

FAIR Software tools


Carlos Martinez-Ortiz

"How FAIR are you?" webinar, February 24, 2021




Outline

- FAIR principles (in general)
 - Why is this important for researchers?
- FAIR principles (for software)
 - Why is it different from data?
- Guidance
- Questions?

Findable


Accessible


Interoperable


Reusable


2016: “The FAIR guiding principles for scientific data management and stewardship”
Wilkinson et al., doi:10.1038/sdata.2016.18


2018: “Central to the realization of FAIR are FAIR Digital Objects, which may represent data, software or other research resources.” (European Commission)


2019: “Towards FAIR Principles for Research Software”
Lamprecht et al., doi: 10.3233/DS-190026

My personal view on FAIR

Findable


Accessible


Interoperable


Reusable


Why is reuse important for science?

Antonie van Leeuwenhoek

- 70x to over 250x magnification
- Crafted his own lenses
- Pioneered the study of microscopy



Image credit: Rijksmuseum Boerhaave

Why is reuse important for science?

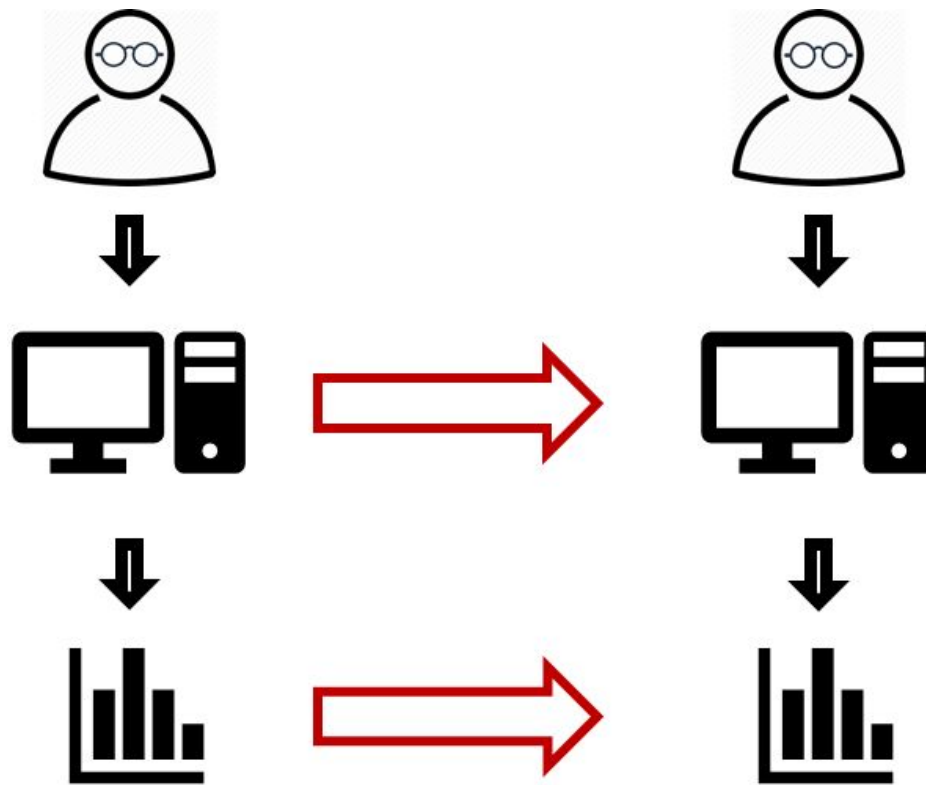
- Lab equipment is readily available
- Microscope specifications allow us to find an equivalent device

The devices we use for science are important!

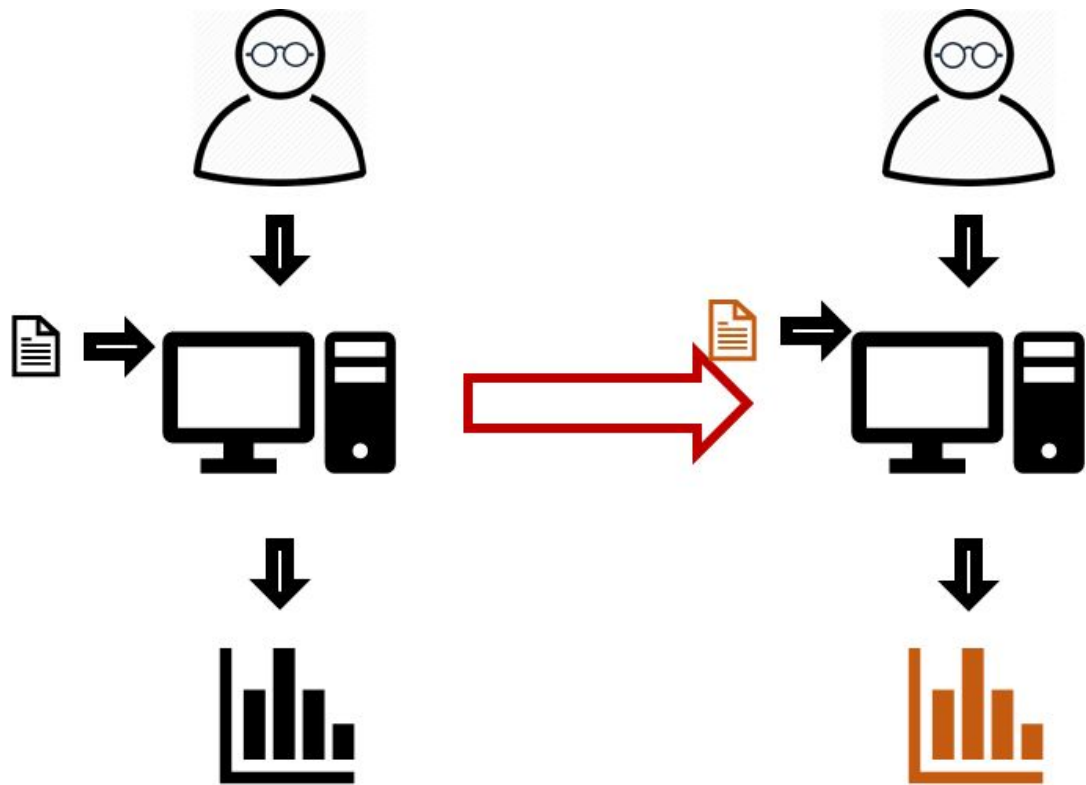


Image credit: [Wikimedia commons](#)

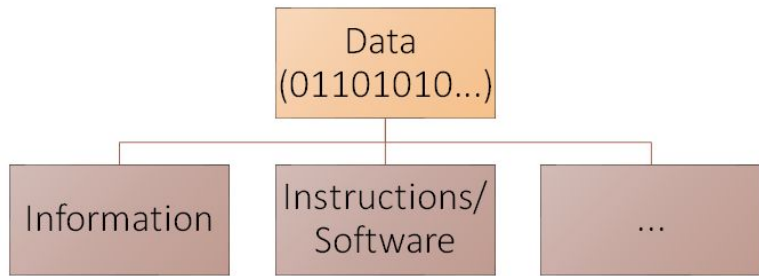
Software is our modern “microscope”



Software is our modern “microscope”

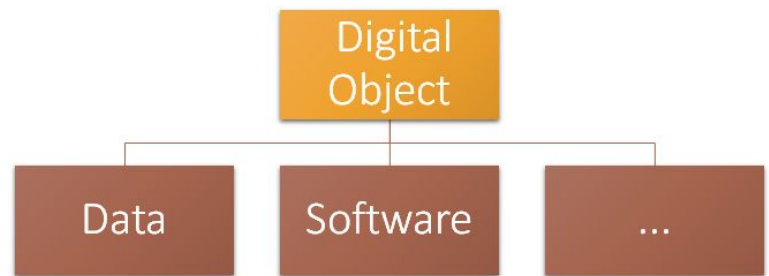


Can we use the FAIR principles for software?



Software is not data!

vs.



Some previous FAIR software initiatives/outcomes

“Applying FAIR Principles to Software” at the 2017 Workshop on Sustainable Software Sustainability (WOSS17)

“Making Software FAIR” at the DTL Communities@Work 2018 Conference

“FAIRness assessment for software” at the 2018 DBCLS/NBDC BioHackathon

“Sharing Your Software – What is FAIR?” at the 2018 American Geophysical Union (AGU) Fall Meeting

Top 10 FAIR Data & Software Global Sprint, including “10 easy things to make your software FAIR” 2019

“FAIR principles for Software” at 2019 Workshop on Sustainable Software Sustainability (WOSS19)

“FAIR Software” Birds of a Feather meeting at deRSE 2019

“Five recommendations for FAIR software” at NL-RSE 2019

TIB Training workshops on FAIR Data and Software 2018 - 2019

Towards FAIR principles for research software 2019 DOI: 10.3233/DS-190026

FAIR Computational Workflows 2020 DOI: 10.1162/dint_a_00033

FAIRsFAIR T2.4: FAIR assessment for research software

From FAIR research data toward FAIR and open research software

Lorentz Workshop 9-13 March 2020 (Automated Workflow Composition in the Life Sciences)

BRDI NAS Washington 16-17 March 2020

Ongoing effort on defining FAIR principles for software

FAIR4RS WG

- <https://www.rd-alliance.org/fair-principles-research-software>
- <https://www.rd-alliance.org/group/software-source-code-ig/wiki/fair4software-reading-materials>
- <https://github.com/force11/FAIR4RS/blob/master/CommunityEngagementChannels.md>



Let's talk about you...

Which countries do you or your organisation represent?

Cyprus

France

UK

Spain

Finland

South Africa

UK

Ireland

Ghana



Which countries do you or your organisation represent?

brexited UK

Germany

South Africa

Cyprus



What is your role? (PhD, researcher, ...)

researcher

PhD student

researcher

Researcher

Researcher

Postdoc

Application Scientist

PhD Student

staff bioinformatician



What is your role? (PhD, researcher, ...)

Community Manager

Researcher

coder

Researcher

coordinator

Bioinformaticist



What is your field of research?

Bioinformatics

Genomics & bioinformatics

SE

biocuration

The research software community

bioinformatics / comp sci

I'm a PhD student in bioinformatics

Clinical Research Informatics

Bioinformatics & Genomics



What is your field of research?

Data Management Software

Bioinformatics, Applied ML

bioinformatics

PopGen/Reference
Graphs/Genomics

genomics

genomics



How do you use research software?



I develop software just for myself



I develop software for others to use



I adapt software others built and use it



I use software others built for me



I use generally available software



I don't use research software

What type of research software do you use?

Excel

depends on which task and which project

R

R

Depends on the project

R, docker, Make, standalone tools

Genomic Workflows - Different Software

R

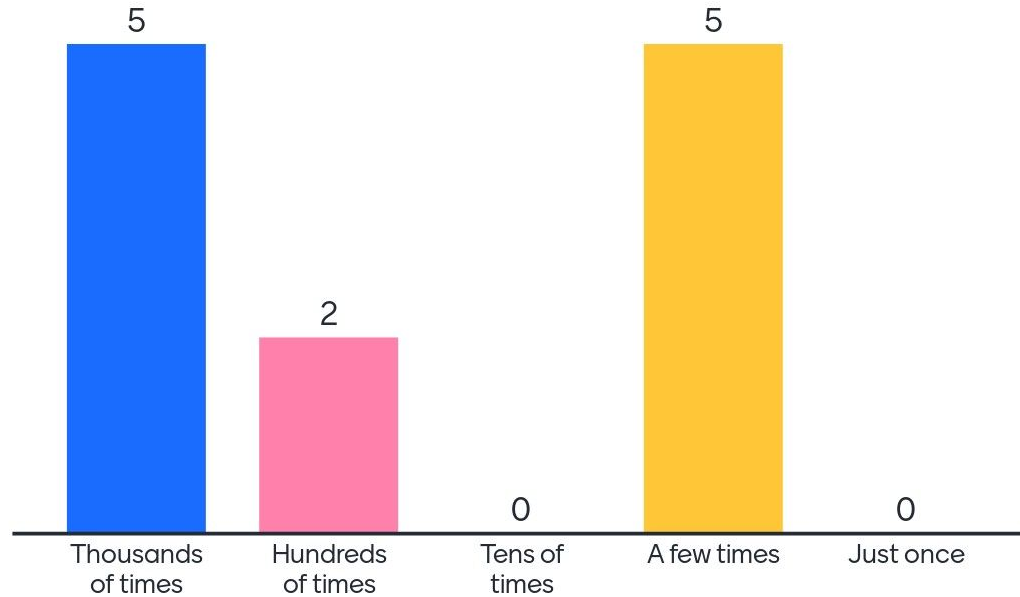
Packages in R for analysing sequencing data, Galaxy Workflows



What type of research software do you use?

Command-line, Python, R, Nextflow

How many times does research software gets reused



How do I get started?



ELIXIR



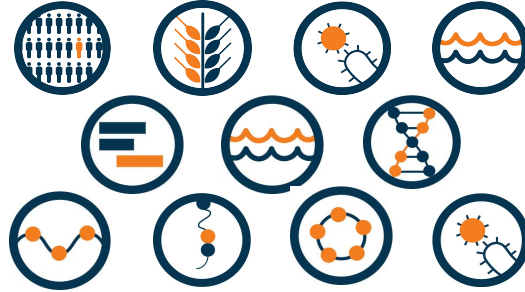
www.elixir-europe.org

Summary of ELIXIR's key opportunities for participation



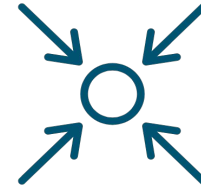
Platforms

(cross-domain,
focusing on one
aspect of service
delivery)



Communities

(domain or
technology specific)



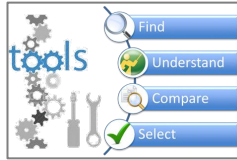
Focus groups

(Topic specific, most
open to all)

The Tools Platform: Developing a tools ecosystem



To support efforts around software packaging & containers, e.g. BioConda/ BioContainer and support sustainable integration into bio.tools and OpenEBench



Bio.tools, a discovery portal for bioinformatics software information, providing curated description of tools and data services



OpenEBench, an infrastructure providing services for hosting scientific benchmark activities and technical monitoring of bioinformatics tools and service



To drive the development of execution platforms (eg Galaxy) and ensure integration with bio.tools, OpenEBench and workflows using CWL



Raise software quality and sustainability, by producing and promoting software best practices and developing training activities

Tools Interoperability, guidelines and resources for guaranteeing platforms integration at the ELIXIR Tools platform ecosystem, with other platforms at ELIXIR and beyond.

Visit fair-software.eu



#1
USE A PUBLICLY
ACCESSIBLE
REPOSITORY
WITH VERSION
CONTROL



#2
ADD A LICENSE



#3
REGISTER YOUR
CODE IN A
COMMUNITY
REGISTRY



#4
ENABLE CITATION
OF THE
SOFTWARE



#5
USE SOFTWARE
QUALITY
CHECKLIST



Where can I learn more?

<https://guide.esciencecenter.nl/>

<https://the-turing-way.netlify.app/>

<https://softdev4research.github.io/4OSS-lesson/>

<https://elixir-europe.org/platforms/tools/software-best-practices>

netherlands



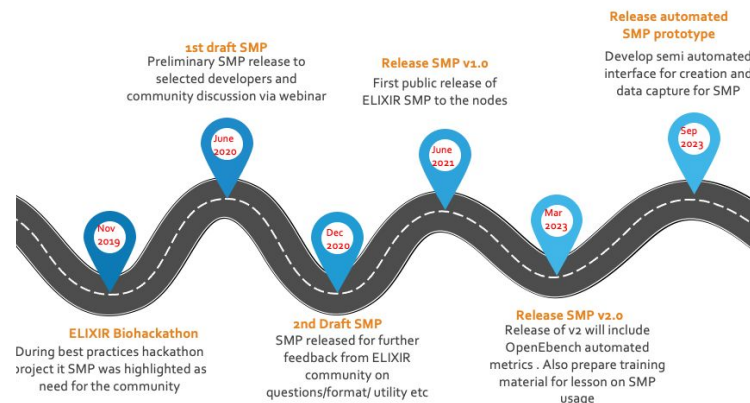
What else can I do to make my software more FAIR?

- Software management plans
 - What are they?
 - How would that help me?
 - Where do I start?

Why use Software Management Plans (SMPs) in ELIXIR?

Towards unified approach to software development and management in ELIXIR.

- Similar to Data Management Plans, SMP is an awareness tool.
- Helps group think in advance about the software that will be developed
- SMP questions help you think about most important parts of project
- Help assign roles and responsibilities in software project
- Can be used as a guide for everyone involved in the project
- Community driven development planned within ELIXIR



More software management plans

- SSI software management plans:
 - <https://www.software.ac.uk/software-management-plans>
- eScience Center Software Sustainability Protocol
 - <http://doi.org/10.5281/zenodo.1451751>

Tools for FAIR sharing of data

- <https://github.com/FAIRDataTeam/FAIRifier>
- <https://github.com/fair-data/fairdatapoint>
- <https://github.com/fair-workflows/nanopub>

Let's stay in touch

✉ c.martinez@esciencecenter.nl

🌐 www.esciencecenter.nl

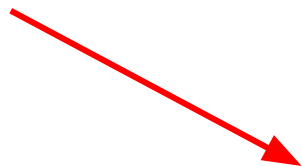
📖 blog.esciencecenter.nl

🐦 [neocarlitos](#)

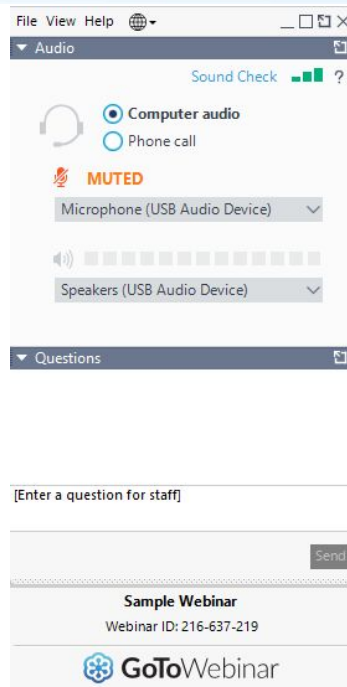
🔄 [c-martinez](#)

Questions?

Please write your questions in the questions window of the GoToWebinar application



Title: FAIR software tools
Presenter: Carlos Martinez Ortiz





Next CINECA webinars

Title: Practically Fair

Presenter: Andrew Stubbs

Date: Thurs 4th March 2021

Time: 3:00 PM GMT / 4:00 PM CET

Registration and details:

<https://www.cineca-project.eu/news-events-all/practically-fair>

Title: How to make training FAIR

Presenter: Anna Swan & Sarah Morgan

Date: Thurs 18th March 2021

Time: 3:00 PM GMT / 4:00 PM CET

Registration and details:

<https://www.cineca-project.eu/news-events-all/how-to-make-training-fair>