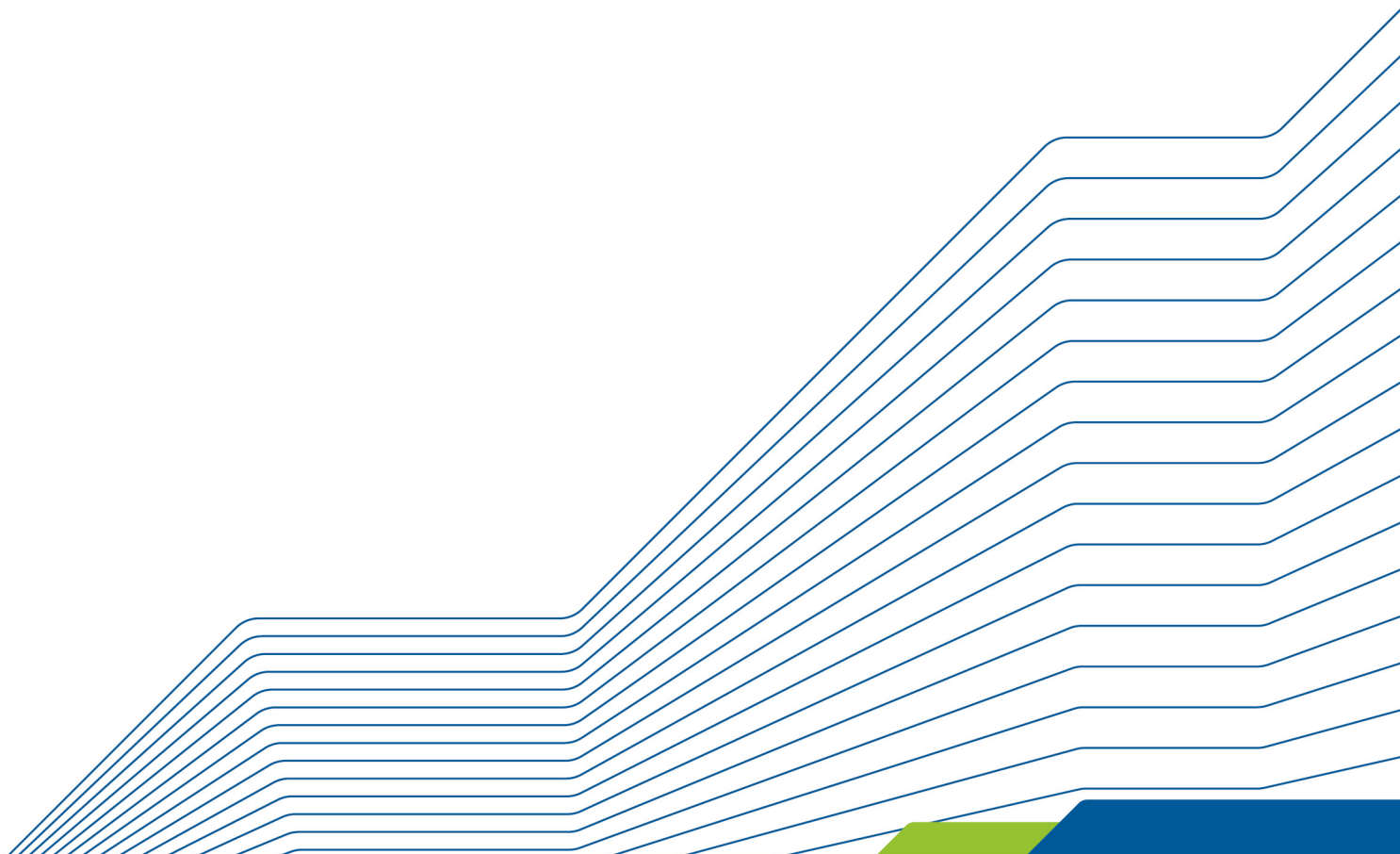


HELMHOLTZ
Open Science

Helmholtz Open Science Briefing

**Helmholtz Open Science
Praxisforum
Forschungsdatenmanagement**

Report



Impressum

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Abstract

Zum Austausch von Best Practices aus den Zentren und zur Förderung der FDM-Community in Helmholtz veranstaltete das Helmholtz Open Science Office am 3. Februar 2022 das erste „Helmholtz Open Science Praxisforum Forschungsdatenmanagement“. In dem Helmholtz-internen Forum wurden exemplarisch verschiedene Herangehensweisen aus Zentren zur Organisation des FDM vorgestellt. Darüber hinaus standen konkrete Service-Angebote zu FDM im Mittelpunkt. Außerdem wurde die Vernetzung mit externen Akteuren, z. B. im Rahmen der NFDI, EOSC oder der RDA, beleuchtet. Die regen Diskussionen verdeutlichten den hohen Bedarf nach übergreifendem Community-Building im Bereich des FDM innerhalb von Helmholtz und darüber hinaus.

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Report

Einführung

Die Zentren der Helmholtz-Gemeinschaft betreiben datenintensive Forschung: Die Anwendung komplexer wissenschaftlich-technischer Infrastrukturen, wie Teilchenbeschleuniger, Satelliten oder Forschungsschiffe und -flugzeuge, sorgt für ein hohes Aufkommen von digitalen Forschungsdaten. Bereits im ersten Helmholtz-Konzept zur Umsetzung der in der „Berliner Erklärung über den offenen Zugang zu wissenschaftlichem Wissen“¹ formulierten Ziele widmete sich die Gemeinschaft dem offenen Zugang zu Forschungsdaten. So konzentriert sich in Helmholtz eine hohe fachliche Kompetenz im Bereich des Forschungsdatenmanagements (FDM).

Im Jahr 2016 verabschiedete die Helmholtz-Gemeinschaft ein Positionspapier mit dem Titel „Die Ressource Information besser nutzbar machen!“² zum Umgang mit Forschungsdaten. Zur praktischen Ausgestaltung dieser Richtungsentscheidung werden an den Zentren Forschungsdaten-Policies entwickelt. Um die Zentren bei der Formulierung ihrer jeweiligen Richtlinien zu unterstützen, verabschiedete die Mitgliederversammlung der Helmholtz-Gemeinschaft praktische Empfehlungen.³ Bereits zwölf Zentren haben seither eigene Richtlinien zum Umgang mit digitalen Forschungsdaten erarbeitet.⁴ Das Helmholtz Open Science Office erstellt seit 2020 gemeinsam mit der „Task Group zur Implementierung der Leitlinien zu Forschungsdaten“⁵ des Arbeitskreises Open Science jährlich einen internen Bericht zum Umgang mit Forschungsdaten und zum Stand der Entwicklung bzw. Implementierung der Forschungsdaten-Policies an den Zentren.

FDM ist in Helmholtz eine gelebte Praxis: Davon zeugen diverse Initiativen und Projekte in den Zentren sowie die Helmholtz-weit agierenden Plattformen im Bereich Information and Data Science⁶; einige dieser Aktivitäten wurden im Rahmen des Praxisforums näher beleuchtet. Zudem betreiben die Zentren über 100 digitale Infrastrukturen, in denen wertvolle digitale Forschungsdaten kuratiert

1 <https://os.helmholtz.de/open-science-in-der-helmholtz-gemeinschaft/berliner-erklaerung-ueber-den-offenen-zugang-zu-wissenschaftlichem-wissen/> [Abgerufen am: 07.03.2022]

2 Mitgliederversammlung der Helmholtz-Gemeinschaft (Ed.) (2016): Die Ressource Information besser nutzbar machen! Positionspapier zum Umgang mit Forschungsdaten in der Helmholtz-Gemeinschaft.
<https://doi.org/10.2312/os.helmholtz.021>

3 Empfehlungen für Richtlinien der Helmholtz-Zentren zum Umgang mit Forschungsdaten. In der 109. Mitgliederversammlung der Helmholtz-Gemeinschaft am 13.-14. September 2017 beschlossen.
<https://doi.org/10.2312/os.helmholtz.002>

4 <https://os.helmholtz.de/open-science-in-der-helmholtz-gemeinschaft/open-research-data/forschungsdatenpolicies-helmholtz-zentren/> [Abgerufen am: 07.03.2022]

5 <https://os.helmholtz.de/open-science-in-der-helmholtz-gemeinschaft/stakeholder-und-ihre-rollen/task-groups/task-group-zur-implementierung-der-leitlinien-zu-forschungsdaten/> [Abgerufen am: 07.03.2022]

6 <https://www.helmholtz.de/forschung/challenges/information-data-science/> [Abgerufen am: 07.03.2022]

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werden.⁷ Eine zentrale Rolle spielt auch die nationale und internationale Vernetzung: Zahlreiche Konsortien der Nationalen Forschungsdateninfrastruktur (NFDI)⁸ werden mit substanzieller Helmholtz-Beteiligung realisiert und auch in den Gremien und Projekten der European Open Science Cloud (EOSC)⁹ engagieren sich Helmholtz-Zentren aktiv.¹⁰

Aufbau und Ablauf des Praxisforums

Zum Austausch von Best Practices aus den Zentren und zur Förderung der FDM-Community in Helmholtz veranstaltete das Helmholtz Open Science Office am 3. Februar 2022 das erste „Helmholtz Open Science Praxisforum Forschungsdatenmanagement“¹¹. In dem Helmholtz-internen Forum wurden exemplarisch verschiedene Herangehensweisen aus Zentren zur Organisation des FDM vorgestellt. Im zweiten Teil der Veranstaltung standen konkrete Serviceangebote im Mittelpunkt. Außerdem wurde die Vernetzung mit externen Akteuren, z. B. im Rahmen der NFDI, EOSC oder der RDA, beleuchtet. Die regen Diskussionen und zahlreichen Rückfragen verdeutlichten den hohen Bedarf nach übergreifendem Community-Building im Bereich des FDM innerhalb von Helmholtz und darüber hinaus. An der Veranstaltung beteiligten sich 185 Personen; aus allen Helmholtz-Zentren waren Teilnehmende vertreten.

Im ersten Part der Veranstaltung wurden beispielhaft organisatorische Strukturen des FDM an den Zentren präsentiert. Jan Bumberger stellte das FDM am Helmholtz-Zentrum für Umweltforschung (UFZ) vor, Özlem Özkan repräsentierte das FDM-Team des Max-Delbrück-Centrum für Molekulare Medizin in der Helmholtz-Gemeinschaft (MDC) und Arne Upmeyer gab einen Einblick in die FDM-Praxis am Karlsruher Institut für Technologie (KIT).

Die anschließenden Vorträge stellten konkrete Serviceangebote für FDM in den Mittelpunkt. Ines Schmahl und Florian Rhiem vom Forschungszentrum Jülich (FZJ) zeichnen den Weg der Forschungsdaten „vom Laborbuch zur Publikation“ nach. Maik Fiedler und Oliver Knodel vom Helmholtz-Zentrum Dresden-Rossendorf (HZDR) beschrieben Entwicklungen rund um das Forschungsdatenrepositorium „RODARE“ des HZDR, welches mit der Open-Source-Software InvenioRDM betrieben wird. Kerstin Wedlich-Zachodin gab einen Einblick, wie RDMO (Research Data Management Organiser) als Werkzeug zur Planung, Implementierung und Verwaltung des Forschungsdatenmanagements am KIT genutzt wird. Kirsten Elger vom Helmholtz-Zentrum

7 <https://os.helmholtz.de/open-science-in-der-helmholtz-gemeinschaft/open-research-data/forschungsdatenrepositorien-in-der-helmholtz-gemeinschaft/> [Abgerufen am: 07.03.2022]

8 <https://www.nfdi.de/> [Abgerufen am: 07.03.2022]

9 <https://www.eosc.eu/> [Abgerufen am: 07.03.2022]

10 <https://os.helmholtz.de/open-science-in-der-helmholtz-gemeinschaft/open-research-data/> [Abgerufen am: 07.03.2022]

11 <https://os.helmholtz.de/open-science-realisieren/veranstaltungen/helmholtz-open-science-foren/praxisforum-forschungsdatenmanagement/> [Abgerufen am: 07.03.2022]

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Potsdam – Deutsches GeoForschungsZentrum schloss den Themenblock mit einem Bericht zur Implementierung des SCHOLIX-Frameworks am Beispiel GFZ Data Services.

Der dritte Teil der Veranstaltung richtete den Fokus auf Kooperationen und die Vernetzung mit externen Akteuren. Rolf Krahl vom Helmholtz-Zentrum Berlin für Materialien und Energie (HZB) stellte ein Schema zur persistenten Identifikation von Forschungsinstrumenten vor, welches im Rahmen der Research Data Alliance (RDA) von einer Arbeitsgruppe entwickelt wurde und u. a. am HZB Anwendung findet. Abschließend berichtete die Projektmanagerin des ExPaNDS-Projektes (European Open Science Cloud Photon and Neutron Data Services) Sophie Servan vom Deutschen Elektronen-Synchrotron (DESY) von der Zusammenarbeit mit Helmholtz-Partner:innen in EU-Projekten zur Photonen- und Neutronenforschung mit Fokus auf FAIR Data Management.

Fazit

Das Forum endete mit einem angeregten Ideenaustausch und vielen Rückfragen an die Vortragenden. Einen zentralen Aspekt der Diskussion bildete die Frage nach der Interoperabilität und sinnvollen Verknüpfung von unabhängigen Systemen, damit Forschungsdaten innerhalb von Workflows möglichst reibungslos übertragen werden können. Solch ein integrativer Ansatz könne die Einbindung von FDM-Prozessen in das wissenschaftliche Arbeiten erleichtern. In diesem Zusammenhang wären weitere Diskussionen über den Einsatz von Data Stewards in Helmholtz hilfreich. Außerdem wurde betont, wie wichtig eine gemeinsame Konzeption von Daten-, Text- und Software-Veröffentlichungen heutzutage sei, da zunehmend Verschränkungen zwischen diesen Publikationsformen festzustellen sind.

Von den Teilnehmenden gab es positives Feedback zur Veranstaltung und es wurde ein hoher Bedarf nach weiteren Austauschmöglichkeiten und Community-Building in Bezug auf das FDM in Helmholtz geäußert. In diesem Sinne wird das Helmholtz Open Science Office den Dialog zum FDM innerhalb der Gemeinschaft weiterhin aktiv fördern und unterstützen.

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Anhang

Programm der Veranstaltung vom 03.02.2022

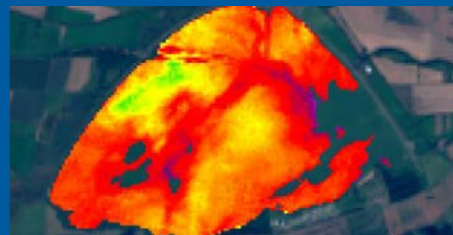
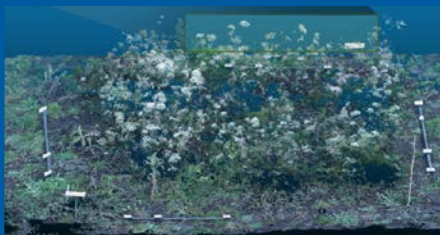
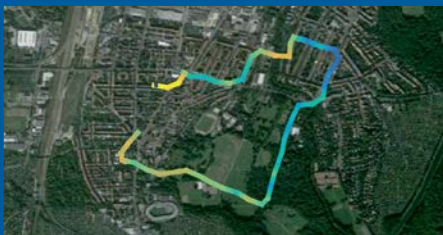
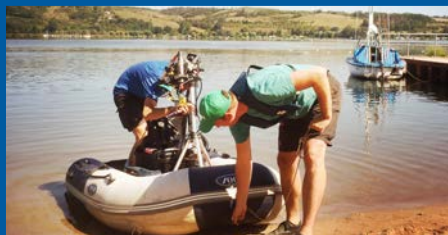
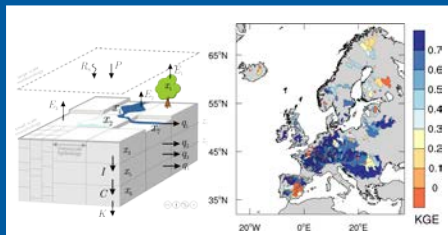
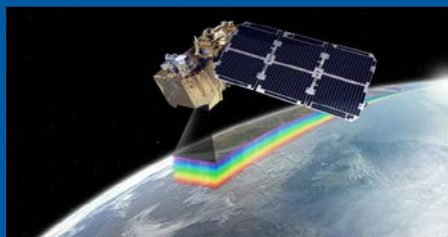
Uhrzeit	Programmpunkt	Referent*in
10:00 - 10:10	Begrüßung	Roland Bertelmann Helmholtz Open Science Office
10:10 - 10:30	Organisatorische Strukturen: Research Data Management am UFZ	Jan Bumberger UFZ
10:30 - 11:50	Organisatorische Strukturen: The Organizational Structure of the Research Data Management at the MDC	Özlem Özkan MDC
10:50 - 11:10	Organisatorische Strukturen: Research Data Management am KIT	Arne Upmeyer KIT
11:10 - 11:20	<i>Pause</i>	
11:20 - 11:40	Technische Umsetzung von RDM Services: From Lab Notebook to Publication – A Lighthouse Workflow for Research Data Management	Ines Schmahl FZJ Florian Rhiem FZJ
12:40 - 12:00	Technische Umsetzung von RDM Services: RODARE – InvenioRDM am HZDR	Maik Fiedler HZDR Oliver Knodel HZDR
12:00 - 12:20	Technische Umsetzung von RDM Services: RDMO und das KIT	Kerstin Wedlich-Zachodin KIT
12:20 - 12:40	Technische Umsetzung von RDM Services: GFZ Data Services and Scholix – a practice example	Kirsten Elger GFZ
12:40 - 13:30	<i>Pause</i>	
13:30 - 13:50	Kooperationen: Persistent Identification of Instruments at HZB	Rolf Krahl HZB
13:50 - 14:10	Kooperationen: The role of Helmholtz Partners in FAIR related Photon and Neutron EU Projects	Sophie Servan DESY / ExPaNDS Project
14:10 - 14:50	Abschlussdiskussion und Abschied	Roland Bertelmann Helmholtz Open Science Office

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Vortragsfolien

1. Jan Bumberger: Research Data Management am UFZ
2. Özlem Özkan: The Organizational Structure of the Research Data Management at the MDC
3. Arne Upmeyer: Research Data Management am KIT
4. Ines Schmahl & Florian Rhiem: From Lab Notebook to Publication – A Lighthouse Workflow for Research Data Management
5. Maik Fielder & Oliver Knodel: RODARE – InvenioRDM am HZDR
6. Kerstin Wedlich-Zachodin: RDMO und das KIT
7. Kirsten Elger: GFZ Data Services and Scholix – a practice example
8. Rolf Krahl: Persistent Identification of Instruments at HZB
9. Sophie Servan & Patrick Fuhrmann: The role of Helmholtz Partners in FAIR related Photon and Neutron EU Projects



Research Data Management am UFZ

Jan Bumberger, 03.02.2022

Vision

Das UFZ zeigt Wege für einen nachhaltigen Umgang mit den natürlichen Lebensgrundlagen zum Wohle von Mensch und Umwelt auf – zur Vereinbarkeit einer gesunden Umwelt mit der gesellschaftlichen Entwicklung.

Mission

- Exzellente integrierte Umweltforschung
- Verlässlicher Partner für Politik, Wirtschaft, Wissenschaft und Gesellschaft
- Lösungsoptionen für gesellschaftliche Herausforderungen
- Wissenschaftliche Infrastrukturen
- Kreative, motivierte und talentierte Mitarbeiter*innen aus dem In- und Ausland
- Attraktive Arbeitsbedingungen

Das UFZ – Zahlen und Fakten



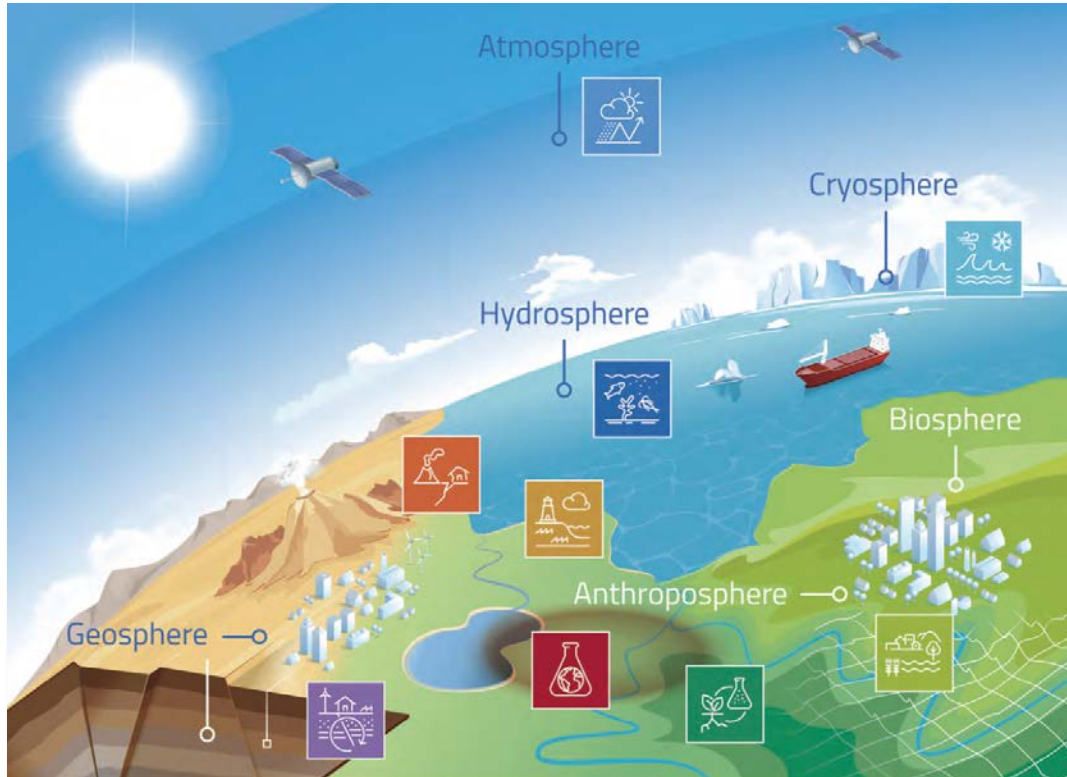
Personal / ca. 1.190 Mitarbeiter*innen gesamt

- ca. 650 Wissenschaftler*innen
- ca. 300 Promovierende inkl. Gastpromovierende
- ca. 670 Gäste (Diplomand*innen, Gastdoktorand*innen, Praktikant*innen, Gastwissenschaftler*innen, Wiss. Hilfskräfte)
- 42 gemeinsame Berufungen mit Partneruniversitäten
- 59 Auszubildende in 9 Fachrichtungen

Finanzen / ca. 96 Mio. Euro gesamt

- 70 Mio. EUR (Zuwendung 90% Bund + je 5% Länder)
- 20 Mio. EUR (Drittmittel inkl. weitergereicherter Zuschüsse)
- 6 Mio. EUR (Sonstige Einnahmen, u.a. durch Lizenzen/Patente)

(Stand 2019)



Informations-, Daten- und Computing-Infrastrukturen für eine ganzheitliche Forschungsperspektive im FB EuU

- Digitalisierung der Datenerfassung, Datenworkflows und Pipelines
- Leitprinzipien sind Open Science und FAIR Data
- Interaktion mit Inkubatoraktivitäten und Nutzung von Diensten (Link zu FB Informationen)
- Thematisch definierte Use Cases innerhalb der POF IV Programmforschung
- Umsetzung bietet einen Mehrwert für Forschung und Öffentlichkeit

Einbettung DataHub FB EuU



Research Data Management UFZ

- i. The UFZ is one of the **leading international institutions in the field of terrestrial environmental data and digitization in science**
- ii. **Fundamental data sets** on the state and change of our environment are available within **multi-thematic research data cubes to enable advanced data science methods and** cross-domain scientific usage
- iii. **Common activities for novel sensor, information technologies and monitoring concepts** enable closing of information gaps in environmental systems science. Prototypes help to test-drive new technologies and concepts and lead to the introduction of usable solutions.
- iv. Interoperable data infrastructures supports **sustainable and long-term data findability, availability, reusability and semantic linking with metadata**
- v. **Scientific communities** are capable of dealing with all aspects of the modern data lifecycle and **benefit from digital and cultural transformation**

Service, Consulting and Education

- Schulungen
- Consulting
- Kommunikation
- Projekte (intern und Drittmittel)

Information Technologies

- Infrastrukturen (Entwicklung und Betrieb)
- Technologieerprobung
- Projekte (intern und Drittmittel)

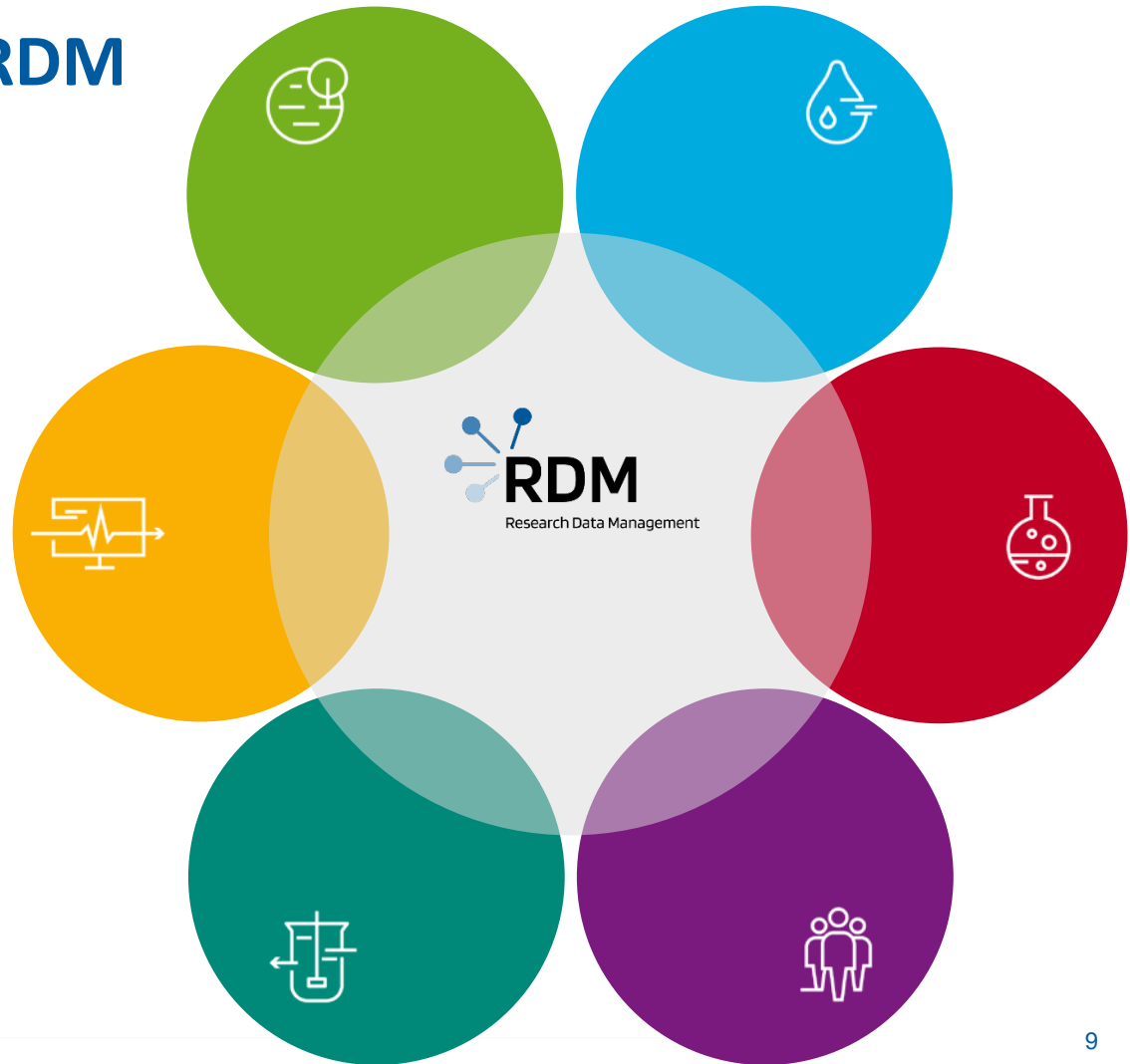
Data Pipelines and Processing

- Datenverarbeitung
- Projekte (intern und Drittmittel)

Community building RDM

Prozessmodell

- Verknüpfung strategischer Projekte und Forschungsinfrastrukturen und deren Akteure
 - Etablierung eines kritischen Personenkreises als „Enabler“ an der Schnittstelle zwischen RDM und Themenbereichen
- Ausbau des RDM-Teams, gemeinsame Fortschritte bei der Digitalisierung der Forschung

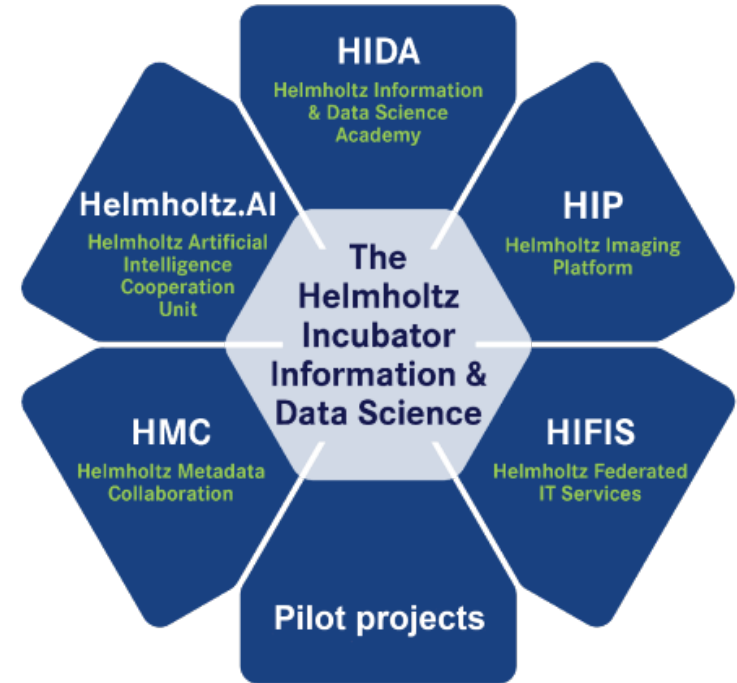


Research Data Management

Helmholtz Inkubator

Data Science adressieren:

- Weiterbildung (HIDA)
- Projekte und Unterstützung im Bereich KI (HAICU)
- Projekte und Unterstützung im Bereich Metadaten (HMC)
- Projekte und Unterstützung im Bereich Imaging (HIP)
- Technologien und Systeme (HIFIS)



Research Data Management

Wissenschaftliche Einbindung

- Verbindung zu UFZ-relevanten POFIV Topics
- Mitwirkung in strategisch relevanten Projekten am UFZ
- Durchführung von Entwicklungsprojekten für das Datenmanagement spez. Communities am UFZ (incl. Commitment der Akteure)
- Datenbeauftragte je Department am UFZ als AnsprechpartnerInnen
- Einwerbung von Drittmitteln im Bereich Datentechnologien

Research Data Management

Infrastrukturelle Einbindung

- Ausbauinvestitionen und Großgeräte, Berücksichtigung Datenmanagement bei Planung und Lebenszyklus
- Verbindung Bibliothek (Datenpublikationen, Indikatoren usw.)
- Weiterbildungen und Schulungen für wiss.-techn. Personal für Nutzung Dateninfrastrukturen
- Betrieb der Dateninfrastrukturen über interne IT und externe Dienstleister

- Kultureller Wandel ist kontinuierlicher Prozess
- Datenmanagement ist wesentlicher Teil der Digitalisierung in der Forschung
- Wissenschaftliche strategische Einbindung ist Voraussetzung
- Datenmanagement bei Forschungsinfrastrukturen im gesamten Lebenszyklus
- Enabling digitaler Arbeitsweisen durch gemeinsame Entwicklungsprojekte incl. Involvierung der Akteure

MAX-DELBRÜCK-CENTRUM FÜR MOLEKULARE MEDIZIN

The Organizational Structure of the Research Data Management at the MDC

Helmholtz Open Science Practice Forum
Dr. Özlem ÖZKAN

WHO ARE WE?

Dr. Özlem Özkan

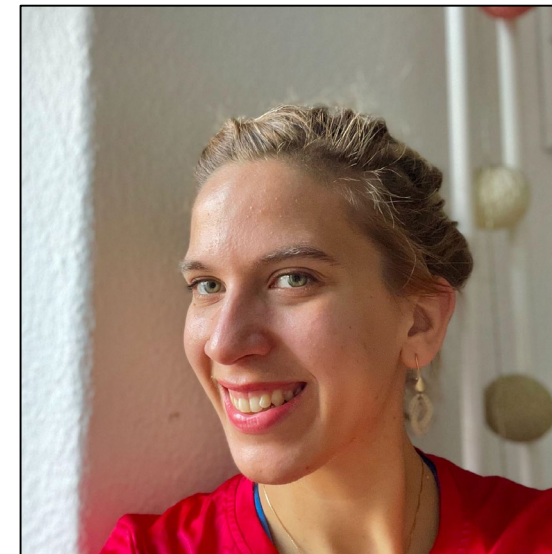
- Bsc: Computer Education
- Msc & PhD: Medical Informatics
- R.Areas: Data Protection & Privacy
- Experiences: IT & Data Science



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Dr. Inga Patarčić

- Bsc & Msc : Molecular Biology
- PhD: Bioinformatics
- R.Areas: Genomics & Genetics, ML
- Experiences: Research, Open Science, SciComm



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MDC RESEARCH DATA MANAGEMENT UNIT

- The Max Delbrück Center for Molecular Medicine is one of the world's leading biomedical research centers (1992).
- The MDC has **88 labs** and **833** researchers who analyze how the human body works in both health and disease.
- The Research Data Management Unit was established **in 2020** as a part of the MDC's Scientific Infrastructure Department.



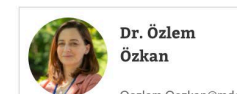
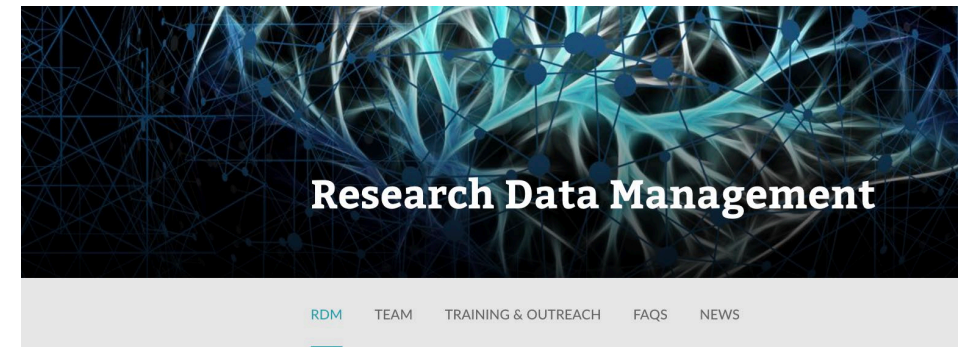
OUR VISION AND MISSION

Our vision

To support researchers in all their data related activities in order to achieve a more **effective use of resources, transparency, re-use, participation, accountability and reproducibility in the MDC** as well as facilitate collaborative work across institutions.

Our mission

To aid researchers through all **phases of research data life cycle**.



**Dr. Özlem
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13125 Berlin

[Contact Form](#)

Research Data Management Services Unit

Scientific research is increasingly more digital, with expanding volumes of data that necessitates good data management practices. Our role is to provide information, consultation, support, and training to researchers through all phases of **the research data life cycle** (Planning, Data Collection, Management and Analysis, Preservation and Sharing).

We provide advice and support in the following areas

Planning

Data Management Plans



WE WORK WITH

- IT
- Data Protection Office
- Information Security Office
- Legal Department
- Technology Transfer Office
- Research Funding Department
- Library
- Technology Platforms & Research Groups



AREAS OF FOCUS



WE PROVIDE ADVICE AND SUPPORT IN:

Planning

Managing

Sharing

Training & outreach

Policies

- Data management planning (DMPs) and access to templates
- Data description and metadata extraction
- Data documentation
- Choice of repositories
- Choices of file formats
- Data re-use

- Storage and backup plans
- Electronic lab notebooks (ELNs)
- Tools and software solutions
- Supporting digitization efforts

- Data access and Sharing rights
- Data privacy and GDPR compliance
- Data ownership, licensing and citation
- Publishing requirements

- Guidelines and tutorials
- Community building
- Face-to-Face/Online support
- Training and workshops
- Training & events portal

- Research data management policy
- IT and data safety policy
- Data sharing policy
- Guidelines on research ethics
- Collection of funders policy and guidelines
- RDM roadmap and implementation strategy

PLANNING:

- Data Management Plans (DMPs) and related guidelines
 - **DMP Tool specifically designed for MDC researchers**
 - Data Organization Guidelines
 - [Guidelines on versioning](#)
 - [Guidelines on file formats](#)
 - [Guidelines on file naming](#)
 - [Guidelines on directory structure](#)

Directory structure

A clear directory structure will make it easier to locate files and versions and this is particularly important when collaborating with others. Consider a hierarchical file structure starting from broad topics to more specific ones nested inside, restricting the level of folders to 3 or 4 with a limited number of items (max. 50 items if possible) inside each folder.

File naming

A file name should be unique, consistent and descriptive. This allows for increased visibility and discoverability and can be used to easily classify and sort files. Remember, a file name is a primary identifier to the file and its contents.

File format

The choice of file formats plays an essential role for long term data storage and archiving, data sharing, searchability, accessibility, and has a significant impact on data reusability. It is advisable to consider open file formats whenever possible that allows the data to be

PLANNING: (DATA MANAGEMENT PLANS AND RELATED GUIDELINES)

- **Data Storage, Archive and Dispose Guidelines**
 - Data Storage, Access and Backup Guideline
 - Data Archival Guideline
 - Data Disposal Guideline

PLANNING: (DATA MANAGEMENT PLANS AND RELATED GUIDELINES)

- **Private and Sensitive data**
 - Personal Research Data and Ethics Workflow
 - Guidelines for Storing Private and Sensitive Data
 - Guidelines for Archival of Private and Sensitive Data

MANAGING:

- **Purchasing & Launching** one main institutional **Electronic Lab Notebook solution**
- **Onboarding research groups**

[More info](#)



INSTITUTE & CAMPUS / JANUARY 28, 2022

Bye-bye, paper chaos!

Since always scientists have been documenting their lab research by hand. Now it is time for a digital solution. In this interview for “We at the MDC,” research data manager Dr. Özlem Özkan explains how a new electronic lab notebook is set to change working life for researchers at the MDC.

<https://www.mdc-berlin.de/news/news/bye-bye-paper-chaos>

SHARING:

- **Data Access and Sharing Rights**
 - Data publishing and Data citation guideline
- **Data License Guideline**

POLICIES:

Research Data Management Policy:

MDC-Management, Principal Investigators (PIs) and all researchers at the MDC, hold the primary responsibility for compliance with this policy and the responsibility for research data management during and after a research project.



Institutional Data Policies (1/63):

- 3.49 Leibniz Institute for the History and Culture of Eastern Europe (GWZO)
- 3.50 research center Jülich
- 3.51 University of Potsdam
- 3.52 DIPF - Leibniz Institute for Research and Information in Education
- 3.53 Technical University Berlin
- 3.54 Technical University of Clausthal
- 3.55 Otto-von-Guericke University Magdeburg
- 3.56 Foundation University of Hildesheim
- 3.57 Bauhaus University Weimar
- 3.58 Alfred Wegener Institute – Helmholtz Center for Polar and Marine Research
- 3.59 RheinMain University of Applied Sciences
- 3.60 Leibniz Institute for East and Southeast European Studies (IOS)
- 3.61 Max Delbrück Center for Molecular Medicine (MDC)
- 3.62 Free University of Berlin
- 3.63 University of Osnabrück

Max Delbrück Center for Molecular Medicine (MDC)






- [Research Data Management \(RDM\) Policy](#) approved by the MDC board of directorates and valid from 03/01/2021

https://www.forschungsdaten.org/index.php/Data_Policies

POLICIES:

- [Collection of funders policy and guidelines](#)
- [RDM roadmap and implementation strategy \(2020-2025\)](#)
- [Guideline on research ethics processes](#)
- [Collection of journals policy and guidelines](#)
- [Storage, archival and disposal policy](#)

The requirements for the retention and preservation of research of the top funders

FUNDER	WHAT?	HOW LONG?	STARTING WHEN?	WHERE?
 Horizon 2020	Research data, unpublished data, code ¹	-	Immediately	Any repository ¹
 European Research Council (ERC)	Research data, unpublished data, code ¹	-	Within six months after the publication ²	Any relevant repository (Suggestions: GenBank and PDB) ^{1,2}
 NIH	"Financial and programmatic records, supporting documents, statistical records, and all other records that are required by the terms of a grant, or may reasonably be considered pertinent to a grant" ³	Period of three years ³	The date the annual FFR* is submitted ³	-
 DFG	Generally raw research data ⁴	Ten years ⁴	Within one year after the completion of the project ¹	Any repository ¹
 BMBF	Research data ¹	Longterm ¹	After the	Any

TRAININGS AND OUTREACH:

- **Research Data Management Trainings (at least 4 / year)**
- **One-on-One advice and support**
- **Carpentries Membership**
- **RDM Working Group (Researchers + IT members)**
- **German RSpace User Group**
- **Create an eLearning content**
- **Organize workshops**
- **Guideline for new starters**

WHAT WE DID:

Research Data Policy

Data Organization Guidelines

Purchased an Electronic Lab Notebook (ELN)

Data Storage and Backup Guideline (under approval)

Data Archive and Disposal Guideline (in preparation)

Personal Data Processing Workflow (in preparation)



HOW TO GET IN TOUCH

Website

<https://www.mdc-berlin.de/research-data-management>

Email

rdm@mdc-berlin.de

oezlem.oezkan@mdc-berlin.de

inga.patarcic@mdc-berlin.de

Research Data Management am KIT



Serviceteam RDM@KIT

Timeline



- * 2012 – 2015 Bedarfserhebungen in der Wissenschaft
 u.a. landesweit im Projekt *bwFDM-Communities*
- * 2015 Gründung des Serviceteams RDM@KIT
- * 2015 – 2016 Entwicklung der Leitlinien zu einem verantwortungsvollen und nachhaltigen
 Forschungsdatenmanagement am KIT (FDM-Policy) und Verabschiedung durch Präsidium und Senat
- * 2015 – heute Partizipation des Serviceteams an zahlreichen Projekten des FDM
 re3data (federführend), Projekte im Rahmen von bwFDM, RDMO,
 chemotion / EDEL, SuLMaSS, ExU-RDM-Vorhaben (DORA4KIT ...) ...
- * 2015 – heute Ausbau vorhandener und Entwicklung von neuen FDM-Services sowie Integration in die
 Informationsinfrastruktur des KIT gemäß den FAIR-Prinzipien
 - Schulung und Beratung
 - Dynamischer Data Management Plan
 Research Data Management Organiser, RDMO
 - Workflows zwischen KITopen, Repositorien und Speichersysteme
- * 2020 Gründung des RDM-Forums

KIT-FDM-Policy (Leitlinien zu einem verantwortungsvollen und nachhaltigen Forschungsdatenmanagement am KIT)

1. Das Management von Forschungsdaten beginnt mit der Planung von Forschungsvorhaben und umfasst die Erfassung, Verarbeitung, und Aufbewahrung von Forschungsdaten. Es sichert den Zugang bzw. die Zugangsbeschränkungen, die Reproduzierbarkeit und die Nachnutzung von Forschungsdaten.
2. Verantwortlich für die Forschungsdaten und die Einhaltung der fachspezifischen Standards sind die Forschenden. Die Koordination des Forschungsdatenmanagements obliegt den Leitungen der Institute und der sonstigen wissenschaftlich tätigen Organisationseinheiten.
3. Das KIT berät beim Forschungsdatenmanagement* in Forschungsvorhaben von der Planung, über die Durchführung bis über das Vorhabensende hinaus. Dabei wird fachspezifischen Anforderungen, z.B. der Auswahl geeigneter Repositorien und Datenformate, Rechnung getragen.
4. Das KIT sorgt für geeignete Aufbewahrungsmöglichkeiten für Forschungsdaten und stellt dafür geregelte Zugänge und eine entsprechende Infrastruktur zur Verfügung.
5. Das KIT fördert und unterstützt den freien Zugang zu Forschungsdaten unter Beachtung ethischer, rechtlicher, wirtschaftlicher und vertraglicher Rahmenbedingungen. *

* Beratung, Förderung und Unterstützung erfolgt durch das Serviceteam Forschungsdatenmanagement am KIT <http://www.rdm.kit.edu/>

Das Serviceteam RDM@KIT

Beteiligte Organisationseinheiten (**fett** = federführend)

- * **BIB** KIT-Bibliothek
- * **SCC** Steinbuch Centre for Computing (Rechenzentrum)
- * STAB-DO Digital Office
- * FOR Forschungsförderung
- * Archiv Archiv des KIT
- * *IRM* *Innovations- und Relations-Management*
- * *ZAR* *Zentrum für Angewandte Rechtswissenschaft*

- * Data Stewards, themenspezifische Experten...

Weitergehende Informationen & Kontakt

- * Websites: rdm.kit.edu, forschungsdaten.info
- * E-Mail: contact@rdm.kit.edu



Aufgabenportfolio des Serviceteams + Partner

- ✓ Leitung, Strategie, Organisation
- ✓ Webseite
- ✓ Beratung, Unterstützung bei Anträgen, technischen Fragen, Diensten...
- ✓ Trainings
- ✓ Rechtliche Hilfestellung
- ✓ Liaison Office
- ✓ Dienstbetrieb, z.B. RDM Navigator, RADAR4KIT
- ✓ Expertise bei Bewertung/Auswahl von geplanten RDM-und Open- Science-Projekten am KIT und externen Partnern
- ✓ Aufbau und Pflege von Strukturen und Netzwerken, z.B. RDM-Forum

Nächster Schritt Serviceteam: Profilschärfung

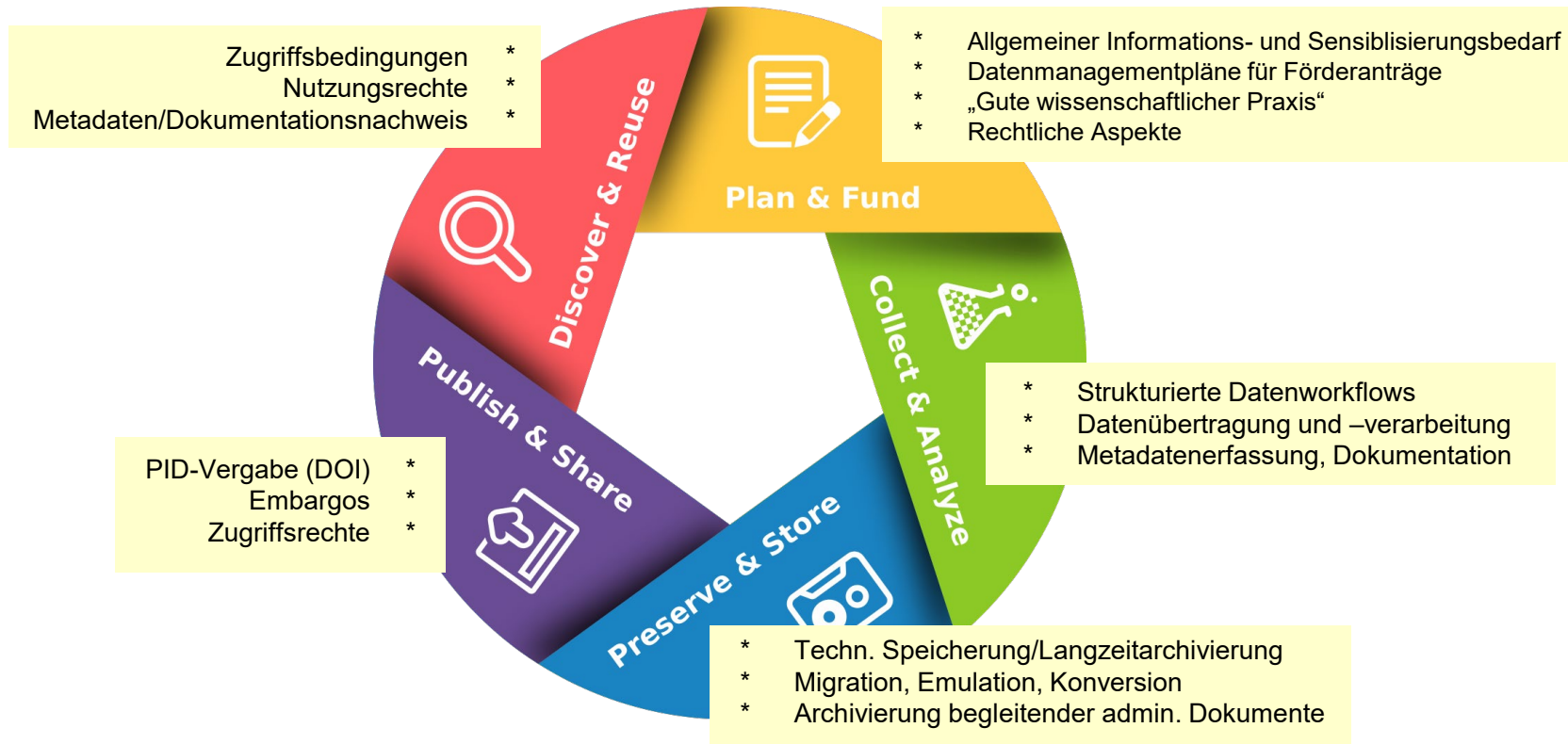


Wir sind gut. Wie können wir besser?

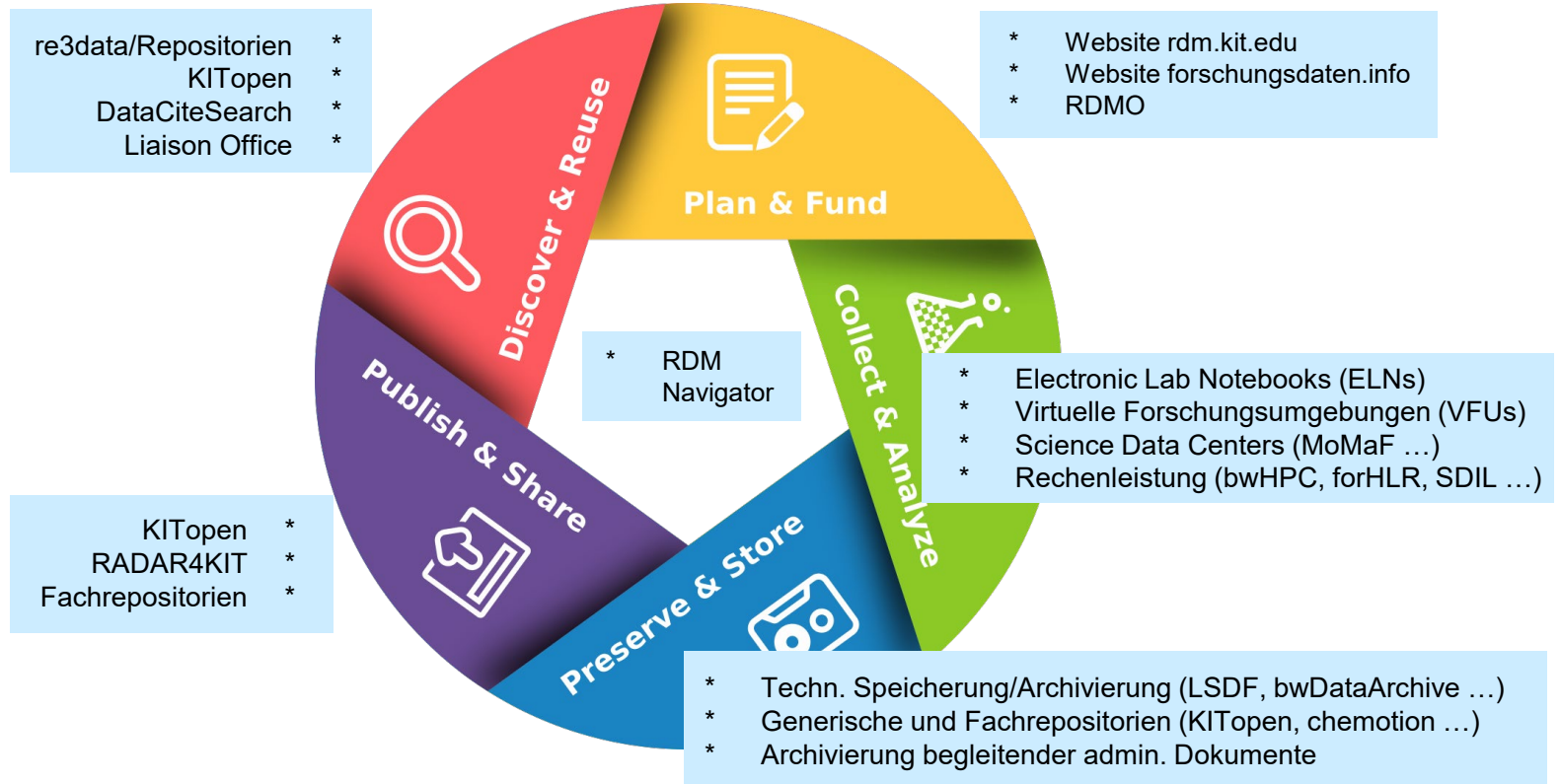
Forschungsdatenzyklus



FDM-Anforderungen am KIT

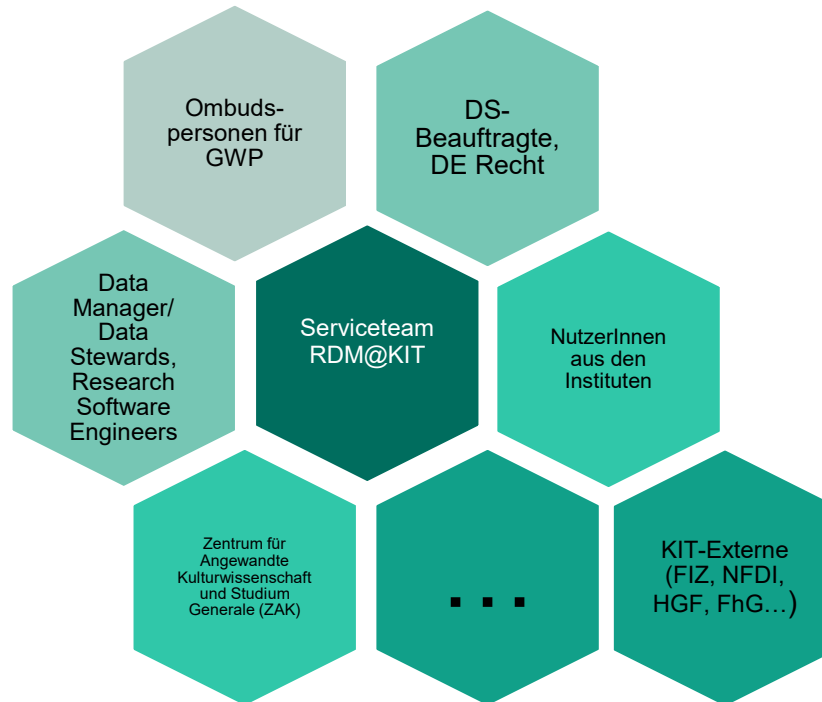


FDM-Dienste am KIT



RDM-Forum

Austauschplattform für RDM-Best-Practice zwischen Nutzern, Infrastrukturanbietern, Partnern und dem Serviceteam RDM@KIT



Findet ca. 2xjährlich statt

Bisherige Themen:

- ❖ Data Stewards am KIT
- ❖ Vorstellung von Repositorien/Arbeitsumgebungen/Elektronischen Laborbüchern (Chemotion / Scimotion, Kadi4MAT, Cat4KIT, Jupyter Notebooks)
- ❖ DORA4KIT Data Literacy (Digitale FDM-Lernmodule für Studierende, exemplarisch in der chemischen Biologie)
- ❖ KIT-Gerätepool

...

 Weiterentwicklung eines nutzernahen Forschungsdatenmanagements am KIT

Science Data Center am KIT und in BW als Bausteine der NFDI



BERD@BW



BERD@NFDI

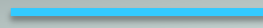


BioDATEN
Life Cycle



GXGA

MOMAF



SDC4LIT



NFDI4@t



★ Noch nicht genehmigt

NFDI-Beteiligung des KIT

DAPHNE4NFDI

FAIRmat

NFDI4Cat

NFDI4Chem

NFDI4Earth

NFDI4Ing

NFDI4Microbiota

NFDI-Matwerk

PUNCH4NFDI

- Runde 1: Personal weitgehend an Bord
- Runde 2: Personalaquise läuft
- Beteiligte Personen am KIT finden sich erst
- SCC z.B. schon im Austausch mit den Konsortien am KIT, bei denen SCC Mittragsteller ist

Fragen?

Gerne!

Jetzt oder später unter:

arne.upmeier@kit.edu



Mit Ausnahme der geschützte Logos und Abbildungen stehen diese Folien unter Lizenz CC-0.

Dank an Dr. Claudia Kramer, die mich bei der Erstellung der Folien unterstützt hat.

FROM LAB NOTEBOOK TO PUBLICATION A LIGHTHOUSE WORKFLOW FOR RESEARCH DATA MANAGEMENT

FEBRUARY 3, 2022 | INES SCHMAHL & FLORIAN RHIEM

FROM LAB NOTEBOOK TO PUBLICATION

Why SampleDB?

- Scientific IT-Systems at PGI/JCNS at Forschungszentrum Jülich
 - Several different institutes with vast variety of instruments, experiments and processes
 - Initial request: long term archival of sample and measurement metadata
 - Long term archival itself is (close to) useless
 - if data is incomplete / not reproducible
 - if data is not findable, accessible, interoperable and reusable (FAIR)
- Electronic Lab Notebook that can be more than an archive

FROM LAB NOTEBOOK TO PUBLICATION

What metadata needs to be stored?

Key Goals

- Findability
- Reproducibility

Generic metadata, e.g.

- Authors
- Tags/Keywords

Process-specific metadata, e.g.

- Instrument settings
- Environmental parameters

FROM LAB NOTEBOOK TO PUBLICATION

How to store process-specific metadata? - Formats

Rich text format

- write down what you did
- + very flexible and "comfortable"
- - just text
- - hardly machine-readable
- - barely searchable
- - no validation

Process-specific formats

- fill out form fields
- + fields can have various data types
- + machine-readable
- + searchable based on fields
- + validation possible
- - requires setup for each individual process

FROM LAB NOTEBOOK TO PUBLICATION

How to store process-specific metadata? - Schemas

Domain-specific language for formats

- defines the metadata fields
 - can be as generic or specific as desired
 - clear separation between formats and code
 - graphical editor for basic schemas
- users can define schemas themselves

Schema

Title: Measurement Informatic Tags: Disabled Hazards: Disabled

Properties

Name	Title	Type	Required	Note
name	Measurement Name	Text (Simple)	Yes	Note
<input checked="" type="checkbox"/> Default	<input checked="" type="checkbox"/> Pattern	<input checked="" type="checkbox"/> Minimum Length	<input checked="" type="checkbox"/> Maximum Length	
XRR-	^XRR-[0-9]+\$	1	100	

Name	Title	Type	Required	Note
sample	Sample	Sample	Yes	Note

Name	Title	Type	Required	Note
created	Creation Datetime	Datetime	Yes	Note

Name	Title	Type	Required	Note
slit_width	Slit Width	Quantity	No	Note
Units	<input type="checkbox"/> Default			
mm	Default			

Name	Title	Type	Required	Note
type	Measurement Type	Text (Choice)	Yes	Note
Choices	<input type="checkbox"/> Default			
Rocking-Curve-Scan ω-2θ-Scan Z-Scan	Default			

Measurement #3283: Demo Measurement

Information

Instrument	Huber 4 Circle Diffractometer
Action	Perform Single Crystal Measurement
Measurement Name	Demo Measurement
Measurement Datetime	Jan 18, 2022, 10:25:13 AM
Measurement Numbers	<ul style="list-style-type: none">1680-1688
Tags	demo
Sample	Demo-26 (#3282)
Comment	—
CSD Number	—
Radiation	0.56 Å (AgKα)
Detector Distance	2.986 mm
Sample Z	28.36 mm
Slit 1 Left	0 mm
Slit 1 Right	0 mm
Slit 1 Top	0 mm
Slit 1 Bottom	0 mm
Temperature	293.15 K
Electric field	0 V/m
Pressure	AP
Special Options	None
Special Options Comments	—

Runlist

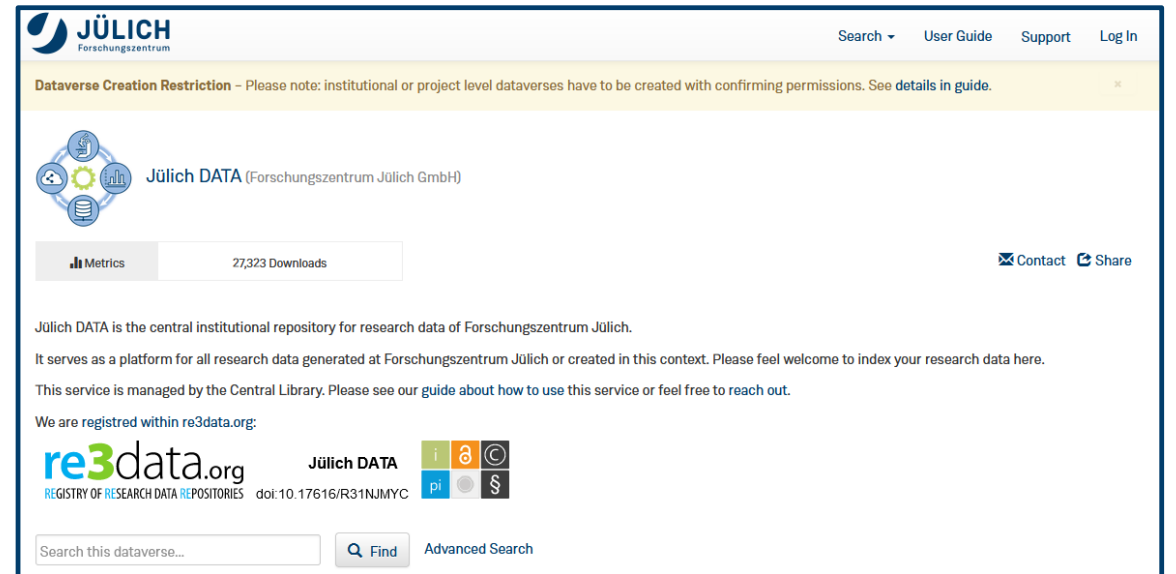
Run	Type	Motor	Start	End	Steps	Exposure Time	Omega	2 Theta	Chi	Phi
1	cont_scan	Phi	0	180	900	10 s	-49.998	-50	-	-
2	cont_scan	Phi	0	180	360	30 s	-49.998	-50	-	-
3	cont_scan	Phi	0	180	180	60 s	-49.998	-50	-	-
4	cont_scan	Phi	0	180	900	10 s	-0.001	-0.001	-	-
5	cont_scan	Phi	0	180	360	30 s	-0.001	-0.001	-	-
6	cont_scan	Phi	0	180	180	60 s	-0.001	-0.001	-	-
7	cont_scan	Phi	0	180	900	10 s	49.998	49.998	-	-
8	cont_scan	Phi	0	180	360	30 s	49.998	49.998	-	-

FROM LAB NOTEBOOK TO PUBLICATION

Jülich DATA

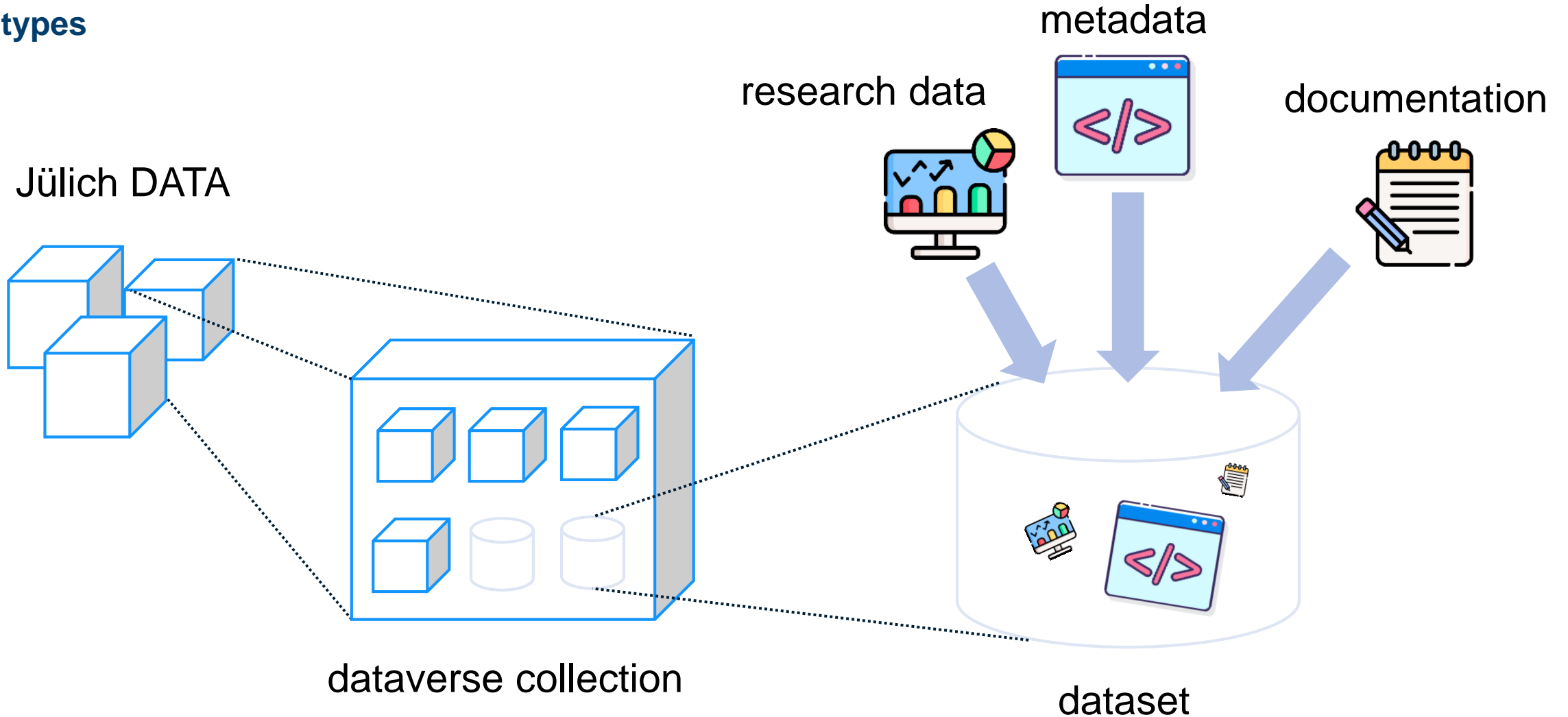
Key facts:

- institutional data repository of the FZ Jülich
- index for data publications
- based on the [Dataverse software](#)
- open source software to share, cite and find data



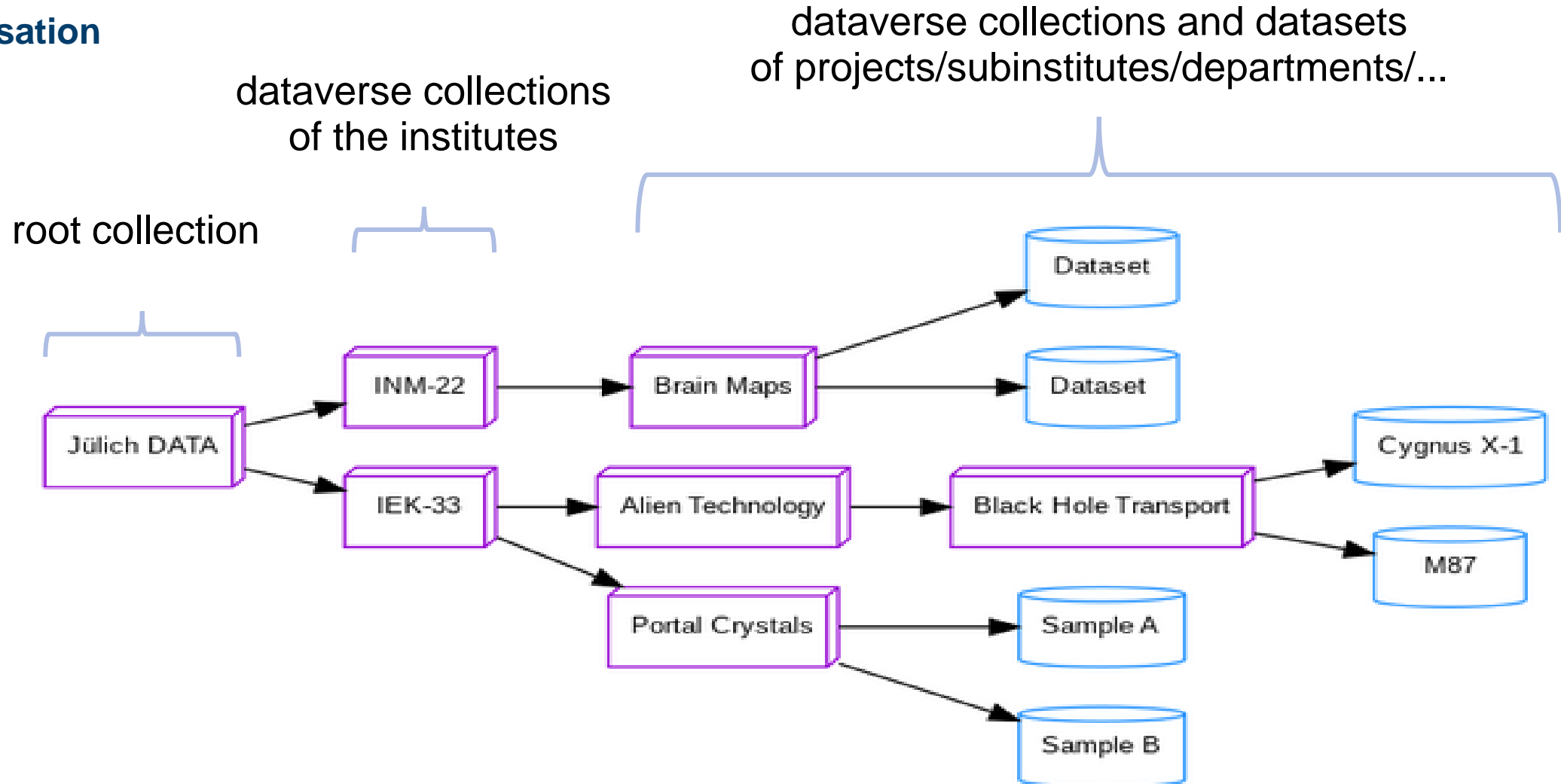
FROM LAB NOTEBOOK TO PUBLICATION

Data types



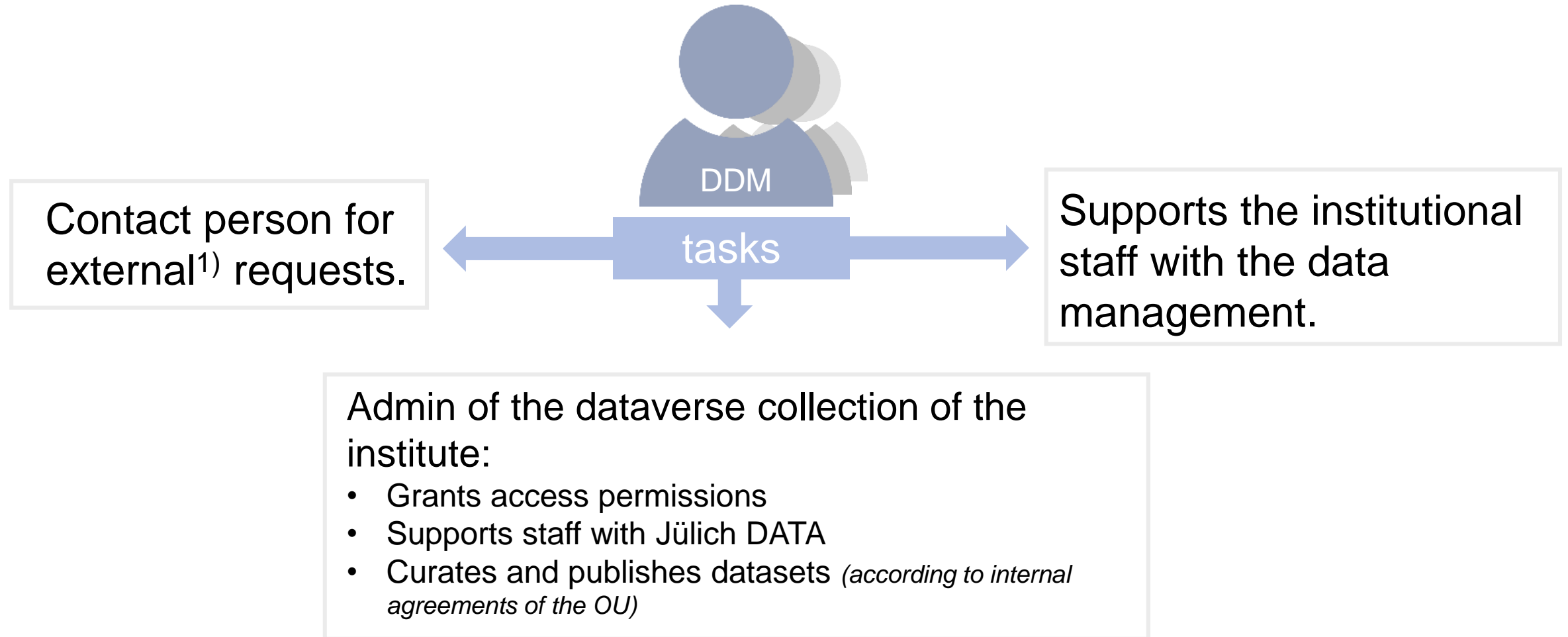
FROM LAB NOTEBOOK TO PUBLICATION

Organisation



FROM LAB NOTEBOOK TO PUBLICATION

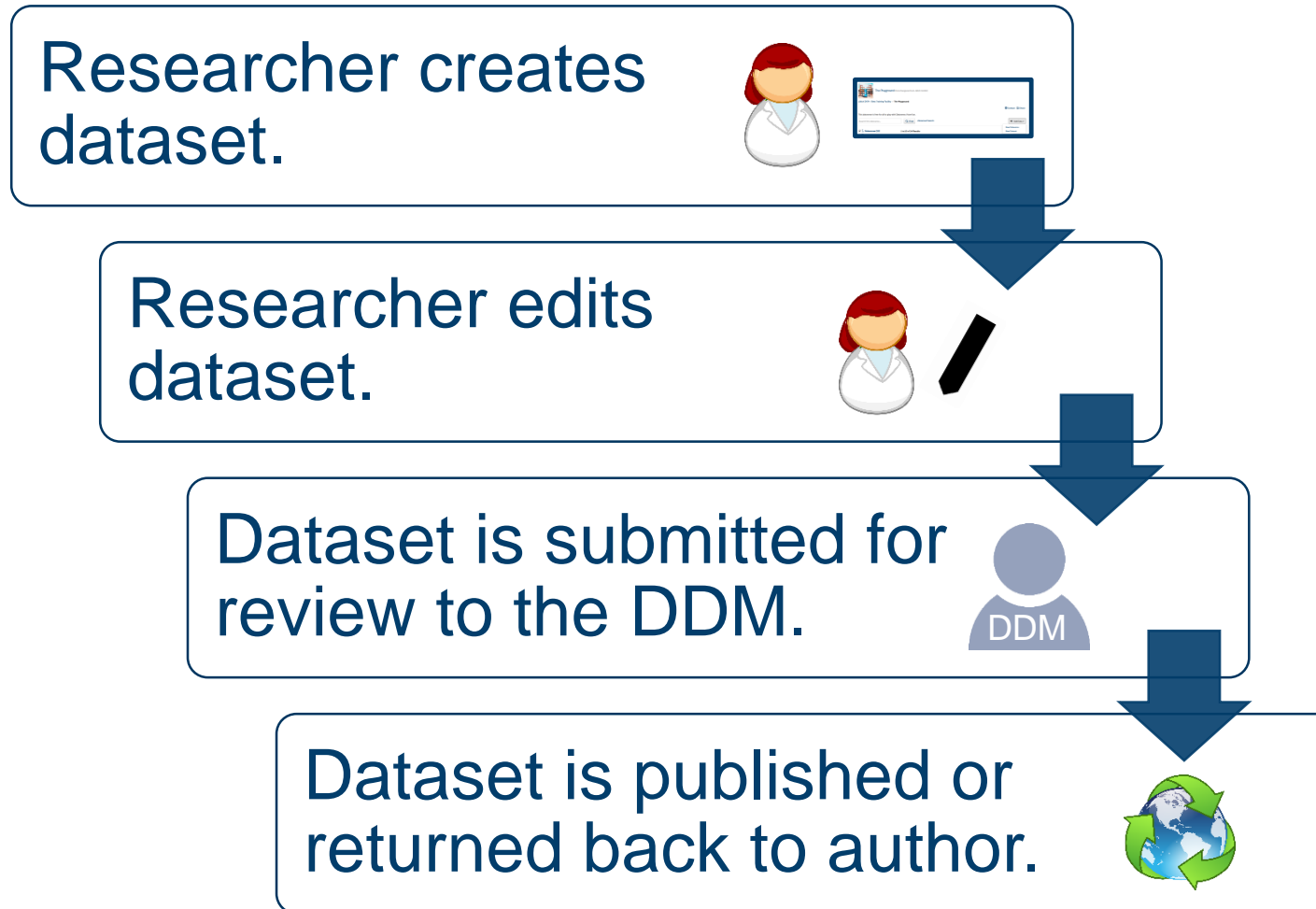
The role of the „decentralized data manager“ (DDM)



1) external = FZJ-intern or external

FROM LAB NOTEBOOK TO PUBLICATION

Standard publication workflow



FROM LAB NOTEBOOK TO PUBLICATION

Metadata schemes

Mandatory:

Citation Metadata

FZJ Metadata

Optional:

Subject-specific metadata schemes like

New:

Geospatial
Metadata

Social Science
and Humanities
Metadata

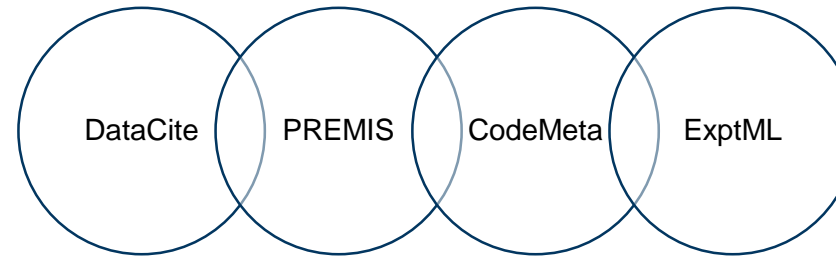
EngMeta

FROM LAB NOTEBOOK TO PUBLICATION

EngMeta

- developed for **engineering disciplines**

- based on **existing standards:**



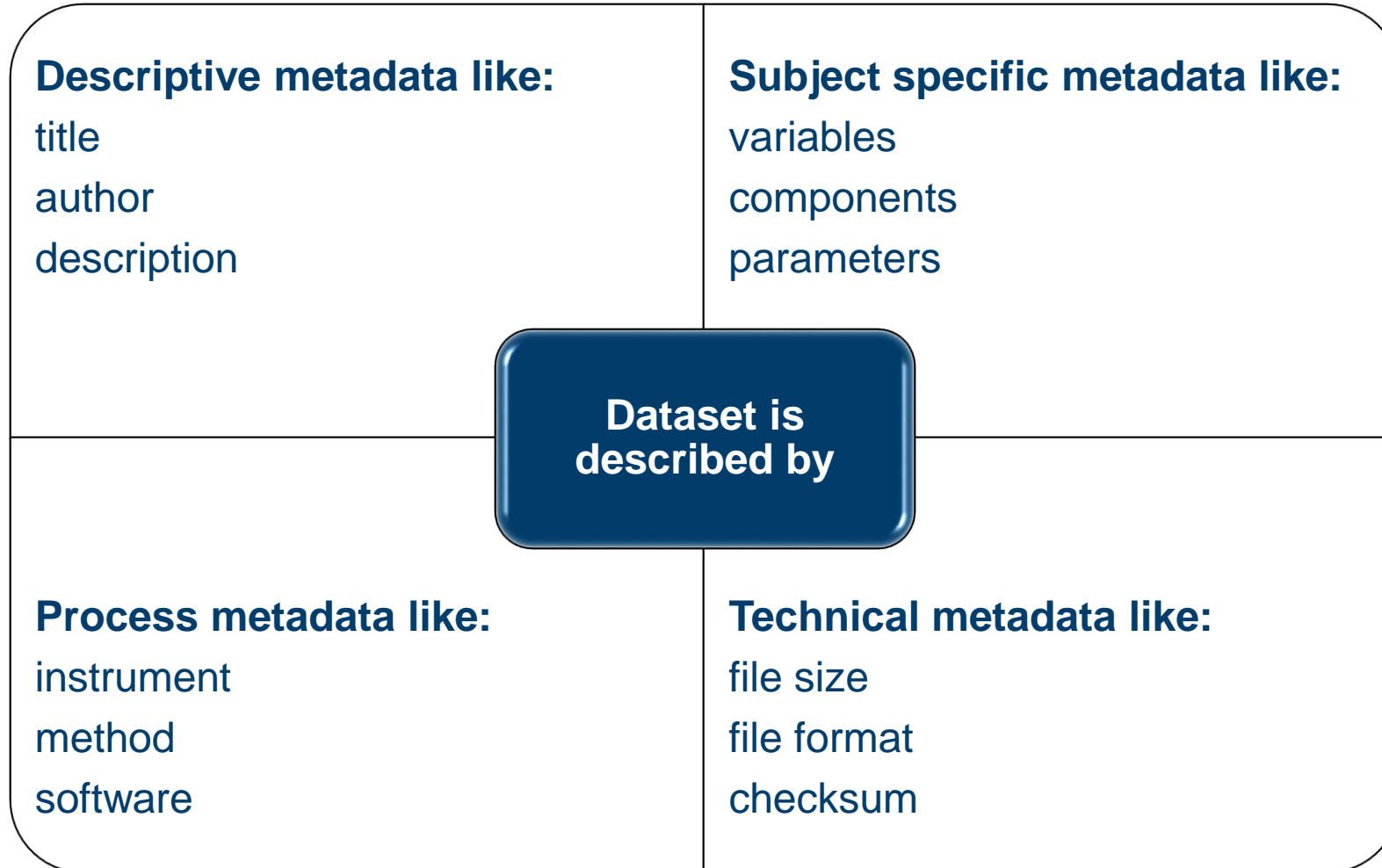
- implementation in Dataverse software in **2 blocks:**

- Engineering Metadata
- Process Metadata

A screenshot of a metadata selection interface. It features a list of metadata categories, each with a checkbox and a link to 'View fields'. The categories are: Citation Metadata (Required) [checked], Geospatial Metadata, Social Science and Humanities Metadata, Astronomy and Astrophysics Metadata, Life Sciences Metadata, Journal Metadata, FZJ Metadata [checked], Engineering Metadata, and Process Metadata. A red arrow points from the 'Process Metadata' text in the list above to the 'Process Metadata' checkbox in this screenshot.

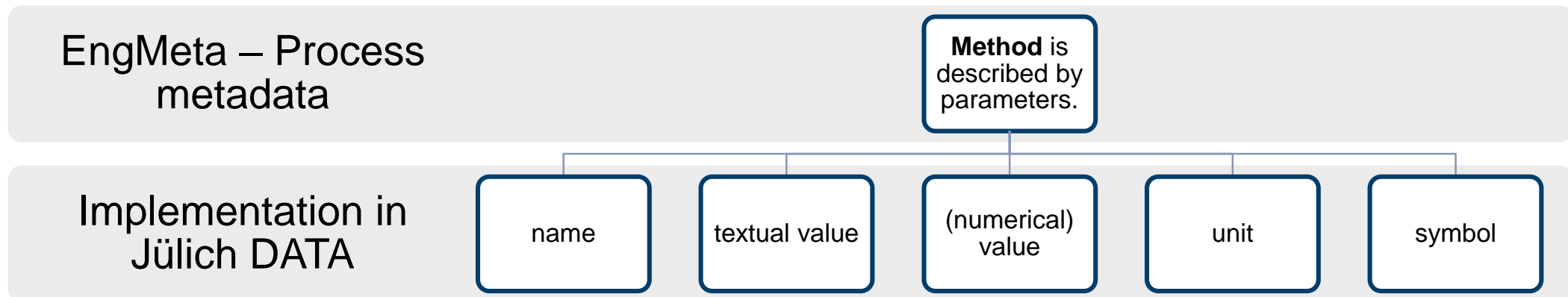
FROM LAB NOTEBOOK TO PUBLICATION

EngMeta



FROM LAB NOTEBOOK TO PUBLICATION

Mapping



FROM LAB NOTEBOOK TO PUBLICATION

Mapping

Metadata in SampleDB

Measurement #3283: Demo Measurement

Information

Instrument	Huber 4 Circle Diffractometer
Action	Perform Single Crystal Measurement
Measurement Name	Demo Measurement
Measurement Datetime	Jan 18, 2022, 10:25:13 AM
Measurement Numbers	• 1680-1688
Tags	demo
Sample	Demo-26 (#3282)
Comment	—
CSD Number	—
Radiation	0.56 Å (AgKa)
Detector Distance	2.986 mm
Sample Z	28.36 mm
Slit 1 Left	0 mm
Slit 1 Right	0 mm
Slit 1 Top	0 mm
Slit 1 Bottom	0 mm
Temperature	293.15 K
Electric field	0 V/m
Pressure	AP
Special Options	None
Special Options Comments	—
Runlist	

Metadata in Jülich DATA

Process Metadata ^

Processing Methods * ?

Name * ?

Description ?

Parameters ?

Method Parameters * ?

Name * ?	Textual Value ?	+ -
Measurement Name	Demo Measurement	
Symbol ?	Unit ?	
Value ?		

Name * ?	Unit ?	+ -
Detector Distance	mm	
Value ?	Symbol ?	
2.986		
Textual Value ?		

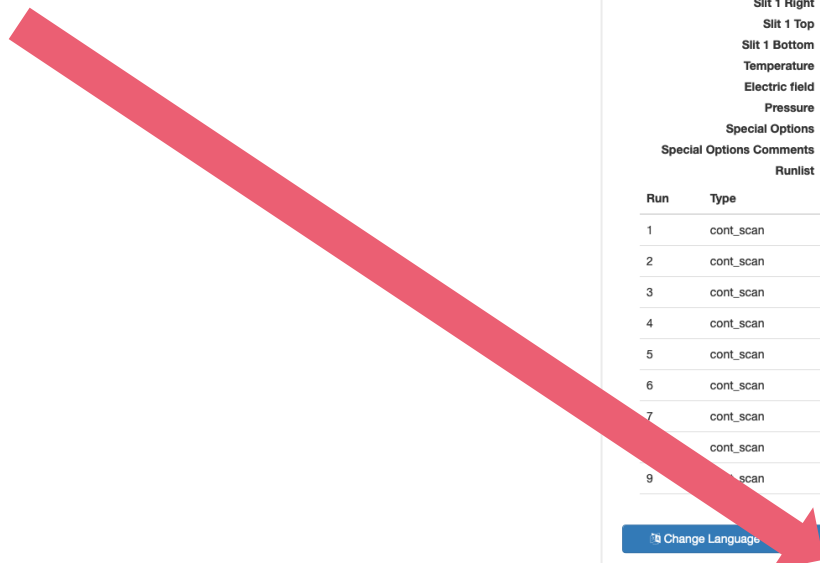


FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

Step 1:

Start export of metadata to Jülich DATA.



Measurement #3283: Demo Measurement

Information

Instrument [Huber 4 Circle Diffractometer](#)
Action [Perform Single Crystal Measurement](#)
Measurement Name Demo Measurement
Measurement Datetime Jan 18, 2022, 10:25:13 AM
Measurement Numbers • 1680-1688
Tags [demo](#)
Sample [Demo-26 \(#3282\)](#)
Comment —
CSD Number —
Radiation 0.56 Å (AgK α)
Detector Distance 2.986 mm
Sample Z 28.36 mm
Slit 1 Left 0 mm
Slit 1 Right 0 mm
Slit 1 Top 0 mm
Slit 1 Bottom 0 mm
Temperature 293.15 K
Electric field 0 V/m
Pressure AP
Special Options None
Special Options Comments —

Runlist

Run	Type	Motor	Start	End	Steps	Exposure Time	Omega	2 Theta	Chi	Phi
1	cont_scan	Phi	0	180	900	10 s	-49.998	-50	-	-
2	cont_scan	Phi	0	180	360	30 s	-49.998	-50	-	-
3	cont_scan	Phi	0	180	180	60 s	-49.998	-50	-	-
4	cont_scan	Phi	0	180	900	10 s	-0.001	-0.001	-	-
5	cont_scan	Phi	0	180	360	30 s	-0.001	-0.001	-	-
6	cont_scan	Phi	0	180	180	60 s	-0.001	-0.001	-	-
7	cont_scan	Phi	0	180	900	10 s	49.998	49.998	-	-
8	cont_scan	Phi	0	180	360	30 s	49.998	49.998	-	-
9	cont_scan	Phi	0	180	180	60 s	49.998	49.998	-	-

[Change Language](#) [Edit Object](#) [Edit Permissions](#) [Use as Template](#) [Show QR Code](#)
[Export Data](#) [Export to Jülich DATA](#) [Create Notebook -](#)

FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

Step 2:

Select metadata.

Export to Dataverse

iffSamples can export the metadata and files of this object to Jülich DATA. It will create a draft dataset, which you can then review and publish.

Properties
Select which properties should be exported to Jülich DATA.

Select all Unselect all

- Measurement Name
- Detector Distance
- Sample
- Slit 1 Bottom
- Slit 1 Left
- Slit 1 Right
- Slit 1 Top
- Measurement Datetime
- Electric field
- Special Options
- Runlist → 0 → Chi

Select Dataverse collection.

Tags / Keywords
Select which tags should be exported as keywords to Jülich DATA.

Select all Unselect all

demo

Dataverse
Select which dataverse this object should be exported to.

Florian Rhiem Test Datavei ▾

Cancel Export

iffSamples is a service by the [PGI / JCNS S](#)

FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

Step 3:

Dataset is automatically created.

Dataset can be edited.

The screenshot shows the 'Add + Edit Metadata' form. It includes the following fields:

- Title:** Demo Measurement
- Subtitle:** (empty)
- Alternative Title:** (empty)
- Alternative URL:** https://docker.iff.kfa-juelich.de/dev-sampled/objects/3283
- Other ID:** Agency: iffSamples, Identifier: 3283

The screenshot shows the dataset page for 'Demo Measurement'. The page includes the following information:

- Dataset Name:** Demo Measurement (Draft, Unpublished)
- Description:** Dataset exported from iffSamples.
- Subject:** Other
- Keyword:** demo
- Dataset Persistent ID:** doi:10.0346/JUELICH-DATA-BETA/XNE37A
- Title:** Demo Measurement
- Alternative URL:** https://docker.iff.kfa-juelich.de/dev-sampled/objects/3283
- Other ID:** iffSamples: 3283
- Author:** Florian Rhiem - ORCID: 0000-0001-6461-9433, fourcircle_bot

A red box highlights the 'Add + Edit Metadata' button in the top right corner.

FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

Step 3:

Submit dataset to DDM.

The screenshot shows the Jülich DATA interface for a dataset titled "Demo Measurement". The dataset is currently in a "Draft" and "Unpublished" state. The page includes a breadcrumb trail: "Jülich DATA - Beta Training Facility > The Playground > Florian Rhiem Test Dataverse > Demo Measurement". In the top right corner, there are buttons for "Contact", "Share", "Submit for Review" (highlighted with a red box), and "Edit". Below the title, there is a "Cite Dataset" button and a link to "Learn about Data Citation Standards". The dataset description is "Dataset exported from iffSamples". The subject is "Other" and the keyword is "demo". There are tabs for "Files", "Metadata", "Terms", and "Versions", with an "Add + Edit Metadata" button. The "Citation Metadata" section is expanded, showing the following information:

Field	Value
Dataset Persistent ID	doi:10.0346/JUELICH-DATA-BETA/XNE37A
Title	Demo Measurement
Alternative URL	https://docker.iff.kfa-juelich.de/dev-sampled/objects/3283
Other ID	iffSamples: 3283
Author	Florian Rhiem - ORCID: 0000-0001-6461-9433 fourcircle_bot

FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

Step 4:

Dataset is published or returned to author.

The screenshot shows a dataset page for "Demo Measurement" in a draft state. At the top, a yellow banner indicates the draft is under review. A navigation bar includes "Contact", "Share", "Publish", "Return to Author", and "Edit" buttons. The "Publish" and "Return to Author" buttons are highlighted with a red box. Below the title, the dataset is identified as a draft version of a measurement. A "Cite Dataset" button and a link to "Data Citation Standards" are present. The description, subject, and keyword are listed. A "Citation Metadata" section at the bottom provides details such as the Dataset Persistent ID (doi:10.0346/JUELICH-DATA-BETA/XNE37A), Title (Demo Measurement), Alternative URL, Other ID (iffSamples: 3283), and Author (Florian Rhiem - ORCID: 0000-0001-6461-9433, fourcircle_bot).

FROM LAB NOTEBOOK TO PUBLICATION

From SampleDB to Jülich DATA

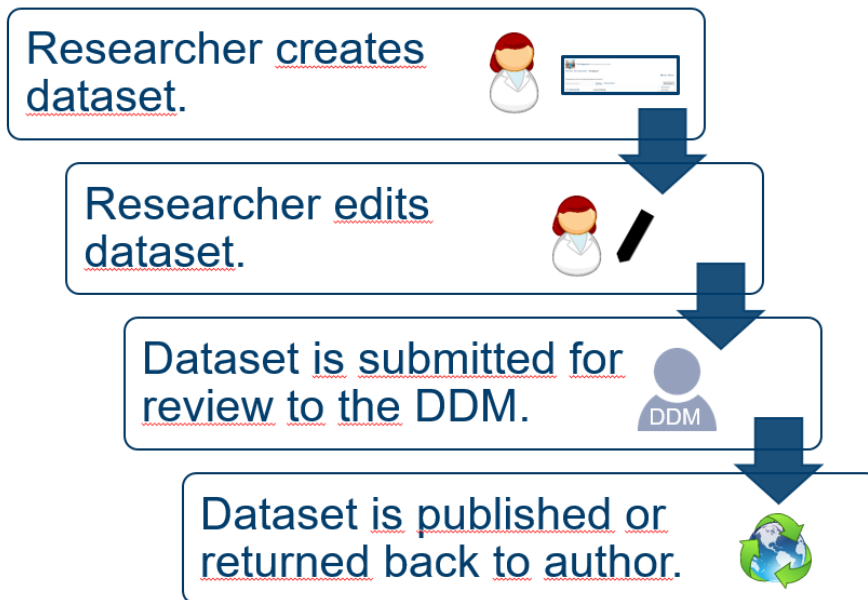
Data publication in Jülich DATA

The screenshot shows a dataset page for 'Demo Measurement'. At the top right, there are buttons for 'Contact', 'Share', 'Link', and 'Edit'. The dataset title 'Demo Measurement' is followed by 'Draft' and 'Unpublished' status tags. The main description reads: 'Florian Rhiem; fourcircle_bot, 2022, "Demo Measurement", <https://doi.org/10.0346/JUELICH-DATA-BETA/XNE37A>, Jülich DATA - Beta Training Facility, V1'. Below this is a 'Cite Dataset' button and a link to 'Learn about Data Citation Standards'. To the right, a 'Dataset Metrics' box shows '0 Downloads'. The 'Description' field contains 'Dataset exported from iffSamples.', 'Subject' is 'Other', and 'Keyword' is 'demo'. There are tabs for 'Files', 'Metadata', 'Terms', and 'Versions', with an 'Add + Edit Metadata' button. The 'Citation Metadata' section lists: 'Dataset Persistent ID' (doi:10.0346/JUELICH-DATA-BETA/XNE37A), 'Title' (Demo Measurement), 'Alternative URL' (https://docker.iff.kfa-juelich.de/dev-sampledb/objects/3283), 'Other ID' (iffSamples: 3283), and 'Author' (Florian Rhiem - ORCID: 0000-0001-6461-9433, fourcircle_bot).

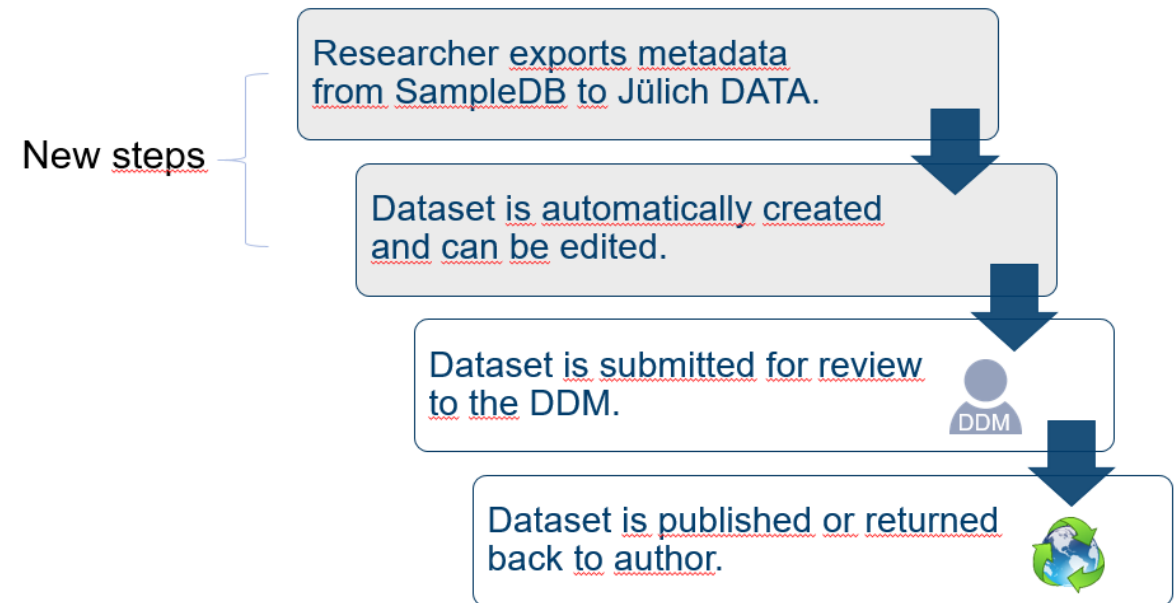
FROM LAB NOTEBOOK TO PUBLICATION

Summary

Standard publication workflow



New workflow: From SampleDB to Jülich DATA



THANK YOU!



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LIST OF IMAGES

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	CC-BY 2.5 DK	Based on https://digitalbevaring.dk	Oliver Bertuch (editor) digitalbevaring.dk (author)

RO DARE

The word 'RO' is in white, followed by an orange icon of a database cylinder with three horizontal lines, and then the word 'DARE' in white.

ROSSENDORF DATA REPOSITORY

InvenioRDM am HZDR

February 2022, **Helmholtz Open Science Praxisforum**

Maik Fiedler and **Oliver Knodel**

maik.fiedler@hzdr.de / o.knodel@hzdr.de



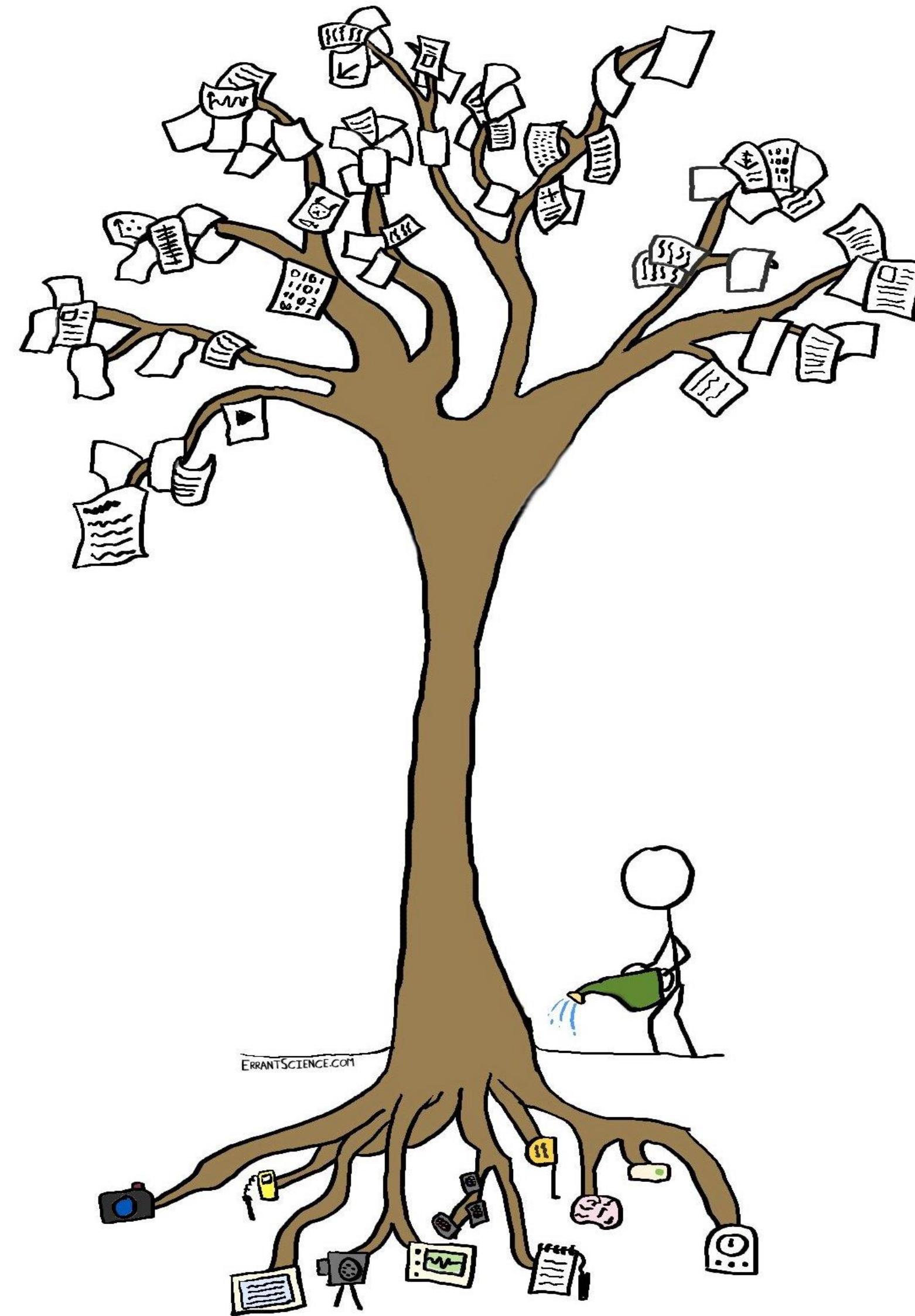
Structure

I. The Publication Ecosystem at HZDR

- Motivation
- Usage
- Current situation

I. The HZDR Data Management Strategy

- InvenioRDM
- End-to-End Data Lifecycle
- The HELIPORT Project



Parsons, Georgina; Woodfield, Heather; Partridge, Matthew (2016): CORD, conveyed through the medium of poetry. Cranfield Online Research Data (CORD). Figure. <https://doi.org/10.6084/m9.figshare.3823893.v1>

Motivation

ROBIS

**Free-text Field
Internal Archive**

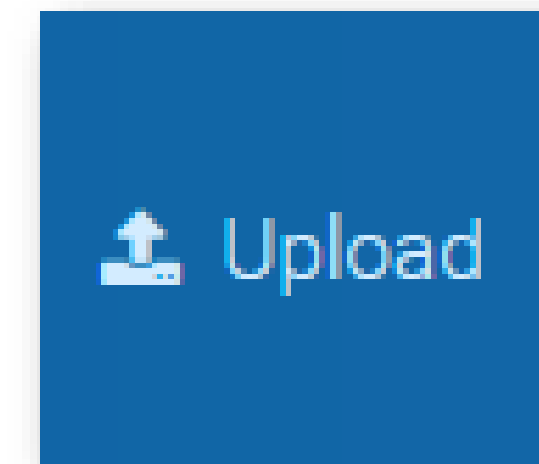
F A I R
findable, accessible, interoperable and re-usable



RO  DARE
ROSSENDORF DATA REPOSITORY

RODARE at HZDR I

Findable, **A**ccessible, **I**nteroperable and **R**e-usable



Dataset Image Video/Audio Software Other



Usual Choices

- Open Access
- Embargoed Access
- Restricted Access
- Closed Access

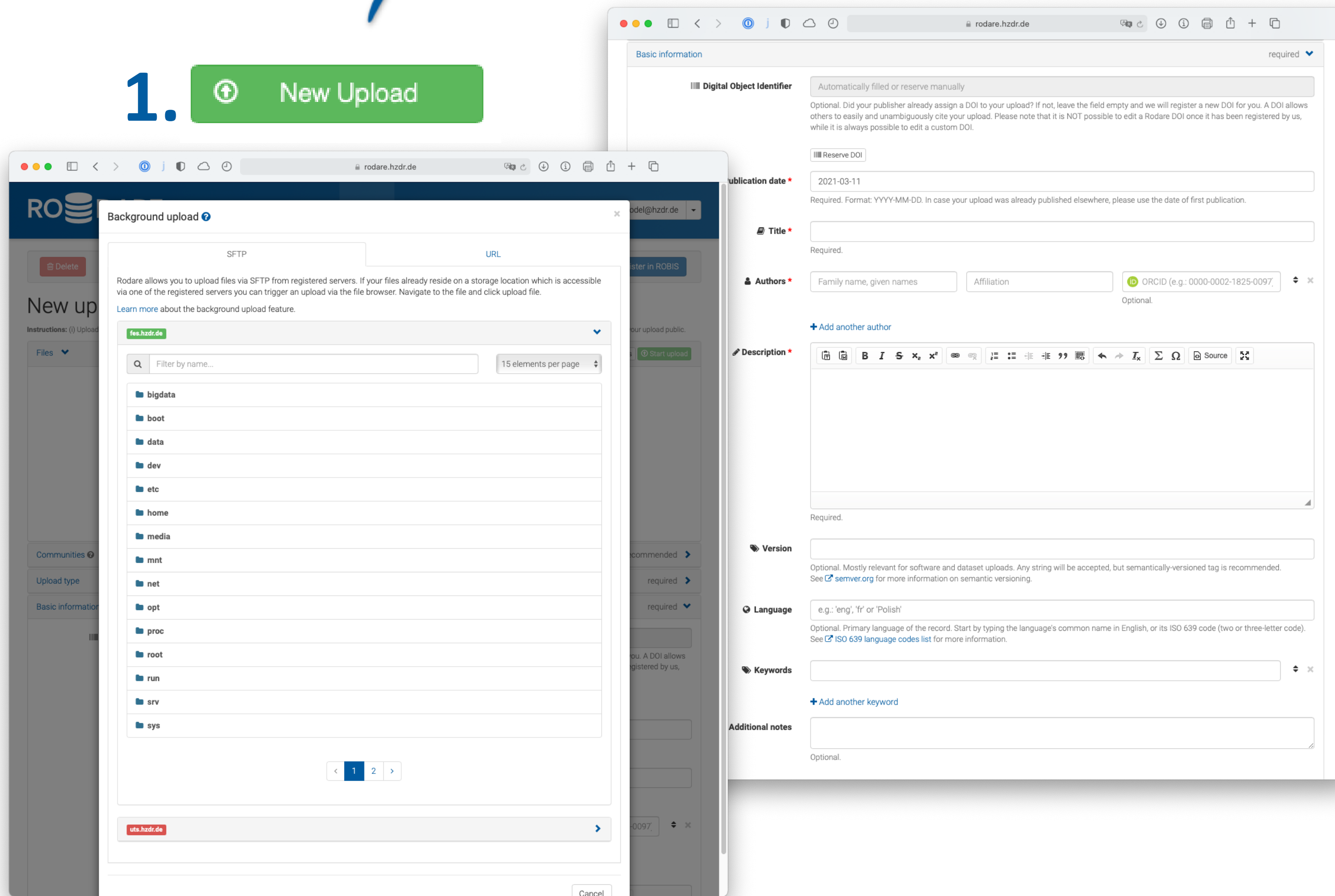


General Workflow...

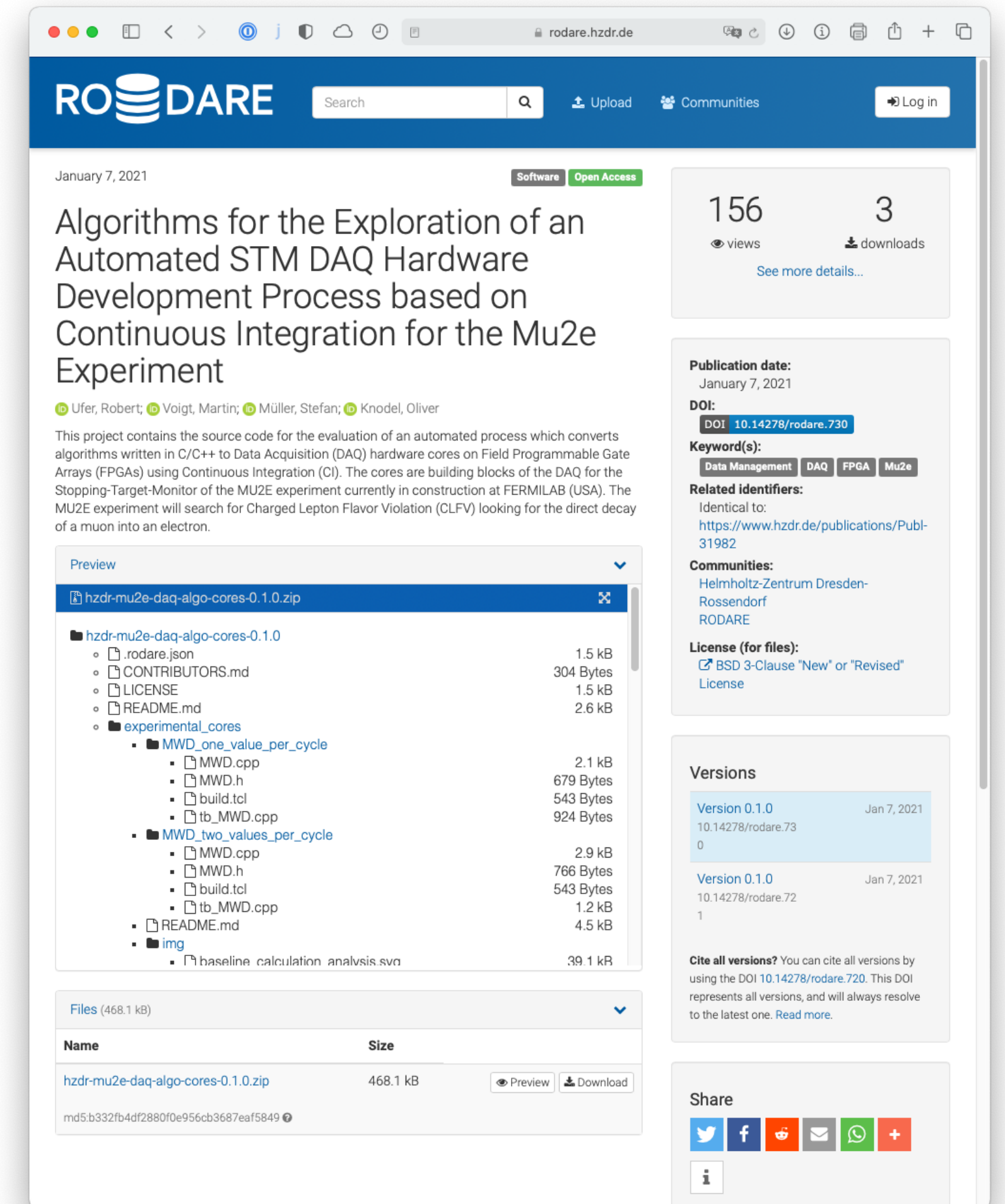
1.  New Upload

2. Describe

3. Publish



The image shows two overlapping screenshots of the RODARE interface. The foreground screenshot displays the 'Background upload' dialog box, which has two tabs: 'SFTP' and 'URL'. The 'SFTP' tab is active, showing a file browser with a search bar and a list of folders including 'bigdata', 'boot', 'data', 'dev', 'etc', 'home', 'media', 'mnt', 'net', 'opt', 'proc', 'root', 'run', 'srv', and 'sys'. A 'Start upload' button is visible at the bottom right of the dialog. The background screenshot shows the 'Basic information' form for a new upload. It includes fields for 'Digital Object Identifier' (with a 'Reserve DOI' button), 'Publication date' (set to 2021-03-11), 'Title', 'Authors' (with fields for name and affiliation, and an ORCID field), 'Description' (with a rich text editor), 'Version', 'Language' (set to 'eng'), and 'Keywords'. There is also an 'Additional notes' field at the bottom.



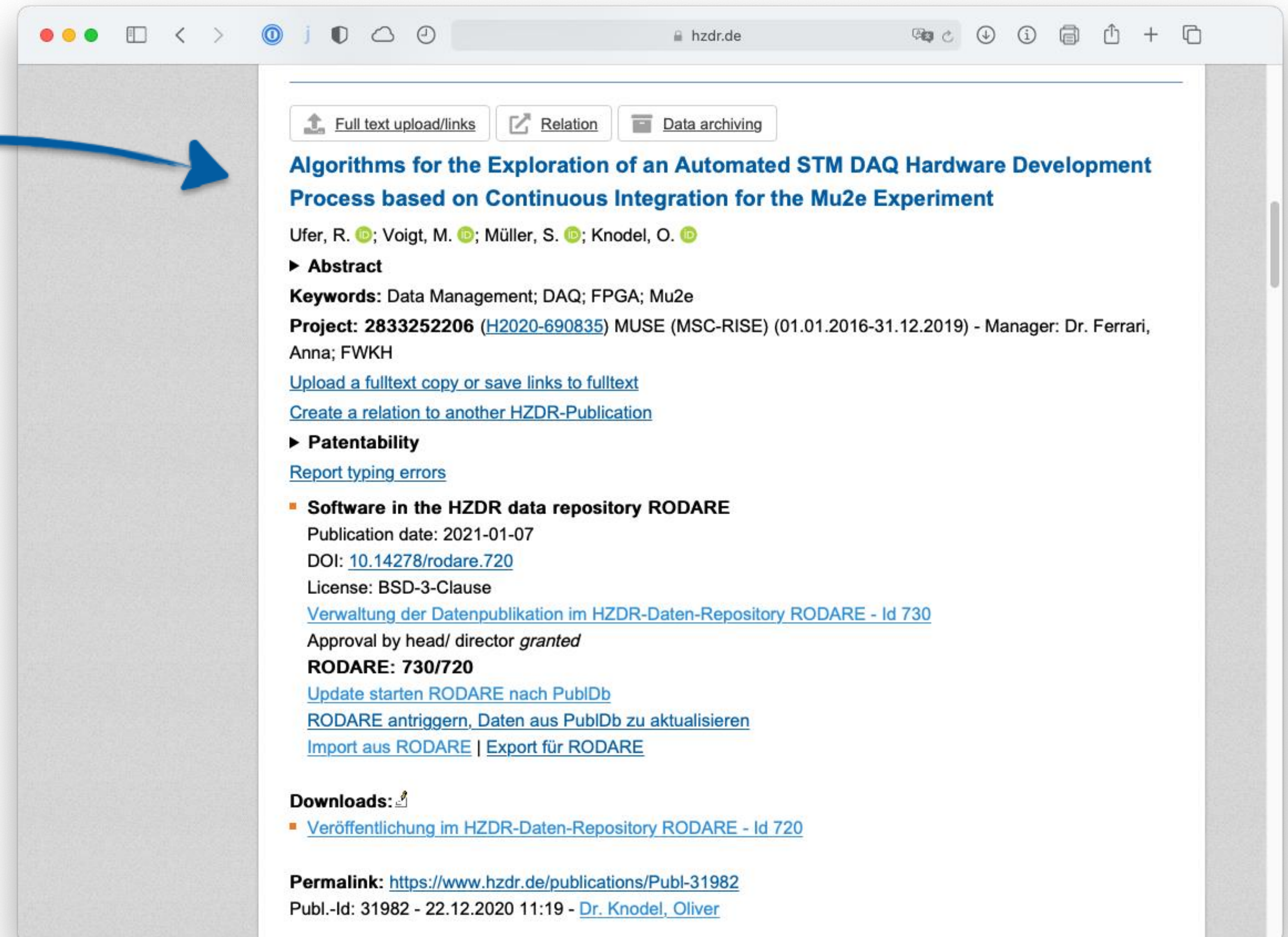
The image shows a screenshot of the published RODARE record page for the document 'Algorithms for the Exploration of an Automated STM DAQ Hardware Development Process based on Continuous Integration for the Mu2e Experiment'. The page is dated January 7, 2021. It features a title, authors (Ufer, Robert; Voigt, Martin; Müller, Stefan; Knodel, Oliver), and a detailed description of the project. A 'Preview' section shows a file tree for 'hzdr-mu2e-daq-algo-cores-0.1.0.zip' with a total size of 468.1 kB. The file tree includes files like '.rodare.json', 'CONTRIBUTORS.md', 'LICENSE', 'README.md', and a directory 'experimental_cores' containing sub-directories for 'MWD_one_value_per_cycle' and 'MWD_two_values_per_cycle'. A 'Versions' table shows two versions of the document, both dated January 7, 2021. The page also displays statistics (156 views, 3 downloads), publication information (DOI: 10.14278/rodare.730), and a 'Share' section with social media icons.

Integrated in the HZDR Publication Repository ROBIS

- HZDR publications must be registered in our overall publication repository ROBIS.

 Register in HZDR publication repository





Uploads to Rodare are **only possible for HZDR employees**, but the author list is **not limited** to HZDR members!



hzdr.de

[Full text upload/links](#) [Relation](#) [Data archiving](#)

Algorithms for the Exploration of an Automated STM DAQ Hardware Development Process based on Continuous Integration for the Mu2e Experiment

Ufer, R. ; Voigt, M. ; Müller, S. ; Knodel, O. 

► **Abstract**

Keywords: Data Management; DAQ; FPGA; Mu2e

Project: 2833252206 ([H2020-690835](#)) MUSE (MSC-RISE) (01.01.2016-31.12.2019) - Manager: Dr. Ferrari, Anna; FWKH


[Upload a fulltext copy or save links to fulltext](#)

[Create a relation to another HZDR-Publication](#)

► **Patentability**

[Report typing errors](#)

- **Software in the HZDR data repository RODARE**
Publication date: 2021-01-07
DOI: [10.14278/rodare.720](#)
License: BSD-3-Clause
[Verwaltung der Datenpublikation im HZDR-Daten-Repository RODARE - Id 730](#)
Approval by head/ director *granted*
RODARE: 730/720
[Update starten RODARE nach PubIDb](#)
[RODARE antriggern, Daten aus PubIDb zu aktualisieren](#)
[Import aus RODARE](#) | [Export für RODARE](#)

Downloads: 

- [Veröffentlichung im HZDR-Daten-Repository RODARE - Id 720](#)

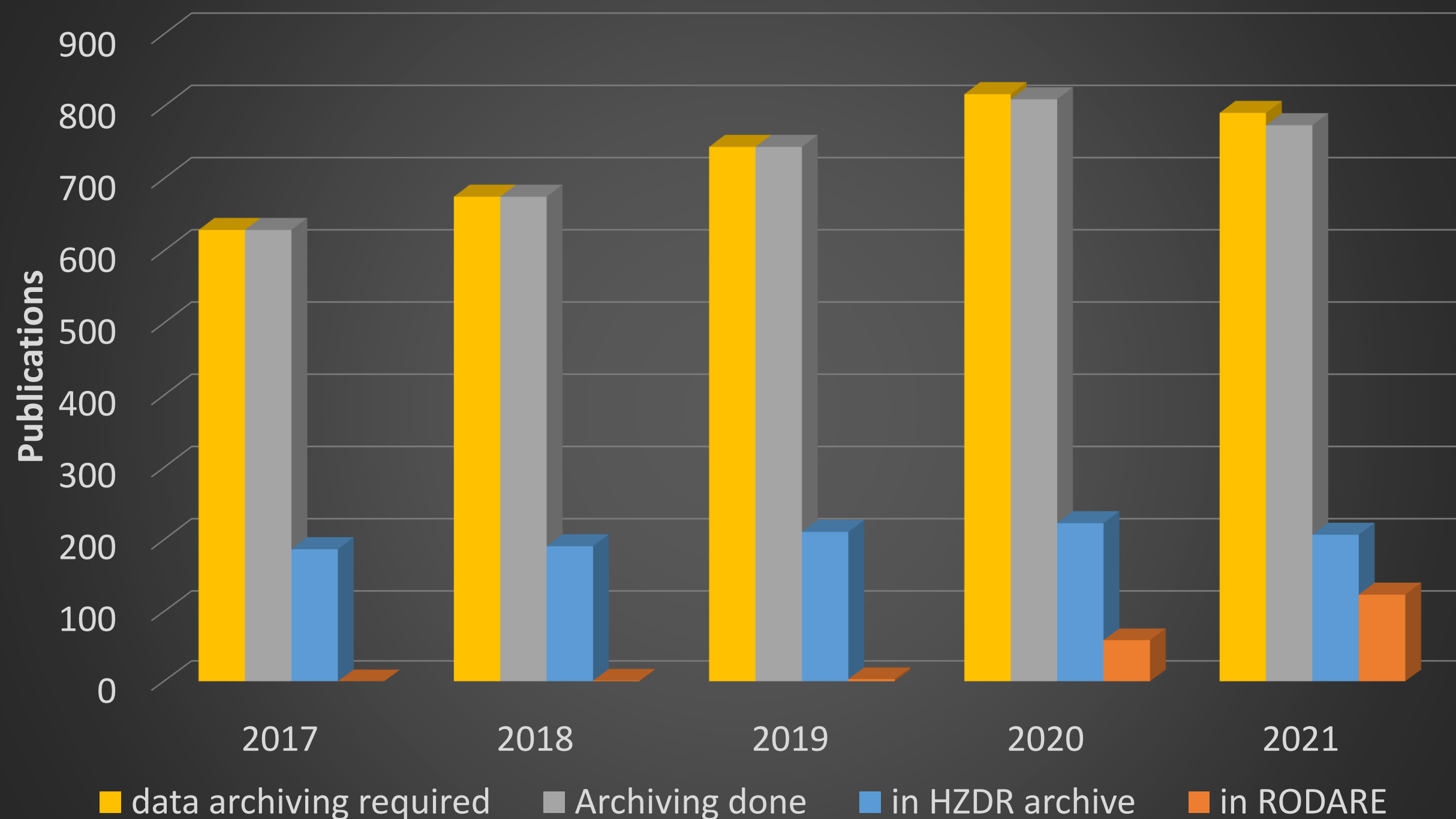
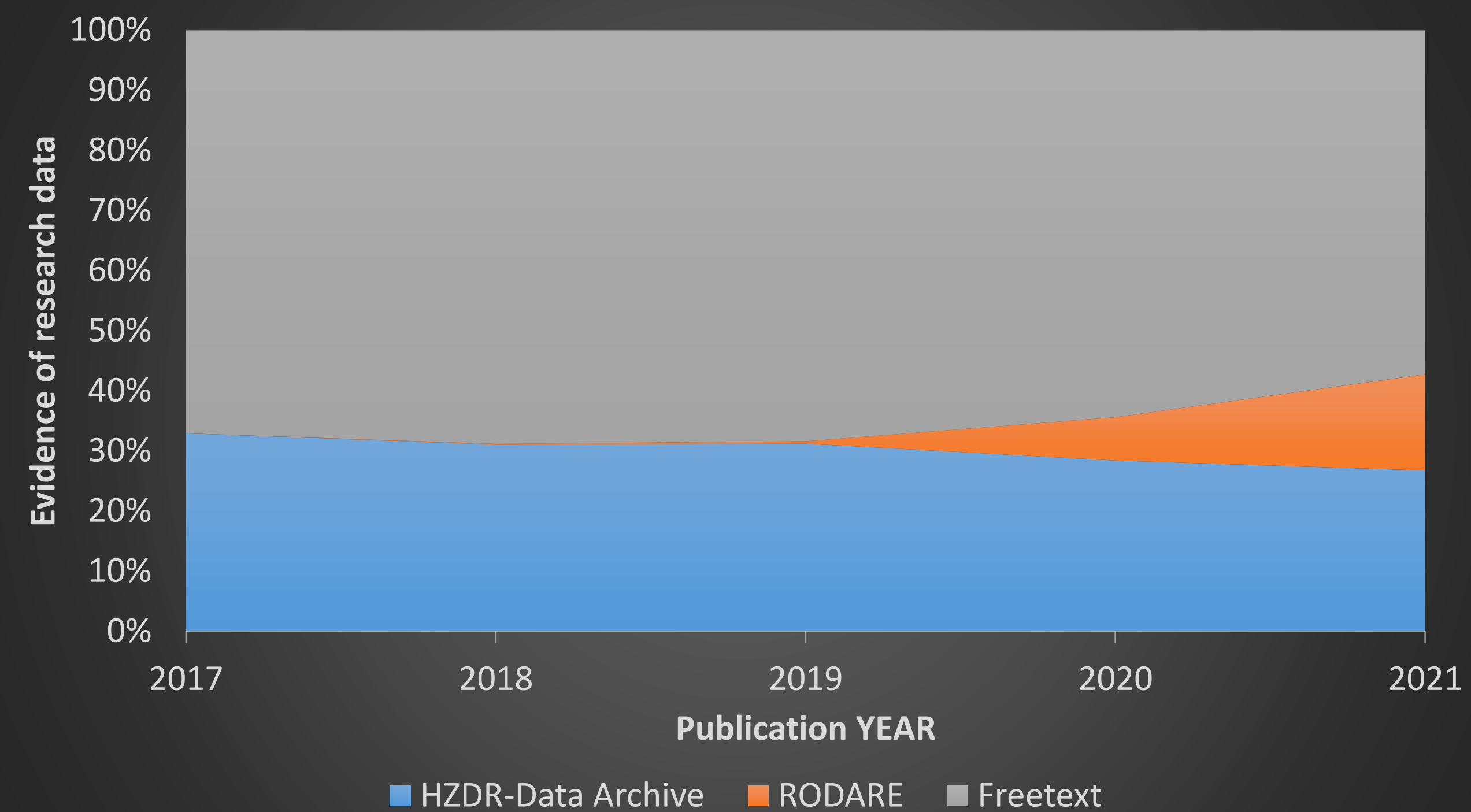
Permalink: <https://www.hzdr.de/publications/Publ-31982>
Publ.-Id: 31982 - 22.12.2020 11:19 - [Dr. Knodel, Oliver](#)

RODARE at HZDR II

Statistics

Total

- 341 Records
- 28117 downloads
 - one record every 4.2 days
 - 19.7 downloads per day



most downloaded = 4430 downloads
 newest = 2022-02-02
 most viewed = 1574 views

each record is

- viewed 151.9 times
- downloaded 82.5 times

Now and Tomorrow

What we can't do yet, but want to?

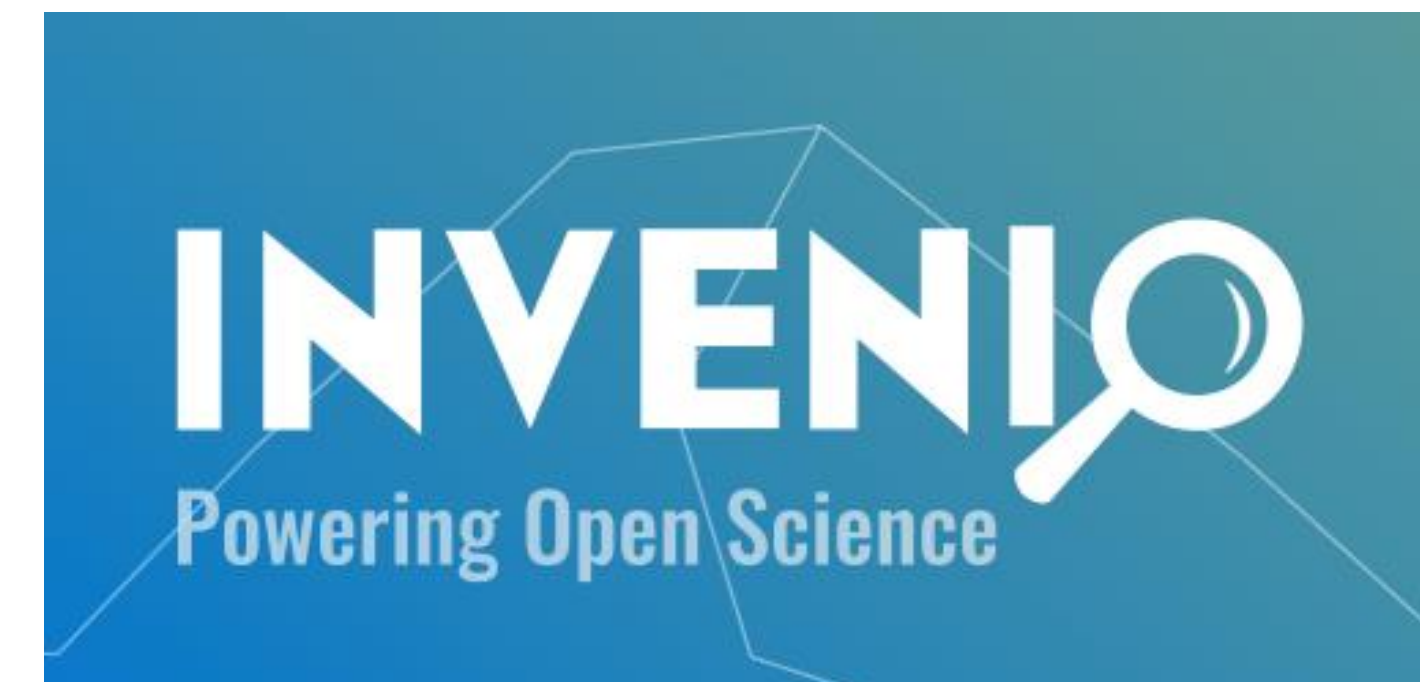
- Curation
- Archive-Repository Integration
- „Deeper“ Usage and Citation-Statistics

Technical Realisation ...and Integration in our Data Management

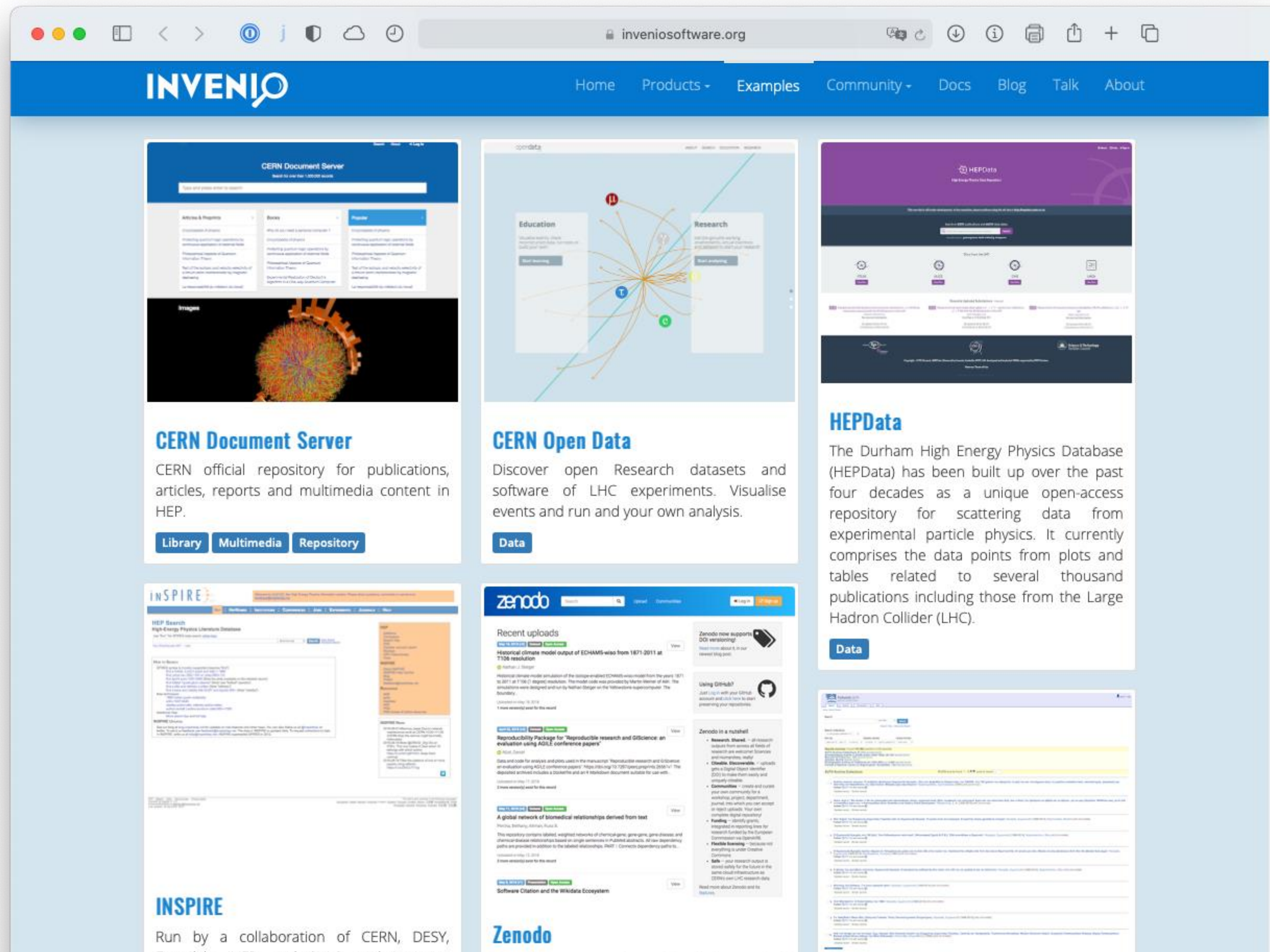


Background: Invenio → Zenodo → RODARE

- Rodare is build on top of Zenodo, an interdisciplinary open research data repository service.
- Zenodo is built on the foundation of the [Invenio](#) digital library and adds a couple of features to the Invenio framework:
 - Persistant identifiers (DOIs),
 - Communities,
 - GitHub integration,
 - OpenAire support,
 - ...
- Zenodo itself is built and operated by [CERN](#) and [OpenAIRE](#).
- Many organizations adapted Zenodo and keeping the clones up to date is a challenge...



The InvenioRDM (Research Data Management) Project



NORTHWESTERN UNIVERSITY



InvenioRDM Roadmap

- The community provides monthly releases.
- Separate LTS releases to enable intermediate steps for stable productive setups.

2022

Jan

Feb

Mar

Apr

v8.0 (STS)

- Maintained until v9.0.
- Planned release date: February 25th.

v9.0 (LTS)

- Maintained until the next LTS release.
- Planned release date: April 15th.

Current

A team actively works on this now

Metadata

Data citation support
 Improve the data citation support in InvenioRDM according to [Fenner et al. \(2019\) A data citation roadmap for scholarly data repositories](#).
 @Front Matter

Preservation

OCFL Backend Support
 Support for storing records and files according to the Oxford Common Filesystem Layout.
 @Data Futures

Metadata

OAI-PMH sets support
 Supports the sets feature of the OAI-PMH harvesting protocol.
 @TU Graz

Vocabularies

Creator/contributor auto-completion and improved ORCID integration
 Enable auto-completion of creators/contributors in the deposit from a local names vocabulary that can be filled from e.g. ORCID or your institutional employee database.
 @CERN

I18N

Internationalization (I18N)
 Finalise the I18N support and provide a german translation of InvenioRDM. Further languages to come later.

Near-term

A team plans to work on this next

Files

Linking to files on external storage systems
 Support linking to files on an external storage system instead of requiring the files to be uploaded via InvenioRDM.
 @Caltech

Third-party Integrations

OpenAIRE integration
 Integrate InvenioRDM with the OpenAIRE infrastructure by supporting the required OAI-PMH sets, export formats as well as allowing direct indexing of new records to OpenAIRE.
 @CERN

IIIF

IIIF image previewer
 Enables the International Image Interoperability Framework (IIIF) support and integrates the Mirador v3 previewer for large images.
 @Data Futures & Uni Hamburg

Communities

Communities REST API: Members support
 Adds support for having multiple community owners and members of communities with curation capabilities. This task only deals with the REST API and backend (i.e. the user interface is a separate task).
 @CERN, Northwestern University & TU Wien

Vocabularies

Funders and grants
 Enable the funder/grants field in the deposit form and import the required vocabularies in InvenioRDM.

Planned

A team has planned this on their schedule

Communities

Communities UI: Records/requests
 Implements the primary user interface for searching and browsing records associated with a community. Includes the workflow support for submission of new records to a community and the integration into the deposit form.
 @CERN

Metadata

Custom fields: REST API support
 Allow instances to configure additional custom fields and make them available in the deposit form and on the landing page. The current task implements the backend first.
 @CERN

Communities

Communities UI: Members
 Implements the user interface for managing members of a community as well as inviting members and allow user to request membership.
 @CERN

Third-party Integrations

ownCloud integration
 Enable selecting files from an ownCloud installation in the deposit form, and download the selected files on the server backend. Part of the EU-funded project CS3MESH.
 @CERN

Our Current Project: Transfer RODARE to RODARE(RDM)

RODARE Search Upload Communities o.knodel@hzdr.de

Recent uploads

- January 13, 2022 (v1) Dataset Open Access** View
Data publication: Precise measurement of gas parameters in a realistic RPC configuration: the currently used R134a gas and a potential alternative eco-gas
Fan, Xingming; Naumann, Lothar; Siebold, Mathias; Löser, Markus; Stach, Daniel; Kalipoliti, Lida; Kämpfer, Burkhard
These data are taken during the measurement and folded to support the research in the related publication.
Uploaded on January 13, 2022
- January 12, 2022 (v1) Dataset Open Access** View
Data publication: Describing chain-like assembly of ethoxygroup-functionalized organic molecules on Au(111) using high-throughput simulations
Lokamani, Mani; Kelling, Jeffrey; Ohmann, Robin; Meyer, Jörg; Kühne, Tim; Cuniberti, Gianareullo; Wolf, Jannic; Juckeland, Guido; Huhn, Thomas; Zahn, Peter; Moresco, Francesca; Gemming, Sibylle
Bei diesem Datensatz handelt es sich um die Grundzustandsstruktur von PEEB auf Au(111) und die Inputdatei für DFTB+.
Uploaded on January 12, 2022
- February 7, 2021 (v1) Video/Audio Open Access** View
Data publication: Realtime 3D graphics and VR with Kotlin and Vulkan
Günther, Ulrik; Harrington, Kyle
This is the video recording of the talk.
Uploaded on January 10, 2022
- January 6, 2022 (v1) Dataset Open Access** View
Cell voltage model for Li-Bi liquid metal batteries
Weber, Norbert; Duczek, Carolina; Horstmann, Gerrit M.; Landgraf, Steffen; Nimitz, Michael; Personnetaz, Paolo; Weier, Tom;

RODARE Uploads Log in Sign up

Rosendorf Data Repository

Search

Welcome to RODARE

About
About HZDR
Principles
Infrastructure
Contact
Policies

Help
FAQ
News
Blog
Status

Contribute
GitLab

Registered in
re3data.org
REGISTRY OF SEARCH DATA POSITORIES
http://doi.org/10.17616/R3DR140

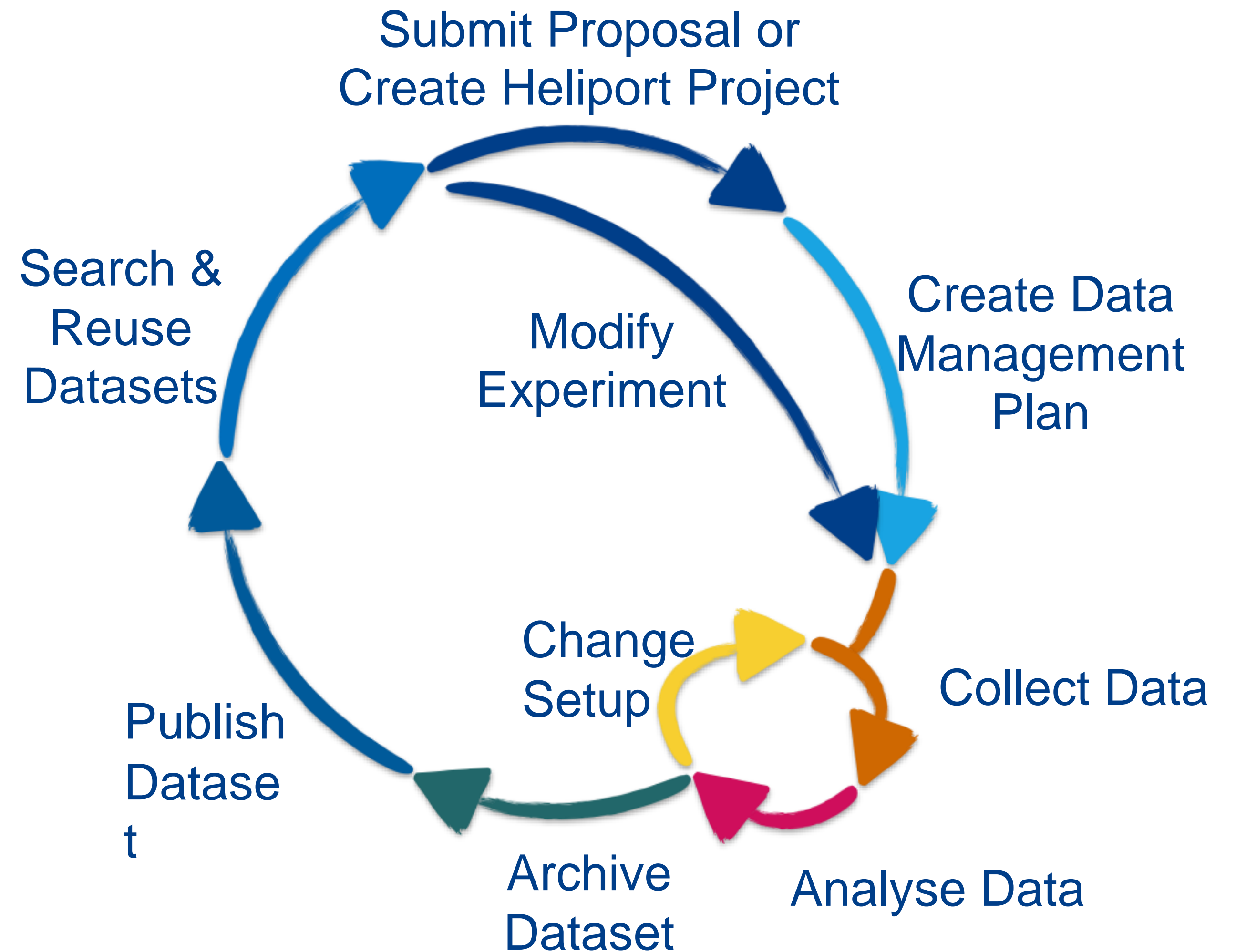
Member of
HELMHOLTZ RESEARCH FOR GRAND CHALLENGES
DRESDEN concept

Powered by HZDR & InvenioRDM
Imprint Privacy Policy Terms of Use Support

Language: English

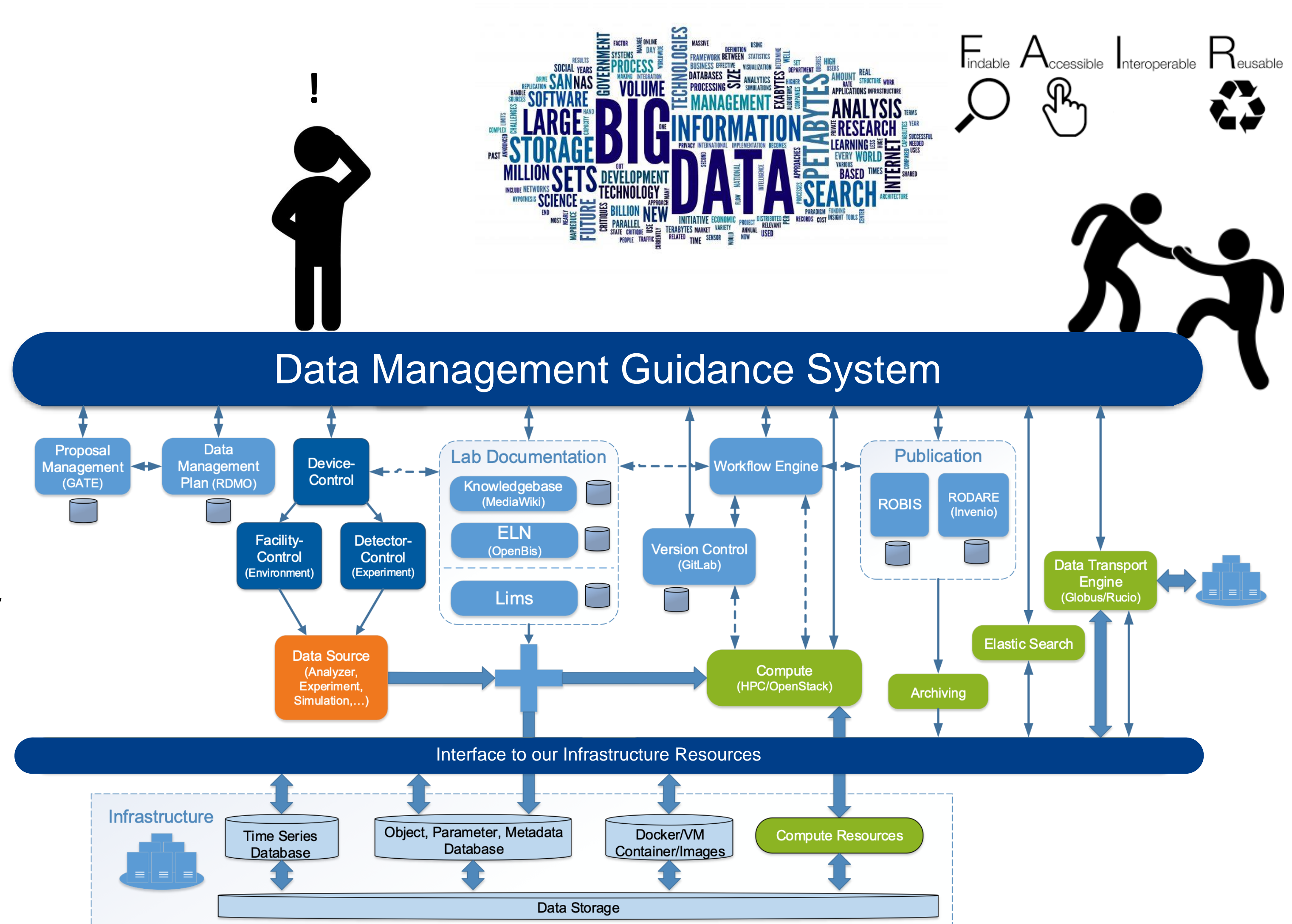
The Overall Objective: An End-to-End Digital Data Lifecycle

- We support many steps of a research experiment with tools:
 - electronic lab books,
 - interactive analysis,
 - publication of datasets,
 - scientific workflow management,
 - Handle generation and management.
- A uniform access to all services and systems is necessary.
- The documentation of all these linked resources is essential to create a comprehensible and FAIR data lifecycle.

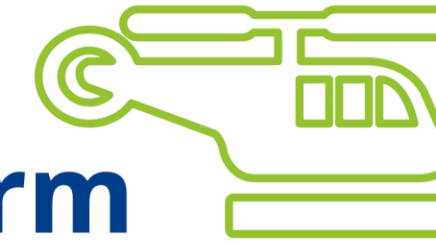


Data Management at HZDR

- Our HZDR IT infrastructure can support various experiments, but it is complex...
- Scientists often don't know which services are available and how to use them.
- An overarching system guiding our scientists (and visitors) through the lifecycle of their research project (and our services) is inevitable.
- The concept of FAIR research becomes an important topic for our scientists.



HELIPORT HELmholtz Scientific Project WOrkflow PlaTform



“ The HELIPORT project aims at developing a platform which accommodates the **complete life cycle** of a scientific project and links all corresponding programs, systems and workflows to create a more **FAIR** and comprehensible project description.

Project Members:



Founded by:



The screenshot shows the HELIPORT web interface at `vlsdms.fz-rossendorf.de`. The main content is a 'Project Graph: PaN Research Project' with five categories: Project, Systems, Resources, Automation, and Results. Each category contains several items in blue rounded rectangles, connected by lines. Below the graph is a footer with 'HELIPORT' description, 'Contact' (Dr. Oliver Knodel, FWCC), and 'Imprint' (Brought to you by the Computational Science Group (FWCC) at the Helmholtz-Zentrum Dresden - Rossendorf (HZDR)).

On the right, a browser window displays a JSON-LD data view for the project. The data includes:

```

{
  "namespaces": {
    "datacite": "http://purl.org/spar/datacite/",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "heliport": "https://heliport/schema/",
    "time": "http://www.w3.org/2006/time#",
    "dc": "http://purl.org/dc/terms/"
  },
  "heliport:project_id": 28,
  "datacite:hasIdentifier": "HZDR.FWCC.2021.84769",
  "heliport:uuid": "09779261-200c-48c4-be9c-f298369d6a1c",
  "datacite:handle": "https://hdl.handle.net/None",
  "heliport:project_name": "PaN Research Project",
  "time:hasBeginning": "2021-04-01 09:14:34.296524+00:00",
  "datacite:hasDescription": "",
  "heliport:group": "FWCC",
  "heliport:owner": {
    "datacite:hasIdentifier": "132739",
    "datacite:orcid": null,
    "rdfs:label": "Knodel, Dr. Oliver (FWCC) - 132739"
  },
  "heliport:has_VersionControl": [
    {
      "heliport:version_control_id": 15,
      "datacite:uri": "https://ddd",
      "rdfs:label": "Test"
    }
  ],
  "heliport:has_DataManagementPlan": [
    {
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      "datacite:uri": "https://dddd",
      "datacite:hasDescription": "dddd"
    }
  ],
  "heliport:has_Documentation": [
    {
      "heliport:documentation_id": 7,
      "datacite:uri": "https://ddd",
      "heliport:documentation_system": "MediaWiki",
      "datacite:hasDescription": "ddd"
    }
  ],
  "heliport:has_DataSource": [
    {
      "heliport:data_source_id": 11,
      "datacite:uri": "http://ddd",
      "heliport:use_computer": null,
      "rdfs:label": "ddd",
      "datacite:hasDescription": ""
    }
  ]
}

```

Integration of RODARE (InvenioRDM) in HELIPORT

HELIPORT | Helmholtz Scientific Project Workflow Platform

Projects > gELBE beamtime 21102205-ST > GATE

Gate Project

GATE-ID 2205

Title Tests of the detector system for the Stopping Target Monitor of the MU2E experiment in a high flux pulsed gamma beam (Resubmission of 20101909-ST due to COVID pandemic)

Proposer Mueller, Dr. Stefan (FWCC) - 7394 (Owner of Project "gELBE beamtime 21102205-ST")

Abstract The gELBE pulsed gamma beam, with narrow pulses set to about 600 kHz repetition rate - the choice of the ELBE CW mode with micropulses at 406 kHz or 812.5 kHz is ideal in our case- is the unique facility in the world suited to study the performance of the Stopping Target Monitor detector of the Mu2e Experiment. The STM monitor has the crucial role to normalize the charged lepton flavor muon conversion rate in the Mu2e experiment. The ability to operate at high rate in presence of background is crucial at ELBE the unique possibility to validate the final methodology that will be employed by the STM detector.

Proposal 21102205-ST

Restricted no

Responsible Experimentalist Mueller, Dr. Stefan (FWCC) - 7394

Local Contact Schwengner, Dr. Ronald (FWKK) - 938

Co-Proposers

Person	Status in Project
Ferrari, Dr. Anna (FWKH) - 5161	Member

Experimentalists

Person	Status in Project
Ferrari, Dr. Anna (FWKH) - 5161	Member
Knodel, Dr. Oliver (FWCC) - 132739	Member
Rachamin, Dr. Reuven (FWOR) - 7214	Member

HZDR | Helmholtz-Zentrum Dresden-Rossendorf

HZDR Proposal Management - Oliver Knodel

Proposal list

Proposal	Action	Title	Proposer	Beamtime	Facility	ET alloc.
21102205-ST 06.08.2020	no action	Tests of the detector system for the Stopping Target Monitor of the MU2E experiment in a high flux pulsed gamma beam (Resubmission of 20101909-ST due to COVID pandemic)	Stefan Mueller, HZDR, DE	2021/1	1.1-ELBE: gelbe	6 Shifts (12)

Go to top of page | responsible: User Office

Impressum | Datenschutz | Datenschutz HZDR

Bautzner Landstraße 400, 01328 Dresden
Telefon: +49 351 260 - 0
E-Mail: kontakt@hzdr.de

auditberufundfamilie

RODARE | Helmholtz-Zentrum Dresden-Rossendorf

December 20, 2021

Tests of the detector system for the Stopping Target Monitor of the MU2E experiment in a high flux pulsed gamma beam

Alvarez, Claudia; Chen, Jijun; Edmonds, Andrew; Ferrari, Anna; Huang, Shihua; Keshavarzi, Alexander; Knodel, Oliver; Koltick, David; Lancaster, Mark; Miller, James P.; Müller, Stefan; Popp, James L.; Rachamin, Reuven; Simic, Milena; Tickle, Steven; Ufer, Robert; Voigt, Martin

This dataset contains data generated with LaBr and NaI detector (DSPEC and oscilloscope data) at the gELBE beam. The gELBE pulsed gamma beam to test the detector system for the Stopping Target Monitor of the MU2E experiment. The gELBE pulsed gamma beam with narrow pulses set to about 600 kHz repetition rate - the choice of the ELBE CW mode with micropulses at 406 kHz or 812.5 kHz is ideal in our case- is the unique facility in the world suited to study the performance of the Stopping Target Monitor detector of the Mu2e Experiment. The STM monitor has the crucial role to normalize the charged lepton flavor muon conversion rate in the Mu2e experiment. The ability to operate at high rate in presence of background is crucial. We have at ELBE the unique possibility to validate the final methodology that will be employed by the STM detector.

Files (78.7 GB)

Name	Size	Preview	Download
Beamtime_DSPEC_data.zip	413.6 kB	Preview	Download
md5:80b7479345832311663d0cec34441024			
calibration-NaI.zip	5.1 kB	Preview	Download
md5:0eb69f4dd8b1185c2d7d2596e0d6ff0			

160 views | **66** downloads

Publication date: December 20, 2021

DOI: DOI: 10.14278/rodare.1343

Keyword(s): dataset, detector, Stopping Target Monitor (STM), MU2E, gELBE, Data Management, DAQ, muon conversion

Related identifiers: Identical to: <https://www.hzdr.de/publications/PubI-33129>

Communities: Helmholtz-Zentrum Dresden-Rossendorf, RODARE

Appendix



Image Sources

Slide 4

<https://www.downloadclipart.net/large/secure-https-png-pic.png>

<https://logosmarken.com/wp-content/uploads/2020/12/GitHub-Logo.png>

https://www.re3data.org/bundles/kitlibraryre3dataapp/img/re3datalogo_black.png

https://hochschulforumdigitalisierung.de/sites/default/files/images/veranstaltungen/Logo_Horizontal.png

https://upload.wikimedia.org/wikipedia/commons/thumb/0/06/ORCID_iD.svg/2048px-ORCID_iD.svg.png

https://upload.wikimedia.org/wikipedia/commons/thumb/1/11/DOI_logo.svg/1200px-DOI_logo.svg.png

https://upload.wikimedia.org/wikipedia/commons/a/a4/DataCite_logo.png

<http://www.openarchives.org/images/OA100.gif>

Slides 4, 10, 11, 12

<https://invenio-software.org/products/rdm/>

Helmholtz Open Science Praxisforum

Forschungsdatenmanagement

» Technische Umsetzung von RDM Services: RDMO und das KIT«

Research Data Management Organiser

Zur Planung, Umsetzung und Verwaltung des Forschungsdatenmanagements



Willkommen bei RDMO auf forschungsdaten.info

Das Ziel ist es mit RDMO unter dem Dach von forschungsdaten.info, eine Webapplikation bereitzustellen, die die strukturierte Planung, Umsetzung und Verwaltung der Daten in einem wissenschaftlichen Projekt unterstützt. Zusätzlich sollen die gesammelten Informationen in textueller Form für Anforderungen von Förderern oder für Berichte ausgearbeitet sein.

Diese Webseite befindet sich derzeit in der Pilotphase.

Wenn Sie mehr über über Forschungsdatenmanagement erfahren wollen, besuchen Sie <https://www.forschungsdaten.info/>.

Login

Username

Password

Remember Me

Login

If you have not created an account yet, then please [sign up first](#).

If you forgot your password and want to reset it, [click here](#).

Alternatively, you can login using one of the following third party accounts:

SIGN IN with ORCID 



Dr. Kerstin V. Wedlich-Zachodin

Anwendungsmöglichkeiten eines Datenmanagementplans (DMPs)

Anforderungen
Fördergeber

Kommunikationstool
zwischen
Projektpartnern

Projektinternes FDM
/Selbstmanagement

Nach-und
Weiternutzung von
Forschungsdaten

Kostenabschätzung
(FDM-Kosten)

- Standarddaten:
 - Projektname sowie Projektstart und -ende
 - Verantwortliche
 - Förderprogramm (optional)
 - Etc.
- Overhead:
 - Datenschutz und rechtliche Aspekte
 - Kosten
 - Projektplanung
 - etc.
- Angaben zu Forschungsdaten:
 - Welche Daten werden erwartet?
 - Welchen Umfang werden die Daten haben? (kB, MB, GB, TB,...?)
 - Wie werden die Daten...
 - ...produziert?
 - ...verarbeitet?
 - ...ausgewertet?
 - ...archiviert?
- Archivierung und Nachnutzung:
 - Wo und wie werden die Daten nach dem Projekt gespeichert?
 - Welche Daten sollen wie geteilt werden? (optional)
 - Wie werden (alle) Daten gesichert?
 - Werden Metadaten erfasst? Wenn ja welche?
 - Wie und wo werden Metadaten erfasst?

DMP-Tools:

- **DMPonline** (DCC) und **DMPTool** (CDL) sind teilweise sehr länderspezifisch (UK, US)
- produzieren einen statischen DMP (Textdokument)
- sind in der Praxis zentrale Websites
- verfügen über eine begrenzte Anpassungsfähigkeit (lokale Institution, Forschungsbereich)
- übermitteln eventuell sensible Informationen

Research Data Management Organisier:

- ist ein „Organisier“ (Verwaltungstool)
- ist dynamisch
- ist lokal
- ist multilingual
- hat eine Datenschutz-Vereinbarung

Aktives Datenmanagement:

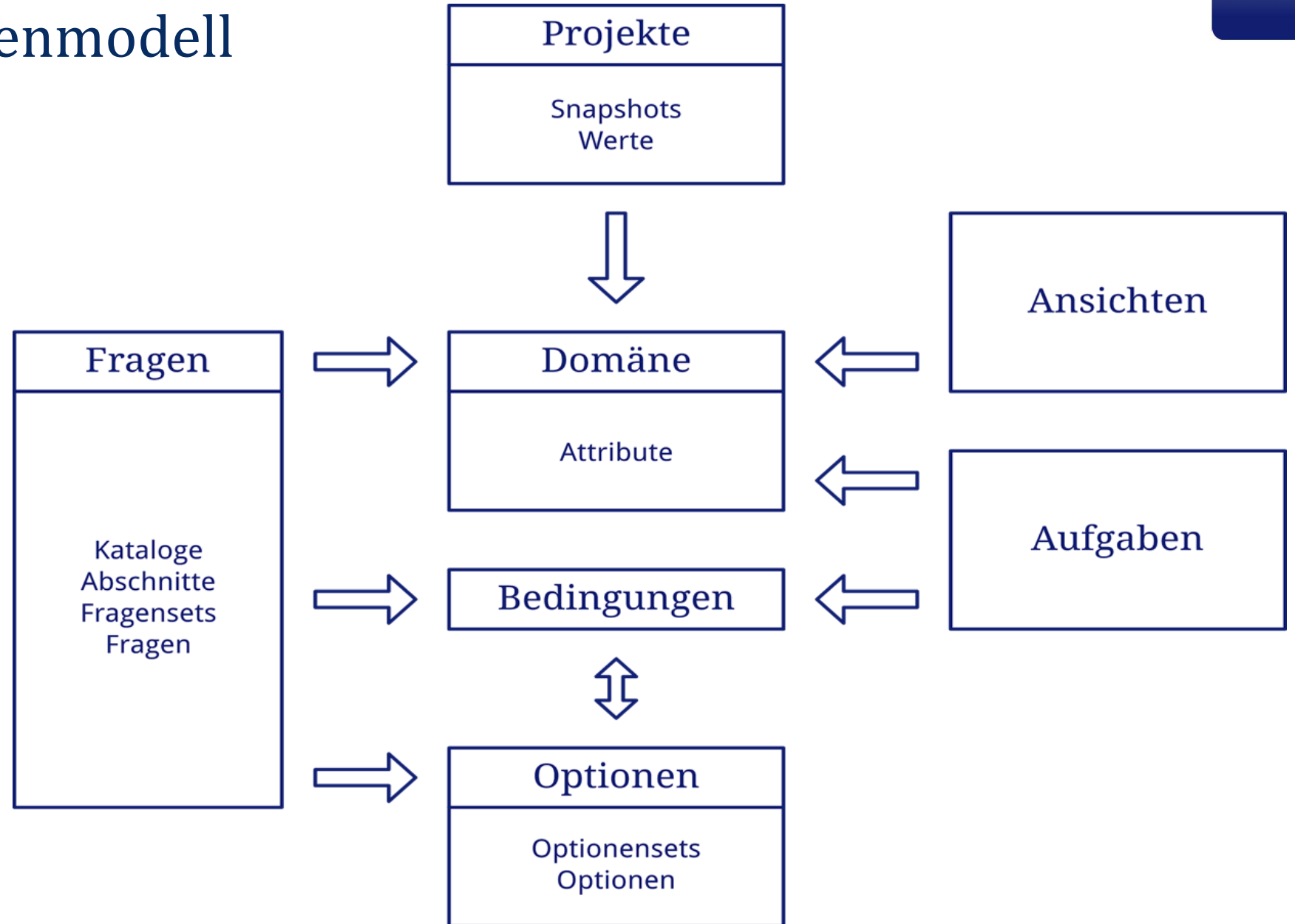
Schwerpunktverschiebung
von der Planung zur
Organisation des FDMs



Ein **Organizer** anstelle eines
Datenmanagementplans (DMPs)

- **RDMO** ermöglicht für Institutionen sowie Forscher ihr FDM zu planen und durchzuführen
- Kann alle relevanten Planungsdaten und Datenmanagementaufgaben über den gesamten Lebenszyklus der Forschungsdaten zusammenstellen
- Unterstützt die gesamte Lebensdauer eines Projekts und darüber hinaus
- Bindet alle Interessengruppen ein, nicht nur Forscher und Geldgeber

RDMO Datenmodell



- Zugang per lokalem Account, OAuth2, LDAP Anbindung, Shibboleth
- Strukturierung der Informationen zum Forschungsdatenmanagement anhand von Projekten, Kollaborationen
- Strukturiertes Interview (verschiedene Fragenkataloge: Generische Fragenkataloge & Möglichkeit der Anpassung: disziplinspezifische/institutionelle Fragenkataloge und Antwortmöglichkeiten)
 - Verschiedene Widgets, kontrollierte Vokabulare, Hilfetexte, Navigation
 - Reiter für verschiedene Projektpartner, Datensätze, etc.
 - Bedingungen und Überspringen von Fragen
- Mehrsprachigkeit (Deutsch, Englisch sowie Französisch und Italienisch)

- Anzeige und Export der Fragen und Ansichten in gängigen Formaten und nach Anforderungen spezifischer Förderer (z. B. H2020, ggf. institutionelle Vorgaben)
- Import und Export von Projekten zwischen verschiedenen RDMO-Instanzen
- Erstellen von Versionen („Snapshots“)
- Anzeigen von Aufgaben (z. B. „Datenschutzbeauftragten kontaktieren“)
- Momentan: Pilot Anbindung/Schnittstelle an ein generisches Forschungsdatenrepositorium (RADAR), weitere Piloten mit anderen Repositorien etc. möglich
- Nutzung fremder APIs zur Generierung von Antwortmöglichkeiten (z.B. re3data.org)
- Integration in Projektmanagement-Tools (GitHub Issues, GitLab, Jira, Redmine)

- Lokal statt zentral
 - Vollständige Anpassung des Inhalts
 - disziplinärer Kontext
 - institutionelles Umfeld
 - Leicht einsetzbar für Universitäten und Institutionen
 - Unterstützt individuelles Styling und Corporate Design
- Software
 - In Python mit Django und AngularJS geschrieben
 - Verwendet eine relationale Datenbank (MySQL, Postgres, SQLite)
 - Open Source mit der auf GitHub verfügbaren Apache2-Lizenz
 - GitHub Repository zum Austausch:
 - <https://github.com/rdmorganiser/rdmo>
 - <https://github.com/rdmorganiser/rdmo-plugins>

Questionnaire

Technical classification / Data size

Please fill in the form for each dataset. The different datasets will be referred to in following questions. You can add a new dataset using the green button. Once created, you can edit or delete datasets using the buttons in the top right corner.

ds500

d5001

[Add dataset](#)



What is the actual or expected size of the dataset?

- less than 1 GB
- 1 GB to 1 TB
- 1 TB to 100 TB
- more than 100 TB
- exact size:
- not yet defined



[Back](#)

[Skip](#)

[Save](#)

[Save and proceed](#)

Overview

Project: [FDM2](#)

Catalog: [Brief questionnaire](#)

[Back to my projects](#)

Progress

10 of 37

[Back](#)

[Skip](#)

Navigation

Please note that using the navigation will discard any unsaved input.

[General](#)

[Content classification](#)

[Technical classification](#)

→ [Data size](#)

[Formats](#)

[Tools](#)

[Versioning](#)

[Data usage](#)

[Metadata and referencing](#)

[Legal and ethics](#)

[Storage and long-term preservation](#)



Beispiele

In Forschungsprojekten u. a.:

- **EmiMin** – Verbundvorhaben Emmissionsminderung Nutztierhaltung (ZB Med/Publisso, Köln)
- **FoDaKo** – Forschungsdaten in Kooperation (BMBF) (Universitäten Düsseldorf-Siegen-Wuppertal)

Als Service einer Infrastruktureinrichtung u. a.:

- Technische Universität Darmstadt
- Universität Hildesheim
- Forschungszentrum Jülich
- DKRZ

In regionale Verbänden u. a.:

- **bw2FDM** (rdmo.forschungsdaten.info)
- **HeFDI**

Übergreifend in den NFDI-Konsortien:

- NFDI4Ing, NFDI4Life

RDMO-Community:

- sorgt für den Fortbestand der Software
- gründet Arbeitsgemeinschaft RDMO, besteht aus:
 - einer **Steuerungsgruppe**
 - einer **Softwaregruppe**
 - einer **Content-Gruppe** (mit UAGs)
- Nutzeraustausch über:
 - Slack-Channel
 - DFN-Mailinglisten
 - RDMO-Sprechstunde

rdmo.forschungsdaten.info – Nutzung:

- Exzellencluster „Politics of Inequality“ (Uni KN)
- Trans-Regio (TFP (Theoretische Festkörperphysik), KIT)
- SDC Biodaten
- Eigennutzung (Serviceteam RDM@KIT)

Schnellstartanleitung:

<https://rdmorganiser.github.io/docs/Schnellstartanleitung.pdf>

FAQs:

<https://www.forschungsdaten.org/index.php/FAQs>

Kurze Erklärfilme wie „Wie beantworte ich einen Fragenkatalog“: unter:

<https://rdmorganiser.github.io/dokumentation>

Youtube RDMO-Videos:

<https://www.youtube.com/channel/UC5CCijOICLxMKO4PIjE5-fg/search?query=rdmo>

Website: <https://rdmorganiser.github.io>

Documentation: <https://rdmo.readthedocs.io>

Demo instance: <https://rdmo.aip.de>
(neuesten Entwicklungen zum Ausprobieren)

UB RDMO (LMU): <https://rdmo.ub.uni-muenchen.de>
(über ORCID nutzbar, viele Fragenkataloge
vorrätig; weitere nutzbare Instanzen:
<https://rdmorganiser.github.io/kooperationen>)

Slack: <https://rdmo.slack.com>

Mailinglist: rdmo@listserv.dfn.de

Twitter: @rdmorganiser

Vielen Dank fürs Zuhören😊

Das Serviceteam RDM@KIT

Beteiligte Organisationseinheiten (**fett** = federführend)

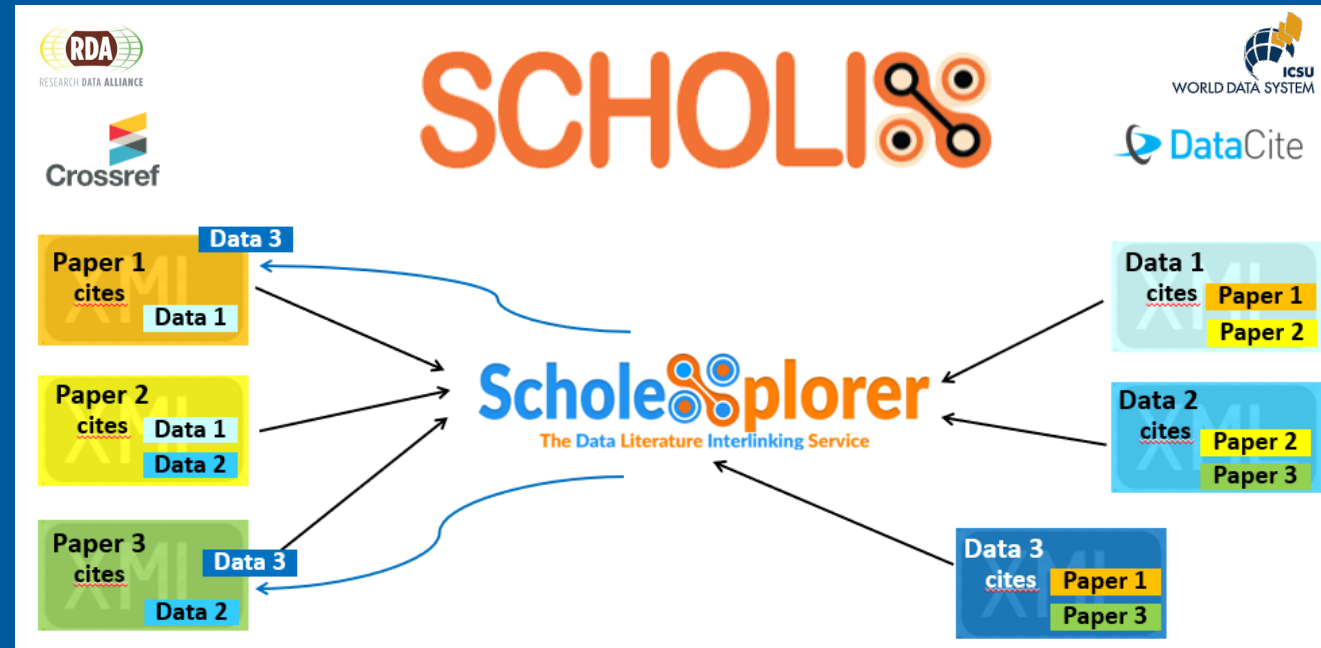
- **BIB** KIT-Bibliothek
- **SCC** Steinbuch Centre for Computing (Rechenzentrum)
- STAB-DO Digital Office
- Archiv Archiv des KIT
- FOR Forschungsförderung
- IRM Innovations- und Relations-Management
- ZAR Zentrum für Angewandte Rechtswissenschaft

Weitergehende Informationen & Kontakt

- Websites: rdm.kit.edu, forschungsdaten.info
- E-Mail: contact@rdm.kit.edu



GFZ Data Services and Scholix – a practice example



Kirsten Elger, GFZ
kelger@gfz-potsdam.de



Open data – an international request



G8 OPEN DATA CHARTER

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003): „*Open access contributions include original scientific research results, raw data and metadata, source materials, digital representations of pictorial and graphical materials and scholarly multimedia materials.*”

→ following the **FAIR Principles*** for Research Data Management

FAIR Principles

Findable



Accessible



Interoperable



Reusable



Tsukuba Communiqué

G7 Science and Technology Ministers' Meeting in



Government of Canada

Gouvernement du Canada

Jobs

Immigration

Travel

Business

Benefits

Home → Open Government → About Open Government → G8 Open Data Charter – Canada's Action Plan

G8 Open Data Charter – Canada's Action Plan

H2020 Programme



Guidelines on

FAIR Data Management in Horizon 2020



Deutsche Forschungsgemeinschaft

Guidelines on handling of research data

Data Supplements: Status quo 2015

 **Chemical Geology**
Volume 411, 14 September 2015, Pages 283-298 

Mineralogical transformations set slow weathering rates in low-porosity metamorphic bedrock on mountain slopes in a tropical climate

Ricarda Behrens ^{a, b, c, d, e}, Julien Bouchez ^{a, c}, Jan A. Schuessler ^a, Stefan Dultz ^d, Tilak Hewawasam ^e, Friedhelm von Blanckenburg ^a

Acknowledgements

Stefan Gehrman and Otto Diedrich are thanked for preparation of cylindrical samples from the corestone, and Tobias Meier and Eric Rybacki for their guidance with the He-pycnometry measurements. Thanks also go to Michael Klatt for support of laboratory work in Hannover, to Franziska Adams for help with Fe-redox analyses, and to Jean L. Dixon for sampling support. Dieter Rhede is acknowledged for electron microprobe analytical support and Geerke Floor and anonymous reviewers for comments on this manuscript. This work was conducted in the frame of the Graduate School GRK1364 funded by the German Science Foundation (DFG), co-financed by GFZ Potsdam, and the University of Potsdam.

Appendix A. Supplementary data

 [Download : Download Word document \(45KB\)](#)

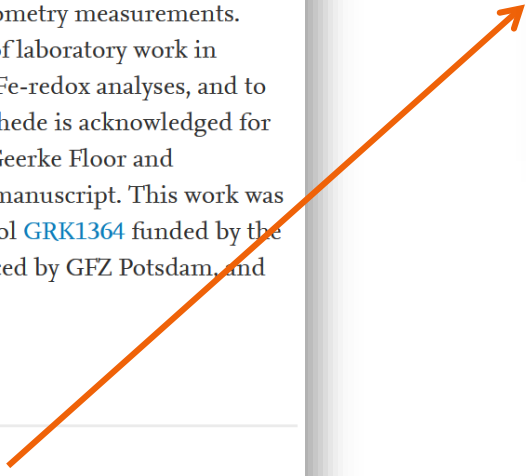
Plagioclase[¶]

Element-oxides in weight-%, mean-concentration data given for each corestone-zone (Z1 to Z4)[¶]

x	Sample-1-Z1, n=13x	Sample-2-Z2, n=10x	Sample-3-Z3, n=13x	Sample-3-Z4a, n=5x	Sample-5-Z4c, n=6x
SiO ₂ x	61.81x	61.80x	61.91x	61.21x	60.90x
TiO ₂ x	0.02x	0.01x	0.02x	0.01x	0.02x
Al ₂ O ₃ x	23.54x	23.65x	23.79x	23.82x	23.59x
Cr ₂ O ₃ x	d.1.*x	d.1.*x	d.1.*x	d.1.*x	d.1.*x
SrOx	d.1.*x	d.1.*x	d.1.*x	d.1.*x	d.1.*x
FeOx	0.08x	0.05x	0.06x	0.05x	0.05x
MnOx	0.01x	0.01x	0.01x	d.1.*x	0.01x
MgOx	d.1.*x	d.1.*x	d.1.*x	d.1.*x	d.1.*x
CaOx	5.27x	5.25x	5.31x	5.18x	d.1.*x
Na ₂ Ox	8.45x	8.57x	8.50x	8.61x	d.1.*x
K ₂ Ox	0.27x	0.24x	0.27x	0.26x	d.1.*x
Clx	d.1.*x	d.1.*x	d.1.*x	d.1.*x	d.1.*x
Totalx	99.45x	99.57x	99.86x	99.13x	98.60x

d.1.*: below-detection limit[¶]

- Link to the supplement at the end of the paper
- Proprietary format, not suitable for the „long term“
- Supplements are uncurated – often without metadata or definition of column heads



Data Supplements: Status quo 2016

Earth Surf. Dynam., 4, 895–909, 2016
<https://doi.org/10.5194/esurf-4-895-2016>
 © Author(s) 2016. This work is distributed under the Creative Commons Attribution 3.0 License.



Research article

Article Peer review Metrics Related articles

22 Dec 2016

Download

- ▶ Article (5377 KB)
- ▶ Full-text XML
- ▶ Supplement (421 KB)
- ▶ BibTeX
- ▶ EndNote


We quantify the glacial legacy of Holocene erosion at the eastern

Glaciation's topographic control on Holocene erosion at the eastern edge of the Alps

Jean L. Dixon^{1,2}, Friedhelm von Blanckenburg^{1,3}, Kurt Stüwe^{1,4}, and Marcus Christl^{1,5}

Dixon et al. (2016)

Supplementary Data Page 1 of 5

 PDF

Supplementary Data. Compilation of ¹⁰Be Derived Erosion Rates Across the European Alps

Study	Sample ID	Lat (dd)	Long (dd)	Mean Slope (deg)	Published Erosion Rate (mm ky ⁻¹)	SLHL 10Be Prod Rate* (at g ⁻¹ yr ⁻¹)	Rescaled Erosion Rate* (mm ky ⁻¹)
Delunel et al., 2010	Rd01	45.053	5.844	30.8	510	4.59	444
Delunel et al., 2010	Rd02	45.015	6.062	35.9	860	4.59	750
Delunel et al., 2010	Rd03	45.038	6.192	25.8	1450	4.59	1264
Delunel et al., 2010	Rd04	44.987	6.481	29.2	1440	4.59	1255
Delunel et al., 2010	Rd05	44.893	6.445	34.6	1200	4.59	1046
Delunel et al., 2010	Rd06	44.881	6.442	36.2	1290	4.59	1124
Delunel et al., 2010	Rd07	44.870	6.485	28.9	1690	4.59	1473
Delunel et al., 2010	Rd08	44.949	5.868	31.4	350	4.59	305
Delunel et al., 2010	Rd09	44.891	5.887	31.3	290	4.59	253
Delunel et al., 2010	Rd10	44.881	5.985	35.4	390	4.59	340
Delunel et al., 2010	Mb130	44.799	5.959	27.7	670	4.59	584

- Link to the supplement clearly visible
- Proprietary format: data extraction from PDF files is time consuming and error-prone
- Supplements are uncurated – often without metadata or definition of column heads



COPDESS

**Coalition for Publishing Data in
the Earth and Space Sciences**

COPDESS Statement of Commitment 2015

**Statement of Commitment from Earth and Space Science Publishers
and Data Facilities**



COPDESS @ AGU 2014

“Scholarly publication is a key high-value entry point in making data available, open, discoverable, and usable. Most publishers have statements related to the inclusion or release of data as part of publication, recognizing that inclusion of the full data enhances the value and is part of the integrity of the research. **Unfortunately, the vast majority of data submitted along with publications are in formats and forms of storage that makes discovery and reuse difficult or impossible.**”

Hanson et al. (2015, <https://doi.org/10.1029/2015EO022207>) and www.copdess.org

Coalition on Publishing Data in the Earth and Space Sciences

2015: **Data Publications are citable in research articles** (COPDESS Statement of Commitment)



STATEMENT OF COMMITMENT

(January 2015)

- data should be stored in **appropriate domain repositories**.
- **citations of data sets** should be included within **reference lists**.
- include in research papers concise **data availability statements**.
- links to data sets in publications and corresponding links to journals in data facilities

<http://www.copdess.org/statement-of-commitment/>

How do I cite a dataset?

Properties of granular analogue model materials: A community wide survey

M. Klinkmüller^a, G. Schreurs^{a,1}, M. Rosenau^b, H. Kemnitz^b

^a Institute of Geological Sciences, University of Bern, Baltzerstrasse 1 +3, CH-3012 Bern, Switzerland

^b Helmholtz-Zentrum Potsdam, GFZ Deutsches GeoForschungsZentrum, Telegrafenberg, D-14473 Potsdam, Germany

sented as grain size distribution curves, in which particle grain size is plotted against cumulative weight percentage (Fig. 2).

The original sieve data have been published open access and are available in Klinkmüller et al. (2016b).

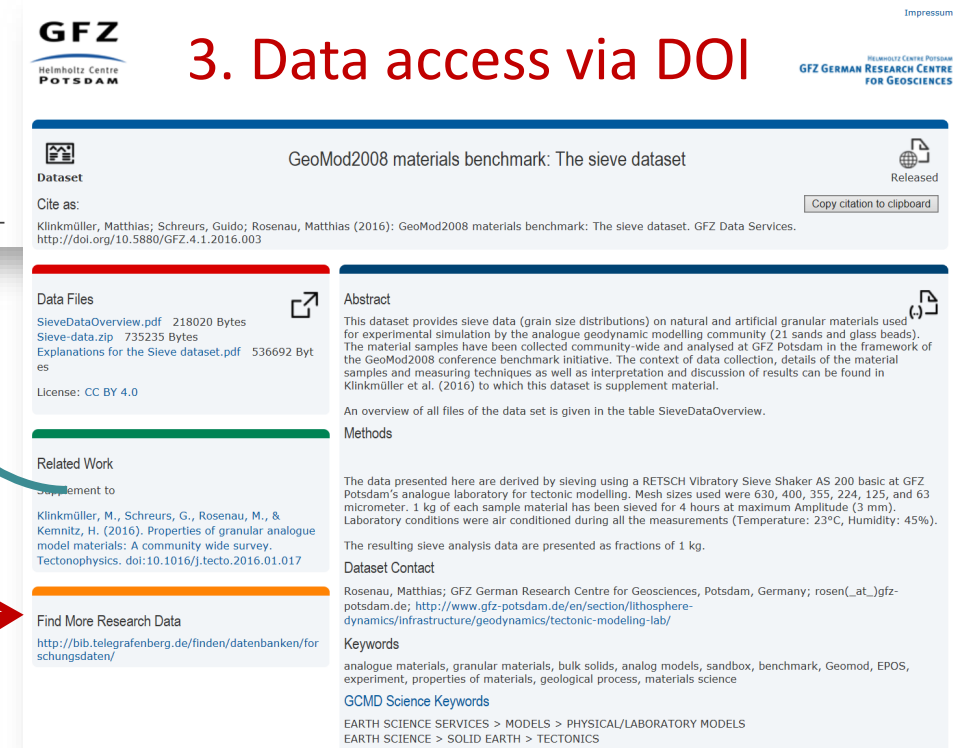
References

- Heilbronner, R., Keulen, N., 2006. Grain size and grain shape analysis of fault rocks. *Tectonophysics* 427, 199–216.
- Hubbert, M.K., 1951. Mechanical basis for certain familiar geologic structures. *Geol. Soc. Am. Bull.* 62, 1259–1273.
- Klinkmüller, M., Schreurs, G., Rosenau, M., 2016a. GeoMod2008 materials benchmark: The ring shear test data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.002>.
- Klinkmüller, M., Schreurs, G., Rosenau, M., 2016b. GeoMod2008 materials benchmark: The sieve data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.003>.
- Klinkmüller, M., Kemnitz, H., Schreurs, G., Rosenau, M., 2016c. GeoMod2008 materials benchmark: The SEM image data set. GFZ Data Services. <http://dx.doi.org/10.5880/GFZ.4.1.2016.004>.

Link to paper

1. Citation in the text

3. Data access via DOI



GFZ
Helmholtz Centre
POTSDAM

GeoMod2008 materials benchmark: The sieve dataset

Dataset

Cite as:
Klinkmüller, Matthias; Schreurs, Guido; Rosenau, Matthias (2016): GeoMod2008 materials benchmark: The sieve dataset. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.003>

Data Files

SieveDataOverview.pdf 218020 Bytes
Sieve-data.zip 735235 Bytes
Explanations for the Sieve dataset.pdf 536692 Bytes
License: CC BY 4.0

Abstract

This dataset provides sieve data (grain size distributions) on natural and artificial granular materials used for experimental simulation by the analogue geodynamic modelling community (21 sands and glass beads). The material samples have been collected community-wide and analysed at GFZ Potsdam in the framework of the GeoMod2008 conference benchmark initiative. The context of data collection, details of the material samples and measuring techniques as well as interpretation and discussion of results can be found in Klinkmüller et al. (2016) to which this dataset is supplement material.

An overview of all files of the data set is given in the table SieveDataOverview.

Methods

The data presented here are derived by sieving using a RETSCH Vibratory Sieve Shaker AS 200 basic at GFZ Potsdam's analogue laboratory for tectonic modelling. Mesh sizes used were 630, 400, 355, 224, 125, and 63 micrometer. 1 kg of each sample material has been sieved for 4 hours at maximum Amplitude (3 mm). Laboratory conditions were air conditioned during all the measurements (Temperature: 23°C, Humidity: 45%).

The resulting sieve analysis data are presented as fractions of 1 kg.

Dataset Contact

Rosenau, Matthias; GFZ German Research Centre for Geosciences, Potsdam, Germany; [rosen\(at\)_gfz-potsdam.de](mailto:rosen(at)_gfz-potsdam.de); <http://www.gfz-potsdam.de/en/section/lithosphere-dynamics/infrastructure/geodynamics/tectonic-modelling-lab/>

Keywords

analogue materials, granular materials, bulk solids, analog models, sandbox, benchmark, Geomod, EPOS, experiment, properties of materials, geological process, materials science

GCMD Science Keywords

EARTH SCIENCE SERVICES > MODELS > PHYSICAL/LABORATORY MODELS
EARTH SCIENCE > SOLID EARTH > TECTONICS

2. Full reference with DOI in the References

...so far so good, but what happens when ...

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

Cite as:
Reiter, Karsten; Kukowski, Nina; Ratschbacher, Lothar; Rosenau, Matthias (2016): Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.007>

Files

- Explanations_Reiter-et-al-2016.pdf 0.5 Mb
- list-of-files-Reiter-et-al-2016.pdf 232.6 Kb
- Experimenting.avi 78.7 Mb
- gb70-pictures.pdf 497.1 Kb
- gb40-3Dview-30-34.avi 5.8 Mb
- gb50-3Dview-30-33.avi 5.7 Mb
- gb55-3Dview-30-32.avi 6.1 Mb
- gb60-3Dview-30-30.avi 6.4 Mb

Abstract

This data publication includes animations and figures of eight scaled analogue models that are used to investigate the interaction of two indenters in analogue experiments on curved fold-and-thrust belts. The models are made of low-friction glass beads or viscous silicone oil representing weak shale or evaporates layers, respectively. The surface evolution by

data publication in 2016

ELSEVIER

Earth and Planetary Science Letters
Volume 302, Issues 1–2, 1 February 2011, Pages 132–146

The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts

Karsten Reiter ^{a, b}, Nina Kukowski ^{b, 1}, Lothar Ratschbacher ^a

Show more

<https://doi.org/10.1016/j.epsl.2010.12.002> Get rights and content

Supplement to an article from 2011

Abstract

Scaled analogue experiments are used to investigate the indentation of two



data publication in 2016

Supplement to an article from 2011

Dataset Description

Supplement to

Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. Earth and Planetary Science Letters, 302(1-2), 132–146. doi:10.1016/j.epsl.2010.12.002

Data repository can add a link to the paper in the data publication

Is **not** possible to add the citation of the dataset to the paper 5 years after publishing

Data: <http://doi.org/10.5880/GFZ.4.1.2016.007>, Paper: <https://doi.org/10.1016/j.epsl.2010.12.002>

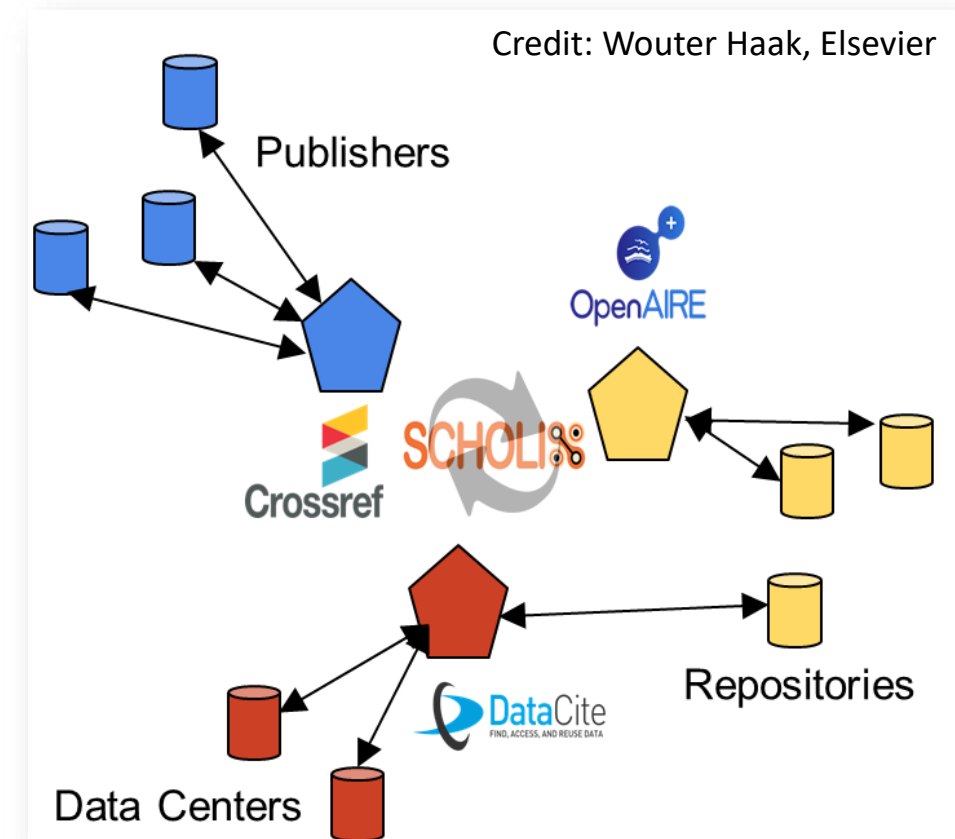
What is SCHOLI%



SCHOLI% is short for **SCHOL**arly **LI**nk **eX**change. The goal of Scholix is to improve the links between scholarly literature and research data as well as between data and data.

SCHOLI% is a joint initiative of the **Research Data Alliance** (RDA) and the **ICSU World Data System** (WDS), supported by a number of partner organisations. It has a global scope.

SCHOLI% provides a **technical framework** for **interlinking scholarly literature with data** by connecting repositories, publishers and data centres.



Why do we need links between scholarly literature and data?

Links between scholarly literature and data **enable a reader of a journal article to follow a link to the data that supports the findings of the data**. Conversely, they **enable a user of a dataset to find literature based on that dataset**. These links significantly aid the scientific method by improving discovery of and access to related knowledge and underpinning observations. The benefits of links between scholarly literature and data include:

- **increased visibility, discovery and retrieval** of both literature and data
- facilitating **reuse, reproducibility and transparency** of research
- enabling **better attribution of credit for published data**, providing an additional **incentive for researchers to share their data**.

Where are the links between literature and data?

Journal Article

CC BY

Article Peer review Metrics Related articles

Data description paper

15 May 2019



ICGEM – 15 years of successful collection and distribution of global gravitational models, associated services, and future plans

E. Sinem Ince¹, Franz Barthelmes¹, Sven Reißland¹, Kirsten Elger², Christoph Förste¹, Frank Flechtner^{1,4}, and Harald Schuh^{3,4}

References

Barthelmes, F.: Definition of Functionals of the Geopotential and Their Calculation from Spherical Harmonic Models: Theory and formulas used by the calculation service of the International Centre for Global Earth Models (ICGEM), Scientific Technical Report STR09/02, Revised Edition, January 2013, Deutsches GeoForschungZentrum GFZ, <https://doi.org/10.2312/GFZ.b103-0902-26>, 2013.

Barthelmes, F.: Global Models, in: Encyclopedia of Geodesy, edited by: Grafarend, E., Springer International Publishing, 1–9, https://doi.org/10.1007/978-3-319-02370-0_43-1, 2014.

Barthelmes, F. and Förste, C.: The ICGEM-format. Potsdam: GFZ German Research Centre for Geosciences, available at: <http://icgem.gfz-potsdam.de/ICGEM-Format-2011.pdf> (last access: 30 January 2019), 2011.

Barthelmes, F. and Koehler, W.: International Centre for Global Earth Models (ICGEM), in: Dreves: The Geodesists Handbook 2012, J. Geodesy, 86, 932–934, <https://doi.org/10.1007/s00190-012-0584-1>, 2012.

Barthelmes, F., Ince, E. S., and Reißland, S.: International Centre for Global Earth Models, International Association of Geodesy, Travaux, Volume 40, Reports 2015–2017, available at: https://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux_2015-2017.pdf (last access: 30 January 2019), 2017.

Data Publication

GFZ DATA SERVICES
Geosciences Data Publisher

New Chilean and a global compilation of soil production, chemical weathering, and physical erosion rates from soil-mantled hillslopes

Dataset Released

Cite as:
Schaller, Mirjam; Ehlers, Todd A. (2021): New Chilean and a global compilation of soil production, chemical weathering, and physical erosion rates from soil-mantled hillslopes. GFZ Data Services. <https://doi.org/10.5880/fgdgeo.2021.036>

Files
Download data and description
License: CC BY 4.0

Abstract
This data publication contains new and recalculated soil production, chemical weathering, and physical erosion rates for granitoid soil-mantled hillslopes in the Chilean Coastal Cordillera. For further comparison and data discussion the data publication presents global rates from granitoid soil-mantled hillslopes combined with a suite of parameters at the sample location (e.g., slope, precipitation, temperature, vegetation cover). The data were collected within the DFG Priority Program 1803 "EarthShape - Earth Surface Shaping by Biota".

Dataset Description
Supplement to
https://doi.org/10.1007/978-3-319-02370-0_43-1

Additional Information
The DFG Priority Program 1803 "EarthShape - Earth Surface Shaping by Biota" (2016–2022; <https://www.earthshape.net/>) explored between scientific disciplines and includes geoscientists and biologists to study from different viewpoints the complex question how microorganisms, animals, and plants influence the shape and development of the Earth's surface over time scales from the present-day to the young geologic past. All study sites are located in the north-south trending Coastal Cordillera mountains of Chile, South America. These sites span from the Atacama Desert in the north to the Araucanía forests approximately 1200 km to the south. The site selection contains a large ecological and climate gradient ranging from very dry to humid climate conditions.

Related Work
Cites
Bestland, E. A., Liccioli, C., Soloninka, L., Chittleborough, D. J., & Fink, D. (2016). Catchment-scale denudation and chemical erosion rates determined from 10Be and mass balance geochemistry (Mt. Lofty Ranges of South Australia). *Geomorphology*, 270, 40–54. <https://doi.org/10.1016/j.geomorph.2016.07.014>

Broxton, P. D., Zeng, X., Scheffic, W., & Troch, P. A. (2014). A MODIS-Based Global 1-km Maximum Green Vegetation Fraction Dataset. *Journal of Applied Meteorology and Climatology*, 53(8), 1996–2004. <https://doi.org/10.1175/jamc-d-13-0356.1>

Burke, B. C., Heimsath, A. M., & White, A. F. (2007). Coupling chemical weathering with soil production across soil-mantled landscapes. *Earth Surface Processes and Landforms*, 32(6), 853–873. <https://doi.org/10.1002/esp.1443>

Burke, B. C., Heimsath, A. M., Soong, Y. P., & Lee, S. Y. (2015). Erosion of a high-altitude, low-relief area on the Korean Peninsula: implications for soil production across soil-mantled landscapes. *Earth Surface Processes and Landforms*, 40(13), 1730–1745. <https://doi.org/10.1002/esp.3749>

Dixon, J. L., Heimsath, A. M., & Anderson, R. (2009). The critical rate of climate and saproite weathering in landscape evolution. *Earth Surface Processes and Landforms*, 34(11), 1507–1521. <https://doi.org/10.1002/esp.1836>

Dixon, J. L., Hartshorn, A. S., Heimsath, A. M., DiBiase, R. A., & Whipple, K. X. (2012). Chemical weathering response to tectonic forcing: A slope perspective from the San Gabriel Mountains, California. *Earth and Planetary Science Letters*, 323–324, 40–49. <https://doi.org/10.1016/j.epsl.2012.01.010>

Ferrier, K. L., Kirchner, J. W., & Finkbeiner, R. C. (2012). Weak influences of climate and mineral supply rates on chemical erosion rates: Measurements along two altitudinal transects in the Idaho Batholith. *Journal of Geophysical Research: Earth Surface*, 117(F2), n/a–n/a. <https://doi.org/10.1029/2011JF002331>

Gilbert, G. K. (1877). Report on the Geology of the Henry Mountains. Monograph. US Geological Survey. <https://doi.org/10.3133/70099916>

Heimsath, A. M., Dietrich, W. E., Nishiizumi, K., & Finkbeiner, R. C. (1997). The soil production function

Location
Click/hover over markers or bounding boxes to see related details. Click/hover over details to see related marker or bounding box.



References → Links

How can I provide information about links?

Repositories, data centres, journals and others **provide information about the links between literature and data** that they hold to community 'hubs' such as OpenAire, Crossref and DataCite – **in the machine-readable metadata (XML, JSON)**

 **DataCite** metadata schema

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<relatedIdentifiers>
  <relatedIdentifier relatedIdentifierType="DOI"
    relationType="Cites">10.1016/j.quaint.2015.03.007
  </relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="DOI"
    relationType="IsSupplementTo">10.2113/gsjfr.47.2.175
  </relatedIdentifier>
</relatedIdentifiers>
```

 **Crossref** metadata schema

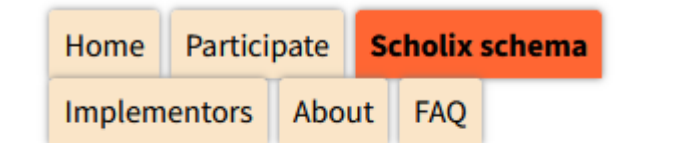
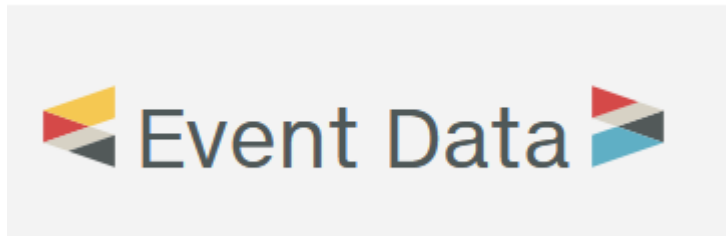
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  <rel:description>Sicard-2018-External-database-S1
</rel:description>
  <rel:inter_work_relation identifier-type="doi"
    relationship-type="isSupplementedBy">
    10.6084/m9.figshare.5981968
  </rel:inter_work_relation>
</rel:related_item>
```

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<citation key="ref2">
  <doi>10.6084/m9.figshare.5981968</doi>
</citation>
```

Scholexplorer



How can I implement Scholix?



**Scholix metadata schema for
exchange of scholarly links**

Scholix can only work when there are clear data citations in articles and article citations in data publications!

...back to the old example...

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

Cite as:
Reiter, Karsten; Kukowski, Nina; Ratschbacher, Lothar; Rosenau, Matthias (2016): Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.007>

Files

- Explanations_Reiter-et-al-2016.pdf 0.5 Mb
- list-of-files-Reiter-et-al-2016.pdf 232.6 Kb
- Experimenting.avi 78.7 Mb
- gb70-pictures.pdf 497.1 Kb
- gb40-3Dview-30-34.avi 5.8 Mb
- gb50-3Dview-30-33.avi 5.7 Mb
- gb55-3Dview-30-32.avi 6.1 Mb
- gb60-3Dview-30-30.avi 6.4 Mb

Abstract

This data publication includes animations and figures of eight scaled analogue models that are used to investigate the interaction of two indenters in analogue experiments on curved fold-and-thrust belts. The experimental setup consists of a sedimentary basin with a basal detachment layer, a basal detachment layer is made up of low-friction glass beads or viscous silicone oil representing weak shale or evaporates layers, respectively. The surface evolution by

data publication in 2016

Dataset Description

Supplement to

Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. *Earth and Planetary Science Letters*, 302(1-2), 132-146. doi:10.1016/j.epsl.2010.12.002

Data repository can add a link to the paper in the data publication

ELSEVIER Earth and Planetary Science Letters
Volume 302, Issues 1-2, 1 February 2011, Pages 132-146

The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts

Karsten Reiter ^{a, b}, Nina Kukowski ^{b, 1}, Lothar Ratschbacher ^a

Show more

<https://doi.org/10.1016/j.epsl.2010.12.002> Get rights and content

Abstract

Scaled analogue experiments are used to investigate the indentation of two

Supplement to an article from 2011

Is **not** possible to add the citation of the dataset to the paper 5 years after publishing

Data: <http://doi.org/10.5880/GFZ.4.1.2016.007>, Paper: <https://doi.org/10.1016/j.epsl.2010.12.002>

New possibilities for cross-linking data and papers

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

Cite as:
Reiter, Karsten; Kukowski, Nina; Ratschbacher, Lothar; Rosenau, Matthias (2016): Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.1.2016.007>

Files

- Explanations_Reiter-et-al-2016.pdf 0.5 Mb
- list-of-files-Reiter-et-al-2016.pdf 232.6 Kb
- Experimenting.avi 78.7 Mb
- gb70-pictures.pdf 497.1 Kb
- gb40-3Dview-30-34.avi 5.8 Mb
- gb50-3Dview-30-33.avi 5.7 Mb
- gb55-3Dview-30-32.avi 6.1 Mb
- gb50-3Dview-30-30.avi 6.4 Mb

Abstract

This data publication includes animations and figures of eight scaled analogue models that are used to investigate the interaction of two adjacent indenters in analogue experiments. The experiment is performed on a scale of 1:100. The model consists of a 1.5 m wide and 1.5 m high layer of quartz sand in front of the indenter, 1 by 2 meter in size and 1.5 cm thick, represents the sedimentary basin infill. A basal detachment layer is made up of low-friction glass beads or viscous silicone oil representing weak shale or evaporates layers, respectively. The surface evolution by

data publication in 2016

Dataset Description

Supplement to

Reiter, K., Kukowski, N., & Ratschbacher, L. (2011). The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts. *Earth and Planetary Science Letters*, 302(1-2), 132-146.
[doi:10.1016/j.epsl.2010.12.002](http://doi.org/10.1016/j.epsl.2010.12.002)

SCHOLIX

New link to data on the paper page

ELSEVIER Earth and Planetary Science Letters
Volume 302, Issues 1-2, 1 February 2011, Pages 132-146

The interaction of two indenters in analogue experiments and implications for curved fold-and-thrust belts

Karsten Reiter ^{a, b}, Nina Kukowski ^{b, 1}, Lothar Ratschbacher ^a

Show more

<https://doi.org/10.1016/j.epsl.2010.12.002> Get rights and content

Abstract

Scaled analogue experiments are used to investigate the indentation of two

Supplement to an article from 2011

Research data for this article

GFZ Data Services
Geosciences data

Data associated with the article:
Supplementary material for analogue experiments on the interactions of two indenters, and their implications for curved fold-and-thrust belts

new

GFZ
Helmholtz Centre
POTSDAM

Data: <http://doi.org/10.5880/GFZ.4.1.2016.007>,
Paper: <https://doi.org/10.1016/j.epsl.2010.12.002>

Conclusion – what do he have to do?

- Researchers** make sure to always cite scholarly literature, data and software publications in all publications and especially to include data and software citations in the reference lists of articles.
- Repositories** make sure to include the related references (scholarly literature, data, software) in the metadata sent to the DOI registration agencies (DataCite, Crossref,...)
- Journals** make sure to include the full list of references in the metadata sent to the DOI registration agencies (Crossref, DataCite,...)
- Event Data APIs** of DataCite or Crossref can be used to retrieve links between scholarly literature, data and software. They are using the Scholix metadata schema

Publications – further reading

- <https://doi.org/10.1016/j.patter.2020.100007>: Khan et al. (2020) Identifying Data Sharing and Reuse with Scholix: Potentials and Limitations
- <https://www.stm-researchdata.org/>: Scholix and article-data linking has been covered extensively in STM's Year of Research Data
- <https://www.stm-researchdata.org/wp-content/uploads/2019/12/Crossref-data-citation.pdf>: CrossRef's role in the data citation workflow
- <https://doi.org/10.5281/zenodo.1120267>: Scholix metadata schema
- Cousijn, H. et al. A data citation roadmap for scientific publishers. Sci. Data. 5:180259 <https://doi.org/10.1038/sdata.2018.259>

Persistent Identification of Instruments at HZB

Rolf Krahl

Helmholtz Open Science Practice Forum
Research Data Management, 3 February 2022



Persistent Identification of Instruments WG

The Persistent Identification of Instruments Working Group seeks to explore a community-driven solution for globally unique identification of measuring instruments operated in the sciences.

- Working group in the Research Data Alliance (RDA).
- Active from March 2018 to October 2019.
- Now still active in “maintenace mode”.

Goals and potential benefits:

- Create persistent identifiers (PIDs) for instruments.
- Link data to the instruments that generated them (provenance).
- Better track the scientific output of an instrument by journal articles and datasets referencing the instrument.
- Aid equipment logistics and mission planning.
- Allow automatic aggregation of information: richer metadata for datasets if information about the instrument used to collect the data can be retrieved.
- Add another relevant node to the PID Graph.

- Collected use cases from institutions interested in using PIDs for instruments.
- Formulated a schema for the metadata describing an instrument to be registered with a PID.
- Explored potential solutions with PID infrastructure providers. Identified two candidates:
 - ePIC (Handles)
 - DataCite (DOIs)
- Adopters (selection):
 - Helmholtz-Zentrum Berlin für Materialien und Energie
 - British Oceanographic Data Centre
 - EUDAT B2INST
 - sensor.community

- The PIDINST Metadata Schema defines the properties to be registered in the PID infrastructure.
- Provide the information to identify the individual instrument instance.
- The schema need to be generic. Detailed technical description is not included.
- Allow to add links to other sources of information.
- When using DOIs, we need to map the PIDINST schema onto DataCite metadata.

<i>ID</i>	<i>Property</i>
1	Identifier
2	SchemaVersion
3	LandingPage
4	Name
5	Owner
6	Manufacturer
7	Model
8	Description
9	InstrumentType
10	MeasuredVariable
11	Date
12	RelatedIdentifier
13	AlternateIdentifier

- HZB uses DOIs for instrument PIDs.
- Scope: beamlines and experimental stations. Other instruments on a case by case basis.
- Existing instrument database IGAMA in the user portal. Use this database for the DOI landing pages.
- Example: PEAXIS - Combined RIXS and XPS:
 - <https://doi.org/10.5442/NI000024>
 - Entry at DataCite Commons










The screenshot shows the HZB website interface. At the top, there is a navigation bar with the HZB logo and menu items: RESEARCH, USER ACCESS, INDUSTRY, CAREERS, ABOUT US. Below the navigation bar, the page title is 'PEAXIS' and the sub-heading is 'Combined RIXS and XPS'. The main text describes the station: 'The station PEAXIS (PhotoElectron Analysis and X-ray Inelastic Spectroscopy) is a novel station installed at the U49-PEAXIS beamline. It is dedicated to studies of angle-resolved XPS (Resonant Inelastic X-ray Scattering) and PES (PhotoElectron Spectroscopy) on solids. As shown in the Schematic figure below, the station is equipped with an electron energy analyzer (left) and a XPS spectrometer (right). Various sample manipulators (red) can be installed in the sample chamber (green). The XPS arm is continuously rotatable on a supporting rail in a range of 100 degrees.' Below the text, there is a 'Selected Applications' section with a bulleted list: '• Magnetic, d-d and charge transfer excitations in model quantum materials and functional energy materials', '• Dispersive excitations in quantum materials (e.g. plasmons and excitons)', '• Electron-phonon coupling in solid-state materials', and '• Reaction mechanisms in battery materials'. To the right of the text is a circular diagram labeled 'Storage Ring Hall' with a color-coded ring. Below the diagram, there are two 'Instrument Scientist' entries: 'Deric Wang' with contact information and 'Dr. Marcio Bartholomei' with a photo.

Reference the Instrument DOI from a Data Publication

- The Instrument can be linked from DataCite metadata registered with the DOI for the data publication.
- Use RelatedIdentifier with relationType=IsCompiledBy.
- Example of a HZB data publication:
 - <https://doi.org/10.5442/ND000001>
 - Entry at DataCite Commons

HZB Helmholtz Zentrum Berlin
HZB Data Service

Neutron study of the topological flux model of hydrogen ions in water ice

Hoffmann, J. U. , Semmerose, K. , Isakov, S. , Morris, D. J. , Klenke, B. , Gouvy, L. , Seifert, K. , Tsvirt, D. , Gierke, S. 

1. Helmholtz-Zentrum Berlin für Materialien und Energie, Helmholtz-Platz 1, 14109 Berlin, Germany
2. Theoretische Physik, ETH Zürich, 8093 Zürich, Switzerland
3. Google Inc., Randolph Square 116, 8022 Zürich, Switzerland

emitter: guage 600. The development of quasi-free neutron of K900 Ice gives the way for further studies to develop a comprehensive atomic-scale understanding of this most common ice of water.

The merged untransformed datasets from the flat cone diffractometer C2 at the neutron source BER II is given in the Neutron/ICE5 file format. The calculated reciprocal space and the simulation are stored as HDF5 files.

Metadata

- [DataCite DOI](#)
- [Zenodo link](#)

Related Work

Compiled by




- [Helmholtz-Zentrum Berlin für Materialien und Energie, Flat Cone Diffractometer, Neutron/ICE5 and 10.5442/ND000001](#)

References

- [Jens-Uwe Hoffmann, Manfred Reinke, 2018, 02, The Flat Cone Diffractometer at BER II, Journal of Large-Scale Research Facilities, 4, 012, <https://doi.org/10.17815/JLSRF-4-012>](#)

Cited by

- [Morris, D. J. et al. 2019, Neutron studies of quasi-free and charged H₂O in water-ice, Sci. Data, 8, 95, 124111, <https://doi.org/10.1038/s41598-019-12411-1>](#)

-  M. Stocker et al, 2020.
Persistent Identification of Instruments.
Data Science Journal, 19(1).
DOI:<https://doi.org/10.5334/dsj-2020-018>
-  R. Krahl et al, 2021.
Metadata Schema for the Persistent Identification of Instruments.
Research Data Alliance.
Submitted as a RDA recommendation.
DOI:<https://doi.org/10.15497/RDA00070>
-  RDA Persistent Identification of Instruments WG
Persistent Identification of Instruments
Documentation. <https://rda-pidinst.readthedocs.io/>

ExPaNDS

**European Open Science Cloud Photon
and Neutron Data Services**

The role of Helmholtz Partners in FAIR related Photon and Neutron EU Projects

Presented by: Sophie SERVAN (DESY, ExPaNDS project manager)

With special thanks to Patrick Fuhrmann (DESY)



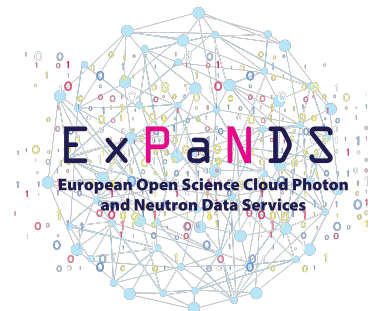
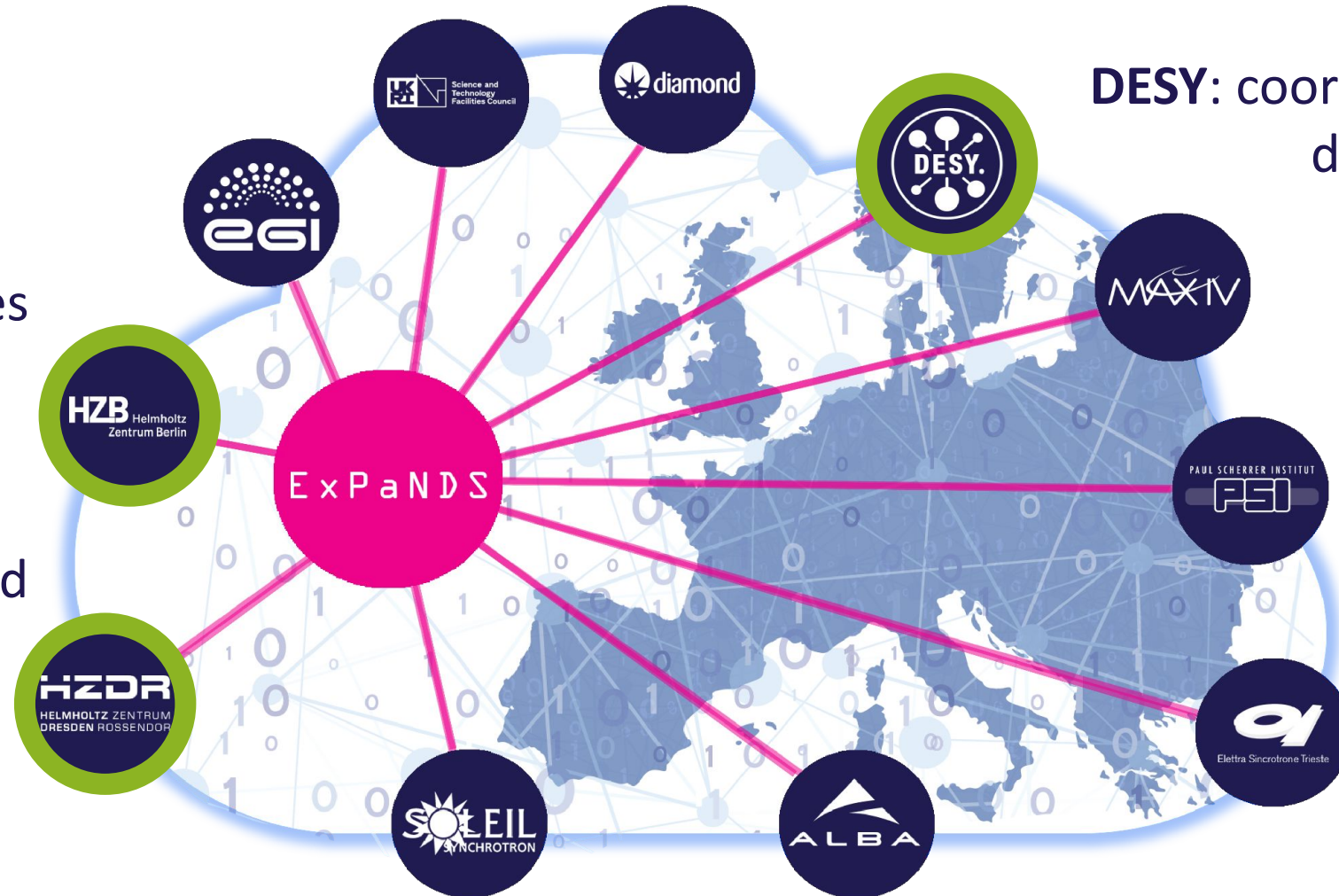
ExPaNDS and Helmholtz

Making FAIR and open science a reality for:

HZB: FAIR data and metadata catalogues

HZDR: training and data analysis

DESY: coordinator and data analysis



The PaN EU project landscape



Policies

Common data policy

FAIR data policy

DMPs

Metadata

Data PIDs

Instrument PIDs

Ontology

Search API

Sample PIDs

Analysis

Software Catalogue

Jupyter

Remote analysis

Training

e-neutron

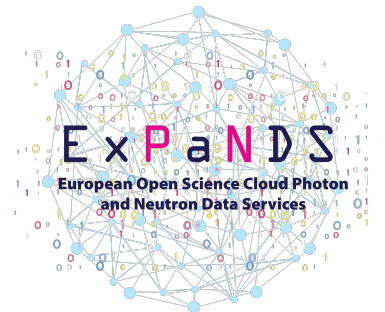
Training platform

AAI

UmbrellaID

AARC Blueprint

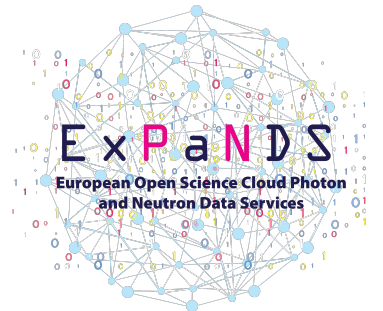
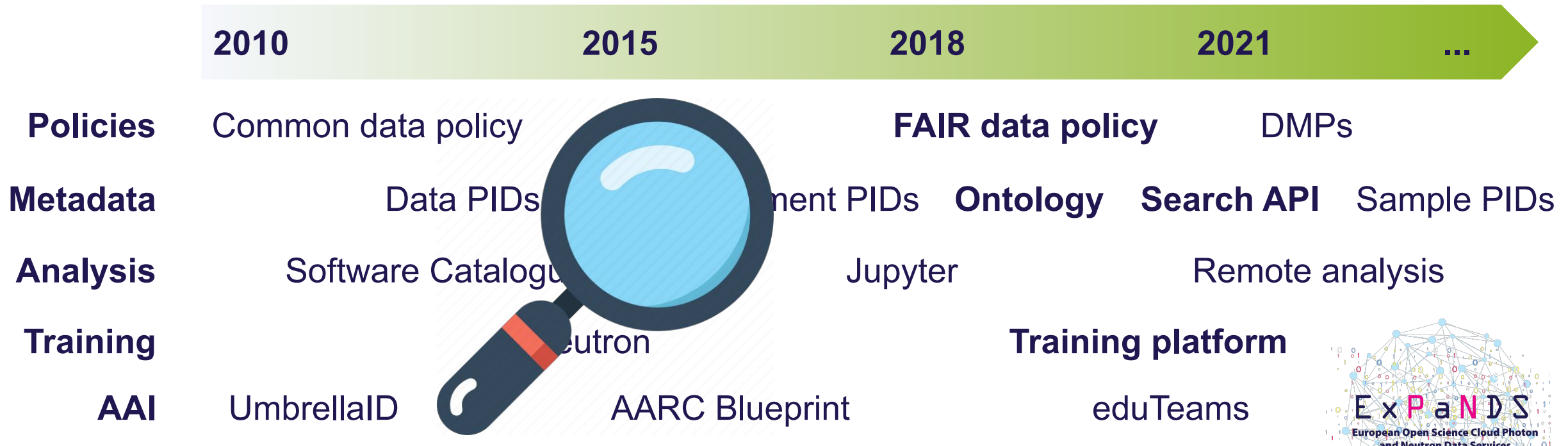
eduTeams



This project receives funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 857641

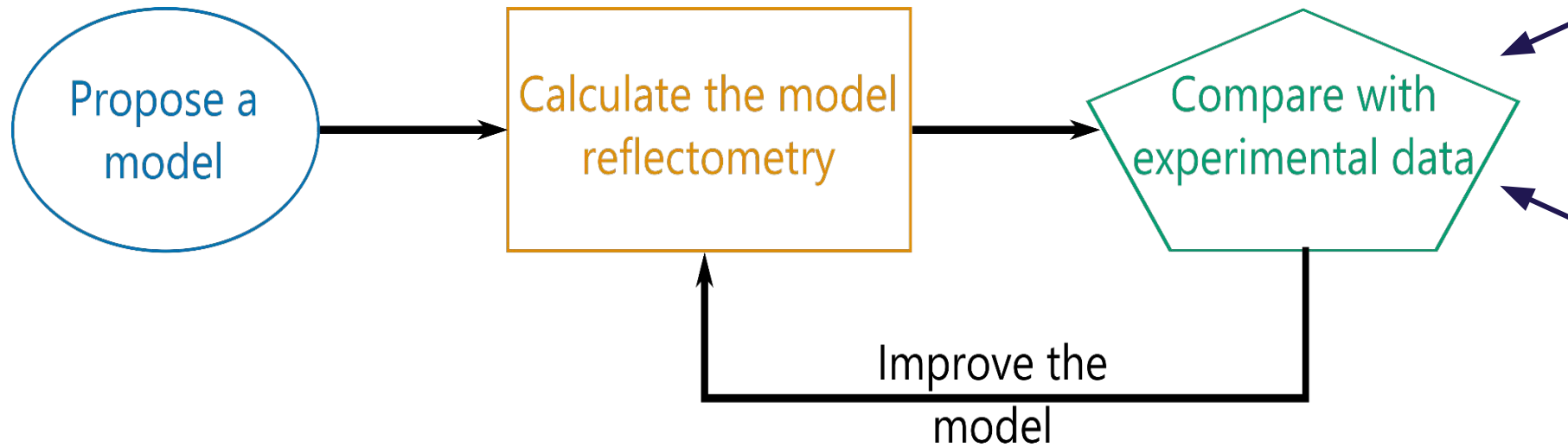
A selection of projects outcomes

- using the case study of a reflectometry scientist
- then with a wider perspective for open science across domains



FAIR case study

Reflectometry scientist



source: https://www.reflectometry.org/isis_school/2_model_dependent_analysis/what_is_model_dependent_analysis.html



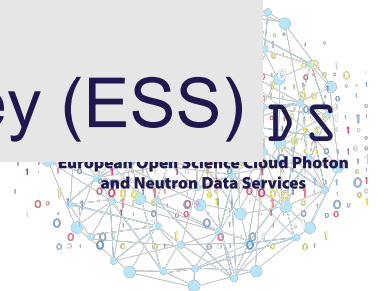
Diamond Light Source, UK



ISIS Neutron and Muon Source, UK

“Starting values of the reflectometry model parameters are a mixture of sample knowledge, published results and trial and error.”

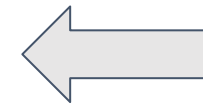
- Andrew McCluskey (ESS)



FAIR case study

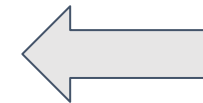
How to access relevant published results

1. Access to PaN databases



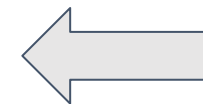
federated access to
metadata catalogues

2. Search for reflectometry-related data

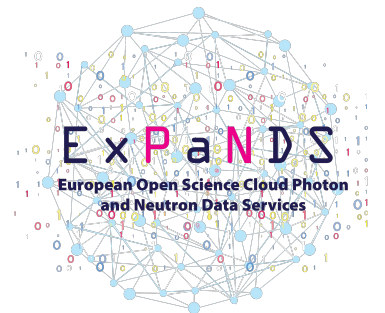


search API +
techniques ontology

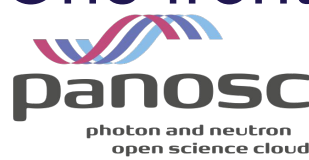
3. Search for specific samples

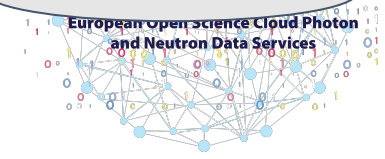
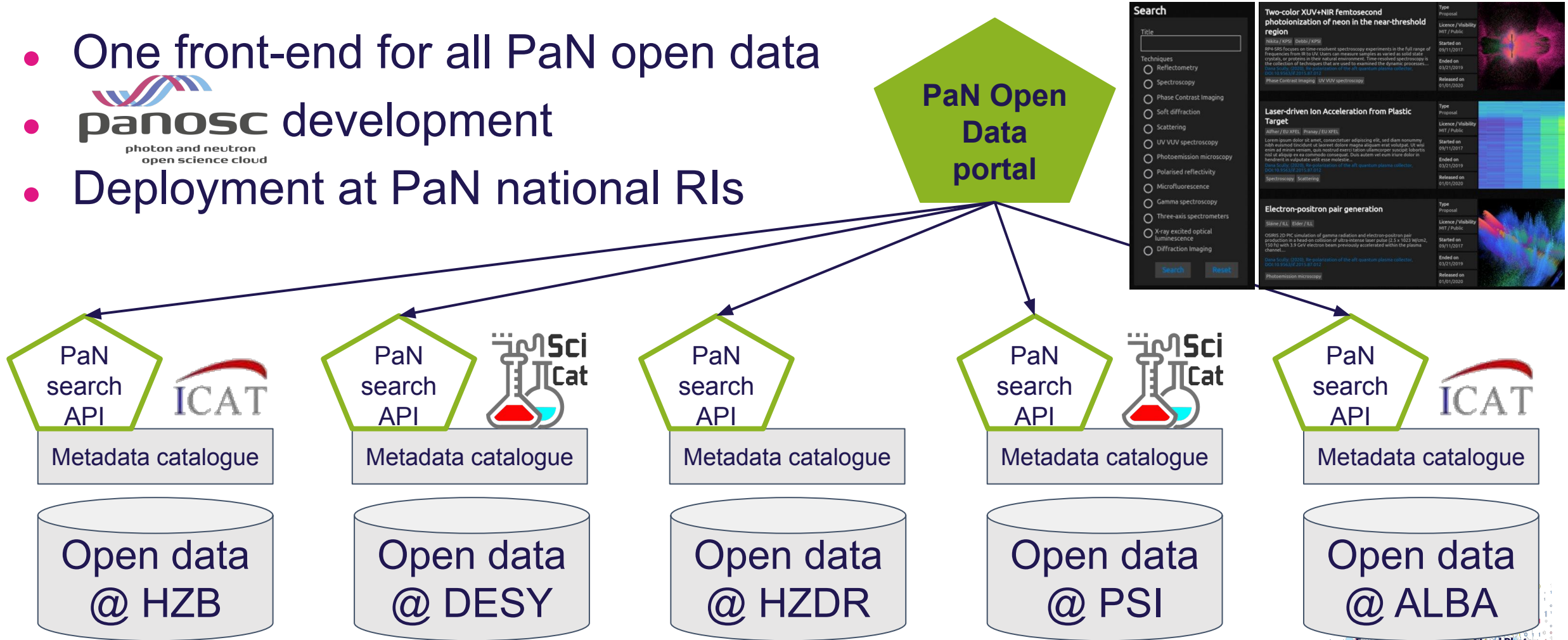


search API + NeXus



1. Access to PaN databases

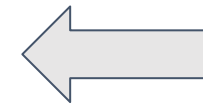
- One front-end for all PaN open data
-  panosc development
photon and neutron open science cloud
- Deployment at PaN national RIs



FAIR case study

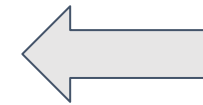
How to access relevant published results

1. Access to PaN databases 



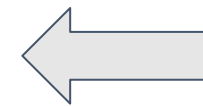
federated access to
metadata catalogues

2. Search for reflectometry-related data

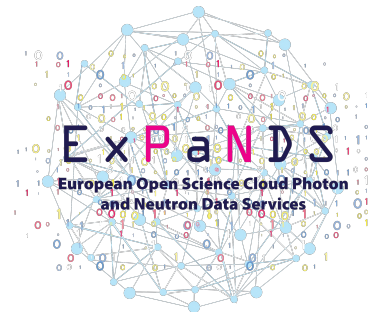


search API +
techniques ontology

3. Search for specific samples



search API + NeXus



2. Search for reflectometry-related data

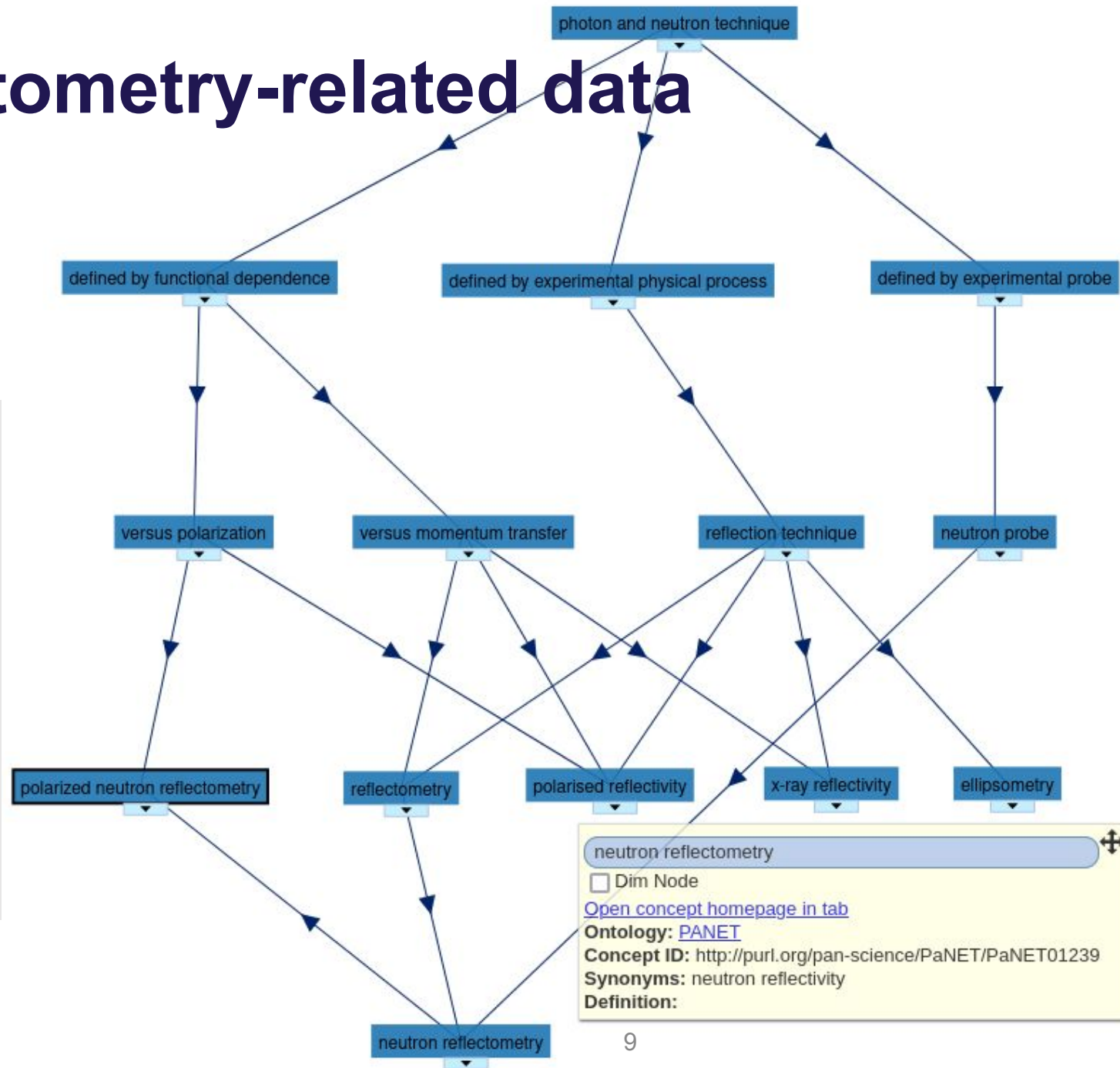
PaN search API

Endpoint: GET /datasets

Filter

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{  
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    {  
      "relation": "techniques",  
      "scope": {  
        "where": {  
          "name": "reflectometry"  
        }  
      }  
    }  
  ]  
}
```

+ enriched by the ontology 🙌



2. Search for reflectometry-related data

PaN techniques ontology (PaNET)

- Hosted in BioPortal
 - Public, REST API
 - Mappings
- Facilitate consistent semantics
- Provides synonyms, references and PIDs
- Has a defined maintenance process

Collins, Steve P. et. al. (2021).
ExPaNDS ontologies v1.0. Zenodo.
<https://doi.org/10.5281/zenodo.4806026>

BioPortal Ontologies Search Annotator Recommender Mappings

PaN Experimental technique
Last uploaded: June 18, 2021

Summary Classes Properties Notes Mappings Widgets

Jump to: Details Visualization Notes (0) Class Mappings (0)

Path to Root

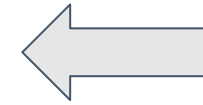
- dataset
- Person
- photon and neutron technique
 - defined by experimental physical process
 - absorption technique
 - absorption and phase contrast nanotomography
 - absorption contrast imaging
 - absorption microtomography
 - absorption spectroscopy
 - absorption tomography
 - linear dichroism
 - magnetic circular dichroism
 - magnetic linear dichroism
 - x-ray magnetic linear dichroism
 - neutron transmission radiography
 - scanning transmission microscopy
 - time dependent absorption
 - x-ray absorption
 - x-ray magnetic circular dichroism
 - x-ray standing wave
 - dispersive technique
 - emission technique
 - force measurement
 - interferometry technique
 - magnetism technique
 - nonlinear interaction
 - propagation technique
 - reflection technique
 - refraction technique
 - resonance phenomenon
 - scattering technique
 - elastic scattering
 - CHMO_0000182
 - diffraction
 - atomic scale diffraction
 - coherent diffraction
 - diffraction imaging
- defined by pi. defined by functional dependence
 - obtain spatial map
 - imaging



FAIR case study

How to access relevant published results

1. Access to PaN databases 



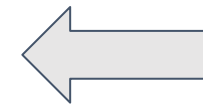
federated access to
metadata catalogues

2. Search for reflectometry-related data 

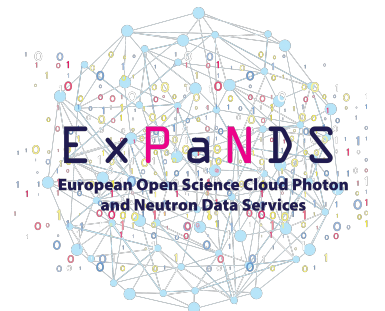


search API +
techniques ontology

3. Search for specific samples



search API + NeXus



3. Search for specific samples

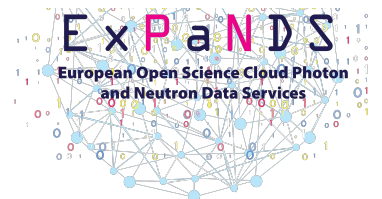
NeXus

Additional filter

```
{
  "include": [
    {
      "relation": "parameters",
      "scope": {
        "where": {
          "and": [
            { "name": "NXsample density" },
            { "value": { "between": [800 - 850] } },
            { "unit": "g/cm^3" }
          ]
        }
      }
    }
  ]
}
```

- Hosted in NIAC GitHub
- Provides single controlled vocabulary of NeXus terms
- Provides relationships and PIDs
- Has a defined maintenance process

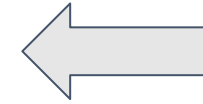
Collins, Steve P. et. al. (2021).
ExPaNDS ontologies v1.0. Zenodo.
<https://doi.org/10.5281/zenodo.4806026>



FAIR case study

How to access relevant published results

1. Access to PaN databases ✓



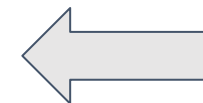
federated access to
metadata catalogues

2. Search for reflectometry-related data ✓



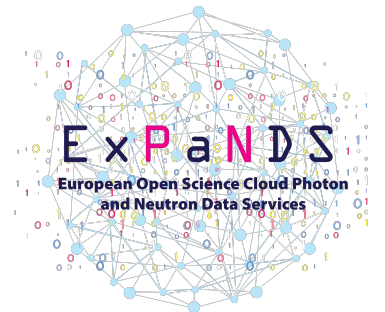
search API +
techniques ontology

3. Search for specific samples ✓



search API + NeXus

BUT this needs time!



Data steward

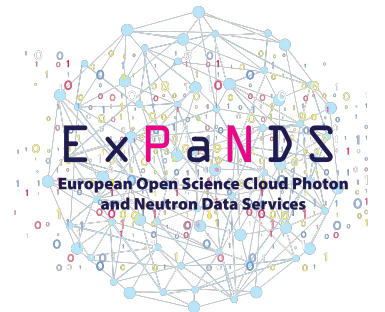
Falling between the cracks of library and domain scientists



Data Steward

"I ensure data usage complies with our policies."

- To make sure the **ontologies**, as bases of our **Nexus rendering** and **catalogue entries** are followed up upon and **regularly updated**;
- The data **policies**, FAIR rules and DMPs are **up to date**;
- **Data handling at the facility** is following the data policies and DMPs;
- Provides regular beamline and dataset **FAIR assessment**;
- Involved in **international groups** on definitions and standards, like RDA, NIAC and national initiatives.



And for the wider scientific communities

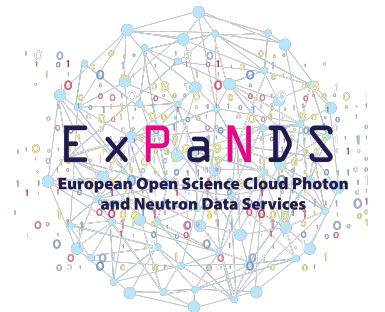
Making our data available in the



**EUROPEAN OPEN
SCIENCE CLOUD**

For researchers who are:

- looking for **machine learning** training datasets
- **aggregating** studies from different domains
- **reproducing** published results (open review)
- ...



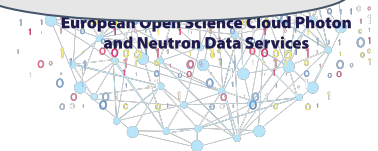
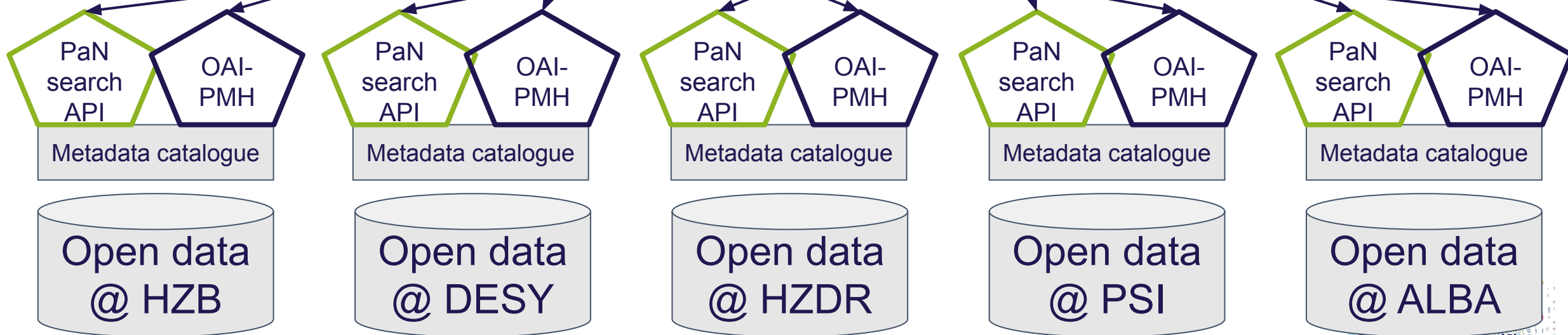
Access to PaN databases For the wider community

Discovery by
non-domain specialists



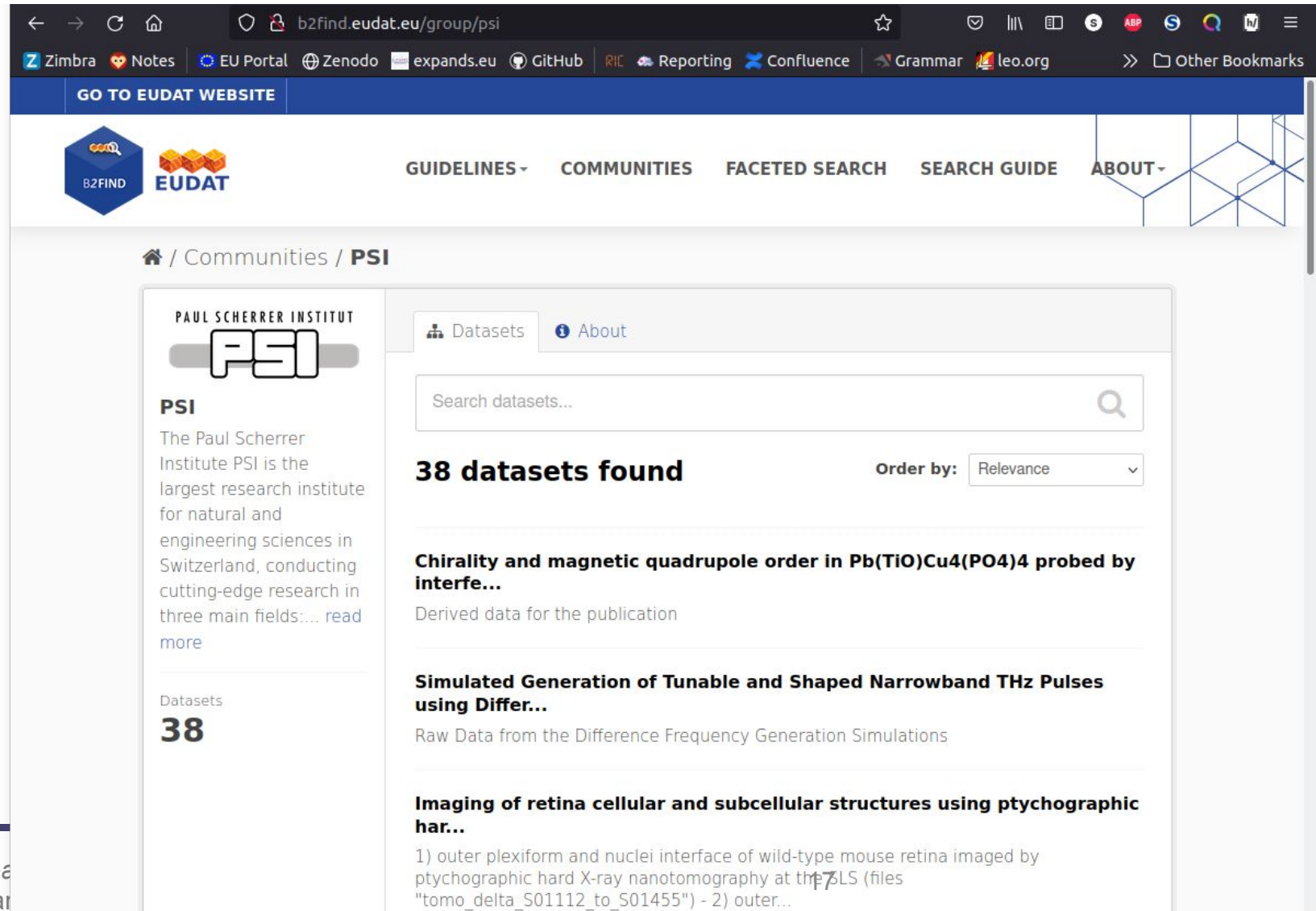
PaN Open
Data
portal

Reuse by domain
specialists



Access to PaN databases For the wider community

- Using standard schemas
 - DataCite (default)
 - DublinCore (minimal)
 - DCAT
- and OAI-PMH



The screenshot shows a web browser window with the URL `b2find.eudat.eu/group/psi`. The browser's address bar and bookmarks are visible at the top. The website header includes a navigation menu with links for `GUIDELINES`, `COMMUNITIES`, `FACETED SEARCH`, `SEARCH GUIDE`, and `ABOUT`. The main content area displays the profile for the Paul Scherrer Institut (PSI), including its logo and a brief description. A search bar is present, and the results show 38 datasets found, ordered by relevance. The first dataset is titled "Chirality and magnetic quadrupole order in Pb(TiO)Cu4(PO4)4 probed by interfe..." and the second is "Simulated Generation of Tunable and Shaped Narrowband THz Pulses using Differ...".



Access to PaN databases For the wider community

6 verbs: GetRecord, Identify,
ListIdentifiers, ListMetadataFormats,
ListRecords and ListSets invoked within
http

Example of record available via
OAI-PMH from RODARE@HZDR:

https://rodare.hzdr.de/oai2d?verb=ListRecords&metadataPrefix=oai_dc

OAI Record: oai:rodare.hzdr.de:990

OAI Record Header

OAI Identifier	oai:rodare.hzdr.de:990	oai_dc	formats
Datestamp	2021-05-25T12:06:31Z		
setSpec	openaire_data	Identifiers	Records
setSpec	openaire_data	Identifiers	Records
setSpec	user-rodare	Identifiers	Records

Dublin Core Metadata (oai_dc)

Author or Creator	Singh, Abhishek
Author or Creator	Li, Jiang
Author or Creator	Pashkin, Oleksiy
Author or Creator	Rana, Rakesh
Author or Creator	Winnerl, Stephan
Author or Creator	Helm, Manfred
Author or Creator	Schneider, Harald
Date	2021-05-21
Description	This is the raw data related to the publication "High-field THz pulses from a GaAs THz power reading from the locking. It is used for Figs. 2(a&b). The file "005-PC are data corresponding to Figs 3(a&b). Plots in Figs. 4(b-d) are also calculated from are data used for THz spot diameter calculation.
Resource Identifier	https://rodare.hzdr.de/record/990
Resource Identifier	10.14278/rodare.990
Resource Identifier	oai:rodare.hzdr.de:990
Language	eng
Relation	url:https://www.hzdr.de/publications/Publ-32657
Relation	url:https://www.hzdr.de/publications/Publ-32614
Relation	doi:10.14278/rodare.989
Relation	url:https://rodare.hzdr.de/communities/rodare
Rights Management	info:eu-repo/semantics/openAccess
Rights Management	https://creativecommons.org/licenses/by/4.0/legalcode
Subject and Keywords	Terahertz emitter, Photoconductive THz emitter, Nonlinear THz effects
Title	High-field THz pulses from a GaAs photoconductive emitter for non-linear THz s
Resource Type	info:eu-repo/semantics/other
Resource Type	dataset



PaN-training.eu

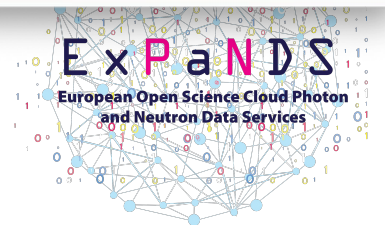
Central platform for PaN teaching and learning:

- create / store courses
- collect existing material
- link \neq resources

Reusing successful open source projects:

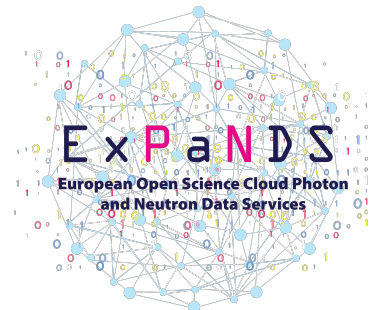
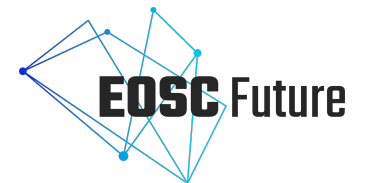
- Elixir's TeSS
- SINE2020 e-neutrons

The screenshot shows the PaN-training.eu website. At the top, there is a navigation bar with 'Catalogue', 'E-learning', 'Events', and 'About'. The main header features the 'Photon and Neutron Training' logo and a search bar. Below the header, there are four main sections: 'Materials' (Find documents, videos and git repos), 'Events' (Browse events provided by our community), 'Workflows' (Guided processes for specific scientific management), and 'Providers' (Browse by the Institute providing content). A central banner for 'E-Learning Courses' highlights 'Online interactive courses on the theory of PaN science, along with experimental data reduction and analysis.' Below this, there are two featured content boxes: 'Test material on python' and 'Metadata Catalogue Release'. The footer includes contact information, logos for 'ExPaNDs' and 'panosc', and a statement of support from the European Union's Horizon 2020 research and innovation programme.



Outlooks

- We anticipate **data stewards** will become new standard positions at facilities, between domain scientist and librarian
- **OAI-PMH** and **PaN search API** now integrated as modules in community catalogues ICAT and SciCat
- Work on **ontologies**: a good opportunity for reuse
- **PaN science case** in EOSC-Future: rapid classification of X-ray crystallography images - preparing with prototypes data analysis workflows in EOSC



Photon & Neutron (PaN) science and **Helmholtz**



<https://leaps-initiative.eu/>



<https://www.lens-initiative.org/>



This project receives funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 857641