HELMHOLTZ METADATA COLLABORATION (HMC)

Project Call 2025

Funded by the Initiative and Networking Fund (INF)

1. Background

The Helmholtz Metadata Collaboration (HMC) develops and implements concepts and technologies to leverage high-quality metadata for research data across research fields and their communities – improving metadata will improve research data and the science conducted with it. Its main goal is to establish a Helmholtz FAIR data space – a decentralized infrastructure for trustworthy data sharing and exchange based on common agreed principles – to make the vast amount of diverse research data produced by Helmholtz Centres findable, accessible, interoperable and reusable (FAIR).

One essential component of HMC is the funding of projects that initiate and underpin the growing metadata network within the Helmholtz Association. These projects should initiate new developments, extend existing solutions for the usage in the HMC context, expand the HMC network, and enable new cross-discipline collaborations.

2. Objectives

The objective of this call for HMC projects is to initiate and facilitate activities that address practical challenges in the **field of metadata generation and data enrichment**. The call aims at funding promising collaborative projects with the potential to add new knowledge as well as solutions to the wider HMC framework and the Helmholtz FAIR data space, and the potential to sustainably propel the respective metadata community.

Hence, first practical results and promising prototypes are expected in Q1/Q2 of 2027, i.e. one year after the funding starts. The results shall underpin and stimulate the growing HMC network. As part of this, results shall be presented at an HMC conference in 2027. To ensure the project's link to HMC, all applicants must contact at least one HMC metadata hub and/or the technology unit FAIR Data Commons when considering a proposal submission (see below for contacts and formal regulations).

3. Goals of project call

An HMC project addresses one or more of these overarching goals:

- Further metadata generation with interoperable, high quality metadata standards, vocabularies, semantics and/or ontologies.
- Adopt or develop tools for data enrichment (e.g. automated metadata generation for recording dataset descriptions and workflows), metadata quality assessment and/or curation.
- Promote interdisciplinary collaboration between metadata experts and domain scientists; collaborations between Helmholtz research fields are encouraged.

All projects are expected to contribute to the establishment of a Helmholtz FAIR data space. This can be demonstrated amongst other things, through linking data assets via relevant technologies or by working towards innovative recommendations for policy and practice.

HMC welcomes proposals in **all areas relevant to metadata**. The following list exemplifies key areas of particular interest to HMC[1] (in no particular order):

- Novel strategies for the automatic generation or exchange of metadata. Suggestions for use cases include:
  - Harmonization of machine interfaces for data base and repository ingest/exchange.
  - Connection to the Helmholtz FAIR data space:
    - Application of FAIR Digital Objects (FDO)[2] in scientific workflows.
    - Implementing prerequisites for metadata harvesting to the Helmholtz Knowledge Graph (KG)[3].
  - Maintaining (meta)data from orphaned data, for example in case of decommissioned infrastructure or retiring staff.
  - Exposure of metadata and harvesting from pre-existing data sources, for example machine-actionable data management plans, workflow tools, or instruments.
- The innovative integration and/or application of persistent identifiers (PIDs) in diverse contexts. This could include:
  - Integration of PIDs in the research workflow, for example samples/specimens.

[1] Please refer to chapter 12 (glossary) for definitions.
[2] https://helmholtz-metadaten.de/en/fair-data-commons/realizing-fair-digital-objects (25.02.2025)
[3] https://helmholtz-metadaten.de/en/unhide_helmholtz-kg (25.02.2025)

  - Automatic generation of PID graphs.
  - The application of FDOs.
  - Reuse of data enabled by Research Object (RO) crates.
- Approaches to achieve metadata interoperability. Potential topics include:
  - Interfaces between metadata generating tools, for example electronic lab notebooks.
  - Crosswalks between metadata schemata, ontologies, or other semantic artefacts.
  - Agile approaches to the development, extension, or alteration of existing schemata.

Projects need to show the potential impact of their goals on science, its data services and communities. Further, projects should demonstrate their potential to add new knowledge and solutions to the wider HMC framework at the end of the project's lifetime. This includes links to respective infrastructures within HMC[4] and at participating Helmholtz Centres as well as the impact on research data curation practices in the respective research fields.

In summary, projects should contribute to the overall development of the emerging HMC community. They should contribute to establish and strengthen long-term cooperation between partners and communities and by this, they should enable the transfer of technologies, methods and best practices within research fields or across programs (please also see 4. Criteria for more details).

4. Criteria

Projects shall be aligned with the goals formulated above. Proposals that meet the following criteria will be evaluated based on the evaluation criteria (see Chapter 8).

Thematic criteria

a. The project must further one or more of the goals of this call.

b. The project must demonstrably support the FAIR principles.

Further criteria

a. Transfer

Rather than pure technological innovation, HMC also encourages knowledge and technological transfer for the implementation and deployment of existing techniques relevant to the generation and preservation of high-quality metadata in areas where this is not yet common practice. HMC projects shall contribute to Helmholtz' transfer objective through **one or more** of the following:

[4] https://helmholtz-metadaten.de/fairdata and https://helmholtz-metadaten.de/en/communities)

- Openness to enable knowledge transfer (in science and society)
- Collaboration with relevant external partners such as companies or non-profits
- Outlining where the project fits into the research or technology lifecycle – from early stage innovation to potential transfer to large-scale implementation – and delivering an appropriate strategy to achieve these aims
- Outlining how the project achieves the maturation of (preliminary) findings and results, e.g. advancing the Technology Readiness Level (TRL)
- Outlining a sound and implementable exploitation strategy

b. Budget

Projects can apply for a total volume of approximately € 400k for a period of up to 2 years. Half of the financial volume and at most € 200k will be funded by the Initiative and Networking Fund (INF). The contribution by participating Helmholtz Centres has to be confirmed by a signed letter from the board of directors, either by the administrative, the scientific director or both[5], when submitting the proposal.

A maximum of 70% of the INF funding can be assigned to one Helmholtz Centre.

Staff, travel expenses and cost for consumables are eligible for funding; investments are excluded.

Funding will be assigned for Helmholtz Centres only. In clearly documented cases, funding can also be provided for highly qualified university partners (within Germany). The funds will NOT be eligible for overhead costs.

c. Duration of Projects

Projects must start as soon as possible (within 3 months) after positive formal notification by the President of the Helmholtz Association. Applications shall describe how a swift start of the project is ensured upon the funding decision (e.g. hiring, data provision).

Projects may run for no longer than two years. First deliverables/prototypes need to be presented 12 months after the start of the project.

d. Applicants and Eligibility

An eligible proposal must comprise partners from at least two different Helmholtz Centres (or two AST programmes respectively). HMC encourages the submission of interdisciplinary proposals from different Helmholtz research fields.

Applicants must specify a coordinating centre and person. Project coordinators can only lead three projects, but can participate in multiple other project proposals. Applicants should consider an appropriate and balanced diversity of the principal investigators (PI) involved.

[5] as listed here: https://www.helmholtz.de/en/about-us/structure-and-governance/statutes-and-governance/assembly-of-members/ (25.02.2025)

Proposals submitted for this call must not have been submitted simultaneously to another funding line of the Helmholtz Association or any other funding line, i.e. there must be a formal rejection of a previous submission. Further, PIs must state if they are or were part of an active or completed HMC project and if and how the proposal is connected to this project.

Revised resubmissions of previously unsuccessful HMC project proposals must be accompanied by a brief description of changes applied in the appendix (max. 1 page).

Employees of HMC units (hubs, FAIR Data Commons, HMC office), people who provide substantial support to HMC or anyone else connected in any way with helping to set up the project call, including members of the collaboration, steering and scientific advisory boards, shall not be permitted to enter the project call.

Project applicants must contact at least one HMC metadata hub and/or the technology unit FAIR Data Commons for advice during the application phase. This needs to be confirmed in writing by at least one of the respective HMC hub or FAIR Data Commons coordinators and to be enclosed in section 3 of the proposal.

e. Format

A proposal MUST be submitted **as a single PDF file** and formatted as follows:

- single PDF file
- Page format: A4 (portrait format)
- Font: Arial, 12pt
- Line spacing: 1.5, Border Top/Left/Right/Bottom 2.5/2.5/2.5/2.0cm
- Language: English
- Budgets: EUR x00,000.00
- References: Harvard Citation Format

f. Exclusion Criteria

Proposals will be rejected by the following arguments:

- Extensions of existing projects cannot be funded.
- Deadline for submission was not met or the submission is incomplete.
- Guidelines for budget, duration, applicants and eligibility, proposal content, format, and/or length were not followed entirely.
- Confirmation letters of board of directors are not included or incomplete.
- Confirmation letter from at least one HMC hub or FAIR Data Commons coordinator is not included or incomplete.

5. Rights and Obligations

- During the funding period, project partners can participate in HMC events (e.g. training offers, seminars, workshops).
- During the funding period, project partners commit to participate in HMC's cross-field activities, such as progress workshops, method exchange workshops or hackathons, and to present their results.
- The results of an HMC project are to be made available to the HMC and Helmholtz community. This means, e.g., that software and algorithms must be open source (complying with an OSI approved license) and methods, reference data, reports and publications of the project results must be open access.
- Funded projects commit to acknowledge financial support through the HMC projects funding line in any project-related published output.
- Funded projects commit to share short updates about ongoing projects (e.g. on the HMC website and associated social media channels) regularly.
- Funded projects shall be in regular contact with their respective HMC hub and/or FAIR Data Commons for subject-specific exchange, technical exchange and integration into the community.
- Reporting by funded projects is to be made to the INF following its processes and to the HMC boards. This includes annual and final reports demonstrating progress and results (referencing deliverables). Further reports can be requested. Reporting is as coordinated as possible.

6. Proposal Submission and Structure

To submit a proposal, please use our submission system at
https://proposals.helmholtz-metadaten.de/

The Proposal consist of three sections:

Section 1: General information (will be submitted via the online submission tool):

- Abstract (English, max. 1000 characters including blanks)
- up to 10 keywords
- project duration (max. 24 months)
- requested INF funding (max. 200,000.00€) and matching funds

- Names and contact information of principal investigator(s), participating centres and external partners

Section 2: Proposal (main body maximum 7 pages in total including figures, excluding the appendices, template is provided):

- Project title, acronym, project duration, names of PIs, centre, abstract (1 page, excluded from main body) and keywords
- Main body, chapters
  - State of the research field
  - Objectives
  - Approach
  - Expected results
  - Expected impact on the community and link to HMC, including a sustainability strategy beyond the project's funding period
  - Transfer
  - Implementation and management
  - Result handling

Section 3: Appendices (templates are provided)

- References (max. 2 pages)
- List of contributions of PIs and staff
- Gantt Chart, showing a list of work packages, and a list of deliverables
- Detailed budget plan (personnel, consumables): use both templates Annex 2a and 2b
- If applicable: Revised resubmissions of previously unsuccessful HMC project proposals must be accompanied by a brief description of changes (max. 1 page, to be inserted in the appendix).
- Brief description of proposed staffing including timeline
- Brief CVs of the principal investigators and potential staff members.
- Equality, diversity and inclusion (EDI) statement
- List of existing tools, metadata standards/schemas and semantic artefacts

- Confirmation letter by all Helmholtz Centres[6] involved concerning the co-funding provided. The confirmation letter needs to be signed by the board of directors, either by the scientific, the administrative director or both, of the respective centre.
- Confirmation letter of consultation signed by at least one HMC hub or FAIR Data Commons coordinator
- A list of cooperation partners (only via the submission portal)
- A list of independent experts as potential reviewers can be provided. The proposed experts need to be unbiased (only via the submission portal)

7. Evaluation Process and Selection

Proposals are subject to the following evaluation procedure. Proposals are checked with regard to formal requirements. Proposals are evaluated by a panel of independent experts (no presentation), on the basis of the evaluation criteria listed below. At least two external reviews will be solicited for each proposal. The panel performs a pre-assessment of all proposals (all proposals subject to the pre-assessment will also be assessed in the panel meeting). Based on this evaluation, the panel will recommend a list of projects for funding. The President will review the list of ranked proposals and decide which projects shall be funded.

Staff at the Helmholtz Association's head office and Helmholtz Metadata Collaboration's administrative office will jointly manage the evaluation procedure and the handling of proposals. The Helmholtz head office will manage the evaluation meeting. The HMC collaboration board members and HMC steering board members will have no access to submitted proposals or assessments at any stage during the evaluation procedure. They will not contact the panel of experts.

[6] If you plan to submit a proposal with a university please consult our FAQs for more information (https://helmholtz-metadaten.de/faq-projectcall) (25.02.2025).

8. Evaluation Criteria

Novelty and innovative character	• Potential to open new and sustainable pathways in handling data, enabling new science • Clearly defined objective and extent to which the proposed project addresses one or more of the call's goals[5] • Extent to which the proposal is beyond the current state of the art in the respective community
Impact on tools/services in research field, Helmholtz and HMC	• Extent to which the expected output(s) of the proposal would advance the development/ implementation/use of tools/services in the research field, Helmholtz and HMC • Extent to which the expected outputs are reusable and adaptable by other communities/centres • Extent to which the expected outcome addresses a specific demand by a community • Extend to which the proposal addresses one or more of the defined HMC key areas[7]
Impact on community building in research field, Helmholtz and HMC	• The engagement strategy for a specific community is clearly defined and contributes to a long-term cooperation within Helmholtz. • Measures for transfer[8] to communities beyond the specific community targeted by the proposal are clearly articulated. • Measures to ensure the sustainability of the project results are clearly stated.
Quality and efficiency of the implementation	• Quality and effectiveness of the work plan • Complementarity of the partners and balance of expertise to achieve the goal • Appropriateness of the allocation of tasks, ensuring that all PIs and staff have a valid role and adequate resources in the project to fulfil that role • Prospects to complete the project within the timeline indicated in the call

[7] See chapter 3. Goals of project call
[8] See chapter 4. Criteria

9. Inquiries

Answers to general questions concerning the call can be found in the FAQs: https://helmholtz-metadaten.de/faq-projectcall.

For **formal questions** concerning this call, please write to project-proposal@helmholtz-metadaten.de to reach the HMC office and the Helmholtz Association's head office.

For **topic-related questions and consultation**, please contact at least one HMC metadata hub and/or the technology unit FAIR Data Commons:

AST	Witold Arndt, DLR, phone: +49 2203 601 5429, email: witold.arndt@dlr.de
Earth and Environment	Dr. Emanuel Söding, GEOMAR, phone: +49 431 600 4256, email: esoeding@geomar.de
Energy	Dr. Wolfgang Suess, KIT, phone: +49 721 608 25722; email: wolfgang.suess@kit.edu
Health	Dr. Marco Nolden, DKFZ, phone: +49 6221 42-2325, email: m.nolden@dkfz-heidelberg.de
Matter	Dr. Oonagh Brendike-Mannix, HZB, phone: +49 30 8062 12539, email: oonagh.mannix@helmholtz-berlin.de
Information	Dr. Volker Hofmann, FZJ, phone: +49 241 927803 21, email: v.hofmann@fz-juelich.de
FAIR Data Commons	Thomas Jejkal, KIT, phone: +49 721 608-24042, email: thomas.jejkal@kit.edu

10. Timeline

Date	Event or Action
04 March 2025	Announcement of the HMC Project Call 2025. Submissions are accepted only via https://proposals.helmholtz-metadaten.de/
30 May 2025	Application deadline
June - September 2025	Proposals are checked for compliance with the formal criteria and scored by panel members according to award criteria
September 2025	Assessment by the panel members
September - December 2025	Funding decision made by the Helmholtz President, funding contracts between Helmholtz Association and submitting centre are being drawn up
January - April 2026	Start of HMC projects

11. Annexes

- Annex 1: Proposal template for proposal submission
- Annex 2a and b: Templates for budget tables
- Annex 3: Template for Gantt Chart
- Annex 4: Template for CV
- Annex 5: Conflict of interest for suggested reviewers
- Annex 6: Data protection information

12. Glossary

AST	Helmholtz Association research field Aeronautics, Space and Transport managed by the German Aerospace Center (DLR).
data ecosystem	The Helmholtz research data ecosystem contains the entirety of digital technologies and independent resources located in the different Helmholtz centers. This includes both scientific infrastructures that produce data and data infrastructures used to store, share, or transfer data. Critically, the ecosystem contains the Helmholtz human community that interacts with these technologies. The ecosystem develops through interaction of components from which common norms and culture emerges and is maintained by adaptive self-organization of its parts.
FAIR Data	FAIR data is (meta)data which follows the FAIR Principles. The FAIR Data Principles are a set of guiding principles in order to make data findable, accessible, interoperable and reusable (Wilkinson et al., 2016)[9].
FAIR data space	The FAIR data space is a "decentralised infrastructure for trustworthy data sharing and exchange in data ecosystems based on commonly agreed principles" (Nagel & Lycklama, 2022)"[10].
FAIR Digital Object (FDO)	FDOs are digital objects that allow the representation of critical information about a digital entity as a machine actionable and technology independent digital object. The acquired information is stored in a typed persistent identifier (PID), either by value for fast decision making on PID-level, or by reference pointing to (meta-) data located in established and trusted repositories.
HMC	Helmholtz Metadata Collaboration
INF (IVF)	Initiative and Networking Fund (Impuls- und Vernetzungsfond), a Helmholtz funding scheme.
Knowledge graph (KG)	A graph is a structure in which pairwise connections between things are modelled using "nodes" connected by "edges". In a knowledge graph, such a structure is used to capture knowledge about how a collection of things (represented as nodes) relate to one another (via edges). This helps organisations to consolidate and keep track of their collective knowledge.
Metadata schema	A template which shows how to structure and store metadata. For example, the arrangement of fields in a BibTeX template constitutes a metadata schema used by a reference management programme.
Ontology	A structured collection of terms, their definitions and the relationships between them expressed in a formal manner, which supports machine-driven reasoning.
Persistent Identifier (PID)	A long-lasting reference to an object. Some PIDs are linked to kernel information profiles, which provide metadata or information about that object when the PID is resolved.
RDM	Research data management

[9] https://doi.org/10.1038/sdata.2016.18
[10] https://doi.org/10.1007/978-3-030-93975-5_2

(Digital) Repository	A place where data, code, software, or other digital assets are stored.
Research Object (RO) Crate	A data structure based on schema.org and JSON-LD designed to package research data with their metadata. The RO-Crate specifications are defined by an RDM community that aims to facilitate data exchange between researchers as well as infrastructures.
Semantic artefact	Any digital entity that associates meaning with or defines the elements within it. One should distinguish between semantic artefacts that are only human-readable (e.g. a glossary on a web page) and those that are machine-actionable (e.g. ontologies that allow machine-driven reasoning).