University Policy on research data management

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Part I - General principles and Aims

Section 1 – General Principles

Politecnico di Torino recognizes the fundamental role of data produced during research activities for scientific and technological advance.
Therefore, Politecnico di Torino recognizes the importance of Data management in line with the principles and requirements of Open Science for the quality, integrity, impact, and efficiency of scientific research and commits to applying the highest standards for their collection, storage, preservation, and sharing.

The availability of reliable and findable data is crucial for the quality and integrity of research, strictly necessary for verifying the reliability and correctness of both the methodologies and the results of a research project, as well as for their replicability and reproducibility. Additionally, the transparency, sharing, and systematic reusability of data, along with the processes and methodologies associated with them, enhance the impact and efficiency of research processes. Furthermore, Politecnico di Torino recognizes research data as an important scientific output in its own right.

In compliance with current legislation on the protection of personal data, in particular the European Regulation 2016/679 (GDPR)[1], intellectual property and security, confidentiality commitments with third parties, as well as with the provisions contained in the Statute and University regulations, the Politecnico di Torino encourages and protects the sharing of scientific data produced by its staff according to the principle "as open as possible, as closed as necessary". More specifically, the Politecnico di Torino encourages the production, management and sharing of scientific data according to the FAIR (Findable, Accessible, Interoperable, Reusable) principles, in coherence with the recommendations of European and national frameworks directed to enhance the production and curation of FAIR data also in the context of research evaluation.

Politecnico di Torino recognizes that research data, even after the end of the project that generated them, constitutes a knowledge asset of the University institution, as well as a resource - even in the long term - for scientific research, education and the progress of society.

Section 2 – Definitions

The following definitions are considered for the purposes of the present policy.

Affiliates
Professors, researchers, doctoral students, post-doctoral fellows, scholarship holders, students, technical-administrative and library staff, belonging to the Politecnico di Torino or visiting academics involved in the research activities to which the present policy applies.

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[1] https://www.polito.it/privacy

Research project
Scientific activity that responds to a research purpose, regardless of the source of funding. Research projects may consist of experimental activities, theoretical studies, practicability studies, data analysis, etc. Research activities for a doctoral or master's degree also represent a research project.

Research data
All information, in any format, that is created or used according to the defined protocols or methodologies in the framework of a specific research activity. By way of example only, research data are understood to be the results (positive or negative) of all experiments relevant to the research itself, observations, experiences, published and/or unpublished sources, bibliographic references, software and codes, texts, objects, present or past, collected or created in digital and/or paper format. The research data may be presented in the form of a symbol, number, text, image, audio, video, etc., and can be either raw or processed.

Trusted repository
Digital repositories preferably belonging to non-commercial institutions (academic or research institutions, state or inter-governmental organisations, societies or scientific communities providing free and open access to metadata and data according to the given licence) where researchers can place their research data (datasets) and make them accessible according to appropriate international standards specified as follows.
Digital repositories suitable for the purposes of this policy may be: a) institutional, with the purpose of collecting, sharing and preserving the digital research results of each research institution; b) disciplinary, in support of specific research communities, supported and accepted by them; c) generalist.
They must also be reliable according to the definition given by the European Commission in the Annotated Grant Agreement[2] of the Horizon Europe Project. Specifically, a trusted digital archive must belong to at least one of the following categories:
1. certified archives (e.g., CoreTrustSeal, Nestor Seal DIN31644, ISO1636);
2. disciplinary or domain archives commonly used by the scientific community and internationally acknowledged;
3. generalist, institutional or other archives that comply with a minimum set of requirements, such as:
    a. ensuring the preservation, proper care, security and integrity of the contents in the long term (at least 10 years in accordance with this policy) according to terms and conditions explicitly specified online in a clear manner;
    b. ensuring that the content is accessible, as open and free of charge as possible in compliance with the legal and ethical restrictions applied, and that a persistent digital identifier (DOI, handle, etc.) is provided to the content
    c. ensure that datasets are described by a minimum set of metadata to guarantee their visibility, reuse and quotability (e.g., authors, description of the dataset, date of repository or publication, place of repository, embargo period - if

necessary, associated license, standards used to structure the dataset); these metadata are machine-actionable and use standard non-proprietary formats (Dublin Core, Data Cite, etc.)

    d. implement quality assurance mechanisms for the accuracy and integrity of the deposited datasets and metadata and meet internationally and nationally accepted security policies to ensure levels of privacy and confidentiality appropriate to the type of data which is being deposited.

A further value measure to determine the trustworthiness of an archive is its potential federation in the European Open Science Cloud (EOSC).

FAIR Principles

The FAIR[3] principles are technical specifications to make all research results such as (but not limited to) research data, software and protocols Findable, Accessible, Interoperable and Reusable. In summary, to be FAIR data and metadata must:

1. have a unique and persistent digital identifier and be deposited in a searchable digital platform. For findability purposes, it is important that data are described using sufficiently rich metadata (findable);
2. be accessible via standard communication protocols. Access protocols should be as open and free as possible and provide for authentication and authorization procedures where necessary. Furthermore, metadata should be accessible even when the data with which they are associated are no longer available;
3. use open and standard formats that can be easily deciphered by different informatic systems (e.g., other databases or software than native ones) to be used in combination with other datasets (interoperable)
4. be well described and documented to make them easily readable and analyzable and have a license or use terms explaining how they can be used by others (reusable).

Data Management Plan (hereinafter DMP)

The DMP is a structured, dynamic document supporting the planning and execution of a research project that states how the data will be managed both during the life of the project and after its conclusion. It provides information on research data, such as type, origin, formats, methods, volume, licenses, and establishes how data will be managed, saved and valorized.

Section 3 – Aims

This policy aims to promote and support the development of good practices for the responsible management of research data throughout the research lifecycle and for the archiving, sharing and long-term preservation of research data associated with publications or other results (patents, project deliverables, doctoral theses, etc.) or, in other words, of all the research data that are considered scientifically relevant in itself data, achieving a good combination of academic and scientific freedom, compliance with standards recognized by the international scientific community and the maintenance and promotion of the University's knowledge heritage.

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[3] Wilkinson, M.D et al., The FAIR Guiding Principles for scientific data management and stewardship, Scientific data, 2016, 3, doi:10.1038/sdata.2016.18

This policy:

- implements, with regard to research data, Article 4.8 of the Statute, which states that '*The Politecnico di Torino embraces the principles of full and open access to scientific literature and promotes the free online dissemination of research results produced in the University*';

- is in accordance with the University Policy on Open Access to Scientific Publications in '*giving a strong impetus to the culture and practice of Open Science by the academic community starting with the definition of policies to promote, raise awareness and support the openness of scientific publications, data and software*';

- encourages the compliance of research staff with the University Regulation for Research Integrity, Article 2 - Fundamental Principles of Research Integrity, paragraph 2, letter d), in which research staff is called upon to '*present all research data and sources in a truthful and honest manner as soon as possible and keep a record of all research carried out in order to ensure its verification and reproducibility, with particular regard to the preservation of data that have been used in support of scientific publications*';

- embraces the tenets and guidelines of the Piano Nazionale per la Scienza Aperta (Decreto Ministeriale n. 268 del 28 febbraio 2022), which is an integral part of the Piano Nazionale della Ricerca 2021-2027 del Ministero dell'Università e della Ricerca;

- adopts the Recommendation of the European Commission on Access to and Preservation of Scientific Information (April, the 25th 2018) and Directive 2019/1024/EU of the European Parliament and of the Council (June, the 20th 2019) on the openness of data and the re-use of public sector information, with particular reference to Article 10 - Research Data, as well as the UNESCO Recommendation on Open Science (November, the 23th 2021);

- endorses the tenets of the European Charter for Researchers adopted by Council Recommendation (December, the 18th 2023), with particular attention to the key principles of research ethics and integrity, freedom of scientific research and open science, and of the Agreement on Reforming Research Assessment signed by the University in June 2022, with specific reference to the relation between verifiability and reproducibility of results and research quality.

Part II – Implementation modalities

Section 4 – Scope of application

This policy is addressed to all affiliates and applies to all research projects limited to the parts for which the Politecnico di Torino is responsible for its own affiliates.
Where research has been financed by third parties and there are specific agreements concerning the control of research data, their availability and maintenance, such agreements shall prevail over this policy, always in compliance with the regulations in force.

Section 5 – Research Data management

The following recommendations are made for the management of research data and their metadata.

5.1 Management
Throughout the life cycle of the research activity, research data must be collected, managed and archived in a correct, complete and reliable way, with care for their integrity, classification and documentation for subsequent use and safe storage respecting any legal and contractual constraints. In general, the production and management of research data must follow the FAIR principles as far as possible.

For the sake of sustainable and effective management, not all research data can or should be stored long-term[4]. After all, it is the prerogative of the affiliates to decide which data is worth keeping and, if necessary, sharing. On technical and scientific relevance, it should be noted that data of little interest in a particular context may be relevant for other scientific communities, just as negative results may be relevant. It is good practice at the start of the project to establish a research data management plan (DMP) as a support tool, which defines criteria for the evaluation and selection of data for long-term storage.

5.2 Deposit and publication
Research data associated with publications or other results (e.g. patents, project deliverables, doctoral theses) and research data deemed to be of scientific-technical interest for its own sake must be deposited in a trusted digital repository for long-term preservation and made freely available for use for scientific, historical or public interest research purposes, according to the principle of "as open as possible, as closed as necessary" and in compliance with current legislation on the protection of personal data and privacy, security[5] and intellectual property, as well as with the dispositions contained in the University Statute and Regulations, except for specific research funding agreements with third parties.

The choice of the archive is free and left up to the affiliates who are responsible for the data, assuming that the archive satisfies the requirements specified in section 2-Definitions. We recommend the use of the guidelines and practices drawn up by the Politecnico di Torino and, where available, the use of thematic/disciplinary[6] repositories and to refer to the good

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[4] As an example, in some situations the size of the raw data may determine that only the derived data can be archived, in others it may be relevant to keep only the raw data (e.g., observational data that cannot be regenerated) together with the tools used for the analysis and generation of the derived data. In other cases, data may be judged to be of poor scientific or technical quality or become obsolete.

[5] See in particular the Politecnico di Torino "Regolamento di Ateneo per l'Integrità nella Ricerca, Art. 3 - Violazioni dei principi dell'integrità nella ricerca, point 4", in which "*it then highlights the need to request an opinion from the University Research Ethics Committee, in those instances in which the research involves: the participation of sentient beings; the use, production and collection of human tissues and cells; the collection of personal data and the processing of information relating to an identified or identifiable person; the possibility of dual use of technologies; the possibility of environmental and health risks*".

[6] Further information about specific data repositories for different scientific areas can be found in the document Open Research Data and Data Management Plans Information for ERC grantees of the ERC Scientific

practices on the sharing of research data and metadata promoted by the Landmark research infrastructures established by ESFRI (European Strategy Forum on Research Infrastructures)[7] and, more in general, to the FAIR principles.

If no third-party rights are imposed on the data and if there are no uses forbidden by law, the stored research data (datasets) must be associated with a license for free use (e.g., Creative Commons licenses), providing usage traceability and providing credit to the original source.

Research data must be archived and disseminated in compliance with European and national legislation on the processing of personal data (GDPR and Privacy Code), the intellectual property legislation and any agreements with third-party funders of the research. The minimum archiving period for research data is 10 years from the public release of research results following the end of itself. After this period, the data may be deleted unless important research interests remain. In situations where research data must be destroyed or deleted (at the end of the storage period or for ethical or legal reasons), such action should only be considered after considering all ethical and legal aspects. Any eventual removal or destruction of research data must be verifiable and its documentation accessible. However, metadata associated with the erased data should always remain available and accessible. At the same time, the rights of any third party funding the research and other stakeholders must be safeguarded, as well as confidentiality and security requirements.

5.3 Metadata storage on the institutional repository
In order to preserve the knowledge heritage constituted by the research data and in view of research exploitation, monitoring and evaluation activities, it is requested that the Politecnico di Torino's affiliates, authors or co-authors of the dataset, once the dataset has been deposited in a reliable archive and a persistent digital identifier has been obtained, register the related metadata in the Politecnico di Torino's institutional archive (PORTO@Iris), in the "9.FAIR Data Collection" category.

Section 6 – Responsibilities

Responsibility for collection, management and maintenance of research data is shared between the affiliates and the Politecnico di Torino itself, each in their respective domains of competence and in compliance with the Code of Ethics and the Research Integrity Regulations.

6.1 Researchers affiliates to the Politecnico di Torino
Affiliates, individually or as participants in a project, and making use of the information, infrastructure and support services provided by Politecnico di Torino:

- define how research data generated during the project will be collected, documented, stored, accessed, used, and preserved (or destroyed). When required by contracts with

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Council. Version 4.1 April, the 20th 2022. For software, we can refer to good practice in archiving, identification, description and citation with open and shared infrastructures such as Software Heritage.
[7] https://www.esfri.eu; https://www.esfri.eu/sites/default/files/ESFRI_LM- Monitoring_Guide_Public.pdf

research funders or other legal entities or when deemed appropriate, this information should be included in a DMP from the start of the project;
- make back-up copies and fulfill institutional and legal or contractual requirements related to research data and the management of metadata which describes them;
- identify and adopt practices that ensure the security, access control, integrity and availability of research data over time;
- establish appropriate action for the preservation and accessibility of research data in accordance with the previsions of this policy in the occurrence of an end of the relationship between the affiliates and the Politecnico di Torino;
- define which of the research data collected should be preserved and shared and ensure their proper management, also considering the responsibilities deriving from agreements with third parties and ethical, privacy, security, protection and enhancement of intellectual property aspects;
- plan the use of research data even after the end of the project, defining specifically the reuse rights;
- give appropriate recognition (e.g., in scientific publications), both at individuals and institution of affiliation level, to those who have contributed to collecting, obtaining, and analyzing research data.

The scientific responsible for the research project coordinates the planning of management, preservation, storage, and publication of research data generated during the project. Special attention should be paid to researchers in the early stages of their careers and/or in training (thesis students, doctoral students, research fellows), for whom training and adoption of research data management and sharing practices in accordance with FAIR principles and "as open as possible, as closed as necessary" are to be encouraged.

6.2 Politecnico di Torino
The Politecnico di Torino:
- provides qualified human resources to develop services and tools supporting research data management activities, such as data scientists and data stewards;
- ensures adequate resources, tools, and infrastructure in accordance with this policy;
- provides assistance in designing and compiling DMPs;
- ensures the support of specialized staff in data protection, privacy regulation (GDPR), and protection of the intellectual property;
- ensures that affiliates have appropriate access to basic training through internal or external courses on data research management according the international standards;
- ensures the necessary conditions for the implementation of this policy, whose ongoing supervision and updating is in charge of the University Open Access Commission.

More detailed guidelines about technical and practical aspects of research data management, such as the choice of repository, the choice of data to be deposited and the methods for doing so, software management, licensing, DMP templates for different research needs, services and resources made available by the Politecnico di Torino, and staff to support them, are published and updated periodically on the University Libraries web pages.