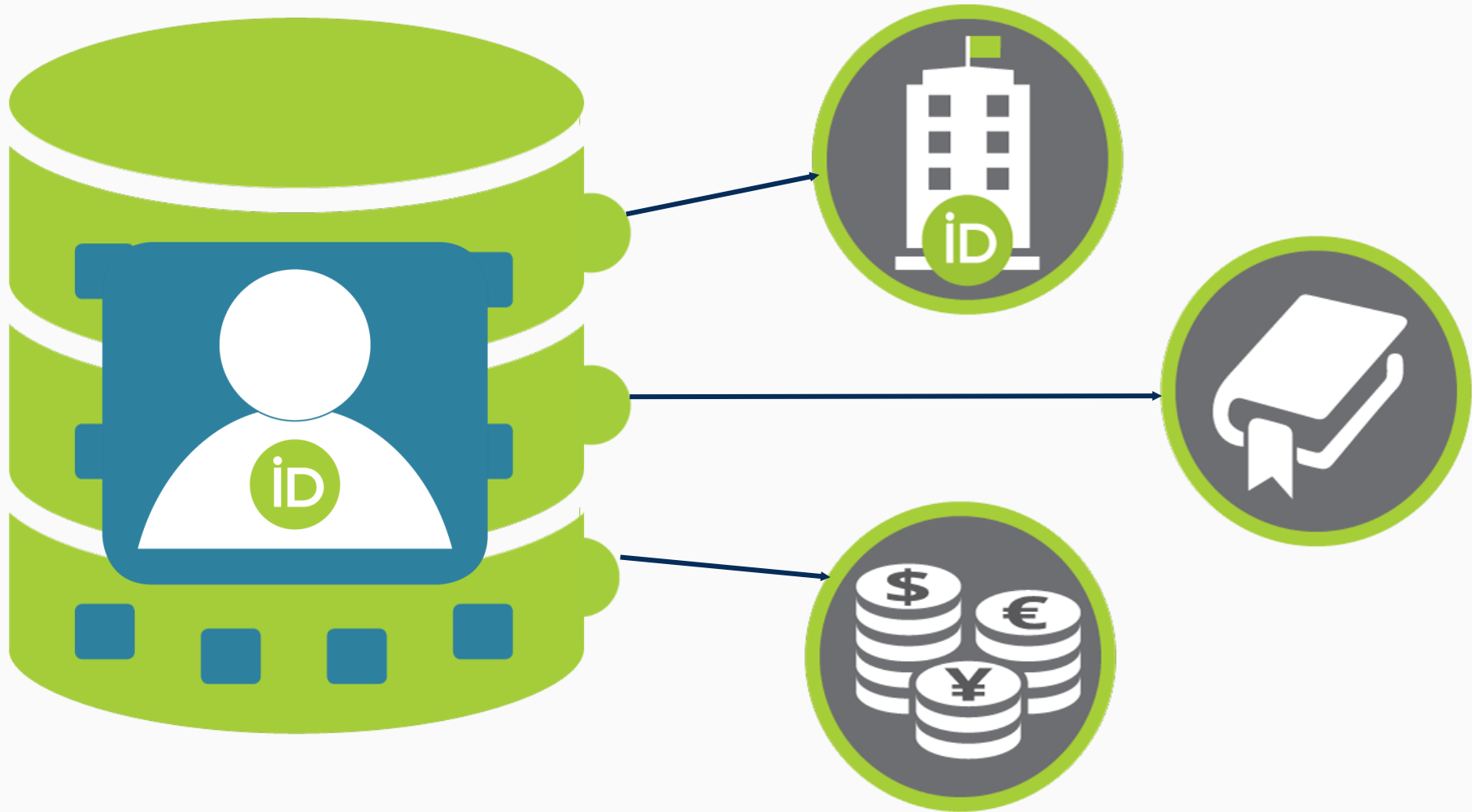


<https://orcid.org/0000-0001-2345-6789>

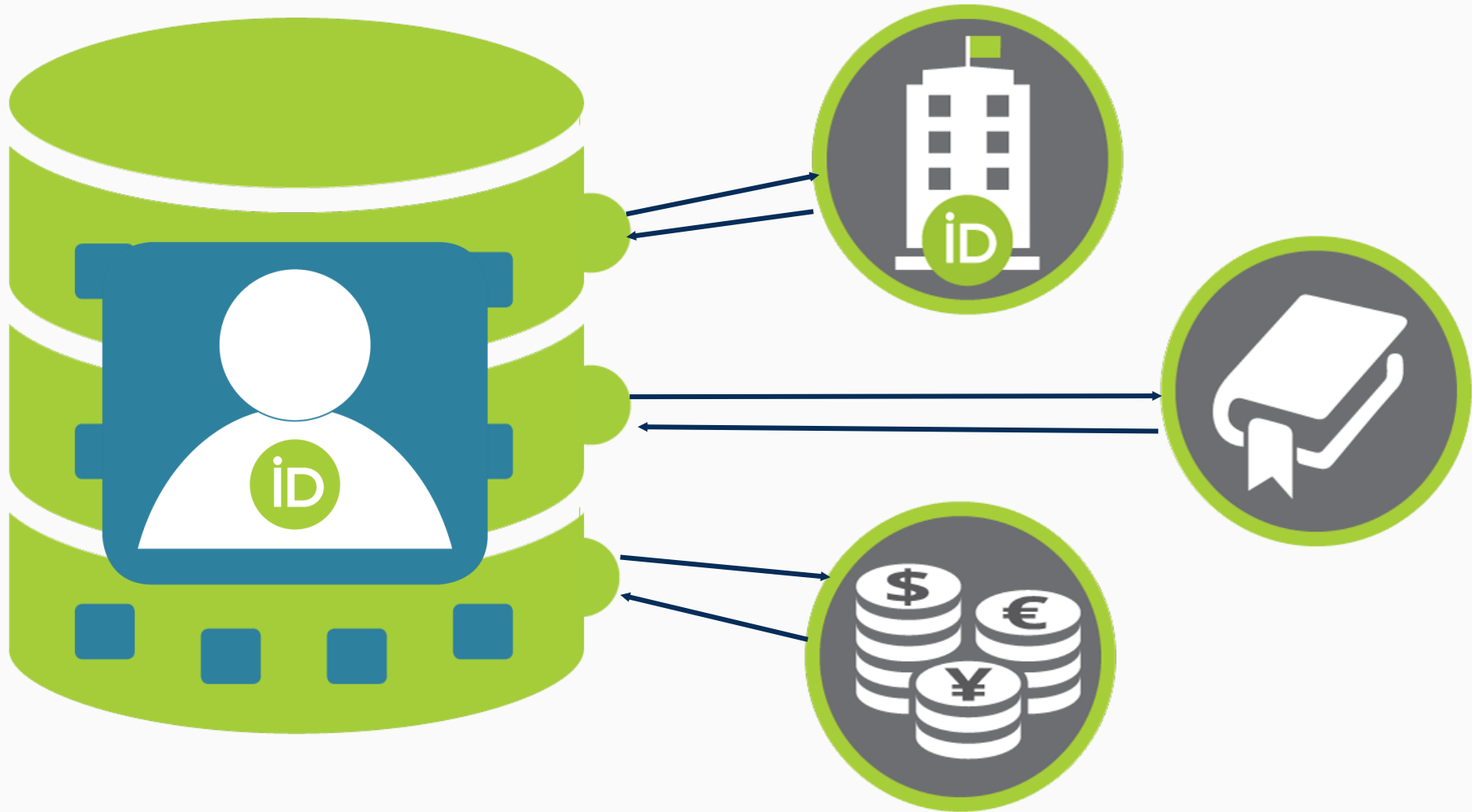
An ORCID record



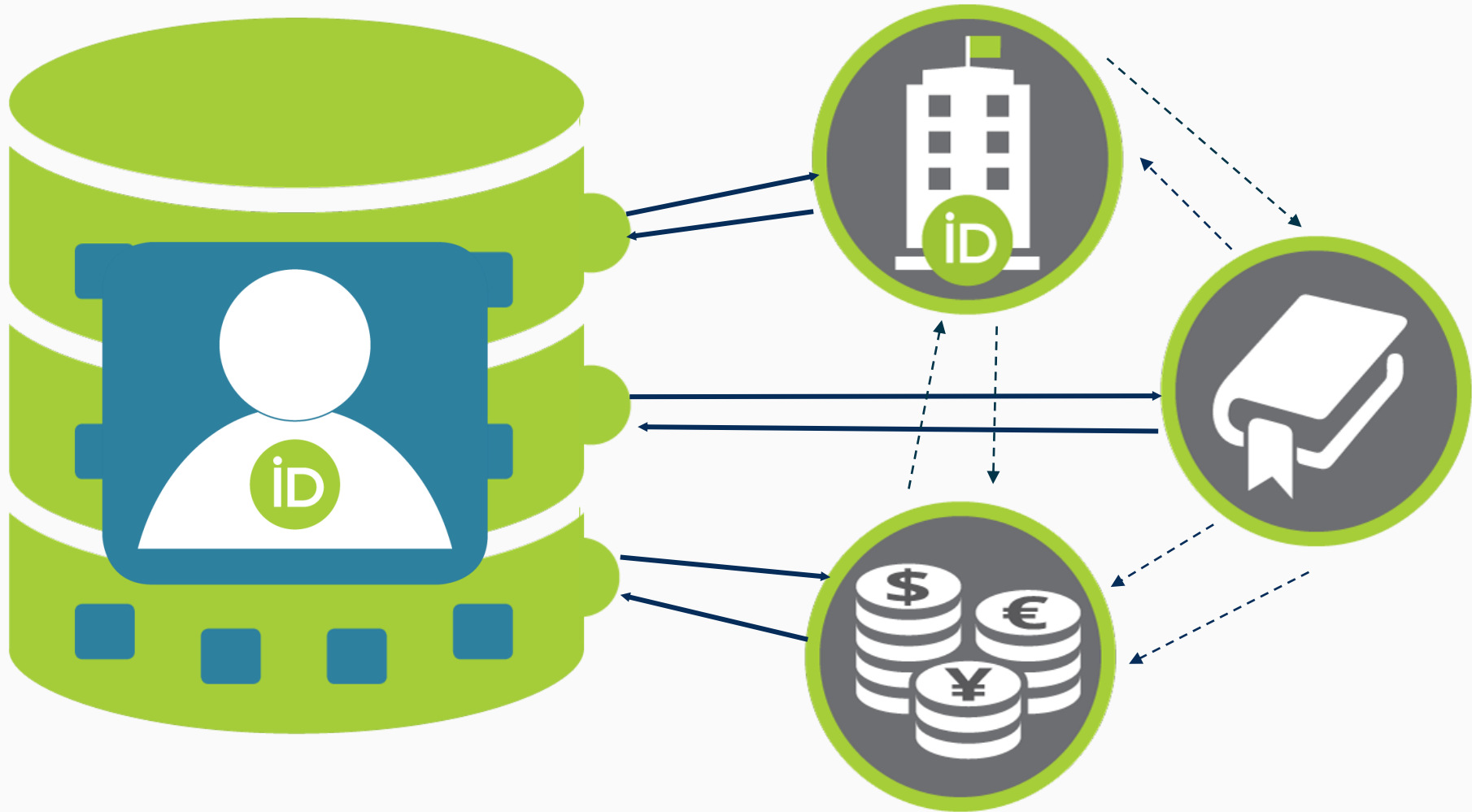
Application Programming Interfaces (APIs)



Application Programming Interfaces (APIs)



Application Programming Interfaces (APIs)



The ability to disambiguate researchers is critical for a trustworthy scholarly record

What's in a name?

Most names are not unique

S.M. Hernandez Garcia

S. Garcia

蘇菲亞

اي فوس

소피아

Many people have the same or similar name, and names may change through marriage or other circumstances.



Individuals and organizations can use different alphabets, abbreviations, or naming conventions.

People use different versions of their names during their career.

RESEARCH ARTICLE

Peta-electron volt gamma-ray emission from the Crab Nebula

The LHAASO Collaboration*,†, Zhen Cao, F. Aharonian, Q. An, Axikegu, L. X. Bai, Y. X. Bai, Y. W. Bao, D. Bastieri, X. J. Bi, Y. J. Bi, H. Cai, J. T. Cai, Zhe Cao, J. Chang, J. F. Chang, B. M. Chen, E. S. Chen, J. Chen, Liang Chen, Liang Chen, Long Chen, M. J. Chen, M. L. Chen, Q. H. Chen, S. H. Chen, S. Z. Chen, T. L. Chen, X. L. Chen, Y. Chen, N. Cheng, Y. D. Cheng, S. W. Cui, X. H. Cui, Y. D. Cui, B. D'Ettorre Piazzoli, B. Z. Dai, H. L. Dai, Z. G. Dai, Danzengluobu, D. della Volpe, X. J. Dong, K. K. Duan, J. H. Fan, Y. Z. Fan, Z. X. Fan, J. Fang, K. Fang, C. F. Feng, L. Feng, S. H. Feng, Y. L. Feng, B. Gao, C. D. Gao, L. Q. Gao, Q. Gao, W. Gao, M. M. Ge, L. S. Geng, G. H. Gong, Q. B. Gou, M. H. Gu, F. L. Guo, J. G. Guo, X. L. Guo, Y. Q. Guo, Y. Y. Guo, Y. A. Han, H. H. He, H. N. He, J. C. He, S. L. He, X. B. He, Y. He, M. Heller, Y. K. Hor, C. Hou, X. Hou, H. B. Hu, S. Hu, S. C. Hu, X. J. Hu, D. H. Huang, Q. L. Huang, W. H. Huang, X. T. Huang, X. Y. Huang, Z. C. Huang, F. Ji, X. L. Ji, H. Y. Jia, K. Jiang, Z. J. Jiang, C. Jin, T. Ke, D. Kuleshov, K. Levochkin, B. B. Li, Cheng Li, Cong Li, F. Li, H. B. Li, H. C. Li, H. Y. Li, Jian Li, Jie Li, K. Li, W. L. Li, X. R. Li, Xin Li, Xin Li, Y. Li, Y. Z. Li, Zhe Li, Zhuo Li, E. W. Liang, Y. F. Liang, S. J. Lin, B. Liu, C. Liu, D. Liu, H. Liu, H. D. Liu, J. Liu, J. L. Liu, J. S. Liu, J. Y. Liu, M. Y. Liu, R. Y. Liu, S. M. Liu, W. Liu, Y. Liu, Y. N. Liu, Z. X. Liu, W. J. Long, R. Lu, H. K. Lv, B. Q. Ma, L. L. Ma, X. H. Ma, J. R. Mao, A. Masood, Z. Min, W. Mitthumsiri, T. Montaruli, Y. C. Nan, B. Y. Pang, P. Pattarakijwanich, Z. Y. Pei, M. Y. Qi, Y. Q. Qi, B. Q. Qiao, J. J. Qin, D. Ruffolo, V. Rubev, A. Saiz, L. Shao, O. Shchegolev, X. D. Sheng, J. Y. Shi, H. C. Song, Yu. V. Stepanov, Y. Su, Q. N. Sun, X. N. Sun, Z. B. Sun, P. H. T. Tam, Z. B. Tang, W. W. Tian, B. D. Wang, C. Wang, H. Wang, H. G. Wang, J. C. Wang, J. S. Wang, L. P. Wang, L. Y. Wang, R. N. Wang, Wei Wang, Wei Wang, X. G. Wang, X. J. Wang, X. Y. Wang, Y. Wang, Y. D. Wang, Y. J. Wang, Y. P. Wang, Z. H. Wang, Z. X. Wang, Zhen Wang, Zheng Wang, D. M. Wei, J. J. Wei, Y. J. Wei, T. Wen, C. Y. Wu, H. R. Wu, S. Wu, W. X. Wu, X. F. Wu, S. Q. Xi, J. Xia, J. J. Xia, G. M. Xiang, D. X. Xiao, G. Xiao, H. B. Xiao, G. G. Xin, Y. L. Xin, Y. Xing, D. L. Xu, R. X. Xu, L. Xue, D. H. Yan, J. Z. Yan, C. W. Yang, F. F. Yang, J. Y. Yang, L. L. Yang, M. J. Yang, R. Z. Yang, S. B. Yang, Y. H. Yao, Z. G. Yao, Y. M. Ye, L. Q. Yin, N. Yin, X. H. You, Z. Y. You, Y. H. Yu, Q. Yuan, H. D. Zeng, T. X. Zeng, W. Zeng, Z. K. Zeng, M. Zha, X. X. Zhai, B. B. Zhang, H. M. Zhang, H. Y. Zhang, J. L. Zhang, J. W. Zhang, L. X. Zhang, Li Zhang, Lu Zhang, P. F. Zhang, P. P. Zhang, R. Zhang, S. R. Zhang, S. S. Zhang, X. Zhang, X. P. Zhang, Y. F. Zhang, Y. L. Zhang, Yi Zhang, Yong Zhang, B. Zhao, J. Zhao, L. Zhao, L. Z. Zhao, S. P. Zhao, F. Zheng, Y. Zheng, B. Zhou, H. Zhou, J. N. Zhou, P. Zhou, R. Zhou, X. X. Zhou, C. G. Zhu, F. R. Zhu, H. Zhu, K. J. Zhu, X. Zuo

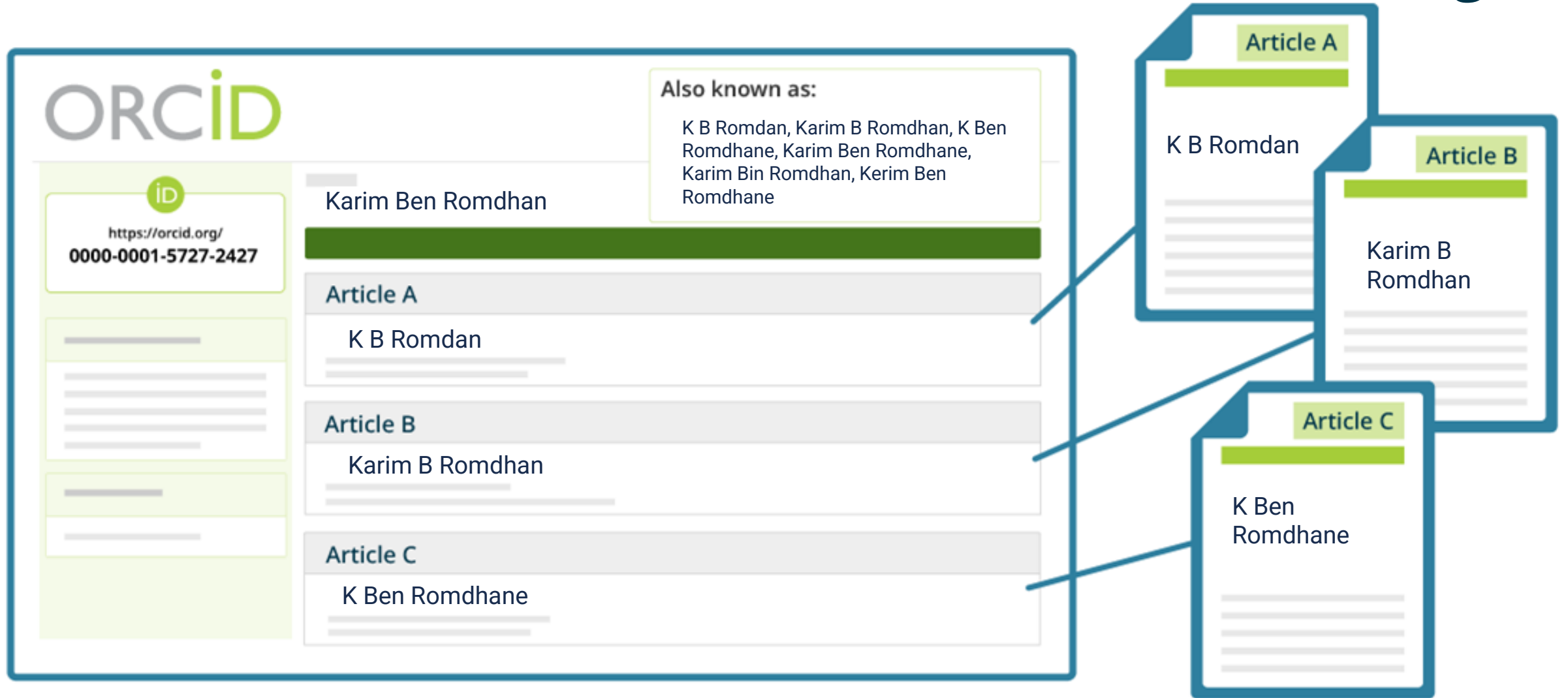
| Virology | Research Article | 06 June 2022

Trivalent NDV-HXP-S Vaccine Protects against Phylogenetically Distant SARS-CoV-2 Variants of Concern in Mice

Authors: Irene González-Domínguez , Jose Luis Martínez, Stefan Slamanig , Nicholas Lemus, Yonghong Liu, Tsoi Ying Lai, Juan Manuel Carreño, Gagandeep Singh , Gagandeep Singh , Michael Schotsaert, Ignacio Mena, Stephen McCroskery, Lynda Coughlan , Floriana Hammer , Adolfo García-Sastre , Peter Palese , Weina Sun

SHOW FEWER | AUTHORS INFO & AFFILIATIONS

ORCID also solves name variation, the iD never changes



Information on ORCID records can help

Entries that can be added:

- Affiliations
- Professional activities
- Funding information
- Outputs
- Peer reviews
- Research Resources
- Website URLs
- Other non-sensitive personal data

The screenshot displays an ORCID iD record for Sofia Maria Hernandez Garcia. The record is organized into two main columns. The left column contains a header with the ORCID iD logo and the URL <https://orcid.org/0000-0001-5727-2427>. Below this are sections for 'Emails' (showing s.garcia@orcid.org), 'Websites & social links' (showing 'Faculty profile webpage'), 'Other IDs' (listing 'Profile system identifier: A-123456', 'ResearcherID: L-8716-2018', and 'eScientist: 0000-0001-5727-2427'), and 'Countries' (showing 'United States'). The right column features a header with a login prompt 'Is this you? [Sign in to start editing](#)' and a 'Printable version' link. Below the header is the 'Published name' 'Sofia Maria Hernandez Garcia'. A 'Name' field shows 'Sofia Garcia', and an 'Also known as' field shows 'S. M. Garcia, Sofia Maria Garcia'. The 'Biography' section states 'Sofia Maria Hernandez Garcia is used for testing and demonstrating ORCID records.' The 'Activities' section is expanded, showing a list of activity types with counts and sort options: 'Employment (2)', 'Education and qualifications (4)', 'Invited positions and distinctions (3)', 'Membership and service (2)', 'Funding (1)', 'Research resources (2)', 'Works (7)', and 'Peer review (2)'. Each activity type has a right arrow and a 'Sort' button.

ORCID member organizations add validated information

When an ORCID member updates an ORCID record, the source (provenance) of that update is captured for re-use:

- Research organizations add affiliations
- Publishers add outputs and reviews
- Funders add funding items



These provide **‘trust markers’** that can be used to help in decision making.



University of Oxford: Oxford, Oxfordshire, GB

(Said Business School)
Employment

Source: ORCID Integration at the University of Oxford



▼ Review activity for **British journal of Cancer** (1)

Journal, British journal of Cancer
ISSN: [1532-1827](#)

Review date: 2020-11-16

Type: Review

Role: Reviewer

Source: Nature Publishing Group

We aim to balance researcher control and data quality

Researchers:

- Own their own records
- Control who accesses their information
- May change access preferences at any time



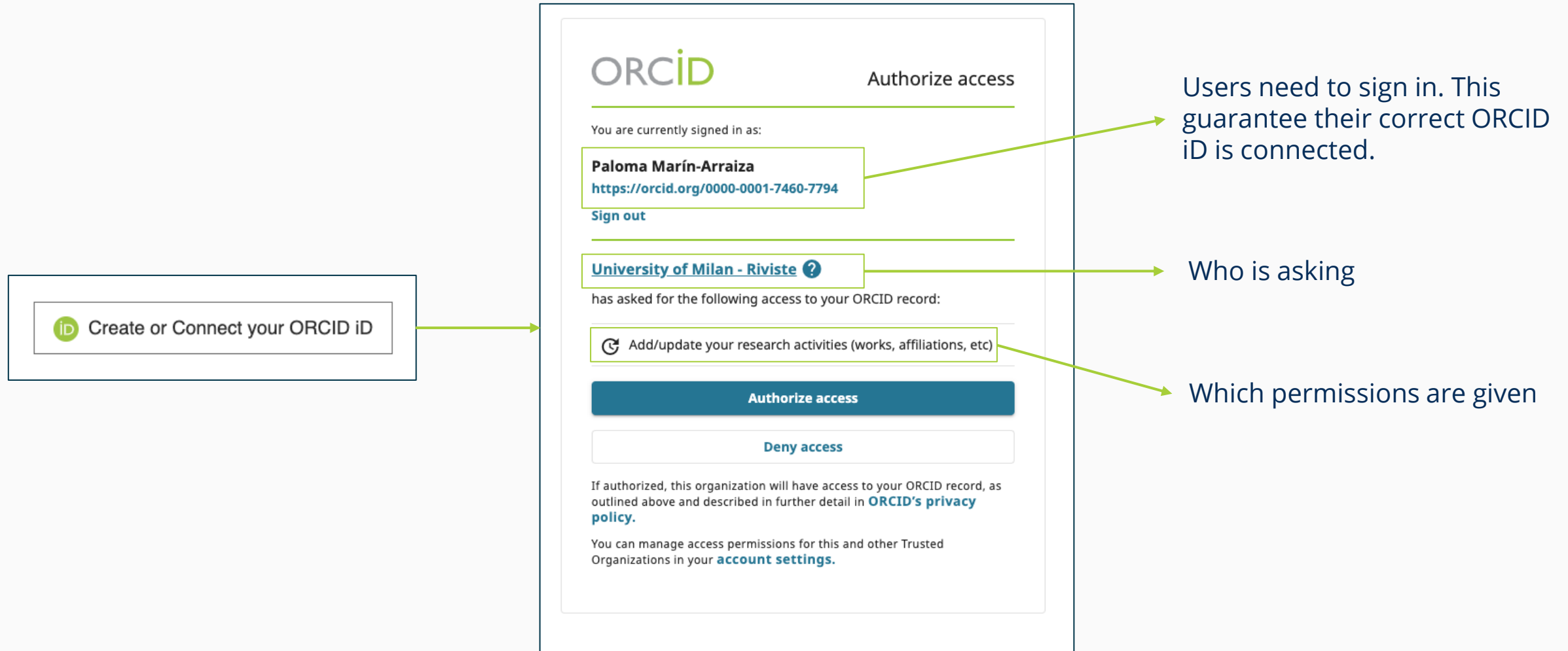
- Terms of use prevent misrepresentation
- False data in records may be disputed by anyone in the community
- Machine-learning algorithm detects obvious spam
- Disputed and spam records are removed from use, pending correction or withdrawal

Organizations may only add information to ORCID records with the researcher's permission, and may only update or delete information that was added by them



Trust in an ORCID record accumulates over time as reliable and trustworthy data sources add information (with the record holder's permission)

The authentication process guarantees data control



ORCID is increasingly a hub for an immense amount of profile activity with over 4700 interconnected systems

Software connected with ORCID:

- ePrints
- Open Journal Systems
- DSpace 7.x
- DSpace CRIS
- SmartSimple
- Proposal Central
- ...



2022 1.2B items
of data in ORCID records was reused by external systems

2,400,050
Records updated by ORCID members in **2022**

ORCID data is read **122.3** million times/month
by external systems, saving users time and reducing administrative burden

Constant exchange with the global community



**Members
Connect
(Monthly
Newsletter)**



**Friends of ORCID
channel**



**Member
Mixers
(coming soon)**

About DataCite

About DataCite



Global non-profit membership organization working with 2800+ repositories in the world to provide DOIs for research outputs and resources.

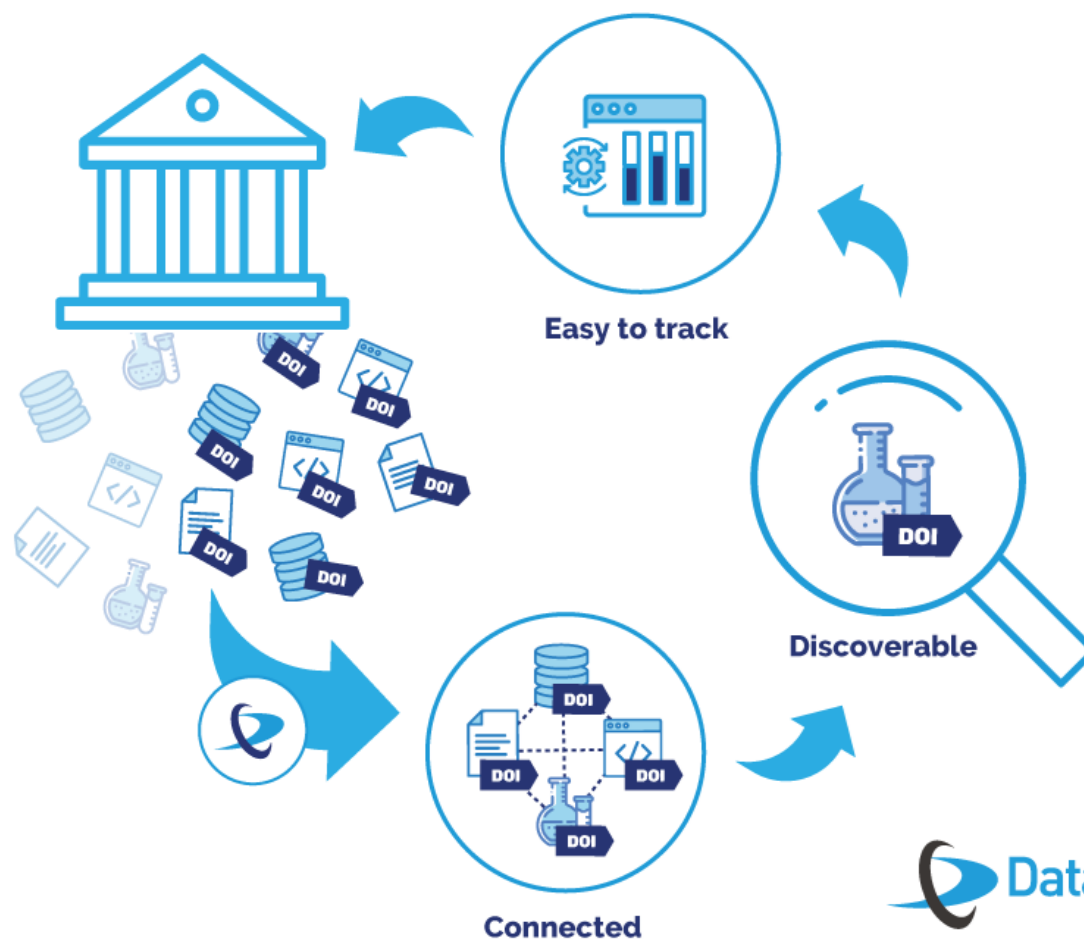
We are a global community that share a common interest: to ensure that research outputs and resources are openly available and connected so that their reuse can advance knowledge across and between disciplines, now and in the future.

**Connecting research,
identifying knowledge**

How do we connect research?

DOIs & metadata for a wide range of research outputs:

1. Research datasets and collections, associated workflows, software, images, models, samples, DMPs
2. Grey literature such as theses, dissertations, reports, unpublished conference papers, newsletters, preprint journal articles, technical standards, and specifications for which the institutional repository is the primary publication point.



Our value



Registering DataCite DOIs makes your research outputs discoverable.

- A DOI makes your research outputs uniquely identifiable.
- Metadata that you register with DataCite is in a central location, harvestable by anyone.
- Metadata for our Members' research outputs appear in other search engines.



DataCite services make it easy to follow best practices.

- We make research data management easy: you register your first DOI in less than 1 minute.
- DataCite DOIs and metadata help you make your research FAIR.
- We connect you to the DataCite Member community, which is full of passionate people who share experience and continue to support best practice.
- Our metadata schema is extensive and has been adopted by other PID service providers globally.



DataCite services help you track and report on your research.

- A DOI enables easy tracking of your research outputs through simple user interfaces.
- DataCite services make institutional reporting simple.
- DataCite services support data citation and usage analytics

Our community



2800+

Repositories



280+

Members



50

Countries



47m+

DOIs



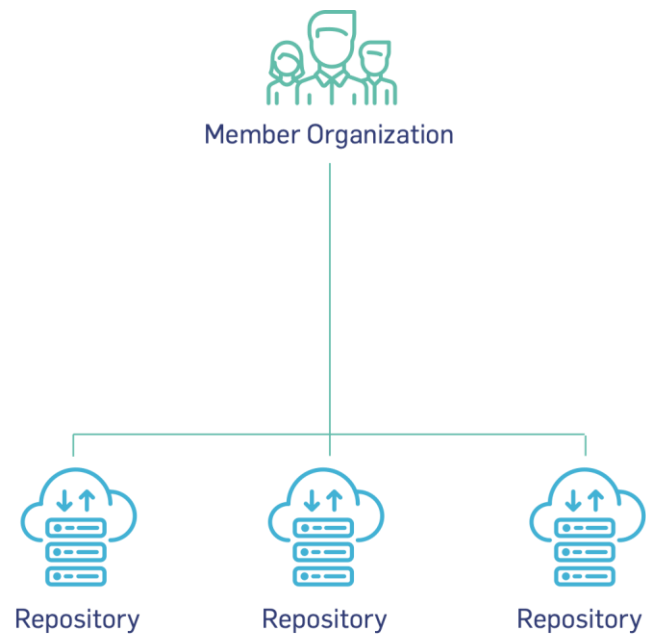
1300+

Organizations

DataCite Membership



Direct Membership



Consortium Membership



Create and Manage DOIs



DataCite membership allows you to create and manage DOIs for all of your repositories. You can do this through:

- Our primary REST API that supports JSON and enables automated DOI registration
- Our manual interface that enables you to register DOIs in less than a minute.
- Registered DataCite Service providers that provide a platform where you can register DOIs.



Services

We sustain open infrastructure services to ensure that research outputs and resources are easily findable, accessible, interoperable, and reusable (FAIR).

	Create DOIs	Integrate Workflows	Enable Discovery	Promote Reuse
Why?	Make research outputs and resources discoverable and citable for the long term	Enhance research workflows and services through integration	Enable discovery of research outputs and resources and reporting with advanced tools and analytics	Promote reuse with flexible, state-of-the art tools and technology
What?	<ul style="list-style-type: none">• DOI & metadata management services• Link checker	<ul style="list-style-type: none">• APIs to automate system integration• Usage tracker	<ul style="list-style-type: none">• Metrics & relational metadata files• Search & analytics dashboards• Data Citation Corpus	<ul style="list-style-type: none">• Content negotiation & citation formatter• ORCID auto updates & claiming
How?	Register DOIs and provide rich metadata in standardized formats	Automate DOI registration and/or retrieve relevant metadata through system integration	Make outputs resolvable and discoverable through metadata including connections between outputs/resources and other entities	Enable reuse through good citation practices and embedding DOIs in scholarly infrastructure workflows

PIDs are an integral piece in solving the FAIR puzzle

PID

<https://doi.org/10.5438/cxe5-rg55>

Resolve service

Prefix
(assigning body)

Suffix
(resource)

METADATA

IDENTIFIER

URL/LANDING PAGE

TITLE

CREATOR

PUBLISHER

RESOURCE TYPE

ENRICH WITH OPTIONAL
METADATA



- (meta)data are assigned a globally unique and persistent identifier



- (meta)data are retrievable via an identifier using a standardized protocol
- metadata are accessible, even when the data are no longer available



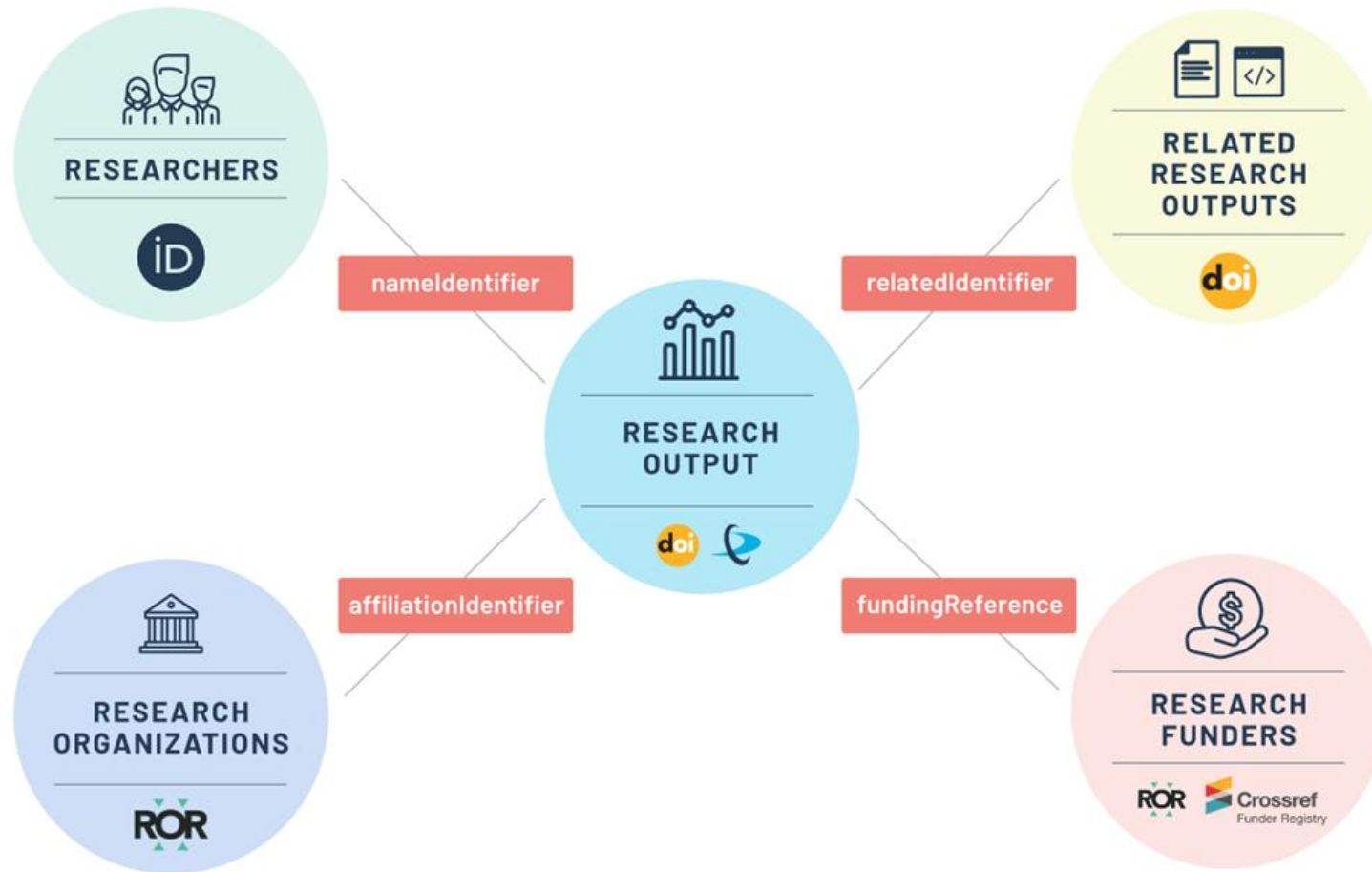
- (meta)data use a formal, accessible, shared, and broadly applicable language knowledge representation.
- (meta)data include qualified references to other (meta)data



- meta(data) are described with a plurality of accurate & relevant attributes
- (meta)data are associated with detailed provenance

DataCite Connection Metadata

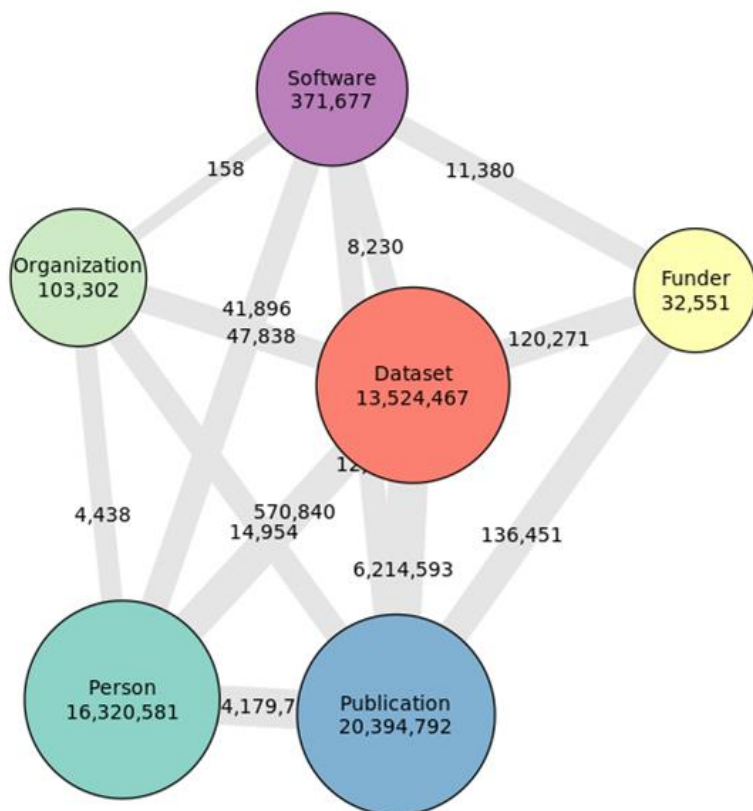
Connect DataCite DOIs to every part of research ecosystem



Connected PIDs

PID Graph

Number of nodes and connections (7 March 2023)

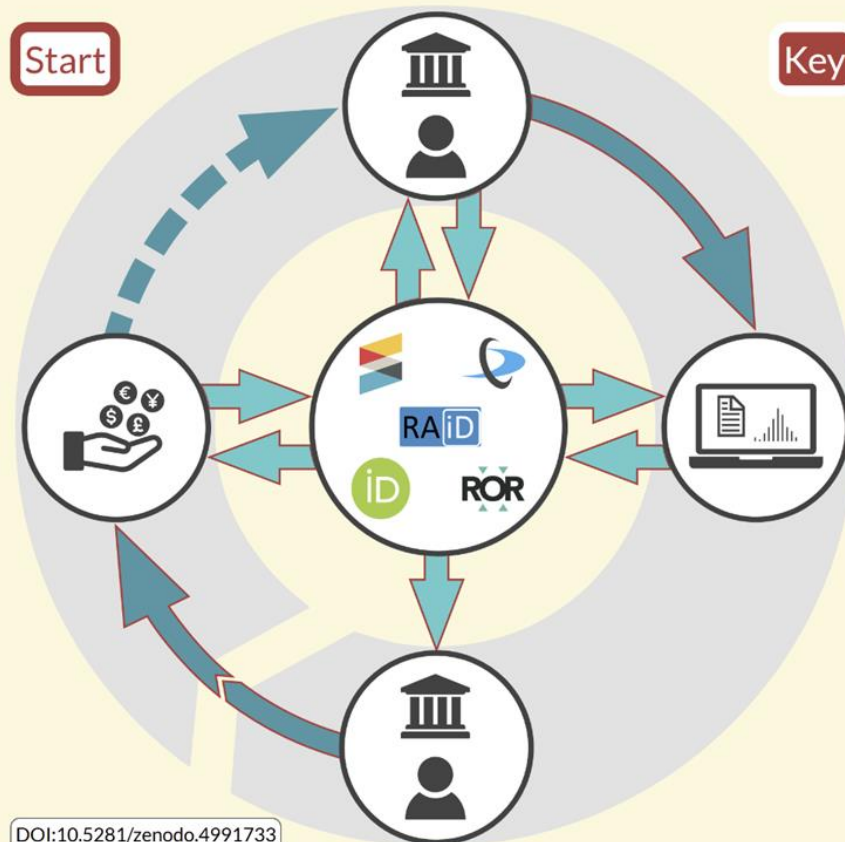


PIDs in the research life cycle

The PID optimised research cycle

MOREBRAINS

The PID-optimised research cycle



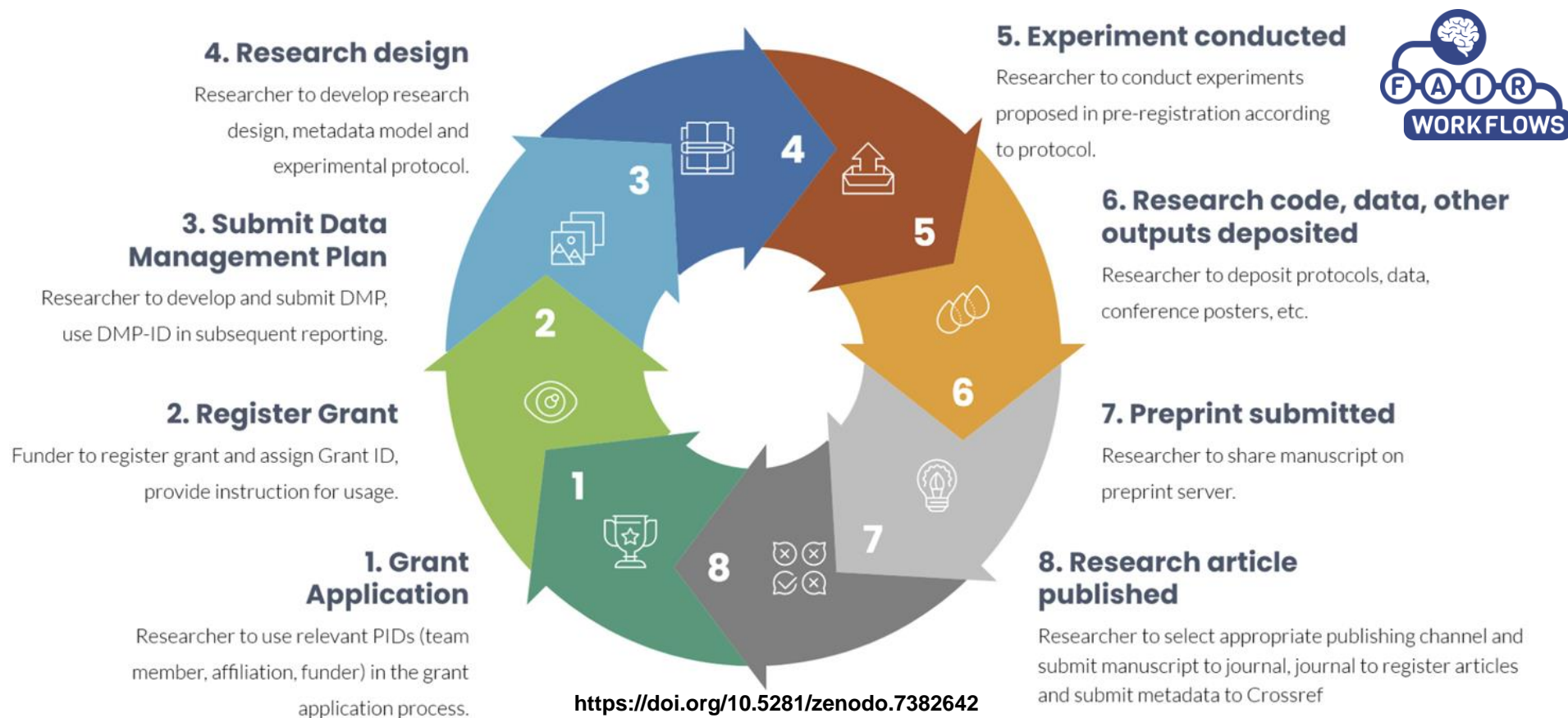
Actors and entities

- = Funding organisations
- = Research-performing organisations
- = Research contributors
- = Research output platforms/publishers (articles, data, algorithms, etc)

Priority PIDs and registries

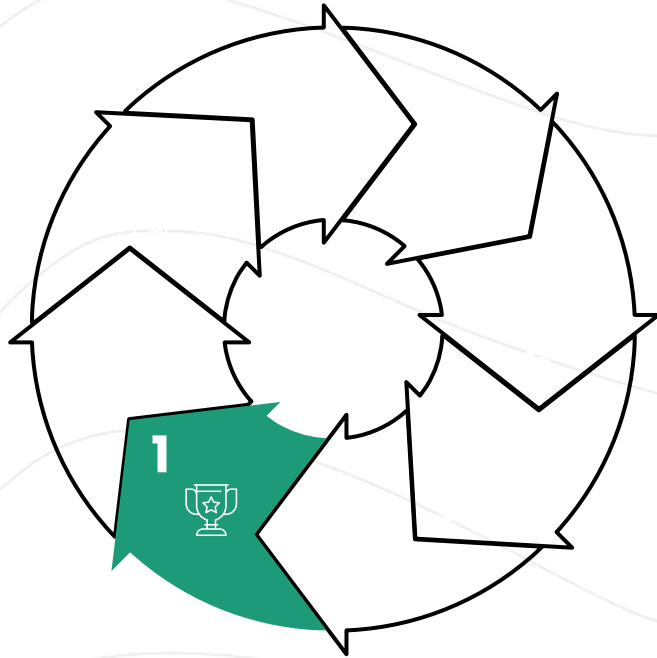
- = Crossref
- = Datacite
- = ORCID
- = Digital Object Identifier (DOI)
- = Research Activity Identifier (RAiD)
- = Research Organisation Registry (ROR)

Actions to take in the research process



Key activities

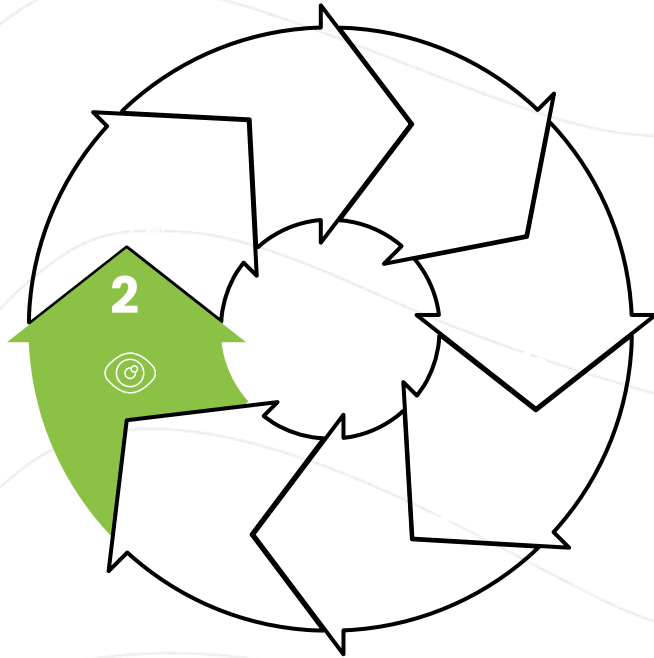
Grant Application



Researchers to obtain an ORCID and use their ORCID iDs during the application process (and subsequent research process).

Researchers to include the ROR ID of their affiliated institute/organization during the application process.

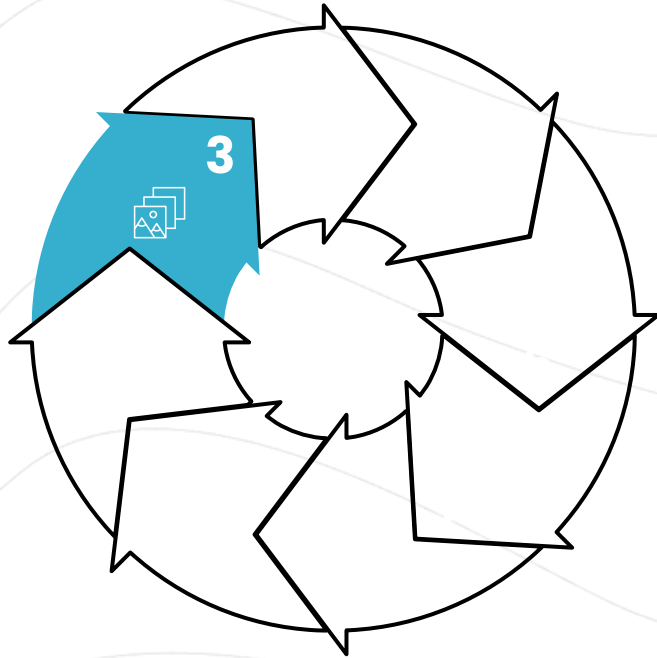
Registering Grant



Funder to use an organization PID to self-identify.

Funder to assign Grant ID once the grant is awarded, and to provide the Grant ID to the awardees and instruction for the application of Grant ID in reportable outputs.

Data Management Planning

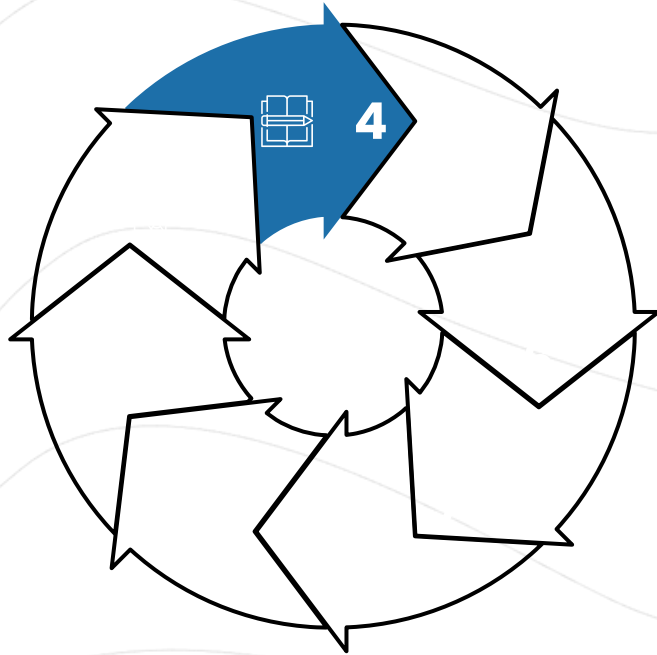


Researcher to develop and share DMP and register a DMP-ID.

Researcher to associate outputs with the DMP.

Researcher or research administrator to consider registering project identifier (e.g. RAiD).

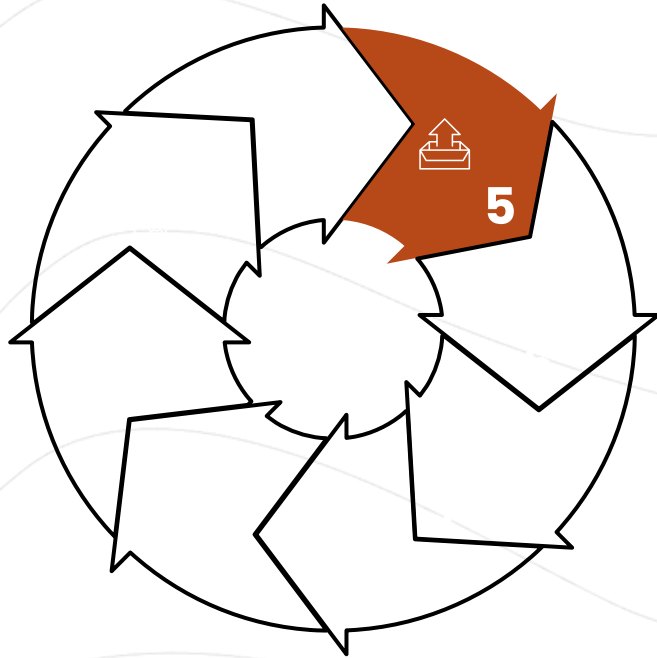
Research design



Researcher to consider submitting a registered report or preregistration to a platform that registers DOIs.

Researcher to create rich metadata for research activities by keeping metadata records and using connection metadata.

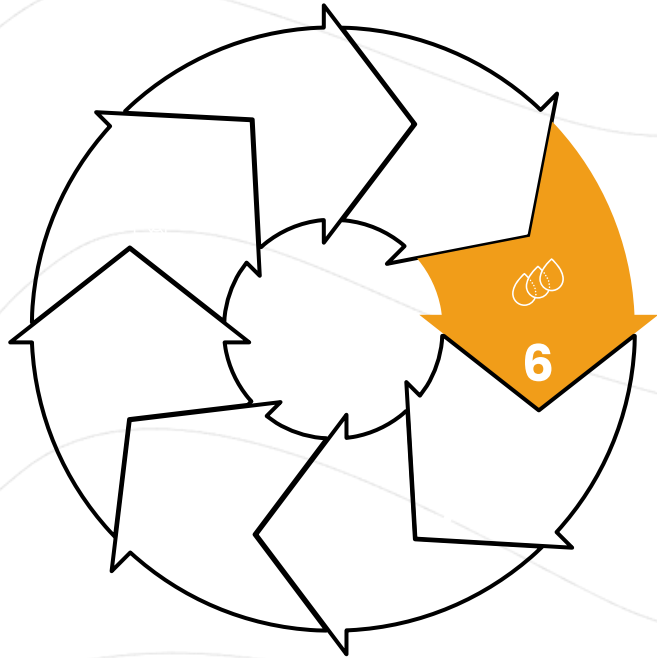
Conducting experiments



Researcher to build experimental protocols, making new protocols publicly available or reusing existing protocols connected through metadata.

Researcher to publicly communicate the progress and interim outputs on platforms registering PIDs.

Deposition of code, data, and other outputs

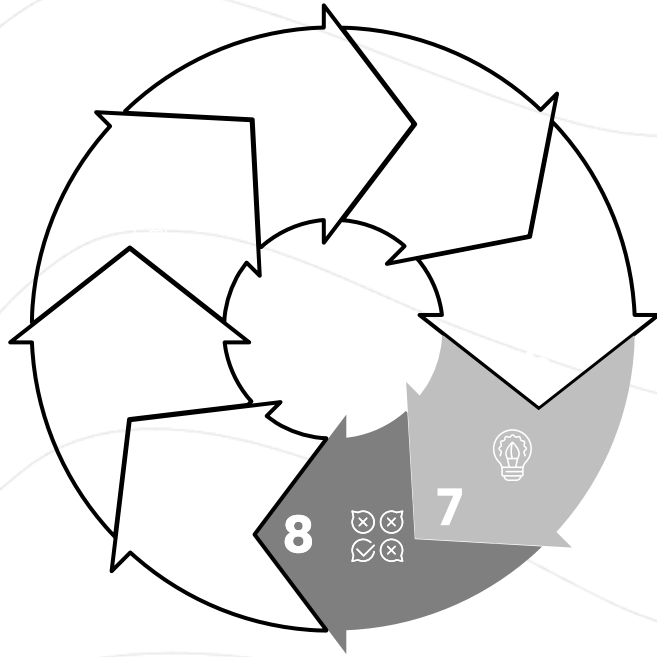


Researcher to prepare and share dataset with PIDs and metadata.

Researcher to prepare and share data analysis scripts/software with PIDs and metadata.

Researcher to connect these to the grant/project/DMP

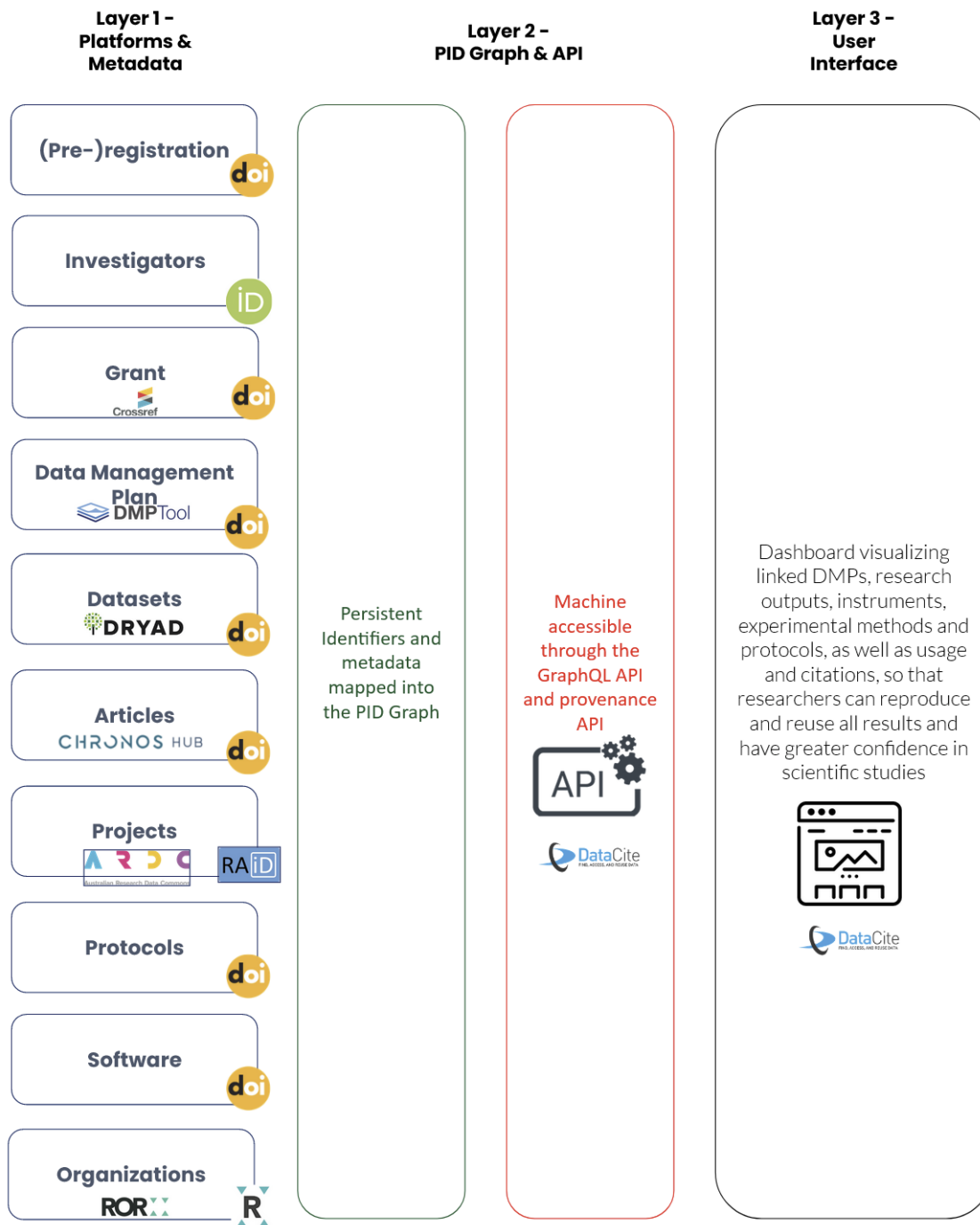
Preprint submission and article publication



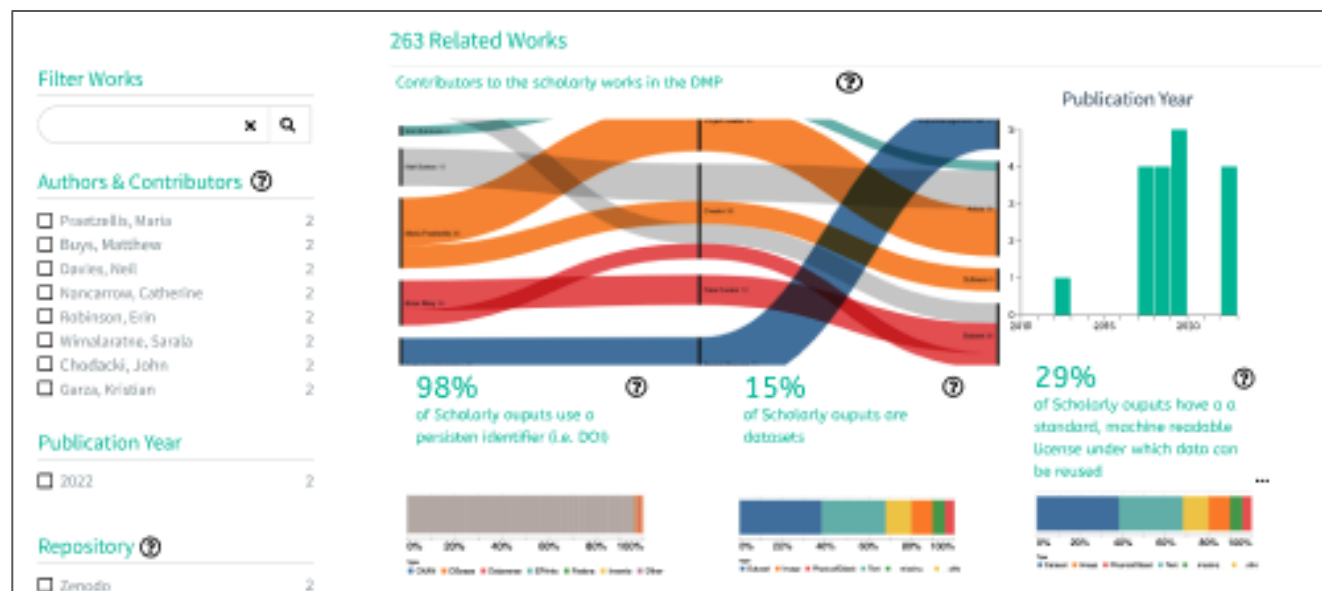
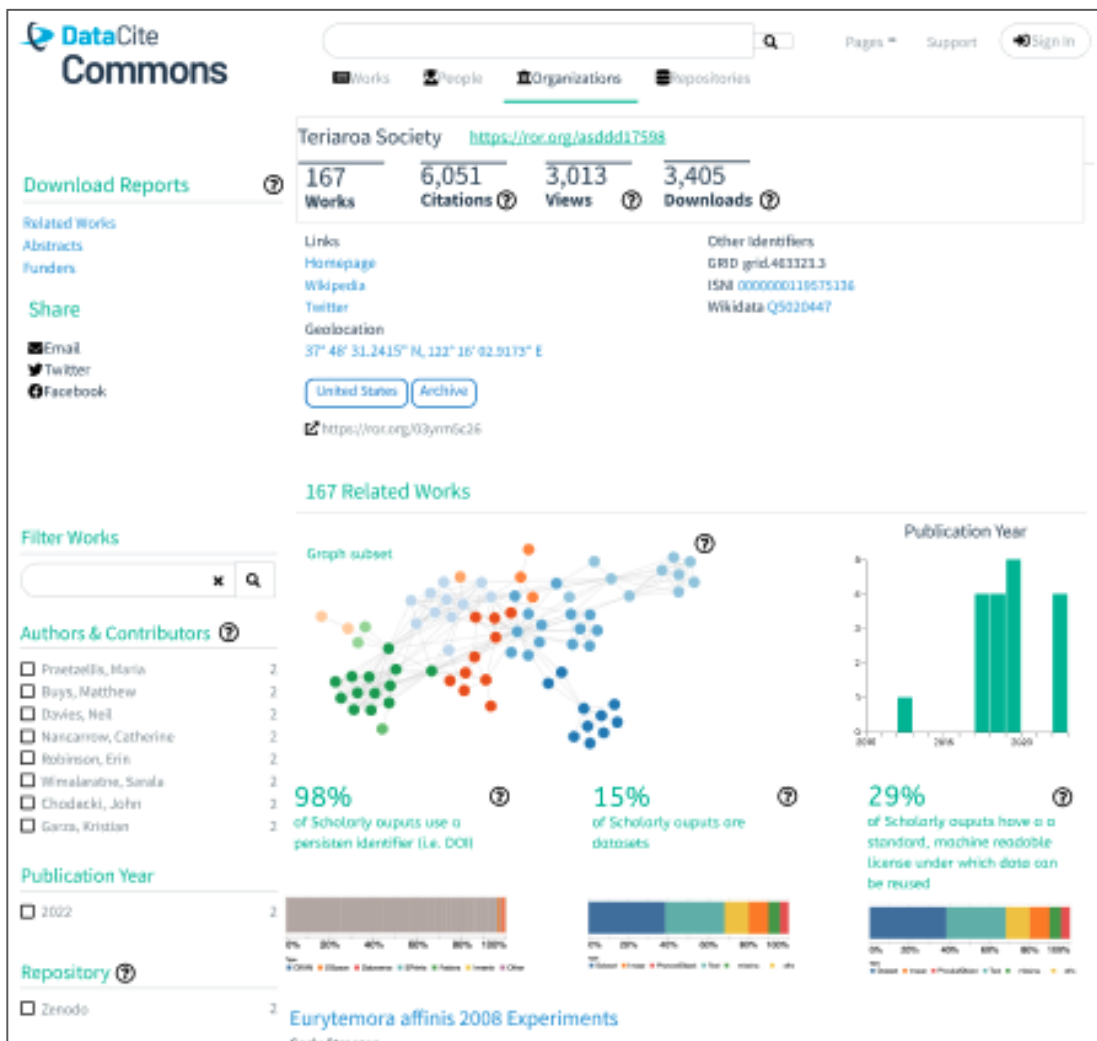
Researcher to submit the manuscript to a preprint server.

Researcher to submit the manuscript to a journal.

Journal/preprint server to register DOIs and make connection metadata available.



Connected research

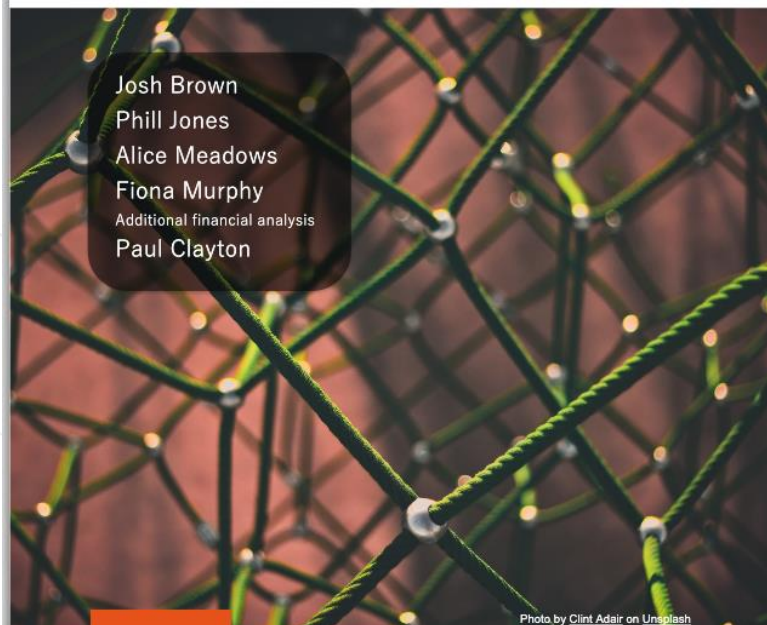


International approaches to PIDs Implementation

PID cost-benefits analysis focus on metadata reuse, automation, aggregation and analysis

UK PID Consortium Cost-Benefit Analysis

21st June 2021



Jisc

MOREBRAIN

DOI 10.5281/zenodo.4772627



MOREBRAIN

Incentives to Invest in Identifiers

A cost-benefit analysis of persistent identifiers in
Australian research systems

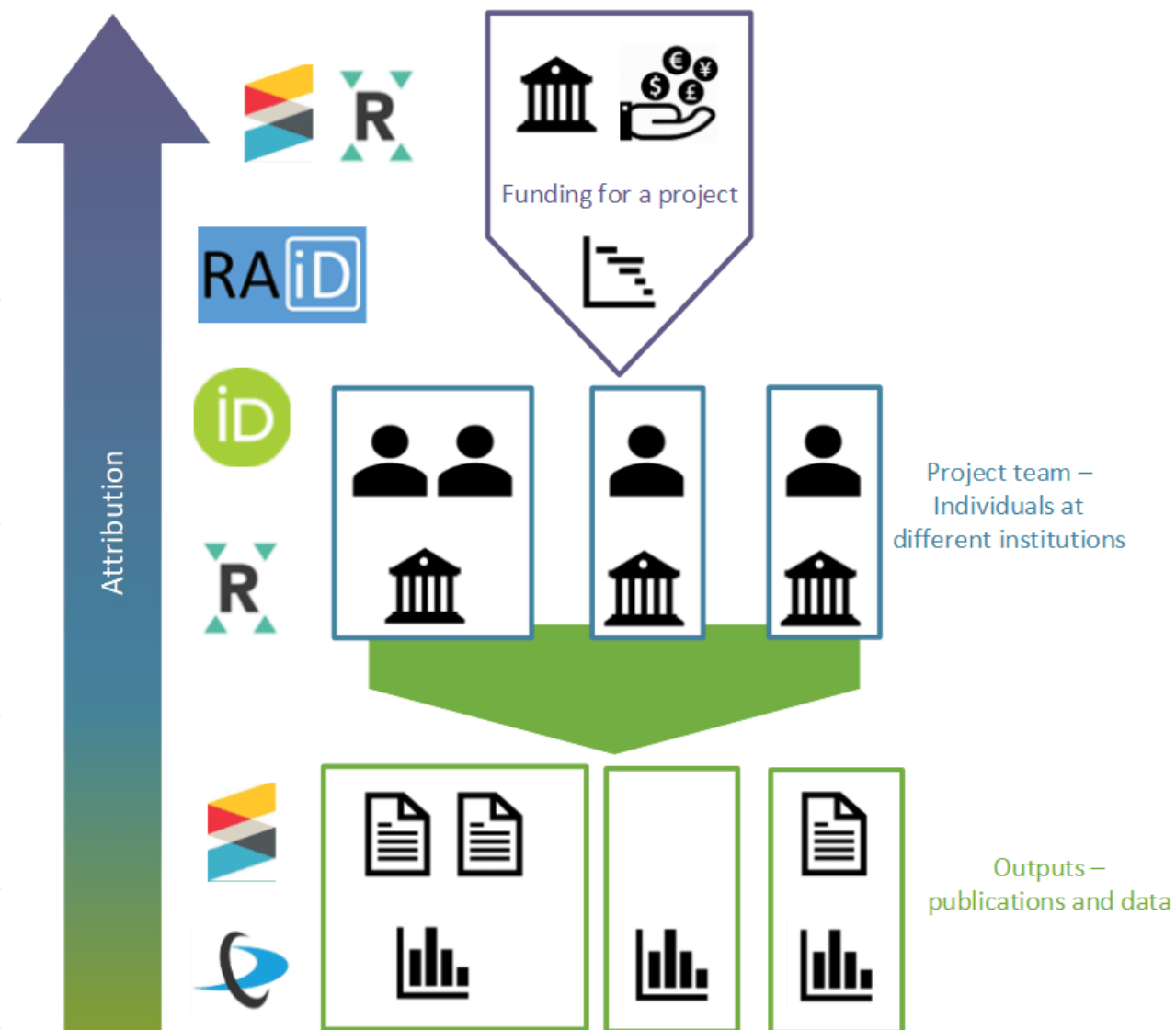


Sources:

Brown, Josh, Jones, Phill, Meadows, Alice, Murphy, Fiona, & Clayton, Paul. (2021). UK PID Consortium: Cost-Benefit Analysis (1.0). Zenodo. <https://doi.org/10.5281/zenodo.4772627>

Brown, Josh, Jones, Phill, Meadows, Alice, & Murphy, Fiona. (2022). Incentives to invest in identifiers: A cost-benefit analysis of persistent identifiers in Australian research systems. Zenodo. <https://doi.org/10.5281/zenodo.7100578>

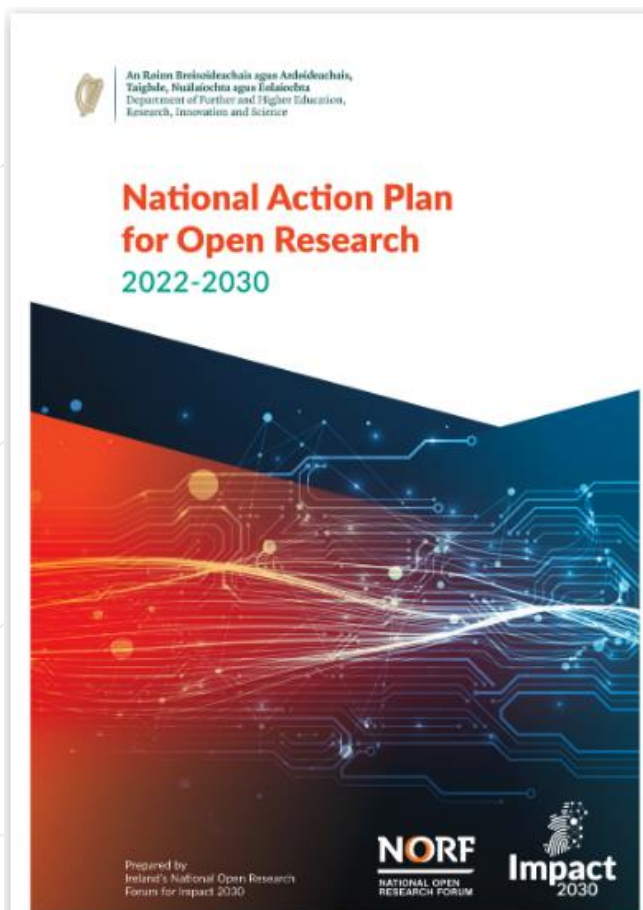
PID National strategy in the UK



Wie geht es weiter? PID Network Deutschland!



Alignment with the National Action Plan for Open Research: the Irish case



Action	Description	Key stakeholders	Timeline
A4.4 Invest in Persistent Identifier infrastructure to enable consistent monitoring and improve interoperability.	A4.4.1 Support the Irish ORCID Consortium and encourage further development and adoption of ORCID according to international best practice by researchers and within the systems and processes of publishers, research performing organisations, research funding organisations, and infrastructures. ³⁴	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	Ongoing
	A4.4.2 Develop a national roadmap for the adoption of a range of Persistent Identifiers according to international best practice, such as ORCID, DOIs, RAIDs and ROR identifiers. Implement this roadmap to consolidate national coordination and accelerate the uptake and integration of priority identifiers.	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	2023-27

Alignment with the National Action Plan for Open Science: the Italian case



**PIANO NAZIONALE PER LA
SCIENZA APERTA**

- green,
- f. favorire il pieno utilizzo di ORCID-ID per ogni ricercatore, nelle sue funzionalità di abilitare e connettere servizi, anche legati alle citazioni;

ENG: encourage the full use of ORCID-ID for each researcher, in its functionality of enabling and connecting services, including citation-related services;

NATIONAL SCIENCE AND TECHNOLOGY COUNCIL



GUIDANCE FOR IMPLEMENTING NATIONAL SECURITY PRESIDENTIAL MEMORANDUM 33 (NSPM-33) ON NATIONAL SECURITY STRATEGY FOR UNITED STATES GOVERNMENT-SUPPORTED RESEARCH AND DEVELOPMENT

A Report by the
Subcommittee on Research Security
Joint Committee on the Research Environment

January 2022

GUIDANCE FOR IMPLEMENTING NATIONAL SECURITY PRESIDENTIAL MEMORANDUM 33 (NSPM-33) ON NATIONAL SECURITY STRATEGY FOR UNITED STATES GOVERNMENT-SUPPORTED RESEARCH AND DEVELOPMENT

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**UK Research
and Innovation**

UKRI Open Access Policy

Contents:

Policy scope

Requirements for research articles

Requirements for long-form publications

Monitoring and compliance

Funding and policy implementation

Further information

Annex 1: Additional information on policy definitions and scope

Annex 2: Technical requirements for research articles

Glossary

Version Control

Technical requirements for journals and publishing platforms

4. To be considered compliant with UKRI's open access requirements, research articles and conference proceedings with an ISSN made available via journals and publishing platforms are required to meet the following technical requirements:
 - a. Persistent Identifiers (PIDs) for articles must be implemented according to international recognised standards, examples of international standards include Digital Object Identifiers (DOI), Uniform Resource Name (URN) or Handle
 - b. article-level metadata must be used according to a defined application profile that supports the UKRI Open Access Policy and is available, if possible, via a Creative Commons public domain dedication (CC0); the metadata standard must adhere to international best practice such as the Crossref schema and OpenAIRE guidelines
 - c. machine-readable information on the open access status and the licence must be embedded in the article metadata in a standard non-proprietary format
 - d. long-term preservation must be supported via a robust preservation programme such as CLOCKSS, Portico or an equivalent
 - e. openly accessible data on citations must be made available according to the standards set out by the Initiative for Open Citations (I4OC)
 - f. self-archiving policies must be registered in the SHERPA RoMEO database
 - g. common unique PIDs for research management information (for example identifiers for funders and/or organisations) are strongly encouraged; ORCID, the researcher identifier must be supported.



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AP 6 Persistent Identifiers

Institutional Model Policy for the Registration of Digital Object Identifiers (DOIs)

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March 2019



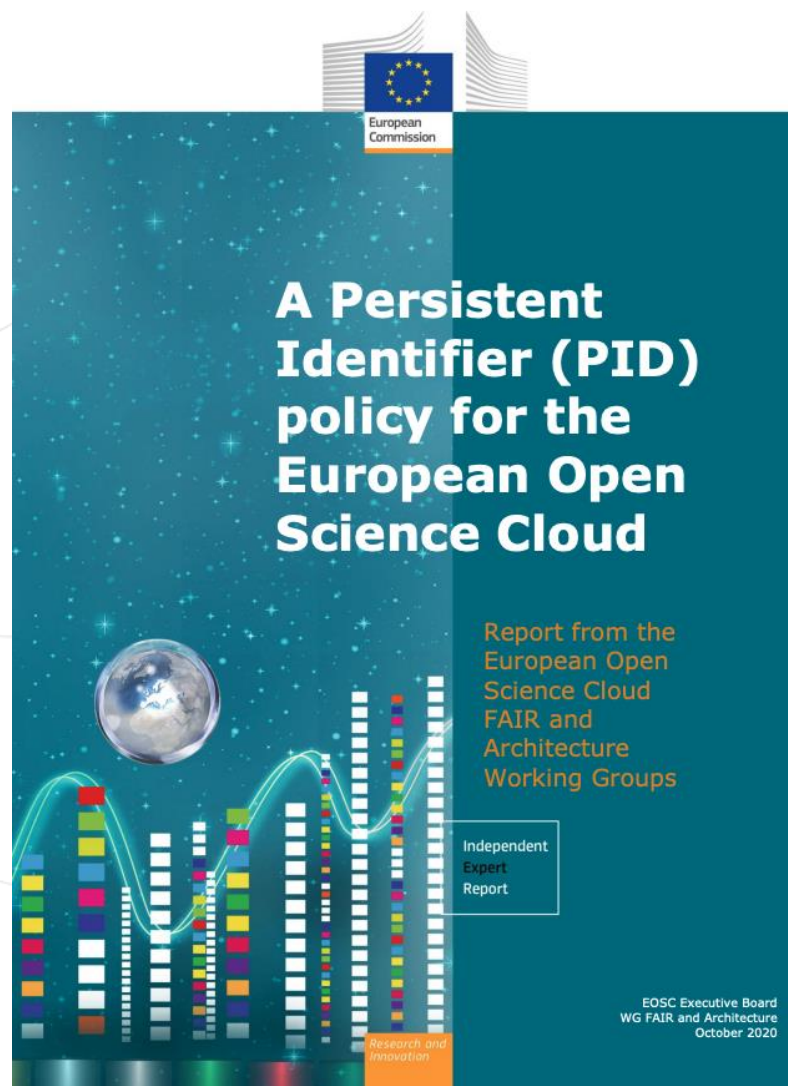
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[DOI 10.25651/1.2019.0002](https://doi.org/10.25651/1.2019.0002)

About E-Infrastructures Austria Plus

The project "e-Infrastructures Austria Plus" (2017-2019) is a project of nine Austrian universities funded by the Austrian Federal Ministry of Education, Science and Research (<https://bildung.bmbwf.gv.at/>). The aim of the project is the coordinated development of an Austrian network for the establishment and further development of common e-Infrastructures by bundling resources and existing knowledge.

Source: <https://doi.org/10.25651/1.2019.0002>



Thank you very much Děkujeme mnohokrát

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Co-funded by
the European Union

