

I see this is important,  
is there any help at  
Empa?



Scientific IT @  
Empa offers  
support & tools



# DigitalScience@Empa

## Intranet Plattform

### On Intranet main page

#### RESEARCH INFOS

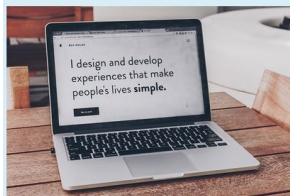
Find [here](#) a list of Research Calls  
Find [here](#) a list of Research Awards  
DigitalScience@Empa - find [here](#):

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

Where can I  
find  
Information  
& support

#### DigitalScience@Empa

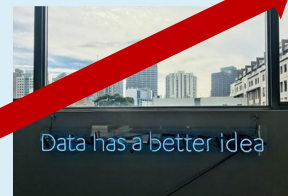
Welcome to the platform about digitalization topics at Empa.



Tools & Platforms



Scientific IT



Modeling & Simulation



Open Science



Events & Training



Community

#### Our new documentation pages

Use your Empa short name and Empa password for login.

**Scientific IT team**

**Computing & HPC**

**Data Management & openBIS**

**Data Science**

**Software engineering**

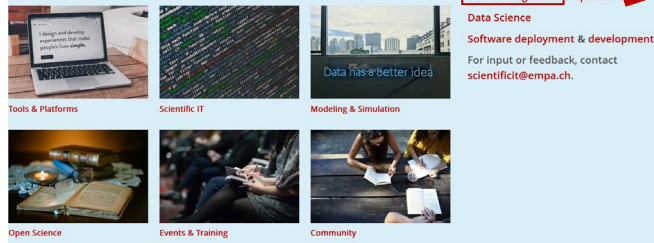
For input or feedback, contact  
[scientificit@empa.ch](mailto:scientificit@empa.ch).

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

# RDM Services & Infrastructure @ Empa

## DigitalScience@Empa

Welcome to the platform about digitalization topics at Empa.



Our new documentation pages:

Scientific IT team

Computing & HPC

**Data Management & openBIS**

Data Science

Software deployment & development

For input or feedback, contact

scientificit@empa.ch.

## How to manage your research data?

Check our information and support pages:

1. **RDM guidelines** to see the advantages of managing your data and possible horror stories if you do not: [here](#)
2. **openBIS** at Empa helps to manage your research data digitally, which includes save data storage, archiving and publishing in data repositories: [here](#)
3. **Data Management Plan (DMP)** to fulfill the requirements of funding agencies: [here](#)
4. **Open Access (OA)** to fulfill the requirement of publishing your paper openly: [here](#)
5. **Open Data Licenses** learn how licenses help to publish your research data openly: [here](#)
6. **Support & training** information [here](#) for:
  - openBIS & Data Management
  - DMP templates & how to get funding for RDM costs
  - Open Access by Lib4RI
  - Scientific IT weekly hours for Software development & Data Science questions
  - Python tutorial twice a year by Scientific IT

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

## SNF Data Management Plan Template

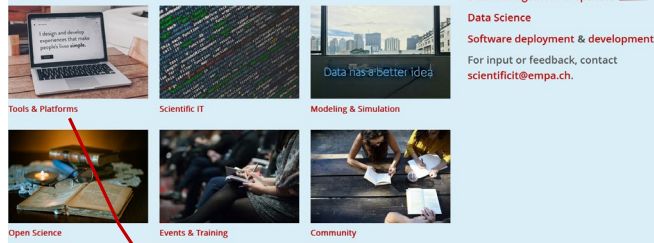
- ❑ Sections analog to the SNF DMP
- ❑ Different categories for
  - ❑ Sensitive data
  - ❑ Using the data management system openBIS
  - ❑ Without using openBIS
- ❑ Description of backup system at Empa
- ❑ Recommendation of FAIR repository

Text  
snippets  
available

# RDM Services & Infrastructure @ Empa

## DigitalScience@Empa

Welcome to the platform about digitalization topics at Empa.



## Collaboration platform – Code versioning



GitLab @Empa

## High performance computing (HPC)

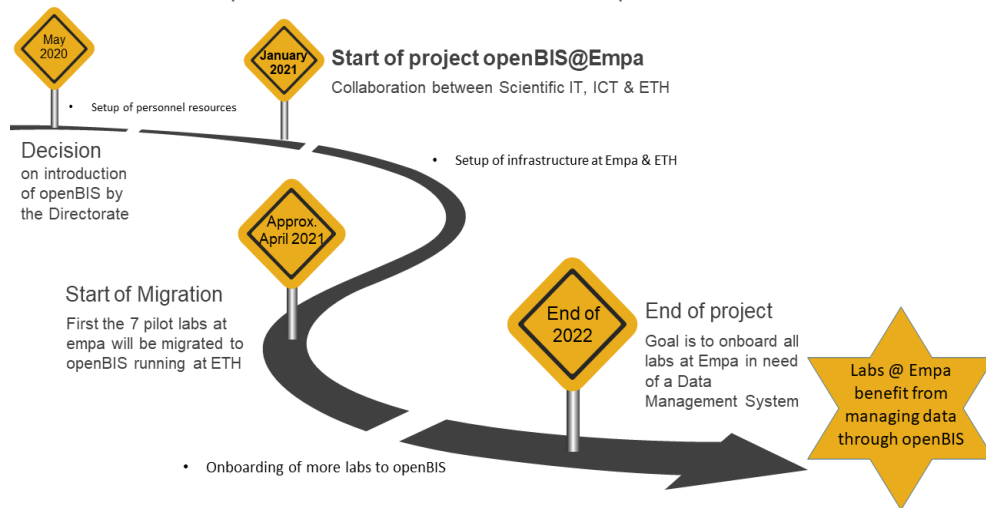
Provision of researchers with technical support regarding HPC-related common problems and long-term projects.

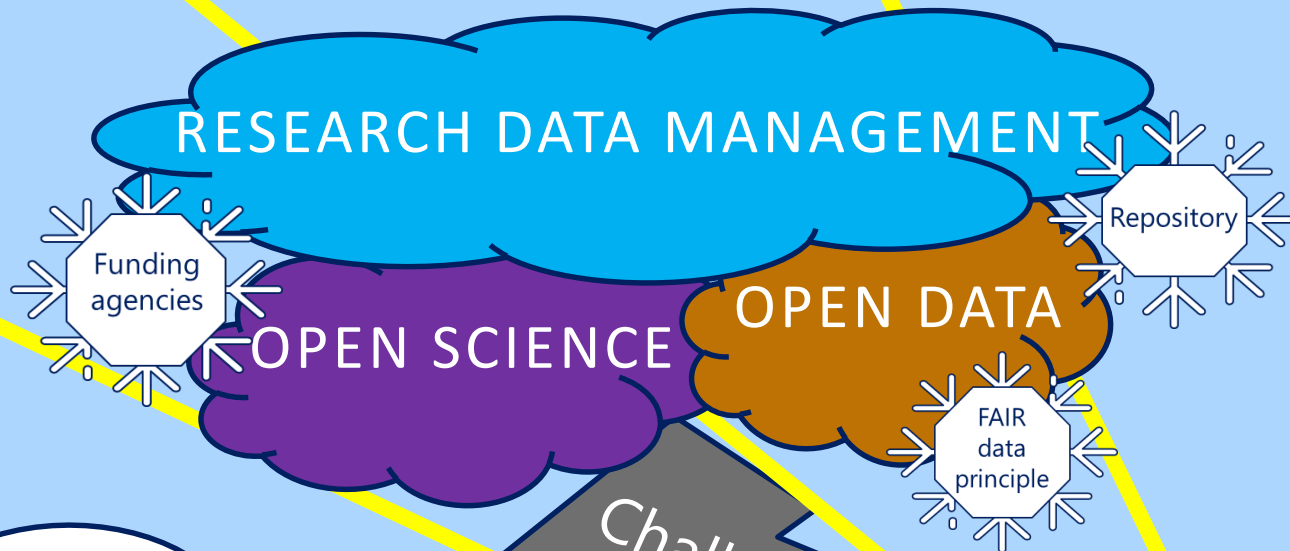
## Data Management System @ Empa

**openBIS**, the **Electronic Laboratory Notebook (ELN)** and **Inventory Management System (LIMS)** at Empa, which 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

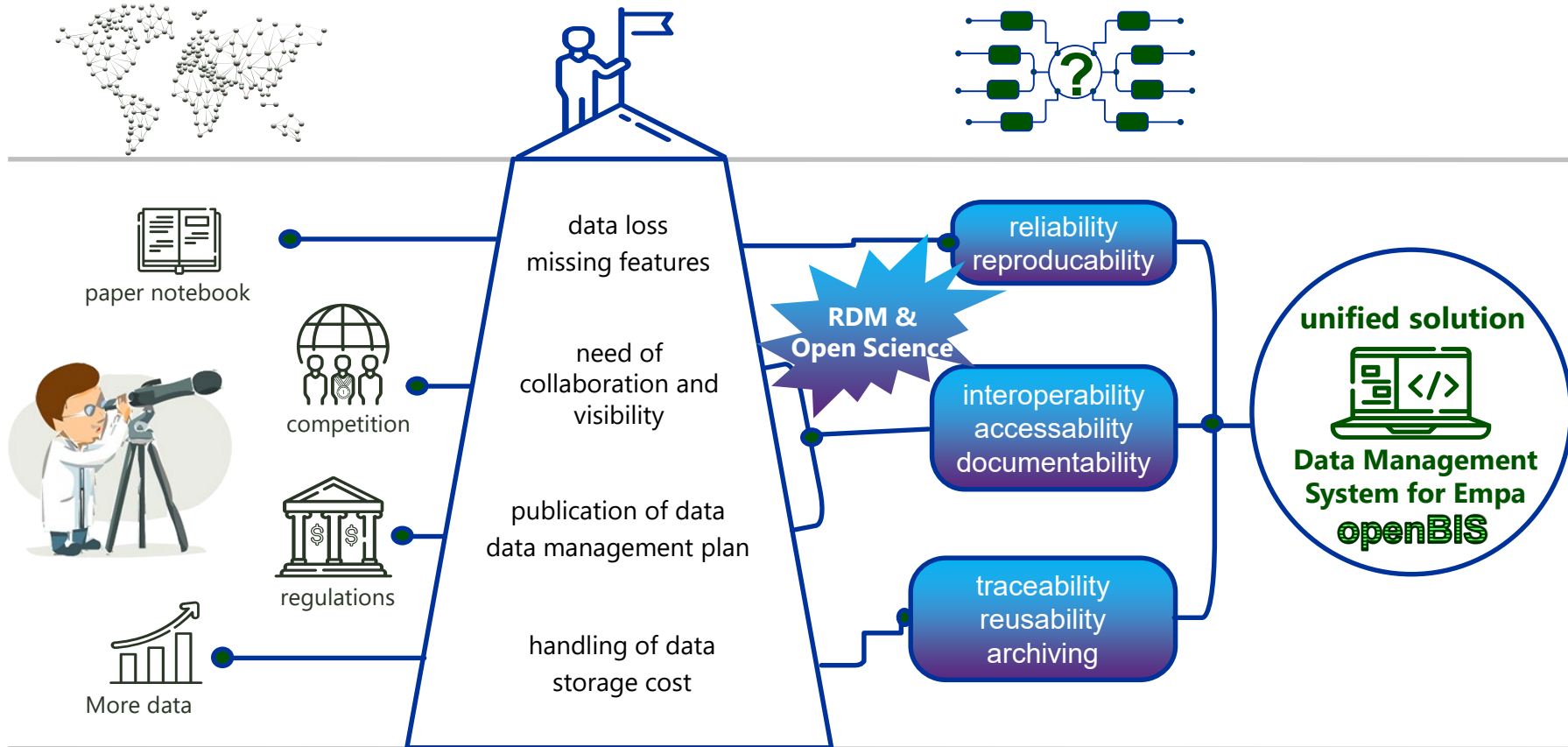


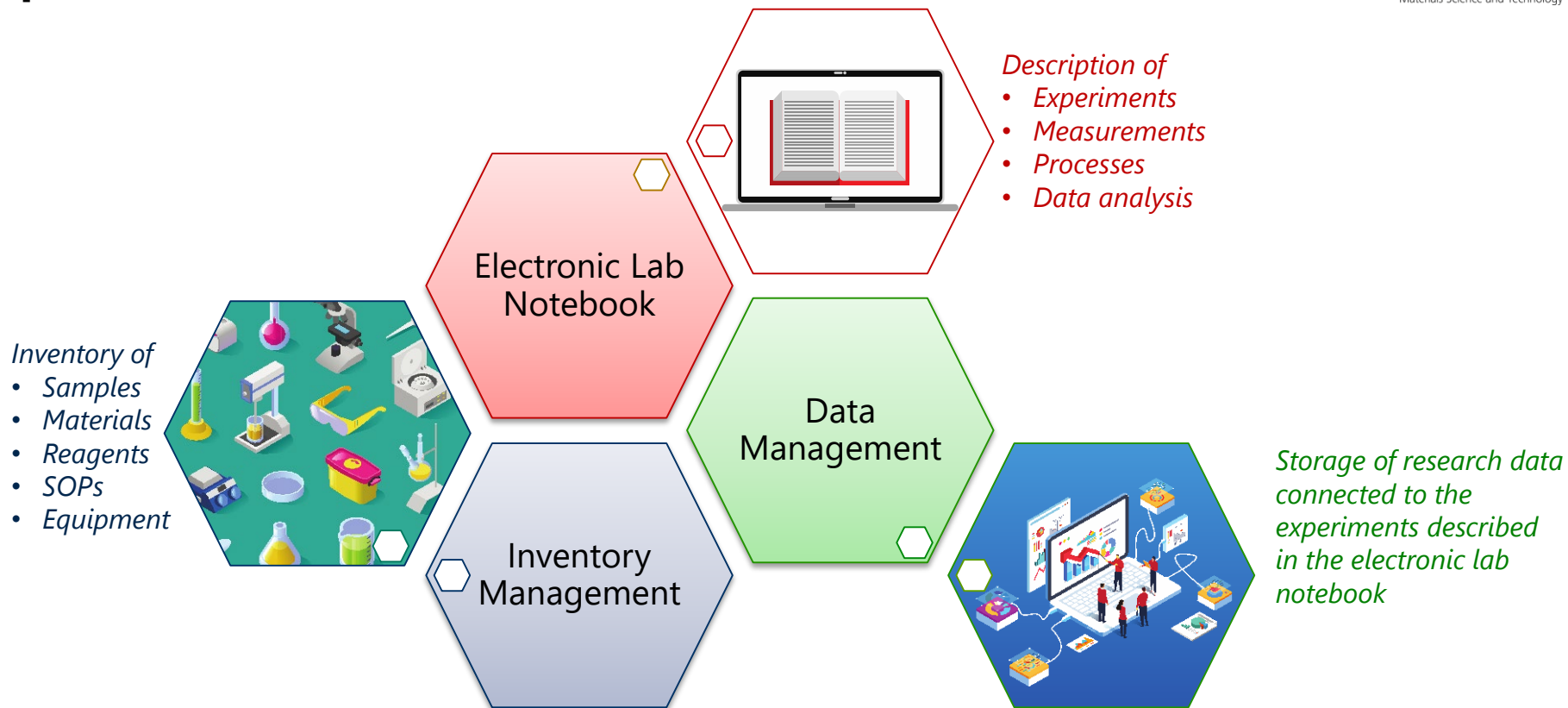


openBIS  
helps to  
solve the  
challenges

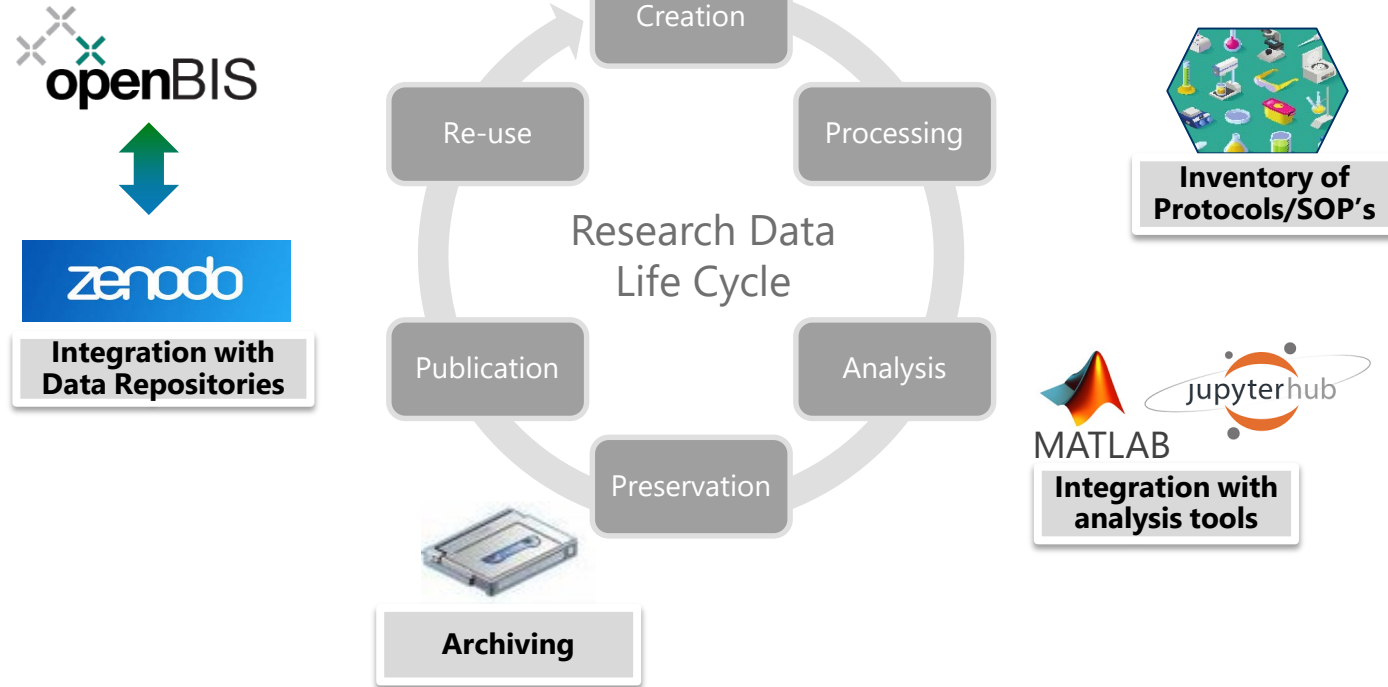
openBIS

# Landscape – Challenges – Solution

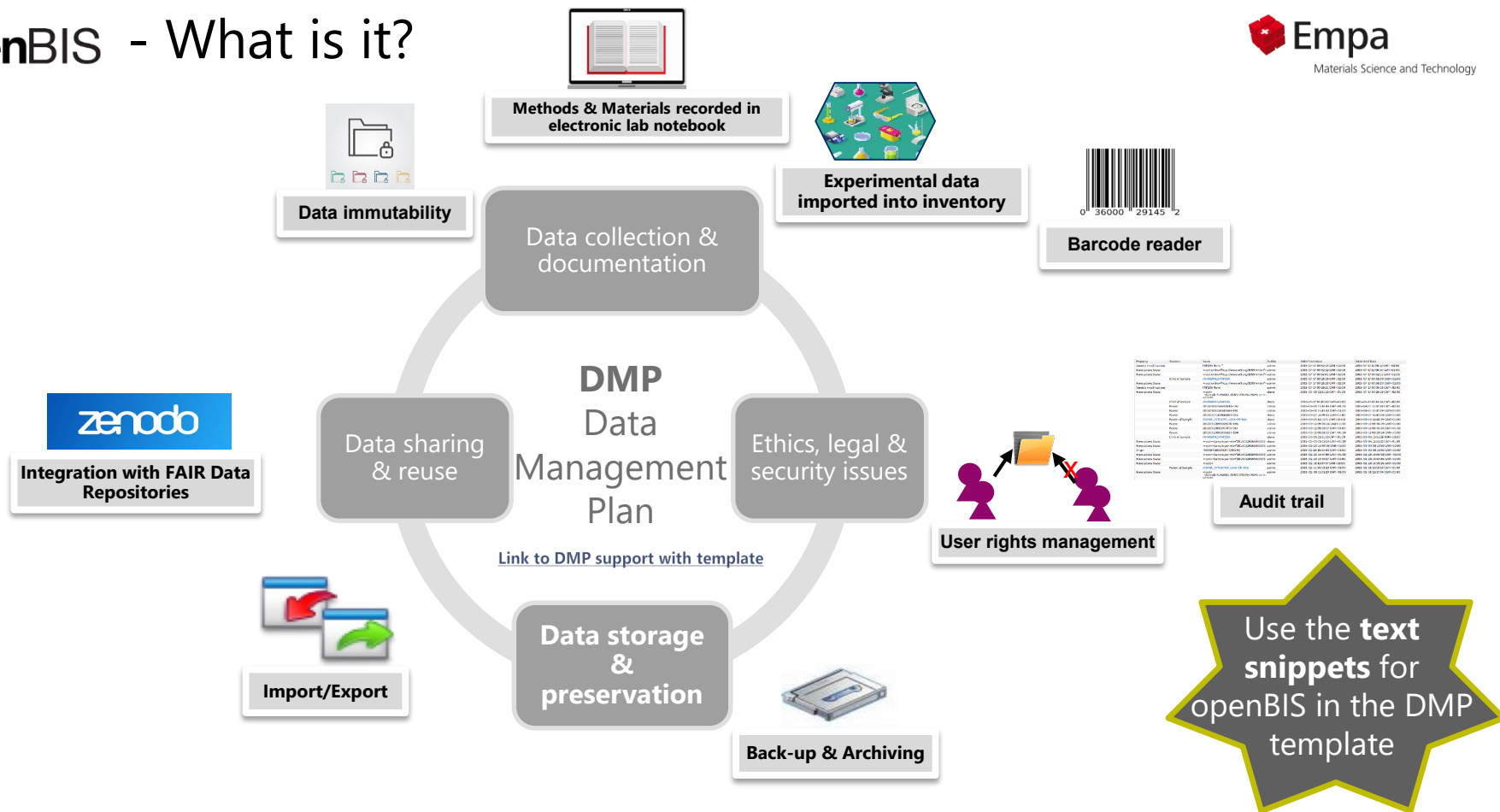




**A data management system – Connecting lab inventory, research data & lab notebook in 1 tool**



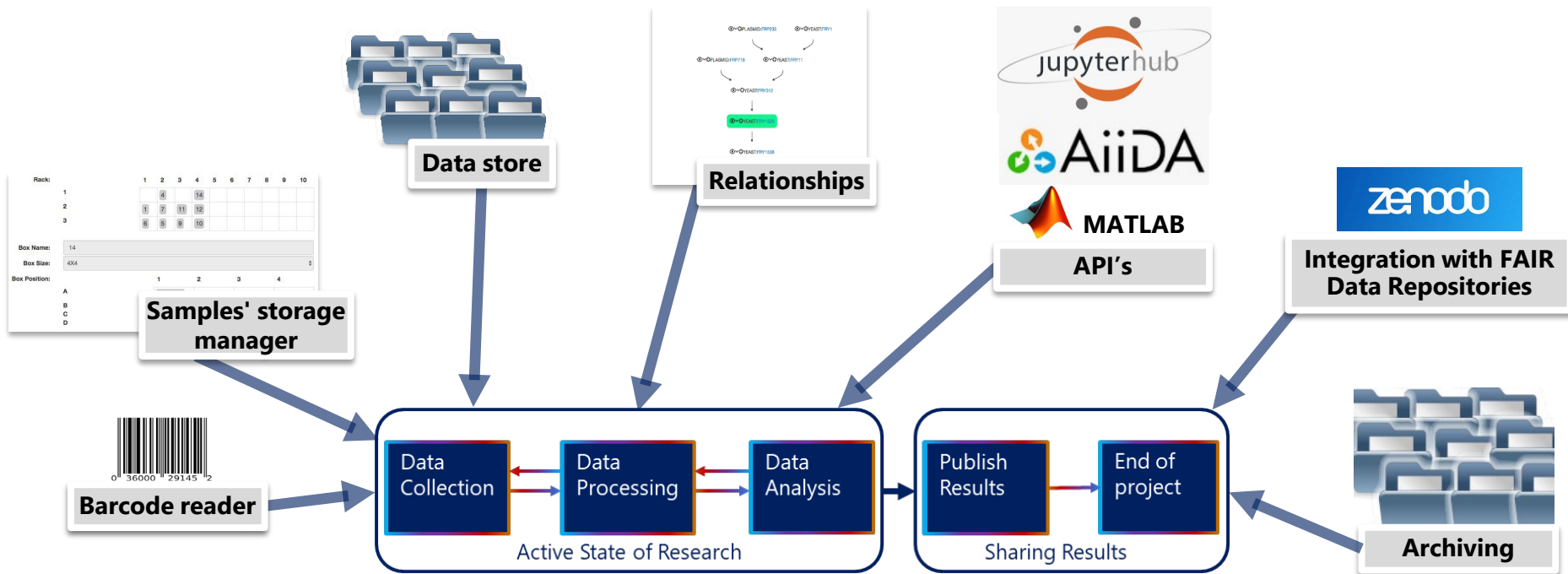
**A data management system – Covering most of the data life cycle in 1 tool**

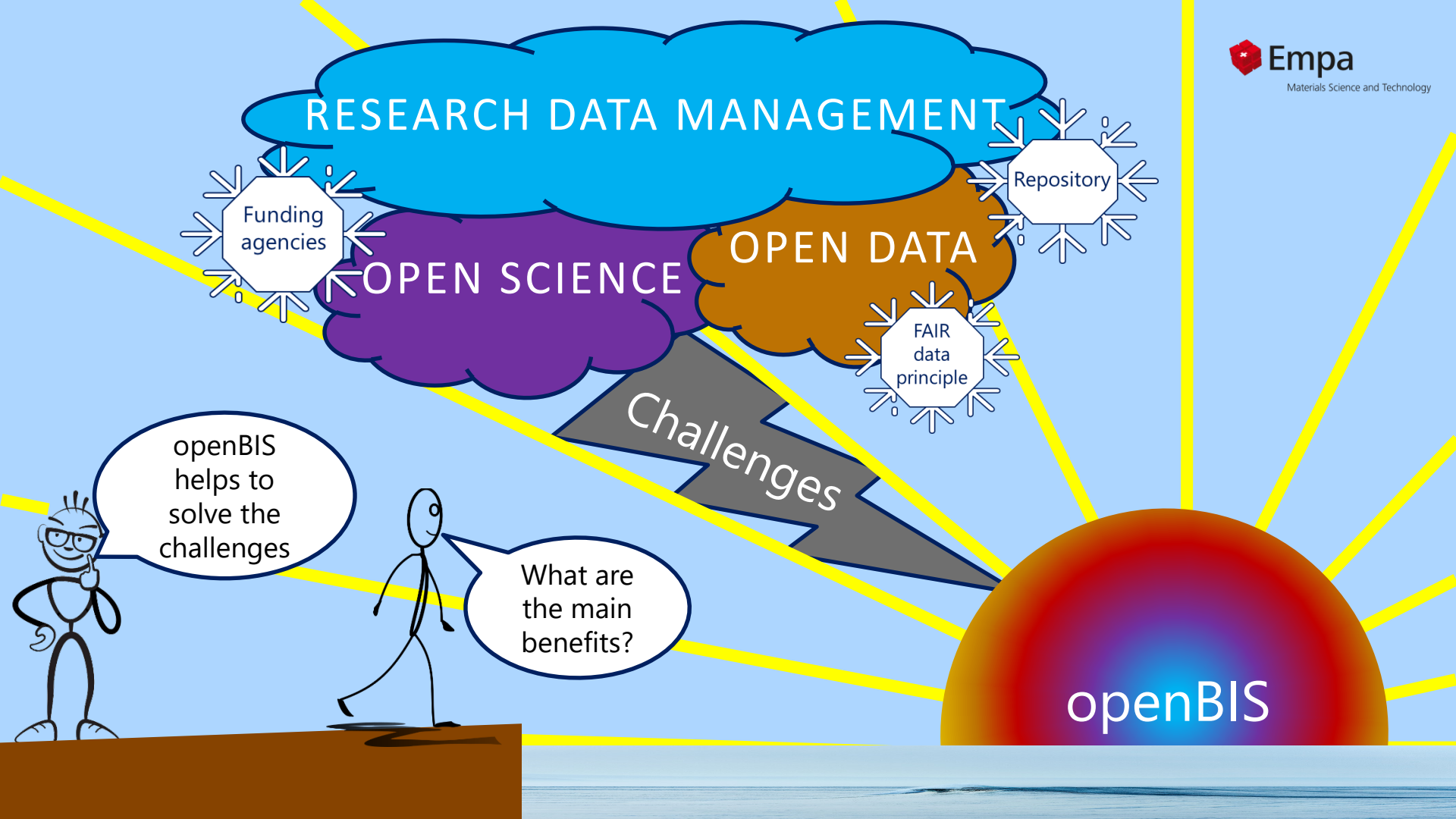


**A data management system – Solving DMPlan requirements of funding agencies with 1 tool**

- Open source software developed by ETH since 2007
  - ELN/LIMS system
- Electronic Lab Notebook & Laboratory Information Management System**

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





# RESEARCH DATA MANAGEMENT

Funding  
agencies

OPEN SCIENCE

OPEN DATA

Repository

FAIR  
data  
principle

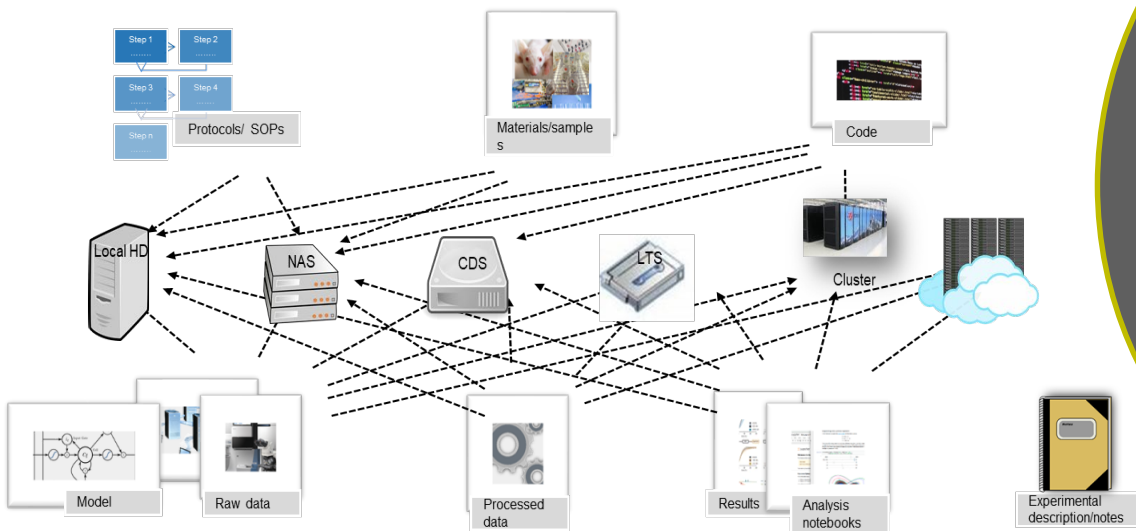
Challenges

openBIS  
helps to  
solve the  
challenges

What are  
the main  
benefits?

openBIS

**A common scenario**  
The "data spread"



**The ideal solution**  
Having everything connected in 1 place



# openBIS - Hierarchy graph

Lab Notebook

Others

Default

Default Lab Notebook

Groupa Anusch.bachhofer At Empa.ch

Groupo Michele.griffa At Empa.ch

Project 1

Creep measurements

Mass loss measurements

Mix designs

Samples 100/0 OPC/CSA

0814-1

0814-2

0814-3

0814-4

0814-5

0814-6

Shrinkage measurements

Shrinkage measurement 1

Shrinkage measurement 2

Shrinkage measurement 7

Shrinkage measurement 16

Others (disabled)

Inventory

Stock

Utilities

About

Shrinkage Measurement: Shrinkage measurement 1

New

Edit

Upload

More

General info

Name: Shrinkage measurement 1

Parents

1-4 of 4

Rows per page: 10

COLUMNS

FILTERS

EXPORTS

Code	Name	Last calibration	Measurement accuracy (in mm)	Gauge reference length (in mm)	Shrinkage dimensionality	SOP ID	Short name of staff	Type
SAMPLE_1	0814-1							New Sample
SHRINKAGE_EQUIPMENT_LENGTH1	Ditast 250 mm LOG 135-34.005	2019-08-07 00:00:00 +0200	0.001	250				Shrinkage Equipment Length
SHRINKAGE_PROTOCOL_1	SIA 262/1, Appendix F				Linear shrinkage	4003		Shrinkage Protocol
STAFF_8	Nikolajs Toropovs						ton	Dienstleistungen Staff

Children

1 of 1

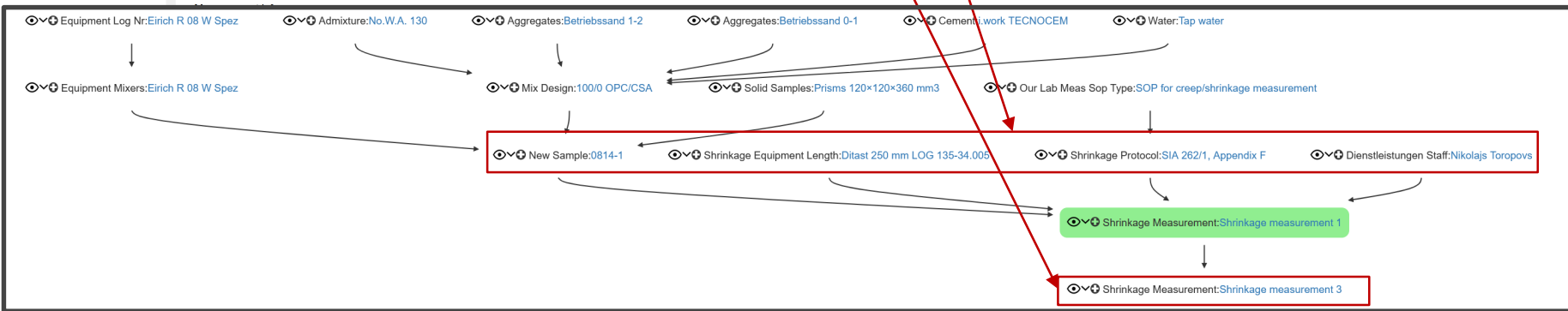
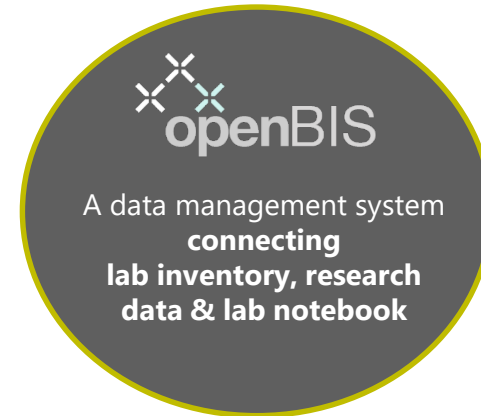
Rows per page: 10

COLUMNS

FILTERS

EXPORTS

Code	Name	Identifier	Shrinkage type	Sample's age at the measurement time point (days)	Shrinkage side A (in microns)	Shrinkage side B (in microns)	Notes
SHRINKAGE_MEASUREMENT_3	Shrinkage measurement 3	/GROUPB_MICHELE.GRIFFA_AT_EMPA.CH /PROJECT_1/SHRINKAGE_MEASUREMENT_3		3	164.0	146.0	





# openBIS benefits



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 losing funding money

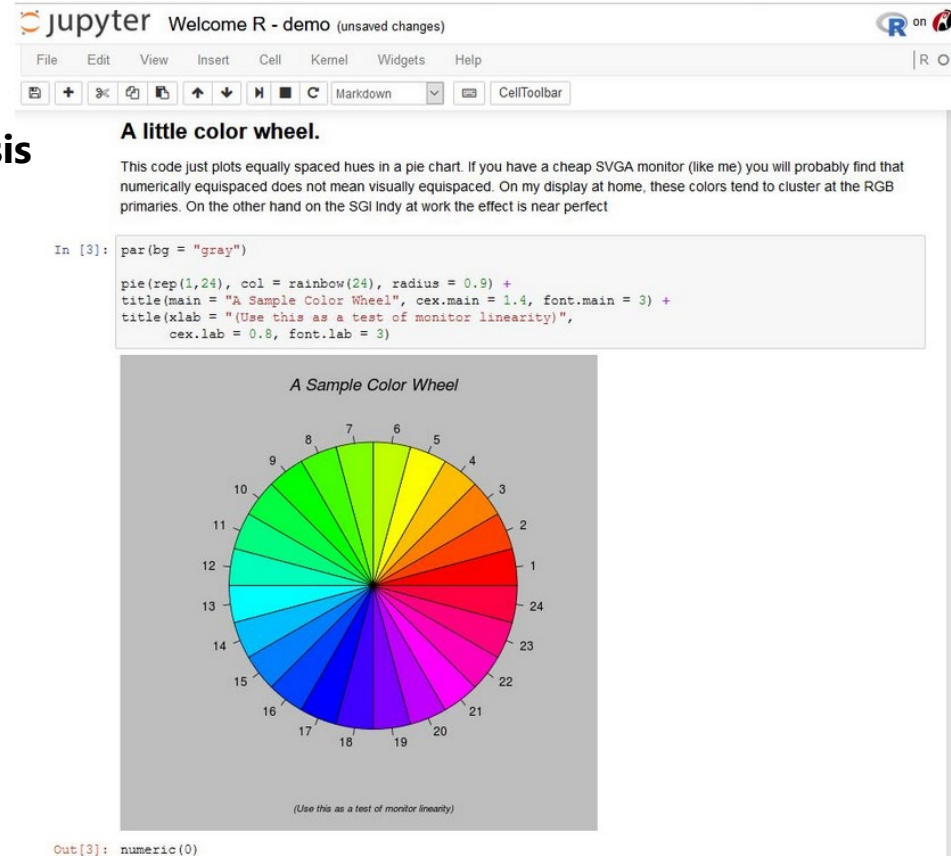


# Data Science with openBIS

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

openBIS comes with Jupyter Hubs for data analysis via **Jupyter Notebooks that support R, Python, Octave**

openBIS API available for Matlab and Python (Pybis)



OPEN ACCESS

OA POLICY OF EMPA

RESEARCH DATA MANAGEMENT

**Empa**  
Materials Science and Technology

**Lib4RI**  
Library for the Research Institutes within  
the ETH Domain: Eawag, Empa, PSI & WSL

**Golden way**

**Green way**



OPEN SCIENCE

openBIS

OPEN DATA

Repository

FAIR  
data  
principle

DMP  
support

**Scientific IT**  
**scientificit@empa.ch**



**DATA MANAGEMENT PLAN  
(DMP)**



**RELIABLE**



**REPRODUCIBLE**

openBIS



**STORING  
BACK UP  
SECURING**



**COLLECTING  
ORGANIZING  
DOCUMENTING**

**openBIS**



**ARCHIVING  
SHARING**

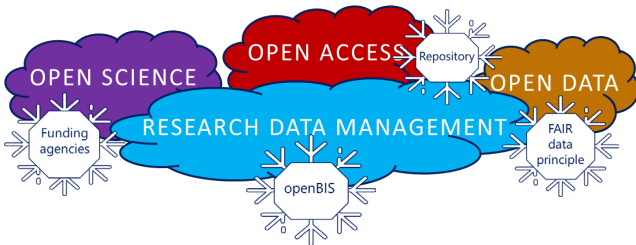
**F.A.I.R.**

**Repository Zenodo**  
**Reproducible Data Analysis**



**REUSABLE**

**Solutions @ Empa for  
RDM & Open Science**



# Support

[scientificit@empa.ch](mailto:scientificit@empa.ch)

<https://scientificit.empa.ch/>



**Empa**  
Materials Science and Technology

# SCIENTIFIC IT

### OUR MISSION

We are at the interface between research and IT. We want to support Empa's research to be at the forefront of materials science by driving Empa's digital transformation and modernising its data management structure.

### OUR SERVICES

- Trainings for Python, openBIS, Research Data Management
- Office hours, Support and ICT interaction
- Connection to expert groups in the ETH domain and Swiss scientific institutions (e.g. SDSC, CSCS, etc.)

### HOW TO CONTACT US

We can be reached via email and through the ticketing system ky2help. For more information on our activities and services please check <https://scientificit.empa.ch>

AREAS OF EXPERTISE	ACTIVITY	SAMPLE QUESTIONS
<b>RESEARCH DATA MANAGEMENT</b>	Good data management and processing practices, promote Open Research Data (ORD). Organisation, transfer, retrieval, handling of sensitive data.	<a href="mailto:openbis-support@empa.ch">openbis-support@empa.ch</a> I would like to have a workflow add-on for openBIS, so it is easier to create all the entries with the correct parent-child connections. Can we design something?
<b>SOFTWARE ENGINEERING</b>	Assist with development and deployment of acquired software. Promotion of good software development practises (docs, git, code optimization).	<a href="mailto:scientificit@empa.ch">scientificit@empa.ch</a> I wrote a script in python and would like to make it available for my coworkers to use after I leave. Can you show me how?
<b>DATA SCIENCE</b>	Tools and methods for materials science research, data driven modeling, collaboration to SDSC.	<a href="mailto:scientificit@empa.ch">scientificit@empa.ch</a> I would like to try out machine learning on my datasets, but I am not sure if it is too complicated, or how to tackle that. Can you help me here?
<b>HIGH PERFORMANCE COMPUTING</b>	Promote usage of national supercomputing resources. Porting and optimizing software.	<a href="mailto:hpc@empa.ch">hpc@empa.ch</a> I'm running an algorithm on my machine, but it always takes so much time. Is there anything you can do about that?

Scan here for our website  
Login with Empa credentials

Elena Pratoni  
 Alessio Bernhartner  
 Eduardo Baldi  
 Matthias Reusser  
 Simone Buffelli  
 Stefanie Heuser  
 Desirée Adamopoulou  
 Alina Kofler  
 Fabio Lopes  
 Pascal Du

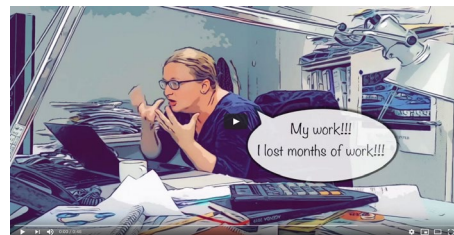
## Videos

**From Open Data to Open Knowledge**  
SIB - Swiss Institute of Bioinformatics • 507 views • 11 months ago

Discover SIB's vision on Open Data, one of the many facets of Open Science - the movement to make scientific research and its dissemination accessible to the society. Harmonizing licenses of datab...

CC

1:34



[https://youtu.be/t\\_rEXpfCTrg](https://youtu.be/t_rEXpfCTrg)  
<https://youtu.be/tFwd2M2OXwQ>  
<https://youtu.be/6kHGbbdFuDE>  
<https://youtu.be/LCZijZP916o>  
<https://youtu.be/NdkIWkRi-ZQ>