European Research Council
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# European Research Council (ERC)

# ERC Data Management Plan

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# ERC OPEN RESEARCH DATA MANAGEMENT PLAN (DMP)

| Project Acronym | Project Number |
|---|---|
| MightyMirrors | 101 170022 |

***Template for the ERC Open Research Data Management Plan (DMP). The following sections should describe how you plan to make the project data Findable, Accessible, Interoperable and Reusable (FAIR). Each of the following five issues should be addressed with a level of detail appropriate to the project.***

**SUMMARY** *(dataset[1] reference and name; origin and expected size of the data generated/collected; data types and formats)*

All the data generated will be the product of the research carried within the project members of MightyMirrors. Any data produced by third parties is explicitly excluded.

**Type I: Characterization and fabrication details:** This data relates to the design if experimental setups and sample processing. Includes, but it is not restricted to:

- Engineering drawings: CAD files, with defined schemas, shapes and dimensions of the prototypes' parts (e.g. mechanical holders, stages, microfluidic system, wiring, etc.) and their integration. (1 MB – 100 MB per design)
- Chip layouts: mask designs to be used in the production steps of the photonic samples. Typically, in gds format. (10 MB – 100 MB per chip)
- Sample processing specifications: detailed list of steps, conditions, and materials' qualities to be used in the production of chip devices. Typically, in Office file (or equivalent) format. (10 kB – 10 MB per process)
- Flow diagrams: detailed graphical descriptions of the algorithms. (10 kB – 10 MB per diagram)
- Programming code: source code of the programs running in the microscope prototypes, both in the computer side and in the embedded side, as well as source codes of simulation software. Typically, in ASCII files encoding different programing languages. (1 MB – 10 MB per program)

[1] *Several datasets may be included into a single DMP.*



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- User protocols and manuals: detailed written and graphical descriptions on how to operate the different parts of the experiment to ensure knowledge transfer. Typically, in Office file (or equivalent) format. (1 MB – 100 MB per document.)

**Type II: Measurements and simulation data:** This data relates to the experiments carried out during the project, which include the characterization and simulation of the photonic systems, and the application in cavity setups. These experiments will generate, among other, datasets of:

- Spectroscopic measurements, scatterometric and cavity measurements: reflectance, transmittance spectra. Typically, in CSV, Origin or Excel files. (1 kB – 100 MB per file)
- Images: photo/micro/nanographies taken by camera, optical microscope, scanning electron microscope, and transmission electron microscope of the photonic systems involving image files (e.g. BMP, TIFF, JPG ...) and video files (e.g. MP4, AVI, MOV...). (1 MB – 1 GB per image/video)
- Numeric simulation results: calculated physical quantities associated to optical and noise properties, like reflectance/transmittance/absorbance, electromagnetic field distribution and their dependence on parameters like wavelengths, temperature. Depending on the specific software, data produced might be in stored in open formats like VTK, HDF5, both as ASCII or binary files, or in software specific legacy file formats. In some cases, only postprocessed data might be stored, instead of raw simulation results. (1 MB – 1 GB per simulation)
- New theoretical models: description of new formulas and algorithms. Typically, in Office file (or equivalent) format. (10 MB… 50 MB per file)



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**1. MAKING DATA FINDABLE** *(dataset description: metadata, persistent and unique identifiers e.g., DOI)*

Research articles published within this project receive a Digital Object Identifier (DOI) from the publisher to ensure persistent citation and findability. Related datasets are made available either as supplementary material linked directly to the online article or separately in a data repository.

Publishing datasets in repositories (e.g., Zenodo or the TU Braunschweig LeoPARD platform) ensures DOI assignment and integration into existing data catalogs and metadata systems. Through standardized metadata, datasets become discoverable in local catalog systems. Repositories also support linked open data, enabling enrichment with additional information and connections to related projects, authors, literature, and datasets. Metadata is automatically disseminated to other catalog systems via APIs.

Overall, this increases the visibility, findability, and contextualization of the data and metadata, supporting the goal of providing FAIR-compliant data and persistent references.

**2. MAKING DATA OPENLY ACCESSIBLE** *(which data will be made openly available and if some datasets remain closed, the reasons for not giving access; where the data and associated metadata, documentation and code are deposited (repository?); how the data can be accessed (are relevant software tools/methods provided?)*

The datasets referenced in the summary will be made available either as supplementary material to the publication or via an appropriate data repository, such as Zenodo or LeoPard, the TU Braunschweig institutional repository, all providing open access. Where possible, the datasets will be released under an open access license, such as CC-BY-NC-SA or a similar license. Publications resulting from the project will be made available as gold or green open access, with gold open access preferred. If gold open access is not feasible, for example for certain conference proceedings, green open access will be pursued. In addition to the raw data included in the publications, the datasets will contain further descriptive information. Software components, including developed models or code segments, will be made openly accessible via GitHub wherever possible.



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**3. MAKING DATA INTEROPERABLE** *(which standard or field-specific data and metadata vocabularies and methods will be used)*

By using a FAIR-compliant data repository, standardised metadata schemes and controlled vocabularies (e.g., Dublin Core and DataCite) will be applied, ensuring consistent metadata exchange and interoperability. Experimental and simulation data will be stored in open, widely used file formats (e.g., CSV, JPEG or similar domain-specific standards), together with descriptive metadata files documenting variables, units, and processing steps. Commented Python scripts for data processing and result generation will be provided, enabling reuse and adaptation. Versioning of datasets and metadata will be maintained to ensure traceability and compatibility with community standards.

**4. INCREASE DATA RE-USE** *(what data will remain re-usable and for how long, is embargo foreseen; how the data is licensed; data quality assurance procedures)*

The datasets will be linked to the corresponding scientific publications using persistent identifiers (DOIs). Access to the datasets will be provided together with the publication or, if necessary, after an embargo period of 6–12 months to allow for further publications or patent applications. The datasets will be released, where possible, under an open access license (e.g., CC-BY-NC-SA). Data will remain re-usable for at least 10 years after publication in external repositories. Long-term availability is ensured through FAIR-compliant repositories, which typically guarantee persistence for at least 10 years.

Data quality will be ensured through version control, documentation of data processing steps in metadata files, automated consistency checks where applicable, and internal review by project members before public release.



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**5. ALLOCATION OF RESOURCES and DATA SECURITY** *(estimated costs for making the project data open access and potential value of long-term data preservation; procedures for data backup and recovery; transfer of sensitive data and secure storage in repositories for long term preservation and curation)*

The selected repositories are free of charge or incur only minimal costs. In addition, all data will be backed up on internal servers to ensure long-term availability. To maintain data integrity over time and across technological changes, bit-stream preservation of archived datasets is planned. Data storage costs will be covered internally. Open access publication fees incurred during the project will be financed by the project in accordance with the Grant Agreement. The use of internal documentation tools ensure that no sensitive personal data are included in the published datasets. No other sensitive data will be generated during the project.

**DISCLAIMER. Please note that the ERC Data Management Plan is not a part of the Ethics Review. It is the responsibility of the Principal Investigator to inform the ERCEA Ethics Team of any ethics issues/concerns regarding the collection, processing, sharing and storage of data in relation to the project.**



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