# Fostering Open Science in Europe: Engagement Strategies from EOSC's Task Forces on Research Careers and Curricula

Written by the Co-Chairs of the following EOSC-A task forces:
1. Data Stewardship, Curricula, and Career Paths Task Force
2. Research Careers, Recognition, and Credit Task Force
3. Upskilling Countries to Engage in EOSC Task Force
4. Researcher Engagement & Adoption Task Force

## Authorship Community

- Celia W.G van Gelder (1) ORCID: 0000-0002-0223-2329; Health-RI, The Netherlands
- Ilire Hasani-Mavriqi (1) ORCID: 0000-0003-0758-0805; Graz University of Technology; Austria
- Iryna Kuchma (1) ORCID: 0000-0002-2064-3439; OpenAIRE/EIFL
- Gustav Nilsonne (2) ORCID: 0000-0001-5273-0150; Karolinska Institutet / Swedish National Data Service, Sweden
- Sabina Anderberg (3) ORCID: 0000-0002-3344-8130; Stockholm University, Sweden
- Helen Clare (3) ORCID: 0000-0002-6656-3012; Jisc, United Kingdom
- Jessica Lindvall (3) ORCID: 0000-0002-5042-8481; Stockholm University, Sweden
- Zisis Kozlakidis (3) ORCID: 0000-0002-3836-7209; BBMRI-ERIC, France
- Sverker Holmgren (4) ORCID: 0000-0002-5298-2590, Chalmers University of Technology, Sweden
- Franciska de Jong (4) ORCID: 0000-0003-1541-9712; CLARIN ERIC, The Netherlands
- Julia Priess-Buchheit (support 1,2,3) ORCID: 0000-0003-3029-9683, Kiel University, Germany

## Table of contents

## Abbreviations

| | |
|---|---|
| CESAER | CESAER - the strong and united voice of universities of science and technology in Europe |
| EOSC | European Open Science Cloud |
| ERIC | European Research Infrastructure Consortium |
| ESFRI | European Strategy Forum for Research Infrastructure |
| EUA | European University Alliance |
| FAIR | Findability, Accessibility, Interoperability, and Reusability |
| HEI | Higher Education Institution |
| MAR | Multi-Annual Roadmap of EOSC |
| OS | Open Science |
| SRIA | Strategic Research and Innovation Agenda of EOSC |
| RFO | Research Funding Organisations |
| RPO | Research Performing Organisations |
| RI | Research Infrastructure |
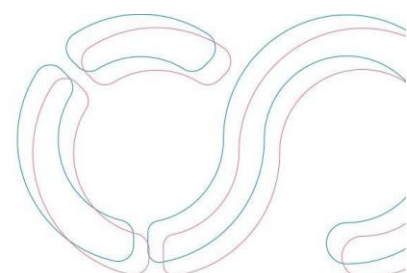
# 1 Introduction

Open Science practices reshape how researchers conduct, disseminate, and use research, making it more transparent, accessible, and efficient. These practices allow for a more inclusive approach to research, where data, findings, and methodologies are available, promoting collaboration and accelerating innovation.
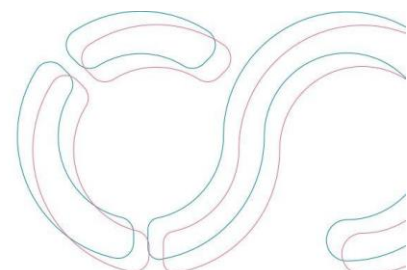
The data-driven transformation of current research practices is both necessary and inevitable. "The digital age allows the ways research is conducted to change in multiple directions, resulting in better science, increased trust in science, and the ability to meet global challenges" (SRIA1.2, p.17). The rapid technological developments integrate with and influence all aspects of scientific discovery. For example, the creation and rapid scale-up of distributed scientific databases have been major steps in this direction. The European Commission anticipates that data are central to the sustainability and development of many fields of activity, e.g., healthcare. However, data should not be perceived as a big European 'data lake' but as a system for data exchange and access governed by common rules, procedures, and technical standards (Hansen et al. 2021).

Embracing the vision of digital transformation, in November 2018, the European Commission launched the European Open Science Cloud (EOSC). The EOSC envisions establishing the European web of FAIR data and related services for research, which will facilitate making research data easy to find, access, interoperate, and reuse (FAIR) and trusted. Also, sustainable research outputs will be available within and across scientific disciplines. Central to this ambition is deploying a trusted federation of existing data, research, and e-infrastructures and adopting Open Science practices and skills as the new normal.

The Strategic Research and Innovation Agenda of EOSC says: "It may be hard to engage researchers directly, so EOSC often has to work through intermediaries who can represent their requirements and interests" (SRIA 1.2, p.60). Research intermediaries such as universities, research infrastructures and science clusters, libraries and repositories, university associations, research institutes, etc., will be essential for the success of EOSC. They will be fundamental to i) drive the Open Science and FAIR cultural change by developing, advocating, and implementing institutional, national, and European Open Science policies, practices, and standards; ii) reach out to individual researchers and educate them in and support them with the transition to Open Science and EOSC-specific features; iii) promote the adoption of and contribution to the web of FAIR data and related services.

Considering this intermediary concept, the European Open Science Cloud Association has four task forces working on engagement and participation coordinated inside the advisory group research careers and curricula.

As a result, after two years of work, these four task forces describe their principles and recommendations for engagement in open science under the umbrella of EOSC in this joint publication. They describe general and tailored recommended actions for research intermediaries to adopt and implement Open Science.

**EOSC Association AISBL**

Rue du Luxembourg 3, BE-1000 Brussels, Belgium
+32 2 537 73 18 | info@eosc.eu | www.eosc.eu
Reg. number: 0755 723 931 | VAT number: BE0755 723 931

## 2 Research Careers and Curricula and the EOSC Association

The "Research Careers and Curricula" advisory group started to address the challenges and opportunities related to research careers in the era of Open Science. The advisory group consists of four task forces:

1. Data Stewardship, Curricula, and Career Paths Task Force
2. Research Careers, Recognition, and Credit Task Force
3. Upskilling Countries to Engage in EOSC Task Force
4. Researcher Engagement & Adoption Task Force

The members of the task forces are experts from all European regions and often have a national role in their own country. This ensures that together, the task force members have an excellent insight into the status of the implementation of OS in Europe, both related to success and challenges.

The task forces provide input to developing the Strategic Research and Innovation Agenda (SRIA), the Multi-annual Roadmap of EOSC-A (MAR), and support collaboration between relevant projects and key stakeholders and intermediaries in Europe and beyond to align and improve the policies and practices on research careers and curricula.

Furthermore, they support collaboration between the EOSC Association and the Coalition for Advancing Research Assessment, the Research Data Alliance, EUA, CESAER, and many others to find synergy and align strategies and activities on engagement, research careers, recognition, and credit.

Next to supporting a shift in research assessment, they establish how data stewardship is currently operationalised and implemented in European countries and institutes. Concentrating on fostering research engagement and adoption, they recognise the significant developments in Open Science being addressed at the Member State level and within research-performing organisations, research infrastructures, and disciplinary groups. They raise awareness regarding Open Science and improve engagement with EOSC.

The work of the four task forces had and has significant implications for the research communities. By giving recommendations and promotion, the group helps to ensure that current and future researchers are well-equipped to contribute to and thrive in the Open Science landscape in Europe. With its work, they aim to assist in aligning various initiatives and supporting onboarding into EOSC by promoting the exchange of approaches across the member states and regions, organisations, and groups.

## 3 Principles of Engagement in Open Science under the Umbrella of EOSC

The multistakeholder principle guides EOSC development (SRIA1.2 p.61-63) and leads the
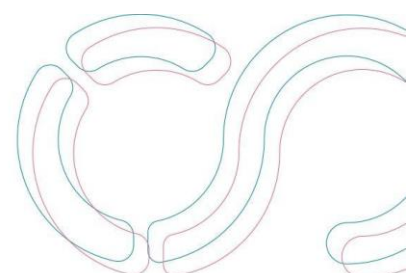
engagement process, which connects EOSC with research communities. The four task forces collect research communities' needs and ensure that EOSC's operation and services add value to researchers' processes while respecting the academic autonomy of research data.

For the 6th General Assembly, the EOSC Association named several important EOSC intermediaries. The advisory group summarised their work relating to the following:

### Research Infrastructures and [Science Clusters](#)

Research infrastructures (RI) are facilities, resources, or services that provide access to major scientific equipment (or sets of instruments), knowledge-based resources such as heritage collections, data archives, scientific data, analytic tools, and programmes for skills development. The European RI ecosystem includes widely distributed data infrastructures providing access to resources under a model of services federation and large single-sited facilities. The European policy framework for stimulating and monitoring the important role of the RI's thematic services and their interoperation with generic e-infrastructures is in the hands of the European Strategy Forum for RI (ESFRI).

The science clusters have grown from five collaborative projects funded by the European Union in 2019 to link Europe's thematic RIs to the EOSC. Together, they cover astronomy and particle physics, environmental science, life science, photon and neutron science, as well as social sciences and humanities. The thematic services developed by the clusters form key building blocks for the EOSC fabric and the wider Open Science agenda and provide harmonised access to data, tools, workflows, and training, both within and across disciplinary boundaries.

### Libraries and Repositories

Libraries at universities often play a central role in the engagement of the cultural shift to Open Science. The libraries have a natural connection to the researchers and are often very service-minded. In many cases, the university libraries host the repositories for the university, and more and more libraries have data stewards organised within their organisation. Often, the libraries are involved in the researchers' skills development. Many libraries function as the universities' Scholarly Communication Office. They are often working to help the researcher with questions about Open Access and have funds to pay the article processing charges.

### Universities and University Associations

Universities and university associations are institutions of higher learning and scholarly research that provide academic degrees in various disciplines, with associations serving to unite, represent, and advocate for these institutions on a broader scale. EOSC is expected to serve approximately 2 million researchers in Europe ultimately, most of them working at more than 800 European universities, and progressively expanding its user base to include the wider public and private sectors (MAR2025, p.12). For most European researchers, their university is the natural open science contact point. Many universities already have advanced open science structures, including policies and procedures, local supporting data infrastructures, and training. These resources will naturally connect many European researchers to the federated EOSC framework, either as individual institutions or by a first-level federation, e.g., at the national level.

### Research Institutes

There are research-focused institutes next to universities and teaching institutions. Many research institutes established frameworks for open science, data handling, processing,
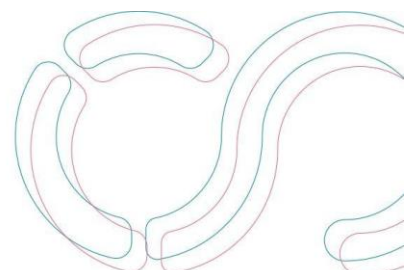
education, training, and awareness activities. They are important in ensuring policy implementation and providing the community with support, guidance, and training. The principle followed is 'as open as possible, as closed as necessary,' balancing open science with the realities of the research environment. In EOSC, research institutes can contribute to the open science movement in its federated form. The open science structures at a national level need to be adopted and implemented in the various research institutes in their respective scientific domains.

**EOSC Partnership**
The signature of the contractual arrangement by the EOSC Association and the European Commission marked the start of the Co-programmed European Partnership on EOSC. This EOSC Partnership brings together all relevant stakeholders to co-design and deploy a European Research Data Commons where data are findable, accessible, interoperable, and reusable (SRIA, p. 50).
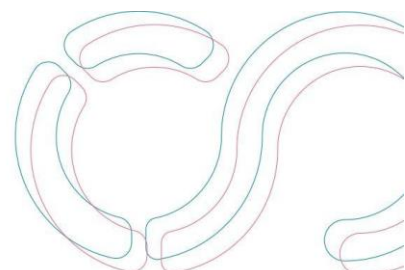
# 4 General and Tailored Actions to Adopt and Implement Open Science

The advisory group experience from the last two years shows that a one-size-fits-all approach in engaging the intermediaries is not feasible. A major challenge is that each nation has different needs, obstacles, and opportunities. That is why the advisory group recommend general and tailored actions, emphasising that each intermediary best knows what works for them.

**GENERAL ACTIONS**
We recommend the following general actions for all the mentioned EOSC intermediaries:
- ❖ **Co-organise stakeholder events** - for example, tripartite events, EOSC coffee, retreats or festivals,
- ❖ **Provide opportunities for learning and sharing** - including summer schools, hackathons, retreats,, knowledge exchange workshops, gamification, train the trainers' programmes,
- ❖ **Build a network of ambassadors/champions** - through an ambassadors' programme or train the trainers' initiative,
- ❖ **Provide financial support** - such as adoption grants or prizes,
- ❖ **Communicate actively and effectively** - community blog posts, official communications materials for reuse, real-life case studies, tailored communications for your country/community,
- ❖ **Join EOSC communities** - such as task forces or project expert groups- to learn about other countries' strategies.

**EOSC Association AISBL**

Rue du Luxembourg 3, BE-1000 Brussels, Belgium
+32 2 537 73 18 | info@eosc.eu | www.eosc.eu
Reg. number: 0755 723 931 | VAT number: BE0755 723 931

**TAILORED ACTIONS**

In addition to the general recommendation, we recommend the following tailored actions:

- ❖ Collaboratively **reform assessment systems** to align with open science principles, rewarding researchers for open practices in hiring, promotions, and grants, particularly within the CoARA framework, while independently documenting, monitoring, and evaluating the impacts of these reforms.
  - ➢ Universities, university associations, and research institutes should consider this action.

- ❖ Support the development of **open infrastructures for research assessment**, including FAIR and open documentation of research assessment policies and practices.
  - ➢ All stakeholders in the EOSC Partnership should consider this action.

- ❖ Enable funding actions that support universities and researchers to **reform research assessment** and complement the activities of CoARA and its members, including supporting research on research assessment systems to build a sound evidence base and supporting piloting responsible use of indicators/metrics, including Open Science.
  - ➢ All stakeholders in the EOSC Partnership and research funding organisations should consider this action.

- ❖ Facilitate cross-faculty discussions and provide systematic and continuous **capacity building on open science** concepts and practices, including broad comprehension of the open science guiding principles and core values as well as technical skills and capacities in digital literacy, digital collaboration practices, data science, and stewardship, curation, long-term preservation and archiving, information and data literacy, web safety, content ownership, and sharing, as well as software engineering and computer science.
  - ➢ Universities, university associations, libraries and repositories, and research institutes should consider this action.

- ❖ Develop curricula and career paths for data steward profiles in policy, research, data, and infrastructure, and as agents of change, i.e., skills to champion data stewardship across an organisation in political, technical, and research contexts, and provide peer-to-peer learning, structured onboarding, on-the-job training, train the trainer, and apprenticeships on **data stewardship**.
  - ➢ Universities, university associations, libraries and repositories, and research institutes should consider this action.
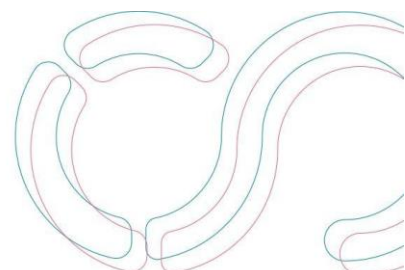
❖ Support the implementation of aligned European curricula (including certification) for **data stewards**, establish proper career paths, and support the implementation of a core curriculum for **data stewardship for researchers** as a core element in research programmes.
  ➢ European policymakers, funders, and governments should consider this action.

❖ Draft a dedicated **strategy towards EOSC**
  ➢ Universities, Rectors Conferences, Research Institutes, Research Infrastructures, and Science Clusters should consider this action.

❖ Strengthen the role of **research-performing organisations** and their European networks in the EOSC-A policy work, e.g., by forming an EOSC-A working group.
  ➢ EOSC-A should consider this action

❖ Maintain **interaction with ERIC Forum** on aligning community outreach in the research infrastructure ecosystem and EOSC-related topics.
  ➢ Research Infrastructures and Science Clusters should consider this action.

# 5 References

1. European Open Science Cloud Association (2023): Strategic Research and Innovation Agenda (SRIA) of the European Open Science Cloud (EOSC) Version 1.2 – 1 November 2023, https://eosc.eu/wp-content/uploads/2023/12/20231114_SRIA_1.2_final2.pdf .
2. European Open Science Cloud Association (2023): Draft - EOSC Multi-Annual Roadmap (MAR) 2025 and 2026–2027, https://eosc.eu/sites/default/files/2023-01/MAR_2025-27_draft.pdf.
3. European Commission. The strategy report on Research Infrastructures, Roadmap 2021. (2021). Available at https://roadmap2021.esfri.eu/
4. Hansen, J., Wilson, P., Verhoeven, E., Kroneman, M., Kirwan, M., Verheij, R., & van Veen, E. B. (2021). Assessment of the EU Member States' rules on health data in the light of GDPR.