



CERN Open Science Policy

Open Education, Training & Outreach

Tim Smith and Sarah Zochling for the
Open Science Strategy Working Group | April 2023

Aim of our roundtable today

*“To elaborate these [i.e. CERN’s **Open Science** goals for (1) training, (2) education, and (3) outreach] further in a coherent, comprehensive and scalable manner, a **roundtable** will be convened **with those responsible for Training, Education and Outreach across CERN** (e.g. representatives from Learning and Development; Academic Training Lectures; and the Accelerator, Physics, and Computing Schools) to discuss the first measures presented below and to assure that all their respective areas are represented appropriately.”*

see Implementation Plan: <https://cds.cern.ch/record/2856044>

Agenda

- 1 | Introduction to the Open Science Policy
- 2 | Defining Open Education, Training & Outreach
- 3 | Material developed for CERN's Education, Training & Outreach Efforts
- 4 | Impact of CERN's Education, Training & Outreach Efforts

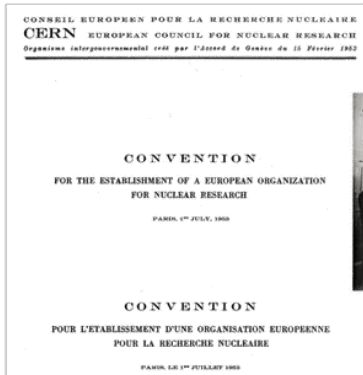
CERN – on the path to universal Open Science



While working at CERN, Tim Berners-Lee invented the **World Wide Web**, initially to simplify information-sharing between scientists



Founding Convention calls for all CERN research to be publicly available



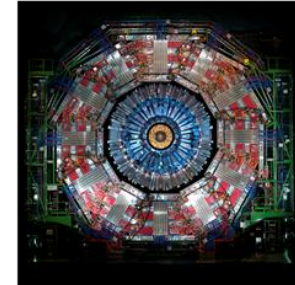
Launch of Zenodo as a general-purpose open repository



- **SCOAP³** initiative starts its operation and converts key journals in particle physics to OA
- **CERN Open Access Policy** released aiming for 100% OA for all CERN articles
- **CERN Open Data Portal** launched



CERN introduces the SCOAP3 idea to initiate **large-scale transition** towards Open Access



All LHC publications will be released **Open Access**



LHC Open Data Policy aligns Open Data practices across all LHC experiments



CERN Open Science Policy released



CERN – *practice first, then describe in a policy!*

www (1989), arXiv (1991), CDS (1993), SCOAP3 (2006), LHC papers (2012)

2014 CERN Open Access Policy

www open licence (1994), open source TF licence recommendation (2012)

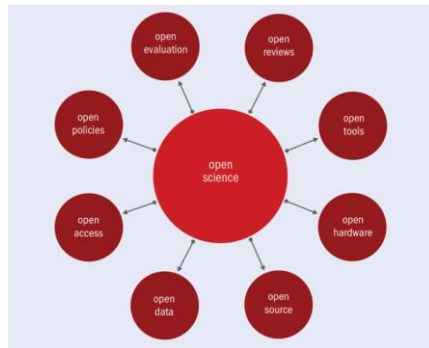
2021 OSPO proposal

Open Hardware licence v1 (2011), OHL v2 (2020)

KT policy: 3 variants; strong reciprocal, weak reciprocal, permissive

CDS (2000), Zenodo(2013), CERN Open Data (2014), HEPData@CERN (2016)

2020 CERN Open Data Policy for LHC



CERN 2019



UNESCO 2021

Similarly for Open Education: Schools, Academic Training, Colloquia, Masterclasses, ...

CERN – on the path to universal Open Science

CERN's first institutional Open Science Policy

- ❖ One year of collaborative drafting, incl. discussions with the Directorate
- ❖ 29th September 2022: presentation to the CERN Council
- ❖ 1st October 2022: Open Science Policy formally in place

⇒ The policy can be found here:
<https://cds.cern.ch/record/2835057>



CERN Open Science Policy

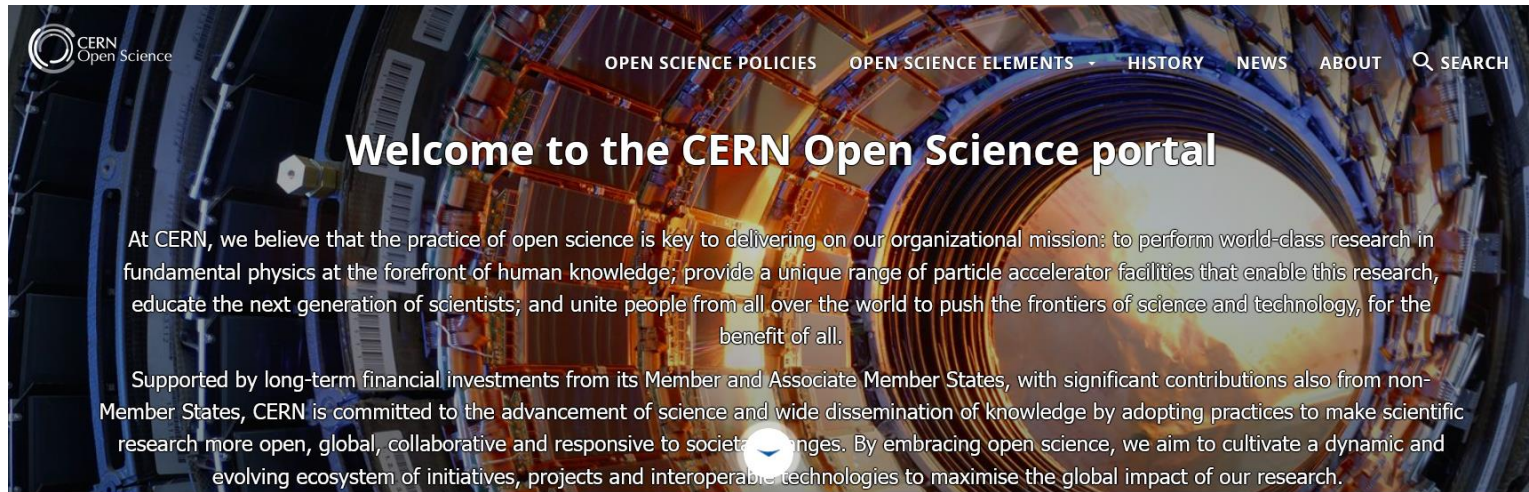
The policy covers 9 areas:

- 1) Open access to publications
- 2) Open data
- 3) Open source software
- 4) Open hardware
- 5) Research integrity, reuse and reproducibility
- 6) Infrastructure provision for open science
- 7) Research assessment and evaluation
- 8) **Education, Training and Outreach**
- 9) Citizen science

CERN Open Science Policy

CERN's Open Science Website:

⇒ More information on the different areas can be found here: <https://openscience.cern/>



ICRC & CERN: open source technologies for humanitarian action

On March 24th, International Committee of the Red Cross (ICRC) representatives from its Delegation for Cyberspace came to CERN for the first in a series of knowledge-sharing sessions on using free and

CERN supports open access publishing for books

Ever since the open access (OA) publication of peer-reviewed primary research articles from CERN authors was made a policy requirement in 2014, CERN has made great strides forward in opening its
2022-12-22

LHCb releases first set of data to the public

The [Large Hadron Collider Beauty](#) (LHCb) experiment at CERN is the world's leading experiment in quark flavour physics with a broad particle physics programme. Its data from Runs 1 and 2 of the [Large](#)
2022-12-08

[more](#)

CERN Open Science Policy

Open Science Strategy Working Group (OSWG):

- ❖ Formed in 2021 as a CERN-wide exchange forum on open science activities
- ❖ Established the Open Science Policy
- ❖ Currently working on an implementation plan for the Open Science Policy
- ❖ ~30 members
 - ⇒ We, Tim and Sarah, are responsible for the Open Training, Education, and Outreach area

CERN Open Education, Training & Outreach

“CERN is committed to developing training courses to facilitate the adoption of open science and equip researchers and supporting personnel at all levels with the necessary skills and expertise to conduct research in an open and reusable (FAIR) way.

Training

Furthermore, CERN commits to facilitating the use of open educational material in teaching/education at schools and universities. CERN encourages the preparation of resources to engage pupils and teachers, both inside and outside the classroom setting, in interactive learning exercises with open datasets and software products. Wherever possible, CERN links open data, software, hardware and additional open resources to published research articles so that they can be used in university courses to practise research and corresponding methodologies (e.g. statistics, machine learning).”

Education & Outreach

see Open Science Policy: <https://cds.cern.ch/record/2835057>

CERN Open Education, Training & Outreach

How can we implement this Open Science Policy in our practice?

⇒ CERN Open Science Policy: Implementation Plan

<https://cds.cern.ch/record/2856044>

- i. draft definitions,
- ii. draft aims and
- iii. iterate with practitioners



CERN Open Education, Training & Outreach

Draft definitions (in this context):

- ❖ **Training:** within CERN, refers to activities that promote the building of capacity on Open Science related activities/practices.
- ❖ **Education:** beyond CERN (especially focusing on school and university students), refers to activities that promote the conceptual understanding of CERN's scientific domains (e.g. physics and engineering) and how the nature of science (e.g. "science is a social endeavour") is facilitated by Open Science practices.
- ❖ **Outreach:** beyond CERN (especially focusing on the general public), refers to activities that promote awareness of CERN's field of research and research methods emphasising Open Science activities/practices.

see Implementation Plan: <https://cds.cern.ch/record/2856044>

CERN Open Education, Training & Outreach

Implementation

*“Embedding Open Science in CERN’s Training, Education and Outreach efforts means providing **training courses** on the principles of **Open Science** (e.g. Open Data) and the tools used for practising Open Science **within the CERN community**. **Beyond the CERN community**, this also means making the **Education and Outreach material** used **openly available**. CERN aims to embody UNESCO’s definition of an Open Science organisation “aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone” (UNESCO 2021), through the following **Open Science goals for (1) training, (2) education, and (3) outreach.**”*

see Implementation Plan: <https://cds.cern.ch/record/2856044>

CERN Open Education, Training & Outreach

(1) Open Science Training aims:

- ❖ establish training courses on the **principles of Open Science covering FAIR data.**
- ❖ establish training courses on the **practicalities of Data Management Plans, reusable analysis and analysis preservation services.**
- ❖ establish training courses on the **practicalities of Open Access and Open Data publishing.**

see Implementation Plan: <https://cds.cern.ch/record/2856044>

CERN Open Education, Training & Outreach

(2) Open Science Education aims:

- ❖ host education programmes (e.g. hands-on workshops) for **teachers, school and university students covering the open nature of science.**
- ❖ offer **online education material about modern physics** for teachers, school and university students, and interested individuals.
- ❖ **conduct physics education research** promoting the conceptual understanding of CERN's scientific domains and the open nature of science.
- ❖ **publish new or already existing educational material, and education research findings** according to the Open Science standards (see #3 below).

continued

CERN Open Education, Training & Outreach

(2) Open Science Education aims:

- ❖ act as **publishing house** for an Open Access Science Education Journal - **PriSE (Progress in Science Education)** - the only multilingual international journal in this area.
- ❖ make material from the **CERN schools (physics, accelerator, computing), Summer student programmes, and the Academic Training series (presentations, videos) available** according to Open Science standards (see #3 below).

see Implementation Plan: <https://cds.cern.ch/record/2856044>

CERN Open Education, Training & Outreach

(3) Open Science Outreach aims:

- ❖ host **outreach events (e.g. physics masterclasses)** in the local area and in the Member and Associate Member States based on CERN's Open Data sets.
- ❖ develop **exhibitions for visitors (on- and off-site) on the theme of Open Science** and the importance of open data practices for wider society (e.g. data driven decision making).
- ❖ **publish outreach material** according to the Open Science standards (see #3 below).

see Implementation Plan: <https://cds.cern.ch/record/2856044>

CERN Open Education, Training & Outreach

How would you define
“CERN’s Training, Education
and Outreach material
relevant for Open Science”?

- ❖ What would you change about the draft definitions and related aims?
- ❖ What would you add/delete?

CERN Open Education, Training & Outreach

Where do we go from here?

To implement and reach the aims described above, the following tasks should be completed within the next year:

- 1) Agree on a **definition of “CERN’s Training, Education and Outreach material relevant for Open Science”**.
- 2) Based on this definition, compile a **list of recommended CERN’s Training, Education and Outreach material and external training offers and material relevant for Open Science**, including whether it is already openly available online on a CERN website and has a clear licence, and if not, document whether it can or cannot be published openly.
- 3) The **material identified as suitable** should be gradually **made available openly on a CERN website** and **ultimately** under an open licence (i.e. CC-BY for text, CC0 for data).

continued

CERN Open Education, Training & Outreach

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continued

CERN Open Education, Training & Outreach

Where do we go from here?

To implement and reach the aims described above, the following tasks should be completed within the next year:

- 4) Those **responsible for CERN's Training, Education and Outreach efforts** should continuously **update the OSWG on additional material to be added to the list.**
- 5) Those responsible for CERN's Training, Education and Outreach efforts are recommended to **consult the future CERN Open Science Policy Office.** They will facilitate and publicise CERN's contributions to society through openly available Training, Education and Outreach material and promote CERN as an "Open Science lab" to provide implementation guidance for the Training, Education and Outreach part of CERN's Open Science Policy.

see Implementation Plan: <https://cds.cern.ch/record/2856044>

Material developed for CERN's Education, Training & Outreach Efforts

How do you develop
Training, Education and
Outreach material?

- ❖ Which experts do you commonly approach?
- ❖ Where do you publish the produced material? Is it openly available?
- ❖ Do you see a benefit in such a catalogue of recommended CERN's Training, Education and Outreach material and external training offers and material relevant for Open Science?

Impact of CERN's Education, Training & Outreach Efforts

How do you measure
the impact of your
Training, Education and
Outreach efforts?

- ❖ Do you usually produce statistics about the audience?
- ❖ If yes, is it literally who turns up or more broadly (views, downloads, ...)?
- ❖ For example, the accelerator school writes (used to write?) a “Yellow Report” - How often is it downloaded?

Conclusions

❖ 3 main points of our meeting today:

- 1) **Definition** of CERN's Training, Education and Outreach material relevant for Open Science
- 2) **Material** developed for CERN's Education, Training & Outreach Efforts
- 3) **Audience/impact** of CERN's Education, Training & Outreach Efforts

❖ Further input/feedback/questions?



**Thank you very much for
your time and input!**

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Open Science Strategy Working Group | April 2023