

# Research Data Management as a prerequisite for Open Research Data at Helmholtz

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Helmholtz Association

Helmholtz Open Science Office

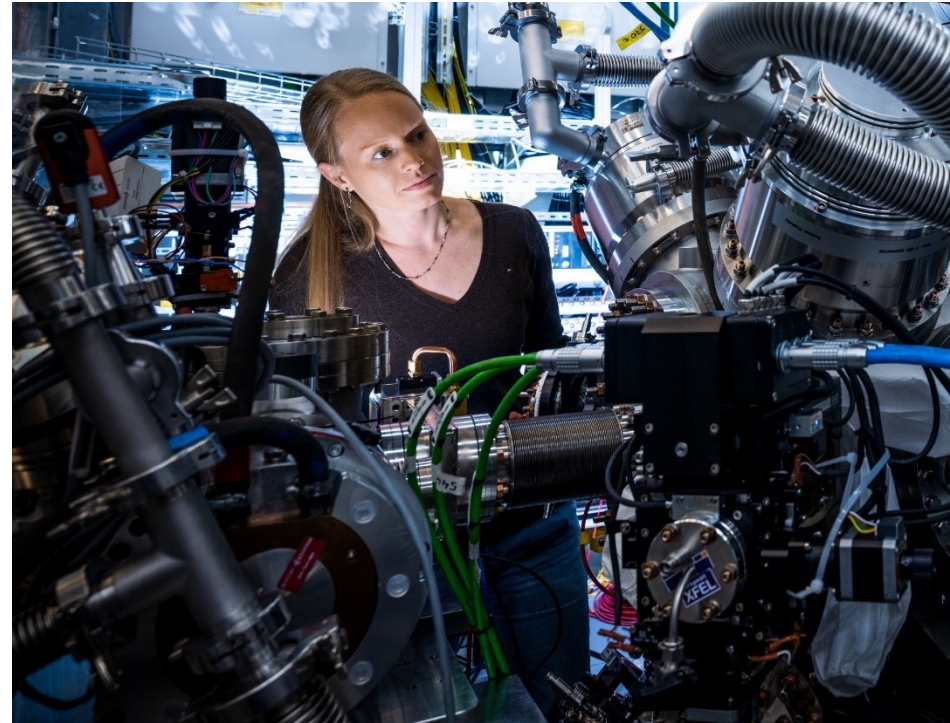
Workshop Forschungsdatenmanagement in der Max-Planck-Gesellschaft, 14.09.2022

Helmholtz Association

# Helmholtz Research Mission and Strategy

## Research for Grand Challenges

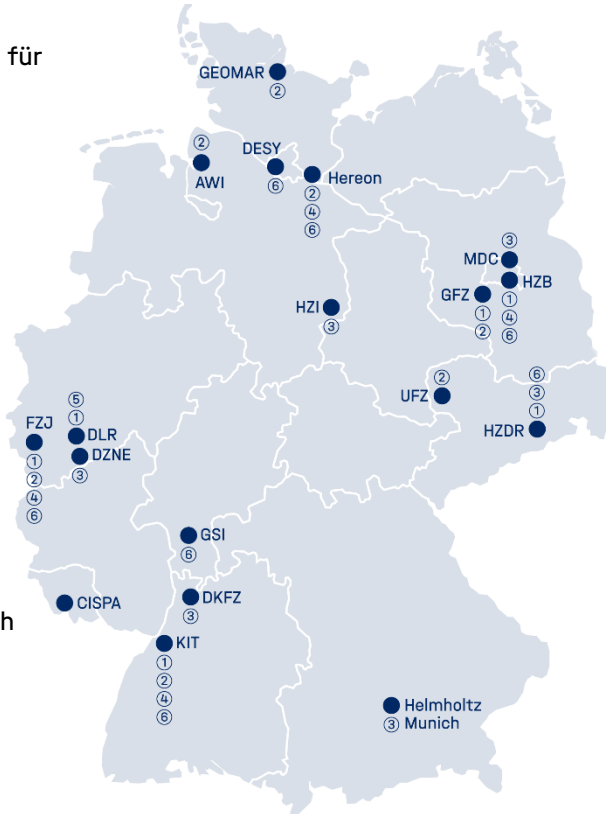
- Systems solutions for grand challenges based on:
  - Scientific excellence
  - Interdisciplinarity and critical mass
  - long term research programs
- Helmholtz provides a highly attractive environment for talents and brilliant brains
- Profound expertise in large scale research infrastructure
- Helmholtz as a prime strategic partner at the local, national and international level
- Transfer of knowledge into economy and society



# Helmholtz research centers

## 18 centers in 6 Research Fields

- Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (AWI)
- CISPA - Helmholtz Center for Information Security
- Deutsches Elektronen-Synchrotron DESY
- Deutsches Krebsforschungszentrum (DKFZ)
- Deutsches Zentrum für Neurodegenerative Erkrankungen (DZNE)
- German Aerospace Center (DLR)
- Forschungszentrum Jülich (FZJ)
- GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
- GSI Helmholtz Center for Heavy Ion Research
- Helmholtz Munich



- Helmholtz-Zentrum Berlin für Materialien und Energie (HZB)
- Helmholtz Center Dresden Rossendorf (HZDR)
- Helmholtz Center for Infection Research (HZI)
- Helmholtz Center for Environmental Research - UFZ
- Helmholtz-Zentrum Hereon
- GEOMAR Helmholtz Center for Ocean Research Kiel
- Helmholtz Center Potsdam - German Research Center for Geosciences GFZ
- Karlsruhe Institute of Technology (KIT)
- Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC)

### Research Fields:

- (1) Energy, (2) Earth and Environment  
 (3) Health, (4) Information  
 (5) Aeronautics, Space and Transport, (6) Matter

# The six research fields of the Helmholtz Association

Energy



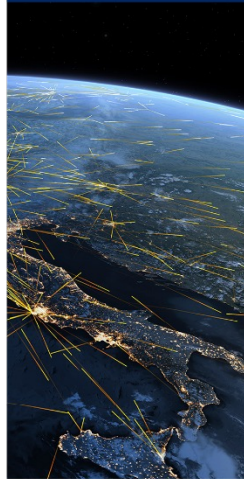
Earth and  
Environment



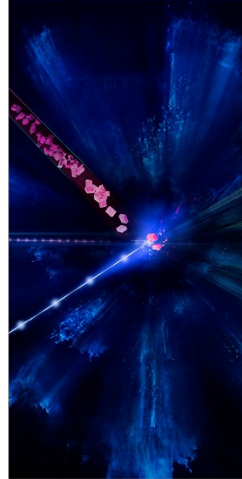
Health



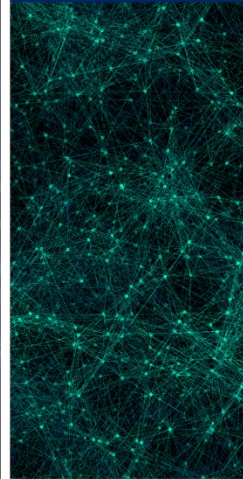
Aeronautics,  
Space  
and  
Transport



Matter



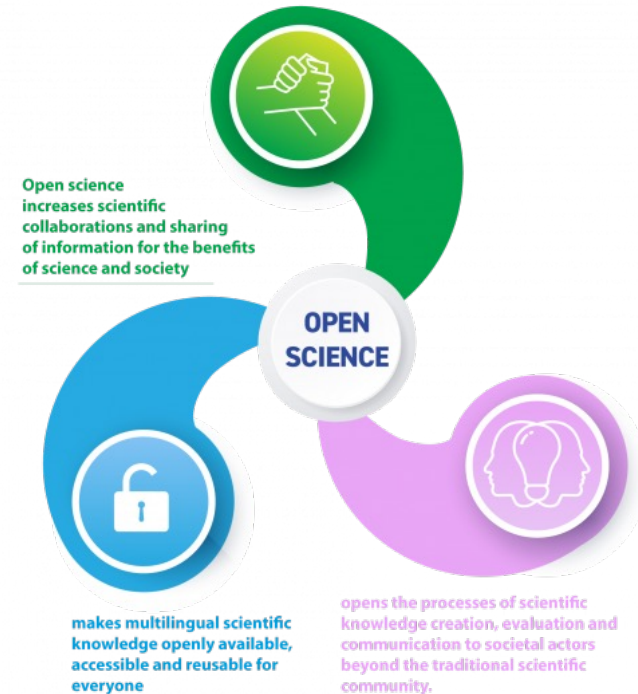
Information



Helmholtz Open Science Office

# Open Science

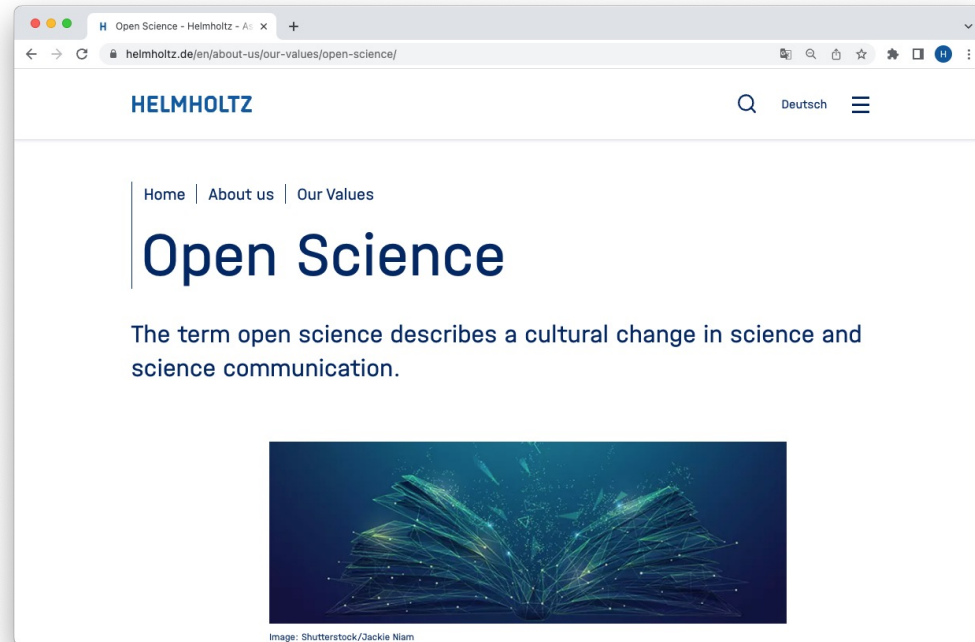
- Cultural change in scientific working methods, organization, and communication.
- Consistently employs digitization to make all components of the scientific process (publications, research data, research software, etc.) open, traceable, reusable, and accessible to everyone (in terms of reducing technical, legal, and financial hurdles).
- Expands transparency and the possibilities for quality assurance, increases the performance of science, and promotes innovations based on scientific findings.
- The development of open science differs in levels of extent in the research fields of the Helmholtz Association, depending on the discipline and respective publication culture.



Source: [UNESCO](#)

# Open Science in Helmholtz

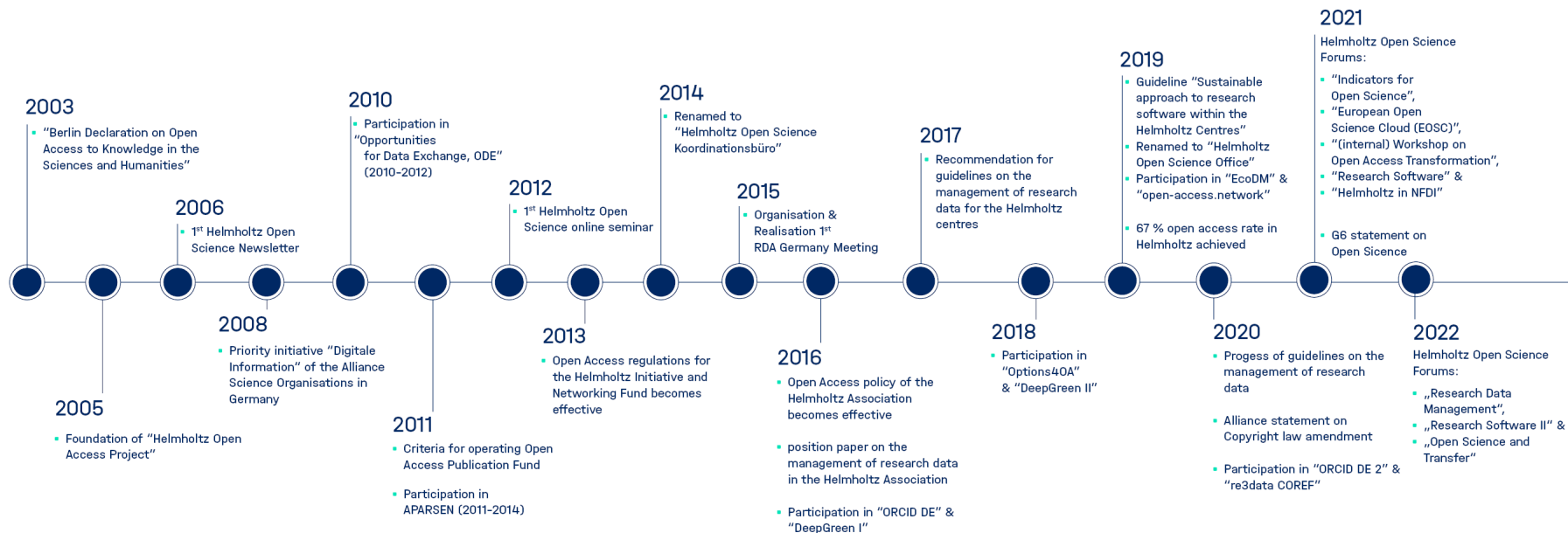
- Open Science is an important **cross-cutting topic** with numerous points of contact
- In the Centers:
  - digitization, research infrastructures, libraries, data centers, transfer, etc.
- In the entire Association:
  - Digital transformation, KPIs, incubator platforms, Initiative and Networking Fund, transfer, etc.



<https://www.helmholtz.de/en/about-us/our-values/open-science/>



# Milestones



## Our Mission

# Enabling Open Science practices in Helmholtz!

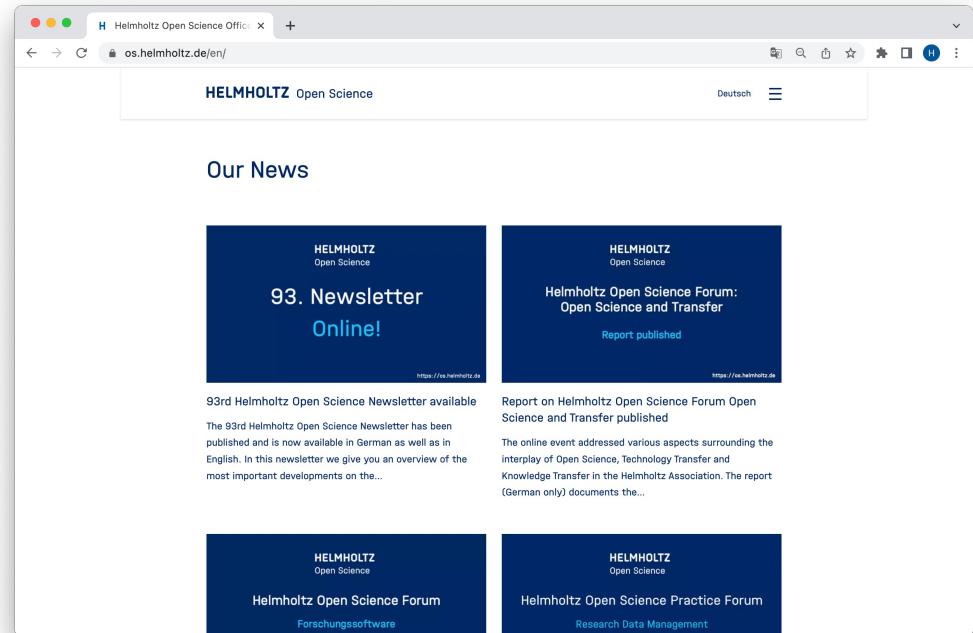
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- The Helmholtz Open Science Office
  - is a **service provider** for the Association for the cultural change “from closed to open”.
  - promotes **dialogue** and provides **impulses** within the Association.
  - offers **training** and **support** concerning all aspects of open science.
  - cooperates with the centers in the **Open Science working group** and in joint task groups
  - delivers a key contribution to the digital transformation.
  - represents **Helmholtz positions** on open science on a national and international level.

**HELMHOLTZ**  
**Open Science**

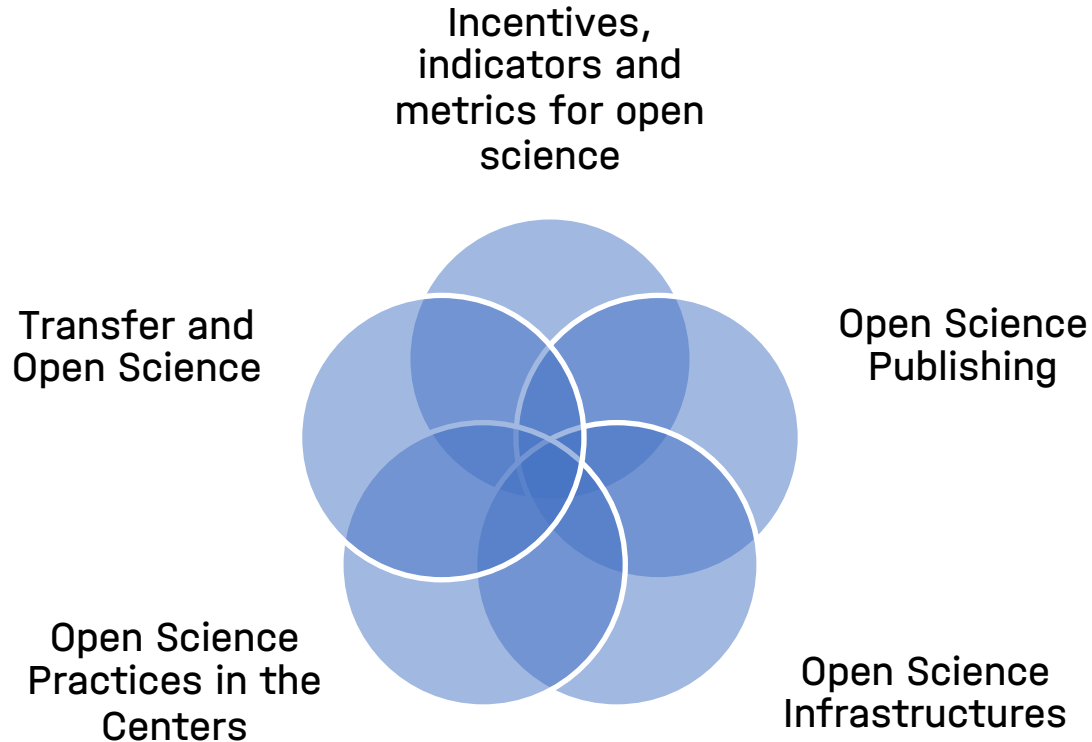
# Open Science in Helmholtz

- Our core topics
  - **Open Access** - access to and re-use of textual publications
  - **Open Research Data** - access to and re-use of research data
  - **Open Research Software** - access to and re-use of research software
  - National and international **network** concerning open science



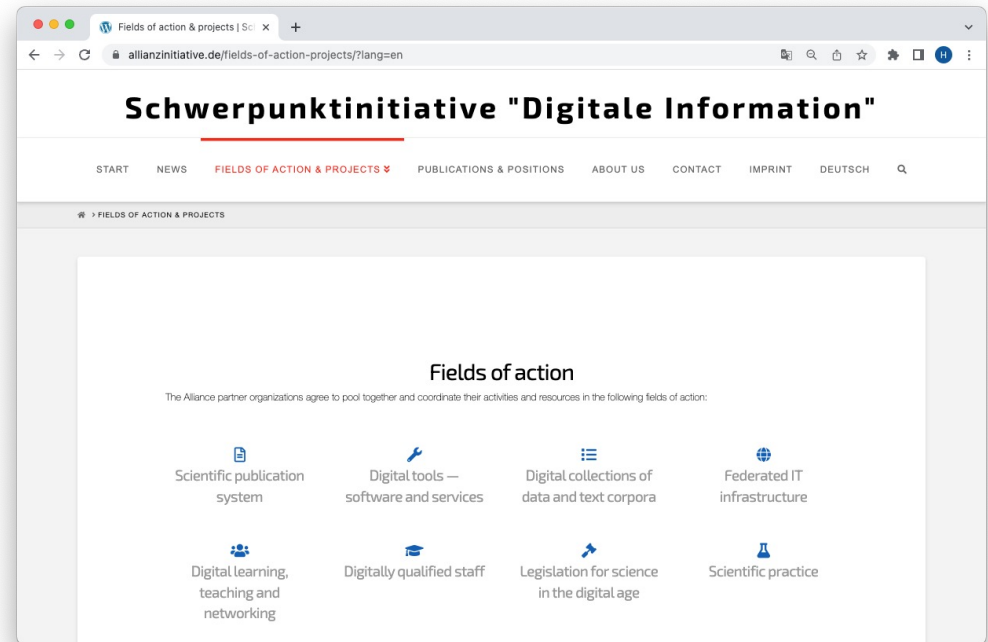
<https://os.helmholtz.de>

# Helmholtz Open Science Office: Focus topics 2021/2022



# Priority Initiative „Digital Information“

- The Helmholtz Association has been cooperating with other science organizations in the context of the Alliance of Science Organizations in Germany in the Priority Initiative “Digital Information” since 2008. The focus is currently on the following topics:
  - Scientific publication system
  - Digital tools - software and services
  - Digital data collections
  - Promotion of IT infrastructures
  - Digital learning, teaching, and networking
  - Digitally qualified staff
  - Law for science in the digital age
  - Research practice



<https://www.allianzinitiative.de>

# Network G6

- The six European research organizations CNR (Italy), CNRS (France), CSIC (Spain), the Helmholtz Association, the Max Planck Society and the Leibniz Association draw up joint statements on current scientific and research policy issues under the name “G6”.
- Within this framework, the Open Science Task Force of the G6 has developed a [statement on the common understanding of open science](#).



# Network G6

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## FAIR DATA

We share a common commitment to the principle of making research data “as open as possible and as closed as necessary”. A balanced and flexible approach to data sharing is essential for an efficient science, research and innovation ecosystem, fostering collaboration, knowledge transfer and preserving scientific freedom.

Our institutions are committed to the sharing of data as guided by the FAIR principles (Findable, Accessible, Interoperable, Reusable). Applying FAIR criteria will guarantee discovery, access and reuse of research outputs by humans and machines. Because the cost of not having FAIR data for research is high, strict adherence to FAIR principles to ensure sustainability of research data and software as well as data preservation are major challenges.

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# Research Data Alliance (RDA)

- The Helmholtz Open Science Office has been co-organizing the [RDA-DE](#) conference since 2016. Thereby the work of the international [Research Data Alliance](#) (RDA) is promoted in Germany and the networking of actors in the field of research data management at the national level is supported.
- Helmholtz is an organisational member of the RDA.
- In 2018, the 11th [RDA Plenary](#) Meeting in Berlin with over 660 participants from 41 countries was co-organized by the Helmholtz Open Science Office.



11th RDA Plenary Meeting in Berlin



Open Research Data

# Core Topic

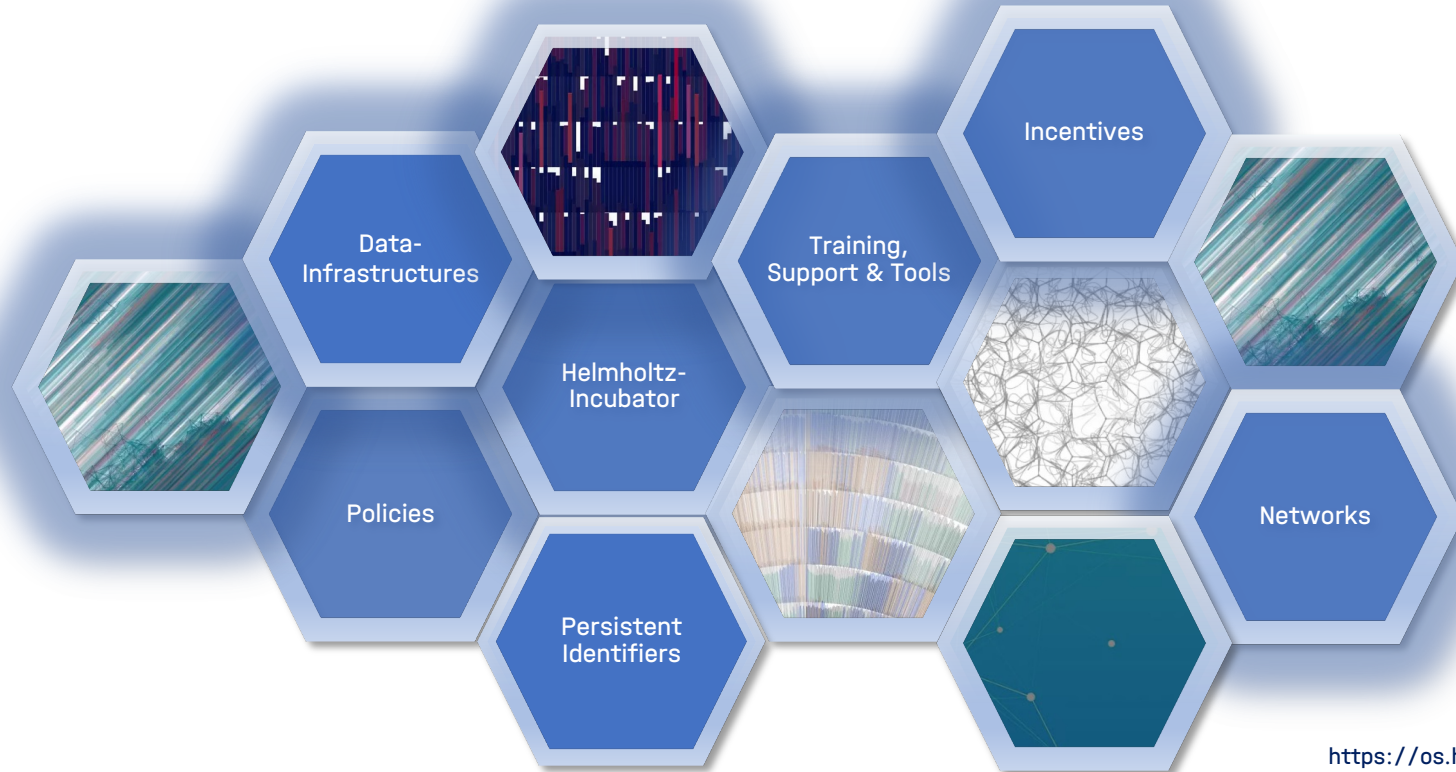
## Open Research Data

- The Helmholtz Association is leading in generating, managing and providing access to [research data](#).
- **Research Data Management** is a prerequisite for Open Research Data at Helmholtz.
- The Helmholtz Open Science Office promotes the **coordination of the Centers** and supports them in **developing policies and related practices** in handling digital research data; esp. concerning the utilization of the [FAIR principles](#) in Helmholtz.
- The work of the Helmholtz Open Science Office thus complements the developments of platforms in the [Helmholtz Incubator](#).



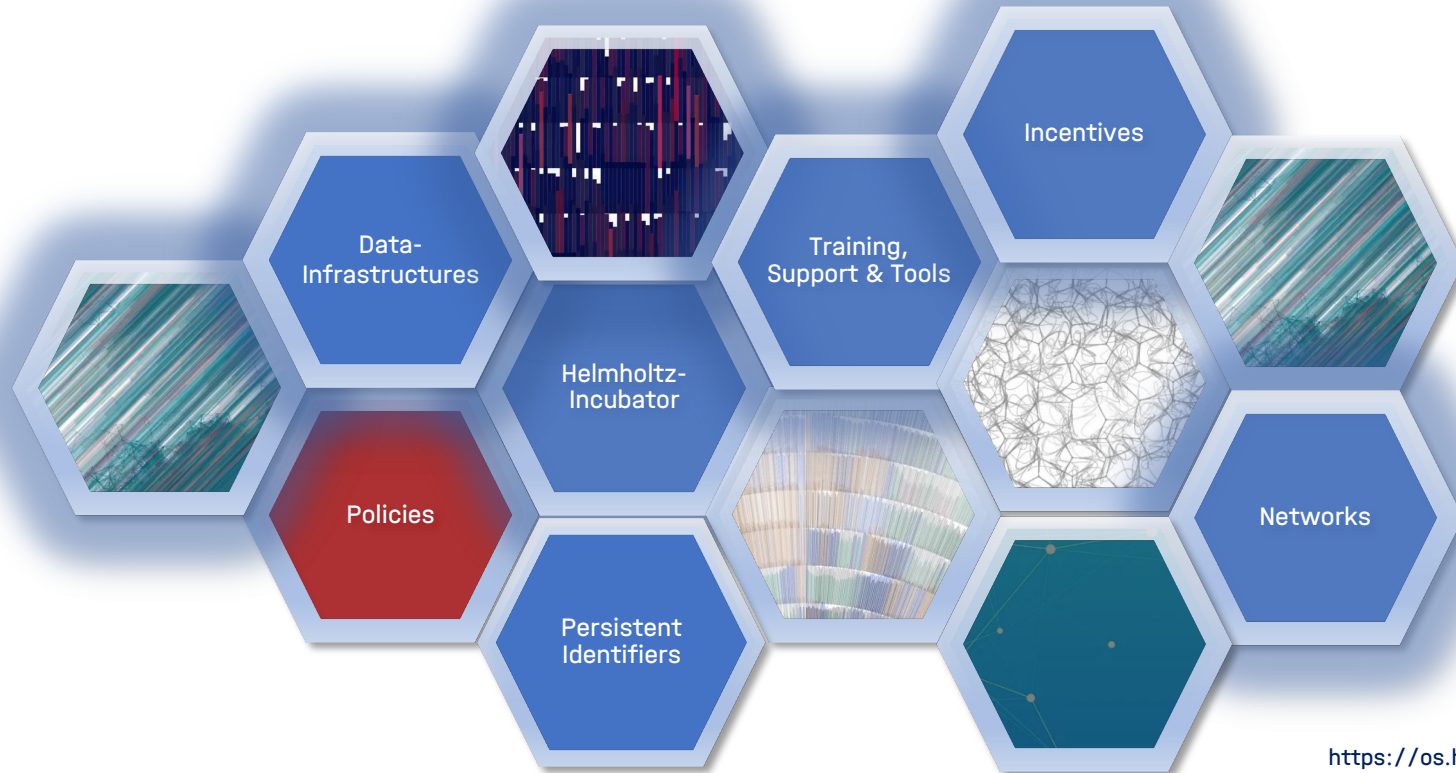
Core Topic

# Open Research Data



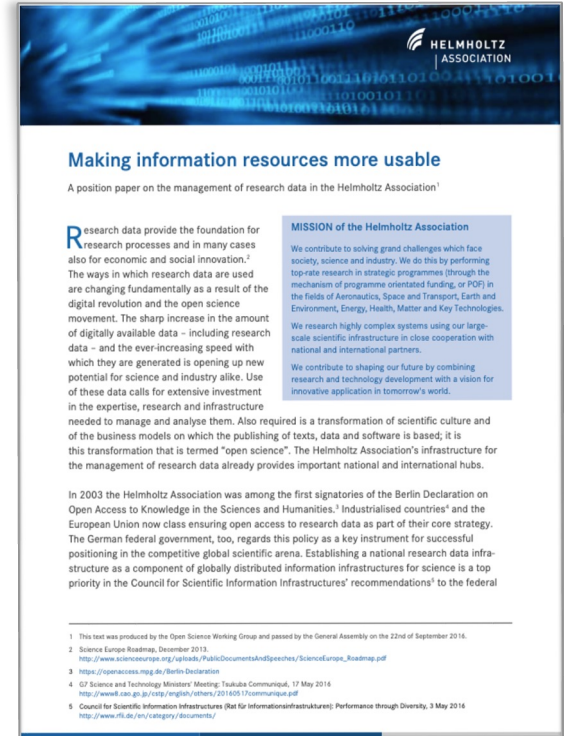
Core Topic

# Open Research Data



## Position paper “Making information resources more usable!”

- Position paper “[Making information resources more usable!](#)” (2016):
  - foster focused research in the field of information technology and pursue the development and operation of corresponding information infrastructures;
  - store research data from the Centres within suitable data infrastructures and make them available openly and free of charge for subsequent use by science and society;
  - play an active part in national and international initiatives to coordinate the establishment of the necessary infrastructures; and
  - education and training in research data management
- These principles are intended to promote the quality, productivity, sustainability and competitiveness of science, in keeping with the mission of the Helmholtz Association. They also provide a basis for knowledge transfer.



The image shows the cover of a position paper from the Helmholtz Association. The top part features a blue background with binary code (0s and 1s) and the Helmholtz Association logo. Below this, the title 'Making information resources more usable' is written in a bold, blue font. Underneath the title, it says 'A position paper on the management of research data in the Helmholtz Association'. The main body of the cover is white with a blue box containing the 'MISSION of the Helmholtz Association'. The mission statement is written in a smaller, blue font. At the bottom of the cover, there is a small paragraph of text and a list of footnotes.

**Making information resources more usable**

A position paper on the management of research data in the Helmholtz Association<sup>1</sup>

**MISSION of the Helmholtz Association**

We contribute to solving grand challenges which face society, science and industry. We do this by performing top-rate research in strategic programmes (through the mechanism of programme orientated funding, or POF) in the fields of Aeronautics, Space and Transport, Earth and Environment, Energy, Health, Matter and Key Technologies.

We research highly complex systems using our large-scale scientific infrastructure in close cooperation with national and international partners.

We contribute to shaping our future by combining research and technology development with a vision for innovative application in tomorrow's world.

Research data provide the foundation for research processes and in many cases also for economic and social innovation.<sup>2</sup> The ways in which research data are used are changing fundamentally as a result of the digital revolution and the open science movement. The sharp increase in the amount of digitally available data – including research data – and the ever-increasing speed with which they are generated is opening up new potential for science and industry alike. Use of these data calls for extensive investment in the expertise, research and infrastructure needed to manage and analyse them. Also required is a transformation of scientific culture and of the business models on which the publishing of texts, data and software is based; it is this transformation that is termed “open science”. The Helmholtz Association’s infrastructure for the management of research data already provides important national and international hubs.

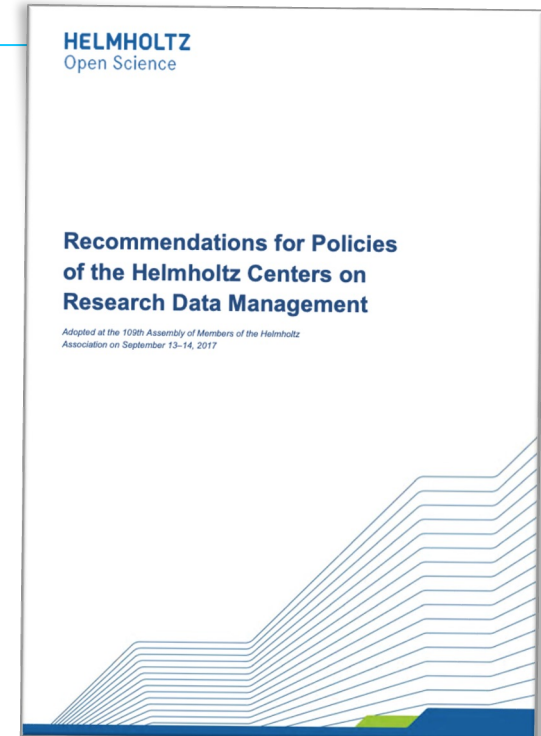
In 2003 the Helmholtz Association was among the first signatories of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities.<sup>3</sup> Industrialised countries<sup>4</sup> and the European Union now class ensuring open access to research data as part of their core strategy. The German federal government, too, regards this policy as a key instrument for successful positioning in the competitive global scientific arena. Establishing a national research data infrastructure as a component of globally distributed information infrastructures for science is a top priority in the Council for Scientific Information Infrastructures’ recommendations<sup>5</sup> to the federal

1 This text was produced by the Open Science Working Group and passed by the General Assembly on the 22nd of September 2016.  
2 Science Europe Roadmap, December 2013.  
[http://www.scienceurope.org/uploads/PublicDocumentsAndSpeeches/ScienceEurope\\_Roadmap.pdf](http://www.scienceurope.org/uploads/PublicDocumentsAndSpeeches/ScienceEurope_Roadmap.pdf)  
3 <https://openaccess.mpg.de/Berlin-Declaration>  
4 © Science and Technology Ministers’ Meeting, Tokyo Communiqué, 17 May 2016  
<http://www.stm.gov.au/files/english/stm/20160517communiqué.pdf>  
5 Council for Scientific Information Infrastructures (Dat for Informationinfrastrukturen): Performance through Diversity, 3 May 2016  
<http://www.ris.de/en/category/documents/>

# Policies

## Recommendations for Policies

- Recommendations for Policies of the Helmholtz Centers on Research Data Management
- Adopted at the Assembly of Members of the Helmholtz Association in 2017
- Content:
  - Preamble
  - Aims
  - Research Data and Research Data Management
  - Responsibility
  - Open Access
  - Quality in the Context of Good Scientific Practice
  - Scientific Recognition
  - Long-Term Availability
  - Research Data Infrastructures
  - Skills Development
  - Funding
  - Legal Issues
  - Appendix: Legal Issues



<https://doi.org/10.48440/os.helmholtz.036>

# Policies

## Policies of the Helmholtz Centers

- Example: [MDC](#)

HELMHOLTZ		MDC	
		MAX-DELBRÜCK-CENTRUM FÜR MOLEKULARE MEDIZIN IN DER HELMHOLTZ-GEMEINSCHAFT	
<b>Change History</b>			
Date	Version	Created by	Description of changes
21.10.2020	1.0	Julia Haseleu	First version approved by MDC-Board
20.01.2021	2.0	Sara El-Gebali	Comments from IT addressed, IPR section reviewed
01.03.2021	2.0	Sara El-Gebali	Approved by MDC-Board

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1. Jurisdiction.....	3
2. Intellectual property rights.....	3
3. Handling research data.....	4
Data storage.....	4
Data access and re-use.....	4
Deletion of data.....	5
4. Responsibilities, rights, duties.....	5
Principal Investigators and Researchers are responsible for:.....	5
The MDC is responsible for:.....	6
5. Definitions.....	6
6. References.....	7
7. Appendix.....	9
Table: Related documents.....	9

Policy Framework for Research Data Management (RDM) | 01.03.2021 | 2

- [Overview:](#)



# Policies

## Policies of Projects and Infrastructures

- Example: HZB

**HZB Data Policy**

**Introduction**

The proper management of scientific data is imperative for safeguarding the integrity and reproducibility of scientific findings. The Deutsche Forschungsgemeinschaft (DFG) recommends in the *Proposals for Safeguarding Good Scientific Practice* [1]: "Primary data as the basis for publications shall be securely stored for ten years in a durable form in the institution of their origin."

Furthermore, the concept of open access to scientific results gains increasingly appreciation. In 2007, the Organisation for Economic Co-operation and Development (OECD) formulated *Principles and Guidelines for Access to Research Data from Public Funding* [2]. This document emphasizes the importance of openness and the free exchange of ideas, information and knowledge for the advancement of science and postulates that research data from public funding should be openly accessible. The Alliance of German Science Organisations took this idea up in the *Principles for the Handling of Research Data* [3] where it "supports the long-term preservation of, and the principle of open access to, data from publicly funded research." This is substantiated by the DFG in the *Leitlinien zum Umgang mit Forschungsdaten* [4] in the context of their funding regulations.

The HZB approves the principle of open access to research data. In doing so, it strives for a careful balance between aspects of competition and collaboration in science. HZB supports its users to fulfill the requirements placed by funders and the scientific community. To this end, it provides the necessary infrastructure for the data management and regulates the access to the data in the present policy.

Last but not least, data management at HZB should be considered as a service to the researchers. It aims to help them to document their results and to ease the burden of the data archiving.

The present policy is based on a model formulated by the *PaNData Europe* project [5].

**1. General principles**

- 1.1 This policy sets the rules for the management of scientific data collected by public research at HZB's large-scale facilities. This includes the ownership of, the curation of and access to the data.
- 1.2 Acceptance of this policy is a condition of the award of beamtime.
- 1.3 For the data from proprietary research, users must make a separate agreement with HZB management how they wish their data to be managed before the start of any experiment.


---

Version 1.1, 2017-01-19

1

[Link](#)

- Example: MOSAiC Expedition

  
**MOSAIC Data Policy**  
2019-09-19

*Please cite or link this publication using the reference:*  
*Antonia Immerz, Stephan Frickenhaus, Peter von der Gathen, Matthew Shupe, Sara Morris, Marcel Nicolaus, Martin Schneebeli, Julia Regner, Allison Fang, Pauline Snaevis-Leijonmalm, Walter Gebert, Ben Rabe, Andreas Herber, Thomas Krumpal, Saman Singh, Raj Jain, Daniela Rensdy, Stefane Schumacher, Amelie Driemel, Peter Gerchow, Angela Schäfer, Inga Schewe, Mohammad Aljan, Frank Oliver Glöckner, Christian Schäfer-Neth, Christopher Jones, Jesse Goldstein, Matt Jones, Giri Prakash, Markus Rex (2019). MOSAiC Data Policy. Zenodo. <http://doi.org/10.5281/zenodo.4537178>*

[Link](#)



# Policies

## Policies of Projects and Infrastructures

- Example: HZB

HZB Data Policy

**Introduction**

The proper management of scientific data is imperative for safeguarding the integrity and reproducibility of scientific findings. The recommendations in the Proposal for Safeguarding data as the basis for publications shall be secured in the institution of their origin."

Furthermore, the concept of open access to scientific data is supported by the Organisation for Economic Co-operation and Development (OECD), which formulated Principles and Guidelines for Access to Scientific Information and Knowledge for the Advancement of Public Funding should be openly accessible. Organisations took this idea up in the Principles where it "supports the long-term preservation of data from publicly funded research." This is in line with the German Basic Law (Grundgesetz) [4] in the context of the HZB approves the principle of open access for a careful balance between aspects of HZB supports its users to fulfill the requirements of the research community. To this end, it provides the necessary infrastructure and regulates the access to the data in the present policy. Last but not least, data management at HZB researchers. It aims to help them to document their data archiving.

The present policy is based on a model form.

**1. General principles**

- 1.1 This policy sets the rules for the management of scientific data collected by public research at HZB's large-scale facilities. This includes the ownership, the curation and access to the data.
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- 1.3 For the data from proprietary research, users must make a separate agreement with HZB management how they wish their data to be managed before the start of any experiment.



Version 1.1, 2017-01-19

1

[Link](#)

- Example: MOSAiC Expedition

MOSAiC  
International Arctic Data Center



### MOSAiC Data Policy

2019-09-19

**3. Raw data and associated metadata**

- 3.1 The experimental team waives all copyright and related or neighboring rights together with all associated claims and causes of action with respect to the raw data and associated metadata according to the Creative Commons CC0 Dedication (see appendix).
- 3.2 All raw data will be curated in well-defined formats, for which the means of reading the data will be made available by HZB.
- 3.3 Associated metadata will be curated either within the raw data files, within an associated on-line catalogue, or within both.

**Public Release of Data (for details see section 8).**

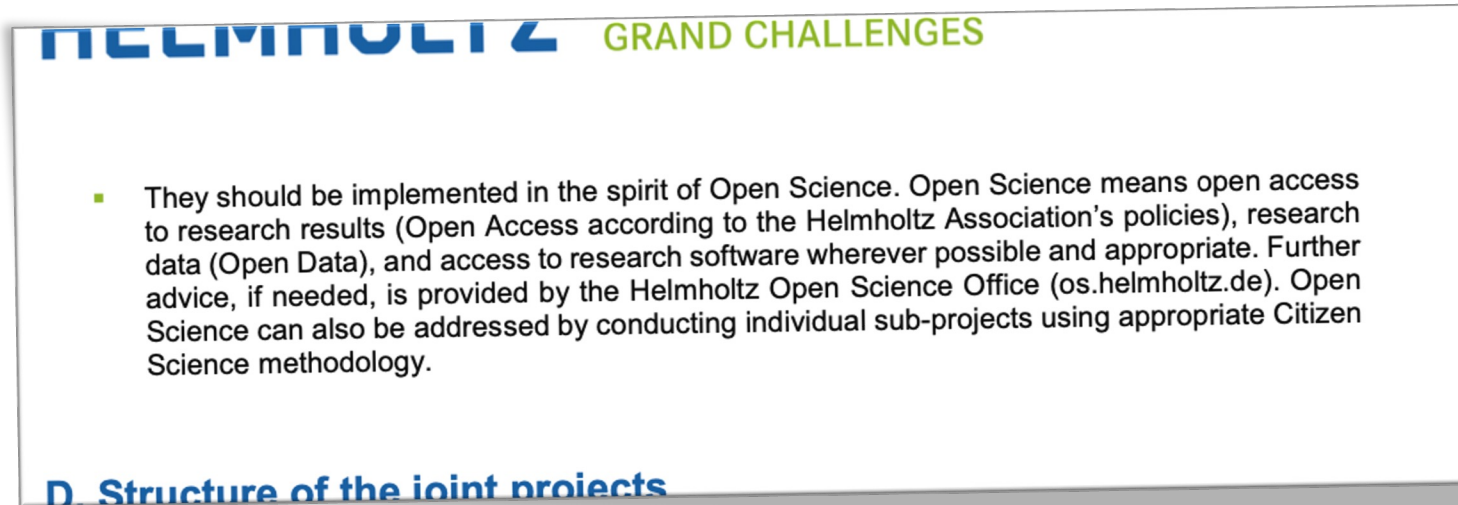
MOSAiC data will be freely and publicly available on the open MCS or PANGAEA and/or alternate public archives on **1 Jan 2023**. From this date on there are no restrictions on data usage, but data users are encouraged to communicate with *data providers* or *data PIs* during early stages of all scientific analyses to ensure accurate usage and interpretation of data. The best practices on co-authorships described in the section "Authorship and Acknowledgment" below continue to apply.

Marcel  
Gelbert,  
Sjane  
van Frank  
Prakash,

[Link](#)

## Open Science in Calls for Applications

- Example: Funding for Joint Research Projects „The Coronavirus Pandemic: Insight, Coping, and Prevention“

A screenshot of a document titled "HELMHOLTZ GRAND CHALLENGES". The text discusses Open Science policies, mentioning open access to research results, data, and software, and provides the website os.helmholtz.de for further information. A section header "D. Structure of the joint projects" is visible at the bottom of the snippet.

**HELMHOLTZ GRAND CHALLENGES**

- They should be implemented in the spirit of Open Science. Open Science means open access to research results (Open Access according to the Helmholtz Association's policies), research data (Open Data), and access to research software wherever possible and appropriate. Further advice, if needed, is provided by the Helmholtz Open Science Office ([os.helmholtz.de](https://os.helmholtz.de)). Open Science can also be addressed by conducting individual sub-projects using appropriate Citizen Science methodology.

**D. Structure of the joint projects**

[Link](#)

[Link](#)

# Open Science in Calls for Applications

- Example: Helmholtz Imaging Projects. Call 2022

Helmholtz Imaging.

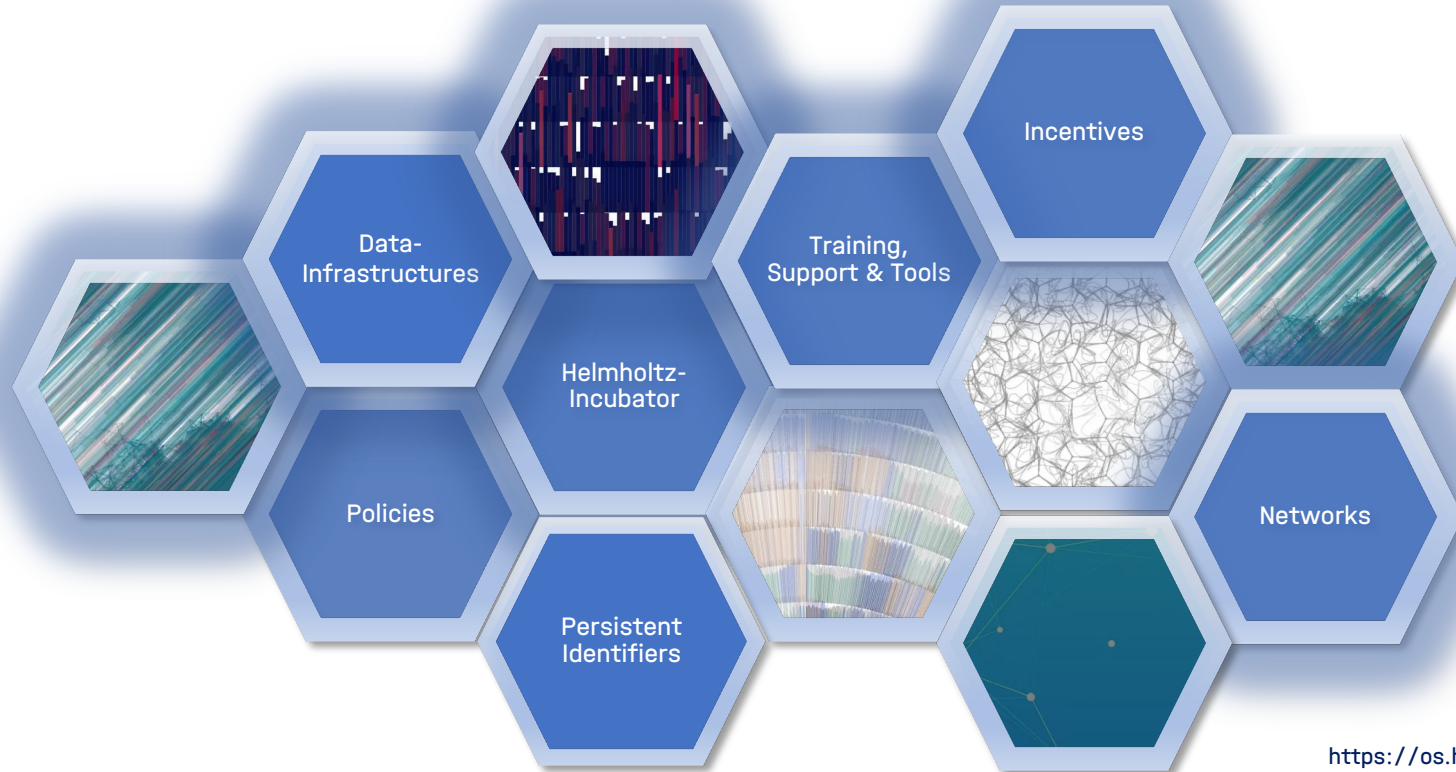
- The results of a Helmholtz Imaging Project are to be made available to the imaging community as a Helmholtz Imaging Solution hosted and communicated by the Helmholtz Imaging Core team. This means, e.g., that software and algorithms must be open source (complying with an OSI approved license) and methods, reference data, reports and publications of the project results must be open access. The Helmholtz Imaging Core team will give support in compiling the Helmholtz Imaging Solution to make it available in a sustainable way.
- The Helmholtz Imaging project shall contribute to the Modalities Database of Helmholtz

[Link](#)

[Link](#)

Core Topic

# Open Research Data



# Core Topic

## Open Research Data



# Training, Support & Tools

## RDM Units

- Example: [MDC](#)

The screenshot shows the homepage of the Research Data Management Services Unit at the Max Delbrück Center for Molecular Medicine (MDC). The page features a dark blue header with navigation links: ABOUT US, RESEARCH, CAREER, NEWS, and EN DE. Below the header, there are two profile cards for Dr. Özlem Özkan and Dr. Inga Patařčić, including their contact information. The main content area has a large heading "Research Data Management Services Unit" and a paragraph explaining their role in providing information, consultation, support, and training throughout the research data life cycle. A section titled "We provide advice and support in the following areas" lists "Planning" with a corresponding button for "Data Management Plans".

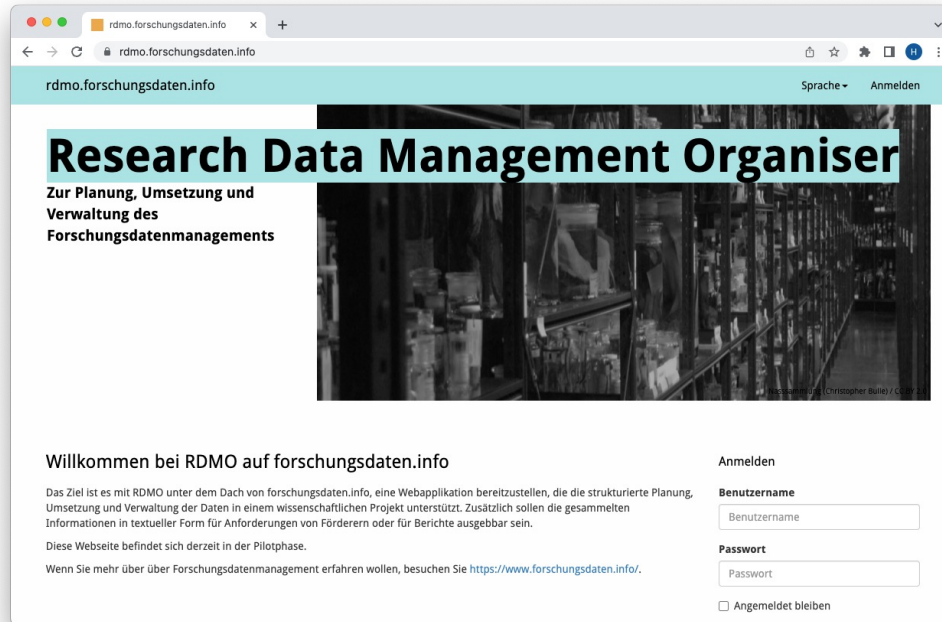
- Example: [GEOMAR](#)

The screenshot shows the homepage of the GEOMAR Data Management Portal. The header includes the GEOMAR logo and the text "Helmholtz-Zentrum für Ozeanforschung Kiel". Navigation links include HOME, RESEARCH DATA, TUTORIALS, SIGN UP, PROJECTS, READ MORE, and CONTACT US. The main content area features a large heading "THE DATA MANAGEMENT PORTAL" and a paragraph describing the portal's services for research data collection, archiving, and publication. Below this, there are sections for "DATA MANAGEMENT SERVICES" and "Open Access" Research Data. On the right side, there are logos for various projects: NFDI4Earth, CDRterra, CDRmare, Test-ArtUp, and CUSCO EVA D.

# Training, Support & Tools

## Data Management Plans

- Example: KIT



The screenshot shows a web browser window with the URL [rdmo.forschungsdaten.info](https://rdmo.forschungsdaten.info). The page features a teal header with the site name and navigation links for 'Sprache' and 'Anmelden'. The main content area has a large title 'Research Data Management Organiser' in bold black text, with a subtitle 'Zur Planung, Umsetzung und Verwaltung des Forschungsdatenmanagements' below it. A background image of a laboratory aisle is visible. Below the title, there is a welcome message: 'Willkommen bei RDMO auf forschungsdaten.info'. The text explains that RDMO is a web application for structured planning, implementation, and management of data in scientific projects. It also mentions that the website is currently in a pilot phase. At the bottom left, there is a link to <https://www.forschungsdaten.info/>. On the right side, there is a login form with fields for 'Benutzername' and 'Passwort', and a checkbox for 'Angemeldet bleiben'.

[Link](#)

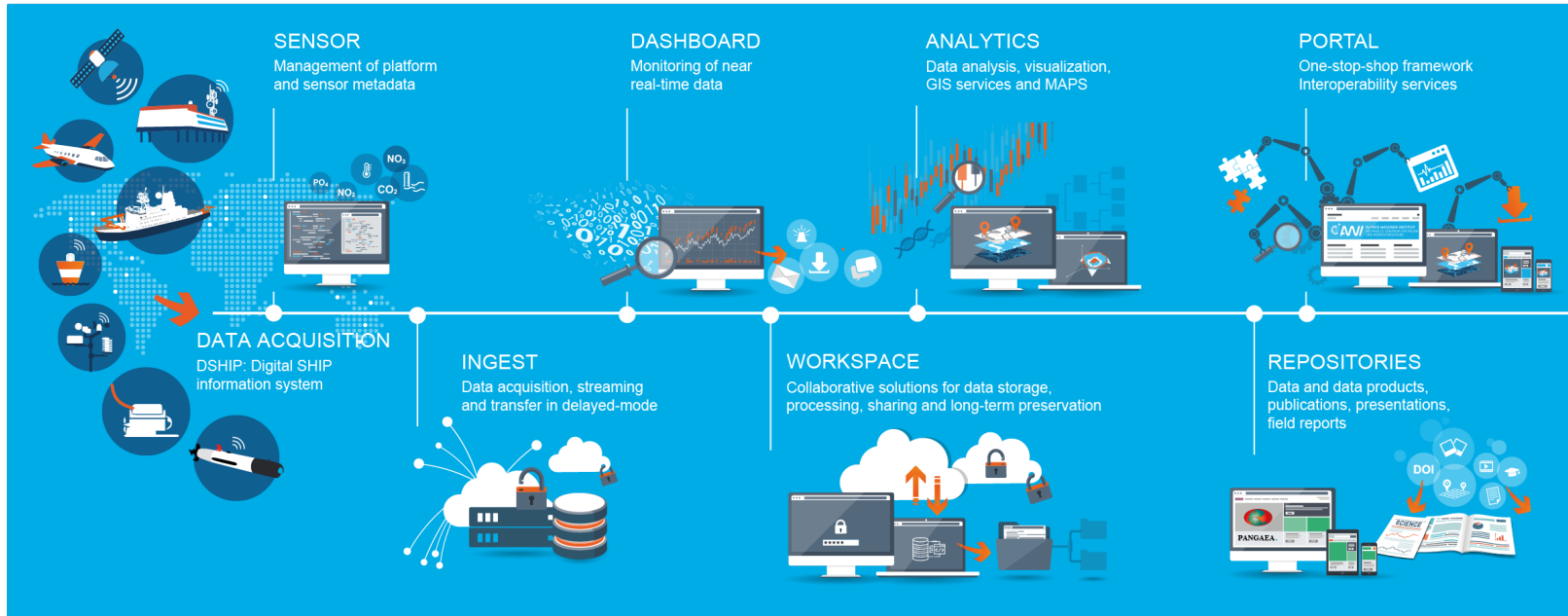
Further Information:

<https://rdmorganiser.github.io>

# Training, Support & Tools

## Workflows

- Example: [AWI](#)



<https://10.1109/OCEANS-Genova.2015.7271657>



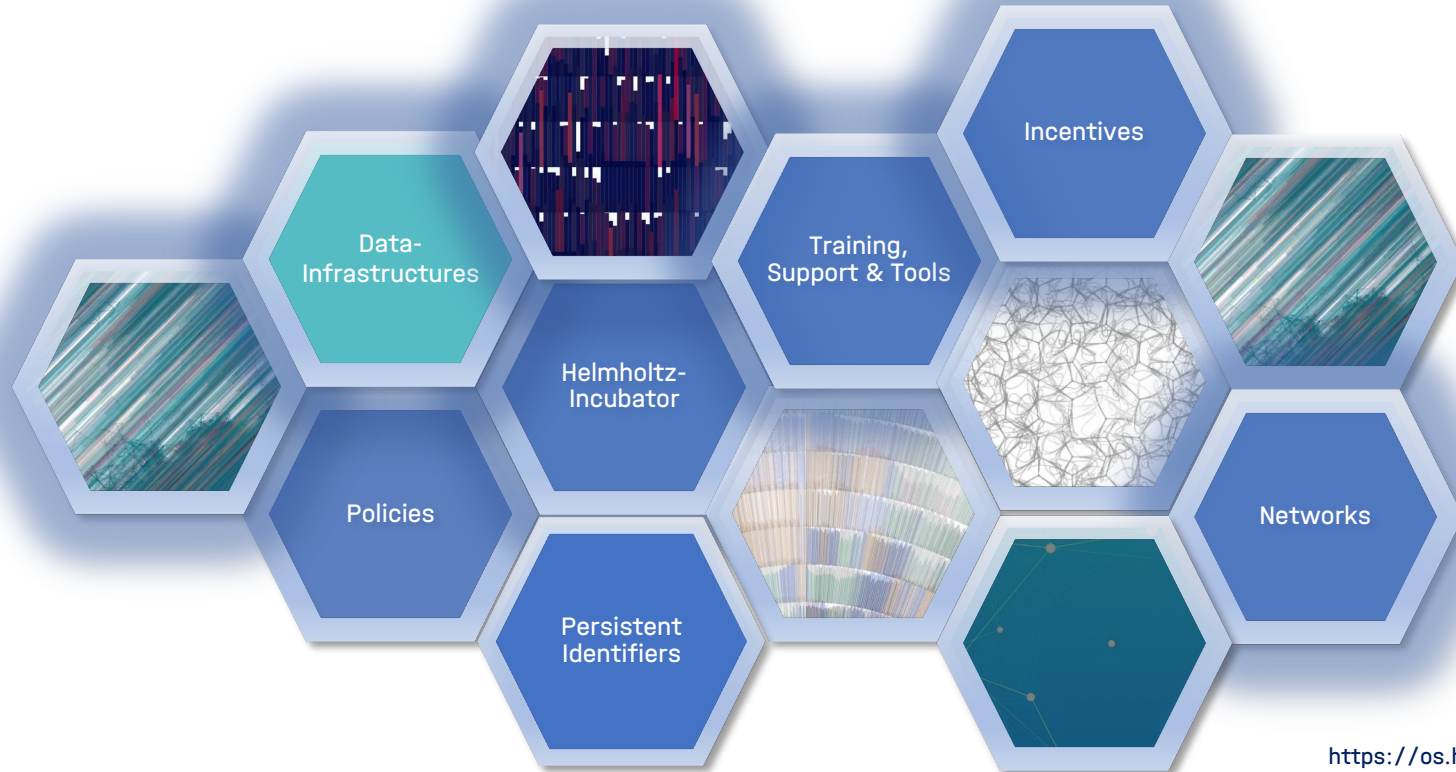
Core Topic

# Open Research Data



Core Topic

# Open Research Data

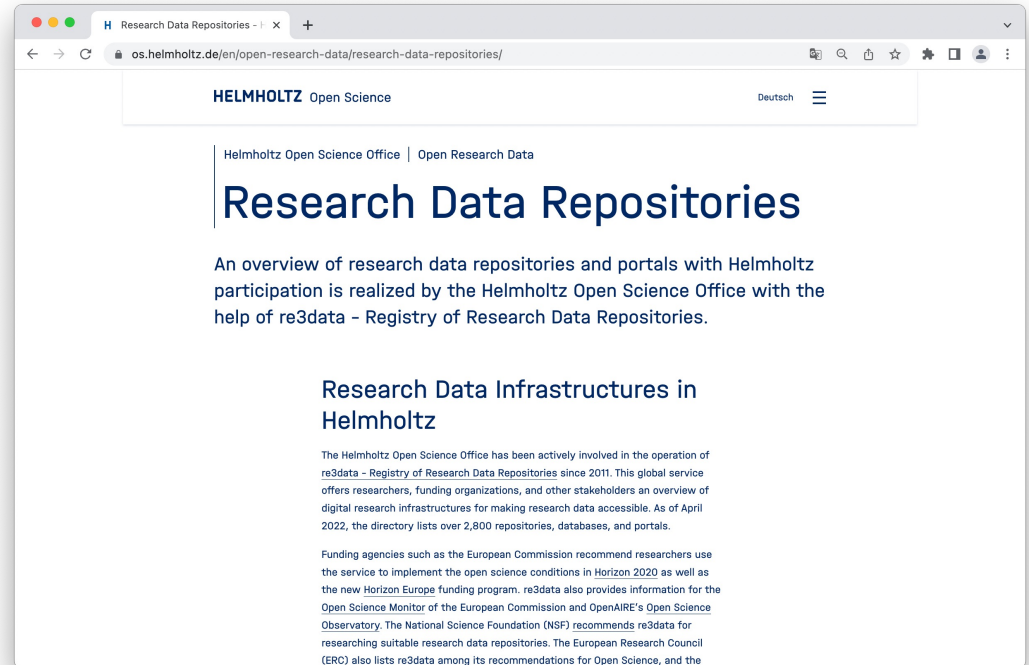


# Infrastructures

## Research Data Repositories

- The Helmholtz Centers operate **about 100 data infrastructures** in the Association in which unique and valuable digital research data is curated.
- An overview offers [re3data](#) - Registry of Research Data Repositories

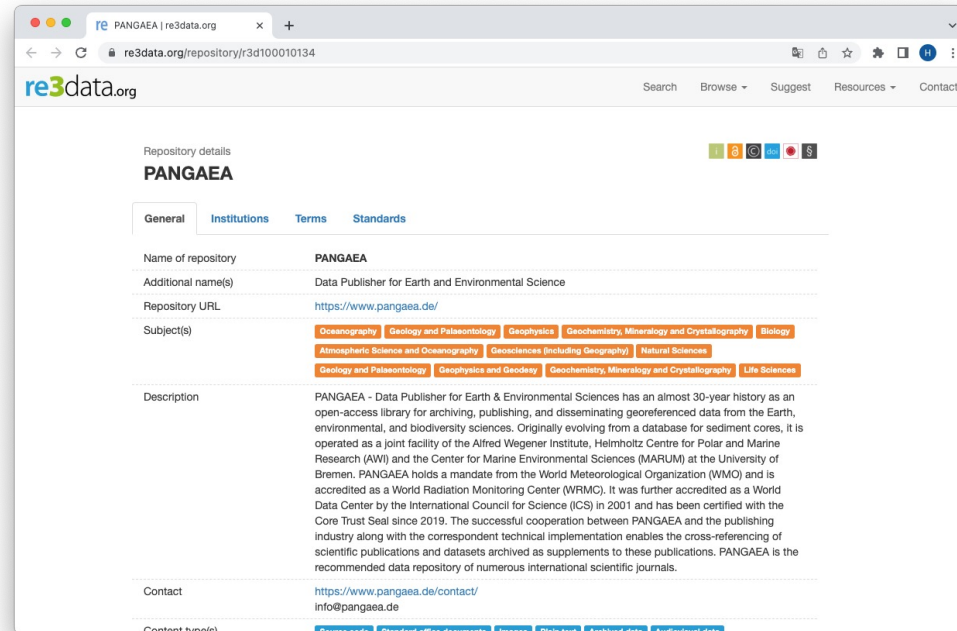
**re3data.org**  
REGISTRY OF RESEARCH DATA REPOSITORIES



The screenshot shows a web browser window with the URL [os.helmholtz.de/en/open-research-data/research-data-repositories/](https://os.helmholtz.de/en/open-research-data/research-data-repositories/). The page header includes the Helmholtz Open Science logo and a language selector set to 'Deutsch'. The main heading is 'Research Data Repositories', with a sub-heading 'Helmholtz Open Science Office | Open Research Data'. Below the heading is a paragraph: 'An overview of research data repositories and portals with Helmholtz participation is realized by the Helmholtz Open Science Office with the help of re3data - Registry of Research Data Repositories.' A section titled 'Research Data Infrastructures in Helmholtz' follows, containing two paragraphs of text. The first paragraph states: 'The Helmholtz Open Science Office has been actively involved in the operation of re3data - Registry of Research Data Repositories since 2011. This global service offers researchers, funding organizations, and other stakeholders an overview of digital research infrastructures for making research data accessible. As of April 2022, the directory lists over 2,800 repositories, databases, and portals.' The second paragraph states: 'Funding agencies such as the European Commission recommend researchers use the service to implement the open science conditions in Horizon 2020 as well as the new Horizon Europe funding program. re3data also provides information for the Open Science Monitor of the European Commission and OpenAIRE's Open Science Observatory. The National Science Foundation (NSF) recommends re3data for researching suitable research data repositories. The European Research Council (ERC) also lists re3data among its recommendations for Open Science, and the

[Link](#)

- re3data is an internationally recognized registry for research data repositories.
- The Helmholtz Open Science Office has been actively involved in the operation of re3data since its launch.
- DFG funded re3data COREF project:
  - Partners: DataCite, Humboldt-Universität zu Berlin, Karlsruher Institut für Technologie (KIT)
  - The main goal of the project is the further professionalization of re3data and the provision of reliable and customizable descriptions of research data repositories.
  - In 2022, re3data celebrates its 10th anniversary!

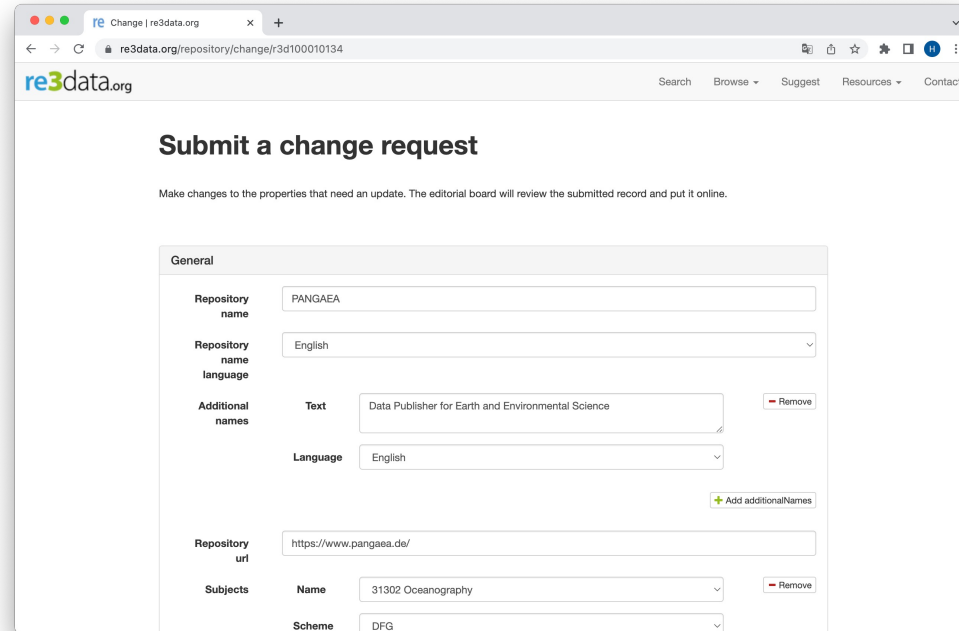


The screenshot shows the re3data.org website interface. The browser address bar displays the URL [re3data.org/repository/r3d100010134](https://re3data.org/repository/r3d100010134). The page title is "PANGAEA". The repository details are as follows:

Name of repository	PANGAEA
Additional name(s)	Data Publisher for Earth and Environmental Science
Repository URL	<a href="https://www.pangaea.de/">https://www.pangaea.de/</a>
Subject(s)	Oceanography, Geology and Palaeontology, Geophysics, Geochemistry, Mineralogy and Crystallography, Biology, Atmospheric Science and Oceanography, Geosciences (Including Geography), Natural Sciences, Geology and Palaeontology, Geophysics and Geodesy, Geochemistry, Mineralogy and Crystallography, Life Sciences
Description	PANGAEA - Data Publisher for Earth & Environmental Sciences has an almost 30-year history as an open-access library for archiving, publishing, and disseminating georeferenced data from the Earth, environmental, and biodiversity sciences. Originally evolving from a database for sediment cores, it is operated as a joint facility of the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the Center for Marine Environmental Sciences (MARUM) at the University of Bremen. PANGAEA holds a mandate from the World Meteorological Organization (WMO) and is accredited as a World Radiation Monitoring Center (WRMC). It was further accredited as a World Data Center by the International Council for Science (ICS) in 2001 and has been certified with the Core Trust Seal since 2019. The successful cooperation between PANGAEA and the publishing industry along with the correspondent technical implementation enables the cross-referencing of scientific publications and datasets archived as supplements to these publications. PANGAEA is the recommended data repository of numerous international scientific journals.
Contact	<a href="https://www.pangaea.de/contact/">https://www.pangaea.de/contact/</a> <a href="mailto:info@pangaea.de">info@pangaea.de</a>
Content type(s)	Source code, Standard office documents, Images, Plain text, Archived data, Audiovisual data

<https://doi.org/10.17616/R3XS37>

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A screenshot of a web browser showing the 'Submit a change request' page on re3data.org. The page title is 'Submit a change request' and the URL is 're3data.org/repository/change/r3d100010134'. The form is titled 'General' and contains several fields: 'Repository name' (PANGAEA), 'Repository name language' (English), 'Additional names' (Text: Data Publisher for Earth and Environmental Science, Language: English), 'Repository url' (https://www.pangaea.de/), and 'Subjects' (Name: 31302 Oceanography, Scheme: DFG). There are 'Remove' buttons for the additional names and subjects sections, and an 'Add additionalNames' button.

<https://doi.org/10.17616/R3XS37>

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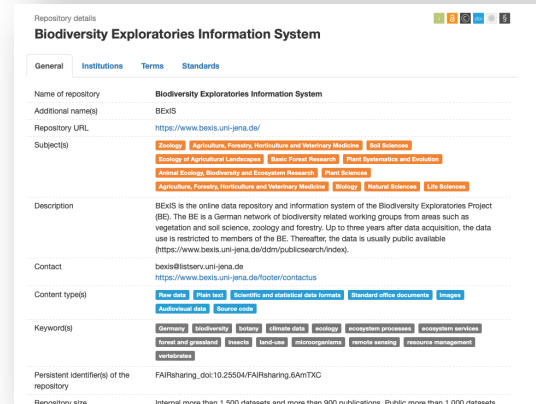
### Data availability

This work is based on data from several projects of the Biodiversity Exploratories programme (DFG Priority Program 1374). The data used for analyses are publicly available from the Biodiversity Exploratories Information System (<https://doi.org/10.17616/R32P9Q>), or will become publicly available after an embargo period of 5 years from the end of data assembly to give the owners and collectors of the data time to perform their analysis. Any other relevant data are available from the corresponding author upon reasonable request.

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Repository details

### Biodiversity Exploratories Information System

General Institutions Terms Standards

Name of repository: Biodiversity Exploratories Information System

Additional name(s): BEIS

Repository URL: <https://www.bexis.uni-jena.de/>

Subject(s): Zoology, Agriculture, Forestry, Horticulture and Veterinary Medicine, Soil Science, Ecology of Agricultural Landscapes, Basic Forest Research, Plant Systematics and Evolution, Animal Ecology, Biodiversity and Ecosystem Research, Plant Sciences, Agriculture, Forestry, Horticulture and Veterinary Medicine, Biology, Natural Sciences, Life Sciences

Description: BEIS is the online data repository and information system of the Biodiversity Exploratories Project (BE). The BE is a German network of biodiversity related working groups from areas such as vegetation and soil science, zoology and forestry. Up to three years after data acquisition, the data use is restricted to members of the BE. Thereafter, the data is usually public available (<https://www.bexis.uni-jena.de/ddm/publicsearch/index>).

Contact: [bexis@listserv.uni-jena.de](mailto:bexis@listserv.uni-jena.de)  
<https://www.bexis.uni-jena.de/footer/contactus>

Content type(s): Raw data, Plant lists, Scientific and statistical data formats, Standard office documents, Images, Authorised data, Source code

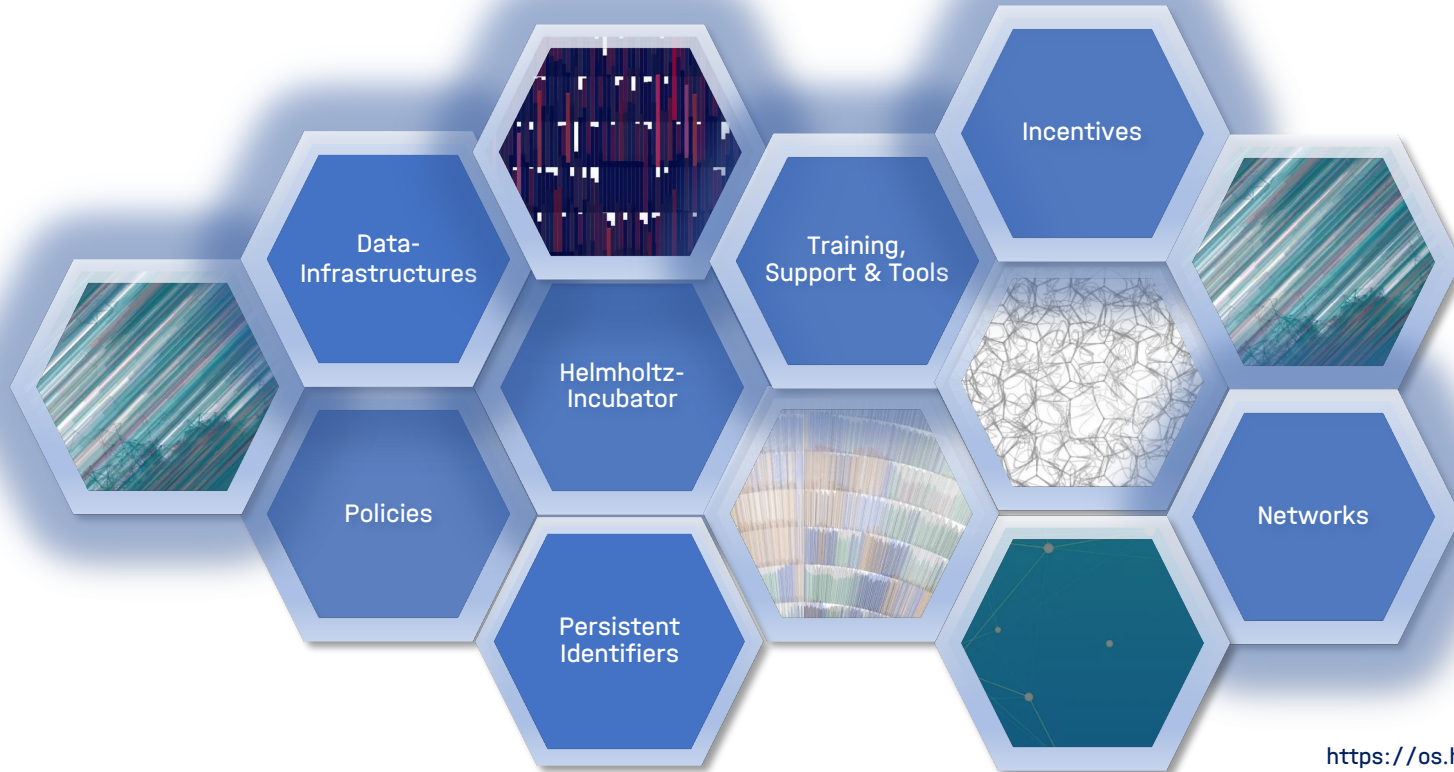
Keyword(s): Germany, biodiversity, botany, climate data, ecology, ecosystem processes, ecosystem services, forest and grassland, insects, landscape, interorganisms, remote sensing, resource management, vertebrates

Persistent identifier(s) of the repository: FAIRsharing\_doi:10.23504/FAIRsharing\_6AmTXC

Repository size: [Internet](#) more than 1,500 datasets and more than 900 publications, [E-public](#) more than 1,000 datasets

Core Topic

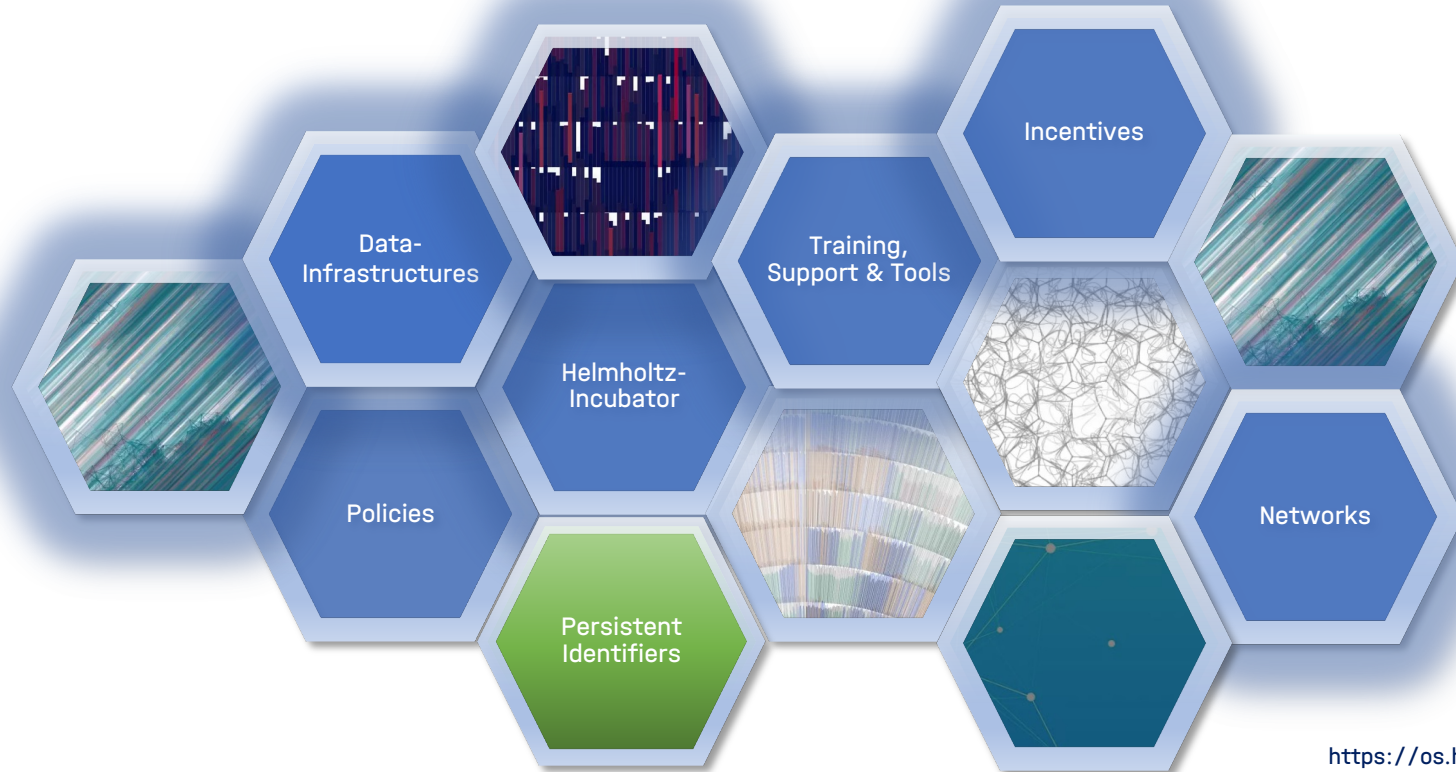
# Open Research Data





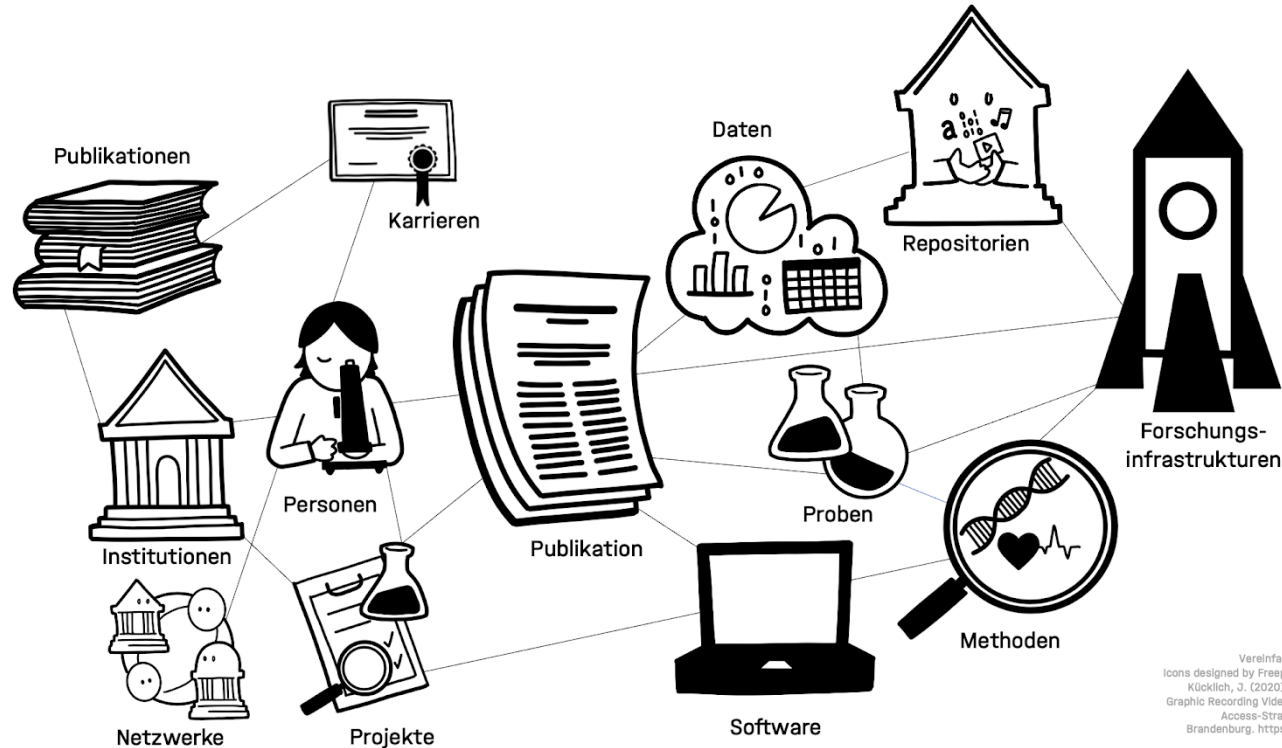
Core Topic

# Open Research Data



# Persistent Identifiers

## PID Vision



Vereinfachte Darstellung.  
Icons designed by Freepik from Flaticon.  
Küoklich, J. (2020). Illustrationen &  
Graphic Recording Videos aus der Open-  
Access-Strategie des Landes  
Brandenburg. <https://doi.org/fkw9>

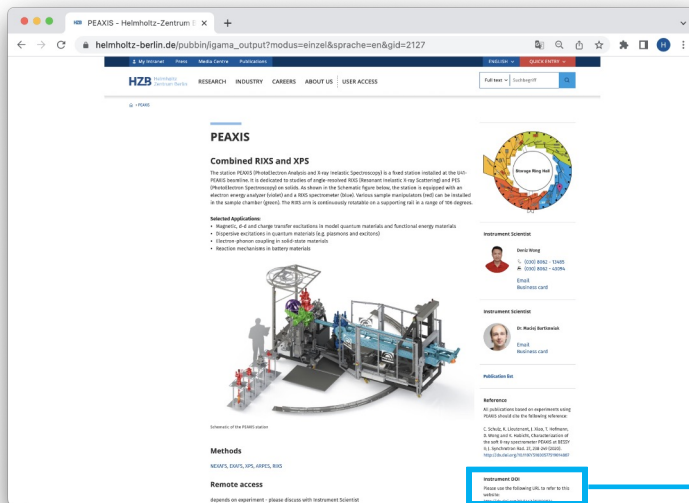
Work of the DFG project ORCID DE:  
<https://www.orcid-de.org>

Pampel, H. (2020): ORCID DE - Stand des  
Projektes und aktuelle Aktivitäten im Bereich  
Organization Identifiers. 4. ORCID DE  
Workshop.  
<http://doi.org/10.5281/zenodo.4305432>

# Persistent Identifiers

## PIDs for Instruments

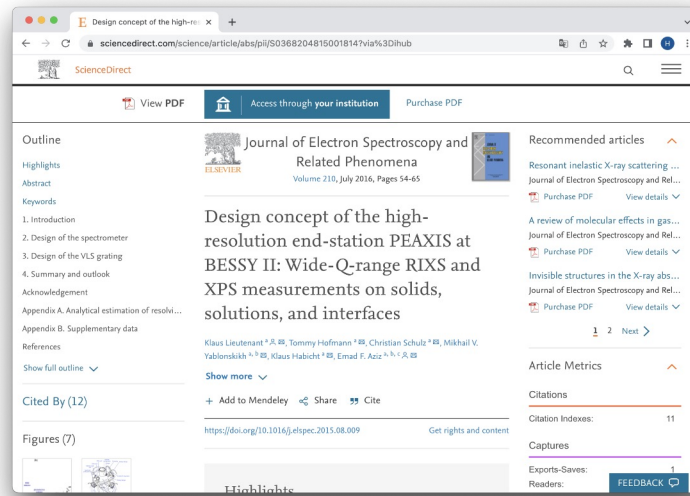
- Example: HZB



<https://doi.org/10.5442/NI000024>

Mapping to DataCite Metadata Schema 4.4 incl. link to articles about the instrument.

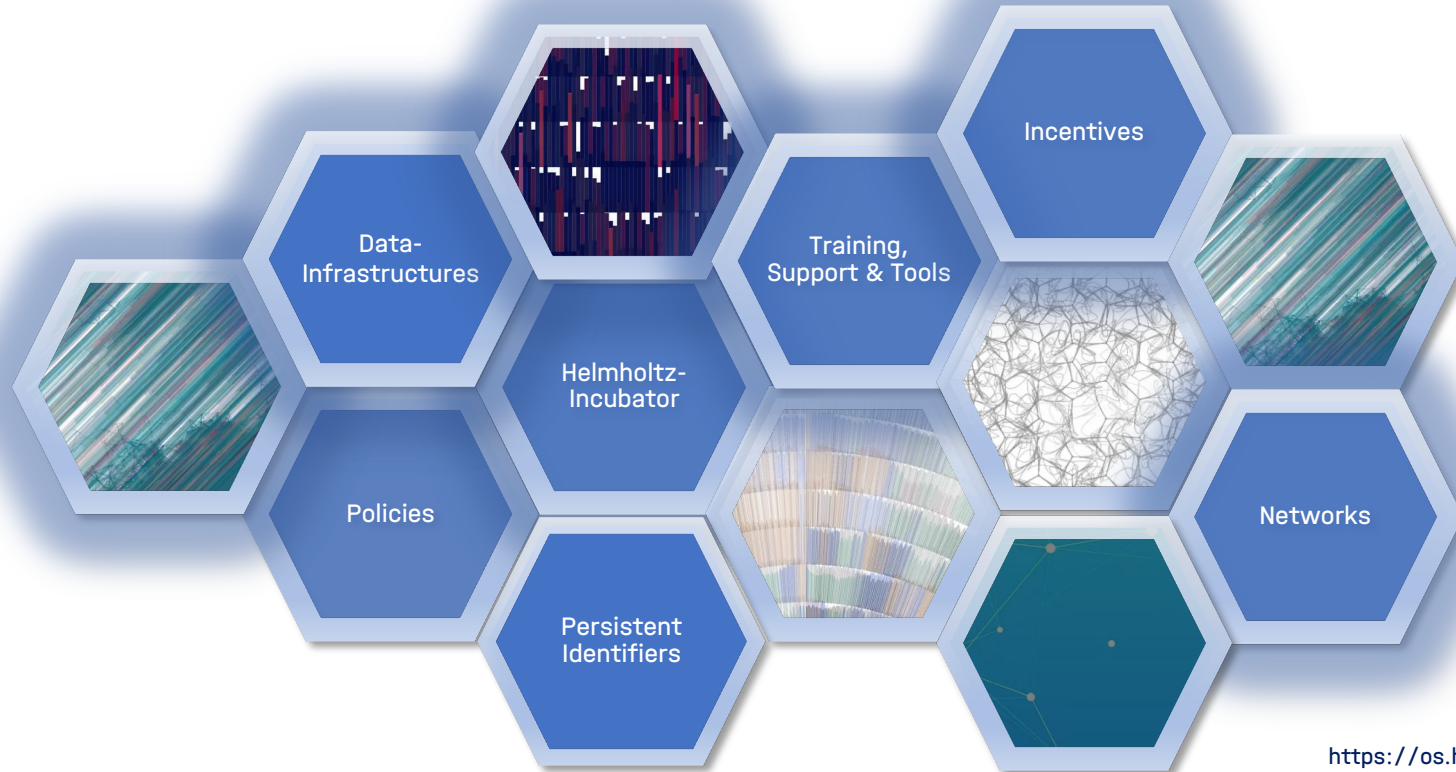
```
<date dateType="Available">2018-10-01</date>
</dates>
<resourceType resourceTypeGeneral="Other">Instrument</resourceType>
<relatedIdentifiers>
  <relatedIdentifier relatedIdentifierType="DOI" relationType="IsDescribedBy">10.1088/1742-6596/738/1/012104</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="DOI" relationType="IsDescribedBy">10.1016/j.jelspec.2015.08.009</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="DOI" relationType="IsDescribedBy">10.1107/S108577510914887</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="DOI" relationType="IsDescribedBy">10.17815/jlsrf-7-177</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="DOI" relationType="References">10.5442/NI000023</relatedIdentifier>
</relatedIdentifiers>
```



<https://doi.org/10.1016/j.jelspec.2015.08.009>

# Core Topic

## Open Research Data



Core Topic

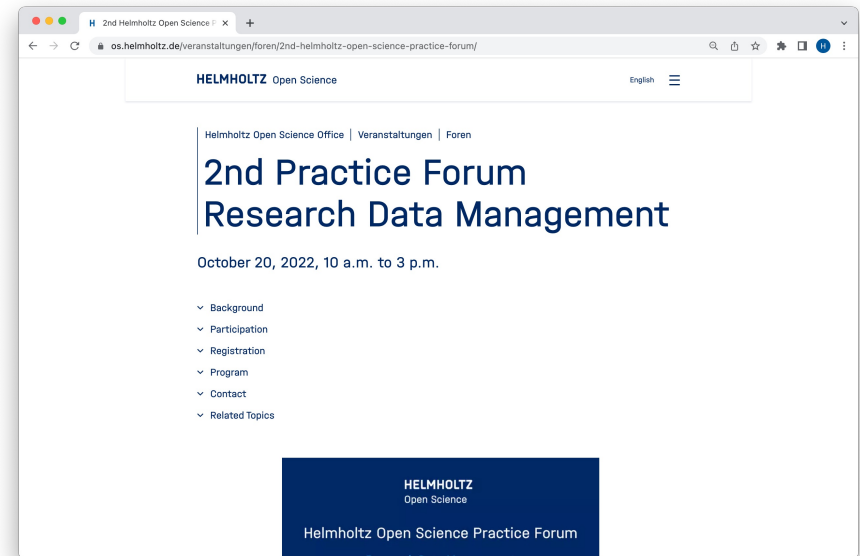
# Open Research Data



# Networks

## Task Group of the WG Open Science

- [Task Group](#) for the Implementation of Research Data Policies of the WG Open Science
- The Task Group was founded to create the Recommendations for guidelines of the Helmholtz centers for handling research data.
- The current focus is on **monitoring** the status of the implementation of Research Data Policies by the Centers:
  - Since 2020, the Helmholtz Open Science Office, together with the Task Group, annually presents an **internal report** on the handling of research data and the status of the development or implementation of research data policies at the Helmholtz Centers.

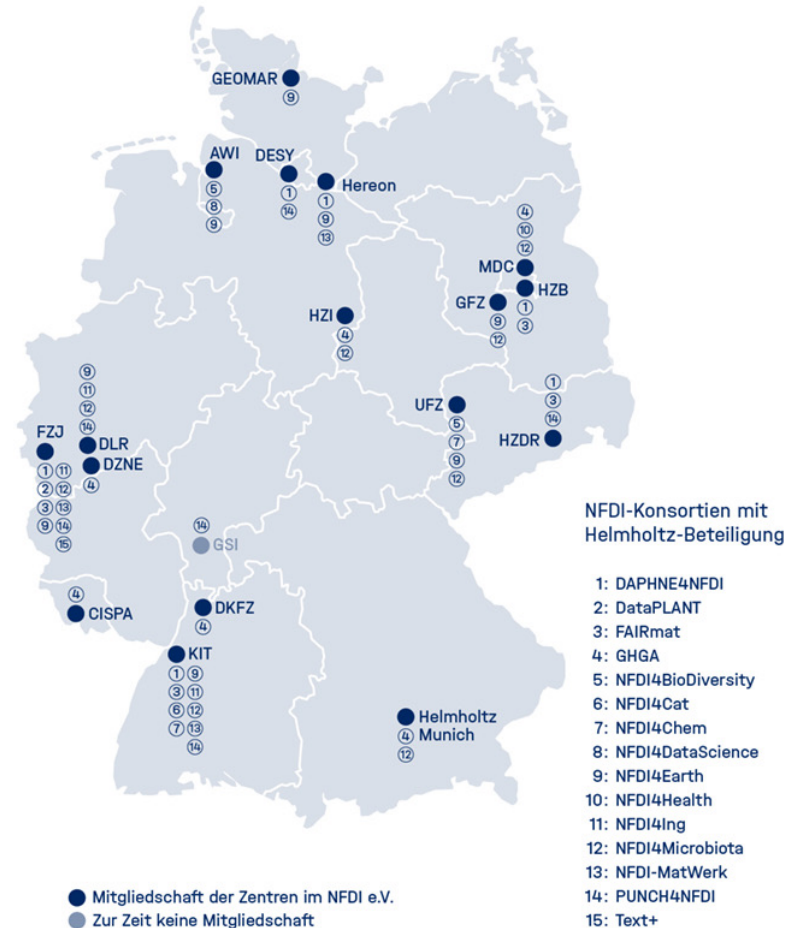


[Link](#)

# Networks

## NFDI

- Numerous consortia of the **National Research Data Infrastructure (NFDI)** are being implemented with substantial Helmholtz participation
- Helmholtz Centers are involved in the following NFDI consortia (as of June 2022):



# Networks

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- Numerous consortia of the **National Research Data Infrastructure (NFDI)** are being implemented with substantial Helmholtz participation
- Helmholtz Centers are involved in the following NFDI consortia (as of June 2022):
  - [DAPHNE4NFDI](#) (Participation from Helmholtz: DESY, FZJ, HZB, HZDR, HEREON, KIT)
  - [DataPLANT](#) (Participation from Helmholtz: FZJ)
  - [FAIRmat](#) (Participation from Helmholtz: FZJ, HZB, HZDR, KIT)
  - [GHGA](#) (Participation from Helmholtz: CISPA, DKFZ, DZNE, HMGU, HZI, MDC)
  - [NFDI4BioDiversity](#) (Participation from Helmholtz: AWI, UFZ)
  - [NFDI4Cat](#) (Participation from Helmholtz: KIT)
  - [NFDI4Chem](#) (Participation from Helmholtz: KIT, UFZ)
  - [NFDI4DataScience](#) (Participation from Helmholtz: AWI)
  - [NFDI4Earth](#) (Participation from Helmholtz: AWI, DLR, FZJ, GEOMAR, GFZ, HEREON, KIT, UFZ)
  - [NFDI4Health](#) (Participation from Helmholtz: MDC)
  - [NFDI4Ing](#) (Participation from Helmholtz: FZJ, DLR, KIT)
  - [NFDI4Microbiota](#) (Participation from Helmholtz: DLR, FZJ, GFZ, HMGU, HZI, KIT, MDC, UFZ)
  - [NFDI-MatWerk](#) (Participation from Helmholtz: FZJ, HEREON, KIT)
  - [PUNCH4NFDI](#) (Participation from Helmholtz: DESY, DLR, FZJ, GSI, HZDR, KIT)
  - [Text+](#) (Participation from Helmholtz: FZJ)



# Networks

## EOSC

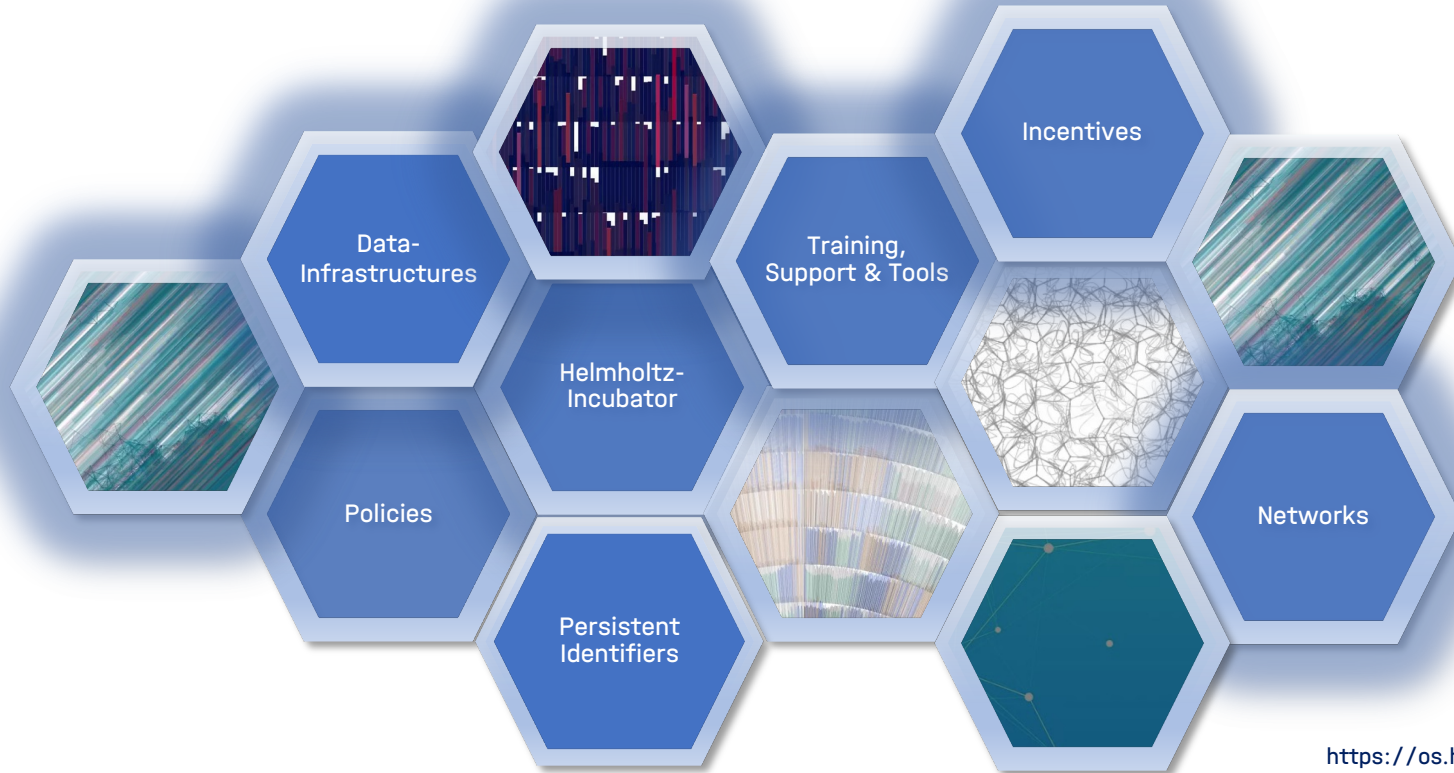
- The **European Open Science Cloud (EOSC)** has been started in 2015 as a project of the European Commission to make it easier for European researchers to access scientific data, platforms, and services for data processing.
- There are currently **8 Helmholtz Centers** involved in a total of **11 on-going EU projects** related to EOSC (as of February 2022).
  - These are the following projects: ENVRI-FAIR, ExPaNDS, ESCAPE, EOSC-Pillar, DICE, EOSC Future, EOSC-Life, EOSC-synergy, EGI-ACE, FAIRsFAIR und PaNOSC.



[Link](#)

Core Topic

# Open Research Data



Core Topic

# Open Research Data



# Helmholtz-Incubator

## Information & Data Science

- **Helmholtz-Inkubator Information & Data Science**
  - 13 innovative pilot projects currently funded (2017 und 2019)
  - Total volume of 36,7 Mil. EUR, 19 Mil. EUR from INF
  - 90 platform projects in the field of AI, imaging and metadata funded since 2019
  - All Centres are involved in the projects
  - **Helmholtz Information & Data Science Academy (HIDA)**



[Link](#)

## Helmholtz AI Cooperation Unit (Helmholtz AI)

- Helmholtz AI Cooperation Unit (Helmholtz AI)
  - Helmholtz AI is the research-driven platform for applied AI
  - HAICU central @ HMGU
  - HAICU local
    - Energy @ KIT
    - Earth and Environment @ HZG
    - Aeronautics, Space and Transport @ DLR Oberpfaffenhofen
    - Matter @ HZDR
    - Key Technology/Information @ Forschungszentrum Jülich
  - Supports the training of the current and next generation of scientists to enable the efficient and agile development and implementation of AI/ML assets across the Helmholtz Association
  - Annual call for Helmholtz AI Projects (2-3 Mio. Euro p.a. from the INF)
  - Helmholtz AI Computing Resources (HAICORE) provide easy and low-barrier GPU access to the entire AI community

**HELMHOLTZAI**  
ARTIFICIAL INTELLIGENCE  
COOPERATION UNIT

<https://www.helmholtz.ai>

# Helmholtz-Incubator

## Helmholtz Federated IT Services (HIFIS)

- **Helmholtz Federated IT Services (HIFIS)**
  - 13 Network of 11 centers, organized in three clusters:
    - Cloud (coordination HZB)
    - Network (coordination DESY)
    - Software (coordination HZDR)
  - Supports scientific projects with IT resources, services, cloud services, consulting, and expertise from the collection, storage, linking, and analysis of research data to the publication of the results
  - Supports the development of well-designed research software
  - Provision of 20 cloud services for the Helmholtz Association, already over 6,000 users of the Helmholtz AAI Services
  - Compatibility with EOSC, EGI Fedcloud, NFDI etc.



<https://hifis.net>

## Helmholtz Imaging Platform (HIP)

- **Helmholtz Imaging Platform (HIP)**
  - Helmholtz Imaging is the overarching platform to better leverage and make accessible to everyone the innovative modalities, methodological richness, outstanding expertise, and data treasures of the Helmholtz Association
  - Organized in 3 clusters that further Imaging Science and offer substantial support for the communities :
    - DESY (focus on acquisition),
    - MDC (focus on Software und Scalability) and
    - DKFZ (focus on Annotation & Computer Vision)
  - Software Support, including a dedicated help desk
  - Annual call for Helmholtz Imaging Projects (1,5 Mio. Euro p.a. from the INF)
  - Publishing and running album, an environment for running HI solutions



<https://helmholtz-imaging.de>

## Helmholtz Metadata Collaboration (HMC)

- **Helmholtz Metadata Collaboration (HMC)**
  - HMC develops and implements novel concepts and technologies for a sustainable handling of research data through high-quality metadata
  - Main mission: Enable Helmholtz Centers and researchers to describe data and its context comprehensively, following the FAIR principles in research data
  - HMC is based on 6 local units (corresponding to the 6 research fields) and a central coordination unit (@GEOMAR), as well as central services (@FZJ+KIT):
    - Earth and Environment @GEOMAR
    - Energy @KIT
    - Key Technologies/Information @FZJ
    - Health @DKFZ
    - Matter @HZB
    - Aeronautics, Space, Transport @DLR
  - Annual call of Helmholtz Metadata Projects (1,2 Mio. Euro p.a. from the INF)



<https://helmholtz-metadaten.de>



# Helmholtz-Incubator

## Helmholtz Information & Data Science Academy (HIDA)

- Helmholtz Information & Data Science Academy (HIDA)
  - Since September 2018 six Helmholtz Information & Data Science Schools are in place that combine discipline specific knowledge with innovative Information and Data Science methods
  - With more than 250 PhD positions Germany's largest coherent postgraduate Information & Data Science training program
  - Helmholtz Information & Data Science Academy (HIDA) as a network roof of the schools
  - Recruiting of high potentials
  - Grants, exchange and networks
  - Knowledge transfer, method transfer and competence transfer

**HiDA** HELMHOLTZ  
Information & Data Science Academy

**HEIBRIDS**  
HELMHOLTZ EINSTEIN INTERNATIONAL  
BERLIN RESEARCH SCHOOL IN DATA SCIENCE

**DASHH** Data Science in Hamburg  
HELMHOLTZ Graduate School  
for the Structure of Matter

**MARDATA** HELMHOLTZ  
SCHOOL FOR MARINE  
DATA SCIENCE

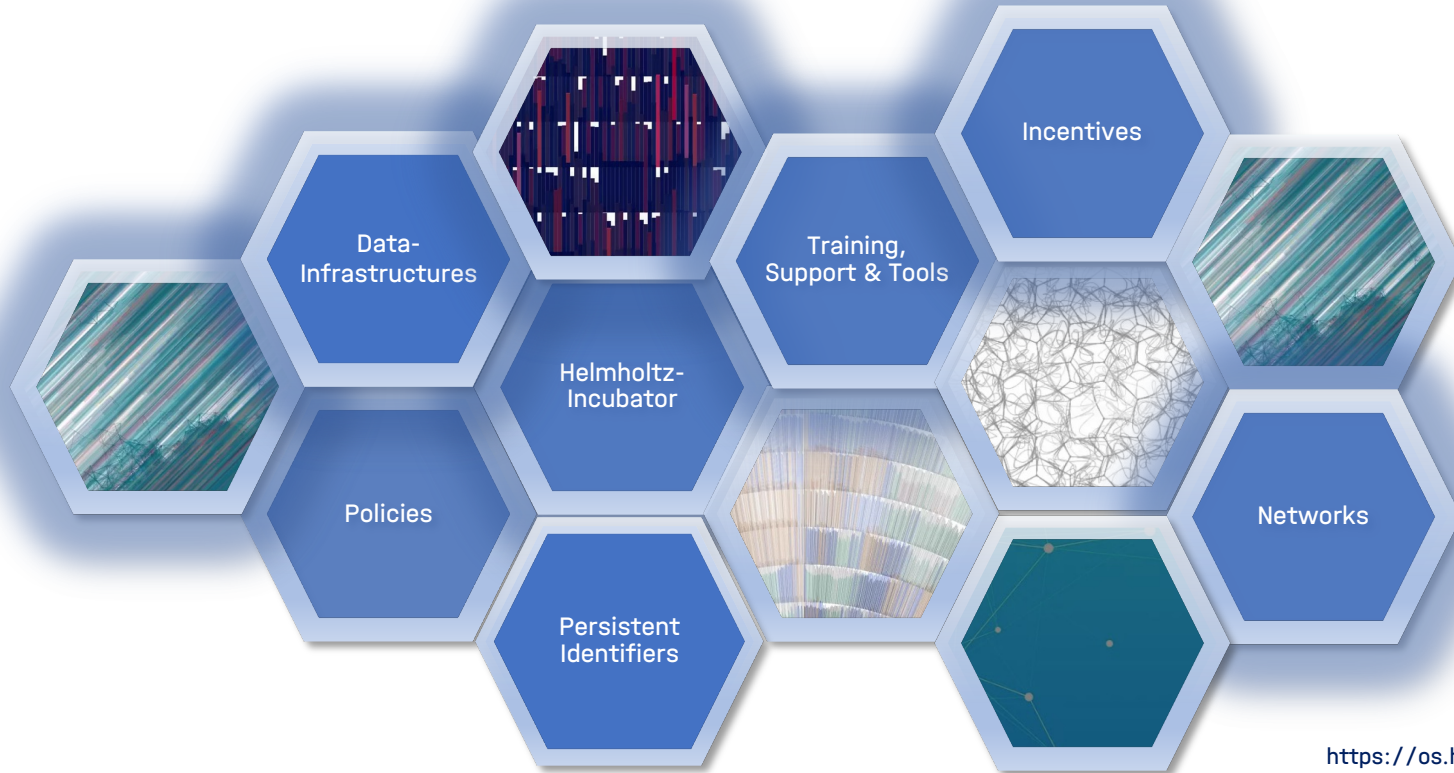
**MUDS** MUNICH SCHOOL FOR  
DATA SCIENCE  
HELMHOLTZ | TUM | LMU

**HDSLEE** HELMHOLTZ  
SCHOOL FOR DATA SCIENCE  
IN LIFE | EARTH | ENERGY

**HiDSS** HELMHOLTZ  
INFORMATION & DATA SCIENCE  
4HEALTH SCHOOL FOR HEALTH

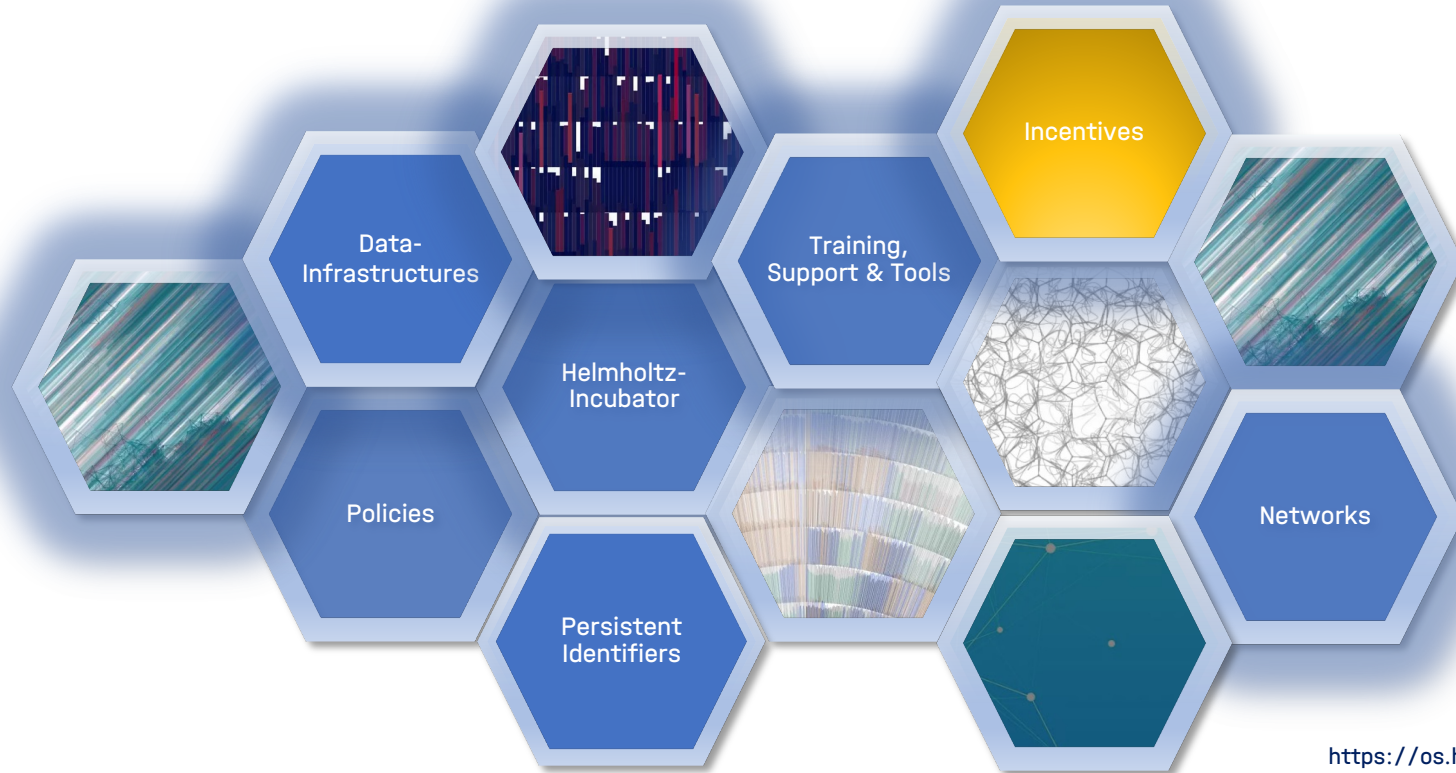
# Core Topic

## Open Research Data



Core Topic

# Open Research Data



# Open Research Data Incentives

- The goal is to develop incentives and indicators to promote open science at Helmholtz.
- The ongoing discussion process to anchor open science in the process of **research evaluation** at Helmholtz needs to be further accompanied in order to develop indicators and incentives for open science in the areas of open access, open research data, and open research software.
- In this context, European and international developments in research assessment are considered and continued; see also [G6 Statement](#).

## RESEARCH ASSESSMENT

Sharing and cooperating are central elements of digital research culture. Openness thus becomes a paradigm of the transformation process of scientific work. Scientific requirements for research findings and quality are manifested in the assessment system. The further development of the respective procedures and criteria is therefore a genuine responsibility of the research organisations. Thus G6 will continue to participate in this process. The elaboration of procedures should be aligned with and support the development of research practices and research culture. Criteria, methods and indicators should be used in a transparent way in order to improve the overall accountability and credibility of the assessment procedures. **Future research assessment should incentivize the provision of Open Access, FAIR data, software, tools, and active contributions to Open Science, and in this way enable the appreciation of the work involved.**

[G6 Open Science Statement](#)

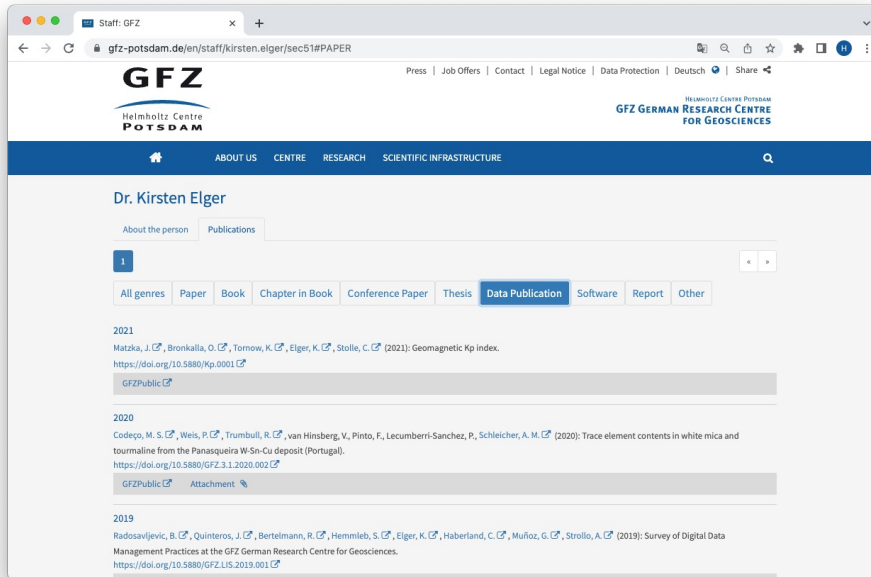
# Open Research Data Incentives

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- The Task Group Helmholtz Quality Indicators for Data and Software Products of the Working Group Open Science of the Helmholtz Association is dedicated to the development of Helmholtz Quality Indicators for Data and Software Products.
- Duration: From March 2022 onwards.
- Relevant products and events:
  - (in German) Diskussionspapier „Indikatoren für Open Science“:
    - <https://doi.org/10.2312/os.helmholtz.014>
  - (in German) Report des Helmholtz Open Science Forum zu „Indikatoren für Open Science“
    - <https://doi.org/10.48440/os.helmholtz.024>

# Open Research Data Incentives

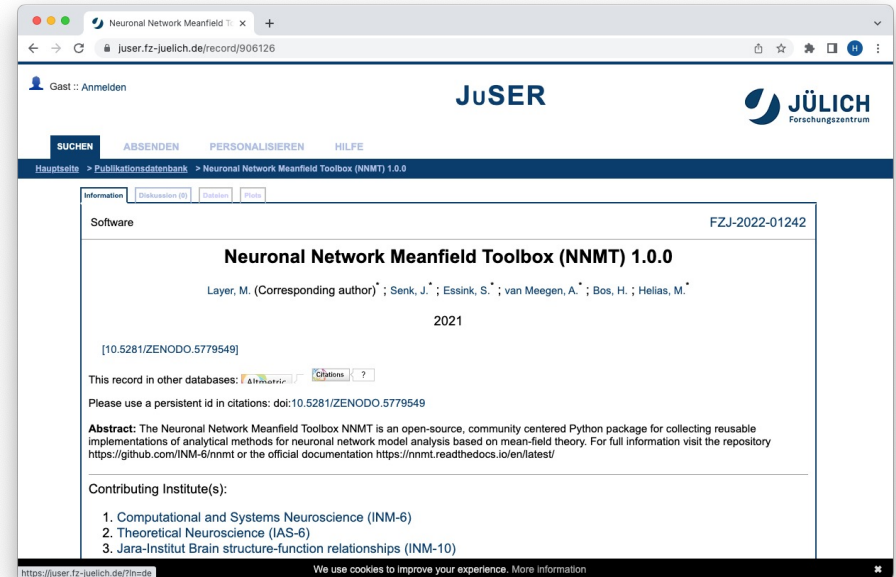
- Research Data as first class output



The screenshot shows the website of the GFZ German Research Centre for Geosciences. The page is for Dr. Kirsten Elger, and the 'Data Publication' tab is selected. It lists three publications:

- 2021**  
Matzka, J., Bronkalla, O., Tornow, K., Elger, K., Stolle, C. (2021): Geomagnetic Kp index.  
<https://doi.org/10.5880/GFZ.3.1.2020.001>  
GFZPublic
- 2020**  
Codeço, M. S., Weis, P., Trumbull, R., van Hinsberg, V., Pinto, F., Lecumberri-Sánchez, P., Schleicher, A. M. (2020): Trace element contents in white mica and tourmaline from the Panasqueira W-Sn-Cu deposit (Portugal).  
<https://doi.org/10.5880/GFZ.3.1.2020.002>  
GFZPublic Attachment
- 2019**  
Radosavljevic, B., Quinteros, J., Bertelmann, R., Hemmleb, S., Elger, K., Haberland, C., MuKoz, G., Strollo, A. (2019): Survey of Digital Data Management Practices at the GFZ German Research Centre for Geosciences.  
<https://doi.org/10.5880/GFZ.LIS.2019.001>

[Link](#)



The screenshot shows the JuSER website record for the 'Neuronal Network Meanfield Toolbox (NNMT) 1.0.0'. The record ID is FZJ-2022-01242. The authors listed are Layer, M. (Corresponding author), Senk, J., Essink, S., van Meegen, A., Bos, H., and Helias, M. The year is 2021. The record is associated with the DOI 10.5281/ZENODO.5779549. The abstract states: 'The Neuronal Network Meanfield Toolbox NNMT is an open-source, community centered Python package for collecting reusable implementations of analytical methods for neuronal network model analysis based on mean-field theory. For full information visit the repository <https://github.com/INM-6/nnmt> or the official documentation <https://nnmt.readthedocs.io/en/latest/>'. The contributing institutes are listed as:

1. Computational and Systems Neuroscience (INM-6)
2. Theoretical Neuroscience (IAS-6)
3. Jara-Institut Brain structure-function relationships (INM-10)

[Link](#)

Thanks for your attention!

Dr. Heinz Pampel



heinz.pampel@os.helmholtz.de



<https://orcid.org/0000-0003-3334-2771>



@pampel



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# HELMHOLTZ

## Open Science

### Keep in touch

- Email: [open-science@helmholtz.de](mailto:open-science@helmholtz.de)
- Twitter: [@helmholtz\\_os](https://twitter.com/helmholtz_os)
- Website: <https://os.helmholtz.de>
- Mailing list for members of Helmholtz:  
[Helmholtz Open Science Professionals](#)
- [Helmholtz Open Science Newsletter](#)