



QuTech
Creating the
quantum future

QuTech Research Data Management Policy



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Preface

The QuTech Research Data Management Policy is part of the central [TU Delft Research Data Framework Policy](#) (which outlines the roles of the Library, ICT Department, University Services and the Executive Board at TU Delft).¹ This policy helps create effective practices for working with research data at the research institute, and defines data management roles and responsibilities of the different stakeholders within QuTech from the 1st of April 2022 onwards.

The principles outlined in this policy are elaborated in more detail, with supporting information available in the online guidance.

This policy is motivated by the belief that good data management is an essential research skill, leads to research that is more time- and cost-efficient as it prevents data and information loss and duplication of efforts and is required to guarantee the quality, reproducibility and impact of research. This policy is inspired by the FAIR principles: research data should be Findable, Accessible, Interoperable and Reusable (FAIR) by archiving the data with proper documentation.

This policy cultivates:

- Best practice for ensuring that scientific arguments and results are reproducible in the long term.
- Better exposure of academic work of researchers at QuTech and TU Delft leading to recognition of the quality of the research process.
- Responsible management of research data, including the protection of intellectual property rights and export control of data
- Improved practices for meeting the demands of funders and publishers with respect to research data management and sharing.
- Long term preservation of the data underlying publications for future researchers within and outside the research group. This cannot be guaranteed by publishing the data in supplementary materials or by only making the data available upon request.

This policy recognises that:

- Individual divisions and research groups have different working practices and processes and will therefore require dedicated guidelines.
- Research Data Management covers the entire process of managing research data from its creation to its re-use and preservation, which is not equal to Open Science. While it is beneficial to publish research data openly, there might be valid ethical, legal, security or commercial implications, which will make data unsuitable for open sharing.
- Research data is the evidence that underpins answers to research questions, and which is necessary to validate research findings, and includes but is not limited to measurement data, source code, algorithms, simulations and models and other forms of information supporting traditional publications.

¹ <https://www.tudelft.nl/en/library/research-data-management/r/policies/tu-delft-faculty-policies>

- The term raw data is not always uniquely defined. Moreover, this policy recognizes that not necessarily all binary data generated (*e.g.*, by a physical measurement or simulation run) is or was useful for scientific studies or was accessible to the researcher. Therefore, in this policy the term raw data should be interpreted as a sufficient set of data necessary to fully verify and/or replicate the experimental, theoretical or computational results presented as research findings.
- There is a limit on the amount of information on reproducing research data that is possible to convey by publishing data, and there always remains know-how and expertise (*e.g.* operating measurements, sample preparation, *etc*) which is not easy to document and is not usually made public.
- Some researchers of QuTech are also affiliated with faculties of TU Delft with their own research data policy. If a policy point is not noted here, they should follow the research data policy of their faculty, but otherwise the most stringent requirement needs to be followed.

The key points of this policy are:

- All individuals involved in research follow the research data management strategy of QuTech and their research group.
- All individuals involved in research attend data management training when required or needed.
- Research data and code needed to reproduce research findings are appropriately documented, stored and shared in a suitable repository. More specifically, the raw and derived data, as well as software scripts used for the full data processing chain, that produce the final figures or tables of a research article are to be published in a trusted data repository (*e.g.* 4TU.ResearchData or Zenodo.org)
- Data Stewards can assist researchers in these activities.

QuTech Roles and Responsibilities

All individuals involved in research are responsible for:

- Ensuring that research data, code and any other materials needed to reproduce research findings are appropriately documented, stored and shared in a research data repository in accordance with the FAIR principles (Findable, Accessible, Interoperable and Reusable) for at least 10 years from the end of the research project, unless there are valid reasons not to do so.
 - The requirement is that both raw and derived data, as well as the software scripts used for the full data processing chain, that produce the final figures or tables of a publication are published in a trusted data repository such as 4TU.ResearchData or Zenodo.org (also coined as Level 1 data by Quantum Nanoscience department²) no later than the publication of a peer reviewed research article or submission of a traditional research article to a preprint archive (e.g. to arXiv.org). Additionally, the required research data also needs to be made available for the review process of said article through the journal or a data repository. Note that publication of data should be under an as open as possible license³. It is also highly encouraged to record the version of all software components used in generation, analysis or processing of data. Moreover, it is required to deposit code which has been used in the analysis or processing of data together with the published dataset (see also TU Delft Research Software Policy⁴ for more details on publication of code/software).
 - Note that deposition (in public data repositories) of datasets not directly linked with publications is not required but encouraged if the data can possibly be used for other scopes than initially intended.
 - Should data which underlies publications, because of valid reasons (e.g. to protect IP sensitive data) not be made available in a public repository, it should be ensured that the data management plan and any research publications resulting from the project have a statement explaining what additional datasets/materials exists; why access is restricted; who can use the data and under what circumstances.
- Contractual agreements with third parties on confidentiality of data should be respected at all times.
- Understanding who owns research data resulting from their projects and what that implies in terms of data management, particularly sharing and publishing.
- Properly citing research data, in accordance with the FORCE11 Joint Declaration of Data Citation Principles.⁵
- Undertaking training in good data management, where advised.

² <https://doi.org/10.5281/zenodo.2556949>

³ <https://data.4tu.nl/info/en/use/publish-cite/upload-your-data-in-our-data-repository/licencing>

⁴ <https://zenodo.org/record/4629662>

⁵ <https://www.force11.org/datacitationprinciples>

PhD students are responsible for:

- Developing a written data management plan (DMP) for managing research outputs within the first 12 months of the PhD study with consultation and feedback of the data steward. (As part of the Go/No-Go meeting. For all PhDs starting from 1 January 2020 onwards.)
- Attending the relevant training in data management either through the Graduate School of their Faculty, for which credits can be obtained or through research data seminars provided by QuTech.
- Ensuring that all data and code underlying first author publications and completed PhD theses are appropriately documented and are made accessible for at least 10 years from the end of the research project via a trusted data repository (4TU.ResearchData or Zenodo), in accordance with the FAIR principles (Findable, Accessible, Interoperable and Reusable), unless there are valid reasons which make research data unsuitable for sharing. (For all PhDs starting from 1 January 2019 onwards.)

Principal investigators are responsible for:

- Establishing a research data management strategy for their research group (which is encouraged to be documented and accessible for relevant QuTech employees) and ensuring that all members of the research group (including students, researchers and support staff involved in research) are aware of the FAIR data principles, are appropriately trained to effectively manage research data, are aware of data storage solutions at QuTech or TU Delft and that members of the research group adhere to the expectations outlined within this policy.
- Ensuring that all members of the group plan for good data management from the outset of any research project by writing a data management plan with the appropriate template and adhere to good data management practice throughout the project's lifecycle.
- Ensuring that where projects are funded by external parties or are in collaboration with external parties, agreements made with those parties strive for compliance with this policy and determine maximal embargo periods. Research funded primarily by third parties will have to be evaluated on a case-by-case basis to ensure the best interests of all parties involved.
- Budgeting for the costs of research data management into financial project planning at the proposal stage.

Bachelor/Master thesis Supervisors are responsible for:

- Ensuring that the project's data management is in line with this policy.
- Obtaining a written agreement from the student with regards to data processing, re-use and sharing, with administrative support from Education and Student Affairs.

PhD Supervisors are responsible for:

- Supporting their PhD students in preparation of a written Data Management Plan (DMP) for managing research outputs within the first 12 months of the PhD study. (As part of the Go/No-Go meeting. For all PhDs starting from 1 January 2020 onwards.)
 - The PhD Supervisor is responsible for reviewing and approving the DMP and the Data Steward can be contacted for advice and support.
- Ensuring that PhD students attend relevant training on data management, either through the Graduate School of their Faculty, for which credits can be obtained or through research data seminars provided by QuTech.
- Ensuring that their PhD students make all data and code underlying their completed PhD theses and publications appropriately documented and accessible in a trusted data

repository (such as 4TU ResearchData or Zenodo) for at least 10 years from the end of the research project, in accordance with the FAIR principles (Findable, Accessible, Interoperable and Reusable), unless there are valid reasons which make research data unsuitable for sharing. (For all PhDs starting from 1 January 2019 onwards.)

Data Stewards are responsible for:

- Facilitating the development, review and implementation of the QuTech data management policy.
- Creating awareness and explaining to researchers the added value of good data management.
- Supporting research teams in developing and maintaining documentation on data management processes and making it accessible to all relevant QuTech employees.
- Assisting researchers in planning the collection, management, and publication of data in research projects and liaising with other service providers (such as Legal services, ICT, Human Research Ethics Committee) as required.
- Helping researchers with writing data management plans and with budgeting for research data management costs in their grant applications.
- Developing and running training events tailored to researchers' needs.
- Identifying researchers who already have good data management practices and encouraging them to become Data Champions⁶ to establish local contact points of expertise.
- Advising researchers on regulations for working with IP sensitive data possibly together in collaboration with the private partner.

Division Research Leads are responsible for:

- Ensuring that PI's have a research data management strategy in place and documented, consistent with the QuTech Research Data Policy.
- Monitoring and reviewing of data management practices in the department.
- Discussing data management practices with members of the department and encouraging them to adhere to best practices.
- Supporting Data Stewards in identifying Data Champion candidates.

The Director Research is responsible for:

- Ensuring that a Data Steward is embedded within QuTech.
- The development of the QuTech Policy for Research Data Management, consisting of department/section specific implementation regulations and goals (e.g. Key Performance Indicators) where necessary.
- Ensuring that research data management is embedded in QuTech regulations.
- Ensuring that reporting on research data management progress is part of the yearly Planning and Control cycle.

⁶ <https://www.tudelft.nl/en/library/research-data-management/r/support/data-champions>