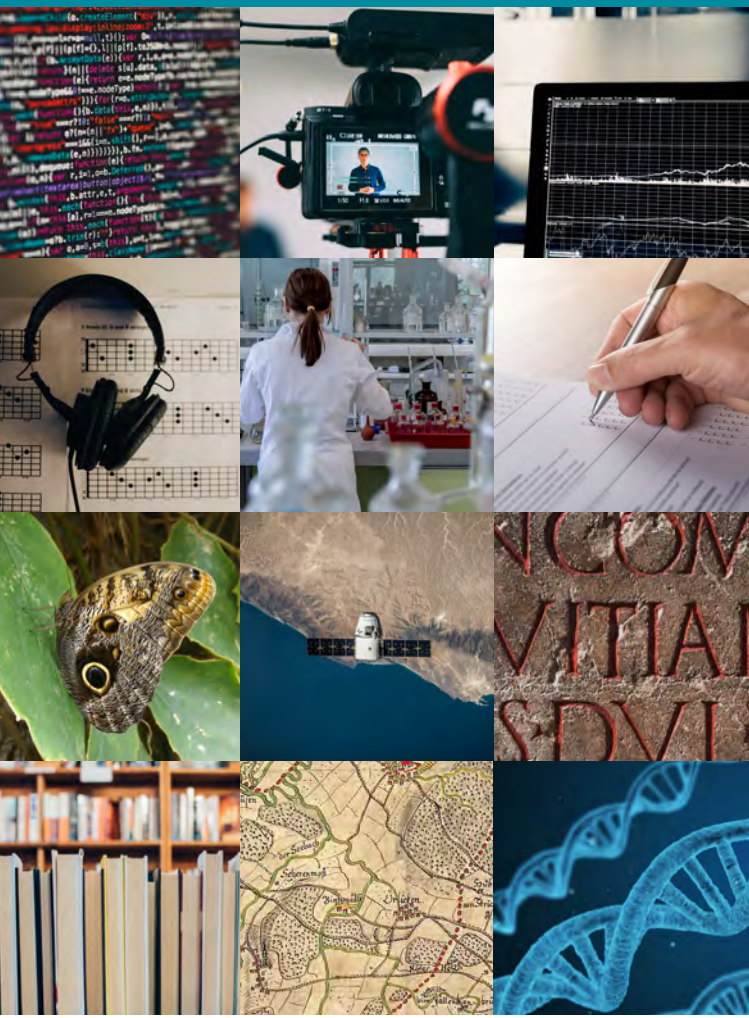
Research Data Management (RDM)

From planning to archiving



LOGO
UNIVERSITY

Contact and Services
Support for your research

TRAINING AND CONSULTING

- Nis antium invent quate plaut
- Osti nostrum qui dolorup tibeatat idundam fugiae.
- Consecto bea comni bea aut aut re nis et que ipsus

TECHNICAL INFRASTRUCTURE

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- Consecto bea comni bea aut aut re nis et que ipsu-sipicturepuda alit hicipsam laborit re, ut a.
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- Consecto bea comni bea aut aut re nis et que ipsus

Contact
Research Data Services
University XY
Tel.: 01234/123-456
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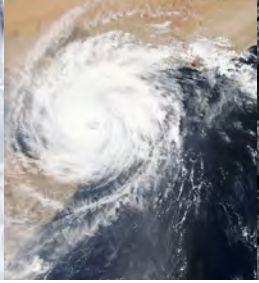
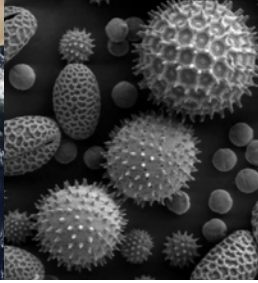



▶ *RESEARCH DATA*

Research data might include measurement data, laboratory values, audiovisual information, texts, survey data, objects from collections, or samples that were created, developed or evaluated during scientific work (DFG Guidelines on the Handling of Research Data, 2015).

▶ *RESEARCH DATA MANAGEMENT (RDM)*

RDM is the systematic handling of research data throughout the entire **data life cycle**. It ranges from collection to analysis and further processing of data to archiving and, if applicable, publication.

▶ *FUNDING*

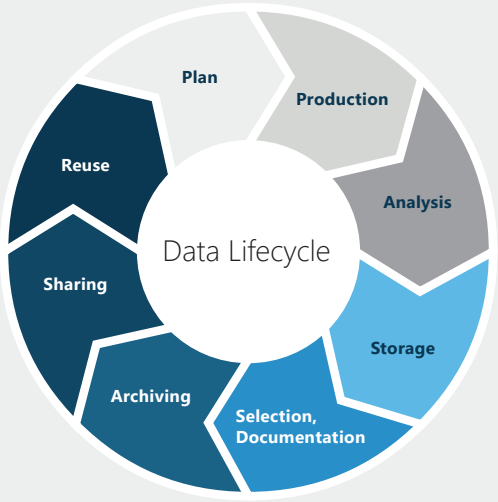
For the approval of **third-party funds**, proof of a structured data management during and after completion of the research process is increasingly important.

▶ *ADVANTAGES: RDM...*

- reduces the risk of data loss
- makes data available and reusable
- prevents overabundant data and redundancy
- promotes the implementation of ethical standards and principles of Good Scientific Practice
- creates legal certainty
- improves the data exchange within research groups (e. g., the data transfer between generations of doctoral students)

"Quality-assured research data form a cornerstone of scientific knowledge and can [...] serve as a basis for further research. The sustainable safeguarding and provision of research data therefore does not serve only the examination of previous results, but to a large extent also the achievement of future results."

From the preamble of the "Principles for the Handling of Research Data", Alliance of Science Organisations in Germany, 2010.



IS YOUR RESEARCH DATA *FAIR*?

Findable
Your research data can be found and cited.

Accessible
Your research data is accessible.

Interoperable
Your research data is technically reusable (formats, software).

Reuseable
Your data is understandable and reusable.

... further information on forschungsdaten.info

Data Management Plans

How to plan, structure and coordinate data

DMP at UA Ruhr

Simply fill out online – and off to the application!

What is a data management plan (DMP)?

A DMP structures the way you deal with your research data. It can serve as a checklist, as well as a basis for ongoing documentation: from survey to long-term storage or publication of your data. More and more research funding organizations, e. g. the EU or the German Federal Ministry of Education and Research (BMBF), demand the creation of a DMP.

What information does a DMP contain?

Crate your DMP here:
www.rdmo.uaruhr.de

ADVANTAGES

- facilitates arrangements for data exchange in collaborations
- facilitates documentation in the case of reporting duties
- facilitates the reuse of your own data
- reduces the risk of data loss

?! The RDM team answers your questions regarding DMP at [rdm@university.de].

Storage Media

Where to put your data

Margaret Hamilton with the printed source code of the software she developed for the Apollo mission, 1969

Storage Media
No backup – no mercy

Eventually your hard-drive will die. They often don`t last long enough to meet the standard storage period of ten years, as required by the DFG in accordance with Good Research Practice.

LIFE EXPECTANCY OF STORAGE MEDIA

Hard disks: 2 – 10 years

DVD: up to 30 years

USB sticks: 10 to 30 years

3... 2... 1... Backup!

When your data is gone – so is your research. If you backup your data on a regular basis, you are on the safe side. Clouds are practical, but problematic: often it is unclear where the data is stored or what happens if the provider is hacked or goes bankrupt. Secure your data by choosing a reliable platform (e. g., Sciebo) and an additional storage method (e. g., the university's servers).

3-2-1-RULE

At least **3** backup copies on **2** different storage media, with **1** backup copy at an external location.

Storing – done right!

Hard disks get lost – repositories don't. Store valuable data in a way that keeps it accessible and safe at the same time. Suitable options are repositories or university services such as [the document server of university xy ...].

?! The RDM team answers your questions regarding storage at [rdm@university.de].

Data Publication

Data speaks for itself

Data Publication

Sharing is caring

"Sharing is caring" – this is also true for research data. Your data is not only valuable for your own research, but can provide important impulses after your project is finished.

ADVANTAGES

- Data becomes comprehensible and reusable for others
- Recognition for your research through data citation
- Results are more easily comparable
- Enables meta-analyses
- Supports interdisciplinary research

How do I publish my data properly?

If you publish your data in a repository that is accessible online, your data is safely stored, findable and usable at the same time.

> ***University repository:*** [Name of repository]

> ***Discipline-specific repository:*** In many scientific communities, there are established services

> ***Generic repository:*** e. g. Zenodo, Radar

> ***Data Journals:*** Focus on the description and methodology of data generation

> ***Discipline-specific journals:*** Supplementary to text publications

?! The RDM team answers your questions regarding data publication at [rdm@university.de].

PID and ORCID
Finding data and authors – and being found!

How can my data be found?

> *Persistent Identifier (PID)*

Publications and data are tagged with a unique, permanent identifier: a so-called Persistent Identifier (PID). It guarantees permanent accessibility. An internationally widely used system for this purpose is the digital object identifier (DOI). [At Uni XY DOI can be provided by…]

> *ORCID iD*

if you publish your data in a repository that is accessible online, your data is safely stored, findable and usable at the same time. In such cases, a PID for authors can help – the ORCID iD. ORCID provides a permanent digital identifier that distinguishes you from all other researchers – like a fingerprint. The ORCID iD can be integrated into important research processes such as the submission of manuscripts and proposals.

Metadata
Knowing what you are looking for

Metadata standards
Data about data

The label on a can indicates what's inside. In the same way, metadata ensures that digital data and objects can be found and used. That's why it's important to "label" your research data.

Types of metadata

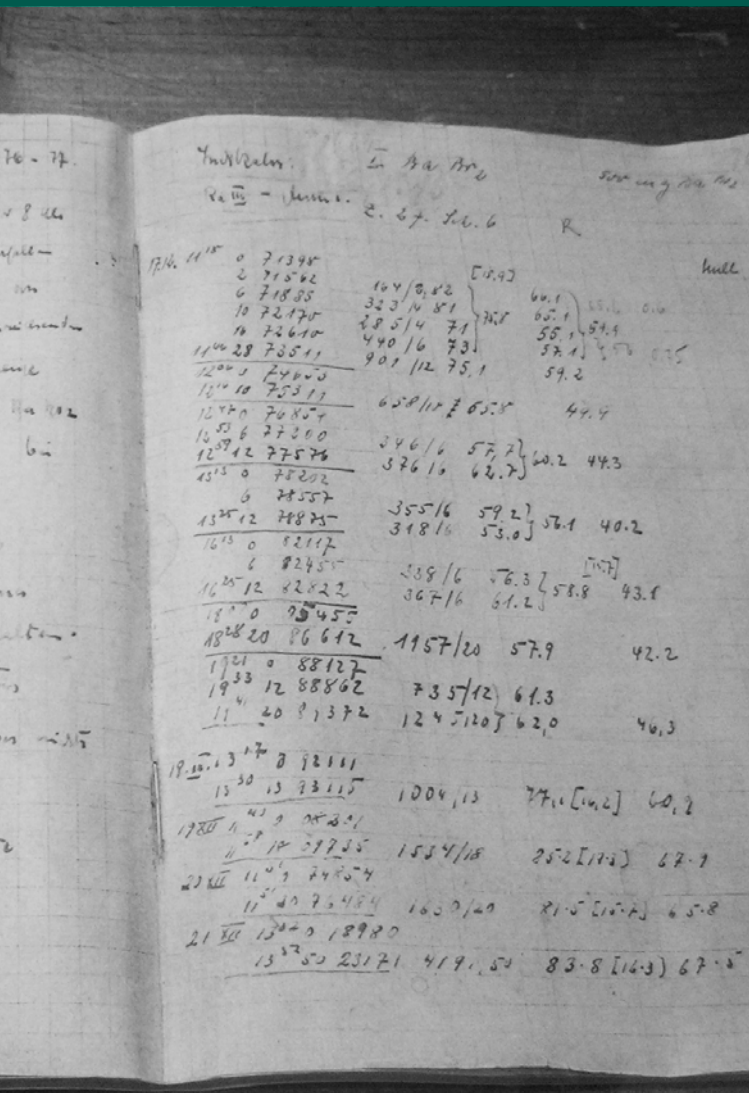
> *Bibliographic or administrative data* is rather general and less community-specific. It includes information about the origin and management of the entire data set.

> *Content-descriptive or subject-specific data* describes individual aspects or data sets in more detail and provides additional information. Depending on the discipline, metadata ist structured quite diversely. Many disciplines already have their own metadata standards.

?! The RDM team answers your questions regarding meta data at [rdm@university.de].

Electronic Lab Notebooks

The end of your jotter chaos



Otto Hahn's laboratory notebook documenting the discovery of nuclear fission, 1938

Electronic Lab Notebooks

The end of your jotter chaos

Electronic Lab Notebooks
Improve your lab workflows digitally

Notebooks are part and parcel of the day-to-day business of research in the natural sciences: this is where measurements, sketches of experimental setups or evaluations end up. But what happens if your data is digital? Do you print it out and glue it into your notebook?

Probably not. Instead, consider using electronic labaratory notebooks (ELN).

WHY USE AN ELN?

- Work collaboratively
- Full text search in all contents
- Data security, access control
- Keep book with PC, mobile phone or tablet
- Ensure data integrity, create verifiability through time stamps
- Import or link any files
- Connect to other systems (API)
- Export to PDF (and other formats)

Overview
[Link to the institution's website with further information]

?! The RDM team answers your questions regarding ELN at [rdm@university.de].

Archiving Images and audiovisual Files

The format matters...

Archiving Images and audiovisual Files
… including "born-digitals"

Without a player, your tapes are plastic waste. Technical evolution also impacts digital file formats: In a worst case scenario, your research data can no longer be accessed or edited.

To sidestep any issues, use the following formats to archive your data.

FIT FOR THE ARCHIVE: FORMATS

▶ Raster graphics

- Tagged Image File Format (TIFF) – uncompressed > *.tif
- Portable Network Graphics (PNG) > *.png
- JPEG2000 > *.jpg, *.jpeg

▶ Vector graphics

- Scalable Vector Graphics (SVG) > *.svg, *.svgz

▶ Computer-aided Design (CAD)

- AutoCAD Drawing > *.dwg
- Drawing Interchange Format, AutoCAD > *.dxf
- Extensible 3D, X3D > *.x3d, *.x3dv, *.x3db

▶ Sound, Audio

- Waveform Audio File Format (WAV) – uncompressed >*.wav

▶ Video

- FFV1 Codec in Matroska Container > *.mkv
- Motion JPEG 2000 (ISO / IEC 15444-4) > *.mj2
- AVI – uncompressed > *.avi

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Personal Data
Operation: undercover

(Research-)Data Protection
Keep personal info personal

General Data Protection Regulation (GDPR), ethical guidelines, federal or state data protection laws, written consent, principles of purpose or "broad consent", pseudonymisation or anonymisation: anyone who wants to handle personal research data in a responsible and legally compliant manner must observe many regulations.

WHY DATA PROTECTION?

- Compliance with ethical standards
- Strengthen confidence in research
- Putting long-term storage, use and/or transfer on a legally sound foundation
- Adhere to the specifications of funding bodies

Further information
on the websites of your data protection officer [Link to Website]

?! The RDM team answers your questions regarding data protection at [rdm@university.de].

Bird's Eye View
All information on RDM at a glance

Picture: Couleur/pixabay - Bearbeitung : E. Böker/forschungsdaten.info

Forschungsdaten.info
The German language information platform

If you want to learn about RDM, this is your go-to page: forschungsdaten.info.

Hosted at the University of Konstanz, the information platform is maintained and quality-assured by a team of RDM specialists.

forschungsdaten.info

CONTENT

- Introduction and practical articles
- Case studies and services from different scientific fields
- Overview of activities in the federal states
- News, quizzes, FAQs and glossary

Create your data management plan at ***rdmo.forschungsdaten.info***

The RDM team answers your questions regarding RDM at [rdm@university.de].