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Acronym	Definition / Meaning
APC	Article Processing Charges
CERI	Community Engaged Research and Innovation
CoARA	Coalition for Advancing Research Assessment
CRUE	Spanish Universities Conference of Rectors
CSIC	Spanish National Research Council
DAPE	Diagnosis, Alignment, Pilot/Practice and Engagement/Education
DIOSI	Developing and Implementing hands-on training on Open Science and Open Innovation for Early Career Researchers
DMP	Data Management Plan
EC	European Commission
EOSC	European Open Science Cloud/Commons
ERA	European Research Area
EU	European Union
EUA	European University Alliance
FAIR	Findable, Accessible, Interoperable, Reusable
FOS	Full Open Science pilot
GDPR	General Data Protection Regulation
LERU	The League of European Research Universities
MS	Milestone
NBN	National Broadband Network
NCU	Nicolaus Copernicus University
NGM	Next Generation Metrics
OA	Open Access
OAIS	Open Archival Information System
OER	Open Educational Resources
ORE	Open Research Europe
OS	Open Science
OS-CAM	Open Science Career Assessment Matrix
OSPP	Open Science Policy Platform
PCI	Practical Commitment for Implementation
RPO	Research Performing Organization

List of Abbreviations and Definitions



Acronym	Definition / Meaning
Skills4EOSC	Skills for the European Open Science commons: creating a training ecosystem for Open and FAIR science
UAntwerp	University of Antwerp
UBremen	University of Bremen
UCY	University of Cyprus
UC3M	Universidad Carlos III de Madrid
UEF	University of Eastern Finland
UEssex	University of Essex
UM	University of Maastricht
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIRI	University of Rijeka
URN	Uniform Resource Name
WP	Work Package
YERUN	Young European Research Universities Network
YUFE	Young Universities for the Future of Europe
YUFERING	YUFE Transforming Research and Innovation through Europe-wide Knowledge Transfer

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1. Introduction

The term "open science commons" is widely discussed in the academic and scientific context. It typically refers to a space that is open, shared, and inclusive, allowing the global scientific community to access, share, and collaborate on research outcomes such as data and publications. It aims to promote transparency, accessibility, and collaboration in scientific research by providing a platform for researchers to freely share and access information, data, services and tools. In our case, the YUFERING project did not aim at creating a common technical platform for YUFE alliance members, but rather to establish a **shared knowledge platform** to implement best practices and share commitments to make Open Science "the default" or "the new normal" in our Universities as Research Performing Organizations (RPOs).

As European Universities and as EU Alliance (EUA), we all have a logic and envisioned "commons" in the traditional meaning of "Open Science Commons" discussed beforehand, the EOSC (European Open Science Cloud/Commons), but we want to define here also the common framework and understanding to implement OS among YUFE universities.

This document is the final deliverable of WP5 of YUFERING (D5.1 Open Science: establishing the New Normal). It aims to recap the results and conclusions that we have agreed upon after almost three years of work (and a pandemic in the middle) to achieve YUFERING's fourth objective: "To make Open Science the *new normal* by creating a YUFE Open Science Strategy".

2. Methodological approach towards a YUFE Open Science Commons

As a "wrap-up-deliverable", D5.1 will review all the work done during the WP, particularly pointing out our general methodological approach "DAPE" that included four steps or phases on the aim of coming up with a common strategy:

1) Diagnosis: This phase was focused on identifying the barriers and challenges to implementing Open Science in YUFE universities at both the researchers and institutional levels. To do this, we conducted a comprehensive survey among YUFE University members. Although participation levels varied among institutions, the survey, which garnered responses from 549 researchers, offered us a broad understanding of each institution and provided valuable insights into the knowledge, needs, and concerns about Open Science among our researchers. In addition to the survey, we also compiled and studied institutional policies, open access mandates, and other related policies pertaining to Open Science at each institution to complete the diagnosis.



- 2) Alignment: During this phase, we conducted an analysis of our policies and practices among YUFE partner universities and established common practices. Additionally, it was highly beneficial to align our training activities in Open Science, as evidenced by the work carried out in Task 5.4 (referenced in D5.3). It could be argued that our most significant effort in alignment was particularly evident in D5.3: the YUFE Open Science Syllabus, where we successfully aligned our practices with the interests of our researchers, as indicated by the survey results.
- 3) Pilots/Practices: During this phase, the focus was on identifying potential Practical Commitments for Implementation (PCIs), as outlined in the final report of the EU Open Science Policy Platform (OSPP) (Méndez et al., 2020). The most notable successful pilot initiative was the FOS: Full Open Science program, which aimed to support and acknowledge Open Science practices within research teams associated with YUFE. These teams utilized a specific set of criteria to align their research practices, outcomes, and outputs with the principles of FOS, and were supported by library services at each of the participant institutions. The outcomes of this pilot were shared during an online workshop held on September 15th, 2023, with the participation of UNESCO¹ (MS13).

Another very important pilot towards our OS Commons was focusing on the research assessment and new indicators on Open Science (see the <u>Deliverable 5.2</u> on YUFE Open Science Model with respect to researchers' assessment). For that purpose, we, for instance, reviewed the existing (not YUFE-specific) guidelines and frameworks related to researchers' assessment and Open Science, and scrutinised to what extent YUFE universities' policies and practices recognise Open Science in academic career structures or in assessments. The group worked on a new kind of template (YUFE Academic Assessment Portfolio) that would recognise researchers' contributions and future visions in Open Science. In addition, we came up with a collection of good practices in the assessment of researchers' contributions, practices that follow the principles of Open Science.

4) Engagement/Education/Training. Education and training are crucial to understand and embrace Open Science by our researchers, and it is something always claimed by them in the survey's answers. To meet that need, and with the spirit of alignment WP5, under task 5.4 we co-created the <u>YUFE Open Science Syllabus (D5.3)</u> that provides the basis for the training activities we have performed during the YUFERING project. These trainings will be also our standard point to plan future trainings in OS, adapting and including content to the new needs in the global development of Open Science. In order to engage more our researchers, we also created formative material like the successful <u>DIY YUFE Open Science Calendar</u> (D5.4) distributed in all our universities for 2022, and

¹ See: <u>http://eventos.uc3m.es/go/YUFERING-OS-bottom-up-implementation</u>



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also adapted by many other institutions in the world. Related with training and engagement, the collection of <u>Open Science Games</u> (MS10) is also very important, since it gathers gamification initiatives of different aspects of OS, both developed by YUFE universities, as well as by other institutions.

3. Diagnosis and alignment of YUFE Open Science institutions

As we have outlined in the previous sections, to diagnose perception and engagement with Open Science practices at YUFE universities, we (i) surveyed researchers at YUFE institutions and (ii) reviewed the current institutional policies concerning OS practices.

3.1 Perceptions and engagement with Open Science practices among YUFE researchers: results of the OS Survey

To conduct the diagnostic survey, we conceptualised engagement with Open Science as a set of behaviours while using the COM-B model (Michie et al., 2011, 2014; Norris & O'Connor, 2019). The model represents a framework for understanding and facilitating behavioural change and postulates that behaviour (B) is a product of the interaction between Capability (C), Opportunity (O), and Motivation (M).



Figure 1: The COM-B Model Applied to Understanding Open Science Behaviours (Michie et al., 2014)

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In brief, capability refers to one's physical and psychological capacity to engage in a behaviour, encompassing knowledge and skills. Opportunity represents external factors that enable or prompt the behaviour, including physical resources and social factors like cultural norms. Motivation encompasses the brain processes that direct behaviour, extending beyond conscious decision-making to include habits, emotions, and reflexive responses. This model is instrumental in developing strategies for behaviour modification, emphasising the interplay of individual capabilities, external opportunities, and motivational factors.

We defined five main target behaviours that will be relevant across different fields at YUFE universities:

- 1) Preparing data/sources and uploading them to a publicly accessible repository (Open data),
- 2) Preparing materials/protocol/workflow and uploading them to a publicly accessible repository (Open materials),
- 3) Making a paper/manuscript publicly available (Open access),
- 4) Making citizen science/participatory/collaborative research,
- 5) Pre-registering a study (Pre-registration).

We then conducted behavioural analyses for each targeted behaviour in terms of the main components, while considering whether any change at the institutional level would be possible. If such a possibility emerged, then it was assessed in the questionnaire. The resulting questionnaire featured seven questions tapping into the uptake of the targeted behaviours (Q1), perception of researchers' capabilities: perceived knowledge (Q2) and training needs (Q3), perception of institutional support: institutional level opportunities (Q4a) and their possible improvements (Q4b), and perception of intrinsic and extrinsic motivation (Q5 and Q6).

The online survey was directed to the researchers of the YUFE universities, including academic staff and postgraduate research students. Participants were recruited via institutional emails and newsletters. We aimed to collect around 500 valid responses (i.e., around 50 participants per institution). We recorded 845 attempts to respond to the questionnaire out of which 549 participants had completed the questionnaire.

The analytical sample was sex-balanced and included researchers at each career stage, predominantly those with both research and teaching responsibilities. Participants mainly came from the social and natural sciences. Researchers affiliated with Universidad Carlos III de Madrid were slightly over-represented (102 answers), while those from Maastricht University were under-represented (32 answers). (For details, see Table 1).



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Variable	п	%	Mean
			(<i>SD</i>)
Gender			
Male	267	48.8	
Female	267	48.8	
Other	3	0.5	
Prefer not to say	10	1.8	
Age (in years)			42.1
			(10.7)
Career Stage			
R1: Early-stage researcher	132	24.0	
R2: Postdoctoral researcher	84	15.3	
R3: Independent researcher	214	39.0	
R4: Leading researcher	119	21.7	
Responsibilities			
Research only	140	25.5	
Research and teaching	397	72.3	
Teaching only	12	2.2	
Field			
Natural sciences	129	23.5	
Engineering and technology	82	14.9	
Medical and health sciences	57	10.4	
Agricultural and veterinary sciences	3	0.5	
Social sciences	202	36.8	
Humanities and the arts	76	13.8	
University			
Maastricht University	32	5.8	
Nicolaus Copernicus University	49	8.9	
Tor Vergata University of Rome	47	8.6	
Universidad Carlos III de Madrid	102	18.6	
University of Antwerp	51	9.3	
University of Bremen	47	8.6	
University of Cyprus	52	9.5	
University of Eastern Finland	48	8.7	
University of Essex	60	10.9	
University of Rijeka	61	11.1	

Table 1: Description of Socio-demographic Characteristics of the Sample from YUFE Universities

Uptake of Open Science practices



The researchers in our sample reported that they are engaging in various open science practices (see Figure 2). Open-access publishing was the most common practice, although a considerable proportion reported never or only sometimes engaging in it. Making research data open and making materials open followed the open-access publishing. Conducting citizen science and pre-registering were much less common among the participants. Notably, pre-registering a study was the least practised, with the majority indicating they never do this, highlighting it as the least adopted open science practice within this group.



Figure 2: Self-Reported Open Science Practices Among Researchers at YUFE University

Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to mean frequency (excluding the "Not applicable" category): from the most common (top) to the least common (bottom). The values under 5% are omitted due to space constraints in the display boxes.

Capabilities: Assessment of current knowledge and training needs

We asked two questions: one to identify the current capabilities to conduct open science, and the other to find the perception of the training needed to close the potential knowledge gaps.

We assessed the perception of the current level of knowledge by asking the question "How knowledgeable are you of the following Open Science practices?" As shown in Figure 3, researchers perceived themselves as knowledgeable in publishing open access and using repositories for uploading data and materials. They perceived themselves to have substantial knowledge gaps in navigating open science legislation, licensing, conducting citizen science, and preparing pre-registration protocols.



Figure 3: Perceived Knowledge of Open Science Practices Among Researchers at YUFE Universities



Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to mean knowledgeability (excluding the "Not applicable" category): from the most knowledgeable (top) to the least knowledgeable (bottom). The values under 5% are omitted due to space constraints in the display boxes.

These perceived knowledge gaps were then identified in the subsequent question identifying learning opportunities ("Which of the following Open Science practices would you like to know more about?"). We asked the researchers to assess their training needs regarding various OS practices (see Figure 4). The majority of researchers feel sufficiently knowledgeable about where and how to make their papers open access. However, researchers required additional guidance and training in areas navigating open science legislation and selecting open licences, where a substantial percentage of participants have expressed the need for more comprehensive support. Furthermore, practices like 'Conducting Citizen Science' and 'Pre-Registration Protocols' also show considerable gaps in knowledge, with many researchers seeking both written materials and training. The figure underscores specific domains within Open Science where educational interventions could be highly beneficial, highlighting the varying levels of proficiency and the need for tailored educational resources across different OS practices.





Figure 4: Training Needs of Open Science Practices Among Researchers at YUFE Universities

Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to the proportion of interest in any guidance: from the most needed (top) to the least needed (bottom).

Opportunities: Assessment of current support and its improvement

To assess the perception of the current support, and the areas where improvement in support is required by their institution, the researchers answered two questions.

First, they assessed the current support provided by their institutions (*How well are the following Open Science practices supported at your university?*). They perceived that the highest level of support was devoted to the guidelines and policies, specialists' advice, and training opportunities about where and how to make their publications open access. This also included institutional repository infrastructure. The support for open data and materials—in terms of guidelines and policies, training and advice—was also perceived as relatively high. On the other hand, citizen science and pre-registration guidelines and policies, as well as specialists' advice and training, were perceived by almost half of those who were aware of any support for these activities. Similarly, researchers were also less aware of the existing support for these two open science practices (i.e., answered "I do not know").



Figure 5: Current University-Level Support of Open Science Practices Among Researchers at YUFE Universities



Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to the mean support: from the least supported (top) to the most supported (bottom).

Second, they assessed where further support could be provided (*Also, please indicate which of these practices you would like to be supported at your university*). The most additional support required was perceived in the specialist advice on how to navigate intellectual property rights and privacy regulations when adopting open research practices, and how to choose and apply a licence for sharing open resources (open data, materials and access); providing financial support for publishing in open access journals; providing general support (e.g., help desk) for open science practices, and advice and training in practices deemed to have lower support: citizen science, pre-registrations, and materials archiving.



Figure 6: Perceived Need of Additional University-Level Support of Open Science Practices Among Researchers at YUFE Universities



Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to the proportion of additional support needed: from the most additional support needed (top) to the least additional support needed (bottom).

Motivation: Assessment of current motivation and possible incentives to increase OS

We used two questions focusing on motivation. We assessed the intrinsic motivation for the targeted open science behaviours by self-assessment of their importance (i.e., *How important is it for you to engage in the following Open Science practices?*). Participants had to indicate how important it is for them to engage in open science practices on a scale ranging from 1 to 5 (1 = "Not at all important", 5 = "Extremely important") or select the option "Not applicable in my field". As shown in Figure 7, the most important motivating factor for the researchers is to publish using open access, with a majority of researchers rating this category as very or extremely important. Furthermore, researchers also perceived making data and materials open as important. Researchers perceived citizen science and pre-registering studies as less important; still, both of these activities are valued with relatively high importance.



Figure 7: Perceived Importance of Open Science Practices Among Researchers at YUFE Universities



Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to the mean importance (excluding the "Not applicable" category): from the most important (top) to the least important (bottom). The values under 5% are omitted due to space constraints in the display boxes.

We assessed external motivation by asking researchers to rate university-level incentives (i.e., *To what extent would the following university-level incentives motivate you to engage more in Open Science practices?*). They indicated to what extent the following university-level incentives would motivate them to engage more in open science activities on a scale ranging from 1 to 5 (1 = "Not motivating at all", 5 = "Extremely motivating").

As shown in Figure 8, the most motivating were the following options: universities providing funding for costs involved in open-access publishing, universities partnering with open-access journals for reduced publication costs, universities providing financial incentives for engaging in Open Science practices, universities recognising Open Science engagement in promotion criteria, and universities recognising time allocated to open science practices. These options were all perceived as "very" or "extremely motivating" by the majority of participants. The least —but still fairly— motivating was the mandatory requirement by the university/department to engage in Open Science practices, and the university providing non-financial incentives for engaging in Open Science practices (i.e., Open Science Award).



Figure 8: Perceived External Motivation of Open Science Practices Among Researchers at YUFE Universities



Note: In the survey, the presented options were shown in random order. In the graph, they are displayed according to how motivating, on average, the option was: from the most motivating (top) to the least motivating (bottom). The values under 5% are omitted due to space constraints in the display boxes.

3.2 Review of the current Open Science policies

In this section, we present a narrative review of the OS policies and mandates of the YUFE universities according to the following open science elements: open access, open data and methods, open education, citizen science, pre-registration, and open scholarship. This analysis of policy content enables us to highlight areas where further alignment would be advised as well as to share examples of good practices across universities and propose a common YUFE open science policy and roadmap.

Open Access

All YUFE universities expect their researchers to store a digital copy of the full text (published article or final peer-reviewed manuscript) in the institutional repository. The universities of Eastern Finland, Nicolaus Copernicus, Rijeka, Cyprus, Antwerp and Maastricht have very detailed OS policies in place detailing the requirements for all open-access routes as well as for "closed" publications. The University of Bremen has an Open Access Policy in place and is currently working on an overall Open Science Policy. The University of Eastern Finland has just updated its overall OS policy and is currently working on an Action Plan for Open Science that will concretise the OS Policy. The University of Antwerp has designed a specific <u>website</u> on OS,



including its policies and activities around OA. Likewise, Universidad Carlos III de Madrid, has a specific <u>website</u>, where OA policies, agreements are practices are also underlined. The universities of Eastern Finland, Nicolaus Copernicus, Rijeka and Cyprus also have specific recommendations in place for the use of Creative Commons (CC) licences. The universities of Eastern Finland, Nicolaus Copernicus, Rijeka, Essex, Bremen and Maastricht also offer financial support for open-access publishing (i.e., for Article Processing Charges, APCs) or they have special agreements with open-access publishers for reduced publication fees; Universidad Carlos III de Madrid (UC3M) applies the transformative agreements negotiated centrally in Spain by CRUE (Spanish University Rectors Conference) and CSIC (Spanish National Research Council). The universities of Nicolaus Copernicus and Rijeka have mandatory use of commonly accepted machine-readable identifiers (DOIs), while Rijeka also has a mandatory assignment of a persistent URN: NBN identifier for all works stored in the nationally established Dabar institutional repositories.

Moreover, the universities of Rijeka and Maastricht have specific open-access policies in place regarding student theses/dissertations. For instance, Rijeka asks to include a signed student statement on the publication of the defended bachelor and/or master thesis, and doctoral dissertation, and a statement permitting the publication of such papers online via institutional repositories and using the digital version of such papers in accordance with generally accepted international standards (CC BY licences) and the rules on open access. Furthermore, the universities of Rijeka and Cyprus also have special monitoring mechanisms in place for open access; for example, in Rijeka, this includes statistics on repository storage, access, and retrieval, as well as statistics on the number of publications by researchers from the University and its constituents in open access journals.

At the University of Eastern Finland, the open access materials repository <u>UEF eRepo</u> contains theses and publications of the University of Eastern Finland, self-archived versions of articles, and metadata of research data made available by the UEF researchers. All University series and monographies publications are provided with the required identification numbers (ISBN, ISSN, URN). <u>UEF CRIS</u> Research Database records data on projects, publications, expert, other scientific and academic activities of the University of Eastern Finland. At the University of Eastern Finland, the total cost of scholarly publication channels and individual publications is also transparent and made publicly available.

A global approach can be also found at UC3M, where the Open Science policies outline not only the goals of the institution, but also the responsibilities of both researchers and the university. Researchers must make Open Science a key parameter in the research process design; they have to deposit the publications and to plan, manage and deposit the data; and they are encouraged to disseminate their outputs in open access as soon as possible and to aim for ethical commitment and research reproducibility. On the other side, the institution is committed to provide training, guides, systems and infrastructures, such as the publication and data repositories, and also to take open science practices into account when it comes to research assessment and economic incentives.



Open data and methods

Most YUFE universities have data management plans (DMPs) support and/or tools in place. They also mention FAIR data as a key priority in their open science policies: researchers are encouraged to make their data, methods, and metadata openly available by submitting them to an open repository. The universities of Essex and Antwerp do not mention directly open data or FAIR principles in their policies, but they do have data management plans in place regarding data deposit, retention and accessibility. Nicolaus Copernicus' open data policy also specifies that data should be published in a repository under a Creative Commons Public Domain licence (CC0) while they, along with the University of Cyprus, also highlight that metadata should meet the OPENAIRE guidelines. UEF eRepo contains metadata of the research data of UEF researchers. The UEF researchers choose the most applicable data repository (national or international) and submit the open research data there. After that, the metadata is transferred automatically to eRepo by harvesting. At the moment, automatic transfer to eRepo is possible from Etsin, Zenodo, EUDAT and Dryad. Etsin catches research data from the main national repositories and services, such as Finnish Social Science Data Archive, The Language Bank of Finland, Finnish Environment Institute, IDA and Fairdata PAS.

Maastricht University also has specific infrastructures in place, as well as long-term external storage facilities and a DATAHUB for research data support, and aims to be fully FAIR by 2023 so that 100% of data generated by researchers will be made available internally for (re)use, and externally where applicable. UC3M policies require researchers to deposit their data according to FAIR principles keeping in mind limitations regarding privacy, intellectual property or other variables; UC3M provides tools and infrastructures for both creating DMPs and for depositing data that are managed and maintained by the regional Madroño Consortium. University of Antwerp is involved in the Flemish interuniversity FAIR Vault project, in which four universities collaborate at developing a joint infrastructure for the preservation of sensitive research data in accordance with FAIR principles and the standards and basic principles of digital archiving. Here, the Open Archival Information System (OAIS) is used as the reference model.

Open education

University of Rijeka's open science policy refers to open education, and asks researchers to store educational material in the institutional repository under the CC BY licence, where they retain copyright and the right to publish without restriction. Maastricht University also has a dedicated page for Open Educational Resources (OER), including definitions, advice and links for finding and using OERs, links to general and domain-specific OER repositories, resources on creating and sharing OERs and national programmes on open learning material. Moreover, the University of Eastern Finland also offers opportunities for open education and learning, for example, in Open University, open online courses, and with open learning materials. UEF Open Science and Research Policy includes policies on research infrastructures, publications, data, and open education. The University of Bremen is currently working on an Open Educational Resources Policy. The other YUFE members do not have specific policies or recommendations in place regarding open education.



Citizen science

The University of Rijeka actively encourages the acceptance of open science practices that include the participation of the general public in scientific activities (citizen science) - e.g., through collection, analysis, and dissemination of data, or (co-)financing of scientific activities. Universidad Carlos III (UC3M) asks its researchers to include open science as a key parameter in the design of their research, both in proposals for public funding and in the conception of doctoral theses and other research projects, and include, whenever possible, citizen science methodologies, and facilitate and enhance interdisciplinary collaboration. Moreover, Maastricht has a specific Platform for Community-Engaged Research (MPCER) which aims to function as a multidisciplinary platform for researchers at Maastricht University who are involved or interested in doing community-engaged research. E.g. in its UEF Open Science and Research Policy, the University of Eastern Finland encourages the utilization of citizen science in relevant research fields and research projects. The University of Antwerp very specifically wants to bridge the gap between university and society, from local to international, and for many years now has actively put the focus on citizen science. Several research groups and scientists have participated to familiar and less familiar citizen science projects or have developed their own successful projects. The other YUFE partner universities do not have any specific policies or recommendations in place regarding citizen science, but YUFERING has inspired them all in the CERI (Community Engaged Research and Innovation) model.

Pre-registration

Universidad Carlos III de Madrid's OS policy asks its researchers in the disciplines that prescribe pre-registration to pre-register their projects in relevant pre-registration repositories, but in practice not many of its researchers practice pre-registration. None of the other YUFE members has any specific policies or recommendations in place regarding pre-registration.

Open scholarship

The universities of Bremen, Cyprus, Eastern Finland, Madrid, Antwerp and Rijeka offer seminars, events, and education/training and awareness-raising activities regarding open science. The University of Essex also has an open science interdisciplinary working group which meets frequently to discuss open science and offers various training/workshops on open science practices. The University of Antwerp organizes courses on Open Science ('Introduction to Data Management Plans' and 'Intake to FAIR') as part of the doctoral training programme and as part of the 'Dive into Open Science' training offer for all researchers, and has installed an Open Science Commission in which researchers and Open Science experts (from the University Library and the Department of Research, Innovation & Valorisation) initiate and promote Open Science policies, procedures and activities. The University of Bremen has established an Open Science Advisory Board with the aim of implementing all aspects of Open Science broadly at the university. UC3M also relies on a cross-cutting unit, UniOS (created back in 2017), coordinated by the Vice President for Research and Transfer, to promote OS at the university. The Open Science Working Group of the University of Eastern Finland, consisting of the heads of the university's faculties and service departments, discusses open science issues at the university level. Moreover, the universities of Rijeka, Madrid, Maastricht, and UEF have behaviour initiatives in place for rewarding open science: open science engagement constitutes part of their promotion and



selection criteria for academic careers. UC3MThe University of Madrid also offers open science internships. The other YUFE members do not have any specific policies or initiatives in place regarding open scholarships.

4. Recommendations to increase uptake of Open Science in YUFE universities: OS strategy and future work

Based on the findings from the survey we formulated three recommendations to increase the uptake of open science practices:

- 1. Enhance Training and Knowledge: Address the identified knowledge gaps in navigating open science legislation, licensing, conducting citizen science, and preparing open data, materials, and pre-registration protocols. This can be achieved through tailored educational programs and comprehensive training materials.
- Improve Institutional Support: Increase support for open science practices by establishing dedicated help desks, providing specialist advice on intellectual property rights and privacy regulations, and offering financial support for open-access publishing. Furthermore, enhance institutional support by facilitating partnerships with open-access journals for reduced publication fees, and providing funding assistance for open-access publishing.
- 3. **Strengthen Motivational Incentives**: Encourage open science engagement by integrating it into selection and promotion criteria for academic careers. Consider offering financial incentives and/or workload time allocation for engaging in open science practices. Implement non-financial incentives, such as awards, to motivate researchers further; however, these should not replace career advancement and financial incentives.

These recommendations aim to leverage the interplay of capabilities, opportunities, and motivation to foster a more robust and pervasive culture of open science within YUFE universities.

In general, it should be stated that creating a common policy on Open Science within current European University Alliances is difficult since the alliances are composed of a number of universities situated in different countries, where each country has its own OS policy and priorities. However, the efforts done in YUFERING project demonstrate that EUA can influence their members on taking the same direction, as well as inspiring and motivate each other in Open Science implementation. Furthermore, the influence among Alliances as a source of self-motivation is also clear.





The event Science with and for Society in European Universities Alliances: Cross-Alliances Forum 2023, on the 30 November and 1 December 2023, held at the Université libre de Bruxelles, demonstrated that EUA SWAFs projects include Open Science as one of the main topics in the Alliances Research and Innovation (R&I) strategies.

5. YUFE Open Science Commons: 12 principles to make OS 'the new normal'.

In the same way that YUFERING created in YEAR 1 of the project the <u>"Open Science Calendar</u> for 2022", gathering a set of principles and statements that all the partners and other institutions around the world could customise, at the end of the project we want to create the **2024 YUFE Open Science** "**calendar**" [only digital] that gathers this time the 12 commitments that we, all the institutions of the YUFE European University Alliance, can commit in Open Science.

January	YUFE universities recognise the value of opening up scientific processes and outcomes , and the urgent implementation of Open Science (OS) to create better Research and Innovation.
February	YUFE, as a European University Alliance, actively contributes to European-level processes, discussions and actions about Open Science. YUFE universities contribute to the OS discussions in Europe and beyond. Our universities are role-models for the implementation of OS in their countries and the ERA .
March	YUFE universities devote resources, both human and economic, to Open Science, .
April	YUFE universities provide infrastructure for Open Science (e.g. institutional repositories, research data repositories, expert finders/research portals, etc.). And we strongly support Open Research Europe (ORE) as an alternative venue, promoting diamond OA publishing.
May	YUFE universities (most of them) are members of COARA and all are committed to the



	principles of Responsible Research Assessment (RRA)
June	YUFE universities support Citizen Science and participatory research. We all agree on the creation of the CERI (Community Engaged Research and Innovation) model and practices.
July	YUFE universities support and promote FOS (Full Open Science) research teams. FOS teams, researchers and champions will be supported beyond YUFERING project.
August	YUFE universities agreed on a <u>common syllabus</u> to skill up our researchers, particularly ECRs and PhD students in Open Science. We particularly value and promote <u>gamification of Open Science</u> and we will collaborate with other training initiatives and projects (<u>DIOSI, Skills4EOSC</u>)
September	We collaborate within our European, national and International networks (e.g. <u>YERUN</u> , national Reproducibility Networks, UNESCO) on advocating Open Science.
October	YUFE universities promote FAIR (Findable, Accessible, Interoperable and Reusable) principles, applied to data, software and other outcomes. We also follow the EU statement "as open as possible, as closed as necessary" for all research data (data FOR/FROM/ABOUT research).
November	YUFE universities promote Open Licences for data and documents and support the Authors' Rights Retention strategy.
December	YUFE universities commit to developing detailed Open Science policies at institutional level following up all the herein defined principles and commitments. We will share policies and practices in English with all YUFE members.

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Appendix: Relevant Open Science resources at YUFE Universities

Open Science Policies/Principles/Mandates

YUFE University	Website
Maastricht University	https://www.maastrichtuniversity.nl/research/open-science
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Nicolaus Copernicus University	https://www.bu.umk.pl/web/eng/open-access-policy-of-ncu
Universidad Carlos III de Madrid	https://www.uc3m.es/openscience/principles
University of Antwerp	https://www.uantwerpen.be/en/research/policy/open-science/
University of Bremen	https://www.uni-
	bremen.de/fileadmin/user_upload/forschung/Open_Science/Open_
	Acces_Policy_EN.pdf;
	https://www.uni-bremen.de/en/forschungsdatenmanagement;
	OER Policy + overarching OS Policy under development
University of Cyprus	https://library.ucy.ac.cy/literature-support/open-access/oa-policies/
University of Eastern Finland	https://studentuef.sharepoint.com/:b:/s/www-
	documents/ET44gm9uX6tAhY_u2VT4oCMB0k2H1InJbiTK5mg7iNT
	<u>0hA?e=FCGoGe</u>
University of Essex	https://www.essex.ac.uk/-/media/documents/directories/reo/open-
	research-position-statement.pdf
University of Rijeka	https://uniri.hr/en/open-science-policy/

OA Repositories

YUFE University	Institutional repository
Maastricht University	https://library.maastrichtuniversity.nl/resources/
Nicolaus Copernicus University	https://repozytorium.umk.pl/
Universidad Carlos III de Madrid University of Antwerp University of Bremen University of Cyprus	https://e-archivo.uc3m.es/ https://repository.uantwerpen.be/desktop/irua https://media.suub.uni-bremen.de/?locale=en https://gnosis.library.ucy.ac.cy/
University of Eastern Finland University of Essex University of Rijeka	https://erepo.uef.fi/?locale-attribute=en https://repository.essex.ac.uk/ Repository of the University of Rijeka UNIRI Repository

Research Data collections/repositories

YUFE University	Institutional repository
Maastricht University Nicolaus Copernicus University	https://repod.icm.edu.pl/dataverse/umk
Tor Vergata University Universidad Carlos III de Madrid University of Antwerp University of Bremen	https://edatos.consorciomadrono.es/dataverse/UC3M https://repository.uantwerpen.be/desktop/irua https://www.pangaea.de/; https://www.qualiservice.org/en/; https://www.parlgov.org/; https://ease-crc.org/open-ease/;



YUFE University

University of Cyprus University of Eastern Finland University of Essex University of Rijeka Institutional repository brary.ucy.ac.cy/

rus <u>https://gnosis.library.ucy.ac.cy/</u> and No institutional research data repository sex <u>https://researchdata.essex.ac.uk/</u> eka <u>Repository of the University of Rijeka | UNIRI Repository</u>

Expert finders / research portals

YUFE University	Institutional repository
Maastricht University	https://library.maastrichtuniversity.nl/research/sharing-output/open-
	access-guide/
Nicolaus Copernicus University	ttps://www.bu.umk.pl/open-acchess
Universidad Carlos III de Madrid	https://researchportal.uc3m.es/
University of Antwerp	https://www.uantwerpen.be/en/research/publications-and-
	expertise/find-an-expert/
University of Bremen	ТВА
University of Cyprus	ТВА
University of Eastern Finland	https://uef.cris.fi/en/
University of Essex	N/A
University of Rijeka	https://portal.uniri.hr/home

OS training / education

YUFE University	Courses/Learning material
Maastricht University	https://library.maastrichtuniversity.nl/research/sharing-output/open-
	access-guide/
	https://library.maastrichtuniversity.nl/research/research-
	essentials/um-general-phd-trainings/
Nicolaus Copernicus University	https://www.bu.umk.pl/otwarte-zasoby-edukacvine
	https://www.bu.umk.pl/aktualnosci-on
	https://www.bu.umk.pl/otwarte-dane-badawcze
Universidad Carlos III de Madrid	https://www.uc3m.es/openscience/training
University of Antwerp	https://www.uantwerpen.be/en/research/policy/open-
	science/researchproces/scientific-design-and-data-analysis/
	https://www.uantwerpen.be/en/research/policy/infosessions/
	https://www.uantwerpen.be/en/centres/antwerp-doctoral-
	school/doctoral-study-programme/training-offer/course-offer-ads/
University of Bremen	https://www.bremen-research.de/data-train/;
	https://ml.zmml.uni-
	bremen.de/video/magic/3w1khjzuaneogs0kg8k8wws48osokgo
	https://www.uni-bremen.de/forschungsdatenmanagement (in
	German)
	https://www.dsc-ub.de/en/qualification.php;
	nttps://m.suub.uni-bremen.de/nome-englisn/retworks-and-
	publishing/open-access-in-premen-2/open-access-what-you-need-
University of Oversus	<u>to-know/</u>
University of Cyprus	https://gnosis.library.ucy.ac.cy/nandie///39728
	https://www.uei.ii/ei//ib/ary/open-reagareh/info
University of Pijoka	https://iiurary.essex.ac.uk/open-research/iiiio
University UL RIJEKA	111103.// 3VK11.01111.111/EUUKAUJE/

