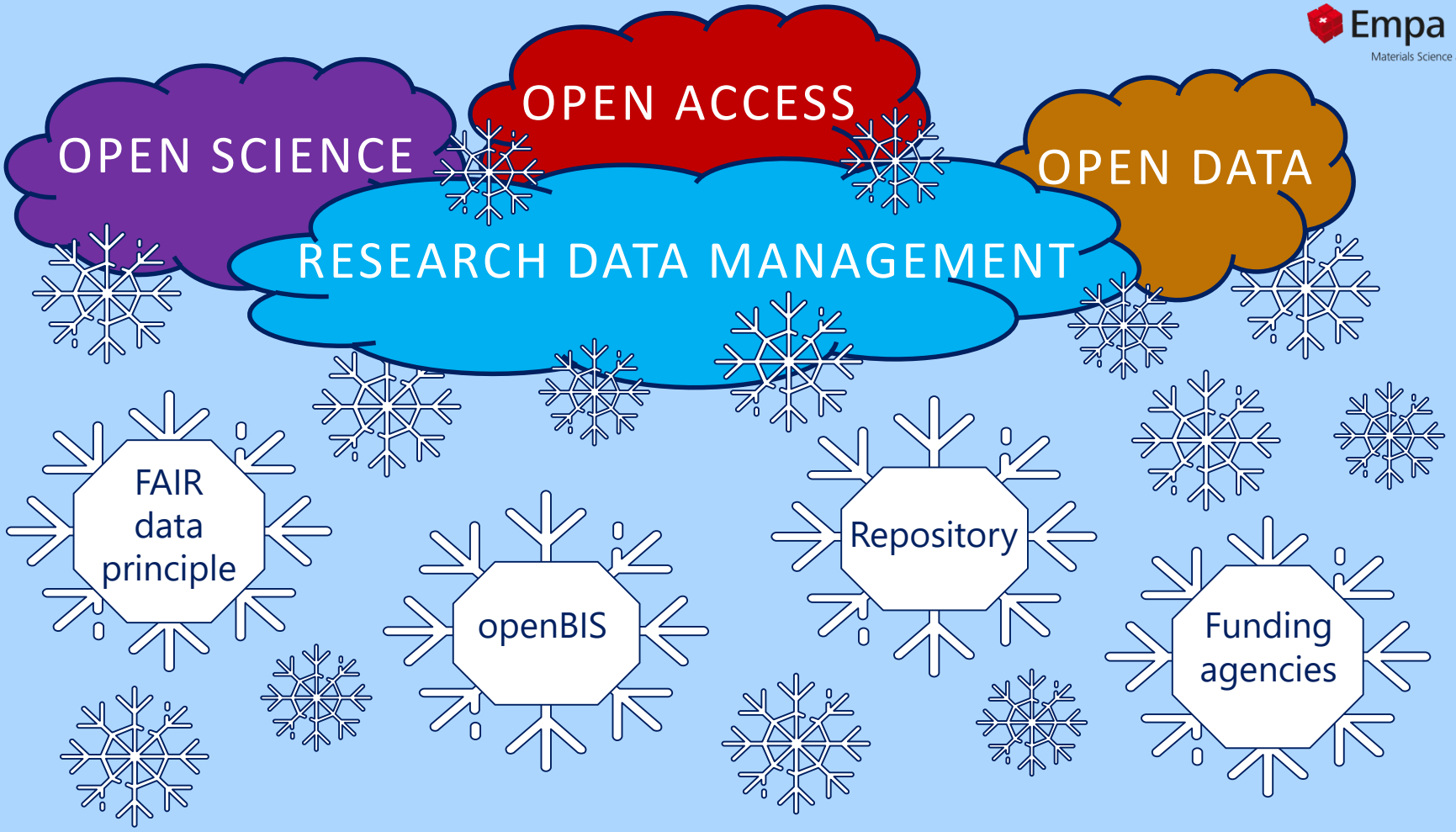
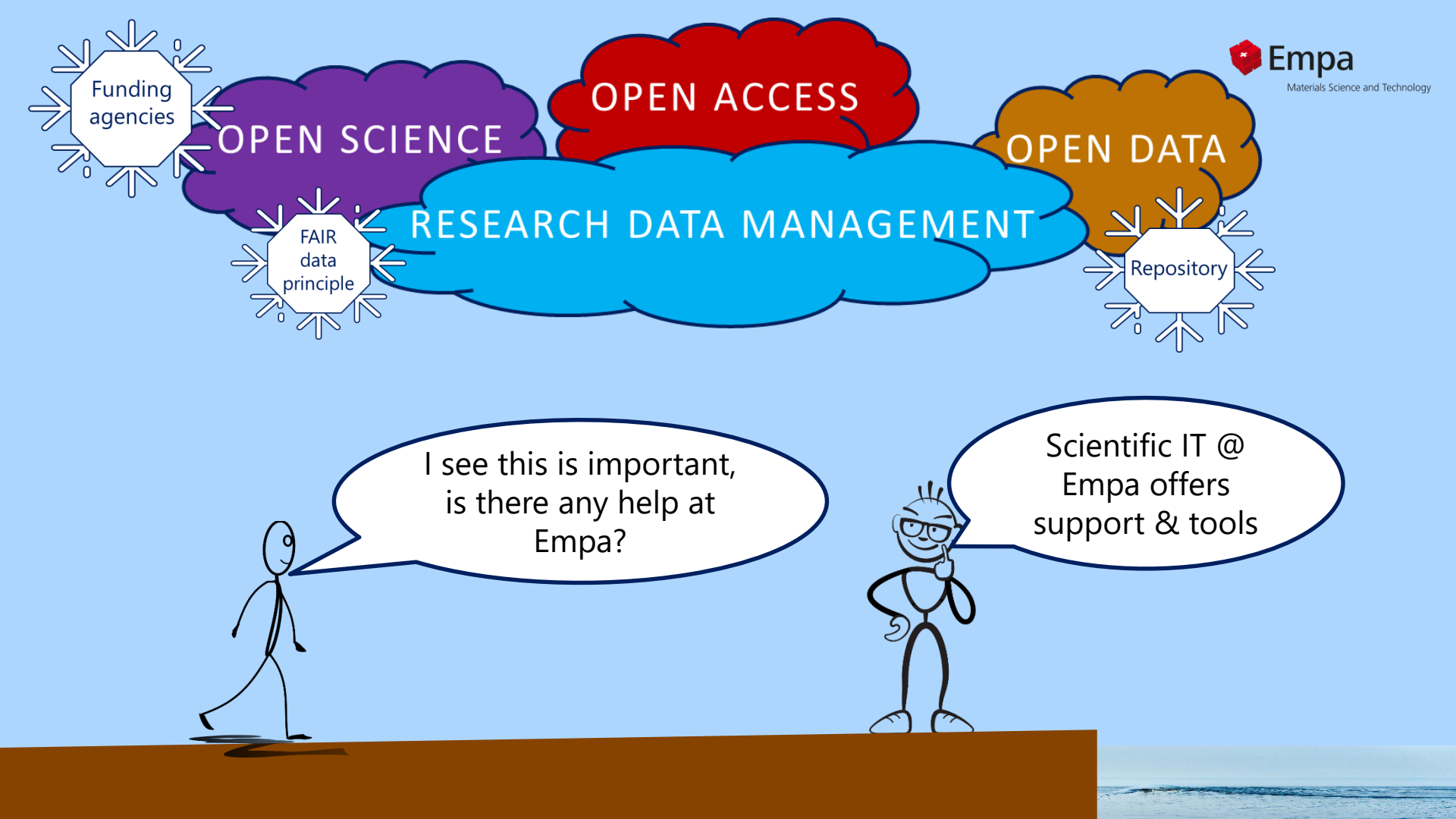
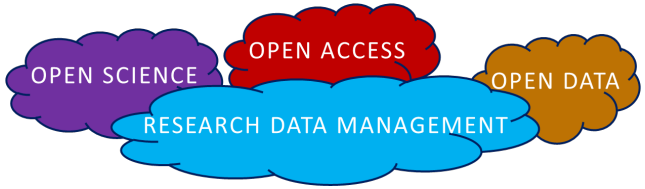

Empa
Materials Science and Technology
OPEN SCIENCE
OPEN ACCESS
OPEN DATA
RESEARCH DATA MANAGEMENT
FAIR data principle
openBIS
Repository
Funding agencies


Empa
Materials Science and Technology
Funding agencies
OPEN SCIENCE
OPEN ACCESS
OPEN DATA
RESEARCH DATA MANAGEMENT
FAIR data principle
Repository
I see this is important, is there any help at Empa?
Scientific IT @ Empa offers support & tools



DigitalScience@Empa
Intranet Plattform

Empa
Materials Science and Technology

On Intranet main page

RESEARCH INFOS

Find here a list of Research Calls

Find here a list of Research Awards

DigitalScience@Empa - find here:

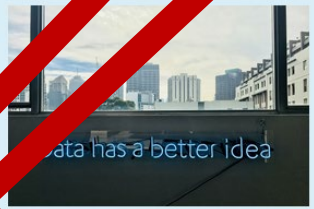
Tools and Platforms, Data Science, Modeling & Simulation, Open Science, Events & Trainings, Community

DigitalScience@Empa

Welcome to this platform where you can find out about digitalization @ Empa. Thi
platform lives from your active contributions, so visit our Wiki and Forum in th
community section and leave comments. For questions or input please cont
anusch.bachofner@empa.ch (Scientific IT).

Tools & Platforms


Data Science



Modeling & Simulation


Open Science


Events & Training


Community

https://www.empa.ch/group/s909/overview

Support

Build up of Scientific IT

Anusch Bachofner

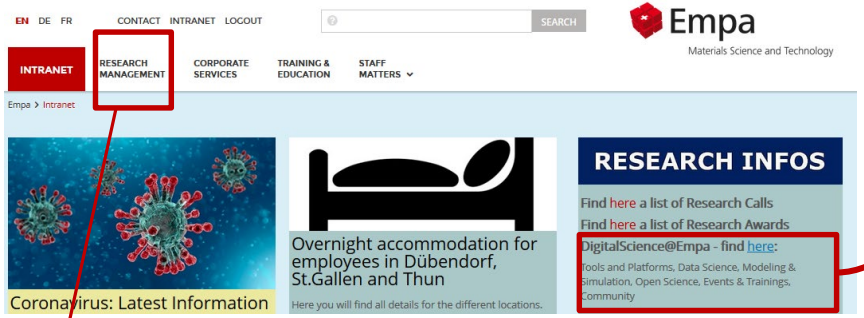
Phone: +41 58 765 4613
anusch.bachofner@empa.ch

Dr. Matthias Rösslein

Phone: +41 58 765 7784
matthias.roesslein@empa.ch

RDM Services & Infrastructure @ Empa

Empa
Materials Science and Technology



Technology-transfer @ Empa

- Handling of software licenses
  - Open Source
  - Commercial
  - Academic …
- Consult with Empa's TT Office tt@empa.ch

https://www.empa.ch/group/s607/software-lizenzen

Scientific IT @ Empa

- Support for RDM
- SNF Data Management Plan template
- RDM guides, Best practice guide
- Open Access @ Empa
  - Policy
  - Publication fund

RDM Services & Infrastructure @ Empa

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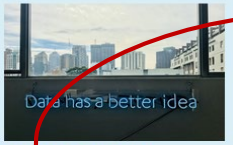
Materials Science and Technology

DigitalScience@Empa

Tools & Platforms

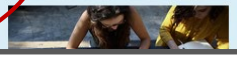

Data Science



Modeling & Simulation


Open Science


Events & Training



Open Science

Open science is about the way research, education and innovation are carried out, disseminated, deployed and transformed by digital tools, networks and media. It relies on the combined effects of technological development and cultural change towards collaboration and openness throughout the spectrum of scientific activities. Open science makes scientific processes more efficient, transparent and effective by offering new tools for scientific collaboration, experiments and analysis and by making scientific knowledge as openly findable, accessible, interoperable and reusable (FAIR) as possible (Swissuniversities, Swiss National Open Science Strategy)


Research Data Management


Open Access


Creative Commons Licenses


Support

Support

The Scientific IT and the Research Data Management Team at Empa offers support in various topics:

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Phone: +41 58 765 4613
anusch.bachofner@empa.ch

Dr. Matthias Rösslein

Phone: +41 58 765 7784
matthias.roesslein@empa.ch

Helpline:

RDM@empa.ch

Research Data Management (RDM)

We are currently introducing the RDM system openBIS at Empa, which is an Electronic Lab Notebook and Laboratory Information system developed by ETH. OpenBIS helps you organize your data and meet the requirements of funding agencies with regard to the FAIR principles (data is Findable, Accessible, Interoperable and Reusable, more explanation).

Empa internal link to more information about **openBIS @ Empa** - link

Data Management Plan (DMP) & How to submit RDM & CSCS costs

Funding agencies require a Data Management Plan. **We offer you support with your data management plan by providing you with a template for the SNF DMP**. This template is a Word document that contains specific answer options for the SNSF questions, distinguishing between working with or without openBIS and with regard to sensitive data. Click here to see: Template for DMP

SNF allows **10'000 CHF funding for data management (RDM)** as data preparation, archiving and publishing on FAIR data repositories (e.g. Zenodo). Please remember to apply for the 10'000 RDM costs (it can be more, if you explain why). It is now necessary to give SNF some explanations how the RDM costs are composed. View this template as information and tranfer it into the SNF propsal (change it where necessary!): Template for RDM costs

Infos about **Empa guidlines for SNF application and how to put in RDM costs** - link (only Empa internal)

Link to **FOKO** (link) and to the leaflet for submission

Sheet for CSCS costs at Empa, use it to calculate your costs and fill them in - Template for CSCS costs

Text snippets available

SNF Data Management Plan Template

- ❑Sections analog to the SNF DMP
- ❑Different categories for
  - ❑Sensitiv data
  - ❑Using the data management system openBIS
  - ❑Without using openBIS
- ❑Description of backup system at Empa
- ❑Recommendation of FAIR repository

RDM Services & Infrastructure @ Empa

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Collaboration platform – Code versioning

GitLab @Empa

High performance computing (HPC)

Provision of researchers with technical support regarding HPC-related common problems and long-term projects.

Dr. Edoardo Baldi
HPC Expert
Phone: +41 58 765 6195
edoardo.baldi@empa.ch

Data Management System @ Empa

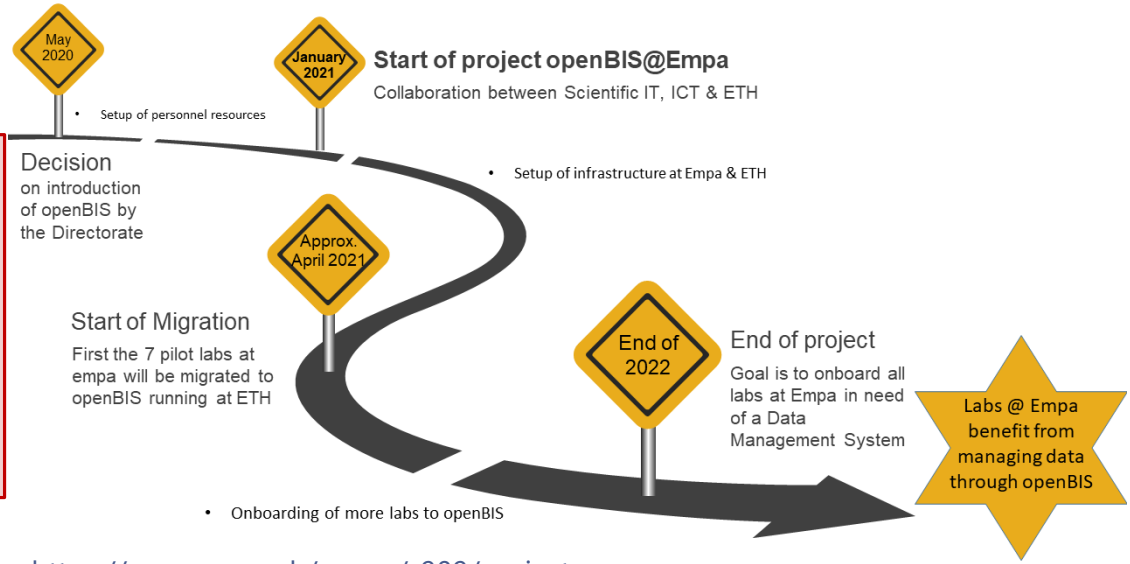
openBIS

Introduction @ Empa as the Electronic Laboratory Notebook (ELN) and Inventory Management System

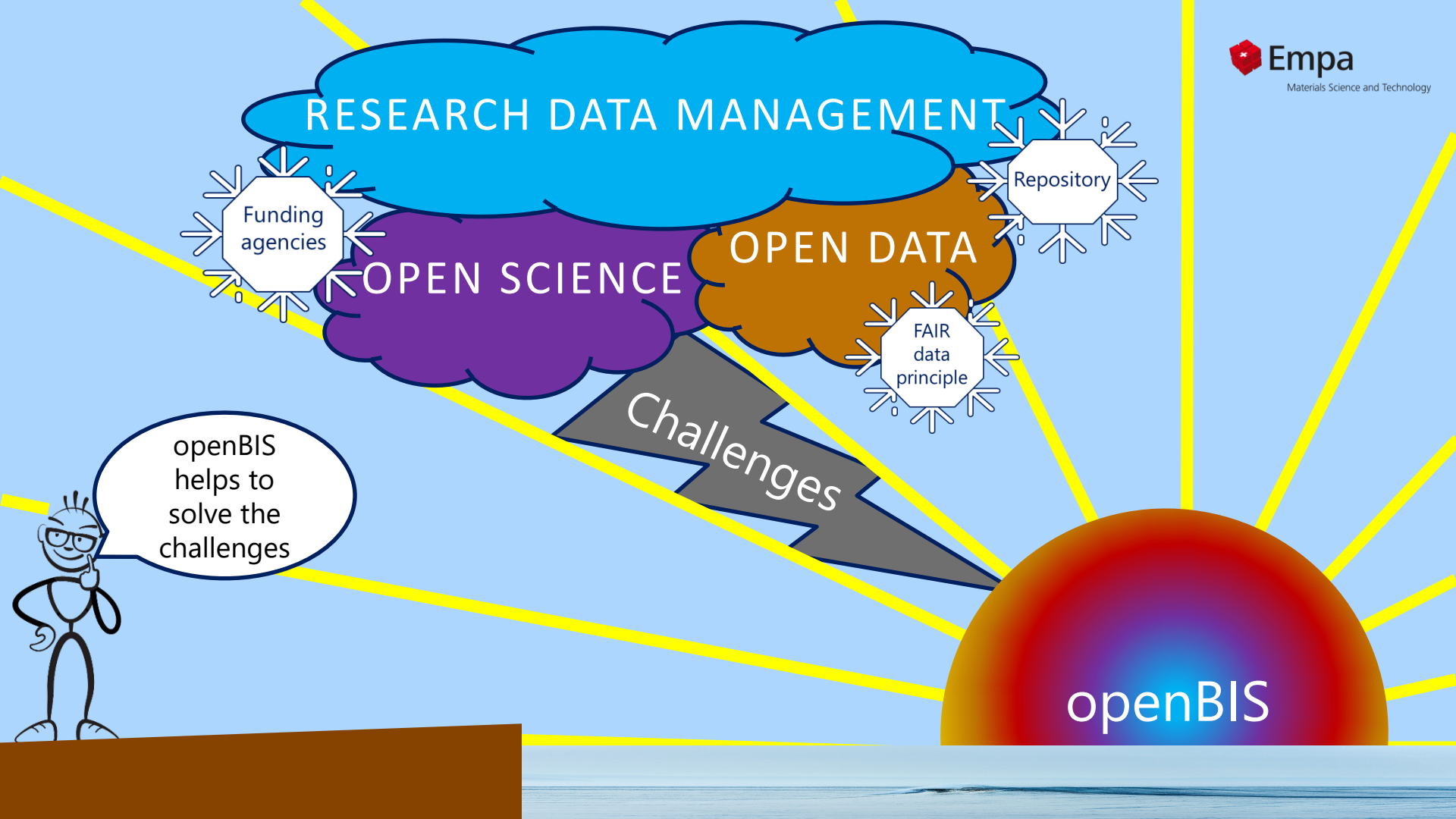
OpenBIS enables easy connection

- ✓ **Zenodo** – data repository according FAIR principles
- ✓ **Jupyter Hubs** – for programming in Python, R etc.
- ✓ **Longterm Archiving** – of research data at ETH

Timeline of openBIS introduction@Empa



https://www.empa.ch/group/s909/projects


RESEARCH DATA MANAGEMENT
Funding agencies
OPEN SCIENCE
OPEN DATA
Repository
FAIR data principle
Challenges
openBIS helps to solve the challenges
openBIS

Landscape – Challenges – Solution

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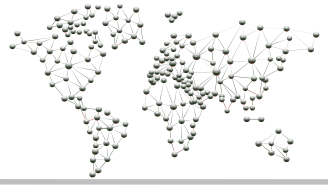

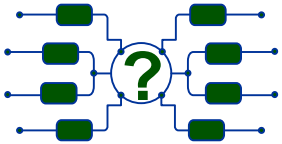

paper notebook

competition

regulations

More data

data loss
missing features

need of
collaboration and
visibility

publication of data
data management plan

handling of data
storage cost

RDM &
Open Science

reliability
reproducability

interoperability
accessability
documentability

traceability
reusability
archiving

unified solution

Data Management System for Empa

openBIS

openBIS - What is it?

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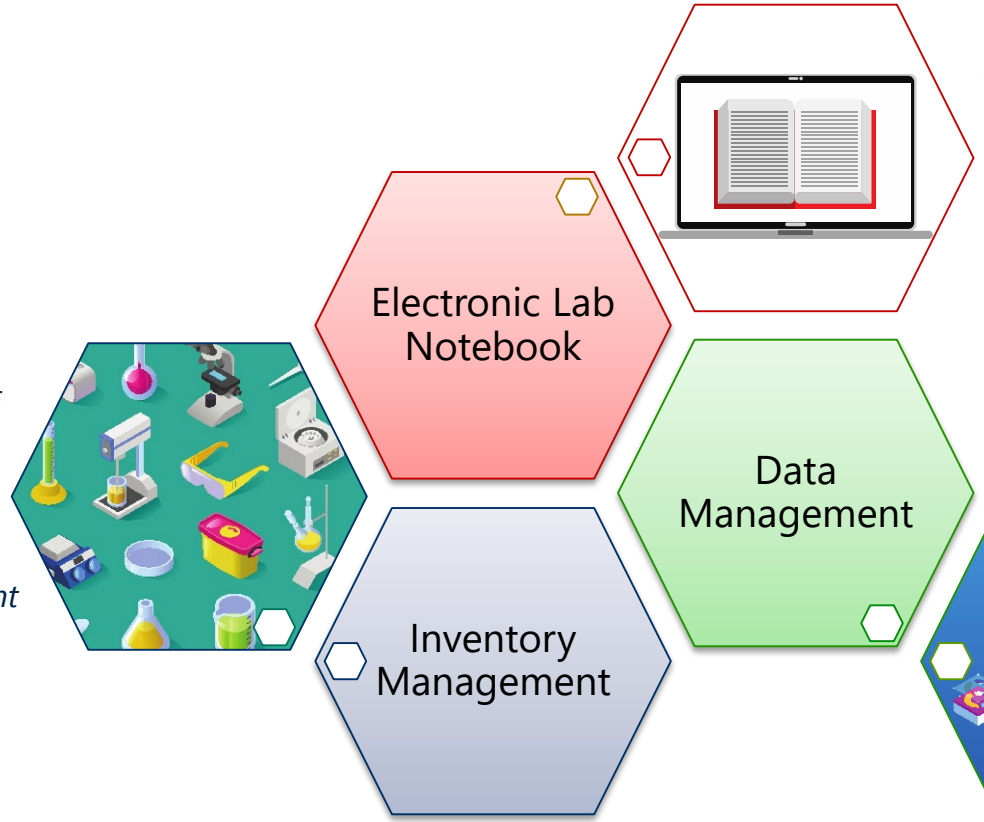

Description of
- *Experiments*
- *Measurements*
- *Processes*
- *Data analysis*

Inventory of
- *Samples*
- *Materials*
- *Reagents*
- *SOPs*
- *Equipment*

Storage of research data connected to the experiments described in the electronic lab notebook

A data management system – Connecting lab inventory, research data & lab notebook in 1 tool

openBIS - What is it?

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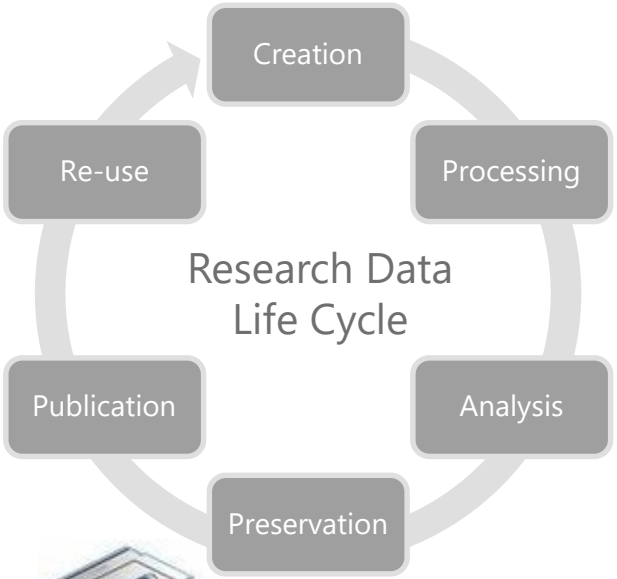
Experiment description in electronic lab notebook

openBIS

zenodo

Integration with Data Repositories



Inventory of Protocols/SOP's

MATLAB

jupyterhub

Integration with analysis tools

Archiving

A data management system – Covering most of the data life cycle in 1 tool

openBIS - What is it?

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Methods & Materials recorded in electronic lab notebook

Experimental data imported into inventory

Barcode reader

Big Data Link

Data immutability

Data collection & documentation

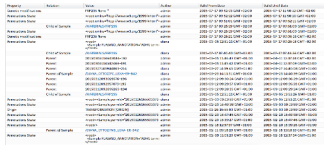
Data sharing & reuse

Ethics, legal & security issues

DMP
Data Management Plan

Link to DMP support with template

Data storage & preservation

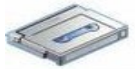


Audit trail

User rights management

Integration with FAIR Data Repositories

Import/Export



Back-up & Archiving

Use the **text snippets** for openBIS in the DMP template

A data management system – Solving DMPlan requirements of funding agencies with 1 tool

openBIS

- Open source software developed by ETH since 2007
- ELN/LIMS system
  Electronic **L**ab **N**otebook & **L**aboratory **I**nformation **M**anagement **S**ystem

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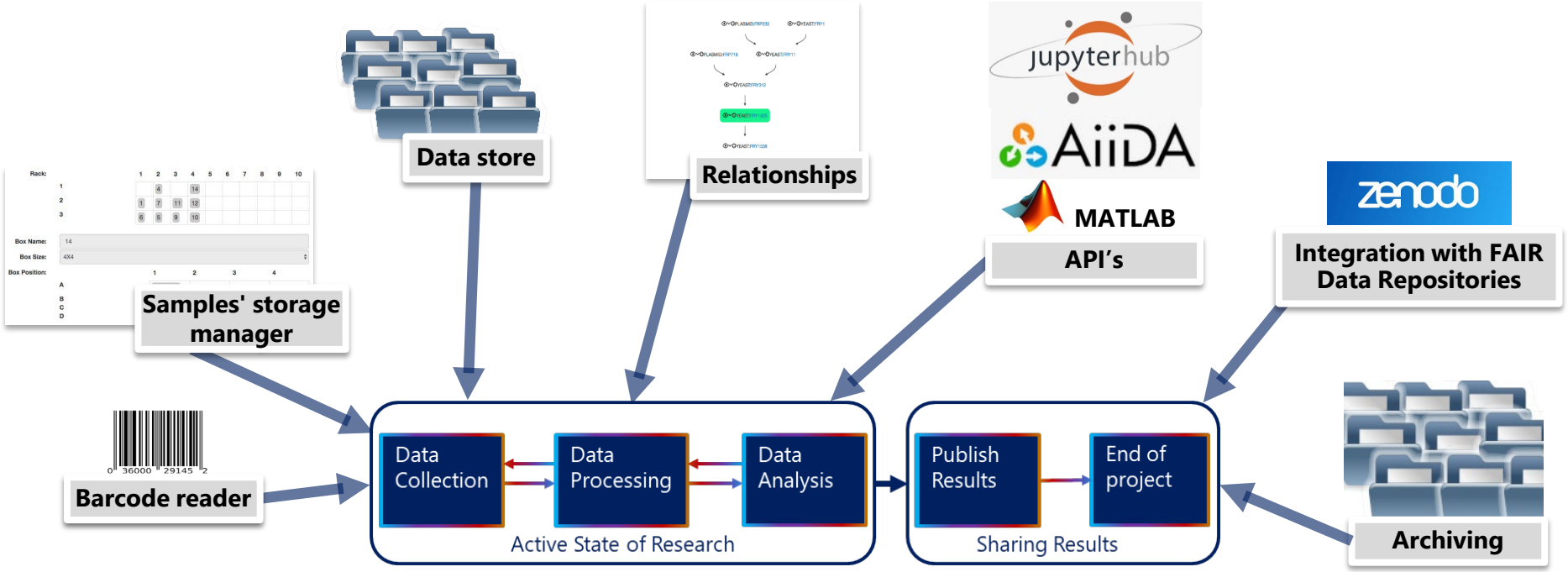
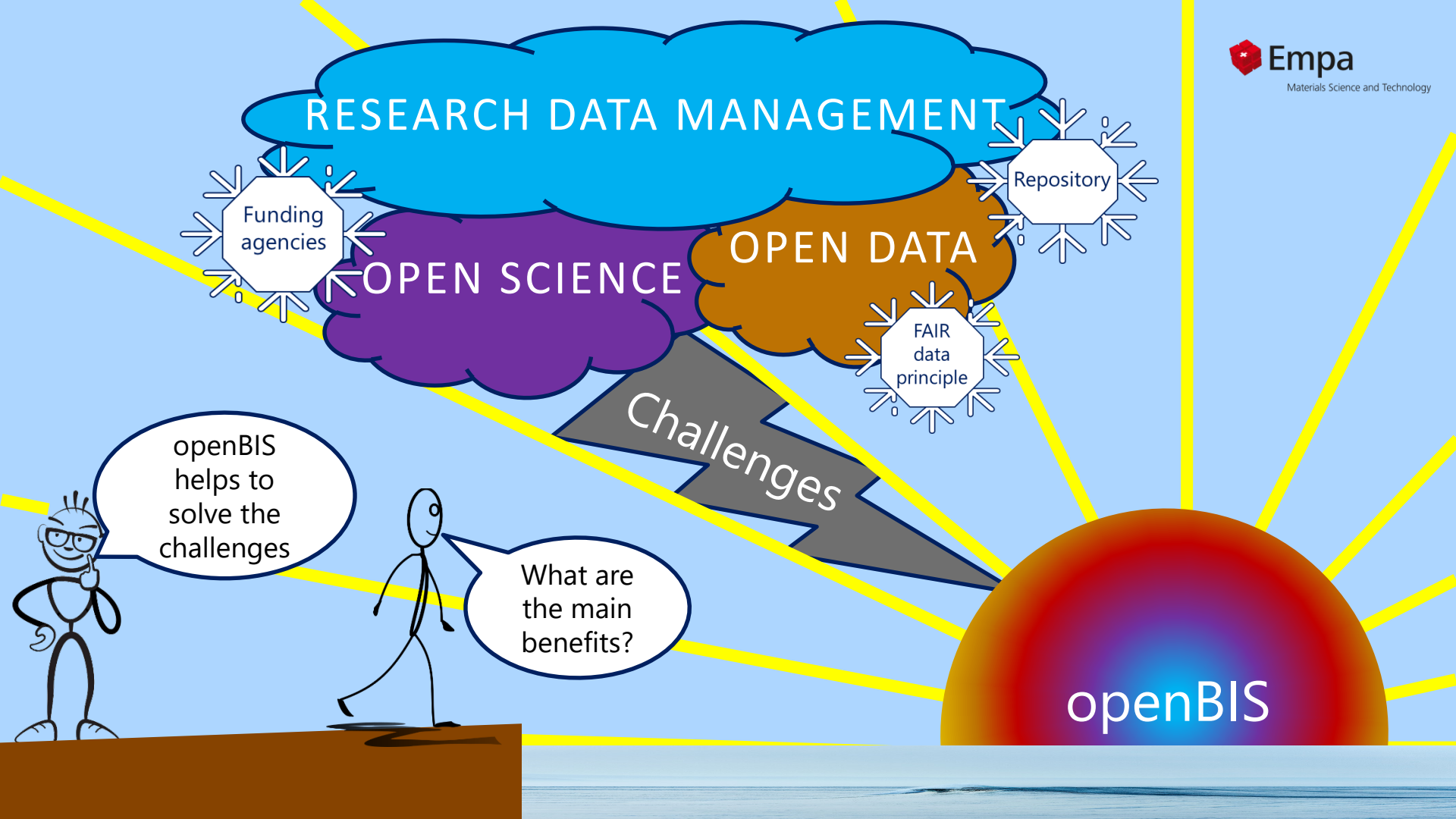
For managing research data from "bench" to publication in a central storage

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FAIR data principle
Challenges
openBIS helps to solve the challenges
What are the main benefits?
openBIS

openBIS - How does it help?

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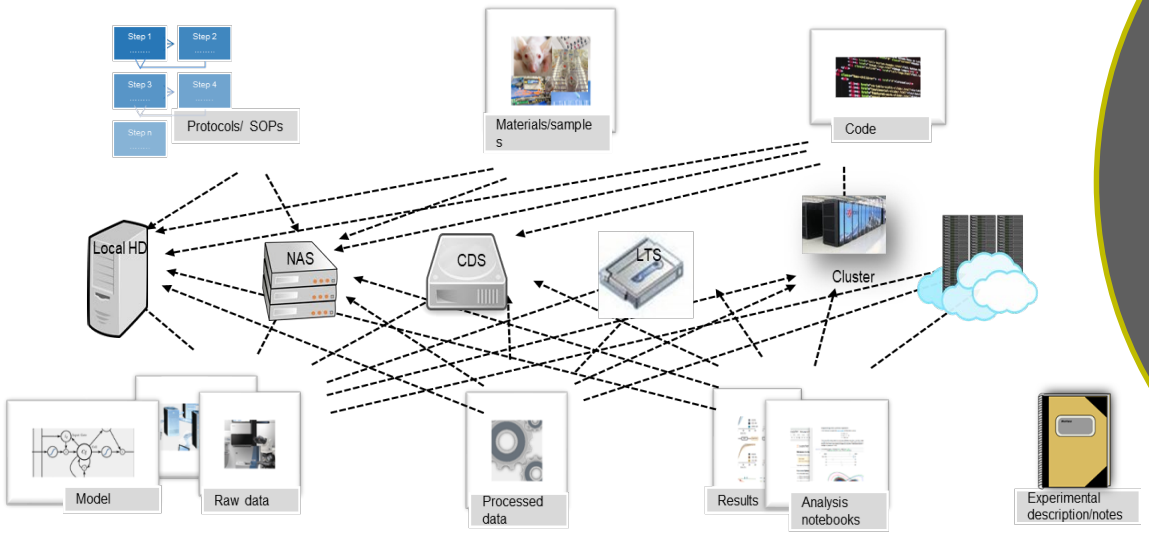
A common scenario
The "*data spread*"



The ideal solution
Having everything connected in 1 place

openBIS - Hierarchy graph

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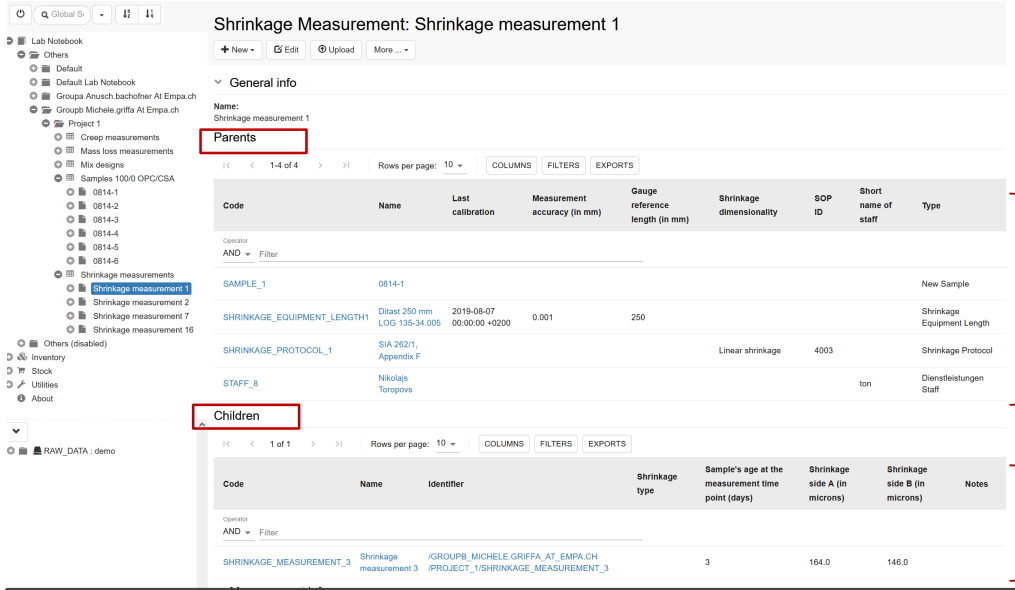
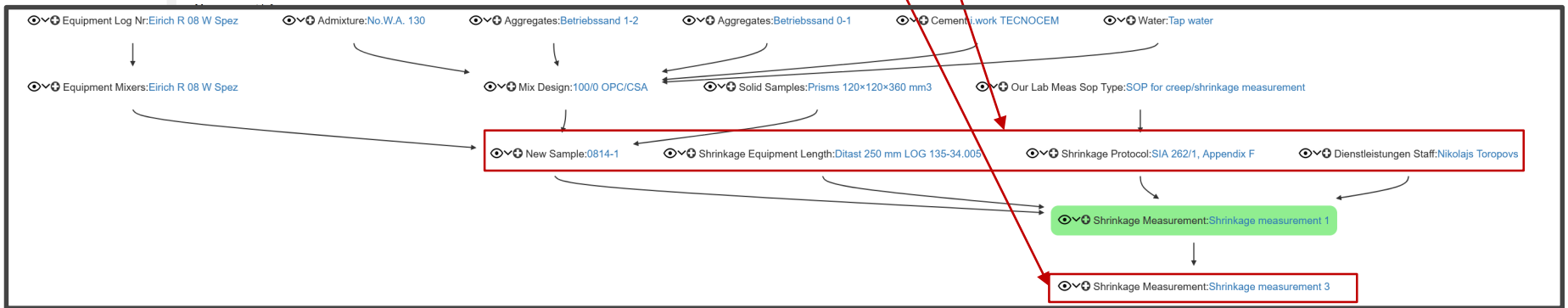


openBIS

A data management system
connecting
lab inventory, research
data & lab notebook



openBIS benefits

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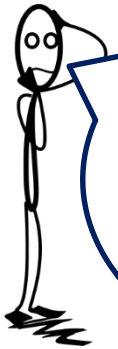
1. **Prevention of loss of research data & knowhow via structured documentation & storage**
2. **Easy & automatic data archiving over a long period**
3. **Easy & fast connection to repository Zenodo**



Challenges at Empa

1. **Data loss** due to change of personnel & no proper documentation of data
2. **No archiving solution** easy accessible & reliable
3. **No repository** available

- **Without openBIS** you need to solve these challenges on your own
- **Without proper data management** you risk loosing funding money

Data Science with openBIS

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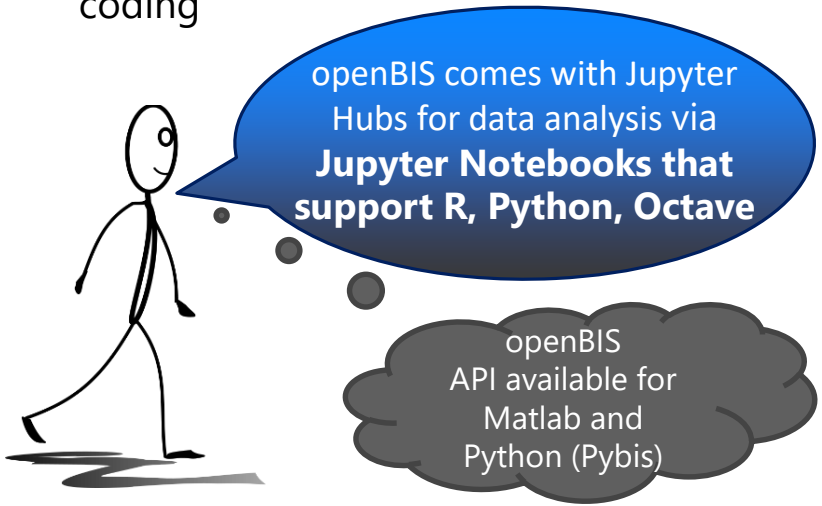
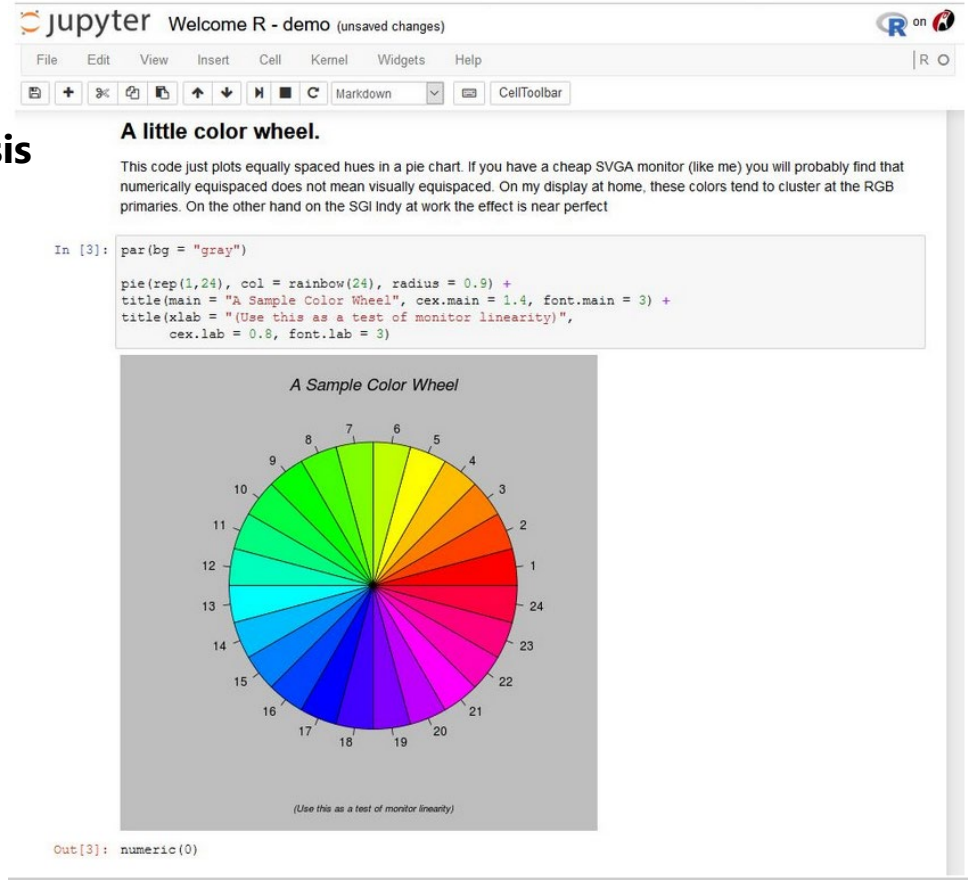
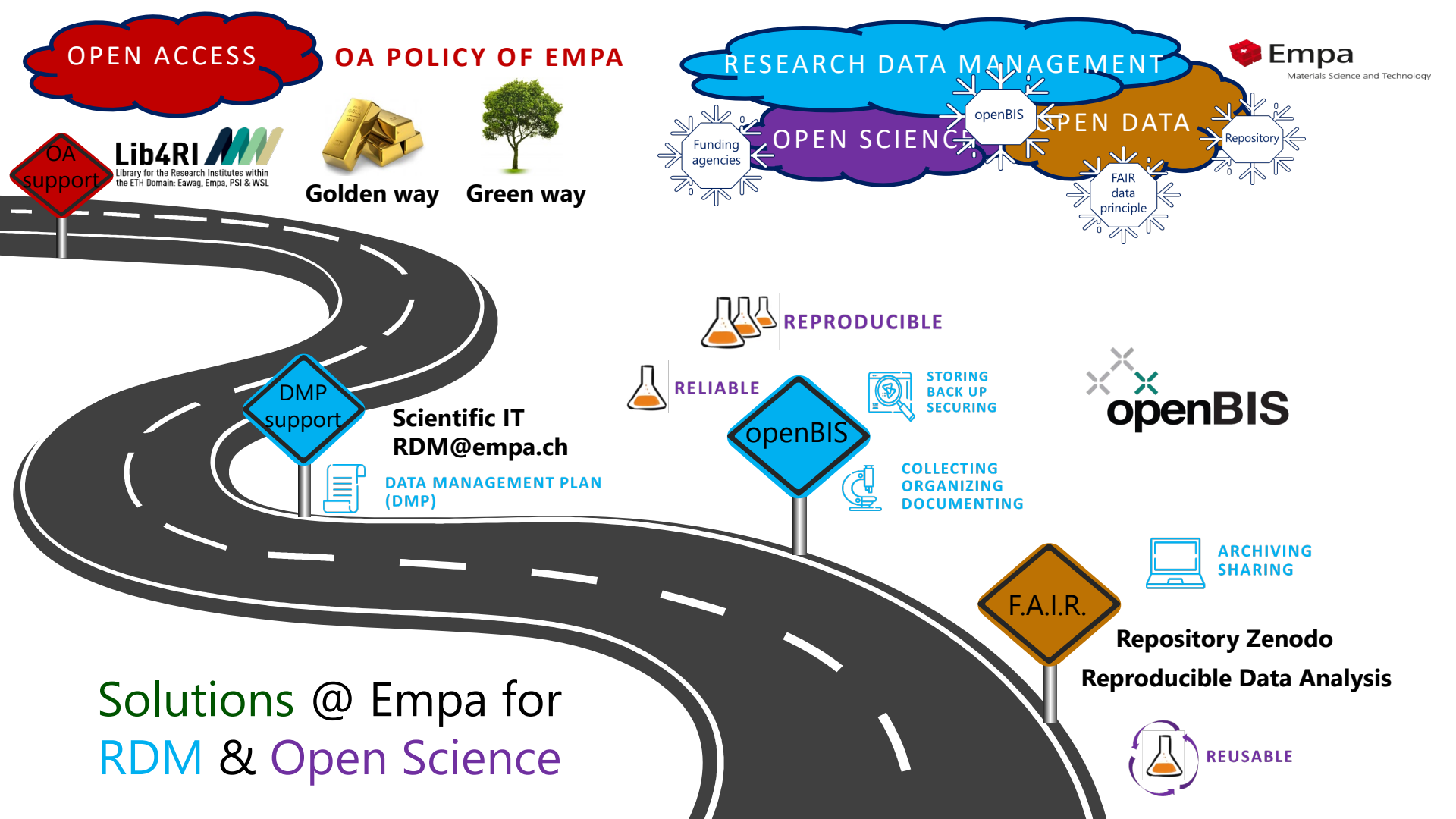
- **Jupyter notebooks combine code, documentation & outputs** like plots, images, videos etc.
- Useful for **interactive/exploratory data analysis** and **reproducability**
- **Easy sharing** of code with documentation and results
- Like a **modern lab notebook** for reproducible coding



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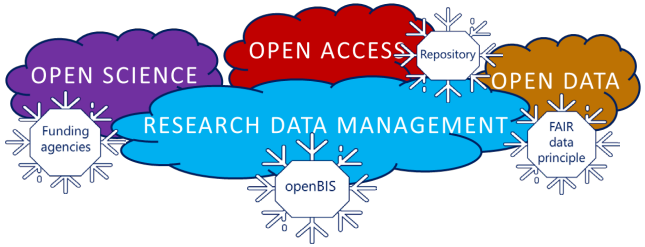
FAIR data principle
OA support
Lib4RI
Library for the Research Institutes within the ETH Domain: Eawag, Empa, PSI & WSL
Golden way
Green way
REPRODUCIBLE
RELIABLE
STORING
BACK UP
SECURING
openBIS
DMP support
Scientific IT
RDM@empa.ch
DATA MANAGEMENT PLAN (DMP)
COLLECTING
ORGANIZING
DOCUMENTING
ARCHIVING
SHARING
F.A.I.R.
Repository Zenodo
Reproducible Data Analysis
REUSABLE
Solutions @ Empa for
RDM & Open Science



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Intranet Plattform https://www.empa.ch/group/s909/overview

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Support

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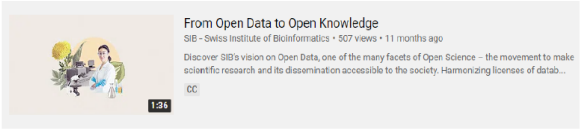
https://www.empa.ch/web/s909

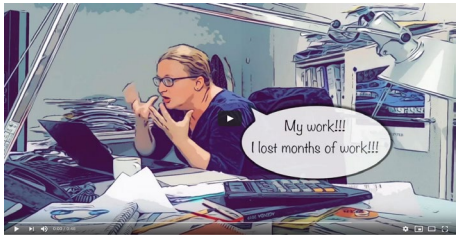
Anusch Bachofner

Matthias Rösslein

Videos



YouTube



https://youtu.be/t_rEXpfCTrg
https://youtu.be/tFWd2M2OXwQ
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https://youtu.be/LCZijZP916o
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