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Open Science at CZU Return Grants: A Guide for main researchers

The principles of **Open Science (OS)** are a mandatory part of the CZU return grant. This guide for main researchers is based on UNESCO Recommendation on Open Science, The EU's open science policy, the National Research, Development and Innovation Policy of the Czech Republic 2021+, and the Open Science Policy – Programme Johannes Amos Comenius. The common goal of these guidelines is to support quality and excellence in research, ensure the application of Open Science principles in publicly funded projects, and strengthen transparency and reusability of research outputs.

For your project, it is essential to ensure **accessibility, reusability, and transparency of results**, following the principle: *"as open as possible, as closed as necessary."*[1]

To comply with the basic principles of Open Science, it is necessary to ensure:
a) open access to peer-reviewed scientific publications resulting from the project;
b) research data management according to FAIR principles and open access to these data.

a) Open access to peer-reviewed scientific publications

Each main researcher must ensure that peer-reviewed scientific publications (hereafter publications) resulting from the Return Grant are **publicly available online**, thus ensuring Open Access (OA).

The main researcher must ensure:

1) **Depositing the publication in a repository**
   - Upload either the **final publisher's version**[2] or the **accepted author manuscript**[3] (postprint/AAM) to a trusted repository (disciplinary or general).
2) **Immediate open access without restrictions**

[1] **The principle "as open as possible, as closed as necessary"** was first formulated by the European Commission in 2016 as part of the Horizon 2020 program ((https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf) and subsequently adopted by the EU Council as a key principle for research data management (https://data.consilium.europa.eu/doc/document/ST-9526-2016-INIT/en/pdf). This formulation has become an international standard and is part of the 2021 UNESCO Open Science Recommendation (https://doi.org/10.54677/MNMH8546)

[2] **Final publisher's version** (also known as Version of Record; VoR) is the definitive version of a scientific article published by the publisher. It contains all modifications after the review process as well as the final typesetting, formatting, page numbering, journal logo, etc. This version is officially published, has a permanent identifier assigned (e.g. DOI) and is considered the reference version of the article.

[3] **Peer-reviewed manuscript** (also known as a postprint or Accepted Author Manuscript; AAM) is a version of an article accepted for publication that includes review comments but has not yet undergone final formatting by the publisher. This version has the same conclusions in content as the final publisher version, but differs in appearance (e.g., it does not contain pagination, publisher typography, or the journal logo). It is usually possible to store this version in a repository according to the terms of the publisher.

- Publications must be **available immediately**—without unnecessary delay.[4] They must be accessible **free of charge, permanently, and without reuse restrictions, using an appropriate license** (Creative Commons CC BY 4.0[5]). For monographs or longer texts, licenses such as CC BY-NC[6], CC BY-ND[7], or CC BY-NC-ND[8] may be used if justified.

3) **Retention of necessary rights**
   - You must **retain copyrights** that allow you to deposit the publication to repository and make the publication openly accessible. Ensure your publishing agreement does not remove this option.
4) **Metadata[9] and links to other outputs**
   - Publications must include information about related outputs, e.g., data, software, or tools required to validate results. Metadata must be **publicly available** and **machine-readable**, in line with FAIR principles (described in more detail in the section Research data management according to FAIR principles).

Which OA model can you choose?

There are several ways of making a scientific publication available in open access. These ways differ mainly in how open access to the publication is provided and in how the publication process is funded.

[4] This means no later than 30 calendar days from the date of publication of the output; in exceptional and justified cases, this period can be extended, but for a maximum of 60 calendar days.
[5] See https://creativecommons.org/licenses/by/4.0.
[6] See https://creativecommons.org/licenses/by-nc/4.0.
[7] See https://creativecommons.org/licenses/by-nd/4.0.
[8] See https://creativecommons.org/licenses/by-nc-nd/4.0.
[9] **Metadata** is structured information that describes, explains, or facilitates the retrieval, use, and management of data or other digital objects. In a research context, metadata may include, for example, dataset name, authors, content description, data collection methodology, temporal and spatial determination, formats used, licenses or keywords. Well-crafted metadata is essential to fulfilling the FAIR principles.

Table 1. Overview of selected OA publishing modes

Green OA	Open access is ensured through so-called self-archiving – i.e., storing the peer-reviewed version of the article (postprint/AAM) in a trusted repository (subject-specific or general). The article may also be published in a journal that is not itself open access. However, authors must check the terms and conditions of their contract with the publisher (especially embargoes[10] and licensing restrictions[11]).
Gold OA	The article is published in an open access peer-reviewed journal, which provides immediate and permanent open access to the full text of the article on the publisher's website. Most of these journals require the author or their institution to pay an article processing charge (APC)[12].
Diamond OA	A special type of Gold OA, where no fees are charged to authors or readers. The entire publication process is funded, for example, by academic institutions, grant agencies, professional societies, or foundations. Journals in this mode provide fully open access without APCs.
Hybrid OA	Hybrid open access is a model in which a scientific journal is primarily available on a subscription basis, but allows authors of individual articles to secure OA for a publication fee. If an author decides to publish their article openly, they pay the APC and the article is then freely available to everyone, while the rest of the journal's content remains locked. This model is often considered problematic due to so-called double funding, where the publisher collects revenue from both subscriptions and APCs for OA. At CZU, there is the possibility of free publication in hybrid journals of selected publishers thanks to the university's participation in the CzechELib consortium[13]. This support is provided through so-called APC tokens, which can be allocated to corresponding authors from CZU based on established rules. If the article is approved, the author pays nothing. The availability of these tokens is limited and subject to allocation rules, such as the "first come, first served" principle, the requirement to state affiliation with CULS, and the use of institutional email. Information on currently supported publishers and rules is provided by the Open Science Centre (CZU Library) at openaccess@lib.czu.cz.

[10] **Embargo** is a time limit set by the publisher during which an article may not be made available in open access mode via a repository. The embargo period begins on the date of the article's official publication and usually lasts between 6 and 12 months (up to 24 months in some fields). After its expiration, the article may be stored in the repository and published in accordance with the terms and conditions.

[11] **License restrictions** are conditions set by the publisher or license that determine how an article may be further distributed, modified, or reused. Many publishers allow self-archiving only of certain versions of an article (e.g., AAM) and only under certain conditions (e.g., citation, specific license type, prohibition of commercial use). It is necessary to always verify these conditions – e.g. using the Open Policy Finder tool: https://openpolicyfinder.jisc.ac.uk

[12] **Article Processing Charge (APC)** is a fee paid by the author or their institution for the publication of an article in open access mode. It serves to cover the publisher's costs associated with the editorial process, peer review, technical processing, and free online access to the article on the journal's website.

[13] **CzechELib konsorcium** (National Centre for Electronic Information Resources) see https://www.czechelib.cz/cs/21-o-czechelib, information about free publishing in OA https://www.czechelib.cz/cs/399-open-access.

b) Research data management according to FAIR principles

Each main researcher is required to ensure that research data generated within the framework of the Return Grant project is managed with an emphasis on **FAIR principles**[14], i.e., that the data is **f**indable, **a**ccessible, **i**nteroperable, and **r**eusable. Adherence to thorough data management together with adherence to FAIR principles contributes not only to the transparency and credibility of scientific research, but also to the practical usability of the results – it allows others to verify, replicate, or build on the research, while also providing certainty to the data creators that they can easily return to the data even years later, understand it, and effectively continue their research.

Table 2. FAIR principles of the research data management

F(indable)	Data and metadata should be easily searchable by both humans and machines. They should be assigned a unique and persistent identifier[15] (e.g., DOI) and described in detail using rich metadata that includes information about the research (e.g., description, context, methodology, processing procedures, versions, etc.).
A(ccesible)	Data and metadata should be stored in trusted repositories and accessible via standardized protocols (e.g., HTTP/S). If data cannot be made available for legitimate reasons (personal data protection, confidentiality, etc.), at least the metadata should always be publicly available.
I(nteroperable)	Data and metadata should be in standardized formats and structured languages that allow them to be combined and reused. Examples include recording data in YYYY-MM-DD format, using controlled vocabularies, ontologies, and links between datasets (e.g., referencing terms, tools, or protocols used).
R(eusable) **Opětovně využitelná**	Data and metadata must be sufficiently documented so that they can be understood and reused in other research. They should be accompanied by a clearly defined license (e.g., Creative Commons) and contain information about the origin of the data, authors, and conditions of their creation, including the temporal, methodological, and contextual framework.

For high-quality research data management, it is essential to:

- **Ensure clear data organization**, i.e., a logical folder structure, consistent and understandable file naming, and internal documentation (e.g., description of variables, collection methods, units of measurement, time ranges, etc.).
- **Perform regular backups** of research data to multiple independent storage locations (e.g., institutional server, cloud storage, and local copies).

[14] **FAIR principles** (Findable, Accessible, Interoperable, Reusable) were first formulated in 2016 in the article *"The FAIR Guiding Principles for scientific data management and stewardship"* see https://doi.org/10.1038/sdata.2016.18.
[15] **Persistent identifier** is a permanently assigned, unique, machine-readable identifier that enables reliable citation, search, and management of digital objects, individuals, or institutions within a research environment. In research practice, commonly used identifiers include DOI (Digital Object Identifier) for datasets, ORCID (Open Researcher and Contributor IDentifier) for researchers, and ROR (Research Organization Registry) for research organizations.

- **Introduce a versioning system** for data files and documentation, e.g., using Git tools, repository functions, or uniform version labeling in advance according to a predefined naming convention[16] in the data management plan[17] (e.g., in file names: _v1, _v2, etc.).
- **Ensure the protection of sensitive data[18]**, in particular personal data or confidential information, through anonymization[19], pseudonymization[20], or restricted access.
- **Develop a data management plan (DMP)** that describes how data will be collected, organized, stored, protected, shared, and archived over the long term during the project. The plan is created at the beginning of the project at the latest and is regularly updated. DMPs can be prepared using online tools with step-by-step instructions for researchers. The most commonly used tools include Data Stewardship Wizard, DMPonline, and Argos OpenAIRE. Some funding providers also require or recommend the use of their own templates, as is the case with the European Commission, the Technology Agency of the Czech Republic, (available only in czech) and the Grant Agency of the Czech Republic.
- **Store research data in a trusted repository**[21](in accordance with the DMP). Trustworthiness is often associated with certification (e.g., Core Trust Seal) and compliance with standards for long-term preservation and accessibility (FAIR principles). General repositories include Zenodo (with its own CZU community), Figshare, and Dryad. It is generally recommended to store research data in disciplinary repositories. You can consult your faculty methodologist or the Open Science Centre (CZU Library) at openscience@lib.czu.cz to select a suitable repository.
- **Ensure open access to data**, ideally under a CC BY 4.0 license, unless this conflicts with personal data protection, trade secrets, security, or other legitimate restrictions. Any exceptions must be duly justified in the DMP.
- **Ensure high-quality data description using metadata**, including information on collection and processing methods, formats used, citation data, and keywords. Metadata must be publicly available and machine-readable, stored in standardized formats according to FAIR principles.

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[16] **Naming convention** is a predefined system for naming files and folders that ensures consistency, clarity, and version traceability. A good naming convention may include, for example, information about the content, date, author, version, and file format. Example: *experiment1_2024-03-15_v2_MK.csv*. The use of a consistent naming convention should be described in the DMP and adhered to by the entire research team.

[17] **Data Management Plan (DMP)** is a living document that describes how research data generated in a project will be managed throughout its life cycle—i.e., how it will be collected, organized, secured, documented, stored, shared, and, where appropriate, made accessible. The plan should be a living document that is updated as the project progresses, in accordance with FAIR principles and the requirements of the funding provider.

[18] **Sensitive data** is personal data (as defined by the GDPR) including, in particular, data concerning health, genetic and biometric data for the purpose of unique identification, political opinions, religious or philosophical beliefs, and sexual orientation. The processing of such data requires increased protection – it is only possible under the conditions laid down by law, using appropriate technical and organizational measures (e.g., pseudonymization/anonymization, see below).

[19] **Anonymization** is a process in which personal data is modified so that it is no longer possible to identify a specific person, either indirectly or by using other available information. Anonymized data is no longer considered personal data under the GDPR.

[20] **Pseudonymization** is a process whereby identification data is replaced by a code or other substitute element (e.g., ID instead of name), whereby the original identity can be restored if additional information (e.g., a key list) is available. Pseudonymized data are considered to be personal data under the GDPR.

[21] **Trusted repository** is a digital storage facility that meets standards for the long-term preservation, management, and sharing of research outputs (e.g., publications or data). A trusted repository has clearly defined conditions for access, sustainability, data protection, metadata policies, and transparent management, and is often listed in international registries such as https://www.re3data.org or https://fairsharing.org. It can be a disciplinary or general repository.

Practical steps for applicants

Each applicant is **required** to describe briefly, specifically, and objectively in their application how they will implement the principles of open science in the project.

At this stage of the application, it is sufficient to briefly describe how you plan to meet the requirements of open science at the level of intent and approach, rather than definitive technical details. You will finalize the details after the project begins in cooperation with the **Open Science Centre** (CZU Library) and faculty methodologists, whose contact information can be found on the CZU Intranet.[22]

Informace týkající se naplňování zásad otevřené vědy uveďte v kapitole ***2. Informace o návratovém grantu*** v sekci ***Očekávané výstupy a výsledky projektu***. Zaměřte se zejména na tyto oblasti:

Please include information regarding the implementation of open science principles in ***Chapter 2. Information about the Return Grant*** in the section entitled ***Expected Outputs and Results of the Project***. Focus particularly on the following areas:

Open access to publications

- Briefly describe how you will ensure that peer-reviewed publications resulting from the project are made publicly available.

Research data and access to it

- Briefly describe what type of data is likely to be generated in the project and how you plan to organize, store, and openly share it. It is not necessary to specify a particular repository—it is sufficient to outline the type of repositories you are considering and confirm that you will adhere to FAIR principles.

Plán správy dat

- Indicate who will be responsible for preparing the Data Management Plan and that you will develop and submit the DMP to the Open Science Centre (CZU Library) within 6 months of the project start date. At this stage of the application, a detailed DMP is not expected – a basic idea of its content is sufficient.

Copyright and licenses

- State that you will strive to preserve the rights necessary for open publication of publications and data.

[22] Information for faculty data methodologists regarding the Data Management Competence Centre (DMCC): https://czuvpraze.sharepoint.com/sites/Nase-univerzita/SitePages/en/Open-Science.aspx

Checklist 1: Before applying for the Return Grant

The checklist below provides applicants with basic guidance on what to consider and take into account in relation to open science requirements before submitting an application.

Table 3. Checklist: Before applying for the Return Grant

Area		Control question	Note
Open access to publications	☐	Have I considered how the publications created in the project will be made available?	For example, storage in a repository or the type of open access (Green/Gold OA) is considered.
	☐	I assume that the publications will be open without any time embargo?	Immediate access after publication is considered, as are ways to achieve this; this is also taken into account when selecting a suitable journal.
	☐	Have I thought about the type of open license I am likely to use?	E.g., CC BY 4.0 (for articles), CC BY-NC, or other public licenses (for monographs, etc.).
Open access to data	☐	Do I have a basic idea of how data will be shared and made available?	The type of repository, open license, and access mode are considered.
	☐	I am considering how data will be managed in accordance with FAIR principles.	E.g., formats, metadata description, long-term availability.
Data Management Plan (DMP)	☐	I know who will be responsible for preparing the DMP in the project?	The responsible person or team and the time frame (e.g., within 6 months of commencement) are specified.
	☐	I expect that we will complete the DMP within 6 months of the project launch?	No detailed documentation is required at the application stage.
Copyright	☐	Have I considered how I will secure the necessary rights for open publication of the results?	Efforts to preserve copyrights in order to enable OA access.
Consideration of OS in the budget	☐	Have I considered the potential costs associated with open science?	Costs associated with data management, ensuring open access to research results, and publication fees (APC) are considered eligible costs.
Support	☐	Have I considered consulting with the Open Science Centre or a faculty methodologist?	Recommended – may improve the quality and clarity of the application.

Checklist 2: During the Return Grant implementation

The checklist below allows the main researcher to continuously verify that they are fulfilling their obligations in the area of open science and data management in accordance with the grant conditions.

Table 4. Checklist: During the Return Grant implementation

Area		Control question	Note
Data Management Plan (DMP)	☐	Was the DMP prepared and submitted to the Open Science Centre (CZU Library)?	The DMP is submitted within 6 months of the project start date.
	☐	Is the DMP continuously updated and revised?	Determine how often the DMP is updated. It is always updated when data processes change.
Consideration of OS in the budget	☐	Does the budget include specific costs associated with data management and ensuring open access to research results?	Costs associated with data management, ensuring open access to research results, and publication fees (APC) are considered eligible costs.
Data storage	☐	Is research data stored in a repository?	After the article has been published or accepted for publication.
	☐	Is the metadata for the data public and machine-readable?	Metadata are stored in a repository in standardized formats without delay and are openly accessible in accordance with FAIR principles.
	☐	Is there an open license assigned to the data?	In justified situations, data is shared on a limited basis. If open access to (some or all) data is not provided, the reason is stated in the DMP.
	☐	Is access to the tools necessary for data validation ensured?	The software, protocols, and methodologies used within the project are specified.
Publication	☐	Is the article stored in the repository without undue delay?	Immediately after publication or acceptance for publication
	☐	Is the correct public license being applied?	The article is licensed under Creative Commons CC BY 4.0. For monographs or longer texts, CC BY-NC, CC BY-ND, or CC BY-NC-ND may be used.
	☐	Is the right to re-release retained (e.g., unsigned exclusive agreement)?[23]	Negotiated with the publisher.

[23] **Exclusive contract with a publisher** is a legal agreement whereby the author transfers all property rights to the work exclusively to the publisher. After concluding an exclusive agreement, the author usually loses the possibility to further distribute, publish, or store the article in a repository, unless the agreement expressly permits it. Concluding an exclusive agreement is contrary to OA requirements unless an exception has been negotiated in advance (e.g., the possibility of self-archiving, retaining rights to the version stored in the repository).

Availability of outputs	☐	Are the project outputs published according to the principle: "as open as possible, as closed as necessary"?	If open access (to some or all) outputs is not provided, the reason is stated in the DMP.
Support and consultations	☐	Was support from the Open Science Centre (CZU Library) or faculty methodologist used during the project?	Recommended at any time during the implementation.