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Aalto University Open Science and Research Policy

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The goals of open science are responsible research and societal impact. Open science means open access to scientific publications, research data, methods, software codes, and infrastructure. It is one of the key instruments for increasing the impact of the research conducted at Aalto University.

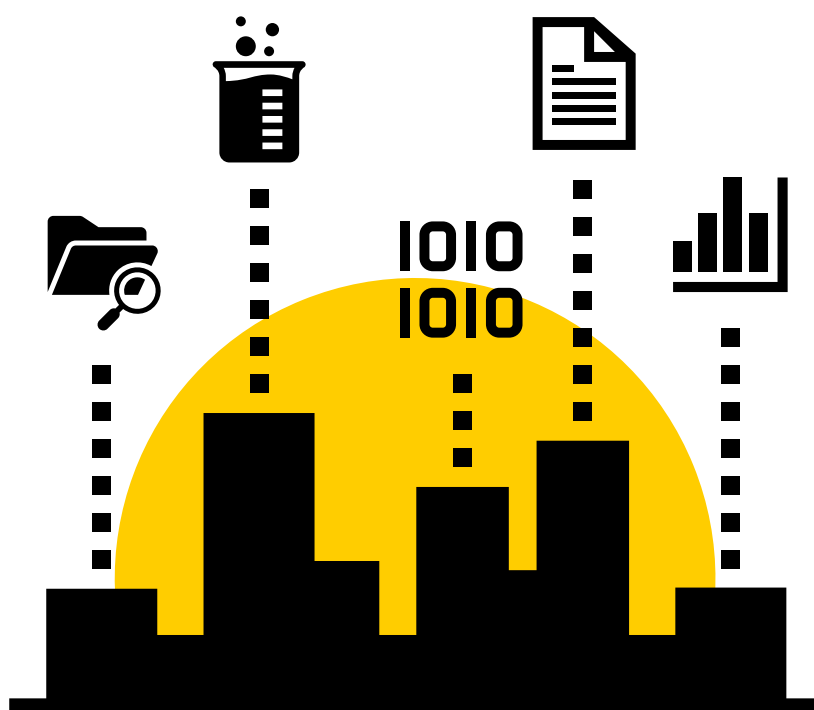


Towards Responsible Research and Societal Impact

Open science means open access to scientific publications, research data, methods, software codes, and infrastructure. It is a key instrument for increasing the impact of the research conducted at Aalto University.

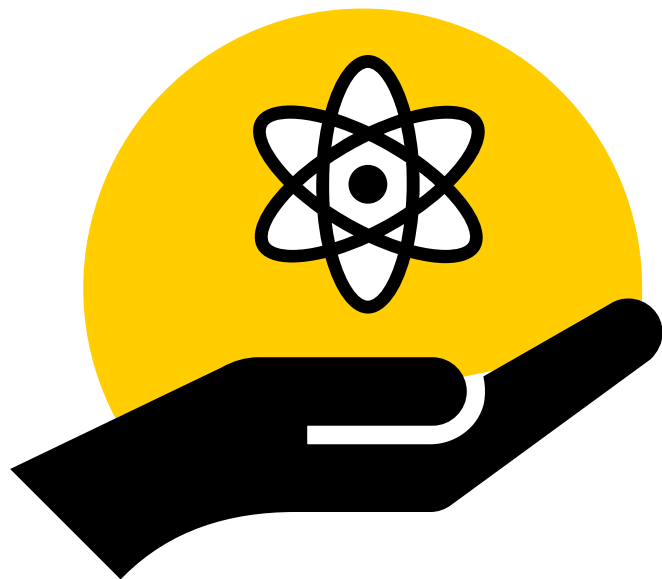
Aalto University contributes to sustainable development by making its research outputs findable, accessible, interoperable and reusable (FAIR), thus facilitating new discoveries and empowering researchers by providing rapid and efficient access to knowledge.

Transparent access to publications, data, methods, codes and tools enhances the quality of research outputs, which then can easily and more efficiently be verified, replicated and extended. Opening data, publications, and software helps to avoid unnecessary duplication of effort, facilitates interdisciplinary research and ensures worldwide equal access to research knowledge. Open access to research outputs benefits researchers by increasing the citations to their publications and datasets.



General Open Science Principles

- 1) Aalto University community follows the principle 'As open as possible, as closed as necessary'.
- 2) Research outputs produced by researchers at Aalto University should be openly accessible. Ethical concerns, personal data protection, confidentiality, security, intellectual property rights, commercial interests or publishers' requirements might restrict the opening of some research outputs.
- 3) The Aalto University community follows the general principles of research ethics, good scientific practice, Finnish legislation, national and international recommendations for open science, and Aalto University guidelines during the research life cycle. Relevant documents and recommendations are listed at the end of this document.
- 4) Activities related to open science and research are a part of academic work and are considered impact merits in recruitment and career promotion decisions.
- 5) Levels of openness are monitored and evaluated.
 - The openness of publications and datasets are monitored by calculating the number and type of Open Access publications and published datasets. Open Science activities are included in the TENK (Finnish National Board on Research Integrity) [CV template](#) and in Aalto University evaluation criteria as impact merits.



Principles of Open Access Publishing

- 1) Aalto University aims to publish all publication types according to open access principles and to do so by recommending publishing in open access channels or by parallel publishing (green open access).
 - Hybrid open access is acceptable only as a part of a transformative agreement. When possible, researchers should adopt the [Creative Commons CC BY 4.0 -license](#) for open access publications.
- 2) Aalto University requires that all peer-reviewed scientific articles and conference papers be parallel published (green open access) in the Aalto University repository if this does not conflict with the rights of publishers or other authors. Aalto University ensures the preservation of publications in the Aalto University repository.
 - Aalto University researchers are requested to email a link to or a copy of the final accepted manuscript to manuscripts@aalto.fi once the publication is accepted and the co-authors' consent to parallel publishing is confirmed. This is not needed if the publications are made openly accessible in open access or hybrid journals.
- 3) Most doctoral and master's theses are openly accessible in the Aalto University repository.
 - [Permission form for electronic publishing of theses](#)
- 4) As a member of the FinELib consortium, Aalto University aims to secure open access agreements or discounts on article processing charges (APCs) with publishers.
 - [Check free or reduced APCs](#)
- 5) Authors have a responsibility to evaluate the integrity, practices and reputation of the journals to which they submit manuscripts.
 - Predatory or pseudo journals pose as scholarly open access journals. Researchers need to be aware of these and refrain from submitting to them. Acting as a reviewer or being a part of the journal board of such journals is considered ethical misconduct (misleading the scientific community). Authors are advised to check the [Publication Forum](#) for information about such journals.



Principles of Open and FAIR Research Data

- 1) Researchers (incl. doctoral students) and research groups are encouraged to draw up a data management plan (DMP) at the beginning stage of research and update the plan regularly.
- 2) Aalto University requires publicly funded research data to be openly accessible unless there are ethical or legal issues preventing open access.
 - Protection of trade secrets and other intellectual property agreements, funders' requirements and publishers' data availability policies are taken into account when defining appropriate access rights to research data.
 - The principal investigators (PIs) are responsible for understanding whether any considerations restrict the publishing of the research data.
- 3) Data that are linked to research publications and data that are suitable for reuse have to be made FAIR (Findable, Accessible, Interoperable and Reusable) to the extent beneficial to society after the data creators and collectors have benefitted from the data (the right to primary use of data).
 - Research data are to be stored in national or international storage services or data repositories that provide persistent identifiers (PIDs, e.g. DOIs) and therefore allow publishing the data in a citable format. Funders' or publishers' requirements are to be followed when choosing a repository unless they contradict Aalto University recommendations.
 - If personal data is published, its access must be restricted in a repository and the data must be pseudonymised. The long-term availability of restricted access data is ensured by giving the access rights to the data support of the university. Anonymised data can be openly accessible.
 - Follow responsible research guidelines when handling personal research data.

4) Aalto University requires that rights related to research data be defined in agreements. Ownership of sui generis database rights and catalogue rights are created as the property of the investor, which in the case of an Aalto employee or funding from Aalto University, is Aalto University. Ownership of copyright and other rights to data and databases produced with external funding are transferred to Aalto University with the employment agreement (Annex 1). In cooperation projects, ownership of rights and licenses to data must be agreed upon as early as possible

- When possible, researchers should adopt the [Creative Commons CC BY 4.0 license](#) for datasets. The attribution term of this license ensures that creators of research data are credited.
- Other licenses can be chosen to fulfil the goals of research work, funders' requirements, publishing agreement requirements and publishers' data availability policies.
- Dual licensing can be utilised in cases where the goal is to sell commercial licenses in addition to distributing a license allowing only academic and other non-commercial uses.

5) The properly documented metadata of all datasets linked to research publications should be added to the Aalto University metadata catalogue in the research information management system, ACRIS. This applies also to datasets that cannot be made openly accessible.

- If you have made your data openly accessible in a repository, send your link or PID (e.g. DOI) to researchdata@aalto.fi, and the information will be inserted into ACRIS for you.

6) When using openly accessible research data, the data should be cited according to good scientific practice.

- See <http://urn.fi/URN:NBN:fi-fe201804106446>



Principles of Open Research Protocols, Methods and Software

- 1) Protocols, methods and software codes should be shared openly, even when implemented with proprietary tools, to guarantee the transparency and replicability of the data collection and analysis process.
 - When possible, adopt the Creative Commons [CC BY 4.0 license](#) for protocols and the [MIT license](#) for released code. Other licenses can be chosen so that they fulfil the goals of research work, funders' requirements, publishing agreement requirements and publishers' data availability policies.
- 2) Novel software packages should be shared openly and follow the principles of free and open source software (FOSS, <https://www.gnu.org/philosophy/free-sw.html>) to maximise the reusability of the tools and the extent of adoption by the research community.
 - Make codes and models transparent, e.g. by providing sufficient documentation of the codes or models when possible
 - Allow for open collaboration through channels that enable participation by the community in the development process (e.g. use GitHub pull requests and GitHub issues for discussions).
 - Make the dissemination of the software open to allow it to be freely used and shared.
- 3) There are various suitable licenses for open source software, such as MIT or GNU. The right choice for the license can depend on the philosophy of the developers as well as on restrictions imposed by any third-party libraries used.
- 4) Derivative outputs such as research result depicted as figures or tables reporting statistical analyses should also be stored in data repositories to allow future meta-analyses and replication.
- 5) When pertinent, it is recommended that the choice of research protocols and analysis methods be pre-registered before beginning data collection and analysis.



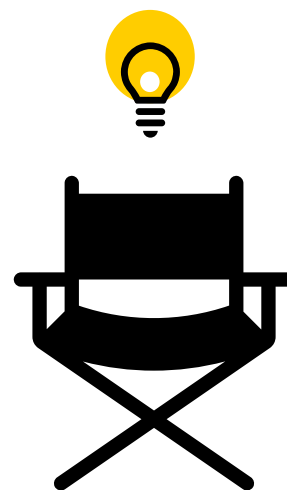
Roles and Responsibilities

All researchers and doctoral students

- Ensure that your research data, code and methods are appropriately documented and shared in a repository. If you cannot make your research data open, publish the metadata and explain why access to the data is restricted.
- Familiarise yourself with the [training and support Aalto University offers to researchers regarding research data](#). For support, contact researchdata@aalto.fi.
- Familiarise yourself with [open access publishing](#) and [discount information](#). For support, contact acris@aalto.fi.
- Familiarise yourself with ACRIS (acris.aalto.fi), the Aalto University research information management system. [ACRIS instructions](#).
- Familiarise yourself with the university's [research ethics guidelines](#).
- Always use your ORCID researcher identifier, especially when submitting research outputs, to improve your own visibility and interoperability.
- When submitting a manuscript, indicate your affiliation with the department (not only the research group), and add the funder's decision number (if your project is externally funded).
- You should always acknowledge the infrastructure (facilities or equipment) that you used in your research. Include the name of the infrastructure as an affiliation (see the names of [Aalto's infrastructures](#)) or add the information about the infrastructure in the acknowledgements section of your paper.

Principal Investigators (PIs)

- Principal Investigators are responsible for creating a data management plan (DMP) at the beginning stage of a research project and for updating it during the project. PIs have the overall responsibility for effective data management during their research projects.
- PIs may decide independently to release data under an open license if the data is owned by the university and/or by the researchers. No outside consultation with any of Aalto's services is needed if there are no restrictions to opening the data (see general principles).
- In cases where research work may lead to commercialisable inventions and researchers are interested in this possibility, Innovation Services should be consulted (innovations@aalto.fi). In cases where intellectual property rights or other legal considerations are unclear, please consult your school's legal services.



The Aalto University service organisation and management provide the following services:

- Support to researchers through tailor-made services, consultations, training, workshops, etc. For data-related questions, contact researchdata@aalto.fi; for publications-related questions, contact acris@aalto.fi.
- Manuscript service, dataset service, DMP review service.
- Necessary infrastructure (research systems: ACRIS, Aaltodoc) and storage and archiving solutions either by Aalto alone or in collaboration with national or international service providers.
- Funding for open access publishing through agreements with publishers.
- Incentives for openness. Incentives are to be defined in the national collaboration.
- Criteria for evaluation of openness. Criteria are to be defined in the national collaboration.



Definitions

- **The Aalto University repository** ACRIS and Aaltodoc together form the Aalto publication repository. Researchers submit their manuscripts to ACRIS, which is integrated with Aaltodoc. Open access publications are findable through both ACRIS and Aaltodoc.
- **APC** (Article Processing Charges): A fee collected to cover the costs of gold open access publishing, e.g. for peer reviews.
- **Data repository**: An archive for publishing data and finding data for reuse. Publishing in a repository helps to store the data securely. Repositories also facilitates data citation when PIDs are used. Some data repositories restrict access, i.e. data may be shared on request only, but metadata may be openly accessible.
- **Derivative outputs**: Derivative outputs are the data that constitute the results in a research paper. They are embedded within the paper as figures and tables. However, since in most cases research papers are released as PDF documents, it may be difficult to extract this data. Sharing derivative outputs in a machine-readable format allows future researchers to reuse the published results for further analysis or meta-analysis. Derivative outputs can be stored in generic repositories (Zenodo, OSF), or in repositories dedicated to a specific field (e.g. NeuroVault for statistical brain maps).
- **DMP** (Data Management Plan): A formal document that specifies how research data is handled during and after a research project. The DMP identifies the key actions to be taken in order to ensure that the research data is of high quality and FAIR (findable, accessible, interoperable and reusable). See: <https://www.aalto.fi/en/services/data-management-plan-dmp>.
- **Embargo**: A period of time set by a publisher during which the author is not permitted to publish a self-archived open-access copy of the publication. The period is calculated from the time the original publication was published.
- **FAIR**: The FAIR Data Principles are a set of guidelines to make data findable, accessible, interoperable and reusable. The principles provide guidance for the management and stewardship of scientific data.
- **Free software**: Computer software distributed under terms that allow users to run the software for any purpose as well as to study, change and distribute it and any adapted versions.
See: <https://www.force11.org/group/fairgroup/fairprinciples>
- **Gold open access**: A published article is immediately provided in open access mode by the scientific publisher. Associated costs are shifted from readers to the university to which the researcher is affiliated. A gold open access fee is often called an Article Processing Charge (APC). Gold open access publishing may also be free of charge.
- **Green open access (self-archiving / parallel publishing)**: The published article or the final peer-reviewed manuscript is archived in an online repository before, after or alongside its publication. Access to this article is often delayed by an embargo period.
- **Hybrid open access**: The article is published in a subscription journal where there is open access to some articles due to previous payment of the APC (Article Processing Charge), and other content is available by payment of a subscription fee.

- **Metadata:** Technical data that describe a research dataset and are necessary for the dataset to be reused. There are two main aspects of metadata: 1) the description of the data: how it was created, how to interpret it, what software is needed to use the data (for example, if in Crystallographic Information File format, ISO 19115) and 2) basic bibliographic information (archival metadata) that is needed to retrieve the dataset and make citations to it, including information about the creator, license, relevant dates, title, year of publication, repository, and identifier (for example, Dublin Core format).
- **Method:** A method is one or more steps in the step by step advancing activity list (protocol list). Method is also a way of collecting data or type of analytic operation by which data is processed (a statistical method, a machine-learning method, etc.). Detailed explanation of the methods used will ensure that the research output is easily reproducible.
- **Open source software:** a computer software in which the source code is released under a license where the copyright holder grants users the rights to use, study, change and distribute the software to anyone and for any purpose.
- **ORCID** (<https://orcid.org/>) provides a persistent digital identifier that distinguishes researchers and supports automated linkages between a researcher and his/her professional activities.
- **PID** (persistent identifier) is a long-lasting reference to a digital resource. (e.g. DOI, ORCID). An identifier is a label which gives a unique name to an entity: a person, place, or thing.
- **Predatory publishing** is an exploitive academic publishing business model that involves charging publication fees to authors without checking articles for quality and legitimacy and without providing the other editorial and publishing services that legitimate academic journals provide, whether open access or not.
- **Preregistration:** When you preregister your research, you specify in advance the research plan of your study and submit it to a registry. Preregistration separates *hypothesis-generating* (exploratory) research from *hypothesis-testing* (confirmatory) research. Both are important. However, the same data cannot be used to generate *and* test a hypothesis, which can happen unintentionally and reduce the credibility of your results. Addressing this problem through planning improves the quality and transparency of your research. Preregistration helps you to report your study clearly and helps others who may wish to build on it.
- **Protocol:** A series of numbered steps to follow to reproduce the results obtained in a specific study. A protocol first lists the data collection, followed by the steps of the analysis including a list of the methods used and their codes, and lastly how the output was produced and distributed.
- **Repository:** A repository is a database or a virtual archive established to collect, disseminate and preserve scientific output (<https://www.openaire.eu/where-can-i-read-more-about-fp7>). There are preprint repositories (manuscripts before peer review, e.g. arXiv.org, bioRxiv.org), postprint repositories (manuscripts accepted for publication, e.g. ACRIS), data repositories (original data used in a study, e.g. Zenodo), protocol and method repositories (procedures to obtain the data and process the data, e.g. Open Science Framework), software repositories (software

used to process the data as well as novel software packages that can be re-used by others, e.g. GitHub, Zenodo), derived data or output repositories (results are put in a machine-readable format, e.g. tables, processed data, statistical results, figures from paper, Zenodo, figshare).

- **Research output** means the production of a research work that may be wholly in written form (journal or conference article, book, book chapter, working paper, etc.) or in the form of a composition, performance, exhibition or creative work (artistic output) or other approved work, e.g. datasets.
- **Research data:** Digital datasets that are generated, processed and used in scientific research, and used as the basis for research findings. Research data also include information describing the context, contents and structure of the data (metadata), along with its lifetime management and processing.
- **Sui generis database:** A database in which there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents. The sui generis database rights of Aalto University ensure that the university can provide usage rights to the database and publish the database.
- **Transformative agreements** change the contract between a subscriber (e.g. a university library) and a publisher. The change is from a subscription model to an open access model.

Related documents and background material

[Aalto University Code of Conduct](#)

[Aalto University Data Protection Policy](#)

[Code of Practice for Project-Based Research at Aalto University](#)

[Declaration on Research Assessment \(DORA\)](#)

[European Commission: Final Report of the Open Science Policy Platform \(7.9.2020\)](#)

[The European Parliament and the Council of the European Union. Directive \(EU\) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on Open Data and the Re-use of Public Sector Information \(7.9.2020\)](#)

[Finnish Advisory Board on Research Integrity \(TENK\) \(2019\). The ethical principles of research with human participants and ethical review in the human sciences in Finland](#)

[Finnish Advisory Board on Research Integrity \(TENK\) \(2012\). Responsible conduct of research and procedures for handling allegations of misconduct in Finland](#)

[Finnish Committee for Research Data \(2018-04-10\) Tracing data: Data citation roadmap for Finland](#)

[League of European Research Universities \(LERU\) Open Science and its Role in Universities: A Roadmap for Cultural Change](#)

[Open Science National Coordination, Federation of Finnish Learned Societies \(7.9.2020\). Policies of open science and research in Finland](#)

[European Science Foundation. Plan S: Making full and immediate Open Access a reality](#)





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