



FAIR principles

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▶ Training challenges

- ▶ Complex topic
- ▶ Terminology
 - ▶ metadata standards, communication protocols, ontologies, etc.
- ▶ Misconceptions
- ▶ Steep learning curve
- ▶ If it's not mandatory, can be difficult to persuade researchers to adhere to FAIR principles
 - ▶ Lack of incentives for extra work

FAIR principles

The FAIR principles describe how research outputs should be organised so they can be exchanged and reused

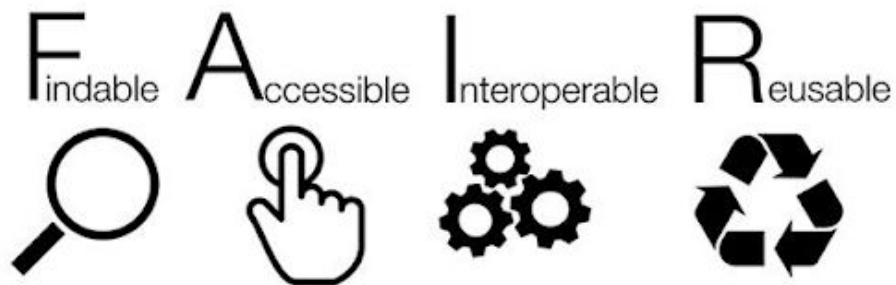


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Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>

Funder requirements

[Horizon Europe](#)

“responsible management of research data in line with the FAIR principles of ‘Findability’, ‘Accessibility’, ‘Interoperability’ and ‘Reusability’, notably through the generalised use of data management plans, and open access to research data under the principle ‘as open as possible, as closed as necessary’, under the conditions required by the grant agreement”;

[Bill & Melinda Gates Foundation](#)

“Grantees are encouraged to adhere to the FAIR principles to improve the findability, accessibility, interoperability, and reuse of digital assets”.

Why are FAIR principles needed?

“The increasing availability of online resources means that data need to be created with longevity in mind. Providing other researchers with access to your data facilitates knowledge discovery and improves research transparency.”

How to make your data FAIR, OpenAIRE

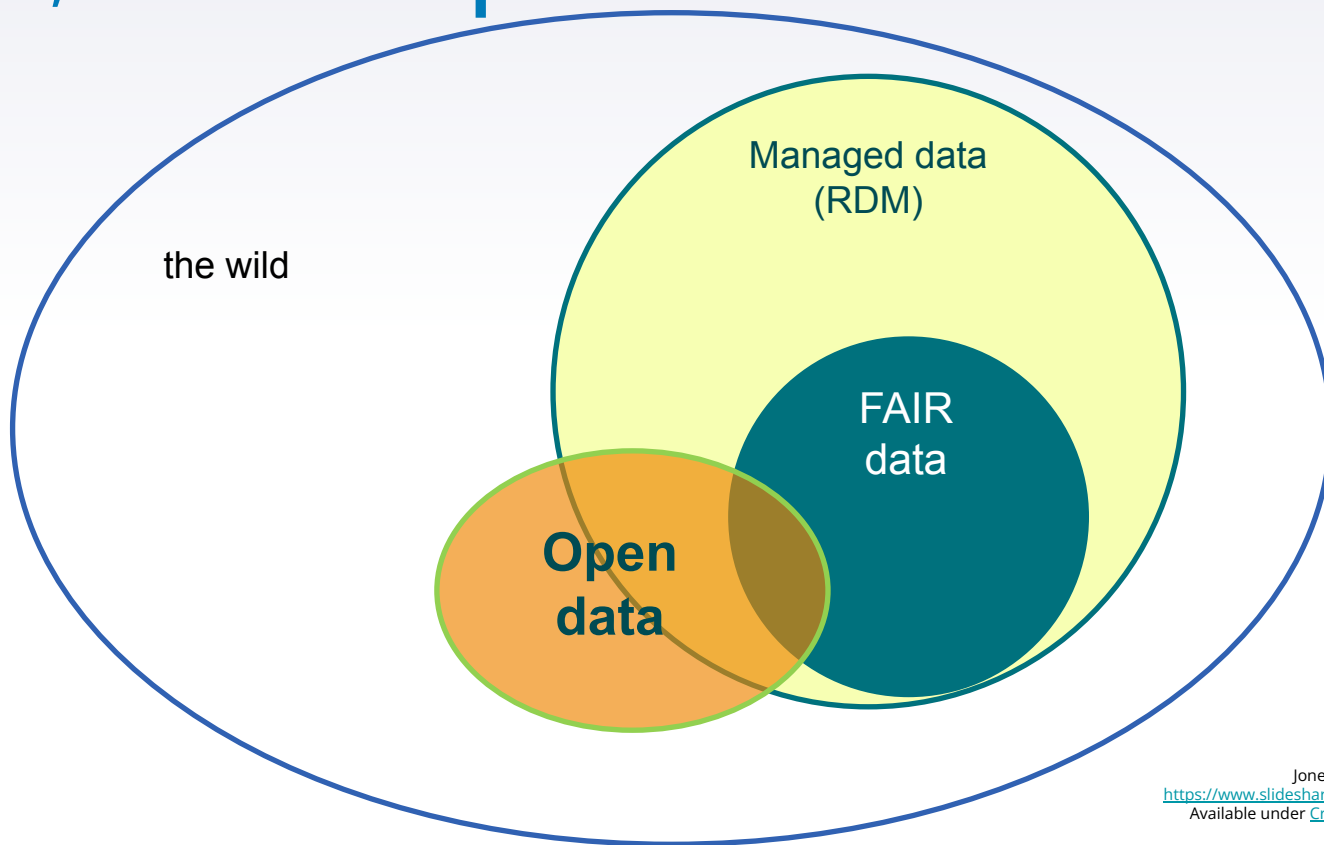
Humans increasingly rely on computational support from machines.

FAIR data enable to find, access, interoperate, and reuse of data with no or minimal human intervention.

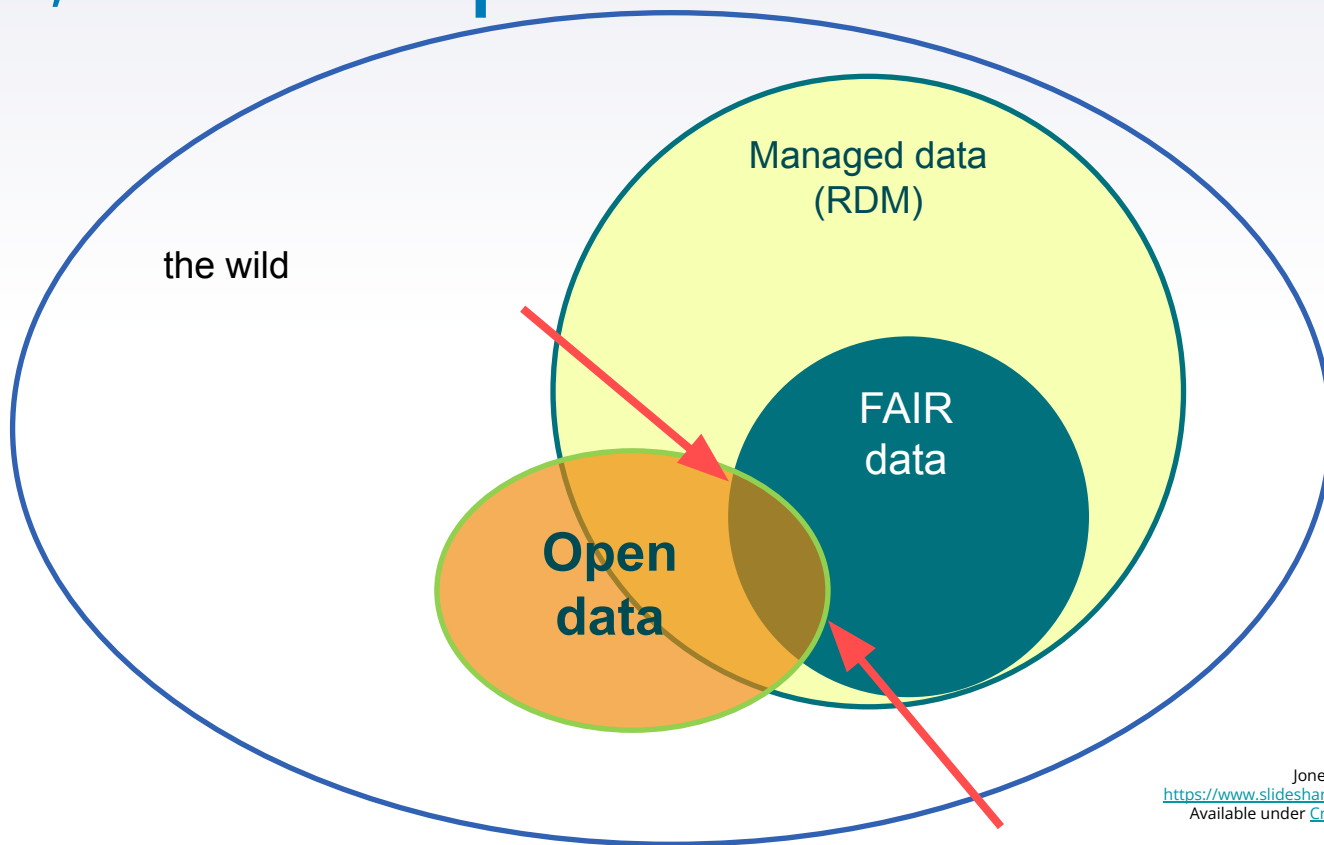


RDM, FAIR & Open Data

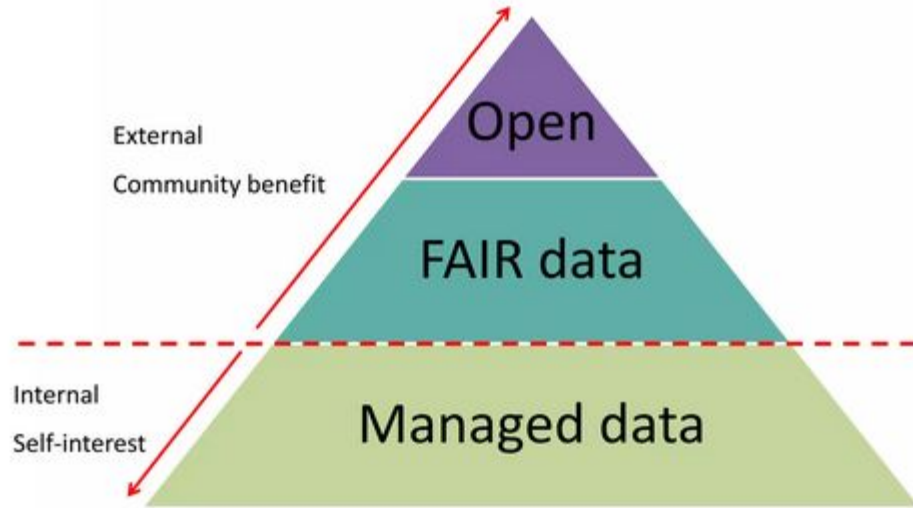
RDM, FAIR & Open data



RDM, FAIR & Open data



RDM, FAIR & Open data





Training tips

Findable

The first step in (re)using data is to find them.

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

F2. Data are described with rich metadata (defined by R1 below)

F3. Metadata clearly and explicitly include the identifier of the data they describe

F4. (Meta)data are registered or indexed in a searchable resource



Accessible

Users need to know how data can be accessed, possibly including authentication and authorisation.

A1. (Meta)data are retrievable by their identifier using a standardised communications protocol

A1.1 The protocol is open, free, and universally implementable

A1.2 The protocol allows for an authentication and authorisation procedure, where necessary

A2. Metadata are accessible, even when the data are no longer available



Interoperable

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

11. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
12. (Meta)data use vocabularies that follow FAIR principles
13. (Meta)data include qualified references to other (meta)data

Photo by [Bruno Figueiredo](#) on [Unsplash](#)



Reusable

To reuse data, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

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

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Training: FAIR assessment

Ask researchers to bring their own data, or use existing.

FAIR assessment tools:

- ▶ F-UJI by FAIRsFAIR
- ▶ ARDC FAIR Assessment tool
- ▶ SATYFID by DANS
 - ▶ (Self-Assessment Tool to Improve the FAIRness of Your Dataset)
- ▶ How FAIR are your data? EUDAT (Zenodo)

RDA FAIR data maturity model

The RDA FAIR Data Maturity Model Working Group develops as an RDA Recommendation a common set of core assessment criteria for FAIRness and a generic and expandable self-assessment model for measuring the maturity level of a dataset. The aim is not to develop yet another FAIR assessment approach but to build on existing initiatives, looking at common elements and allowing the group to identify core elements for the evaluation of FAIRness.

FAIR – not just for (meta)data

Barker, M., Chue Hong, N.P., Katz, D.S. et al. Introducing the FAIR Principles for research software. Sci Data 9, 622 (2022). <https://doi.org/10.1038/s41597-022-01710-x>

Garcia, L., Batut, B., Burke, M. L., Kuzak, M., Psomopoulos, F., Arcila, R., Attwood, T. K., Beard, N., Carvalho-Silva, D., Dimopoulos, A. C., Del Angel, V. D., Dumontier, M., Gurwitz, K. T., Krause, R., McQuilton, P., Le Pera, L., Morgan, S. L., Rauste, P., Via, A., Kahlem, P., ... Palagi, P. M. (2020). Ten simple rules for making training materials FAIR. PLoS computational biology, 16(5), e1007854. <https://doi.org/10.1371/journal.pcbi.1007854>

RDA IG – FAIR Principles for Research Hardware

<https://www.rd-alliance.org/groups/fair-principles-research-hardware>

FAIR *upgrades*



"[...] to make data FAIR whilst preserving them over time requires trustworthy digital repositories (TDRs) with sustainable governance and organizational frameworks, reliable infrastructure, and comprehensive policies supporting community-agreed practices."

Lin, D., Crabtree, J., Dillo, I. et al. The TRUST Principles for digital repositories. *Sci Data* 7, 144 (2020). <https://doi.org/10.1038/s41597-020-0486-7>

Transparency, **R**esponsibility, **U**ser focus, **S**ustainability, **T**echnology

<https://www.rd-alliance.org/rda-community-effort-trust-principles-digital-repositories>

FAIR *upgrades*

CARE principles

Collective benefit; **A**uthority to control; **R**esponsibility; **E**thics

CARE principles complement the existing FAIR principles encouraging open and other data movements to consider both (Indigenous) people and purpose in their advocacy and pursuits.

more on YouTube: <https://youtu.be/309QIZt9H74>

#BeFAIRandCARE

▶ Training tips

- ▶ FAIR is very important! It is the way to preserve data and make it findable and accessible for future reuse, and to align with funders requirements
- ▶ Explain terminology with examples
- ▶ Use real FAIR data in excercises and demonstrations
- ▶ Demonstrate FAIRness assessment
 - ▶ ask researchers to assess their data
- ▶ Present use cases

THANKS!

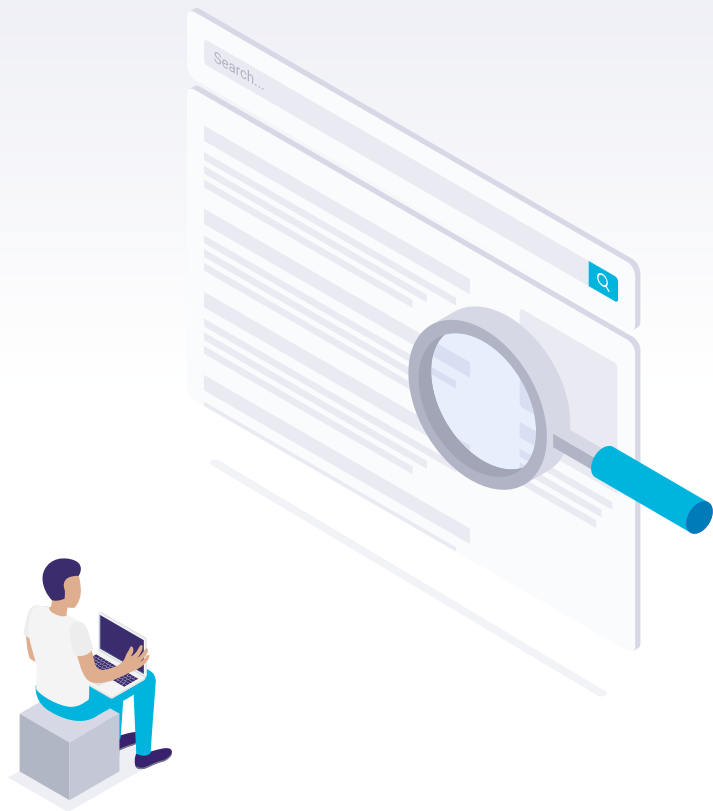
Any questions?

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