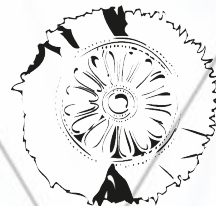


# FAIR Research Software Challenges and Opportunities

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eosc | EVERSE



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## The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson, Michel Dumontier, [...] Barend Mons

*Scientific Data* **3**, Article number: 160018 (2016) | [Cite this article](#)

194k Accesses | 2450 Citations | 1852 Altmetric | [Metrics](#)

The Turing Way Community, & Scriberia. (2024). Illustrations from The Turing Way  
<https://doi.org/10.5281/zenodo.10556824>

# FAIR for non-data objects: some context

- FAIR Principles, at a high level, are intended to **apply to all research objects**; both those used in research and those that are research outputs
- Text in principles often includes "(Meta)data ..."
  - Shorthand for "metadata and data ..."
- Principles applied via dataset creators and repositories, collectively responsible for creating, annotating, indexing, preserving, sharing the datasets and their metadata
- What about non-data objects?
  - While they can often be stored as data, they are not **just** data
- While high level goals (F, A, I, R) are mostly the same, the details and how they are implemented depend on
  - How objects are created and used
  - How/where the objects are stored and shared
  - How/where metadata is stored and indexed
- Work needed to define, then implement, then adopt principles

Slide adapted from the [presentation](#) of the [RDA FAIR4RS](#) steering group at the International Funders Workshop (Nov 2022), <https://zenodo.org/doi/10.5281/zenodo.7350198>

# FAIR for non-data objects: an ongoing effort

## Introducing the FAIR Principles for research software

[Michelle Barker](#) , [Neil P. Chue Hong](#), [Daniel S. Katz](#), [Anna-Lena Lamprecht](#), [Carlos Martinez-Ortiz](#), [Fotis Psomopoulos](#), [Jennifer Harrow](#), [Leyla Jael Castro](#), [Morane Gruenpeter](#), [Paula Andrea Martinez](#) & [Tom Honeyman](#)

[Scientific Data](#) **9**, Article number: 622 (2022) | [Cite this article](#)

DOI: [10.15497/RDA00065](https://doi.org/10.15497/RDA00065)

**Citation and download:** Chue Hong, N. P., Katz, D. S., Barker, M., Lamprecht, A.-L., Martinez, C., Psomopoulos, F. E., Harrow, J., Castro, L. J., Gruenpeter, M., Martinez, P. A., Honeyman, T., et al. (2021). FAIR Principles for Research Software (FAIR4RS Principles). *Research Data Alliance*. DOI: [10.15497/RDA00065](https://doi.org/10.15497/RDA00065)

Breakout 7 Data Infrastructures - Organisa... The FAIR Agenda WGs Getting started

 WG FAIR for **Virtual** Research Environments: FAIR for VREs - The Path Forward

7:30 AM - 9:00 AM

Room E

January 01 2020

## FAIR Computational Workflows

[Carole Goble](#)  , [Sarah Cohen-Boulakia](#), [Stian Soiland-Reyes](#), [Daniel Garijo](#), [Yolanda Gil](#), [Michael R. Crusoe](#), [Kristian Peters](#), [Daniel Schober](#)

[Author and Article Information](#)

*Data Intelligence* (2020) 2 (1-2): 108–121.


[https://doi.org/10.1162/dint\\_a\\_00033](https://doi.org/10.1162/dint_a_00033)

## FAIR for AI: An interdisciplinary and international community building perspective

[E. A. Huerta](#) , [Ben Blaiszik](#), [L. Catherine Brinson](#), [Kristofer E. Bouchard](#), [Daniel Diaz](#), [Caterina Doglioni](#), [Javier M. Duarte](#), [Murali Emani](#), [Ian Foster](#), [Geoffrey Fox](#), [Philip Harris](#), [Lukas Heinrich](#), [Shantenu Jha](#), [Daniel S. Katz](#), [Volodymyr Kindratenko](#), [Christine R. Kirkpatrick](#), [Kati Lassila-Perini](#), [Ravi K. Madduri](#), [Mark S. Neubauer](#), [Fotis E. Psomopoulos](#), [Avik Roy](#), [Oliver Rübel](#), [Zhizhen Zhao](#) & [Ruike Zhu](#)

[Scientific Data](#) **10**, Article number: 487 (2023) | [Cite this article](#)

## Ten simple rules for making training materials FAIR

[Leyla Garcia](#), [Bérénice Batut](#), [Melissa L. Burke](#), [Mateusz Kuzak](#), [Fotis Psomopoulos](#), [Ricardo Arcila](#), [Teresa K. Attwood](#), [Niall Beard](#), [Denise Carvalho-Silva](#), [Alexandros C. Dimopoulos](#), [Victoria Dominguez del Angel](#), [Michel Dumontier](#), [Kim T. Gurwitz](#), [ ... ], [Patricia M. Palagi](#)  [ [view all](#) ]

Published: May 21, 2020 • <https://doi.org/10.1371/journal.pcbi.1007854>

# On the road to Define FAIR for Research Software

- Efforts to adapt and adopt the FAIR principles to research software (RDA FAIR4RS)

## Recommendation n° 2 :

Make sure the specific nature of software is recognized and not considered as “just data” particularly in the context of discussion about the notion of FAIR data.

**2019: the *Opportunity Note* by the French national Committee for Open Science's Free Software and Open Source Project Group**

*(Clément-Fontaine, 2019)*

## Recommendation n° 5 :

Recognise that FAIR guidelines will require translation for other digital objects and support such efforts.

**2020: ‘Six Recommendations for Implementation of FAIR Practice’**

*(FAIR Practice Task Force EOSC, 2020)*



# FAIR4RS Principles



- **Findable:** Software, and its associated metadata, is easy for both humans and machines to find.
- **Accessible:** Software, and its metadata, is retrievable via standardized protocols.
- **Interoperable:** *Software interoperates with other software by exchanging data and/or metadata, and/or through interaction via application programming interfaces (APIs), described through standards.*
- **Reusable:** *Software is both usable (can be executed) and reusable (can be understood, modified, built upon, or incorporated into other software).*

(key differences from FAIR data principles in *italics*)



Output of [the FAIR principles for research software](#) (FAIR4S) - joint Research Software Alliance (**ReSA**), Research Data Alliance (**RDA**), **FORCE11** Working Group/Task force

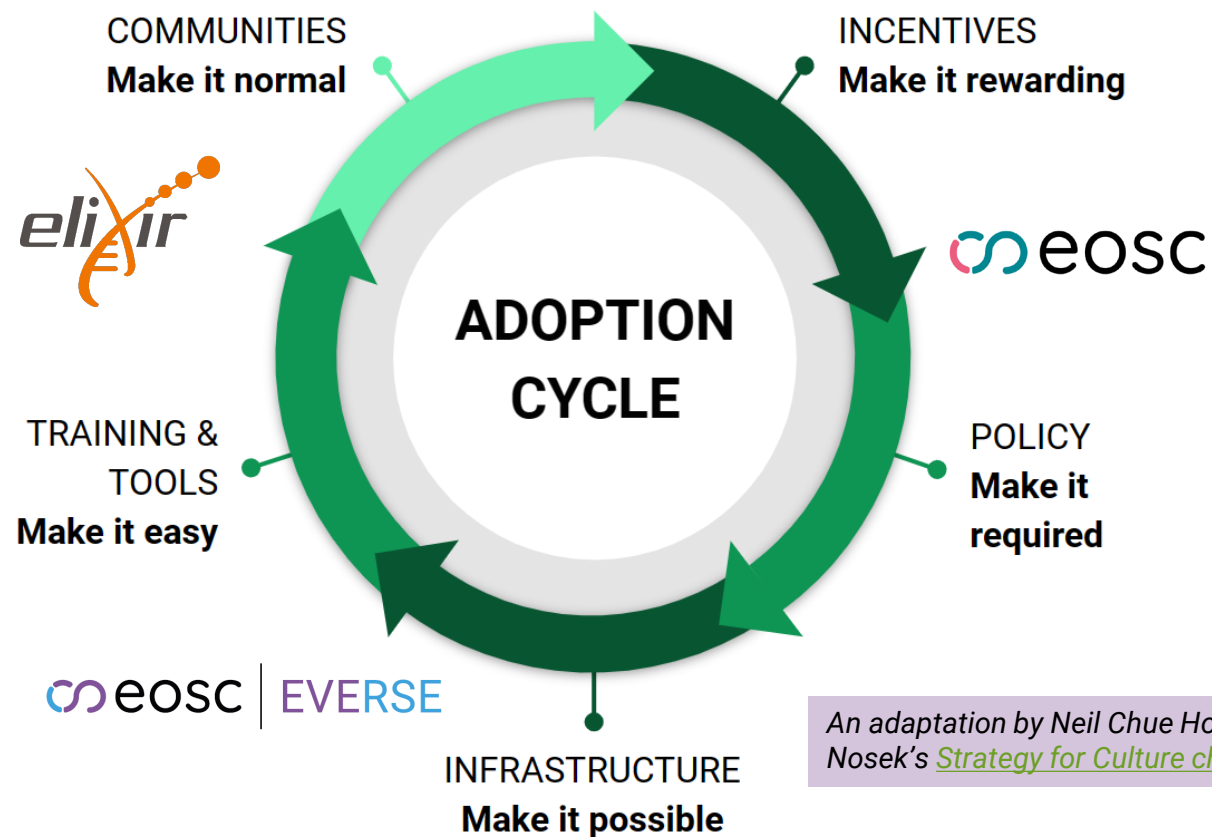
Slide adapted from the [presentation](#) of the [RDA FAIR4RS](#) steering group at the International Funders Workshop (Nov 2022), <https://zenodo.org/doi/10.5281/zenodo.7350198>

# Who is responsible for FAIR software?

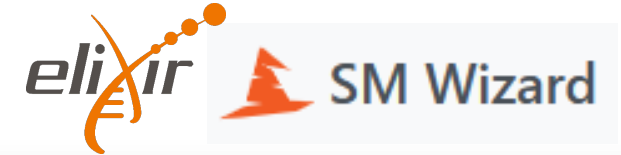
Who is expected to apply FAIR?

- The application of the FAIR4RS Principles is the responsibility of the **owners** (who are often the creators) of the software, not the users.
- The FAIR4RS Principles are also relevant to, and require support from, the **larger ecosystem** and various **stakeholders** that support research software (e.g., repositories and registries).

Slide adapted from the [presentation](https://zenodo.org/doi/10.5281/zenodo.7350198) of the [RDA FAIR4RS](https://zenodo.org/doi/10.5281/zenodo.7350198) steering group at the International Funders Workshop (Nov 2022), <https://zenodo.org/doi/10.5281/zenodo.7350198>



An adaptation by Neil Chue Hong of Nosek's [Strategy for Culture change](#)



# Managing (FAIR) Software

- helps to **implement best practices** during software development
- ensures that software is **accessible** and **reusable** in the short and longer term
- contributes to the **reproducibility** of results
- stimulates **collaborative** work on open-source software for research.

The screenshot shows the SM Wizard interface. On the left is a sidebar with a navigation menu: Dashboard, Knowledge Models, Document Templates, Projects, Documents, and Administration. The main content area is titled 'I. Accessibility & License' and includes a 'Current Phase' section with 'Stage 1: Getting start...'. Below this is a 'Chapters' list with 'I. Accessibility & L...' selected. The main content area contains two questions: '1.1 What is the name of the software?' and '1.2 How can the software be accessed by third parties?'. The '1.1' question has a 'Findable' tag and a text input field. The '1.2' question has an 'Accessible' tag and a text input field. At the bottom, there is a table showing user statistics.

Users	
Active Users	87
Knowledge Model Editors	5
Knowledge Models	2

Martinez-Ortiz, C. et al. (2022). Practical guide to Software Management Plans (1.0). <https://doi.org/10.5281/zenodo.7248877>





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**Leadership**



**<R eSA>**  
*Research Software Alliance*

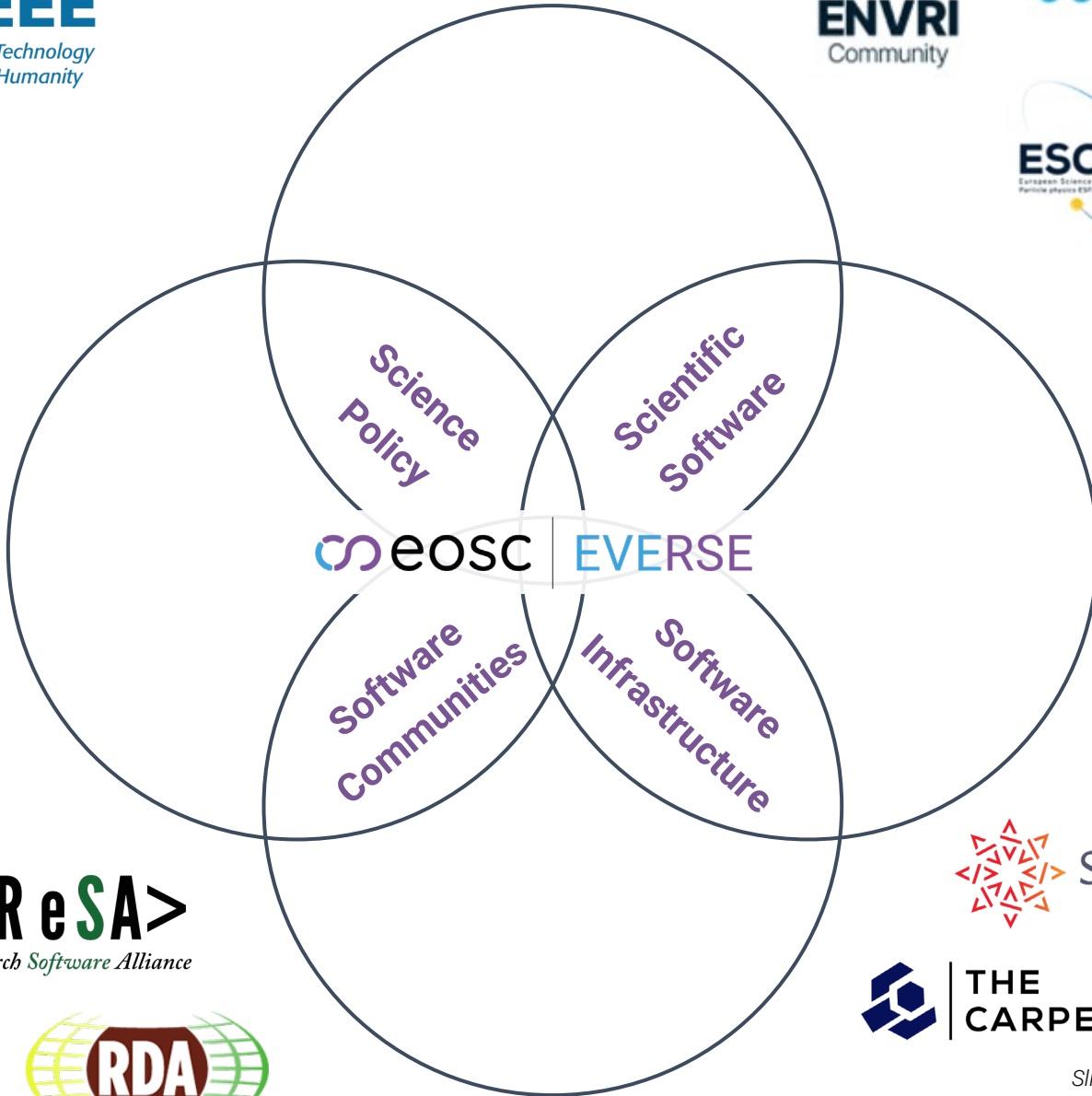


**Software Sustainability Institute**



**RESEARCH DATA ALLIANCE**

**Research**



**Software**



**NUMFOCUS**  
OPEN CODE = BETTER SCIENCE



**Software Heritage**



**THE CARPENTRIES**



Slides adapted from the "OrgMycology - eResearch NZ 2024"  
by Jonah Duckles (orgmycology)

FAIR Research Software: Challenges and Opportunities



18 November 2024

# EVERSE

## Paving the way towards a European **Virtual Institute** for **Research Software Excellence**

**EVERSE** aims to create a framework for research software and code excellence, collaboratively designed and championed by the research communities, in pursuit of building a European network of Research Software Quality and setting the foundations of a future Virtual Institute for Research Software Excellence

- ✓ ensure research software curation, quality, preservation and adoption of best practices, by the Communities, for the Communities, build on collaboration with the five EOSC Science Clusters
- ✓ adopt a three-tier model for research software, i.e., analysis code, prototype tools and research software infrastructure, which captures the varying complexity of research software and its development, and can be used as a basis for research software excellence
- ✓ credit and recognition for both developers and software are essential components of our strategy to promote sustainable software practices

Mar/2024 → Feb/2027 (36 months)

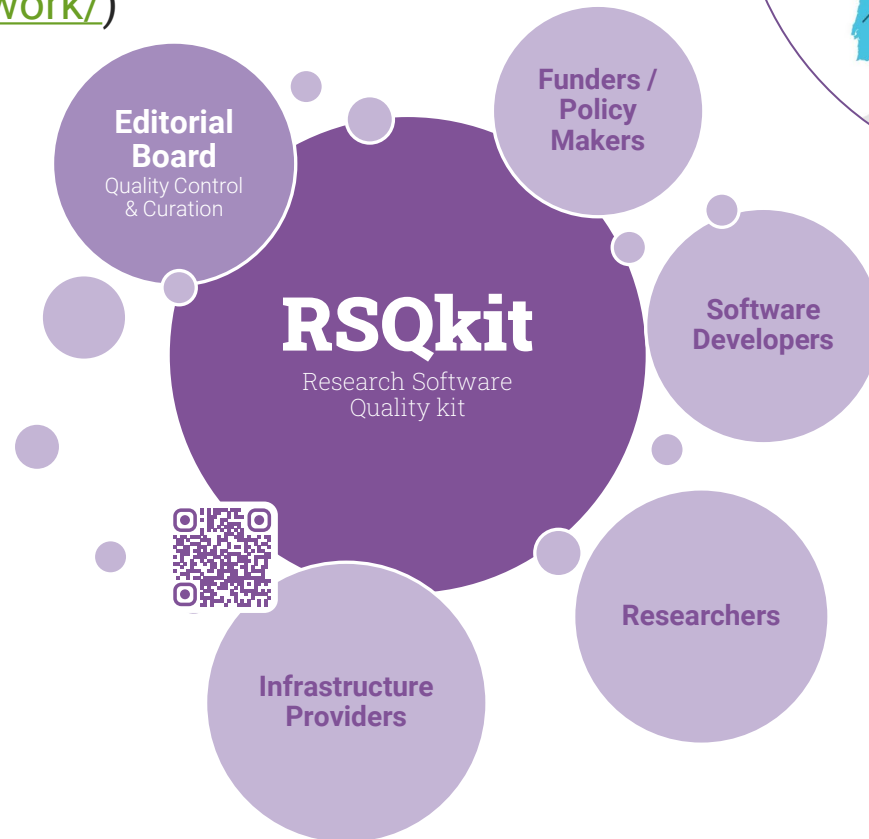
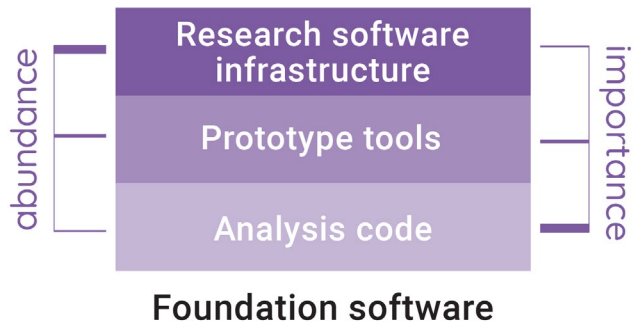
15 Beneficiaries, 1 Associated partner & 2 Affiliated entities

Coordinated by CERTH and BSC

# Establishing a Community

## Elements of EVERSE

- The Network (<https://everse.software/network/>)
- RSQkit (<https://everse.software/RSQKit/>)
- Software Reference model
- Training
- Recognition framework



## Join Us



Any individual or organization that agrees with our vision statement is welcome to join the network



# Global Engagement

- EVERSE and the Science for Africa Foundation agreed to have a joint event during the project's lifetime
- Now joined by the Research Software Alliance (ReSA) and the Research Software and Systems Engineers (RSSE) of Africa/Talarify
- Two-step event:
  - 1. Satellite event at an African RSE conference: workshop on assessing existing expertises as well as needs for researchers who codes, while EVERSE integrates them into Network and offers resources
  - 2. 1-2 day event with a set of session dedicated to talks, trainings, online resources and teaching content; ideally recurring
- Aim is to merge both RSE movements, help and learn from each other

# EOSC OA 7: Research Software



OA Expert Group:  
Research Software

The primary objective of this Expert Group is to address the challenges and opportunities around research software in the context of the EOSC framework.

- specifically target the research software created for research purposes or during the research process
- aims to promote all aspects of research software, including metadata, quality, preservation, registries, reproducibility and recognition
- will closely work with global initiatives and efforts on this domain





THANK YOU!  
MERCI!  
GRAZIE!  
GRACIAS!  
DANK JE WEL!



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