FAIRification is a Team Sport

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ELIXIR
Interoperability Platform ExCo

Professor of Data Readiness
Associate Director, Oxford e-Research Centre

Founding
Academic Editor

Group: datareadiness.eng.ox.ac.uk

elixir-europe.org

Nature.com/sdata
Discoveries are made using shared data and this requires data that are:

- Cited and stored to be discoverable
- Retrievable and structured in standard format(s)
- Richly described to be understandable

**Data preparation** accounts for about 80% of the work of data scientists

Use of data at scale by humans and machines

Comment: The FAIR Guiding Principles for scientific data management and stewardship

Globally unique and persistent identifiers

Detailed provenance

Community defined terminologies

Terms of access

Terms of use

Community defined descriptive metadata
FAIR has aligned the broad community around common guidelines.
FAIR Principles: a continuum of features, attributes and behaviours

Fairness does not mean everyone gets the same. Fairness means everyone gets what they need.

Rick Riordan
FAIRsharing.org

Recommended by national and international funders, e.g.:

FAIR cookbook

Horizon Europe (HORIZON)
Programme Guide
Version 1.2
04 October 2021

IMI2 project guidelines for open access to publications and research data
An informative and educational resource

It provides *curated, community-vetted descriptions* and *relationship graphs* of standards, databases and policies in *all disciplines*.
Promoting databases, standards, policies

Guides consumers to discover, select and use these resources with confidence.

Helps producers to make their resources more visible, more widely adopted and cited.
Detailed descriptions that help you decide what resource is right for your case

License

Standard(s)

Policy(s)

Life cycle status

Maintainer(s)

Database(s)

API

Record Status

DOI: 10.25504/FAIRsharing.m3jtpg
Show the relations between databases, standards, and policies
Visualize these relations to guide you
Help you search by subject

Classification is powered by our Subject Ontology of 436 terms

URL: fairsharing.org/browse/subject
URL: github.com/FAIRsharing/subject-ontology
Working with international communities to create subject-specific collections of the resources
FAIRsharing: working with and for all stakeholders

Users, adopters and collaborators include:

Researchers
Developers and curators
Journal publishers
Librarians and Trainers
Societies and Alliances
Funders

An endorsed output of the FAIRsharing WG (since 2015):
A WG (since 2015) in:

A recommended resource in EOSC reports

https://fairsharing.org/communities
### Current operational Team

- **Allyson Lister**, Content and Community Lead
- **Milo Thurston**, Technical Lead
- **Ramon Granell**, Data Enrichment & Quality Manager
- **Delphine Dauga**, Data Curator Manager
- **Hiring in progress**, Web Developer
- **Dominique Batista**, Research Software Engineer
- **Philippe Rocca-Serra**, Co-Founder
- **Susanna-Assunta Sansone**, PI and Founder
- *and many collaborators and contributors!*

### Executive Advisors

- **Varsha Khodiyar**, Independent expert
- **Chris Graf**, Springer Nature
- **David Carr**, Independent expert
- **Robert Hanisch**, Director, NIST Office of Data & Informatics
- **Peter McQuilton**, FAIRsharing Founding Member, GSK

### Stakeholder Advisors

- **Amye Kenall**, VP of Publishing and Product, Research Square
- **Adam Leary**, Oxford University Press
- **Catriona MacCallum**, Hindawi
- **Dagmar Meyer**, European Research Council, Executive Agency
- **Dominic Fripp**, JISC, UK
- **Emma Ganley**, Protocols.io
- **Geraldine Clement-Stoneham**, Medical Research Council
- **Helena Cousijn**, DataCite
- **Iain Hrynaszkiewicz**, PLoS
- **Imma Subirats**, FAO of the United Nations
- **Kiera McNiece**, Cambridge University Press
- **Luiz Olavo Bonino**, GO-FAIR
- **Marina Soares E Silva** and **Sarah Callaghan**, Elsevier
- **Michael Ball**, Biotechnology and Biological Sciences Research Council
- **Mike Huerta**, NIH National Library of Medicine
- **Molly Cranston** and **Guillaume Wright**, F1000Research
- **Nick Everitt** and **Matthew Cannon**, Taylor and Francis
- **Scott Edmunds**, GigaScience, Oxford University Press
- **Simon Hodson**, CODATA
- **Theo Bloom**, British Medical Journal
- **Thomas Lemberger**, EMBO Press
- **Wei-Mun Chan**, eLife
- **Sowmya Swaminathan**, Springer Nature
IMI2 project guidelines for open access to publications and research data

Recommended by national and international funders, e.g.:
A ‘live’ collection of recipes to help achieve FAIR data management

1. Learn how to improve the FAIRness with **exemplar datasets**
2. Understand the levels and **indicators** of FAIRness
3. Discover **open source** technologies, tools and services
4. Find out the required **skills**
5. Acknowledge the **challenges**

[faircookbook.elixir-europe.org](http://faircookbook.elixir-europe.org)
Recipes that cover all aspects of FAIRness

Over 70 recipes (May 2022) released and many more in progress!
Examples in the life sciences, including omics, pre-clinical and clinical areas
But not limited to it!
Anatomy of a recipe

Ingredients
An idea of tools/skills needed

<table>
<thead>
<tr>
<th>Tool Name</th>
<th>Tool Location</th>
<th>Tool function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROBOT</td>
<td><a href="http://robot.obibrary.org/">http://robot.obibrary.org/</a></td>
<td>ontology management cli</td>
</tr>
</tbody>
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Step by step process
Guidelines, process, description

References
What should I read next?

Practical elements, code snippets

```python
#Python3
#zooma-annotator-script.py

def get_annotations(propertyType , propertyValues, filters = ""): 
```

Examples

7.12.1. Competency questions for the Ontology ROBOT use case
7.12.2. Application ontology for metabolomics
Citability of the recipes and credit to the authors

Unique, persistent identifiers

- Recipe Overview
- Unique, persistent identifiers
- Recipe Type: Background information
- Audience: Principal Investigator, Data Manager, Data Scientist
- Maturity Level & Indicator: [F+MM-1.1C] [F+MM-1.2C]

Cite me with FC8006

iD ORCID

CreDiT attribution ontology

<table>
<thead>
<tr>
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<th>ORCID</th>
<th>Affiliation</th>
<th>Type</th>
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<tr>
<td>Andrea Splendidzi</td>
<td></td>
<td>Novartis AG</td>
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<td>Alasdair J G Grey</td>
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Maturity level and indicators of FAIRness

We are working to tag the recipes with a ‘dataset maturity model’

It show the level of FAIRness you can reach by applying a specific recipe to improve a dataset

https://fairplus.github.io/Data-Maturity
FAIR Cookbook: turning knowledge into recipes

Almost 100 life sciences professionals, researchers and data managers

FAIR+ partners
Industry + Academia

ELIXIR Nodes
represented
<table>
<thead>
<tr>
<th>The roadmap, your steps</th>
<th>For everyone</th>
<th>adopt it</th>
</tr>
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<tbody>
<tr>
<td><strong>use it</strong></td>
<td><strong>leverage it</strong></td>
<td></td>
</tr>
<tr>
<td>Start using the FAIR Cookbook</td>
<td>Contribute according to your needs</td>
<td>Recommend it in your guidance and training material</td>
</tr>
<tr>
<td>Help us to help you, this is a user-oriented resource</td>
<td>Create and review, or signpost gaps and needs</td>
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<td>Join a network of FAIR experts</td>
<td>join it</td>
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<tr>
<td>Share and broaden your expertise, joining our journey</td>
<td>Benefit from the power of the FAIR community</td>
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<td>Be a recognised expert, enlarge your network</td>
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FAIRification is a team sport, it takes a village, but it is no longer optional. Because better data means better science!